Appendix C
December 7, 2021

Traffic Impact Study for Southern Shakopee AUAR in Shakopee, MN

Prepared for:
City of Shakopee

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I hereby certify that this 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.

DATE: December 7, 2021

Edward F. Terhaar
License No. 24441

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1.0 Executive Summary

The purpose of this Traffic Impact Study is to evaluate the impacts of proposed residential development located in Shakopee, MN. This study is part of an Alternative Urban Areawide Review (AUAR) encompassing multiple parcels located in the southern part of the city. The project site is generally located on south side of Valley View Road and west of CSAH 83. The proposed project location is currently primarily agricultural land.

Based on discussions with City and County staff, this study examined weekday a.m. and p.m. peak hour traffic impacts of the proposed development at the following intersections:

- Valley View Road/Independence Drive
- Valley View Road/Meadowlark Drive
- Valley View Road/Pembina Lane
- CSAH 83/Valley View Road
- CSAH 83/CSAH 42
- CSAH 17/Wood Duck Trail
- CSAH 17/CSAH 78
- CSAH 83/development access (future only)

The most intense development alternative consists of the following uses:

- 885 single family homes

Access points to the surrounding street system are provided at the following locations:

- Valley View Road/Independence Drive
- Valley View Road/Meadowlark Drive
- Valley View Road/Pembina Lane
- CSAH 83/development access located 1,900 feet south of Valley View Road
- Wood Duck Trail
- Leavitt Woods Lane
- Peace Avenue

For purpose of this study, the development is expected to be completed in 2031.

The conclusions drawn from the information and analyses presented in this report are as follows:

- The proposed development is expected to generate 655 trips during the a.m. peak hour, 876 trips during the p.m. peak hour, and 8,354 trips daily.

- Trips added by the development to the CSAH 83/Valley View Road intersection result in level of service F for the eastbound left turn in the a.m. peak hour and p.m. peak hours and level of service F for the westbound through in the p.m. peak hour.

- The following mitigation measures are recommended at each intersection:
    - Valley View Road/Independence Drive
        - Short term – Restripe southbound right turn lane to a through/right turn lane. Construct south leg to City street standards.
        - Long term – No additional improvements needed.
    - Valley View Road/Meadowlark Drive
        - Short term – Construct south leg to City street standards.
        - Long term – No additional improvements needed.
    - Valley View Road/Pembina Lane
        - Short term – Construct south leg to City street standards.
        - Long term – No additional improvements needed.
    - CSAH 83/Valley View Road
        - Short term – Install traffic signal control.
        - Long term – No additional improvements needed.
    - CSAH 83/CSAH 42
        - Short term – No improvements needed.
        - Long term – No improvements needed.
    - CSAH 17/Wood Duck Trail
        - Short term – No improvements needed.
        - Long term – No improvements needed.
    - CSAH 17/CSAH 78
        - Short term – No improvements needed.
        - Long term – No improvements needed.
    - CSAH 83/development access (future only)
        - Short term – Construct west leg to City street standards.
        - Long term – No additional improvements needed.

2.0 Purpose and Background

The purpose of this Traffic Impact Study is to evaluate the impacts of proposed residential development located in Shakopee, MN. This study is part of an Alternative Urban Areawide Review (AUAR) encompassing multiple parcels located in the southern part of the city. The project site is generally located on south side of Valley View Road and west of CSAH 83. The proposed project location is currently primarily agricultural land. The project location is shown in **Figure 1**.

Based on discussions with City and County staff, this study examined weekday a.m. and p.m. peak hour traffic impacts of the proposed development at the following intersections:

- Valley View Road/Independence Drive
- Valley View Road/Meadowlark Lane
- Valley View Road/Pembina Lane
- CSAH 83/Valley View Road
- CSAH 83/CSAH 42
- CSAH 17/Wood Duck Trail
- CSAH 17/CSAH 78
- CSAH 83/development access (future only)

Proposed Development Characteristics

The most intense development alternative consists of the following uses:

- 885 single family homes

Access points to the surrounding street system are provided at the following locations:

- Valley View Road/Independence Drive
- Valley View Road/Meadowlark Lane
- Valley View Road/Pembina Lane
- CSAH 83/development access located 1,900 feet south of Valley View Road
- Wood Duck Trail
- Leavitt Woods Lane
- Peace Avenue

For purpose of this study, the development is expected to be completed in 2031. The proposed development plan is shown in **Figure 2**.

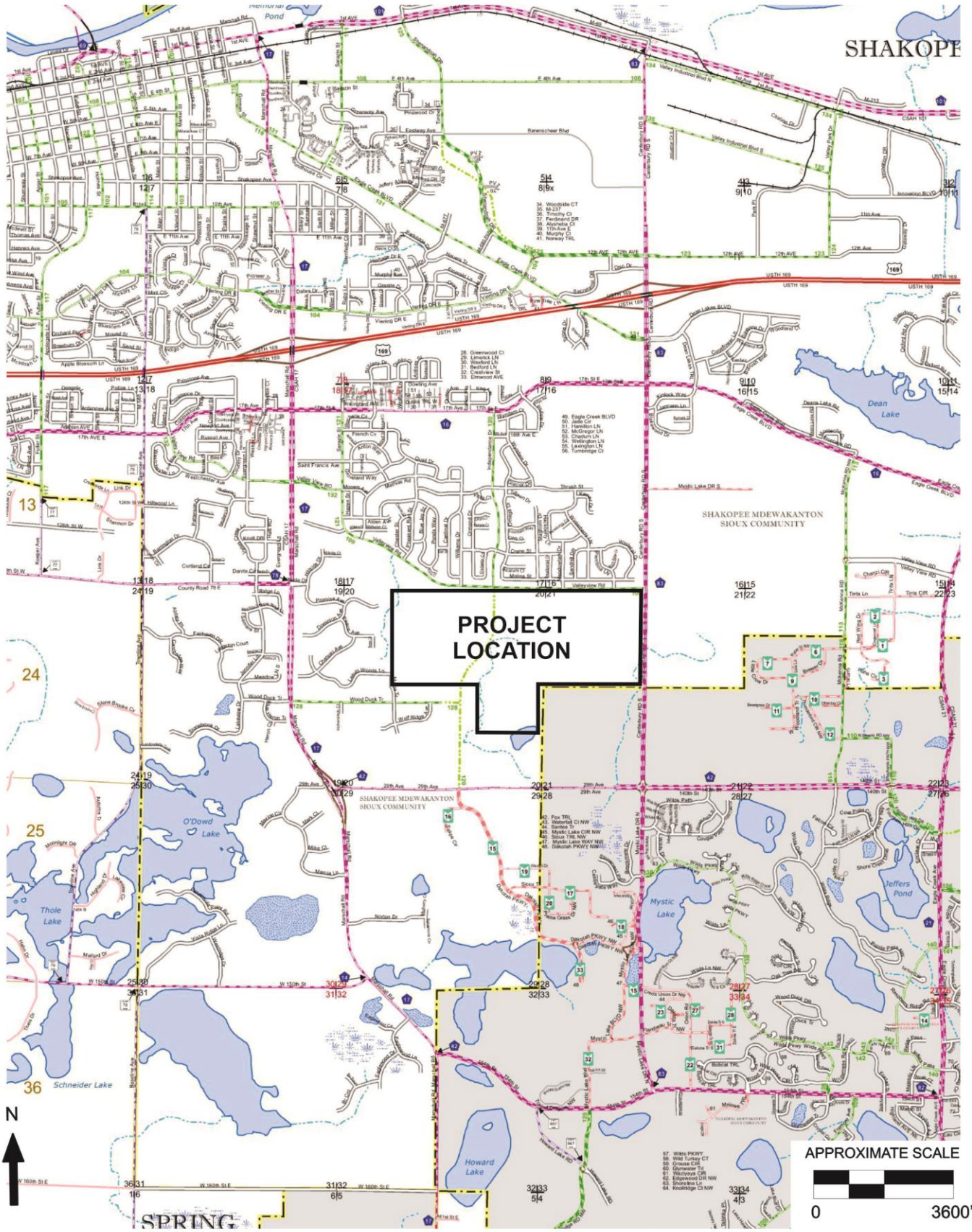

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FIGURE 1

PROJECT LOCATION

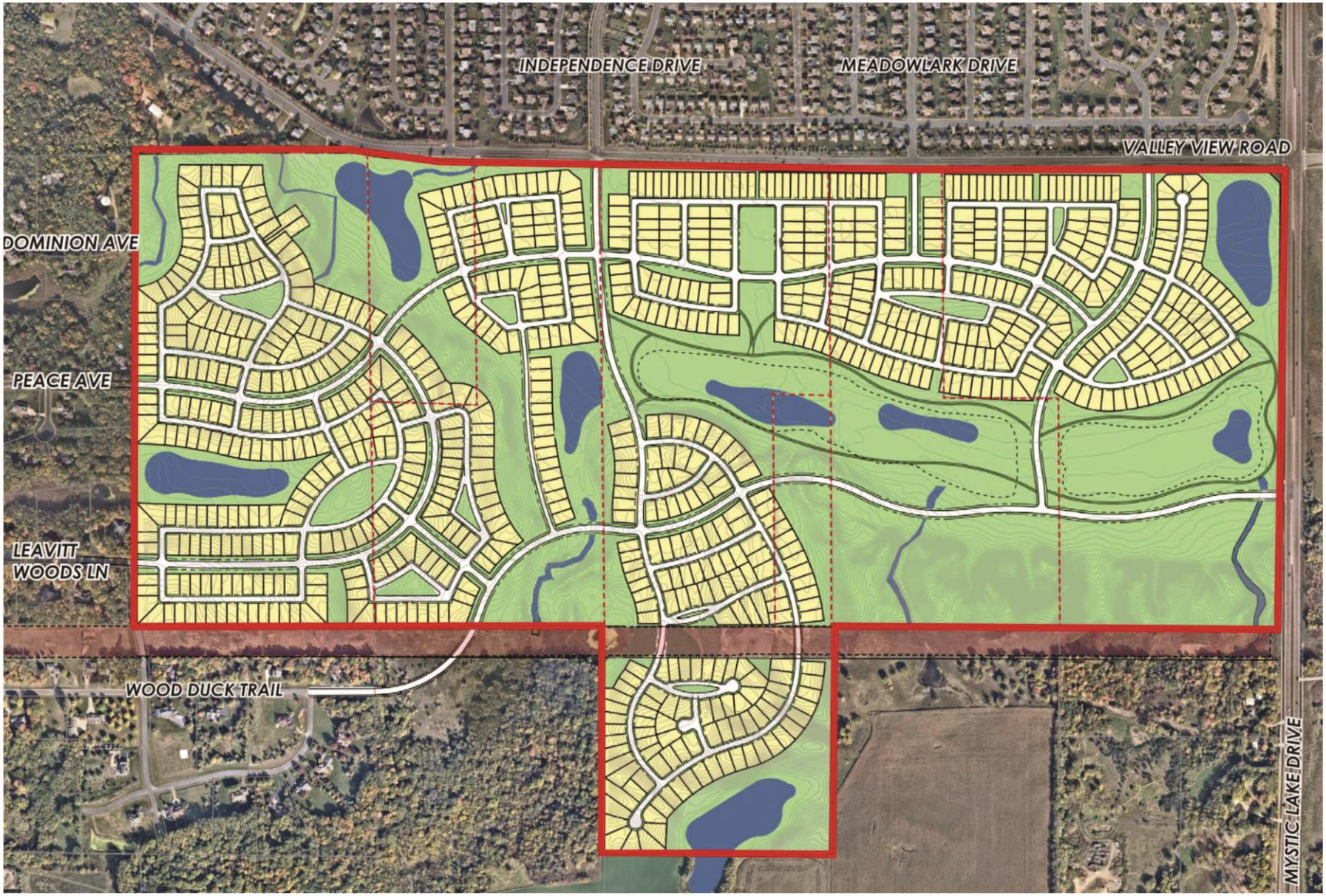

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FIGURE 2

DEVELOPMENT PLAN

3.0 Existing Conditions

The proposed project site is currently primarily agricultural land. The site is bounded by Valley View Road on the north, CSAH 83 on the east, existing residential development on the west, and undeveloped land on the south.

Near the site location, CSAH 83, CSAH 42, and CSAH 17 are four lane divided roadways with turn lanes and traffic signal control at major intersections. Valley View Road and Independence Drive are two-lane urban collector roadways. Meadowlark Drive, Pembina Lane, Wood Duck Trail, Leavitt Woods Lane, and Peace Avenue are local two-lane roadways.

Existing conditions near the proposed project location are shown in **Figure 3** and described below.

Valley View Road/Independence Drive

This four-way intersection is controlled with stop signs on the northbound and southbound approaches. The eastbound, westbound, and northbound approaches provide one shared left turn/through/right turn lane. The southbound approach provides one left turn lane and one right turn lane. The south leg of the intersection serves as driveway access for a private residence.

Valley View Road/Meadowlark Drive

This three-way intersection is controlled with a stop sign on the southbound Meadowlark Lane approach. The southbound approach provides one shared left turn/right turn lane. The eastbound approach provides one shared left turn/through lane. The westbound approach provides one shared through/right turn lane.

Valley View Road/Pembina Lane

This three-way intersection is controlled with a stop sign on the southbound Pembina Lane approach. The southbound approach provides one shared left turn/right turn lane. The eastbound approach provides one shared left turn/through lane. The westbound approach provides one shared through/right turn lane.

CSAH 83/Valley View Road

This four-way intersection is controlled with stop signs on the eastbound and westbound approaches. The northbound and southbound approaches provide one left turn lane, two through lanes, and one right turn lane. The eastbound approach provides one left turn lane and one through/right turn lane. The westbound approach provides one left turn lane, one through lane, and one right turn lane.

CSAH 83/CSAH 42

This four-way intersection is controlled with a traffic signal. The northbound, southbound, and eastbound approaches provide one left turn lane, two through lanes, and one right turn lane. The westbound approach provides two left turn lanes, two through lanes, and one right turn lane.

CSAH 17/Wood Duck Trail

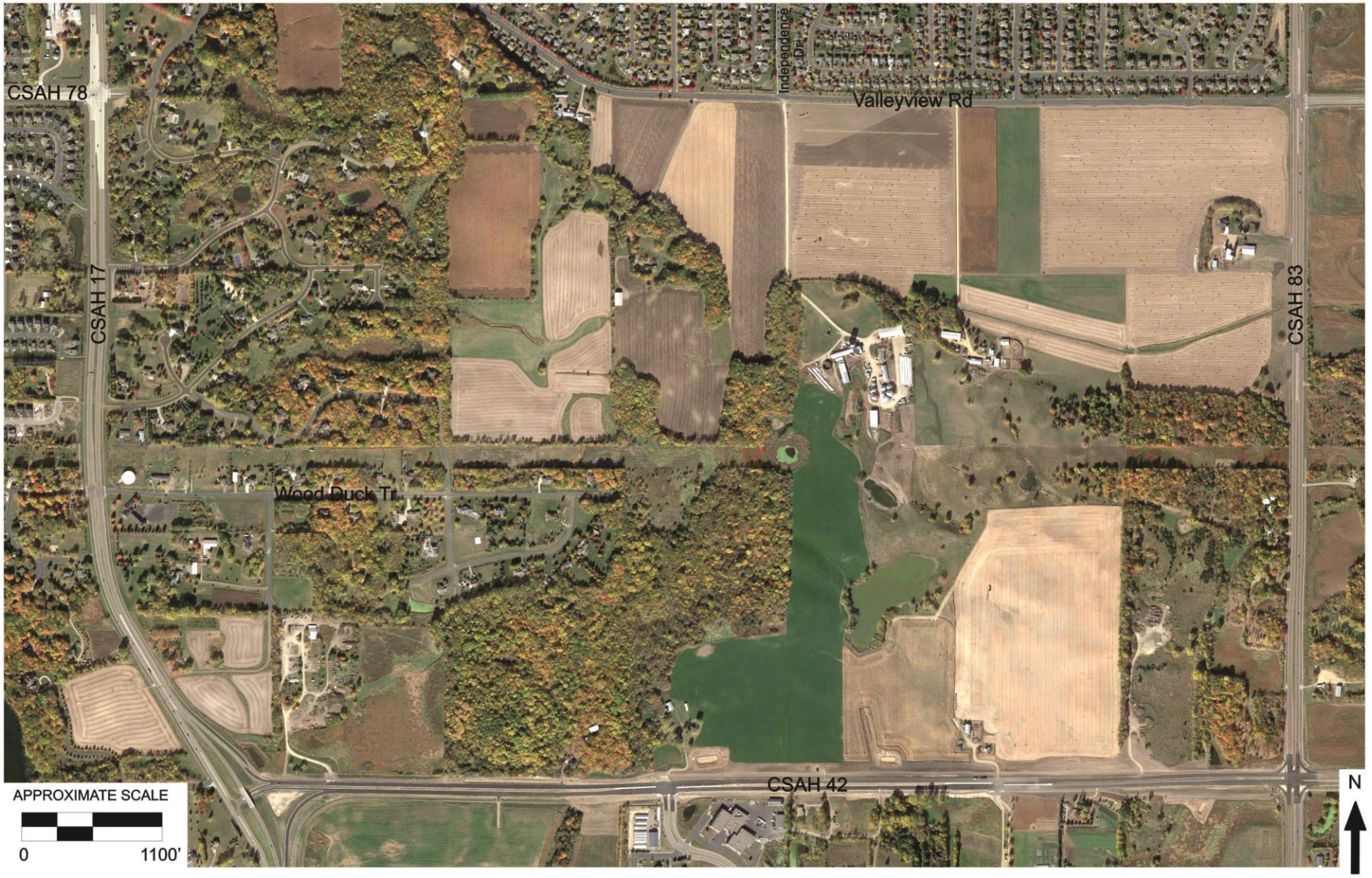
This four-way intersection is controlled with stop signs on the eastbound and westbound approaches. The northbound and southbound approaches provide one left turn lane, two through lanes, and one right turn lane. The eastbound and westbound approaches provide one shared left turn/through/right turn lane.

CSAH 17/CSAH 78

This four-way intersection is controlled with a traffic signal. The northbound approach provides two left turn lanes, two through lanes, and one right turn lane. The southbound approach provides one left turn lane, two through lanes, and one right turn lane. The eastbound approach provides one left turn lane, one left turn/through lane, and one right turn lane. The westbound approach provides one left turn lane, one through lane, and one right turn lane.

Traffic Volume Data

Weekday traffic volume data was recorded at the existing intersections in August, September, and October, 2021. Existing traffic volume data is presented later in this report.



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IN SHAKOPEE, MN

FIGURE 3

EXISTING CONDITIONS

4.0 Traffic Forecasts

Traffic Forecast Scenarios

To adequately address the impacts of the proposed project, forecasts and analyses were completed for the years 2031 and 2040. Specifically, weekday a.m. and p.m. peak hour traffic forecasts were completed for the following scenarios:

- *2021 Existing*. Existing volumes were determined through traffic counts at the subject intersections. The existing volume information includes trips generated by the uses near the project site.

- *2031 No-Build*. Existing volumes at the subject intersections were increased using background growth rates as described in the next section to determine 2031 No-Build volumes. In addition, trips generated by the nearby Valley Crest residential development were included in the No-Build volumes.

- *2031 Build*. Trips generated by the proposed development were added to the 2031 No-Build volumes to determine 2031 Build volumes.

- *2040 No-Build*. Existing volumes at the subject intersections were increased using background growth rates as described in the next section to determine 2040 No-Build volumes. In addition, trips generated by the nearby Valley Crest residential development were included in the No-Build volumes.

- *2040 Build*. Trips generated by the proposed development were added to the 2040 No-Build volumes to determine 2040 Build volumes.

Background Growth Rates

Year 2040 traffic forecasts presented in the City of Shakopee 2040 Comprehensive Plan were used to determine background growth rates for the subject intersections. The following growth rates were determined for each roadway:

- Valley View Road, Independence Drive, Meadowlark Drive, Pembina Lane, Wood Duck Trail, and Hillside Drive – 0.7% per year
- CSAH 83 – 1.5% per year
- CSAH 42 – 3.2% per year
- CSAH 17 – 2.5% per year

Nearby Development

Trips generated by the nearby Valley Crest residential development were included in the traffic forecasts. The Valley Crest development consists of 173 single family homes located on the west side of CSAH 83 at Thrush Street.

The expected development trips were calculated based on data presented in Trip Generation, Tenth Edition, published by the Institute of Transportation Engineers. These calculations represent total trips that will be generated by the proposed development. The resultant trip generation estimates are shown in **Table 4-1**.

Table 4-1
Weekday Trip Generation for Valley Crest Development

Land Use	Size	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily
		In	Out	Total	In	Out	Total	Total
Single family homes	173 DU	32	96	128	108	63	171	1633

Notes: DU=dwelling units

Trip Generation for Proposed Project

The expected new development trips were calculated based on data presented in Trip Generation, Tenth Edition, published by the Institute of Transportation Engineers. These calculations represent total trips that will be generated by the proposed development. The resultant trip generation estimates are shown in **Table 4-2**.

Table 4-2
Weekday Trip Generation for Proposed Project

Land Use	Size	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily
		In	Out	Total	In	Out	Total	Total
Single family homes	885	164	491	655	552	324	876	8354

Notes: DU=dwelling units

Trip Distribution Percentages

Trip distribution percentages for the subject development trips were established based on the nearby roadway network, existing and expected future traffic patterns, and location of the subject development in relation to major attractions and population concentrations.

The distribution percentages for trips generated by the proposed development are described below and shown in **Figure 4**:

- 45 percent to/from the north on CSAH 83
- 15 percent to/from the east on CSAH 42
- 5 percent to/from the south on CSAH 83
- 5 percent to/from the south on CSAH 17
- 5 percent to/from the west on CSAH 78
- 20 percent to/from the north on CSAH 17
- 5 percent to/from the north on Independence Drive

Traffic Volumes

Development trips from Table 4-2 were assigned to the surrounding roadway network using the preceding trip distribution percentages. Traffic volumes were established for all the forecasting scenarios described earlier during the weekday a.m. and p.m. peak hours. The resultant peak hour volumes are shown in **Figures 5 and 6**.

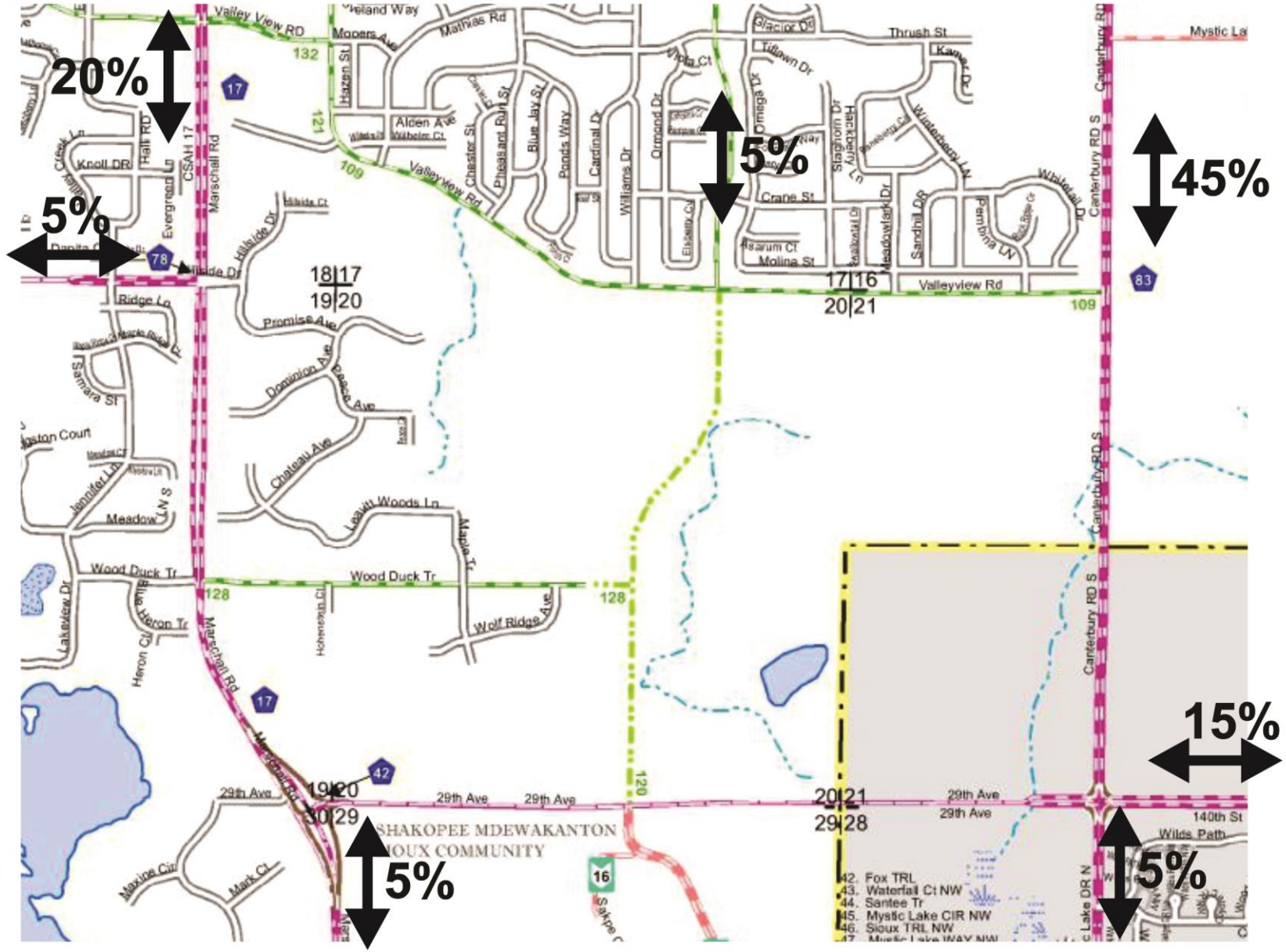

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FIGURE 4

TRIP DISTRIBUTION PERCENTAGES

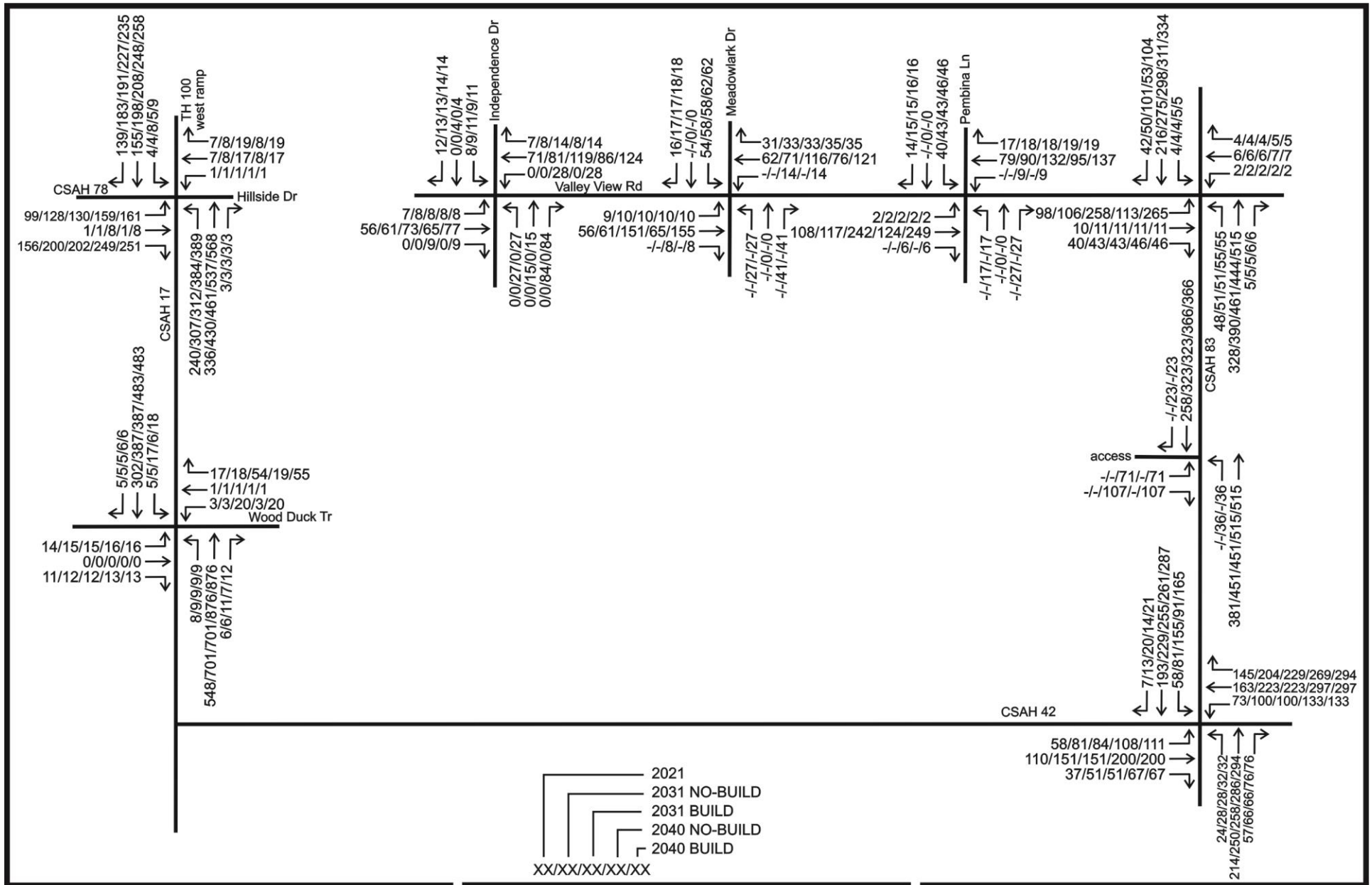

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FIGURE 5

WEEKDAY A.M. PEAK HOUR TRAFFIC VOLUMES

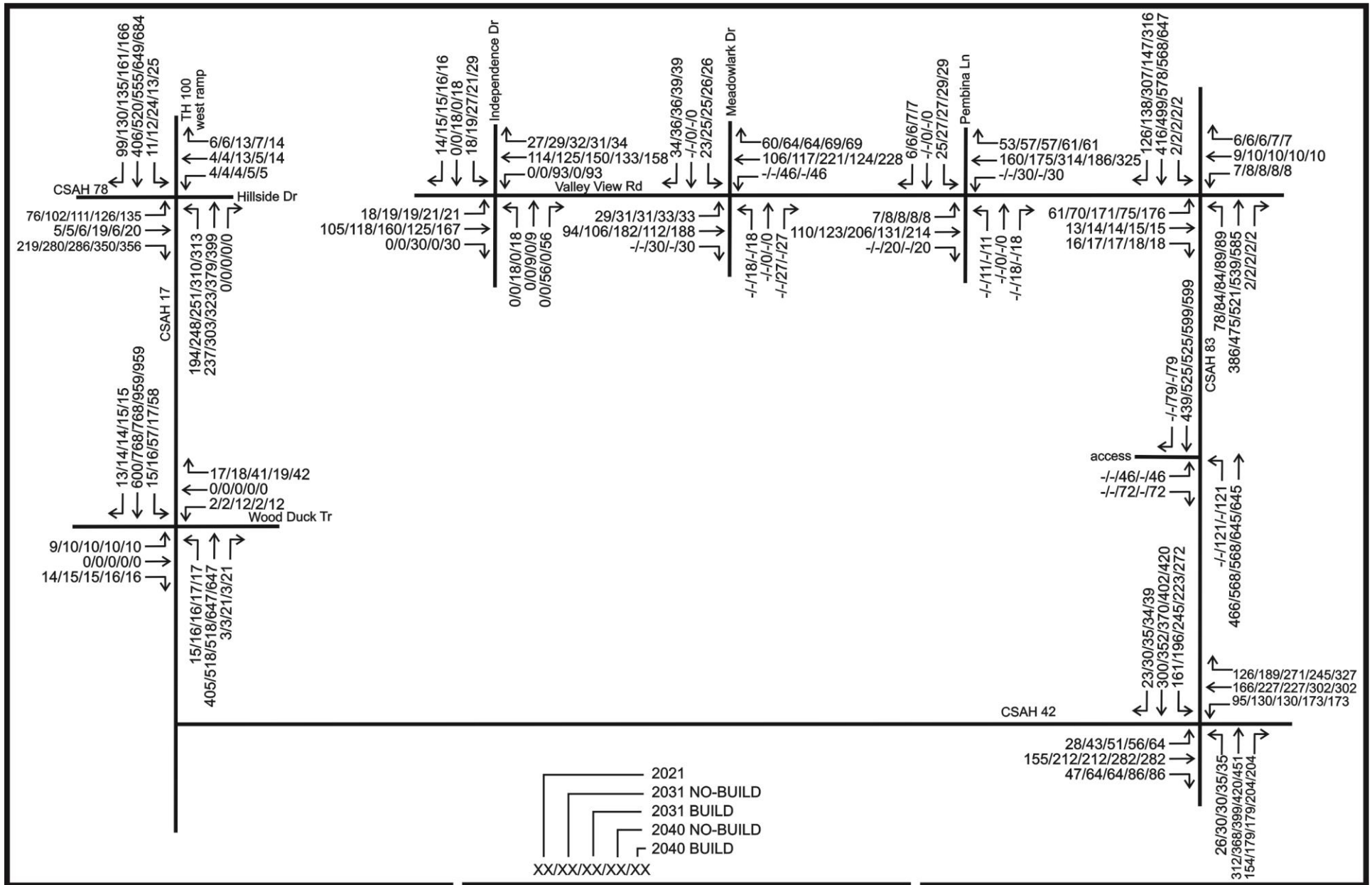

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FIGURE 6

WEEKDAY P.M. PEAK HOUR TRAFFIC VOLUMES

5.0 Traffic Analysis

Intersection Level of Service Analysis

Traffic analyses were completed for the subject intersections for all scenarios described earlier during the weekday a.m. and p.m. peak hours using Synchro software. Initial analysis was completed using existing geometrics and intersection control.

Capacity analysis results are presented in terms of level of service (LOS), which is defined in terms of traffic delay at the intersection. LOS ranges from A to F. LOS A represents the best intersection operation, with little delay for each vehicle using the intersection. LOS F represents the worst intersection operation with excessive delay. The following is a detailed description of the conditions described by each LOS designation:

- Level of service A corresponds to a free flow condition with motorists virtually unaffected by the intersection control mechanism. For a signalized or an unsignalized intersection, the average delay per vehicle would be approximately 10 seconds or less.

- Level of service B represents stable flow with a high degree of freedom, but with some influence from the intersection control device and the traffic volumes. For a signalized intersection, the average delay ranges from 10 to 20 seconds. An unsignalized intersection would have delays ranging from 10 to 15 seconds for this level.

- Level of service C depicts a restricted flow which remains stable, but with significant influence from the intersection control device and the traffic volumes. The general level of comfort and convenience changes noticeably at this level. The delay ranges from 20 to 35 seconds for a signalized intersection and from 15 to 25 seconds for an unsignalized intersection at this level.

- Level of service D corresponds to high-density flow in which speed and freedom are significantly restricted. Though traffic flow remains stable, reductions in comfort and convenience are experienced. The control delay for this level is 35 to 55 seconds for a signalized intersection and 25 to 35 seconds for an unsignalized intersection.

- Level of service E represents unstable flow of traffic at or near the capacity of the intersection with poor levels of comfort and convenience. The delay ranges from 55 to 80 seconds for a signalized intersection and from 35 to 50 seconds for an unsignalized intersection at this level.

- Level of service F represents forced flow in which the volume of traffic approaching the intersection exceeds the volume that can be served. Characteristics often experienced include long queues, stop-and-go waves, poor travel times, low comfort and convenience, and increased accident exposure. Delays over 80 seconds for a signalized intersection and over 50 seconds for an unsignalized intersection correspond to this level of service.

The LOS and queuing results for the study intersections are shown in **Figures 7 and 8** and are discussed below.

2021 Existing

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
Valley View Rd/Independence Dr	NB/SB stop	A/A	A/B
Valley View Rd/Meadowlark Dr	SB stop	A/A	A/B
Valley View Rd/Pembina Ln	SB stop	A/A	A/B
CSAH 83/Valley View Rd	EB/WB stop	A/C	A/D
CSAH 83/CSAH 42	Signal	B/B	B/B
CSAH 17/Wood Duck Tr	EB/WB stop	A/B	A/C
CSAH 17/CSAH 78	Signal	A/C	A/C

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS D or better during the a.m. and p.m. peak hours.

Critical Movement 95th Percentile Queue Lengths (in feet)

Intersection	Eastbound left turn			Westbound left turn			Northbound left turn			Southbound left turn		
	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue
Valley View Rd/ Independence Dr	n/a	0	0	n/a	0	0	n/a	0	0	325	0	3
Valley View Rd/ Meadowlark Dr	n/a	0	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	8
Valley View Rd/ Pembina Ln	n/a	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5	5
CSAH 83/ Valley View Rd	300	28	28	300	0	3	300	3	8	280	0	0
CSAH 83/CSAH 42	475	32	22	300	18	26	475	17	15	475	31	63
CSAH 17/ Wood Duck Tr	n/a	5	5	n/a	3	3	250	0	3	265	0	0
CSAH 17/CSAH 78	430	50	43	125	7	10	320	11	35	320	1	9

All queue lengths are contained within the available queueing space.

2031 No-Build

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
Valley View Rd/Independence Dr	NB/SB stop	A/B	A/B
Valley View Rd/Meadowlark Dr	SB stop	A/B	A/B
Valley View Rd/Pembina Ln	SB stop	A/B	A/B
CSAH 83/Valley View Rd	EB/WB stop	A/C	A/E
CSAH 83/CSAH 42	Signal	B/B	B/B
CSAH 17/Wood Duck Tr	EB/WB stop	A/C	A/C
CSAH 17/CSAH 78	Signal	A/C	A/C

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

The eastbound left turn movement at CSAH 83/Valley View Rd operates at LOS E during the p.m. peak hour. All other movements and intersections operate at LOS C or better during the a.m. and p.m. peak hours.

Critical Movement 95th Percentile Queue Lengths (in feet)

Intersection	Eastbound left turn			Westbound left turn			Northbound left turn			Southbound left turn		
	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue
Valley View Rd/ Independence Dr	n/a	0	0	n/a	0	0	n/a	0	0	325	0	3
Valley View Rd/ Meadowlark Dr	n/a	0	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	8
Valley View Rd/ Pembina Ln	n/a	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8	5
CSAH 83/ Valley View Rd	300	40	48	300	0	3	300	3	8	280	0	0
CSAH 83/CSAH 42	475	44	33	300	25	37	475	20	18	475	44	82
CSAH 17/ Wood Duck Tr	n/a	8	10	n/a	5	3	250	0	3	265	0	3
CSAH 17/CSAH 78	430	63	53	125	5	10	320	57	47	320	5	10

All queue lengths are contained within the available queueing space.

2031 Build

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
Valley View Rd/Independence Dr	NB/SB stop	A/B	A/C
Valley View Rd/Meadowlark Dr	SB stop	A/B	A/B
Valley View Rd/Pembina Ln	SB stop	A/B	A/C
CSAH 83/Valley View Rd	EB/WB stop	C/F	D/F
CSAH 83/CSAH 42	Signal	B/B	B/B
CSAH 17/Wood Duck Tr	EB/WB stop	A/C	A/C
CSAH 17/CSAH 78	Signal	B/C	B/C
CSAH 83/development access	EB stop	A/C	A/E

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

The eastbound left turn movement at CSAH 83/Valley View Rd operates at LOS F during the a.m. and p.m. peak hours. The eastbound left turn movement at CSAH 83/development access operates at LOS E during the p.m. peak hour. All other movements and intersections operate at LOS C or better during the a.m. and p.m. peak hours.

Critical Movement 95th Percentile Queue Lengths (in feet)

Intersection	Eastbound left turn			Westbound left turn			Northbound left turn			Southbound left turn		
	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue
Valley View Rd/ Independence Dr	n/a	0	3	n/a	3	8	n/a	23	15	325	3	10
Valley View Rd/ Meadowlark Dr	n/a	0	3	n/a	0	3	n/a	10	8	n/a	15	13
Valley View Rd/ Pembina Ln	n/a	0	0	n/a	0	3	n/a	5	5	n/a	10	10
CSAH 83/ Valley View Rd	300	245	285	300	0	5	300	5	10	280	0	0
CSAH 83/CSAH 42	475	51	39	300	27	39	475	20	18	475	77	102
CSAH 17/ Wood Duck Tr	n/a	8	10	n/a	20	15	250	0	3	265	3	5
CSAH 17/CSAH 78	430	67	63	125	5	10	320	60	49	320	8	17
CSAH 83/ development access	300	20	30	n/a	n/a	n/a	300	3	13	300	n/a	n/a

All queue lengths are contained within the available queueing space.

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2040 No-Build

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
Valley View Rd/Independence Dr	NB/SB stop	A/B	A/B
Valley View Rd/Meadowlark Dr	SB stop	A/B	A/B
Valley View Rd/Pembina Ln	SB stop	A/B	A/B
CSAH 83/Valley View Rd	EB/WB stop	A/D	A/F
CSAH 83/CSAH 42	Signal	B/B	B/B
CSAH 17/Wood Duck Tr	EB/WB stop	A/C	A/D
CSAH 17/CSAH 78	Signal	A/C	A/C

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

The eastbound left turn movement and the westbound through movement at CSAH 83/Valley View Rd operates at LOS F during the p.m. peak hour. All other movements and intersections operate at LOS D or better during the a.m. and p.m. peak hours.

Critical Movement 95th Percentile Queue Lengths (in feet)

Intersection	Eastbound left turn			Westbound left turn			Northbound left turn			Southbound left turn		
	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue
Valley View Rd/ Independence Dr	n/a	0	3	n/a	0	0	n/a	0	0	325	3	3
Valley View Rd/ Meadowlark Dr	n/a	0	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	8
Valley View Rd/ Pembina Ln	n/a	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8	5
CSAH 83/ Valley View Rd	300	53	70	300	0	5	300	5	10	280	0	0
CSAH 83/CSAH 42	475	59	42	300	33	51	475	24	21	475	54	98
CSAH 17/ Wood Duck Tr	n/a	10	15	n/a	5	5	250	0	3	265	0	3
CSAH 17/CSAH 78	430	74	63	125	5	12	320	74	62	320	6	11

All queue lengths are contained within the available queueing space.

2040 Build

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
Valley View Rd/Independence Dr	NB/SB stop	A/B	A/C
Valley View Rd/Meadowlark Dr	SB stop	A/B	A/B
Valley View Rd/Pembina Ln	SB stop	A/B	A/C
CSAH 83/Valley View Rd	EB/WB stop	D/F	E/F
CSAH 83/CSAH 42	Signal	B/B	B/B
CSAH 17/Wood Duck Tr	EB/WB stop	A/C	A/E
CSAH 17/CSAH 78	Signal	B/C	B/C
CSAH 83/development access	EB stop	A/C	A/E

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

The eastbound left turn movement at CSAH 83/Valley View Rd operates at LOS F during the a.m. and p.m. peak hours. The westbound through movement at CSAH 83/Valley View Rd operates at LOS F during the p.m. peak hour. The eastbound left turn movement at CSAH 83/development access operates at LOS E during the p.m. peak hour. All other movements and intersections operate at LOS C or better during the a.m. and p.m. peak hours.

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Critical Movement 95th Percentile Queue Lengths (in feet)

Intersection	Eastbound left turn			Westbound left turn			Northbound left turn			Southbound left turn		
	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue
Valley View Rd/ Independence Dr	n/a	0	3	n/a	3	8	n/a	25	18	325	3	10
Valley View Rd/ Meadowlark Dr	n/a	0	3	n/a	0	3	n/a	10	8	n/a	18	13
Valley View Rd/ Pembina Ln	n/a	0	0	n/a	0	3	n/a	8	5	n/a	13	10
CSAH 83/ Valley View Rd	300	333	365	300	0	5	300	5	13	280	0	0
CSAH 83/CSAH 42	475	68	48	300	37	52	475	23	22	475	89	124
CSAH 17/ Wood Duck Tr	n/a	13	20	n/a	33	20	250	0	3	265	3	5
CSAH 17/CSAH 78	430	78	71	125	4	12	320	80	65	320	9	18
CSAH 83/ development access	300	23	38	n/a	n/a	n/a	300	3	13	300	n/a	n/a

The eastbound left turn queue at CSAH 83/Valley View Road exceeds the available queuing space by 33 feet in the a.m. peak hour and 65 feet in the p.m. peak hour. All other queue lengths are contained within the available queueing space.

Intersection Operations at CSAH 83/Valley View Road with Traffic Signal Control

A potential mitigation measure for the operational issues shown at the CSAH 83/Valley View Road is traffic signal control. The updated intersection operation results assuming traffic signal control are shown below.

Weekday A.M. and P.M. Peak Hour LOS Results at CSAH 83/Valley View Road with Traffic Signal Control

Scenario	AM Peak Hour LOS	PM Peak Hour LOS
2031 Build	B/B	B/C
2040 Build	B/B	B/C

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All movements and the overall intersection operate at LOS C or better during the a.m. and p.m. peak hours.

Critical Movement 95th Percentile Queue Lengths (in feet) at CSAH 83/Valley View Road with Traffic Signal Control

Scenario	Eastbound left turn			Westbound left turn			Northbound left turn			Southbound left turn		
	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue	Lane length	AM queue	PM queue
2031 Build	300	134	112	300	4	12	300	33	38	280	6	3
2040 Build	300	148	123	300	4	13	300	34	39	280	7	3

All queue lengths are contained within the available queueing space.

Recommended Mitigation

The following mitigation measures are recommended at each intersection:

- Valley View Road/Independence Drive
  - Short term – Restripe southbound right turn lane to a through/right turn lane. Construct south leg to City street standards.
  - Long term – No additional improvements needed.

- Valley View Road/Meadowlark Drive
  - Short term – Construct south leg to City street standards.
  - Long term – No additional improvements needed.

- Valley View Road/Pembina Lane
  - Short term – Construct south leg to City street standards.
  - Long term – No additional improvements needed.

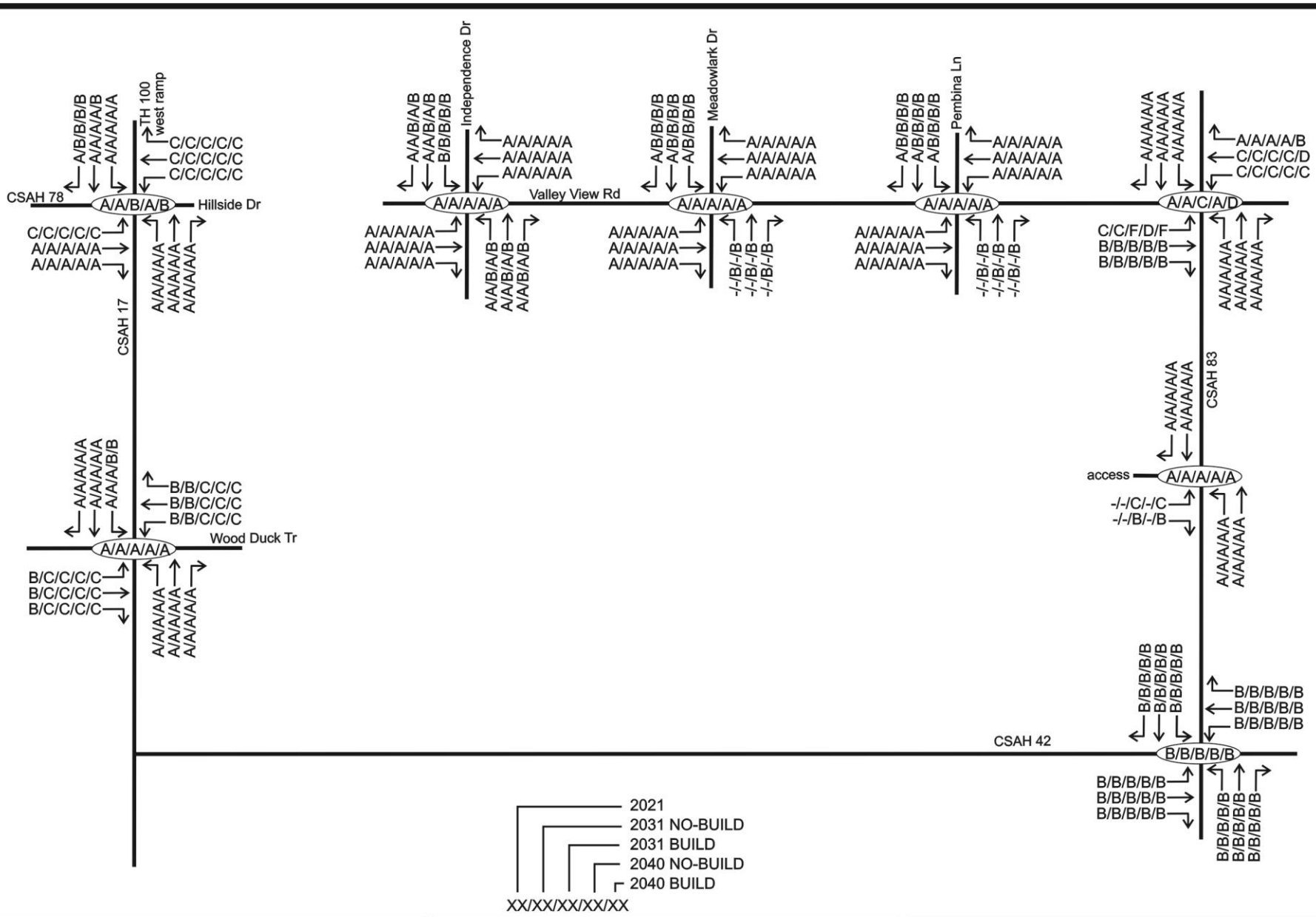
- CSAH 83/Valley View Road
  - Short term – Install traffic signal control.
  - Long term – No additional improvements needed.

- CSAH 83/CSAH 42
  - Short term – No improvements needed.
  - Long term – No improvements needed.

- CSAH 17/Wood Duck Trail
  - Short term – No improvements needed.
  - Long term – No improvements needed.

- CSAH 17/CSAH 78
  - Short term – No improvements needed.
  - Long term – No improvements needed.

- CSAH 83/development access (future only)
  - Short term – Construct west leg to City street standards.
  - Long term – No additional improvements needed.



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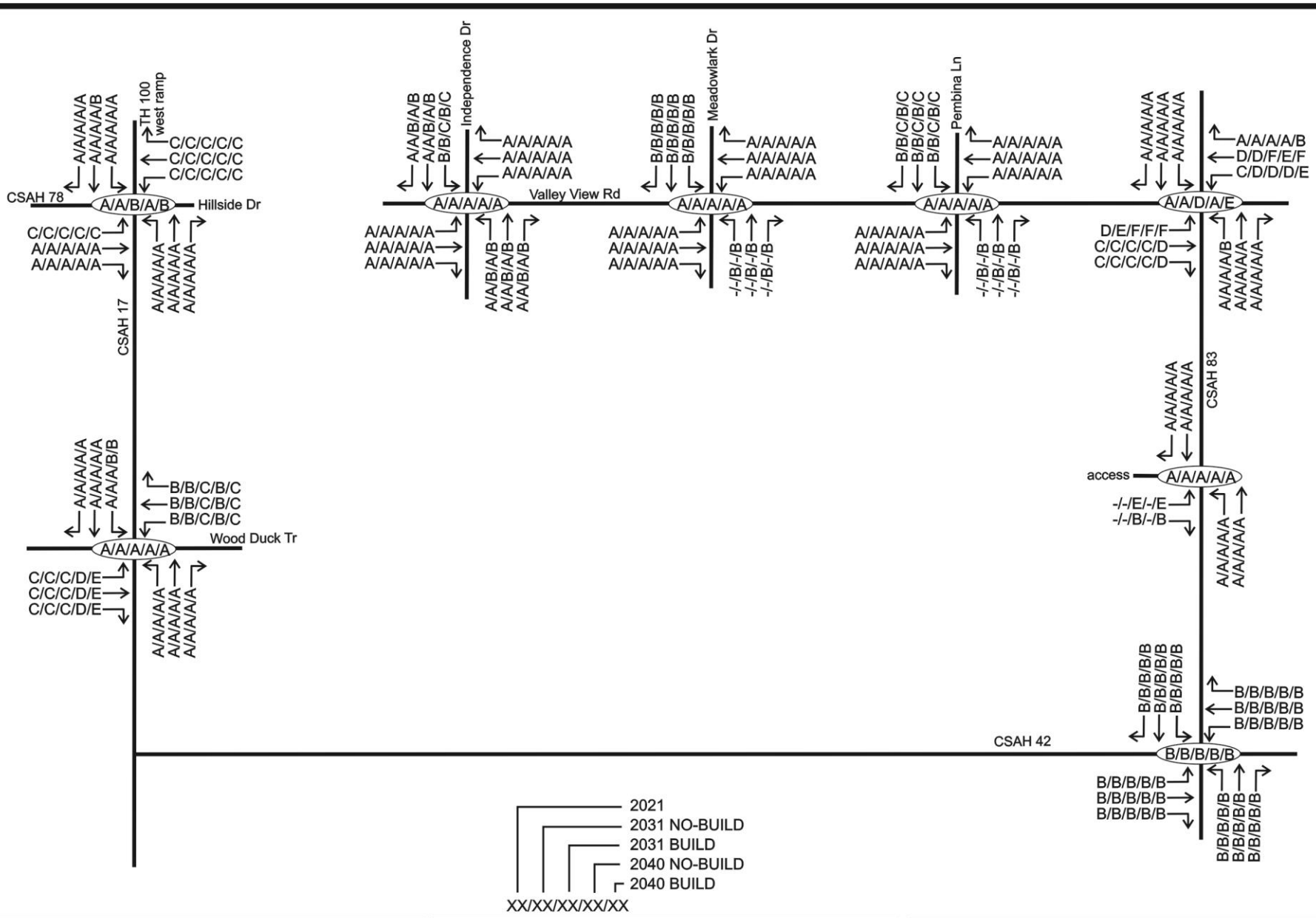
TRAFFIC IMPACT STUDY FOR
SOUTHERN SHAKOPEE AUAR
IN SHAKOPEE, MN

FIGURE 7

WEEKDAY A.M. PEAK HOUR LOS RESULTS



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TRAFFIC IMPACT STUDY FOR
SOUTHERN SHAKOPEE AUAR
IN SHAKOPEE, MN

FIGURE 8

WEEKDAY P.M. PEAK HOUR LOS RESULTS

6.0 Conclusions and Recommendations

The conclusions drawn from the information and analyses presented in this report are as follows:

- The proposed development is expected to generate 655 trips during the a.m. peak hour, 876 trips during the p.m. peak hour, and 8,354 trips daily.

- Trips added by the development to the CSAH 83/Valley View Road intersection result in level of service F for the eastbound left turn in the a.m. peak hour and p.m. peak hours and level of service F for the westbound through in the p.m. peak hour.

- The following mitigation measures are recommended at each intersection:

    - Valley View Road/Independence Drive
        - Short term – Restripe southbound right turn lane to a through/right turn lane. Construct south leg to City street standards.
        - Long term – No additional improvements needed.

    - Valley View Road/Meadowlark Drive
        - Short term – Construct south leg to City street standards.
        - Long term – No additional improvements needed.

    - Valley View Road/Pembina Lane
        - Short term – Construct south leg to City street standards.
        - Long term – No additional improvements needed.

    - CSAH 83/Valley View Road
        - Short term – Install traffic signal control.
        - Long term – No additional improvements needed.

    - CSAH 83/CSAH 42
        - Short term – No improvements needed.
        - Long term – No improvements needed.

    - CSAH 17/Wood Duck Trail
        - Short term – No improvements needed.
        - Long term – No improvements needed.

    - CSAH 17/CSAH 78
        - Short term – No improvements needed.
        - Long term – No improvements needed.

    - CSAH 83/development access (future only)
        - Short term – Construct west leg to City street standards.
        - Long term – No additional improvements needed.

7.0 Appendix

- Level of Service Worksheets

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Traffic Vol, veh/h	7	56	1	0	71	7	0	0	1	8	0	12
Future Vol, veh/h	7	56	1	0	71	7	0	0	1	8	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	70	70	70	70	70	70	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	80	1	0	101	10	0	0	1	11	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	111	0	0	81	0	0	216	212	81	207	207	106
Stage 1	-	-	-	-	-	-	101	101	-	106	106	-
Stage 2	-	-	-	-	-	-	115	111	-	101	101	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1479	-	-	1517	-	-	740	685	979	751	690	948
Stage 1	-	-	-	-	-	-	905	811	-	900	807	-
Stage 2	-	-	-	-	-	-	890	804	-	905	811	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1479	-	-	1517	-	-	723	680	979	746	685	948
Mov Cap-2 Maneuver	-	-	-	-	-	-	723	680	-	746	685	-
Stage 1	-	-	-	-	-	-	899	805	-	894	807	-
Stage 2	-	-	-	-	-	-	874	804	-	897	805	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0	8.7	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	979	1479	-	-	1517	-	-	746	948
HCM Lane V/C Ratio	0.001	0.007	-	-	-	-	-	0.015	0.018
HCM Control Delay (s)	8.7	7.5	0	-	0	-	-	9.9	8.9
HCM Lane LOS	A	A	A	-	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0	0.1

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	56	62	31	54	16
Future Vol, veh/h	9	56	62	31	54	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	71	78	39	68	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	117	0	-	0	191	98
Stage 1	-	-	-	-	98	-
Stage 2	-	-	-	-	93	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1471	-	-	-	798	958
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	931	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1471	-	-	-	792	958
Mov Cap-2 Maneuver	-	-	-	-	792	-
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	931	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1471	-	-	-	825
HCM Lane V/C Ratio	0.008	-	-	-	0.107
HCM Control Delay (s)	7.5	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	108	79	17	40	14
Future Vol, veh/h	2	108	79	17	40	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	123	90	19	45	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	109	0	-	0	227	100
Stage 1	-	-	-	-	100	-
Stage 2	-	-	-	-	127	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1481	-	-	-	761	956
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	899	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1481	-	-	-	760	956
Mov Cap-2 Maneuver	-	-	-	-	760	-
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	899	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1481	-	-	-	803
HCM Lane V/C Ratio	0.002	-	-	-	0.076
HCM Control Delay (s)	7.4	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	98	10	40	2	6	4	48	328	5	4	216	42
Future Vol, veh/h	98	10	40	2	6	4	48	328	5	4	216	42
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	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	109	11	44	2	7	4	53	364	6	4	240	47

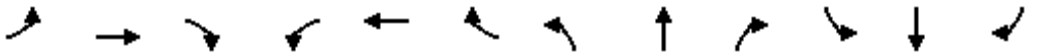
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	540	724	120	604	765	182	287	0	0	370	0	0
Stage 1	248	248	-	470	470	-	-	-	-	-	-	-
Stage 2	292	476	-	134	295	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	425	350	909	382	332	829	1272	-	-	1185	-	-
Stage 1	734	700	-	543	558	-	-	-	-	-	-	-
Stage 2	692	555	-	855	668	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	402	334	909	342	317	829	1272	-	-	1185	-	-
Mov Cap-2 Maneuver	402	334	-	342	317	-	-	-	-	-	-	-
Stage 1	703	698	-	520	535	-	-	-	-	-	-	-
Stage 2	651	532	-	798	666	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	14	1	0.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1272	-	-	402	676	342	317	829	1185	-	-
HCM Lane V/C Ratio	0.042	-	-	0.271	0.082	0.006	0.021	0.005	0.004	-	-
HCM Control Delay (s)	8	-	-	17.2	10.8	15.6	16.6	9.4	8	-	-
HCM Lane LOS	A	-	-	C	B	C	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0.3	0	0.1	0	0	-	-

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	110	37	73	163	145	24	214	57	58	193	7
Future Volume (veh/h)	58	110	37	73	163	145	24	214	57	58	193	7
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	67	128	0	85	190	0	28	249	0	67	224	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	471	517		991	561		445	585		454	710	
Arrive On Green	0.07	0.15	0.00	0.08	0.16	0.00	0.03	0.16	0.00	0.07	0.20	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	67	128	0	85	190	0	28	249	0	67	224	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.0	1.1	0.0	0.7	1.6	0.0	0.4	2.1	0.0	1.0	1.8	0.0
Cycle Q Clear(g_c), s	1.0	1.1	0.0	0.7	1.6	0.0	0.4	2.1	0.0	1.0	1.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	471	517		991	561		445	585		454	710	
V/C Ratio(X)	0.14	0.25		0.09	0.34		0.06	0.43		0.15	0.32	
Avail Cap(c_a), veh/h	854	3352		1485	3139		784	2500		837	2713	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.7	12.6	0.0	10.2	12.5	0.0	10.9	12.5	0.0	10.3	11.4	0.0
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	0.4	0.0	0.1	0.5	0.0	0.1	0.3	0.0
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	0.3	0.4	0.0	0.2	0.5	0.0	0.1	0.7	0.0	0.3	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	12.9	0.0	10.3	12.9	0.0	11.0	13.0	0.0	10.4	11.7	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		195	A		275	A		277	A		291	A
Approach Delay, s/veh		12.2			12.1			12.8			11.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	10.0	7.2	9.4	5.6	11.2	6.8	9.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	23.5	7.5	31.5	7.5	25.5	9.5	29.5
Max Q Clear Time (g_c+I1), s	3.0	4.1	2.7	3.1	2.4	3.8	3.0	3.6
Green Ext Time (p_c), s	0.1	1.4	0.1	0.8	0.0	1.3	0.1	1.2

Intersection Summary	
HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	0	11	3	1	17	8	548	6	5	302	5
Future Vol, veh/h	14	0	11	3	1	17	8	548	6	5	302	5
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	-	-	-	-	-	-	250	-	250	250	-	250
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	15	0	12	3	1	18	9	596	7	5	328	5

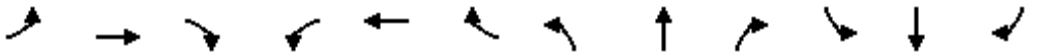
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	655	959	164	788	957	298	333	0	0	603	0	0
Stage 1	338	338	-	614	614	-	-	-	-	-	-	-
Stage 2	317	621	-	174	343	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	351	256	852	282	256	698	1223	-	-	971	-	-
Stage 1	650	639	-	446	481	-	-	-	-	-	-	-
Stage 2	669	477	-	811	636	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	337	253	852	276	253	698	1223	-	-	971	-	-
Mov Cap-2 Maneuver	337	253	-	276	253	-	-	-	-	-	-	-
Stage 1	645	636	-	443	478	-	-	-	-	-	-	-
Stage 2	645	474	-	796	633	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	12	0.1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1223	-	-	459	536	971	-	-
HCM Lane V/C Ratio	0.007	-	-	0.059	0.043	0.006	-	-
HCM Control Delay (s)	8	-	-	13.3	12	8.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	1	156	1	7	7	240	336	3	4	155	139
Future Volume (veh/h)	99	1	156	1	7	7	240	336	3	4	155	139
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	116	0	0	1	8	8	279	391	3	5	180	162
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	0		37	39	33	1478	1964	876	610	1655	738
Arrive On Green	0.08	0.00	0.00	0.02	0.02	0.02	0.09	0.55	0.55	0.01	0.47	0.47
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	116	0	0	1	8	8	279	391	3	5	180	162
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.6	0.0	0.0	0.0	0.2	0.3	1.9	2.9	0.0	0.1	1.5	3.2
Cycle Q Clear(g_c), s	1.6	0.0	0.0	0.0	0.2	0.3	1.9	2.9	0.0	0.1	1.5	3.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	276	0		37	39	33	1478	1964	876	610	1655	738
V/C Ratio(X)	0.42	0.00		0.03	0.20	0.24	0.19	0.20	0.00	0.01	0.11	0.22
Avail Cap(c_a), veh/h	1456	0		627	658	558	1648	1964	876	784	1655	738
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.1	0.0	0.0	25.2	25.3	25.3	4.8	5.9	5.3	7.3	7.9	8.4
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.3	2.5	3.7	0.1	0.2	0.0	0.0	0.1	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	0.7	0.0	0.0	0.0	0.1	0.1	0.5	0.9	0.0	0.0	0.5	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.1	0.0	0.0	25.5	27.9	29.0	4.8	6.1	5.3	7.3	8.0	9.0
LnGrp LOS	C	A		C	C	C	A	A	A	A	A	A
Approach Vol, veh/h		116	A		17			673			347	
Approach Delay, s/veh		24.1			28.3			5.6			8.5	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	33.6		8.6	9.4	29.0		5.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	26.5		21.5	7.5	24.5		18.5				
Max Q Clear Time (g_c+I1), s	2.1	4.9		3.6	3.9	5.2		2.3				
Green Ext Time (p_c), s	0.0	2.5		0.3	0.3	1.6		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Traffic Vol, veh/h	8	61	1	0	81	8	0	0	1	9	0	13
Future Vol, veh/h	8	61	1	0	81	8	0	0	1	9	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	70	70	70	70	70	70	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	87	1	0	116	11	0	0	1	13	0	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	127	0	0	88	0	0	241	237	88	232	232	122
Stage 1	-	-	-	-	-	-	110	110	-	122	122	-
Stage 2	-	-	-	-	-	-	131	127	-	110	110	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1459	-	-	1508	-	-	713	664	970	723	668	929
Stage 1	-	-	-	-	-	-	895	804	-	882	795	-
Stage 2	-	-	-	-	-	-	873	791	-	895	804	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1459	-	-	1508	-	-	694	659	970	717	663	929
Mov Cap-2 Maneuver	-	-	-	-	-	-	694	659	-	717	663	-
Stage 1	-	-	-	-	-	-	888	798	-	875	795	-
Stage 2	-	-	-	-	-	-	856	791	-	887	798	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0	8.7	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	970	1459	-	-	1508	-	-	717	929
HCM Lane V/C Ratio	0.001	0.008	-	-	-	-	-	0.018	0.02
HCM Control Delay (s)	8.7	7.5	0	-	0	-	-	10.1	9
HCM Lane LOS	A	A	A	-	A	-	-	B	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	61	71	33	58	17
Future Vol, veh/h	10	61	71	33	58	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	77	90	42	73	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	132	0	-	0	214	111
Stage 1	-	-	-	-	111	-
Stage 2	-	-	-	-	103	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1453	-	-	-	774	942
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	921	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1453	-	-	-	767	942
Mov Cap-2 Maneuver	-	-	-	-	767	-
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	921	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1453	-	-	-	801
HCM Lane V/C Ratio	0.009	-	-	-	0.119
HCM Control Delay (s)	7.5	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	117	90	18	43	15
Future Vol, veh/h	2	117	90	18	43	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	133	102	20	49	17

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	122	0	-	0	249	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	137	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1465	-	-	-	739	941
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	890	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1465	-	-	-	738	941
Mov Cap-2 Maneuver	-	-	-	-	738	-
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	890	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1465	-	-	-	782
HCM Lane V/C Ratio	0.002	-	-	-	0.084
HCM Control Delay (s)	7.5	0	-	-	10
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	106	11	43	2	6	4	51	390	5	4	275	50
Future Vol, veh/h	106	11	43	2	6	4	51	390	5	4	275	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	118	12	48	2	7	4	57	433	6	4	306	56

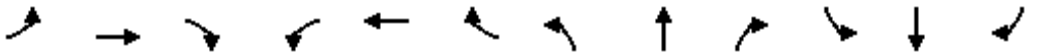
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	648	867	153	714	917	217	362	0	0	439	0	0
Stage 1	314	314	-	547	547	-	-	-	-	-	-	-
Stage 2	334	553	-	167	370	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	355	289	866	319	270	787	1193	-	-	1117	-	-
Stage 1	671	655	-	489	516	-	-	-	-	-	-	-
Stage 2	653	513	-	818	619	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	333	274	866	280	256	787	1193	-	-	1117	-	-
Mov Cap-2 Maneuver	333	274	-	280	256	-	-	-	-	-	-	-
Stage 1	639	652	-	466	491	-	-	-	-	-	-	-
Stage 2	610	488	-	756	617	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.3	15.9	0.9	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1193	-	-	333	601	280	256	787	1117	-	-
HCM Lane V/C Ratio	0.047	-	-	0.354	0.1	0.008	0.026	0.006	0.004	-	-
HCM Control Delay (s)	8.2	-	-	21.6	11.7	18	19.4	9.6	8.2	-	-
HCM Lane LOS	A	-	-	C	B	C	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.6	0.3	0	0.1	0	0	-	-

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	151	51	100	223	204	28	250	66	81	229	13
Future Volume (veh/h)	81	151	51	100	223	204	28	250	66	81	229	13
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	94	176	0	116	259	0	33	291	0	94	266	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	458	549		979	586		441	621		457	782	
Arrive On Green	0.08	0.15	0.00	0.09	0.16	0.00	0.04	0.17	0.00	0.08	0.22	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	94	176	0	116	259	0	33	291	0	94	266	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.6	1.6	0.0	1.0	2.4	0.0	0.5	2.7	0.0	1.5	2.3	0.0
Cycle Q Clear(g_c), s	1.6	1.6	0.0	1.0	2.4	0.0	0.5	2.7	0.0	1.5	2.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	458	549		979	586		441	621		457	782	
V/C Ratio(X)	0.21	0.32		0.12	0.44		0.07	0.47		0.21	0.34	
Avail Cap(c_a), veh/h	771	3060		1361	2866		737	2283		770	2477	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.3	13.8	0.0	10.7	13.8	0.0	11.5	13.6	0.0	10.7	12.0	0.0
Incr Delay (d2), s/veh	0.2	0.3	0.0	0.1	0.5	0.0	0.1	0.6	0.0	0.2	0.3	0.0
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	0.5	0.6	0.0	0.3	0.8	0.0	0.2	0.9	0.0	0.5	0.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.5	14.1	0.0	10.8	14.3	0.0	11.6	14.1	0.0	10.9	12.3	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		270	A		375	A		324	A		360	A
Approach Delay, s/veh		13.2			13.2			13.9			11.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	10.9	8.0	10.1	5.9	12.5	7.6	10.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	23.5	7.5	31.5	7.5	25.5	9.5	29.5
Max Q Clear Time (g_c+I1), s	3.5	4.7	3.0	3.6	2.5	4.3	3.6	4.4
Green Ext Time (p_c), s	0.1	1.7	0.1	1.1	0.0	1.6	0.1	1.7

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	0	12	3	1	18	9	701	6	5	387	5
Future Vol, veh/h	15	0	12	3	1	18	9	701	6	5	387	5
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	-	-	-	-	-	-	250	-	250	250	-	250
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	16	0	13	3	1	20	10	762	7	5	421	5

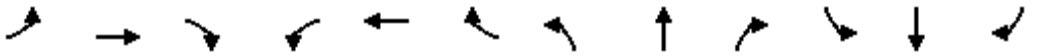
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	833	1220	211	1003	1218	381	426	0	0	769	0	0
Stage 1	431	431	-	782	782	-	-	-	-	-	-	-
Stage 2	402	789	-	221	436	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	261	179	794	196	179	617	1130	-	-	841	-	-
Stage 1	573	581	-	353	403	-	-	-	-	-	-	-
Stage 2	596	400	-	761	578	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	249	176	794	191	176	617	1130	-	-	841	-	-
Mov Cap-2 Maneuver	249	176	-	191	176	-	-	-	-	-	-	-
Stage 1	568	578	-	350	399	-	-	-	-	-	-	-
Stage 2	570	396	-	744	575	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16	13.8	0.1	0.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1130	-	-	358	435	841	-	-
HCM Lane V/C Ratio	0.009	-	-	0.082	0.055	0.006	-	-
HCM Control Delay (s)	8.2	-	-	16	13.8	9.3	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.2	0	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	1	200	1	8	8	307	430	3	4	198	183
Future Volume (veh/h)	128	1	200	1	8	8	307	430	3	4	198	183
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	150	0	0	1	9	9	357	500	3	5	230	213
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	300	0		41	43	37	1372	1935	863	556	1618	722
Arrive On Green	0.08	0.00	0.00	0.02	0.02	0.02	0.10	0.54	0.54	0.01	0.46	0.46
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	150	0	0	1	9	9	357	500	3	5	230	213
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.1	0.0	0.0	0.0	0.2	0.3	2.5	3.9	0.0	0.1	2.0	4.5
Cycle Q Clear(g_c), s	2.1	0.0	0.0	0.0	0.2	0.3	2.5	3.9	0.0	0.1	2.0	4.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	0		41	43	37	1372	1935	863	556	1618	722
V/C Ratio(X)	0.50	0.00		0.02	0.21	0.25	0.26	0.26	0.00	0.01	0.14	0.30
Avail Cap(c_a), veh/h	1385	0		608	639	541	1662	1935	863	730	1618	722
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.1	0.0	0.0	25.2	25.3	25.3	5.1	6.4	5.5	7.7	8.4	9.0
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.2	2.4	3.4	0.1	0.3	0.0	0.0	0.2	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	0.9	0.0	0.0	0.0	0.1	0.1	0.6	1.2	0.0	0.0	0.7	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.4	0.0	0.0	25.4	27.6	28.8	5.2	6.7	5.5	7.7	8.5	10.1
LnGrp LOS	C	A		C	C	C	A	A	A	A	A	B
Approach Vol, veh/h		150	A		19			860			448	
Approach Delay, s/veh		24.4			28.1			6.1			9.3	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	33.2		8.9	9.6	28.5		5.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	28.0		20.5	9.5	24.0		18.0				
Max Q Clear Time (g_c+I1), s	2.1	5.9		4.1	4.5	6.5		2.3				
Green Ext Time (p_c), s	0.0	3.4		0.4	0.6	2.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Traffic Vol, veh/h	8	73	9	28	119	14	27	15	84	11	4	13
Future Vol, veh/h	8	73	9	28	119	14	27	15	84	11	4	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	70	70	70	70	70	70	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	104	13	40	170	20	39	21	120	16	6	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	190	0	0	117	0	0	406	403	111	463	399	180
Stage 1	-	-	-	-	-	-	133	133	-	260	260	-
Stage 2	-	-	-	-	-	-	273	270	-	203	139	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1384	-	-	1471	-	-	555	536	942	509	539	863
Stage 1	-	-	-	-	-	-	870	786	-	745	693	-
Stage 2	-	-	-	-	-	-	733	686	-	799	782	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1384	-	-	1471	-	-	523	515	942	417	518	863
Mov Cap-2 Maneuver	-	-	-	-	-	-	523	515	-	417	518	-
Stage 1	-	-	-	-	-	-	862	779	-	738	672	-
Stage 2	-	-	-	-	-	-	690	665	-	672	775	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.3	11.4	11.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	742	1384	-	-	1471	-	-	417	746
HCM Lane V/C Ratio	0.243	0.008	-	-	0.027	-	-	0.038	0.033
HCM Control Delay (s)	11.4	7.6	0	-	7.5	0	-	14	10
HCM Lane LOS	B	A	A	-	A	A	-	B	B
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	151	8	14	116	34	27	0	41	58	0	17
Future Vol, veh/h	10	151	8	14	116	34	27	0	41	58	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	92	92	79	79	92	92	92	79	92	79
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	191	9	15	147	43	29	0	45	73	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	190	0	0	200	0	0	432	442	196	443	425	169
Stage 1	-	-	-	-	-	-	222	222	-	199	199	-
Stage 2	-	-	-	-	-	-	210	220	-	244	226	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1384	-	-	1372	-	-	534	510	845	525	521	875
Stage 1	-	-	-	-	-	-	780	720	-	803	736	-
Stage 2	-	-	-	-	-	-	792	721	-	760	717	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1384	-	-	1372	-	-	512	498	845	489	509	875
Mov Cap-2 Maneuver	-	-	-	-	-	-	512	498	-	489	509	-
Stage 1	-	-	-	-	-	-	771	712	-	794	727	-
Stage 2	-	-	-	-	-	-	763	712	-	712	709	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.6	11	13
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	672	1384	-	-	1372	-	-	543
HCM Lane V/C Ratio	0.11	0.009	-	-	0.011	-	-	0.175
HCM Control Delay (s)	11	7.6	0	-	7.7	0	-	13
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	242	6	9	132	18	17	0	27	43	0	15
Future Vol, veh/h	2	242	6	9	132	18	17	0	27	43	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	92	92	88	88	92	92	92	88	92	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	275	7	10	150	20	18	0	29	49	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	170	0	0	282	0	0	472	473	279	477	466	160
Stage 1	-	-	-	-	-	-	283	283	-	180	180	-
Stage 2	-	-	-	-	-	-	189	190	-	297	286	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1407	-	-	1280	-	-	502	490	760	498	494	885
Stage 1	-	-	-	-	-	-	724	677	-	822	750	-
Stage 2	-	-	-	-	-	-	813	743	-	712	675	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1407	-	-	1280	-	-	488	485	760	475	489	885
Mov Cap-2 Maneuver	-	-	-	-	-	-	488	485	-	475	489	-
Stage 1	-	-	-	-	-	-	723	676	-	820	743	-
Stage 2	-	-	-	-	-	-	790	736	-	683	674	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.4	11.2	12.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	625	1407	-	-	1280	-	-	540
HCM Lane V/C Ratio	0.077	0.002	-	-	0.008	-	-	0.122
HCM Control Delay (s)	11.2	7.6	0	-	7.8	0	-	12.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	18.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	258	11	43	2	6	4	51	461	5	4	298	101
Future Vol, veh/h	258	11	43	2	6	4	51	461	5	4	298	101
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	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	287	12	48	2	7	4	57	512	6	4	331	112

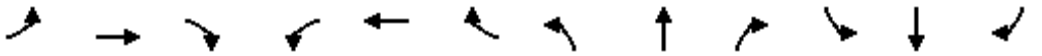
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	713	971	166	806	1077	256	443	0	0	518	0	0
Stage 1	339	339	-	626	626	-	-	-	-	-	-	-
Stage 2	374	632	-	180	451	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	319	251	849	273	218	743	1113	-	-	1044	-	-
Stage 1	649	638	-	439	475	-	-	-	-	-	-	-
Stage 2	619	472	-	804	569	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	296	237	849	237	206	743	1113	-	-	1044	-	-
Mov Cap-2 Maneuver	296	237	-	237	206	-	-	-	-	-	-	-
Stage 1	616	635	-	417	451	-	-	-	-	-	-	-
Stage 2	575	448	-	741	567	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	70.9	18.2	0.8	0.1
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1113	-	-	296	556	237	206	743	1044	-	-
HCM Lane V/C Ratio	0.051	-	-	0.968	0.108	0.009	0.032	0.006	0.004	-	-
HCM Control Delay (s)	8.4	-	-	83.2	12.3	20.3	23.1	9.9	8.5	-	-
HCM Lane LOS	A	-	-	F	B	C	C	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	9.8	0.4	0	0.1	0	0	-	-

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	151	51	100	223	229	28	258	66	155	255	20
Future Volume (veh/h)	84	151	51	100	223	229	28	258	66	155	255	20
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	98	176	0	116	259	0	33	300	0	180	297	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	442	539		944	568		441	610		499	892	
Arrive On Green	0.08	0.15	0.00	0.09	0.16	0.00	0.04	0.17	0.00	0.12	0.25	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	98	176	0	116	259	0	33	300	0	180	297	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.7	1.7	0.0	1.0	2.5	0.0	0.6	2.9	0.0	3.0	2.6	0.0
Cycle Q Clear(g_c), s	1.7	1.7	0.0	1.0	2.5	0.0	0.6	2.9	0.0	3.0	2.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	442	539		944	568		441	610		499	892	
V/C Ratio(X)	0.22	0.33		0.12	0.46		0.07	0.49		0.36	0.33	
Avail Cap(c_a), veh/h	684	2809		1208	2625		672	1980		913	2625	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.0	14.6	0.0	11.4	14.7	0.0	12.3	14.5	0.0	10.6	11.8	0.0
Incr Delay (d2), s/veh	0.3	0.3	0.0	0.1	0.6	0.0	0.1	0.6	0.0	0.4	0.2	0.0
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	0.6	0.6	0.0	0.3	0.9	0.0	0.2	1.0	0.0	1.0	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.2	15.0	0.0	11.5	15.3	0.0	12.3	15.1	0.0	11.0	12.0	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		274	A		375	A		333	A		477	A
Approach Delay, s/veh		14.0			14.1			14.8			11.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	11.1	8.1	10.4	6.0	14.2	7.8	10.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	21.5	6.5	30.5	6.5	28.5	8.5	28.5
Max Q Clear Time (g_c+I1), s	5.0	4.9	3.0	3.7	2.6	4.6	3.7	4.5
Green Ext Time (p_c), s	0.3	1.7	0.1	1.1	0.0	1.9	0.1	1.6

Intersection Summary	
HCM 6th Ctrl Delay	13.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	0	12	20	1	54	9	701	11	17	387	5
Future Vol, veh/h	15	0	12	20	1	54	9	701	11	17	387	5
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	-	-	-	-	-	-	250	-	250	250	-	250
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	16	0	13	22	1	59	10	762	12	18	421	5

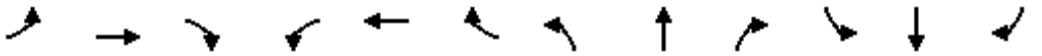
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	859	1251	211	1029	1244	381	426	0	0	774	0	0
Stage 1	457	457	-	782	782	-	-	-	-	-	-	-
Stage 2	402	794	-	247	462	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	250	171	794	188	173	617	1130	-	-	837	-	-
Stage 1	553	566	-	353	403	-	-	-	-	-	-	-
Stage 2	596	398	-	735	563	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	220	166	794	181	168	617	1130	-	-	837	-	-
Mov Cap-2 Maneuver	220	166	-	181	168	-	-	-	-	-	-	-
Stage 1	548	554	-	350	399	-	-	-	-	-	-	-
Stage 2	533	394	-	707	551	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.2	17.5	0.1	0.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1130	-	-	324	368	837	-	-
HCM Lane V/C Ratio	0.009	-	-	0.091	0.222	0.022	-	-
HCM Control Delay (s)	8.2	-	-	17.2	17.5	9.4	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.8	0.1	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	8	202	1	17	19	312	461	3	8	208	191
Future Volume (veh/h)	130	8	202	1	17	19	312	461	3	8	208	191
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	157	0	0	1	20	22	363	536	3	9	242	222
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	300	0		79	82	70	1322	1863	831	535	1557	694
Arrive On Green	0.08	0.00	0.00	0.04	0.04	0.04	0.10	0.52	0.52	0.01	0.44	0.44
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	157	0	0	1	20	22	363	536	3	9	242	222
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.6	0.7	2.7	4.5	0.0	0.1	2.2	4.9
Cycle Q Clear(g_c), s	2.3	0.0	0.0	0.0	0.6	0.7	2.7	4.5	0.0	0.1	2.2	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	0		79	82	70	1322	1863	831	535	1557	694
V/C Ratio(X)	0.52	0.00		0.01	0.24	0.31	0.27	0.29	0.00	0.02	0.16	0.32
Avail Cap(c_a), veh/h	1362	0		614	645	547	1596	1863	831	696	1557	694
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.5	0.0	0.0	24.5	24.8	24.9	5.7	7.1	6.1	8.2	9.1	9.8
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.1	1.5	2.5	0.1	0.4	0.0	0.0	0.2	1.2
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	0.9	0.0	0.0	0.0	0.3	0.3	0.7	1.4	0.0	0.0	0.8	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	0.0	0.0	24.6	26.3	27.4	5.8	7.5	6.1	8.2	9.3	11.1
LnGrp LOS	C	A		C	C	C	A	A	A	A	A	B
Approach Vol, veh/h		157	A		43			902			473	
Approach Delay, s/veh		24.9			26.8			6.8			10.1	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	32.6		9.0	9.8	28.0		6.9				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	27.5		20.5	9.5	23.5		18.5				
Max Q Clear Time (g_c+I1), s	2.1	6.5		4.3	4.7	6.9		2.7				
Green Ext Time (p_c), s	0.0	3.6		0.4	0.6	2.1		0.1				

Intersection Summary		
HCM 6th Ctrl Delay	10.2	
HCM 6th LOS	B	

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	71	107	36	451	323	23
Future Vol, veh/h	71	107	36	451	323	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	300	0	300	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	77	116	39	490	351	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	674	176	376	0	-	0
Stage 1	351	-	-	-	-	-
Stage 2	323	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	388	837	1179	-	-	-
Stage 1	684	-	-	-	-	-
Stage 2	706	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	375	837	1179	-	-	-
Mov Cap-2 Maneuver	375	-	-	-	-	-
Stage 1	661	-	-	-	-	-
Stage 2	706	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1179	-	375	837	-	-
HCM Lane V/C Ratio	0.033	-	0.206	0.139	-	-
HCM Control Delay (s)	8.2	-	17.1	10	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	0.5	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↱	
Traffic Vol, veh/h	8	65	1	0	86	8	0	0	1	9	0	14
Future Vol, veh/h	8	65	1	0	86	8	0	0	1	9	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	70	70	70	70	70	70	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	93	1	0	123	11	0	0	1	13	0	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	134	0	0	94	0	0	255	250	94	245	245	129
Stage 1	-	-	-	-	-	-	116	116	-	129	129	-
Stage 2	-	-	-	-	-	-	139	134	-	116	116	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1451	-	-	1500	-	-	698	653	963	709	657	921
Stage 1	-	-	-	-	-	-	889	800	-	875	789	-
Stage 2	-	-	-	-	-	-	864	785	-	889	800	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1451	-	-	1500	-	-	678	648	963	703	652	921
Mov Cap-2 Maneuver	-	-	-	-	-	-	678	648	-	703	652	-
Stage 1	-	-	-	-	-	-	882	794	-	868	789	-
Stage 2	-	-	-	-	-	-	845	785	-	881	794	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0	8.7	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	963	1451	-	-	1500	-	-	703	921
HCM Lane V/C Ratio	0.001	0.008	-	-	-	-	-	0.018	0.022
HCM Control Delay (s)	8.7	7.5	0	-	0	-	-	10.2	9
HCM Lane LOS	A	A	A	-	A	-	-	B	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	65	76	35	62	18
Future Vol, veh/h	10	65	76	35	62	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	82	96	44	78	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	140	0	-	0	226	118
Stage 1	-	-	-	-	118	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1443	-	-	-	762	934
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1443	-	-	-	755	934
Mov Cap-2 Maneuver	-	-	-	-	755	-
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	916	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1443	-	-	-	789
HCM Lane V/C Ratio	0.009	-	-	-	0.128
HCM Control Delay (s)	7.5	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	124	95	19	46	16
Future Vol, veh/h	2	124	95	19	46	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	141	108	22	52	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	130	0	-	0	264	119
Stage 1	-	-	-	-	119	-
Stage 2	-	-	-	-	145	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1455	-	-	-	725	933
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	882	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1455	-	-	-	724	933
Mov Cap-2 Maneuver	-	-	-	-	724	-
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	882	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1455	-	-	-	768
HCM Lane V/C Ratio	0.002	-	-	-	0.092
HCM Control Delay (s)	7.5	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	113	11	46	2	7	5	55	444	6	5	311	53
Future Vol, veh/h	113	11	46	2	7	5	55	444	6	5	311	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	126	12	51	2	8	6	61	493	7	6	346	59

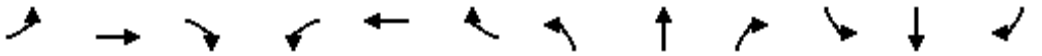
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	731	980	173	806	1032	247	405	0	0	500	0	0
Stage 1	358	358	-	615	615	-	-	-	-	-	-	-
Stage 2	373	622	-	191	417	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	310	248	840	273	231	753	1150	-	-	1060	-	-
Stage 1	633	626	-	445	480	-	-	-	-	-	-	-
Stage 2	620	477	-	792	590	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	286	233	840	235	217	753	1150	-	-	1060	-	-
Mov Cap-2 Maneuver	286	233	-	235	217	-	-	-	-	-	-	-
Stage 1	599	622	-	421	455	-	-	-	-	-	-	-
Stage 2	573	452	-	725	586	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.1	17.5	0.9	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1150	-	-	286	559	235	217	753	1060	-	-
HCM Lane V/C Ratio	0.053	-	-	0.439	0.113	0.009	0.036	0.007	0.005	-	-
HCM Control Delay (s)	8.3	-	-	27.1	12.3	20.5	22.2	9.8	8.4	-	-
HCM Lane LOS	A	-	-	D	B	C	C	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	2.1	0.4	0	0.1	0	0	-	-

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	200	67	133	297	269	32	286	76	91	261	14
Future Volume (veh/h)	108	200	67	133	297	269	32	286	76	91	261	14
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	126	233	0	155	345	0	37	333	0	106	303	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	455	656		992	686		419	646		433	803	
Arrive On Green	0.09	0.18	0.00	0.10	0.19	0.00	0.04	0.18	0.00	0.09	0.23	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	126	233	0	155	345	0	37	333	0	106	303	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.2	2.3	0.0	1.4	3.5	0.0	0.7	3.4	0.0	1.9	2.9	0.0
Cycle Q Clear(g_c), s	2.2	2.3	0.0	1.4	3.5	0.0	0.7	3.4	0.0	1.9	2.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	455	656		992	686		419	646		433	803	
V/C Ratio(X)	0.28	0.36		0.16	0.50		0.09	0.52		0.24	0.38	
Avail Cap(c_a), veh/h	707	2946		1196	2683		630	1979		699	2243	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.5	14.4	0.0	10.8	14.6	0.0	12.4	14.9	0.0	11.7	13.2	0.0
Incr Delay (d2), s/veh	0.3	0.3	0.0	0.1	0.6	0.0	0.1	0.6	0.0	0.3	0.3	0.0
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	0.7	0.8	0.0	0.4	1.2	0.0	0.2	1.2	0.0	0.6	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.8	14.7	0.0	10.9	15.1	0.0	12.5	15.6	0.0	12.0	13.5	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		359	A		500	A		370	A		409	A
Approach Delay, s/veh		13.7			13.8			15.3			13.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	11.8	8.6	12.0	6.2	13.6	8.3	12.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	22.5	6.5	33.5	6.5	25.5	9.5	30.5
Max Q Clear Time (g_c+I1), s	3.9	5.4	3.4	4.3	2.7	4.9	4.2	5.5
Green Ext Time (p_c), s	0.1	1.9	0.1	1.5	0.0	1.9	0.1	2.3

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	0	13	3	1	19	9	876	7	6	483	6
Future Vol, veh/h	16	0	13	3	1	19	9	876	7	6	483	6
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	-	-	-	-	-	-	250	-	250	250	-	250
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	17	0	14	3	1	21	10	952	8	7	525	7

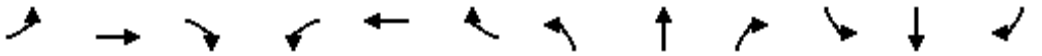
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1036	1519	263	1249	1518	476	532	0	0	960	0	0
Stage 1	539	539	-	972	972	-	-	-	-	-	-	-
Stage 2	497	980	-	277	546	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	186	118	735	129	118	535	1032	-	-	712	-	-
Stage 1	494	520	-	271	329	-	-	-	-	-	-	-
Stage 2	523	326	-	706	516	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	175	116	735	125	116	535	1032	-	-	712	-	-
Mov Cap-2 Maneuver	175	116	-	125	116	-	-	-	-	-	-	-
Stage 1	489	515	-	268	326	-	-	-	-	-	-	-
Stage 2	496	323	-	686	511	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.3	16.5	0.1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1032	-	-	266	338	712	-	-
HCM Lane V/C Ratio	0.009	-	-	0.119	0.074	0.009	-	-
HCM Control Delay (s)	8.5	-	-	20.3	16.5	10.1	-	-
HCM Lane LOS	A	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.2	0	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	159	1	249	1	8	8	384	537	3	5	248	227
Future Volume (veh/h)	159	1	249	1	8	8	384	537	3	5	248	227
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	186	0	0	1	9	9	447	624	3	6	288	264
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	0		41	43	37	1305	1898	847	489	1501	670
Arrive On Green	0.09	0.00	0.00	0.02	0.02	0.02	0.12	0.53	0.53	0.01	0.42	0.42
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	186	0	0	1	9	9	447	624	3	6	288	264
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.6	0.0	0.0	0.0	0.2	0.3	3.3	5.2	0.0	0.1	2.7	6.1
Cycle Q Clear(g_c), s	2.6	0.0	0.0	0.0	0.2	0.3	3.3	5.2	0.0	0.1	2.7	6.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	326	0		41	43	37	1305	1898	847	489	1501	670
V/C Ratio(X)	0.57	0.00		0.02	0.21	0.25	0.34	0.33	0.00	0.01	0.19	0.39
Avail Cap(c_a), veh/h	1393	0		612	642	544	1716	1898	847	662	1501	670
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	0.0	0.0	25.0	25.1	25.2	5.6	6.9	5.7	8.5	9.5	10.5
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.2	2.4	3.4	0.2	0.5	0.0	0.0	0.3	1.7
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	1.1	0.0	0.0	0.0	0.1	0.1	0.8	1.6	0.0	0.0	0.9	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.4	0.0	0.0	25.3	27.5	28.6	5.7	7.4	5.7	8.5	9.8	12.2
LnGrp LOS	C	A		C	C	C	A	A	A	A	A	B
Approach Vol, veh/h		186	A		19			1074			558	
Approach Delay, s/veh		24.4			27.9			6.7			10.9	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	32.5		9.3	10.8	26.6		5.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	28.0		20.5	12.5	21.0		18.0				
Max Q Clear Time (g_c+I1), s	2.1	7.2		4.6	5.3	8.1		2.3				
Green Ext Time (p_c), s	0.0	4.3		0.5	1.0	2.3		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Traffic Vol, veh/h	8	77	9	28	124	14	27	15	84	11	4	14
Future Vol, veh/h	8	77	9	28	124	14	27	15	84	11	4	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	70	70	70	70	70	70	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	110	13	40	177	20	39	21	120	16	6	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	197	0	0	123	0	0	419	416	117	476	412	187
Stage 1	-	-	-	-	-	-	139	139	-	267	267	-
Stage 2	-	-	-	-	-	-	280	277	-	209	145	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1376	-	-	1464	-	-	544	527	935	499	530	855
Stage 1	-	-	-	-	-	-	864	782	-	738	688	-
Stage 2	-	-	-	-	-	-	727	681	-	793	777	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1376	-	-	1464	-	-	511	506	935	408	509	855
Mov Cap-2 Maneuver	-	-	-	-	-	-	511	506	-	408	509	-
Stage 1	-	-	-	-	-	-	856	775	-	731	667	-
Stage 2	-	-	-	-	-	-	682	660	-	666	770	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.3	11.5	11.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	731	1376	-	-	1464	-	-	408	743
HCM Lane V/C Ratio	0.246	0.008	-	-	0.027	-	-	0.039	0.035
HCM Control Delay (s)	11.5	7.6	0	-	7.5	0	-	14.2	10
HCM Lane LOS	B	A	A	-	A	A	-	B	B
HCM 95th %tile Q(veh)	1	0	-	-	0.1	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	155	8	14	121	35	27	0	41	62	0	18
Future Vol, veh/h	10	155	8	14	121	35	27	0	41	62	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	92	92	79	79	92	92	92	79	92	79
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	196	9	15	153	44	29	0	45	78	0	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	197	0	0	205	0	0	444	454	201	454	436	175
Stage 1	-	-	-	-	-	-	227	227	-	205	205	-
Stage 2	-	-	-	-	-	-	217	227	-	249	231	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1376	-	-	1366	-	-	524	502	840	516	514	868
Stage 1	-	-	-	-	-	-	776	716	-	797	732	-
Stage 2	-	-	-	-	-	-	785	716	-	755	713	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1376	-	-	1366	-	-	501	490	840	480	502	868
Mov Cap-2 Maneuver	-	-	-	-	-	-	501	490	-	480	502	-
Stage 1	-	-	-	-	-	-	767	708	-	788	723	-
Stage 2	-	-	-	-	-	-	755	707	-	707	705	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.5	11.1	13.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	662	1376	-	-	1366	-	-	534
HCM Lane V/C Ratio	0.112	0.009	-	-	0.011	-	-	0.19
HCM Control Delay (s)	11.1	7.6	0	-	7.7	0	-	13.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	2	249	6	9	137	19	17	0	27	46	0	16
Future Vol, veh/h	2	249	6	9	137	19	17	0	27	46	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	92	92	88	88	92	92	92	88	92	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	283	7	10	156	22	18	0	29	52	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	178	0	0	290	0	0	487	489	287	492	481	167
Stage 1	-	-	-	-	-	-	291	291	-	187	187	-
Stage 2	-	-	-	-	-	-	196	198	-	305	294	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1398	-	-	1272	-	-	491	480	752	487	485	877
Stage 1	-	-	-	-	-	-	717	672	-	815	745	-
Stage 2	-	-	-	-	-	-	806	737	-	705	670	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1398	-	-	1272	-	-	477	475	752	464	480	877
Mov Cap-2 Maneuver	-	-	-	-	-	-	477	475	-	464	480	-
Stage 1	-	-	-	-	-	-	716	671	-	813	738	-
Stage 2	-	-	-	-	-	-	782	730	-	676	669	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.4	11.3	12.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	615	1398	-	-	1272	-	-	528
HCM Lane V/C Ratio	0.078	0.002	-	-	0.008	-	-	0.133
HCM Control Delay (s)	11.3	7.6	0	-	7.9	0	-	12.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.5

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	265	11	46	2	7	5	55	515	6	5	334	104
Future Vol, veh/h	265	11	46	2	7	5	55	515	6	5	334	104
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	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	294	12	51	2	8	6	61	572	7	6	371	116

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	795	1084	186	898	1193	286	487	0	0	579	0	0
Stage 1	383	383	-	694	694	-	-	-	-	-	-	-
Stage 2	412	701	-	204	499	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 278	216	824	234	186	711	1072	-	-	991	-	-
Stage 1	611	610	-	399	442	-	-	-	-	-	-	-
Stage 2	588	439	-	779	542	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 254	202	824	199	174	711	1072	-	-	991	-	-
Mov Cap-2 Maneuver	~ 254	202	-	199	174	-	-	-	-	-	-	-
Stage 1	576	606	-	376	417	-	-	-	-	-	-	-
Stage 2	540	414	-	712	539	-	-	-	-	-	-	-

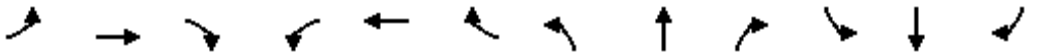
Approach	EB	WB	NB	SB
HCM Control Delay, s	124.2	20.3	0.8	0.1
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1072	-	-	254	517	199	174	711	991	-	-
HCM Lane V/C Ratio	0.057	-	-	1.159	0.123	0.011	0.045	0.008	0.006	-	-
HCM Control Delay (s)	8.6	-	-	148.2	12.9	23.3	26.7	10.1	8.7	-	-
HCM Lane LOS	A	-	-	F	B	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	13.3	0.4	0	0.1	0	0	-	-

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

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	200	67	133	297	294	32	294	76	165	287	21
Future Volume (veh/h)	111	200	67	133	297	294	32	294	76	165	287	21
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	129	233	0	155	345	0	37	342	0	192	334	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	435	641		950	665		429	632		480	919	
Arrive On Green	0.09	0.18	0.00	0.10	0.19	0.00	0.04	0.18	0.00	0.12	0.26	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	129	233	0	155	345	0	37	342	0	192	334	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.4	2.5	0.0	1.4	3.7	0.0	0.7	3.7	0.0	3.5	3.3	0.0
Cycle Q Clear(g_c), s	2.4	2.5	0.0	1.4	3.7	0.0	0.7	3.7	0.0	3.5	3.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	435	641		950	665		429	632		480	919	
V/C Ratio(X)	0.30	0.36		0.16	0.52		0.09	0.54		0.40	0.36	
Avail Cap(c_a), veh/h	626	2702		1055	2453		584	1705		825	2370	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.4	15.4	0.0	11.7	15.6	0.0	13.3	16.0	0.0	11.3	13.0	0.0
Incr Delay (d2), s/veh	0.4	0.3	0.0	0.1	0.6	0.0	0.1	0.7	0.0	0.5	0.2	0.0
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	0.8	0.9	0.0	0.5	1.4	0.0	0.2	1.4	0.0	1.2	1.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.7	15.7	0.0	11.8	16.3	0.0	13.4	16.7	0.0	11.9	13.2	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		362	A		500	A		379	A		526	A
Approach Delay, s/veh		14.7			14.9			16.4			12.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	12.1	8.7	12.2	6.3	15.5	8.4	12.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	20.5	5.5	32.5	5.5	28.5	8.5	29.5
Max Q Clear Time (g_c+I1), s	5.5	5.7	3.4	4.5	2.7	5.3	4.4	5.7
Green Ext Time (p_c), s	0.3	1.9	0.1	1.5	0.0	2.2	0.1	2.3

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

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	0	13	20	1	55	9	876	12	18	483	6
Future Vol, veh/h	16	0	13	20	1	55	9	876	12	18	483	6
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	-	-	-	-	-	-	250	-	250	250	-	250
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	17	0	14	22	1	60	10	952	13	20	525	7

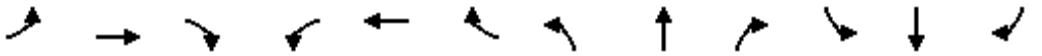
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1062	1550	263	1275	1544	476	532	0	0	965	0	0
Stage 1	565	565	-	972	972	-	-	-	-	-	-	-
Stage 2	497	985	-	303	572	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	178	113	735	124	114	535	1032	-	-	709	-	-
Stage 1	477	506	-	271	329	-	-	-	-	-	-	-
Stage 2	523	324	-	681	502	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	152	109	735	118	110	535	1032	-	-	709	-	-
Mov Cap-2 Maneuver	152	109	-	118	110	-	-	-	-	-	-	-
Stage 1	472	492	-	268	326	-	-	-	-	-	-	-
Stage 2	459	321	-	649	488	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.6	24.1	0.1	0.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1032	-	-	236	270	709	-	-
HCM Lane V/C Ratio	0.009	-	-	0.134	0.306	0.028	-	-
HCM Control Delay (s)	8.5	-	-	22.6	24.1	10.2	-	-
HCM Lane LOS	A	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	1.3	0.1	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	8	251	1	17	19	389	568	3	9	258	235
Future Volume (veh/h)	161	8	251	1	17	19	389	568	3	9	258	235
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	193	0	0	1	20	22	452	660	3	10	300	273
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	331	0		78	82	70	1263	1852	826	473	1474	657
Arrive On Green	0.09	0.00	0.00	0.04	0.04	0.04	0.12	0.52	0.52	0.01	0.41	0.41
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	193	0	0	1	20	22	452	660	3	10	300	273
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.8	0.0	0.0	0.0	0.6	0.7	3.5	6.0	0.0	0.2	3.0	6.7
Cycle Q Clear(g_c), s	2.8	0.0	0.0	0.0	0.6	0.7	3.5	6.0	0.0	0.2	3.0	6.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	0		78	82	70	1263	1852	826	473	1474	657
V/C Ratio(X)	0.58	0.00		0.01	0.24	0.32	0.36	0.36	0.00	0.02	0.20	0.42
Avail Cap(c_a), veh/h	1271	0		603	633	536	1641	1852	826	629	1474	657
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.8	0.0	0.0	25.0	25.3	25.3	6.1	7.7	6.3	9.0	10.2	11.3
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.1	1.5	2.6	0.2	0.5	0.0	0.0	0.3	1.9
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	1.2	0.0	0.0	0.0	0.3	0.3	1.0	1.9	0.0	0.1	1.1	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	0.0	0.0	25.1	26.8	27.9	6.3	8.2	6.3	9.0	10.5	13.2
LnGrp LOS	C	A		C	C	C	A	A	A	A	B	B
Approach Vol, veh/h		193	A		43			1115			583	
Approach Delay, s/veh		25.4			27.3			7.4			11.8	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.2	33.0		9.6	11.0	27.2		6.9				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	28.5		19.5	12.5	21.5		18.5				
Max Q Clear Time (g_c+I1), s	2.2	8.0		4.8	5.5	8.7		2.7				
Green Ext Time (p_c), s	0.0	4.6		0.5	1.0	2.4		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		11.0
HCM 6th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	71	107	36	515	366	23
Future Vol, veh/h	71	107	36	515	366	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	300	0	300	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	77	116	39	560	398	25

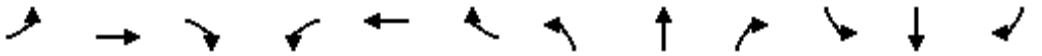
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	756	199	423	0	-	0
Stage 1	398	-	-	-	-	-
Stage 2	358	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	344	809	1133	-	-	-
Stage 1	647	-	-	-	-	-
Stage 2	678	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	332	809	1133	-	-	-
Mov Cap-2 Maneuver	332	-	-	-	-	-
Stage 1	625	-	-	-	-	-
Stage 2	678	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1133	-	332	809	-	-
HCM Lane V/C Ratio	0.035	-	0.232	0.144	-	-
HCM Control Delay (s)	8.3	-	19.1	10.2	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	0.5	-	-

HCM 6th Signalized Intersection Summary
3: CSAH 83 & Valley View

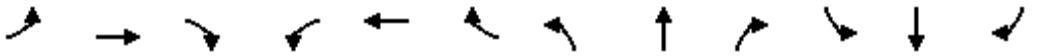
12/07/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	258	11	43	2	6	4	51	461	5	4	298	101
Future Volume (veh/h)	258	11	43	2	6	4	51	461	5	4	298	101
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	287	12	48	2	7	4	57	512	6	4	331	112
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	622	85	339	286	132	111	416	944	421	322	752	336
Arrive On Green	0.19	0.26	0.26	0.00	0.07	0.07	0.06	0.27	0.27	0.01	0.21	0.21
Sat Flow, veh/h	1781	327	1308	1781	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	287	0	60	2	7	4	57	512	6	4	331	112
Grp Sat Flow(s),veh/h/ln	1781	0	1635	1781	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.1	0.0	1.1	0.0	0.1	0.1	0.9	4.8	0.1	0.1	3.1	2.3
Cycle Q Clear(g_c), s	5.1	0.0	1.1	0.0	0.1	0.1	0.9	4.8	0.1	0.1	3.1	2.3
Prop In Lane	1.00		0.80	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	622	0	424	286	132	111	416	944	421	322	752	336
V/C Ratio(X)	0.46	0.00	0.14	0.01	0.05	0.04	0.14	0.54	0.01	0.01	0.44	0.33
Avail Cap(c_a), veh/h	1181	0	1378	535	897	760	611	2626	1171	566	2534	1130
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.9	0.0	11.0	16.6	16.7	16.7	10.7	12.2	10.4	11.9	13.2	12.9
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.0	0.2	0.1	0.1	0.5	0.0	0.0	0.4	0.6
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	1.6	0.0	0.3	0.0	0.1	0.0	0.3	1.6	0.0	0.0	1.1	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.4	0.0	11.1	16.6	16.9	16.8	10.9	12.6	10.5	12.0	13.6	13.5
LnGrp LOS	B	A	B	B	B	B	B	B	B	B	B	B
Approach Vol, veh/h		347			13			575			447	
Approach Delay, s/veh		11.4			16.8			12.4			13.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.7	14.7	4.6	14.5	6.8	12.7	11.9	7.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	28.5	5.5	32.5	6.5	27.5	19.5	18.5
Max Q Clear Time (g_c+I1), s	2.1	6.8	2.0	3.1	2.9	5.1	7.1	2.1
Green Ext Time (p_c), s	0.0	3.5	0.0	0.3	0.0	2.5	0.7	0.0

Intersection Summary	
HCM 6th Ctrl Delay	12.6
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	265	11	46	2	7	5	55	515	6	5	334	104
Future Volume (veh/h)	265	11	46	2	7	5	55	515	6	5	334	104
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	294	12	51	2	8	6	61	572	7	6	371	116
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	618	82	348	279	136	115	414	1008	450	313	819	365
Arrive On Green	0.19	0.26	0.26	0.00	0.07	0.07	0.06	0.28	0.28	0.01	0.23	0.23
Sat Flow, veh/h	1781	311	1322	1781	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	294	0	63	2	8	6	61	572	7	6	371	116
Grp Sat Flow(s),veh/h/ln	1781	0	1632	1781	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.5	0.0	1.2	0.0	0.2	0.1	1.0	5.6	0.1	0.1	3.7	2.5
Cycle Q Clear(g_c), s	5.5	0.0	1.2	0.0	0.2	0.1	1.0	5.6	0.1	0.1	3.7	2.5
Prop In Lane	1.00		0.81	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	618	0	430	279	136	115	414	1008	450	313	819	365
V/C Ratio(X)	0.48	0.00	0.15	0.01	0.06	0.05	0.15	0.57	0.02	0.02	0.45	0.32
Avail Cap(c_a), veh/h	1082	0	1263	515	850	720	589	2575	1149	540	2488	1110
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.5	0.0	11.5	17.4	17.6	17.6	10.7	12.4	10.5	12.0	13.5	13.0
Incr Delay (d2), s/veh	0.6	0.0	0.2	0.0	0.2	0.2	0.2	0.5	0.0	0.0	0.4	0.5
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	1.8	0.0	0.4	0.0	0.1	0.1	0.3	1.9	0.0	0.0	1.3	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.1	0.0	11.6	17.4	17.8	17.8	10.9	13.0	10.5	12.0	13.8	13.5
LnGrp LOS	B	A	B	B	B	B	B	B	B	B	B	B
Approach Vol, veh/h		357			16			640			493	
Approach Delay, s/veh		12.0			17.7			12.7			13.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.8	16.0	4.6	15.2	7.0	13.9	12.4	7.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	29.5	5.5	31.5	6.5	28.5	18.5	18.5
Max Q Clear Time (g_c+I1), s	2.1	7.6	2.0	3.2	3.0	5.7	7.5	2.2
Green Ext Time (p_c), s	0.0	4.0	0.0	0.3	0.0	2.8	0.7	0.0

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

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↱	
Traffic Vol, veh/h	18	105	0	0	114	27	0	0	0	18	0	14
Future Vol, veh/h	18	105	0	0	114	27	0	0	0	18	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	122	0	0	133	31	0	0	0	21	0	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	164	0	0	122	0	0	321	328	122	313	313	149
Stage 1	-	-	-	-	-	-	164	164	-	149	149	-
Stage 2	-	-	-	-	-	-	157	164	-	164	164	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1414	-	-	1465	-	-	632	591	929	640	602	898
Stage 1	-	-	-	-	-	-	838	762	-	854	774	-
Stage 2	-	-	-	-	-	-	845	762	-	838	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1414	-	-	1465	-	-	613	582	929	632	592	898
Mov Cap-2 Maneuver	-	-	-	-	-	-	613	582	-	632	592	-
Stage 1	-	-	-	-	-	-	825	750	-	840	774	-
Stage 2	-	-	-	-	-	-	830	762	-	825	750	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0	0	10.1
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	1414	-	-	1465	-	-	632	898
HCM Lane V/C Ratio	-	0.015	-	-	-	-	-	0.033	0.018
HCM Control Delay (s)	0	7.6	0	-	0	-	-	10.9	9.1
HCM Lane LOS	A	A	A	-	A	-	-	B	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	94	106	60	23	34
Future Vol, veh/h	29	94	106	60	23	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	103	116	66	25	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	182	0	-	0	316	149
Stage 1	-	-	-	-	149	-
Stage 2	-	-	-	-	167	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1393	-	-	-	677	898
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	863	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1393	-	-	-	661	898
Mov Cap-2 Maneuver	-	-	-	-	661	-
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	863	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1393	-	-	-	785
HCM Lane V/C Ratio	0.023	-	-	-	0.08
HCM Control Delay (s)	7.6	0	-	-	10
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	110	160	53	25	6
Future Vol, veh/h	7	110	160	53	25	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	129	188	62	29	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	250	0	-	0	364	219
Stage 1	-	-	-	-	219	-
Stage 2	-	-	-	-	145	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1316	-	-	-	635	821
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	882	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1316	-	-	-	631	821
Mov Cap-2 Maneuver	-	-	-	-	631	-
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	882	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1316	-	-	-	661
HCM Lane V/C Ratio	0.006	-	-	-	0.055
HCM Control Delay (s)	7.8	0	-	-	10.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	61	13	16	7	9	6	78	386	2	2	416	126
Future Vol, veh/h	61	13	16	7	9	6	78	386	2	2	416	126
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	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	14	17	7	10	6	83	411	2	2	443	134

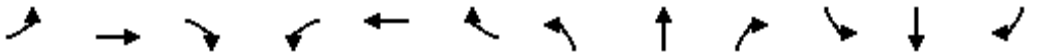
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	824	1026	222	810	1158	206	577	0	0	413	0	0
Stage 1	447	447	-	577	577	-	-	-	-	-	-	-
Stage 2	377	579	-	233	581	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	265	233	782	271	195	800	993	-	-	1142	-	-
Stage 1	560	572	-	469	500	-	-	-	-	-	-	-
Stage 2	616	499	-	749	498	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	236	213	782	236	178	800	993	-	-	1142	-	-
Mov Cap-2 Maneuver	236	213	-	236	178	-	-	-	-	-	-	-
Stage 1	513	571	-	430	458	-	-	-	-	-	-	-
Stage 2	548	457	-	714	497	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.7	20	1.5	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	993	-	-	236	356	236	178	800	1142	-	-
HCM Lane V/C Ratio	0.084	-	-	0.275	0.087	0.032	0.054	0.008	0.002	-	-
HCM Control Delay (s)	9	-	-	25.9	16.1	20.8	26.4	9.5	8.2	-	-
HCM Lane LOS	A	-	-	D	C	C	D	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.1	0.3	0.1	0.2	0	0	-	-

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	155	47	95	166	126	26	312	154	161	300	23
Future Volume (veh/h)	28	155	47	95	166	126	26	312	154	161	300	23
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	29	161	0	99	173	0	27	325	0	168	312	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	415	467		899	649		452	666		503	944	
Arrive On Green	0.03	0.13	0.00	0.09	0.18	0.00	0.03	0.19	0.00	0.11	0.27	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	29	161	0	99	173	0	27	325	0	168	312	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.5	1.5	0.0	0.9	1.6	0.0	0.4	3.0	0.0	2.7	2.6	0.0
Cycle Q Clear(g_c), s	0.5	1.5	0.0	0.9	1.6	0.0	0.4	3.0	0.0	2.7	2.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	415	467		899	649		452	666		503	944	
V/C Ratio(X)	0.07	0.34		0.11	0.27		0.06	0.49		0.33	0.33	
Avail Cap(c_a), veh/h	664	2533		1299	2629		705	2247		1000	3011	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	13.1	14.7	0.0	11.8	13.1	0.0	11.5	13.5	0.0	10.0	11.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.0	0.1	0.2	0.0	0.1	0.6	0.0	0.4	0.2	0.0
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	0.5	0.0	0.3	0.5	0.0	0.1	1.0	0.0	0.8	0.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	15.1	0.0	11.8	13.3	0.0	11.5	14.1	0.0	10.4	11.2	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		190	A		272	A		352	A		480	A
Approach Delay, s/veh		14.8			12.7			13.9			10.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	11.5	7.7	9.4	5.7	14.4	5.8	11.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	23.5	7.5	26.5	6.5	31.5	6.5	27.5
Max Q Clear Time (g_c+I1), s	4.7	5.0	2.9	3.5	2.4	4.6	2.5	3.6
Green Ext Time (p_c), s	0.3	1.9	0.1	0.9	0.0	2.1	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	14	2	0	17	15	405	3	15	600	13
Future Vol, veh/h	9	0	14	2	0	17	15	405	3	15	600	13
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	-	-	-	-	-	-	250	-	250	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	15	2	0	19	16	445	3	16	659	14

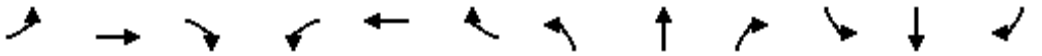
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	946	1171	330	839	1182	223	673	0	0	448	0	0
Stage 1	691	691	-	477	477	-	-	-	-	-	-	-
Stage 2	255	480	-	362	705	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	216	191	666	259	188	780	914	-	-	1109	-	-
Stage 1	401	444	-	538	554	-	-	-	-	-	-	-
Stage 2	727	553	-	629	437	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	206	185	666	247	182	780	914	-	-	1109	-	-
Mov Cap-2 Maneuver	206	185	-	247	182	-	-	-	-	-	-	-
Stage 1	394	438	-	528	544	-	-	-	-	-	-	-
Stage 2	697	543	-	606	431	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.9	10.9	0.3	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	914	-	-	355	636	1109	-	-
HCM Lane V/C Ratio	0.018	-	-	0.071	0.033	0.015	-	-
HCM Control Delay (s)	9	-	-	15.9	10.9	8.3	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	5	219	4	4	6	194	237	0	11	406	99
Future Volume (veh/h)	76	5	219	4	4	6	194	237	0	11	406	99
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	85	0	0	4	4	6	206	252	0	12	432	105
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	243	0		31	33	28	1271	1956	873	701	1685	752
Arrive On Green	0.07	0.00	0.00	0.02	0.02	0.02	0.09	0.55	0.00	0.02	0.47	0.47
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	85	0	0	4	4	6	206	252	0	12	432	105
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.2	0.0	0.0	0.1	0.1	0.2	1.3	1.8	0.0	0.2	3.8	1.9
Cycle Q Clear(g_c), s	1.2	0.0	0.0	0.1	0.1	0.2	1.3	1.8	0.0	0.2	3.8	1.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	243	0		31	33	28	1271	1956	873	701	1685	752
V/C Ratio(X)	0.35	0.00		0.13	0.12	0.21	0.16	0.13	0.00	0.02	0.26	0.14
Avail Cap(c_a), veh/h	1482	0		638	670	567	1456	1956	873	864	1685	752
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	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	0.0	25.0	25.0	25.0	4.8	5.6	0.0	6.8	8.1	7.7
Incr Delay (d2), s/veh	0.9	0.0	0.0	1.8	1.6	3.8	0.1	0.1	0.0	0.0	0.4	0.4
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	0.5	0.0	0.0	0.1	0.1	0.1	0.3	0.5	0.0	0.1	1.2	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.8	0.0	0.0	26.8	26.6	28.8	4.9	5.8	0.0	6.8	8.5	8.0
LnGrp LOS	C	A		C	C	C	A	A	A	A	A	A
Approach Vol, veh/h		85	A		14			458			549	
Approach Delay, s/veh		23.8			27.6			5.4			8.4	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	32.9		8.0	9.2	29.0		5.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	26.5		21.5	7.5	24.5		18.5				
Max Q Clear Time (g_c+I1), s	2.2	3.8		3.2	3.3	5.8		2.2				
Green Ext Time (p_c), s	0.0	1.6		0.2	0.2	3.1		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↱	
Traffic Vol, veh/h	19	118	0	0	125	29	0	0	0	19	0	15
Future Vol, veh/h	19	118	0	0	125	29	0	0	0	19	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	137	0	0	145	34	0	0	0	22	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	179	0	0	137	0	0	352	360	137	343	343	162
Stage 1	-	-	-	-	-	-	181	181	-	162	162	-
Stage 2	-	-	-	-	-	-	171	179	-	181	181	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1397	-	-	1447	-	-	603	567	911	611	579	883
Stage 1	-	-	-	-	-	-	821	750	-	840	764	-
Stage 2	-	-	-	-	-	-	831	751	-	821	750	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1397	-	-	1447	-	-	584	557	911	603	569	883
Mov Cap-2 Maneuver	-	-	-	-	-	-	584	557	-	603	569	-
Stage 1	-	-	-	-	-	-	807	737	-	826	764	-
Stage 2	-	-	-	-	-	-	815	751	-	807	737	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0	0	10.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	1397	-	-	1447	-	-	603	883
HCM Lane V/C Ratio	-	0.016	-	-	-	-	-	0.037	0.02
HCM Control Delay (s)	0	7.6	0	-	0	-	-	11.2	9.2
HCM Lane LOS	A	A	A	-	A	-	-	B	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	106	117	64	25	36
Future Vol, veh/h	31	106	117	64	25	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	116	129	70	27	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	199	0	-	0	348	164
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	184	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1373	-	-	-	649	881
Stage 1	-	-	-	-	865	-
Stage 2	-	-	-	-	848	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1373	-	-	-	632	881
Mov Cap-2 Maneuver	-	-	-	-	632	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	848	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1373	-	-	-	759
HCM Lane V/C Ratio	0.025	-	-	-	0.088
HCM Control Delay (s)	7.7	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	123	175	57	27	6
Future Vol, veh/h	8	123	175	57	27	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	145	206	67	32	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	273	0	-	0	403	240
Stage 1	-	-	-	-	240	-
Stage 2	-	-	-	-	163	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1290	-	-	-	603	799
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	866	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1290	-	-	-	598	799
Mov Cap-2 Maneuver	-	-	-	-	598	-
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	866	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	11.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1290	-	-	-	627
HCM Lane V/C Ratio	0.007	-	-	-	0.062
HCM Control Delay (s)	7.8	0	-	-	11.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	14	17	8	10	6	84	475	2	2	499	138
Future Vol, veh/h	70	14	17	8	10	6	84	475	2	2	499	138
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	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	74	15	18	9	11	6	89	505	2	2	531	147

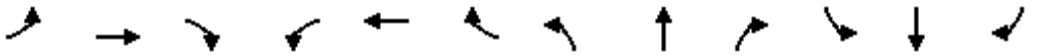
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	971	1220	266	960	1365	253	678	0	0	507	0	0
Stage 1	535	535	-	683	683	-	-	-	-	-	-	-
Stage 2	436	685	-	277	682	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	207	179	732	211	146	746	910	-	-	1054	-	-
Stage 1	497	522	-	405	447	-	-	-	-	-	-	-
Stage 2	569	447	-	706	448	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	178	161	732	177	131	746	910	-	-	1054	-	-
Mov Cap-2 Maneuver	178	161	-	177	131	-	-	-	-	-	-	-
Stage 1	448	521	-	365	403	-	-	-	-	-	-	-
Stage 2	496	403	-	668	447	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	33	25.8	1.4	0
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	910	-	-	178	281	177	131	746	1054	-	-
HCM Lane V/C Ratio	0.098	-	-	0.418	0.117	0.048	0.081	0.009	0.002	-	-
HCM Control Delay (s)	9.4	-	-	39	19.5	26.4	34.9	9.9	8.4	-	-
HCM Lane LOS	A	-	-	E	C	D	D	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.9	0.4	0.1	0.3	0	0	-	-

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	212	64	130	227	189	30	368	179	196	352	30
Future Volume (veh/h)	43	212	64	130	227	189	30	368	179	196	352	30
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	45	221	0	135	236	0	31	383	0	204	367	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	408	491		864	657		443	711		506	1035	
Arrive On Green	0.05	0.14	0.00	0.10	0.18	0.00	0.04	0.20	0.00	0.13	0.29	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	45	221	0	135	236	0	31	383	0	204	367	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.9	2.3	0.0	1.3	2.4	0.0	0.6	4.0	0.0	3.4	3.3	0.0
Cycle Q Clear(g_c), s	0.9	2.3	0.0	1.3	2.4	0.0	0.6	4.0	0.0	3.4	3.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	408	491		864	657		443	711		506	1035	
V/C Ratio(X)	0.11	0.45		0.16	0.36		0.07	0.54		0.40	0.35	
Avail Cap(c_a), veh/h	603	2381		1081	2381		661	1948		952	2728	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	13.9	16.3	0.0	12.6	14.6	0.0	12.2	14.7	0.0	10.0	11.5	0.0
Incr Delay (d2), s/veh	0.1	0.6	0.0	0.1	0.3	0.0	0.1	0.6	0.0	0.5	0.2	0.0
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	0.3	0.9	0.0	0.4	0.8	0.0	0.2	1.4	0.0	1.1	1.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	16.9	0.0	12.7	14.9	0.0	12.2	15.4	0.0	10.5	11.7	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		266	A		371	A		414	A		571	A
Approach Delay, s/veh		16.4			14.1			15.1			11.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	12.7	8.4	10.2	6.0	16.5	6.5	12.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	22.5	6.5	27.5	6.5	31.5	6.5	27.5
Max Q Clear Time (g_c+I1), s	5.4	6.0	3.3	4.3	2.6	5.3	2.9	4.4
Green Ext Time (p_c), s	0.4	2.2	0.1	1.3	0.0	2.5	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	13.7
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	15	2	0	18	16	518	3	16	768	14
Future Vol, veh/h	10	0	15	2	0	18	16	518	3	16	768	14
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	-	-	-	-	-	-	250	-	250	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	16	2	0	20	18	569	3	18	844	15

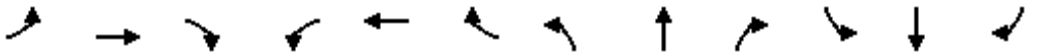
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1201	1488	422	1063	1500	285	859	0	0	572	0	0
Stage 1	880	880	-	605	605	-	-	-	-	-	-	-
Stage 2	321	608	-	458	895	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	140	123	580	177	121	712	778	-	-	997	-	-
Stage 1	308	363	-	451	486	-	-	-	-	-	-	-
Stage 2	665	484	-	552	357	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	132	118	580	167	116	712	778	-	-	997	-	-
Mov Cap-2 Maneuver	132	118	-	167	116	-	-	-	-	-	-	-
Stage 1	301	356	-	441	475	-	-	-	-	-	-	-
Stage 2	632	473	-	527	351	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.5	12	0.3	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	778	-	-	246	537	997	-	-
HCM Lane V/C Ratio	0.023	-	-	0.112	0.041	0.018	-	-
HCM Control Delay (s)	9.7	-	-	21.5	12	8.7	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1	0.1	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	5	280	4	4	6	248	303	0	12	520	130
Future Volume (veh/h)	102	5	280	4	4	6	248	303	0	12	520	130
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	113	0	0	4	4	6	264	322	0	13	553	138
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	270	0		31	33	28	1146	1978	882	673	1713	764
Arrive On Green	0.08	0.00	0.00	0.02	0.02	0.02	0.09	0.56	0.00	0.02	0.48	0.48
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	113	0	0	4	4	6	264	322	0	13	553	138
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.6	0.0	0.0	0.1	0.1	0.2	1.8	2.4	0.0	0.2	5.1	2.7
Cycle Q Clear(g_c), s	1.6	0.0	0.0	0.1	0.1	0.2	1.8	2.4	0.0	0.2	5.1	2.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	270	0		31	33	28	1146	1978	882	673	1713	764
V/C Ratio(X)	0.42	0.00		0.13	0.12	0.22	0.23	0.16	0.00	0.02	0.32	0.18
Avail Cap(c_a), veh/h	1354	0		595	624	529	1312	1978	882	825	1713	764
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	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.8	0.0	0.0	26.1	26.1	26.1	5.1	5.8	0.0	6.8	8.6	7.9
Incr Delay (d2), s/veh	1.0	0.0	0.0	1.8	1.6	3.8	0.1	0.2	0.0	0.0	0.5	0.5
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	0.7	0.0	0.0	0.1	0.1	0.1	0.5	0.7	0.0	0.1	1.7	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	0.0	0.0	27.9	27.7	29.9	5.2	6.0	0.0	6.8	9.1	8.4
LnGrp LOS	C	A		C	C	C	A	A	A	A	A	A
Approach Vol, veh/h		113	A		14			586			704	
Approach Delay, s/veh		24.8			28.7			5.7			8.9	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	34.5		8.6	9.4	30.5		5.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	28.0		20.5	7.5	26.0		18.0				
Max Q Clear Time (g_c+I1), s	2.2	4.4		3.6	3.8	7.1		2.2				
Green Ext Time (p_c), s	0.0	2.1		0.3	0.3	4.1		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Traffic Vol, veh/h	19	160	30	93	150	32	18	9	56	27	18	15
Future Vol, veh/h	19	160	30	93	150	32	18	9	56	27	18	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	186	35	108	174	37	21	10	65	31	21	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	211	0	0	221	0	0	676	675	204	694	674	193
Stage 1	-	-	-	-	-	-	248	248	-	409	409	-
Stage 2	-	-	-	-	-	-	428	427	-	285	265	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1360	-	-	1348	-	-	367	376	837	357	376	849
Stage 1	-	-	-	-	-	-	756	701	-	619	596	-
Stage 2	-	-	-	-	-	-	605	585	-	722	689	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1360	-	-	1348	-	-	314	335	837	295	335	849
Mov Cap-2 Maneuver	-	-	-	-	-	-	314	335	-	295	335	-
Stage 1	-	-	-	-	-	-	742	688	-	607	542	-
Stage 2	-	-	-	-	-	-	518	532	-	643	676	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	2.7	13	15.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	549	1360	-	-	1348	-	-	295	462
HCM Lane V/C Ratio	0.176	0.016	-	-	0.08	-	-	0.106	0.083
HCM Control Delay (s)	13	7.7	0	-	7.9	0	-	18.7	13.5
HCM Lane LOS	B	A	A	-	A	A	-	C	B
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.3	-	-	0.4	0.3

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	31	182	30	46	221	64	18	0	27	25	0	36
Future Vol, veh/h	31	182	30	46	221	64	18	0	27	25	0	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	92	92	91	91	92	92	92	91	92	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	200	33	50	243	70	20	0	29	27	0	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	313	0	0	233	0	0	683	698	217	677	679	278
Stage 1	-	-	-	-	-	-	285	285	-	378	378	-
Stage 2	-	-	-	-	-	-	398	413	-	299	301	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1247	-	-	1335	-	-	363	364	823	367	374	761
Stage 1	-	-	-	-	-	-	722	676	-	644	615	-
Stage 2	-	-	-	-	-	-	628	594	-	710	665	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1247	-	-	1335	-	-	324	336	823	334	346	761
Mov Cap-2 Maneuver	-	-	-	-	-	-	324	336	-	334	346	-
Stage 1	-	-	-	-	-	-	700	655	-	624	587	-
Stage 2	-	-	-	-	-	-	568	567	-	663	644	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	1.1	12.8	13.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	509	1247	-	-	1335	-	-	499
HCM Lane V/C Ratio	0.096	0.027	-	-	0.037	-	-	0.134
HCM Control Delay (s)	12.8	8	0	-	7.8	0	-	13.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	8	206	20	30	314	57	11	0	18	27	0	6
Future Vol, veh/h	8	206	20	30	314	57	11	0	18	27	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	92	92	85	85	92	92	92	85	92	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	242	22	33	369	67	12	0	20	32	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	436	0	0	264	0	0	743	773	253	750	751	403
Stage 1	-	-	-	-	-	-	271	271	-	469	469	-
Stage 2	-	-	-	-	-	-	472	502	-	281	282	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1124	-	-	1300	-	-	331	330	786	328	340	647
Stage 1	-	-	-	-	-	-	735	685	-	575	561	-
Stage 2	-	-	-	-	-	-	573	542	-	726	678	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1124	-	-	1300	-	-	317	316	786	309	325	647
Mov Cap-2 Maneuver	-	-	-	-	-	-	317	316	-	309	325	-
Stage 1	-	-	-	-	-	-	728	679	-	570	542	-
Stage 2	-	-	-	-	-	-	547	524	-	702	672	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.5	12.6	16.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	503	1124	-	-	1300	-	-	341
HCM Lane V/C Ratio	0.063	0.008	-	-	0.025	-	-	0.114
HCM Control Delay (s)	12.6	8.2	0	-	7.8	0	-	16.9
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.4

Intersection	
Int Delay, s/veh	25.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	171	14	17	8	10	6	84	521	2	2	578	307
Future Vol, veh/h	171	14	17	8	10	6	84	521	2	2	578	307
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	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	182	15	18	9	11	6	89	554	2	2	615	327

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1080	1353	308	1051	1678	277	942	0	0	556	0	0
Stage 1	619	619	-	732	732	-	-	-	-	-	-	-
Stage 2	461	734	-	319	946	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 172	149	688	181	94	720	724	-	-	1011	-	-
Stage 1	443	478	-	379	425	-	-	-	-	-	-	-
Stage 2	550	424	-	667	338	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 139	130	688	146	82	720	724	-	-	1011	-	-
Mov Cap-2 Maneuver	~ 139	130	-	146	82	-	-	-	-	-	-	-
Stage 1	389	477	-	332	373	-	-	-	-	-	-	-
Stage 2	464	372	-	628	337	-	-	-	-	-	-	-

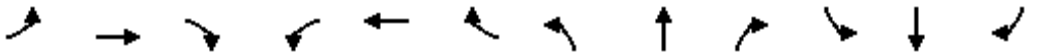
Approach	EB	WB	NB	SB
HCM Control Delay, s	208.5	35.9	1.5	0
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	724	-	-	139	234	146	82	720	1011	-	-
HCM Lane V/C Ratio	0.123	-	-	1.309	0.141	0.058	0.13	0.009	0.002	-	-
HCM Control Delay (s)	10.7	-	-	242.1	22.9	31.2	55.3	10	8.6	-	-
HCM Lane LOS	B	-	-	F	C	D	F	B	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	11.4	0.5	0.2	0.4	0	0	-	-

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

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	212	64	130	227	271	30	399	179	245	370	35
Future Volume (veh/h)	51	212	64	130	227	271	30	399	179	245	370	35
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	53	221	0	135	236	0	31	416	0	255	385	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	394	478		827	614		435	727		533	1139	
Arrive On Green	0.05	0.13	0.00	0.09	0.17	0.00	0.04	0.20	0.00	0.15	0.32	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	53	221	0	135	236	0	31	416	0	255	385	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.1	2.5	0.0	1.4	2.5	0.0	0.6	4.6	0.0	4.3	3.6	0.0
Cycle Q Clear(g_c), s	1.1	2.5	0.0	1.4	2.5	0.0	0.6	4.6	0.0	4.3	3.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	394	478		827	614		435	727		533	1139	
V/C Ratio(X)	0.13	0.46		0.16	0.38		0.07	0.57		0.48	0.34	
Avail Cap(c_a), veh/h	523	2260		946	2260		597	1685		1025	2753	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.7	17.3	0.0	13.5	15.8	0.0	12.7	15.5	0.0	9.7	11.2	0.0
Incr Delay (d2), s/veh	0.2	0.7	0.0	0.1	0.4	0.0	0.1	0.7	0.0	0.7	0.2	0.0
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	0.4	0.9	0.0	0.5	0.9	0.0	0.2	1.6	0.0	1.4	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	18.0	0.0	13.6	16.2	0.0	12.8	16.2	0.0	10.3	11.4	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		274	A		371	A		447	A		640	A
Approach Delay, s/veh		17.4			15.3			16.0			11.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	13.3	8.5	10.3	6.1	18.4	6.9	12.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	20.5	5.5	27.5	5.5	33.5	5.5	27.5
Max Q Clear Time (g_c+I1), s	6.3	6.6	3.4	4.5	2.6	5.6	3.1	4.5
Green Ext Time (p_c), s	0.6	2.3	0.1	1.3	0.0	2.7	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	15	12	0	41	16	518	21	57	768	14
Future Vol, veh/h	10	0	15	12	0	41	16	518	21	57	768	14
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	-	-	-	-	-	-	250	-	250	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	16	13	0	45	18	569	23	63	844	15

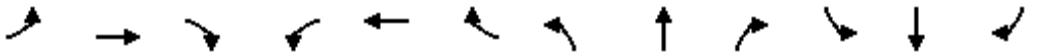
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1291	1598	422	1153	1590	285	859	0	0	592	0	0
Stage 1	970	970	-	605	605	-	-	-	-	-	-	-
Stage 2	321	628	-	548	985	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	121	105	580	152	107	712	778	-	-	980	-	-
Stage 1	272	330	-	451	486	-	-	-	-	-	-	-
Stage 2	665	474	-	488	324	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	106	96	580	138	98	712	778	-	-	980	-	-
Mov Cap-2 Maneuver	106	96	-	138	98	-	-	-	-	-	-	-
Stage 1	266	309	-	441	475	-	-	-	-	-	-	-
Stage 2	609	463	-	444	303	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.9	16.7	0.3	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	778	-	-	208	367	980	-	-
HCM Lane V/C Ratio	0.023	-	-	0.132	0.159	0.064	-	-
HCM Control Delay (s)	9.7	-	-	24.9	16.7	8.9	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.6	0.2	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	19	286	4	13	13	251	323	0	24	555	135
Future Volume (veh/h)	111	19	286	4	13	13	251	323	0	24	555	135
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	132	0	0	4	14	14	267	344	0	26	590	144
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	0		62	65	55	1086	1911	852	678	1706	761
Arrive On Green	0.08	0.00	0.00	0.03	0.03	0.03	0.09	0.54	0.00	0.03	0.48	0.48
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	132	0	0	4	14	14	267	344	0	26	590	144
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.0	0.0	0.0	0.1	0.4	0.5	2.0	2.8	0.0	0.4	5.8	2.9
Cycle Q Clear(g_c), s	2.0	0.0	0.0	0.1	0.4	0.5	2.0	2.8	0.0	0.4	5.8	2.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	276	0		62	65	55	1086	1911	852	678	1706	761
V/C Ratio(X)	0.48	0.00		0.06	0.21	0.25	0.25	0.18	0.00	0.04	0.35	0.19
Avail Cap(c_a), veh/h	1235	0		570	598	507	1245	1911	852	800	1706	761
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	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	0.0	0.0	26.3	26.4	26.4	5.8	6.7	0.0	6.9	9.1	8.4
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.4	1.6	2.4	0.1	0.2	0.0	0.0	0.6	0.6
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	0.8	0.0	0.0	0.1	0.2	0.2	0.5	0.9	0.0	0.1	2.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.1	0.0	0.0	26.7	28.0	28.8	5.9	6.9	0.0	6.9	9.7	8.9
LnGrp LOS	C	A		C	C	C	A	A	A	A	A	A
Approach Vol, veh/h		132	A		32			611			760	
Approach Delay, s/veh		26.1			28.2			6.5			9.4	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	34.8		8.9	9.4	31.5		6.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	29.0		19.5	7.5	27.0		18.0				
Max Q Clear Time (g_c+I1), s	2.4	4.8		4.0	4.0	7.8		2.5				
Green Ext Time (p_c), s	0.0	2.3		0.3	0.3	4.4		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	46	72	121	568	525	79
Future Vol, veh/h	46	72	121	568	525	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	300	0	300	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	78	132	617	571	86

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1144	286	657	0	-	0
Stage 1	571	-	-	-	-	-
Stage 2	573	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	193	711	926	-	-	-
Stage 1	529	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	165	711	926	-	-	-
Mov Cap-2 Maneuver	165	-	-	-	-	-
Stage 1	453	-	-	-	-	-
Stage 2	527	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.6	1.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	926	-	165	711	-	-
HCM Lane V/C Ratio	0.142	-	0.303	0.11	-	-
HCM Control Delay (s)	9.5	-	36	10.7	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.5	-	1.2	0.4	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Traffic Vol, veh/h	21	125	0	0	133	31	0	0	0	21	0	16
Future Vol, veh/h	21	125	0	0	133	31	0	0	0	21	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	145	0	0	155	36	0	0	0	24	0	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	191	0	0	145	0	0	376	384	145	366	366	173
Stage 1	-	-	-	-	-	-	193	193	-	173	173	-
Stage 2	-	-	-	-	-	-	183	191	-	193	193	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1383	-	-	1437	-	-	581	550	902	590	562	871
Stage 1	-	-	-	-	-	-	809	741	-	829	756	-
Stage 2	-	-	-	-	-	-	819	742	-	809	741	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1383	-	-	1437	-	-	560	540	902	582	551	871
Mov Cap-2 Maneuver	-	-	-	-	-	-	560	540	-	582	551	-
Stage 1	-	-	-	-	-	-	794	727	-	813	756	-
Stage 2	-	-	-	-	-	-	802	742	-	794	727	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0	0	10.5
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	1383	-	-	1437	-	-	582	871
HCM Lane V/C Ratio	-	0.018	-	-	-	-	-	0.042	0.021
HCM Control Delay (s)	0	7.7	0	-	0	-	-	11.5	9.2
HCM Lane LOS	A	A	A	-	A	-	-	B	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	33	112	124	69	26	39
Future Vol, veh/h	33	112	124	69	26	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	123	136	76	29	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	212	0	-	0	369	174
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	195	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1358	-	-	-	631	869
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	838	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1358	-	-	-	613	869
Mov Cap-2 Maneuver	-	-	-	-	613	-
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	838	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1358	-	-	-	745
HCM Lane V/C Ratio	0.027	-	-	-	0.096
HCM Control Delay (s)	7.7	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	131	186	61	29	7
Future Vol, veh/h	8	131	186	61	29	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	154	219	72	34	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	291	0	-	0	427	255
Stage 1	-	-	-	-	255	-
Stage 2	-	-	-	-	172	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1271	-	-	-	584	784
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	858	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1271	-	-	-	579	784
Mov Cap-2 Maneuver	-	-	-	-	579	-
Stage 1	-	-	-	-	782	-
Stage 2	-	-	-	-	858	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1271	-	-	-	610
HCM Lane V/C Ratio	0.007	-	-	-	0.069
HCM Control Delay (s)	7.9	0	-	-	11.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	15	18	8	10	7	89	539	2	2	568	147
Future Vol, veh/h	75	15	18	8	10	7	89	539	2	2	568	147
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	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	80	16	19	9	11	7	95	573	2	2	604	156

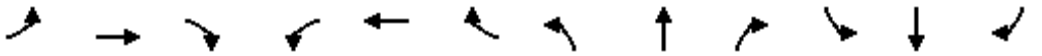
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1090	1373	302	1077	1527	287	760	0	0	575	0	0
Stage 1	608	608	-	763	763	-	-	-	-	-	-	-
Stage 2	482	765	-	314	764	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	170	145	694	173	116	710	848	-	-	994	-	-
Stage 1	450	484	-	363	411	-	-	-	-	-	-	-
Stage 2	534	410	-	671	411	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	142	128	694	139	103	710	848	-	-	994	-	-
Mov Cap-2 Maneuver	142	128	-	139	103	-	-	-	-	-	-	-
Stage 1	400	483	-	322	365	-	-	-	-	-	-	-
Stage 2	456	364	-	630	410	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	48	30.8	1.4	0
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	848	-	-	142	231	139	103	710	994	-	-
HCM Lane V/C Ratio	0.112	-	-	0.562	0.152	0.061	0.103	0.01	0.002	-	-
HCM Control Delay (s)	9.8	-	-	58.8	23.4	32.6	43.9	10.1	8.6	-	-
HCM Lane LOS	A	-	-	F	C	D	E	B	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	2.8	0.5	0.2	0.3	0	0	-	-

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	282	86	173	302	245	35	420	204	223	402	34
Future Volume (veh/h)	56	282	86	173	302	245	35	420	204	223	402	34
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	58	294	0	180	315	0	36	438	0	232	419	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	391	568		833	715		431	743		497	1091	
Arrive On Green	0.06	0.16	0.00	0.10	0.20	0.00	0.04	0.21	0.00	0.14	0.31	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	58	294	0	180	315	0	36	438	0	232	419	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.2	3.5	0.0	1.9	3.5	0.0	0.7	5.1	0.0	4.2	4.2	0.0
Cycle Q Clear(g_c), s	1.2	3.5	0.0	1.9	3.5	0.0	0.7	5.1	0.0	4.2	4.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	391	568		833	715		431	743		497	1091	
V/C Ratio(X)	0.15	0.52		0.22	0.44		0.08	0.59		0.47	0.38	
Avail Cap(c_a), veh/h	504	2142		909	2142		575	1675		934	2609	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.5	17.6	0.0	13.4	16.0	0.0	13.1	16.3	0.0	10.5	12.4	0.0
Incr Delay (d2), s/veh	0.2	0.7	0.0	0.1	0.4	0.0	0.1	0.8	0.0	0.7	0.2	0.0
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	0.4	1.3	0.0	0.6	1.3	0.0	0.3	1.9	0.0	1.4	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	18.3	0.0	13.5	16.4	0.0	13.2	17.0	0.0	11.1	12.6	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		352	A		495	A		474	A		651	A
Approach Delay, s/veh		17.7			15.3			16.7			12.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	14.0	9.0	11.8	6.3	18.5	7.1	13.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	21.5	5.5	27.5	5.5	33.5	5.5	27.5
Max Q Clear Time (g_c+I1), s	6.2	7.1	3.9	5.5	2.7	6.2	3.2	5.5
Green Ext Time (p_c), s	0.5	2.5	0.1	1.8	0.0	2.9	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	16	2	0	19	17	647	3	17	959	15
Future Vol, veh/h	10	0	16	2	0	19	17	647	3	17	959	15
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	-	-	-	-	-	-	250	-	250	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	18	2	0	21	19	711	3	19	1054	16

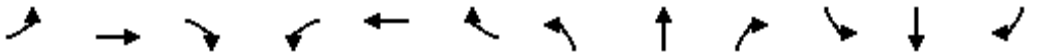
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1486	1844	527	1314	1857	356	1070	0	0	714	0	0
Stage 1	1092	1092	-	749	749	-	-	-	-	-	-	-
Stage 2	394	752	-	565	1108	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	86	74	496	116	73	640	647	-	-	882	-	-
Stage 1	229	289	-	370	417	-	-	-	-	-	-	-
Stage 2	602	416	-	477	284	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	80	70	496	108	69	640	647	-	-	882	-	-
Mov Cap-2 Maneuver	80	70	-	108	69	-	-	-	-	-	-	-
Stage 1	222	283	-	359	405	-	-	-	-	-	-	-
Stage 2	565	404	-	450	278	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.3	13.7	0.3	0.2
HCM LOS	D	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	647	-	-	165	436	882	-	-
HCM Lane V/C Ratio	0.029	-	-	0.173	0.053	0.021	-	-
HCM Control Delay (s)	10.7	-	-	31.3	13.7	9.2	-	-
HCM Lane LOS	B	-	-	D	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.2	0.1	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	6	350	5	5	7	310	379	0	13	649	161
Future Volume (veh/h)	126	6	350	5	5	7	310	379	0	13	649	161
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	138	0	0	5	5	7	330	403	0	14	690	171
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	0		37	39	33	1017	1958	873	632	1696	756
Arrive On Green	0.08	0.00	0.00	0.02	0.02	0.02	0.09	0.55	0.00	0.02	0.48	0.48
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	138	0	0	5	5	7	330	403	0	14	690	171
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.0	0.0	0.0	0.2	0.1	0.2	2.3	3.1	0.0	0.2	6.9	3.4
Cycle Q Clear(g_c), s	2.0	0.0	0.0	0.2	0.1	0.2	2.3	3.1	0.0	0.2	6.9	3.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	286	0		37	39	33	1017	1958	873	632	1696	756
V/C Ratio(X)	0.48	0.00		0.13	0.13	0.21	0.32	0.21	0.00	0.02	0.41	0.23
Avail Cap(c_a), veh/h	1275	0		589	618	524	1241	1958	873	764	1696	756
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	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.0	0.0	0.0	26.2	26.2	26.2	5.8	6.2	0.0	7.0	9.2	8.3
Incr Delay (d2), s/veh	1.3	0.0	0.0	1.6	1.5	3.1	0.2	0.2	0.0	0.0	0.7	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	0.8	0.0	0.0	0.1	0.1	0.1	0.6	1.0	0.0	0.1	2.3	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.2	0.0	0.0	27.8	27.7	29.4	6.0	6.4	0.0	7.0	10.0	9.0
LnGrp LOS	C	A		C	C	C	A	A	A	A	A	A
Approach Vol, veh/h		138	A		17			733			875	
Approach Delay, s/veh		25.2			28.4			6.2			9.7	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	34.5		8.9	9.5	30.5		5.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	29.5		19.5	8.5	26.0		18.0				
Max Q Clear Time (g_c+I1), s	2.2	5.1		4.0	4.3	8.9		2.2				
Green Ext Time (p_c), s	0.0	2.7		0.3	0.5	5.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay	9.7	
HCM 6th LOS	A	

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Traffic Vol, veh/h	21	167	30	93	158	34	18	9	56	29	18	16
Future Vol, veh/h	21	167	30	93	158	34	18	9	56	29	18	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	194	35	108	184	40	21	10	65	34	21	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	224	0	0	229	0	0	700	700	212	717	697	204
Stage 1	-	-	-	-	-	-	260	260	-	420	420	-
Stage 2	-	-	-	-	-	-	440	440	-	297	277	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1345	-	-	1339	-	-	354	363	828	345	365	837
Stage 1	-	-	-	-	-	-	745	693	-	611	589	-
Stage 2	-	-	-	-	-	-	596	578	-	712	681	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1345	-	-	1339	-	-	301	322	828	284	324	837
Mov Cap-2 Maneuver	-	-	-	-	-	-	301	322	-	284	324	-
Stage 1	-	-	-	-	-	-	729	678	-	598	534	-
Stage 2	-	-	-	-	-	-	508	524	-	632	667	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	2.6	13.2	16.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	534	1345	-	-	1339	-	-	284	455
HCM Lane V/C Ratio	0.181	0.018	-	-	0.081	-	-	0.119	0.087
HCM Control Delay (s)	13.2	7.7	0	-	7.9	0	-	19.4	13.7
HCM Lane LOS	B	A	A	-	A	A	-	C	B
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0.3	-	-	0.4	0.3

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	33	188	30	46	228	69	18	0	27	26	0	39
Future Vol, veh/h	33	188	30	46	228	69	18	0	27	26	0	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	92	92	91	91	92	92	92	91	92	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	36	207	33	50	251	76	20	0	29	29	0	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	327	0	0	240	0	0	707	723	224	699	701	289
Stage 1	-	-	-	-	-	-	296	296	-	389	389	-
Stage 2	-	-	-	-	-	-	411	427	-	310	312	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1233	-	-	1327	-	-	350	352	815	354	363	750
Stage 1	-	-	-	-	-	-	712	668	-	635	608	-
Stage 2	-	-	-	-	-	-	618	585	-	700	658	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1233	-	-	1327	-	-	310	324	815	320	334	750
Mov Cap-2 Maneuver	-	-	-	-	-	-	310	324	-	320	334	-
Stage 1	-	-	-	-	-	-	688	645	-	613	579	-
Stage 2	-	-	-	-	-	-	555	558	-	652	636	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	1	13.1	13.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	493	1233	-	-	1327	-	-	488
HCM Lane V/C Ratio	0.099	0.029	-	-	0.038	-	-	0.146
HCM Control Delay (s)	13.1	8	0	-	7.8	0	-	13.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	214	20	30	325	61	11	0	18	29	0	7
Future Vol, veh/h	8	214	20	30	325	61	11	0	18	29	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	92	92	85	85	92	92	92	85	92	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	252	22	33	382	72	12	0	20	34	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	454	0	0	274	0	0	769	801	263	775	776	418
Stage 1	-	-	-	-	-	-	281	281	-	484	484	-
Stage 2	-	-	-	-	-	-	488	520	-	291	292	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1107	-	-	1289	-	-	318	318	776	315	328	635
Stage 1	-	-	-	-	-	-	726	678	-	564	552	-
Stage 2	-	-	-	-	-	-	561	532	-	717	671	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1107	-	-	1289	-	-	303	304	776	297	313	635
Mov Cap-2 Maneuver	-	-	-	-	-	-	303	304	-	297	313	-
Stage 1	-	-	-	-	-	-	719	671	-	558	533	-
Stage 2	-	-	-	-	-	-	534	513	-	692	664	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.5	12.9	17.5
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	487	1107	-	-	1289	-	-	331
HCM Lane V/C Ratio	0.065	0.009	-	-	0.025	-	-	0.128
HCM Control Delay (s)	12.9	8.3	0	-	7.9	0	-	17.5
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.4

Intersection	
Int Delay, s/veh	41.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	176	15	18	8	10	7	89	585	2	2	647	316
Future Vol, veh/h	176	15	18	8	10	7	89	585	2	2	647	316
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	300	-	-	300	-	300	300	-	300	300	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	187	16	19	9	11	7	95	622	2	2	688	336

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1199	1506	344	1168	1840	311	1024	0	0	624	0	0
Stage 1	692	692	-	812	812	-	-	-	-	-	-	-
Stage 2	507	814	-	356	1028	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 141	120	652	149	75	685	674	-	-	953	-	-
Stage 1	400	443	-	339	390	-	-	-	-	-	-	-
Stage 2	516	390	-	634	310	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 109	103	652	114	64	685	674	-	-	953	-	-
Mov Cap-2 Maneuver	~ 109	103	-	114	64	-	-	-	-	-	-	-
Stage 1	344	442	-	291	335	-	-	-	-	-	-	-
Stage 2	425	335	-	592	309	-	-	-	-	-	-	-

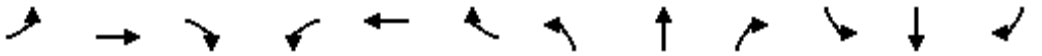
Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 363.8	44.2	1.5	0
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	674	-	-	109	190	114	64	685	953	-	-
HCM Lane V/C Ratio	0.14	-	-	1.718	0.185	0.075	0.166	0.011	0.002	-	-
HCM Control Delay (s)	11.2	-	-	$ 426.7	28.2	39.1	72.1	10.3	8.8	-	-
HCM Lane LOS	B	-	-	F	D	E	F	B	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	14.6	0.7	0.2	0.6	0	0	-	-

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

HCM 6th Signalized Intersection Summary
13: CSAH 83 & CSAH 42

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	282	86	173	302	327	35	451	204	272	420	39
Future Volume (veh/h)	64	282	86	173	302	327	35	451	204	272	420	39
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	67	294	0	180	315	0	36	470	0	283	438	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	552		793	670		424	759		525	1193	
Arrive On Green	0.06	0.16	0.00	0.09	0.19	0.00	0.04	0.21	0.00	0.16	0.34	0.00
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	67	294	0	180	315	0	36	470	0	283	438	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.5	3.7	0.0	2.0	3.8	0.0	0.7	5.8	0.0	5.3	4.5	0.0
Cycle Q Clear(g_c), s	1.5	3.7	0.0	2.0	3.8	0.0	0.7	5.8	0.0	5.3	4.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	552		793	670		424	759		525	1193	
V/C Ratio(X)	0.18	0.53		0.23	0.47		0.08	0.62		0.54	0.37	
Avail Cap(c_a), veh/h	470	1960		862	1960		557	1516		959	2551	
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	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.4	18.7	0.0	14.4	17.4	0.0	13.7	17.1	0.0	10.6	12.1	0.0
Incr Delay (d2), s/veh	0.2	0.8	0.0	0.1	0.5	0.0	0.1	0.8	0.0	0.9	0.2	0.0
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	0.5	1.4	0.0	0.7	1.4	0.0	0.3	2.1	0.0	1.8	1.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.6	19.5	0.0	14.6	17.9	0.0	13.8	18.0	0.0	11.5	12.3	0.0
LnGrp LOS	B	B		B	B		B	B		B	B	
Approach Vol, veh/h		361	A		495	A		506	A		721	A
Approach Delay, s/veh		18.8			16.7			17.7			12.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	14.8	9.0	12.0	6.4	20.6	7.5	13.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	20.5	5.5	26.5	5.5	34.5	5.5	26.5
Max Q Clear Time (g_c+I1), s	7.3	7.8	4.0	5.7	2.7	6.5	3.5	5.8
Green Ext Time (p_c), s	0.7	2.5	0.1	1.8	0.0	3.1	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	16	12	0	42	17	647	21	58	959	15
Future Vol, veh/h	10	0	16	12	0	42	17	647	21	58	959	15
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	-	-	-	-	-	-	250	-	250	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	18	13	0	46	19	711	23	64	1054	16

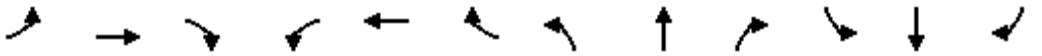
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1576	1954	527	1404	1947	356	1070	0	0	734	0	0
Stage 1	1182	1182	-	749	749	-	-	-	-	-	-	-
Stage 2	394	772	-	655	1198	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	74	63	496	99	64	640	647	-	-	867	-	-
Stage 1	201	262	-	370	417	-	-	-	-	-	-	-
Stage 2	602	407	-	421	257	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	63	57	496	88	58	640	647	-	-	867	-	-
Mov Cap-2 Maneuver	63	57	-	88	58	-	-	-	-	-	-	-
Stage 1	195	243	-	359	405	-	-	-	-	-	-	-
Stage 2	542	395	-	376	238	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	38.4	22.3	0.3	0.5
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	647	-	-	136	267	867	-	-
HCM Lane V/C Ratio	0.029	-	-	0.21	0.222	0.074	-	-
HCM Control Delay (s)	10.7	-	-	38.4	22.3	9.5	-	-
HCM Lane LOS	B	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.8	0.2	-	-

HCM 6th Signalized Intersection Summary
20: CSAH 17 & CSAH 78/Hillside

11/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	20	356	5	14	14	313	399	0	25	684	166
Future Volume (veh/h)	135	20	356	5	14	14	313	399	0	25	684	166
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	159	0	0	5	15	15	333	424	0	27	728	177
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	289	0		67	70	59	965	1896	846	634	1693	755
Arrive On Green	0.08	0.00	0.00	0.04	0.04	0.04	0.09	0.53	0.00	0.03	0.48	0.48
Sat Flow, veh/h	3563	0	1585	1781	1870	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	159	0	0	5	15	15	333	424	0	27	728	177
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.4	0.0	0.0	0.2	0.4	0.5	2.6	3.6	0.0	0.4	7.6	3.7
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.2	0.4	0.5	2.6	3.6	0.0	0.4	7.6	3.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	289	0		67	70	59	965	1896	846	634	1693	755
V/C Ratio(X)	0.55	0.00		0.08	0.21	0.25	0.34	0.22	0.00	0.04	0.43	0.23
Avail Cap(c_a), veh/h	1226	0		566	594	503	1119	1896	846	737	1693	755
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	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.1	0.0	0.0	26.3	26.5	26.5	6.5	7.0	0.0	7.0	9.8	8.7
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.5	1.5	2.2	0.2	0.3	0.0	0.0	0.8	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	1.0	0.0	0.0	0.1	0.2	0.2	0.7	1.1	0.0	0.1	2.6	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.7	0.0	0.0	26.8	28.0	28.7	6.7	7.3	0.0	7.0	10.6	9.5
LnGrp LOS	C	A		C	C	C	A	A	A	A	B	A
Approach Vol, veh/h		159	A		35			757			932	
Approach Delay, s/veh		26.7			28.1			7.0			10.3	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	34.7		9.1	9.5	31.5		6.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	29.5		19.5	7.5	27.0		18.0				
Max Q Clear Time (g_c+I1), s	2.4	5.6		4.4	4.6	9.6		2.5				
Green Ext Time (p_c), s	0.0	2.9		0.4	0.4	5.4		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

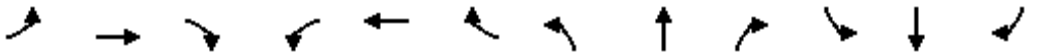
Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	46	72	121	645	599	79
Future Vol, veh/h	46	72	121	645	599	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	300	0	300	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	78	132	701	651	86

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1266	326	737	0	-	0
Stage 1	651	-	-	-	-	-
Stage 2	615	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	161	670	865	-	-	-
Stage 1	481	-	-	-	-	-
Stage 2	502	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	136	670	865	-	-	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	407	-	-	-	-	-
Stage 2	502	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.7	1.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	865	-	136	670	-	-
HCM Lane V/C Ratio	0.152	-	0.368	0.117	-	-
HCM Control Delay (s)	9.9	-	46.1	11.1	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.5	-	1.5	0.4	-	-



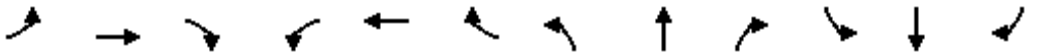
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	171	14	17	8	10	6	84	521	2	2	578	307
Future Volume (veh/h)	171	14	17	8	10	6	84	521	2	2	578	307
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	182	15	18	9	11	6	89	554	2	2	615	327
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	456	132	159	262	109	92	415	1466	654	425	1210	540
Arrive On Green	0.12	0.17	0.17	0.01	0.06	0.06	0.07	0.41	0.41	0.00	0.34	0.34
Sat Flow, veh/h	1781	774	929	1781	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	182	0	33	9	11	6	89	554	2	2	615	327
Grp Sat Flow(s),veh/h/ln	1781	0	1703	1781	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.9	0.0	0.7	0.2	0.2	0.2	1.3	4.9	0.0	0.0	6.2	7.7
Cycle Q Clear(g_c), s	3.9	0.0	0.7	0.2	0.2	0.2	1.3	4.9	0.0	0.0	6.2	7.7
Prop In Lane	1.00		0.55	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	456	0	291	262	109	92	415	1466	654	425	1210	540
V/C Ratio(X)	0.40	0.00	0.11	0.03	0.10	0.07	0.21	0.38	0.00	0.00	0.51	0.61
Avail Cap(c_a), veh/h	772	0	971	500	773	655	620	2661	1187	679	2502	1116
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	15.7	19.5	20.0	19.9	8.2	9.1	7.7	9.7	11.8	12.3
Incr Delay (d2), s/veh	0.6	0.0	0.2	0.1	0.4	0.3	0.3	0.2	0.0	0.0	0.3	1.1
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	1.4	0.0	0.3	0.1	0.1	0.1	0.4	1.5	0.0	0.0	2.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	0.0	15.9	19.5	20.4	20.2	8.5	9.3	7.7	9.7	12.1	13.4
LnGrp LOS	B	A	B	B	C	C	A	A	A	A	B	B
Approach Vol, veh/h		215			26			645			944	
Approach Delay, s/veh		15.6			20.0			9.2			12.5	
Approach LOS		B			C			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.6	23.0	5.0	12.1	7.8	19.7	10.1	7.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	33.5	6.5	25.5	8.5	31.5	13.5	18.5
Max Q Clear Time (g_c+I1), s	2.0	6.9	2.2	2.7	3.3	9.7	5.9	2.2
Green Ext Time (p_c), s	0.0	4.0	0.0	0.1	0.1	5.6	0.3	0.0

Intersection Summary	
HCM 6th Ctrl Delay	11.8
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
3: CSAH 83 & Valley View

12/07/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	15	18	8	10	7	89	585	2	2	647	316
Future Volume (veh/h)	176	15	18	8	10	7	89	585	2	2	647	316
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	187	16	19	9	11	7	95	622	2	2	688	336
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	455	135	161	257	111	94	398	1511	674	402	1250	558
Arrive On Green	0.13	0.17	0.17	0.01	0.06	0.06	0.08	0.43	0.43	0.00	0.35	0.35
Sat Flow, veh/h	1781	779	925	1781	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	187	0	35	9	11	7	95	622	2	2	688	336
Grp Sat Flow(s),veh/h/ln	1781	0	1704	1781	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	4.2	0.0	0.8	0.2	0.3	0.2	1.5	5.7	0.0	0.0	7.2	8.1
Cycle Q Clear(g_c), s	4.2	0.0	0.8	0.2	0.3	0.2	1.5	5.7	0.0	0.0	7.2	8.1
Prop In Lane	1.00		0.54	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	455	0	296	257	111	94	398	1511	674	402	1250	558
V/C Ratio(X)	0.41	0.00	0.12	0.04	0.10	0.07	0.24	0.41	0.00	0.00	0.55	0.60
Avail Cap(c_a), veh/h	707	0	933	446	743	630	588	2708	1208	608	2479	1106
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.5	0.0	16.2	20.2	20.7	20.7	8.4	9.3	7.7	9.8	12.1	12.4
Incr Delay (d2), s/veh	0.6	0.0	0.2	0.1	0.4	0.3	0.3	0.2	0.0	0.0	0.4	1.1
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	1.5	0.0	0.3	0.1	0.1	0.1	0.5	1.7	0.0	0.0	2.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.1	0.0	16.4	20.3	21.1	21.0	8.7	9.5	7.7	9.8	12.5	13.5
LnGrp LOS	B	A	B	C	C	C	A	A	A	A	B	B
Approach Vol, veh/h		222			27			719			1026	
Approach Delay, s/veh		16.2			20.8			9.4			12.8	
Approach LOS		B			C			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.6	24.3	5.0	12.6	8.0	20.9	10.4	7.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.5	5.5	25.5	8.5	32.5	12.5	18.5
Max Q Clear Time (g_c+I1), s	2.0	7.7	2.2	2.8	3.5	10.1	6.2	2.3
Green Ext Time (p_c), s	0.0	4.6	0.0	0.1	0.1	6.3	0.3	0.0

Intersection Summary	
HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B