

Town of Granby  
Agate Avenue – Signal Warrant Study  
and Operational Assessment

Prepared By



QC Review By

Dan Cokley, PE, PTOE

SGM Project: 8133J-34

Town of Granby  
Agate Avenue – Signal Warrant Study  
and Operational Assessment

Prepared By

---

Eric Mahoney, EI

QC Review By

---

Dan Cokley, PE, PTOE

SGM Project: 8133J-34

## Table of Contents

Introduction.....	3
Signal Warrant Summary.....	3
Operational Summary .....	4
Conclusions and Recommendations.....	4
Methodology .....	5
Previous Study Background.....	5
Baseline Traffic.....	5
Analysis Years.....	5
4-hour and 8-hour Volume Factors.....	6
Operational Assessment Methodology.....	6
Signal Warrant Study .....	8
Warrant 1, Eight-Hour Vehicular Volume.....	8
Warrant 2, Four-Hour Vehicular Volume.....	10
Warrant 3, Peak Hour.....	11
Warrant 4, Pedestrian Volume .....	14
Warrant 5, School Crossing.....	15
Warrant 6, Coordinated Signal System .....	15
Warrant 7, Crash Experience .....	15
Warrant 8, Roadway Network.....	17
Operational Assessment .....	18
2025 Baseline .....	19
2030 Traffic Conditions.....	19
2030 Traffic Conditions with Diversion.....	19
2030 Traffic Conditions with Diversion (4th St. Signal) .....	20
Alternatives to Traffic Control Signals.....	21
Appendix A: CDOT Correspondence .....	23
Appendix B: Synchro Modeling Results.....	24
Appendix C: Traffic Volumes by Scenario .....	25
Appendix D: 8-Hour Volumes.....	26



## Introduction

The purpose of this report is to provide a Signal Warrant Study at the 4<sup>th</sup> St. and 6<sup>th</sup> St. intersections with Agate Avenue / US-40 in the Town of Granby, Colorado. The report will also provide an Operational Assessment of the corridor to model existing and proposed future conditions.

The intersections have had previous signal warrant analysis as part of the *E. Agate Avenue Traffic Operational Assessment*, by Bowman Consulting, October 2019. That analysis determined a warrant for the 6<sup>th</sup> Street intersection, but not the 4<sup>th</sup> Street location. The 6<sup>th</sup> Street configuration is complicated by the nearby (~50ft) County Road 60 intersection and signalization would result in a costly reconfiguration; the Town of Granby is considering limiting the 6<sup>th</sup> St. intersection to right-turn in/out only. The proposal would physically prohibit Southbound and Eastbound left turns to and from Agate Ave and would result in a diversion of left turn in/out traffic to the 4<sup>th</sup> St. intersection. 5<sup>th</sup> St. is not a through street and only 1 block in length.

## Signal Warrant Summary

A summary of the signal warrant study for each scenario and intersection is shown in Table 1.

**Table 1 - Signal Warrant Summary**

	4th St & Agate Ave				6th St & Agate Ave			
	2025	2025 Diversion	2030	2030 Diversion	2025	2025 Diversion	2030	2030 Diversion
<b>1, Eight-Hour Vehicular Volume</b>	NO	MET	NO	MET	MET	NO	MET	NO
<b>2, Four-Hour Vehicular Volume</b>	NO	NO	NO	MET	NO	NO	MET	NO
<b>3, Peak Hour</b>	NO	MET	MET	MET	MET	NO	MET	NO
<b>4, Pedestrian Volume</b>	NO	NO	NO	NO	NO	NO	NO	NO
<b>5, School Crossing</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>6, Coordinated Signal System</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>7, Crash Experience</b>	NO	NO	NO	NO	NO	NO	NO	NO
<b>8, Roadway Network</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Legend:</b>								
<b>Warrant is Met:</b>		MET						
<b>Warrant is Not Met:</b>		NO						

### 6<sup>th</sup> Street intersection

The 8-Hour, 4-Hour, and Peak-Hour Vehicular Volume warrants are met in the 2030 scenario. The 8-Hour and 4-Hour, Vehicular Volume warrants are met in the 2025 scenario.

### 4<sup>th</sup> Street intersection

The 8-Hour, 4-Hour, and Peak-Hour Vehicular Volume warrants are met in the 2030 Diversion scenario. The 8-Hour and 4-Hour, Vehicular Volume warrants are met in the 2025 Diversion scenario.



## Operational Summary

The operational assessment indicates that generally most movements at all intersections within the study area operate at acceptable MOEs for the analyzed scenarios. In the 2030 scenarios, the 6<sup>th</sup> St and 4<sup>th</sup> Street unsignalized intersections Southbound movements operate at LOS F in the base and diversion scenarios, respectively. The 4<sup>th</sup> St signalization results in improved side street MOE's with insignificant effect on Agate Avenue level of service and queuing.

## Conclusions and Recommendations

The warrant analysis shows the 4<sup>th</sup> Street and Agate Avenue intersection meets all three of the vehicle volume warrants in the 2030 diverted traffic scenario. The 6<sup>th</sup> Street and Agate Avenue intersection meets all three of the vehicle volume warrants in the 2030 base scenario, without consideration of diverted traffic.

Considering operations, safety, and cost, we recommend diverting 6<sup>th</sup> Street left turns to the preferred primary intersection location at 4<sup>th</sup> Street. Based on the 2030 diversion scenario, we recommend a traffic signal installation at 4<sup>th</sup> Street and Agate Avenue. The Town would like to begin the planning and design work to install the signal at the intersection within the next couple of years.



## Methodology

The methodology and assumptions used in this analysis were coordinated with and approved by CDOT Region 3 prior to performing the assessment, correspondence is provided in Appendix A.

## Previous Study Background

In addition to the above referenced study, McDowell Engineering completed a traffic impact study for the proposed Granby Market Square (GMS) development in 2022. The proposed generated traffic assignment used in the McDowell study was incorporated into future scenarios analyzed by SGM in this study.

## Baseline Traffic

SGM performed traffic counts at the following intersections from Wednesday, 2/19 to Friday, 2/21, 2025, from 7:00 am to 7:00 pm, daily.

- 4<sup>th</sup> and Agate
- 5<sup>th</sup> and Agate
- 6<sup>th</sup> and Agate
- 6<sup>th</sup> and County Road 60

## Analysis Years

Application of the MUTCD Signal Warrant criteria and Operational Analysis was conducted for the Baseline Traffic (2025), 5-year Background and Developed Traffic (2030), and 5-year Background and Developed Traffic (2030) with the re-configured 6<sup>th</sup> St. The scenarios are summarized below.

- Baseline (2025) – A seasonal factor of 1.10 was calculated based on the average monthly volumes at CDOT Station 000223 for the month of February. This factor was applied to the counts collected by SGM to account for the fact that February has lower traffic volumes than the peak month (July).
- Baseline with Diversion (2025) – This scenario is based on the Baseline (2025) scenario above, with the Southbound and Eastbound left turn movements at the 6<sup>th</sup> St. and Agate Ave. intersection diverted to the 4<sup>th</sup> St. and Agate Ave. intersection.
- Background and Developed (2030) – Baseline traffic volumes were factored by a growth rate of 0.7% per year, a factor derived from CDOT's 20-year factor (1.15) for Station 101870. The 5-year factor used is 1.036. This factor was applied to all approaches at all study intersections. This scenario also considered future traffic associated with the GMS development, as discussed above.
- Background and Developed with Diversion (2030) – This scenario is based on the Background and Developed (2030) scenario above, with the Southbound and Eastbound left turn movements at the 6<sup>th</sup> St. and Agate Ave. intersection diverted to the 4<sup>th</sup> St. and Agate Ave. intersection.



## 4-hour and 8-hour Volume Factors

The MUTCD Signal Warrant requires 4- and 8-hour volumes, it was necessary to calculate 4- and 8-hour factors to convert the peak hour volumes from the GMS development to 4- and 8-hour volumes. AM and PM peak hourly volumes were identified for each intersection, along with the next highest volume unique hours. For each of these 8 hours, the total intersection traffic volume was divided by the AM or PM peak volume to produce a volume factor for each hour, relative to the peak hour volume. These factors were then used to scale the projected AM and PM peak GMS traffic volumes to other non-peak intervals.

## Operational Assessment Methodology

The intersections are modeled applying the average day traffic scenarios in Synchro and analyzed using HCM 6<sup>th</sup> Edition methodology. Intersection analysis was performed using the Synchro 11 analysis package to estimate the capacity of the intersection. The Measures of Effectiveness (MOEs) that are compared for this study include LOS (level of service), delay and 95th percentile queue length. See Table 2 for a description and delay interval of each LOS grade. The MOEs will be reported for each analysis scenario to determine the operation of the study intersection. The queue length reported is based upon an average of ten 60-minute Simtraffic modeling runs. The traffic modeling results are presented in Appendix B.

**Table 2 - Level of Service (LOS) Criteria Unsignalized Intersection (HCM, 2016)**

Level of Service		Delay (seconds)
A	Highly Desirable	< 10.0
B	Desirable	10.1 to 15
C	Acceptable	15.1 to 25
D	Acceptable in Urban Areas	25.1 to 35
E	Unacceptable	35.1 to 50
F	Unacceptable	> 50.1

The “overall” intersection level of service at a signalized or an unsignalized intersection corresponds with the average delay experienced on the minor street approaches and the uncontrolled major street movements. The unconflicted major street through movements are considered to have no delay. Because most of the intersection movements are major street movements with no delay, the overall intersection results in a LOS with less delay than the minor street approaches and conflicting major street movements (left turns) experience.

For signalized intersections, the HCM measures level of service in terms of seconds of delay per vehicle.

**Table 3 - Level of Service (LOS) Criteria Signalized Intersection (HCM, 2016)**

Level of Service		Delay (seconds)
A	Highly Desirable	< 10.0
B	Desirable	10.1 to 20
C	Acceptable	20.1 to 35
D	Acceptable in Urban Areas	35.1 to 55
E	Unacceptable	55.1 to 80
F	Unacceptable	> 80.1



This is also a measure of driver discomfort, fuel consumption, and lost travel time. Table 3 relates the LOS to seconds of delay per vehicle at a signalized intersection.

In general, CDOT and the Town consider the overall intersection operation of LOS “D” or better acceptable during the peak hours. The goal is to also provide a similar LOS for each controlled intersection movement and/or approach.

This study will assess the operational measures of effectiveness (MOE's) including Level of Service (LOS), Delay, and 95<sup>th</sup> percentile queue. The MOE analysis by movement provides an overview of all intersection approach and conflicting movements and provides a more realistic picture of operations by controlled movement or approach as experienced and perceived by users. The MOE's also provide a valuable reference point for comparison of LOS, Delay and Queue between scenarios.



## Signal Warrant Study

The Signal Warrant Study is defined by eight (8) signal warrants in the Manual on Uniform Traffic Control Devices (MUTCD). Section 4C of the MUTCD states, “Traffic control signals should not be installed unless one or more of the warrants in this manual are met. The satisfaction of a warrant or warrants is not in itself justification for a signal.”

The MUTCD Traffic Signal Warrants are as follows:

1. Eight Hour Vehicular Volume
2. Four Hour Vehicular Volume
3. Peak Hour Vehicular Volume
4. Pedestrian Volume
5. School Crossing
6. Coordinated Signal System
7. Crash Experience
8. Roadway Network

The volumes used for Warrants 1-3 are included in Appendix D. For the 6<sup>th</sup> Street intersection analysis, the top  $n$  unique hours were used for the  $N$ -Hour Vehicular Volume warrant analyses. Those unique hours are not necessarily the same as the top  $n$  unique hours at the 4<sup>th</sup> Street intersection. Therefore, for the analysis of the 4<sup>th</sup> Street intersection in the Diversion Scenarios, the 6<sup>th</sup> Street diverted traffic volumes used were those that corresponded to the same top  $n$  hours at the 4<sup>th</sup> Street intersection.

### Warrant 1, Eight-Hour Vehicular Volume

#### **Guidance:**

The need for a traffic control signal should be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major street and the more critical minor-street approach, respectively, to the intersection; or
- B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major street and the more critical minor-street approach, respectively, to the intersection.



**Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume**  
**Condition A—Minimum Vehicular Volume**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on more critical minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

**Condition B - Interruption of Continuous Traffic**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on more critical minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

<sup>a</sup> Basic minimum hourly volume<sup>b</sup> Used for combination of Conditions A and B after adequate trial of other remedial measures<sup>c</sup> May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000<sup>d</sup> May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000**Analysis:**

The 8-hour volumes for each scenario are compared to Condition A, Condition B and Combination Condition A and B volumes in Appendix D for 70% volumes based on note C, above. Both intersections have 2 or more existing traffic lanes on the major and minor approaches. Based upon below standard length right turn lane lengths, a portion of the minor street right-turning traffic (25%) has been removed from the minor street approach volume (guidance provided in Appendix A). The 2030 Diversion scenario assumes the proposed one-lane minor approach at 6<sup>th</sup> Street.

**Table 4 – Number of Hours Met in 8-Hour Vehicular Volume Warrant Analysis**

	Condition A	Condition B	Combination	Meets Warrant
<b>Baseline 2025</b>				
4th St	0/8	2/8	0/8	NO
6th St	1/8	8/8	1/8	YES
<b>2025 Diversion</b>				
4th St	2/8	8/8	8/8	YES
6th St	0/8	0/8	0/8	NO
<b>Developed 2030</b>				
4th St	0/8	5/8	1/8	NO
6th St	1/8	8/8	2/8	YES
<b>2030 Diversion</b>				
4th St	2/8	8/8	8/8	YES
6th St	0/8	0/8	0/8	NO
Legend:				
Meets Threshold: ---				

**Status:**

Condition A volumes are not met in any scenario. Condition B volumes are met at the 6<sup>th</sup> Street in the 2025 and 2030 scenarios, and the 4<sup>th</sup> Street in both diversion scenarios. Combination volumes are met at 4<sup>th</sup> Street in both diversion scenarios.



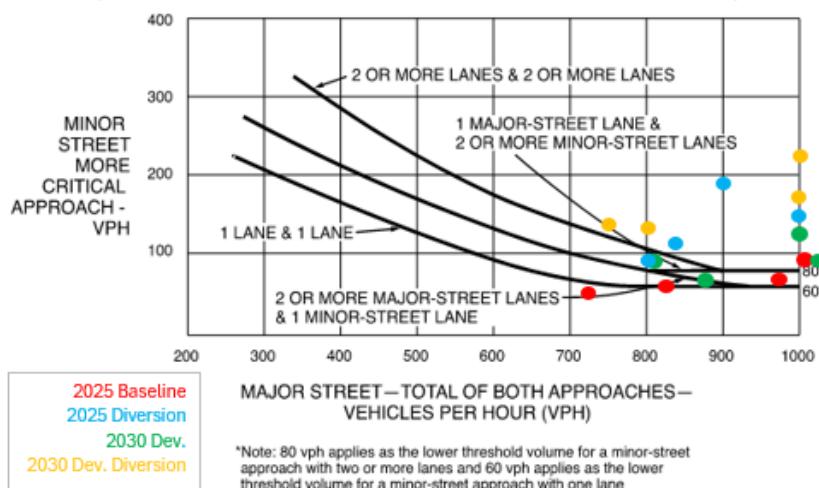
## Warrant 2, Four-Hour Vehicular Volume

### Guidance:

The need for a traffic control signal should be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the more critical minor-street approach (one direction only) all fall above the applicable curve for the existing combination of approach lanes.

**Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)**

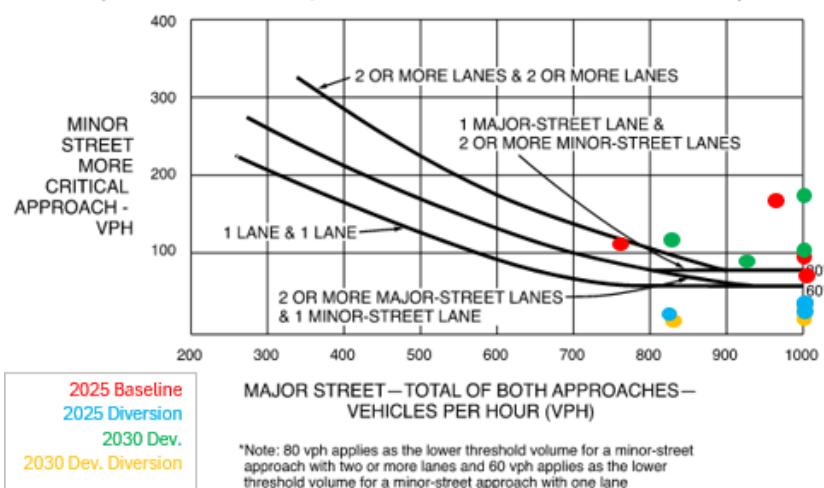
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



### 4<sup>th</sup> Street Intersection

**Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



### 6<sup>th</sup> Street Intersection



### **Analysis:**

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used (population condition met). A summary of the number of hours met in the 4-Hour vehicular volume warrant analysis is shown in Table 5.

**Table 5 - Number of Hours Met in 4-Hour Vehicular Volume Warrant Analysis**

	<b>Meets Warrant</b>	
<b>Baseline 2025</b>		
<b>4th St</b>	1/4	NO
<b>6th St</b>	2/4	NO
<b>2025 Diversion</b>		
<b>4th St</b>	3/4	NO
<b>6th St</b>	0/4	NO
<b>Developed 2030</b>		
<b>4th St</b>	1/4	NO
<b>6th St</b>	4/4	YES
<b>2030 Diversion</b>		
<b>4th St</b>	4/4	YES
<b>6th St</b>	0/4	NO
<b>Legend:</b>		
<b>Meets Threshold:</b>	---	

### **Status:**

All four plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor street approach (one direction only) fall above the applicable curves at the 6<sup>th</sup> Street Intersection in the 2030 developed scenario and the 4<sup>th</sup> Street intersection in the 2030 Diversion Scenario. **The warrant is met at the 6<sup>th</sup> Street intersection in the 2030 Developed Scenario and at the 4<sup>th</sup> Street intersection in the 2030 Diversion Scenario.**

## **Warrant 3, Peak Hour**

### **Guidance:**

This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

The need for a traffic control signal should be considered if an engineering study finds that the criteria in either of the following two categories are met:

- A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:
  - 1. The total stopped-time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach, and



2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and
  3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.
- B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the more critical minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

#### **Analysis A:**

The peak hour volumes for each scenario are compared to Conditions 1-3 in Table 6.

**Table 6 – Peak Hour Vehicular Volume Warrant Analysis**

	Peak-Hour Volumes			1	2	3	Meets Cond. A
	Major	Minor	Total	Time Stopped Delay	Minor St. Vol	Total Entering Volume	
<b>Baseline 2025</b>							
4th St	1131	86	1217	0.2	150	800	NO
6th St	980	163	1143	0.8	150	650	NO
<b>2025 Diversion</b>							
4th St	1131	143	1274	1.2	150	800	NO
6th St	1062	34	1095	0.0	100	650	NO
<b>Developed 2030</b>							
4th St	1238	116	1354	0.3	150	800	NO
6th St	1049	169	1218	0.9	150	650	NO
<b>2030 Diversion</b>							
4th St	1238	175	1413	1.5	150	800	NO
6th St	1135	35	1169	0.0	100	650	NO
<b>Legend:</b>							
<b>Meets Threshold:</b>		---					

#### **Status:**

The peak hour at the 4<sup>th</sup> St. intersection occurs from 4:15 pm to 5:15 pm. The peak hour at the 6<sup>th</sup> St. intersection occurs from 4:30 pm to 5:30 pm. **All three (3) conditions must be met for a single scenario to trigger a warrant. The warrant is not met in any scenario for either intersection.** The volume conditions are met for 2025 and 2030 scenarios at 6<sup>th</sup> St, and the 2025 Diversion and 2030 Diversion scenarios at 4<sup>th</sup> St.

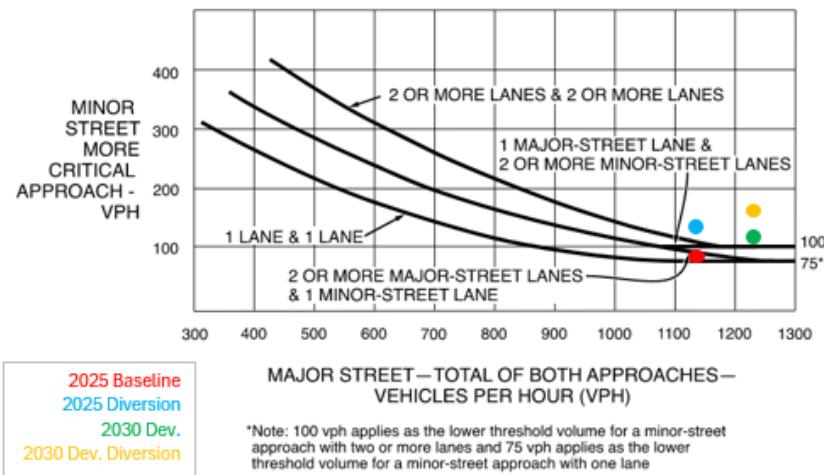


### Analysis B:

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used (population condition met) to evaluate the criteria in Item B of Paragraph 3 in this Section. The peak hour occurs from 4:00 pm to 5:00 pm.

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

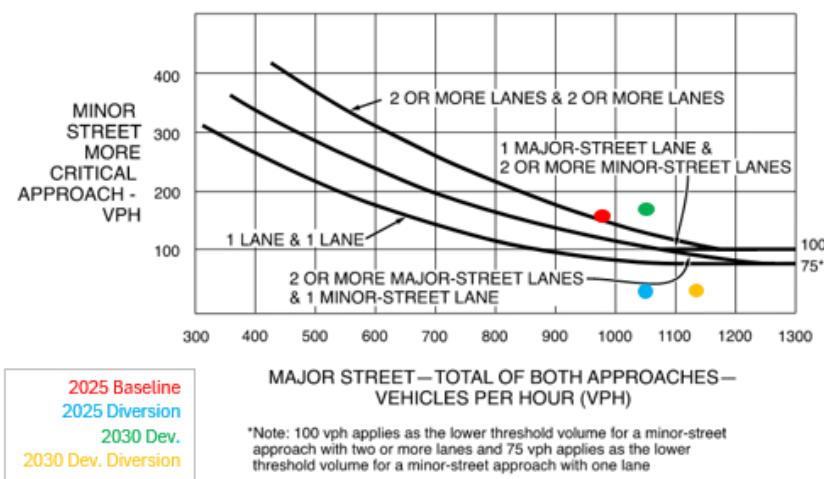
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



### 4<sup>th</sup> Street Intersection

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



### 6<sup>th</sup> Street Intersection



**Status:**

The plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor street approach (one direction only) do not fall above the applicable curve in Figure 4-C4 for the 2025 Diversion Scenario, and both 2030 Scenarios at the 4<sup>th</sup> Street intersection, and for the 2025 Baseline and 2030 Developed Scenarios at the 6<sup>th</sup> street intersection. **The warrant is met at the 4<sup>th</sup> Street intersection for the 2025 Diversion, 2030 Developed and 2030 Diversion Scenarios, and at the 6<sup>th</sup> Street intersection for the 2025 Baseline and 2030 Developed Scenarios.**

## Warrant 4, Pedestrian Volume

**Guidance:**

The need for a traffic control signal at an intersection or midblock crossing should be considered if an engineering study finds that one of the following criteria is met:

- A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or
- B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-6.

**Option:**

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-7 may be used in place of Figure 4C-5 to evaluate Item A in Paragraph 2 of this Section, and Figure 4C-8 may be used in place of Figure 4C-6 to evaluate Item B in Paragraph 2 of this Section.

**Analysis:**

**Table 7 - Peak Pedestrian Volumes, 4<sup>th</sup> Street**

Interval	Volume
2/19/2025 15:45	7
2/19/2025 14:00	6
2/19/2025 13:00	3
2/19/2025 11:45	2

There is no pedestrian crossing at the 6<sup>th</sup> St. intersection. Therefore, this analysis applies only to the 4<sup>th</sup> St. intersection. The lower thresholds for pedestrian volume are 75 pph (Pedestrians per Hour) and 93 pph for the 4 peak hours and 1 peak hour, respectively. The 4 unique hours with the highest pedestrian volumes are shown in Table 7. The volumes for every hour are below the minimum thresholds. **The warrant is not met.**



## Warrant 5, School Crossing

### **Guidance:**

The need for a traffic control signal should be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period and there are a minimum of 20 schoolchildren during the highest crossing hour.

Before a decision is made to install a traffic control signal, consideration should be given to the implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.

The School Crossing signal warrant should not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

### **Analysis:**

There are no school crossings at this location and children do not have to cross Agate Ave to catch a school bus.

**Status: Warrant not applicable.**

## Warrant 6, Coordinated Signal System

### **Guidance:**

The need for a traffic control signal should be considered if an engineering study finds that one of the following criteria is met:

- A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.
- B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation

### **Analysis:**

There is no existing coordinated signal system for the area.

**Status: Warrant not applicable.**

## Warrant 7, Crash Experience

### **Guidance:**

The need for a traffic control signal should be considered if an engineering study finds that all of the following criteria are met:



- A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
- B. At least one of the following conditions applies to the reported crash history (where each reported crash considered is related to the intersection and apparently exceeds the applicable requirements for a reportable crash):
  - 1. The number of reported angle crashes and pedestrian crashes within a 1-year period equals or exceeds the threshold number in Table 4C-2 for total angle crashes and pedestrian crashes (all severities); or
  - 2. The number of reported fatal-and-injury angle crashes and pedestrian crashes within a 1-year period equals or exceeds the threshold number in Table 4C-2 for total fatal-and-injury angle crashes and pedestrian crashes; or
  - 3. The number of reported angle crashes and pedestrian crashes within a 3-year period equals or exceeds the threshold number in Table 4C-3 for total angle crashes and pedestrian crashes (all severities); or
  - 4. The number of reported fatal-and-injury angle crashes and pedestrian crashes within a 3-year period equals or exceeds the threshold number in Table 4C-3 for total fatal-and-injury angle crashes and pedestrian crashes; and
- C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major street and the more critical minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant (see Section 4C.05).

Option:

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000:

The traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Tables 4C-4 and 4C-5 may be used in place of Tables 4C-2 and 4C-3, respectively.

#### **Analysis:**

##### **4<sup>th</sup> St Intersection:**

- A. Trial of alternatives has not been conducted.
- B. The number of reported crashes does not meet conditions 1 – 4.
- C. Using the option noted above for a population less than 10,000, the 4<sup>th</sup> St. intersection volumes exceed those in the 56% column of Table 4C-1 in the **2030 Diversion scenario**.

##### **6<sup>th</sup> St Intersection:**

- A. Trial of alternatives has not been conducted.



- B. The number of reported crashes does not meet conditions 1 – 4.
- C. Using the option noted above for a population less than 10,000, the 4<sup>th</sup> St. intersection volumes exceed those in the 56% column of Table 4C-1 in the **2025 Baseline and 2030 traffic scenarios**.

**Status:**

Since all three conditions must be met to trigger the warrant, **the warrant is not met for either intersection**.

## Warrant 8, Roadway Network

**Guidance:**

The need for a traffic control signal should be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:

- A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or
- B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).

A major route as used in this signal warrant should have at least one of the following characteristics:

- A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow;
- B. It includes rural or suburban highways outside, entering, or traversing a city; or
- C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation

**Analysis:**

Neither intersection is comprised of two major routes coming together. Therefore, the warrant does not apply.

**Status: Warrant not applicable.**



## Operational Assessment

The results of the operational assessment are displayed in Table 8. The traffic volumes for each scenario are provided in Appendix C. Each scenario is discussed in the following sections. The AM peak hour begins at 7:30 AM, and the PM peak hour begins at 4:15 PM.

**Table 8 - Operational Results Summary**

	Approach Movement	Link/Storage Bay length	2025 Baseline			2030			2030 Diversion			
			LOS	Delay	95th % Queue	LOS	Delay	95th % Queue	LOS	Delay	95th % Queue	
			A	B	C	A	B	C	A	B	C	
4th St & Agate Ave	EB LEFT (THRU)	AM	200	A	8.4	10	A	8.5	23	A	8.7	43
	WB LEFT (THRU)			A	9.2	24	A	9.5	37	A	9.8	58
	NB RIGHT/THRU/LEFT	AM	140	A	0	0	A	0	0	A	0	2
	SB THRU/LEFT			C	23.4	10	D	27.8	14	C	24.2	14
	SB RIGHT	AM	130	C	19.6	62	C	24.2	75	F	92.3	180
				D	31.2	75	E	49.9	88	F	69	131
	INTERSECTION OVERALL	AM	50	A	9.8	28	B	10	41	B	10	53
				B	10.6	44	B	11	59	B	11	69
	EB LEFT	PM	200	A	1.4		A	2.1		B	15.8	
	WB LEFT			A	2.3		A	4		A	8.4	
5th St & Agate Ave	EB LEFT	AM	200	A	8.2	17	A	8.3	21	A	8.3	18
	WB LEFT			A	9	26	A	9.2	26	A	9.2	26
	NB RIGHT/THRU/LEFT	AM	100	A	8.7	23	A	8.9	19	A	8.7	23
				A	8.7	9	A	8.9	9	A	8.6	8
	SB THRU/LEFT	AM	140	C	15.3	33	C	16.2	33	C	15.4	31
				C	17.8	25	C	19.3	26	C	17.8	24
	SB RIGHT	AM	130	C	18.3	28	C	19.7	27	C	19	30
				C	24.6	30	D	27.3	28	D	26	28
	INTERSECTION OVERALL	AM	50	A	9.8	50	A	9.9	49	A	9.9	50
				B	10.6	40	B	10.8	38	B	10.8	39
6th St & Agate Ave	EB LEFT	AM	300	A	8.5	46	A	8.6	45	--	--	--
	SB LEFT			A	9.7	57	A	10.0	59	--	--	--
	NB RIGHT	AM	30	F	115.1	59	F	174.3	58	--	--	--
				F	85.5	60	F	127.7	59	--	--	--
	SB RIGHT	AM	30	B	10	47	B	10.2	48	B	10.2	48
				B	11.5	46	B	11.7	48	B	11.7	48
	INTERSECTION OVERALL	AM		B	15.2		C	22		A	0.4	
				A	5.4		A	7.4		A	0.4	
6th St & CR 60	WB LEFT	AM	150	B	10.2	76	B	10.2	144	A	9.9	28
	WB RIGHT			B	10.2	52	B	10.3	47	A	9.9	32
	SB LEFT	AM	30	B	8.7	37	A	8.7	38	A	8.9	38
				A	9	28	A	9.0	28	A	8.8	39
	INTERSECTION OVERALL	AM		A	7.4	26	A	7.4	32	A	7.5	19
				A	7.6	21	A	7.6	29	A	7.5	20
<p>2025 Baseline = (2025 SGM Counts) x (Average Month Factor)</p> <p>*95th percentile queue exceeds link distance</p> <p>*95th percentile queue exceeds storage bay distance</p> <p>**Modeled link distance differs from actual link distance</p>												



The MOE's, LOS, delay (seconds) and 95th percentile queue lengths (feet) by approach movement are also presented in Table 8 and provide a reference point of 2025 Baseline traffic conditions to understand the effect of growth and the reconfiguration (Diversion) of the 6<sup>th</sup> Street intersection.

Queuing is reported for each approach movement at the study intersections to provide another indication of intersection performance. A queue length of 20 ft represents a single vehicle. Highlighted queue lengths indicate that the queue length exceeds the existing storage bay length and are also depicted in Table 8.

## 2025 Baseline

The study intersections operate at an acceptable overall LOS A or better under 2025 Baseline conditions, except for the 6<sup>th</sup> Street intersection, which operates at LOS B in the AM peak hour.

All approach movements operate at an acceptable LOS D or better under Baseline conditions, except for the SB Left movement at the 6<sup>th</sup> Street intersection, which operates at LOS F in both the AM and PM peak hours.

The Baseline scenario shows results with 95th percentile queue lengths below or near existing storage lengths, except for the SB movements at the 6<sup>th</sup> St and Agate Ave intersection, which may also result in blocking the CR60 traffic entering the intersection.

## 2030 Traffic Conditions

The study intersections operate at an acceptable overall LOS A or better under 2030 conditions, except for the 6<sup>th</sup> Street intersection, which degrades to LOS C in the AM peak hour.

The delays increase slightly due to the additional background and developed traffic volumes, but all approach movements operate at an acceptable LOS D or better under 2030 conditions, except for the SB left movement at the 6<sup>th</sup> St and Agate Ave intersection (LOS F), and the SB left from 4<sup>th</sup> St to Agate which degrades to LOS E.

Similarly, the 95<sup>th</sup> percentile queue lengths increase slightly, but all remain below the existing storage lengths, except for the SB movements at the 6<sup>th</sup> St and Agate Ave intersection, as discussed above.

## 2030 Traffic Conditions with Diversion

The study intersections operate at an acceptable overall LOS A or better under 2030 conditions with the 6<sup>th</sup> Street reconfiguration, except for the 4<sup>th</sup> Street intersection, which degrades to LOS B in the AM peak hour.

The reduction in volume at the 6<sup>th</sup> Street intersection improves all turning movements to LOS B or better. However, that volume is now served by the 4<sup>th</sup> Street intersection, where the SB Thru/Left turning movement degrades to LOS F in the AM and PM peak hours.

The 95<sup>th</sup> percentile queue lengths increase at the 4<sup>th</sup> Street intersection for the SB Thru/Left movement, due to the additional volume. The increased queues are longer than the existing storage lengths, and the longer queues may block vehicles seeking to make a SB Right turning movement.



## 2030 Traffic Conditions with Diversion (4th St. Signal)

The 4<sup>th</sup> Street intersection was modeled as a traffic signal using the current 1<sup>st</sup> Street signal timing plan, see Appendix A. The results of the operational assessment for the intersection are shown in Table 9. Overall, the intersection operates at LOS A in both peak hours, which is an improvement from the unsignalized configuration.

Comparing LOS and delay (seconds) to the unsignalized intersection, signal control improves the MOEs at the minor approaches and maintains LOS and Delay on the mainline. The Southbound approach sees the most improvement, specifically the Southbound Thru/Left movement, which improves from LOS F to LOS B in both peak hours. The NB approach also improves, from LOS C to LOS B in the PM peak hour.

The 95th percentile queue lengths are shorter on the minor street approaches, within existing storage lengths. The queue lengths on the Agate Avenue approaches increase significantly with signal control, well within existing storage lengths and a maximum queue of about 4 vehicles.

**Table 9 - 4th St Signal Operational Results Summary**

	Approach Movement		Link/Storage Bay length	2030 Diversion			2030 Div. w/ Signal		
				LOS	Delay	95th % Queue	LOS	Delay	95th % Queue
4th St & Agate Ave	EB LEFT (THRU)	AM	200	A	8.7	43	A	6	55
		PM		A	9.8	58	A	6.2	75
	WB LEFT (THRU)	AM	200	A	0	2	A	0	0
		PM		A	8.8	13	A	6.7	15
	NB RIGHT/THRU/LEFT	AM	140	A	0	0	A	0	0
		PM		C	24.2	14	B	12.1	10
	SB THRU/LEFT	AM	130	F	92.3	180	B	14.2	129
		PM		F	69	131	B	13.7	111
	SB RIGHT	AM	50	B	10	53	B	11.5	41
		PM		B	11	69	B	11	62
	INTERSECTION OVERALL	AM		B	15.8		A	6.4	
		PM		A	8.4		A	5.9	



## Alternatives to Traffic Control Signals

MUTCD Guidance provides that *Since road user delay and the frequency of some types of crashes are sometimes higher under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic control signals even if one or more of the signal warrants has been satisfied.*

Alternatives considered as listed in Section 4B.03 could include the following:

- A. *Installing signs along the major street to warn road users approaching the intersection.*
  - The main issue with the existing 6<sup>th</sup> Street intersection (and proposed 4<sup>th</sup> Street with Diversion) is LOS and Delay of the side street. Signage will not solve that issue.
- B. *Installing a roundabout to reduce fatal and serious injury crashes and vehicular conflicts that result in fatal and serious injury crashes (see Section 8A.12 if the location is in close proximity to a grade crossing).*
  - Accident history is not an issue at the 6<sup>th</sup> Street intersection (or 4<sup>th</sup> Street). A roundabout has been studied (in the CDOT Access Plan) and due to the configuration of the existing intersection is cost prohibitive.
- C. *Installing a pedestrian hybrid beacon, rectangular rapid flashing beacons, pedestrian-actuated Warning Beacons, or In-Roadway Warning Lights; if pedestrian safety is the major concern.*
  - There is not an existing pedestrian crossing at 6<sup>th</sup> Street or current or future demand for a crossing.
- D. *Relocating the stop line(s) and making other changes to improve the sight distance at the intersection;*
  - The current sight distance is adequate at each intersection, although relocation of left turns to 4th Street will provide those main line crossings in an improved location.
- E. *Installing measures designed to reduce speeds on the approaches;*
  - Speed is not the main issue at the 6th Street intersection, although relocation of left turns to 4th Street will provide crossings in an improved location.
- F. *Installing a flashing beacon at the intersection to supplement STOP sign control;*
  - Not applicable. Accident history is not an issue at the 6<sup>th</sup> Street intersection (or 4<sup>th</sup> Street).
- G. *Installing flashing beacons on warning signs in advance of a stop-controlled intersection on the major street and/or minor-street approaches;*
  - Not applicable. Accident history is not an issue at the 6<sup>th</sup> Street intersection (or 4<sup>th</sup> Street).
- H. *Adding one or more lanes on a minor-street approach to reduce the number of vehicles per lane on the approach;*
  - Both intersections are two-lane approaches. The proximity of the CR 60 intersection with 6<sup>th</sup> Street to Agate Avenue limits the length of usable two-lane approach (~50 ft). Reconfiguration of the CR 60 / 6<sup>th</sup> St. / Agate Ave intersections is cost prohibitive and left turning traffic is better served at a more standard geometric intersection.



- I. *Revising the geometrics at the intersection to channelize vehicular movements and reduce the time required for a vehicle to complete a movement, which could also assist pedestrians;*
  - Not applicable.
- J. *Revising the geometrics at the intersection to add pedestrian median refuge islands and/or curb extensions;*
  - Not applicable.
- K. *Installing roadway lighting if a disproportionate number of crashes occur at night;*
  - Not applicable.
- L. *Restricting one or more turning movements, perhaps on a time-of-day basis, if alternate routes are available;*
  - Essentially the proposal this study analyzes, which moves the 2025 warrant at 6<sup>th</sup> Street to a more standard geometric intersection, creating a warrant at 4<sup>th</sup> Street.
- M. *If the warrant is satisfied, installing multi-way stop control;*
  - Agate Avenue volumes not applicable to stop control.



## Appendix A: CDOT Correspondence



## Dan Cokley

---

**From:** Vishwamitra - CDOT, Karthik <karthik.vishwamitra@state.co.us>  
**Sent:** Monday, May 19, 2025 12:53 PM  
**To:** Dan Cokley  
**Cc:** Brian Killian - CDOT; Kandis Aggen - CDOT; tcherry@townofgranby.com; Eric Mahoney  
**Subject:** Re: Town of Granby Agate Avenue – Signal Warrant Study

Hi Dan,

CDOT has the following comments on this analysis:

- Please provide more details on how the 4 and 8 hour factors were calculated.
- Please include the number of hours of the day that meet each warrant. (I.e. 2 out of 4 hours met, doesn't meet warrant; or 9 out of 8 hours met, meets warrant.)
- Please include analysis of the Combination of A and B for Warrant 1 (8 hour warrant).
- Please adjust traffic volumes for seasonal variation. CDOT adjusts traffic volumes to represent the highest month of the year, which is often July along US 40 (double check using annual data from OTIS). The "average day" adjustment isn't needed.
- Please provide the 12 hour count data used in the analysis.
- Please provide the Synchro files used in the analysis.

Best,

Karthik Vishwamitra, EIT III  
Traffic Access Engineer



P [970.683.6279](tel:970.683.6279) | C [720.655.5071](tel:720.655.5071) | E [karthik.vishwamitra@state.co.us](mailto:karthik.vishwamitra@state.co.us)  
222 S. 6th St, Room 100 Grand Junction, CO 81501  
[www.codot.gov](http://www.codot.gov) | [www.cotrip.org](http://www.cotrip.org)

On Fri, May 2, 2025 at 2:49 PM Dan Cokley <[DanC@sgm-inc.com](mailto:DanC@sgm-inc.com)> wrote:

Karthik

Please find attached the Signal Warrant study and Operations assessment for Agate as previously discuss. Please review and let me know if you'd like to discuss questions or comments or would like additional background calculations submitted..

# Appendix A - CDOT Correspondence

## Dan Cokley

---

**Subject:** FW: Town of Granby - Agate / US 40 corridor @ Mon Nov 25, 2024 2pm - 3pm (MST)

### Dan Cokley, PE, PTOE

Civil Services Team Leader/Principal, SGM

---

phone (970) 384-9009

mobile (970) 379-3378

**From:** Vishwamitra - CDOT, Karthik <karthik.vishwamitra@state.co.us>

**Sent:** Tuesday, December 17, 2024 3:17 PM

**To:** Dan Cokley <DanC@sgm-inc.com>

**Cc:** Brian Killian - CDOT <brian.killian@state.co.us>; Kandis Aggen - CDOT <kandis.aggen@state.co.us>; tcherry@townofgranby.com

**Subject:** Re: Town of Granby - Agate / US 40 corridor @ Mon Nov 25, 2024 2pm - 3pm (MST)

Dan,

Thanks for the clarification. The 2030 analysis year is acceptable to CDOT, and should eliminate the need for the interim studies mentioned in the previous comments.

Best,

Karthik Vishwamitra, EIT I

Traffic Access Engineer



P [970.683.6279](tel:970.683.6279) | C [720.655.5071](tel:720.655.5071) | E [karthik.vishwamitra@state.co.us](mailto:karthik.vishwamitra@state.co.us)

222 S. 6th St, Room 100 Grand Junction, CO 81501

[www.codot.gov](http://www.codot.gov) | [www.cotrip.org](http://www.cotrip.org)

On Tue, Dec 17, 2024 at 1:13 PM Dan Cokley <[DanC@sgm-inc.com](mailto:DanC@sgm-inc.com)> wrote:

Thanks, Karthik. We will incorporate these comments into the methodology. Regarding “20-yr” scenario, the intent was to analyze a 2030 scenario, to compare to existing scenarios. I missed that in the original memo, and I think you’d agree that a 20-yr scenario isn’t relevant in a Signal Warrant Analysis.

Thanks,

Dan

---

**From:** Vishwamitra - CDOT, Karthik <[karthik.vishwamitra@state.co.us](mailto:karthik.vishwamitra@state.co.us)>

**Sent:** Monday, December 16, 2024 5:10 PM

**To:** Dan Cokley <[DanC@sgm-inc.com](mailto:DanC@sgm-inc.com)>

**Cc:** Brian Killian - CDOT <[brian.killian@state.co.us](mailto:brian.killian@state.co.us)>; Kandis Aggen - CDOT <[kandis.aggen@state.co.us](mailto:kandis.aggen@state.co.us)>; [tcherry@townofgranby.com](mailto:tcherry@townofgranby.com)

**Subject:** Re: Town of Granby - Agate / US 40 corridor @ Mon Nov 25, 2024 2pm - 3pm (MST)

Hi Dan,

This methodology is acceptable to CDOT with the following comments:

- ✓ - Please include discussion of some of the relevant alternatives outlined in MUTCD Section ~~4B.04~~ in the TIS.
- ✓ - Please include all the MUTCD signal warrants in the analysis in the TIS, even if it's just one line that says "This warrant is not applicable because...".
- Pg. 3: 20-year future traffic should be 2045, not 2030.
- ✓ - If a signal is warranted in the long term future, but not in the short term, CDOT will need interim year analysis to determine when the signal will be warranted. The signal will only be constructed when warranted. This may require interim warrant studies in future years.

I attached the crash data summaries and listings for 4th and 6th St. CDOT will provide the 1st St signal timing sheet soon.

Let us know if you have any other questions.

Best,

**Karthik Vishwamitra, EIT I**  
Traffic Access Engineer



P [970.683.6279](tel:970.683.6279) | C [720.655.5071](tel:720.655.5071) | E [karthik.vishwamitra@state.co.us](mailto:karthik.vishwamitra@state.co.us)

222 S. 6th St, Room 100 Grand Junction, CO 81501

[www.codot.gov](http://www.codot.gov) | [www.cotrip.org](http://www.cotrip.org)

On Wed, Dec 11, 2024 at 8:56 AM Dan Cokley <[DanC@sgm-inc.com](mailto:DanC@sgm-inc.com)> wrote:

Brian and Karthik,

Thanks again for your time to meet on this topic. I have attached a Methodology memo for the Assessment of the 4<sup>th</sup> and 6<sup>th</sup> St intersections with Agate Ave (US40). Please review and let me know if you have any comments or would like to discuss.

Thanks,

## Dan Cokley, PE, PTOE

-----Original Appointment-----

**From:** Brian Killian - CDOT <[brian.killian@state.co.us](mailto:brian.killian@state.co.us)>

**Sent:** Wednesday, November 20, 2024 6:25 AM

**To:** Kandis Aggen - CDOT; Karthik Vishwamitra - CDOT; Dan Cokley; [tcherry@townofgranby.com](mailto:tcherry@townofgranby.com)

**Subject:** Invitation: Town of Granby - Agate / US 40 corridor @ Mon Nov 25, 2024 2pm - 3pm (MST) ([danc@sgm-inc.com](mailto:danc@sgm-inc.com))

**When:** Monday, November 25, 2024 2:00 PM-3:00 PM America/Denver.

**Where:**

When	<a href="#">Join with Google Meet</a>			
Monday Nov 25, 2024 · 2pm – 3pm (Mountain Time - Denver)	<a href="#">Meeting link</a>			
	<a href="https://meet.google.com/asj-vniy-soz">meet.google.com/asj-vniy-soz</a>			
Guests				
Brian Killian - CDOT - organizer	<a href="#">Join by phone</a>			
Kandis Aggen - CDOT	(US) <a href="tel:+12028387190">+1 202-838-7190</a>			
Karthik Vishwamitra - CDOT	PIN: 976614236			
danc@sgm-inc.com	<a href="#">More phone numbers</a>			
tcherry@townofgranby.com				
<a href="#">View all guest info</a>				
<a href="#">Reply for danc@sgm-inc.com</a>				
<table border="1" style="margin-left: auto; margin-right: auto;"><tr><td style="padding: 2px 10px;">Maybe</td><td style="padding: 2px 10px;">No</td><td style="padding: 2px 10px;">Yes</td></tr></table>		Maybe	No	Yes
Maybe	No	Yes		
<a href="#">More options</a>				

## MEMORANDUM

**DATE:** December 11, 2024

**TO:** Brian Killian, P.E., CDOT Region 3 Access Manager

**FROM:** Dan Cokley, PE, PTOE 

**RE:** Agate Ave (US40) Granby – Operations Assessment 4<sup>th</sup> and 6<sup>th</sup> St Intersections

---

This memo documents the methodology and assumptions that SGM intends to use for an Operations Assessment 4<sup>th</sup> and 6<sup>th</sup> Street intersections with Agate Ave in Granby, Colorado. The study is being completed for the Town of Granby to understand existing and future traffic conditions at these intersections, and the effect of potential changes to the 6<sup>th</sup> Street and 4<sup>th</sup> Street intersections. Signal Warrant Analyses will be performed for each intersection in the existing and potential configurations. The main goal of the study is to determine the need for an additional signal in downtown Granby (existing signal at 1<sup>st</sup> Street). The study area is shown in Figure 1.



*Figure 1 – Study Area*

The goal of this memo is to gain CDOT's acceptance of the data intended for use in the assessment and analysis, including proposed assumptions (directional distribution, trip reduction factors, etc.), signal warrant analysis parameters, and the overall approach to the access process for this assessment.

The scope of work includes an operational assessment that would include modeling of the existing intersections:

1. 4<sup>th</sup> Street and Agate Avenue
2. 6<sup>th</sup> Street and Agate Avenue
3. 6<sup>th</sup> Street and County Road 61
4. 1<sup>st</sup> Street and Agate Avenue (*as needed*)

## Future Traffic Projections

- The proposed developments north of town and tributary this travelshed that are on the horizon include 215 E Diamond, currently in the Town land use process and another 10 acre, 40-unit potential annexation considering the Town process. Granby Market Square and Granby Middle School have been approved and not started or fully implemented.
- Use CDOT 20-year factor of 1.15 for Agate Avenue (US 40) through traffic (CDOT Sta 101870) and supplement with above specific data or a similar factor for town side street traffic.
- Seasonal traffic adjustment to “average day” based on CDOT Station 000223 on US 40 east of Berthoud Pass. )MUTCD Section 4C.01 Paragraph 17 A)

## Intersection Traffic Counts

- Provide 12 hr hour (6am to 6pm) counts for two consecutive, non-holiday days (Tue, Wed, Thu).
- Timing of counts determined in scoping meeting. Use short duration and continuous counters on US40 as a reference point to determine seasonal factor.
- Will include vehicle classification, pedestrians and bicyclists.

## Operational Assessment

- Geometric configuration and analysis of 6<sup>th</sup> Street intersection options
- Follow CDOT Level 3 analysis guidelines
- Use Synchro / Simtraffic to identify operational metrics (LOS, Delay, 95<sup>th</sup> Q)
- SGM requests CDOT Signal Timing Data for 1<sup>st</sup> Street*

## Signal Warrant Conditions

- The Warrant Study is defined by eight (8) signal warrants in the Manual on Uniform Traffic Control Devices (MUTCD). Section 4C of the MUTCD states, “Traffic control signals should not be installed unless one or more of the warrants in this manual are met. The satisfaction of a warrant or warrants is not in itself justification for a signal.”
- The table below summarizes the MUTCD warrants. (X represents warrant to be analyzed)

Signal Warrant	Standard
1 Eight Hour Volume	X
2 Four Hour Volume	X
3 Peak Hour Volume	X
4 Minimum Pedestrian Volume	X
5 School Crossing	N/A
6 Coordinated Signal System	N/A
7 Crash Experience	X
8 Roadway Network	N/A

- SGM requests any available CDOT accident data. Will also contact local, county and state police jurisdictions.*

- The study will address adequate gaps in traffic for side street traffic to enter and exit Agate Avenue. (MUTCD Section 4C.01 Paragraph 18 B)

#### Input/Considerations:

- CDOT State Highway Access Code
- US 40 Access Control Study (2006)
- Granby Market Square TIS
- E Agate Avenue (US 40) Traffic Operational Assessment (Bowman, 4/29/19)

Modeling required will be performed using the guidelines of the CDOT Traffic Analysis and Forecasting Guidelines\_v01.072018.

#### Analysis Years

Operational analysis of Baseline (2025), 20-year background traffic (2030) and 20-year total traffic (2030) of the intersections will be completed. Baseline traffic volumes at study intersections will be factored by CDOT's 20-year factor (1.15) provided on the OTIS website for Station 101870 on this segment of US40.

#### Development Land Use Rates

The study will use trip generation rates from the ITE Trip Generation Manual, 11<sup>th</sup> Edition or applicable previously approved traffic study.

#### Trip Reductions

Internal Capture, Multi-modal, and Pass-By: N/A

#### 4<sup>th</sup> St / 6<sup>th</sup> St Traffic Distribution

The directional distribution related to a partial or full closure of 6<sup>th</sup> Street will be routed to and from the 4<sup>th</sup> Street intersection with Agate Avenue. Traffic will be re-distributed primarily based on existing traffic distribution data at each intersection. Generally, "closed" turning movements will be removed from 6<sup>th</sup> and applied to the 4<sup>th</sup> St intersection. The assessment will include discussion of a right-in / right out only and full closure of 6<sup>th</sup> Street. The Town noted that a condition of the County Road 61 gravel pit operating permit is that trucks are not permitted to use the 6th St access to Agate Avenue and must use 5<sup>th</sup> or 4<sup>th</sup> to access Agate.

#### Access Permits

The need and trigger for an updated Access Permit at 4<sup>th</sup> Street will be determined.

# Q-Free MAXTIME Database Print Out

1 - SH-40 Agate Ave Granby & 1St / Liquor store

**Agency** CDOT

**Database Description** R3 CDOT Default

## Basic Timing Parameters - Phase Plan 1

	Timings								Options							
	EB	SB	WB	NB												
Phases	1	2	3	4	5	6	7	8	Phases	1	2	3	4	5	6	7
Enable		X		X		X		X	Enable		X		X		X	
Walk Time	0	7	0	7	0	7	0	7	Auto Flash Ent.		X			X		
Clear Time	0	10	0	19	0	10	0	19	Auto Flash Exit		X			X		
Stdy Don't Walk	0	0	0	0	0	0	0	0	Non Actuated I							
Min Green	5	20	5	7	5	20	5	7	Non Actuated II							
Min Green 2	0	0	0	0	0	0	0	0	Non Lock Mem	X	X	X	X	X	X	X
Min B4 FO	0	0	0	0	0	0	0	0	Min Veh Recall		X			X		
Passage	0.0	5.0	0.0	3.0	0.0	5.0	0.0	3.0	Max Veh Recall							
Passage 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ped Recall							
PLAN 1 (W/D) Max 1	0	30	0	20	0	30	0	10	Soft Veh Recall							
PLAN 2 (W/E) Max 2	0	70	0	30	0	70	0	15	Dual Entry			X				X
Max 3	0	0	0	0	0	0	0	0	Sim Gap Dis			X				X
Conditional Max	0	0	0	0	0	0	0	0	Guaranteed Pass							
Yel Change	3.0	3.5	3.0	3.5	3.0	3.5	3.0	3.5	Act Rest Walk							
Red Clear	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	Cond Service							
Add Red Clear	0	0	0	0	0	0	0	0	Add Initial							
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Max Initial	0	0	0	0	0	0	0	0								
Time B4 Reduce	0	0	0	0	0	0	0	0								
Cars B4 Reduce	0	0	0	0	0	0	0	0								
Time To Reduce	0	0	0	0	0	0	0	0								
Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Dyn Max Limit	0	0	0	40	0	0	0	25								
Dyn Max Step	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0								
Advance Walk	0	0	0	0	0	0	0	0								
Delayed Walk	0	0	0	0	0	0	0	0								
Alt Walk	0	0	0	0	0	0	0	0								
Alt Ped Clr	0	0	0	0	0	0	0	0								
Ped Service Limit	0	0	0	0	0	0	0	0								
Pre Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Pre Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Pre Clearance 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Red Clear Ext Pass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Red Clear Ext Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Queue Jump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Adv Warning Ext	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Pri Walk	0	0	0	0	0	0	0	0								
Call Phases																
Walk Ext	0	0	0	0	0	0	0	0								
Walk Max	0	0	0	0	0	0	0	0								
Wait Cars B4 Sev	0	0	0	0	0	0	0	0								
Ped Clear Thru	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								

Day Plan 1				Day Plan 2			
Event	Hour	Min.	Act	Event	Hour	Min.	Act
1	6	30	21	1	7	30	21
2	19	0	20	2	19	0	20
3	0	0		3	0	0	
4	0	0		4	0	0	
5	0	0		5	0	0	
6	0	0		6	0	0	
7	0	0		7	0	0	
8	0	0		8	0	0	
9	0	0		9	0	0	
10	0	0		10	0	0	

Schedules							
Schedule 1		Enable		Day Plan 1		Days of Week	
Month of Year		On		Days of Month			
J	F	M	A	M	J	S	M
X	X	X	X	X	X	X	X
J	A	S	O	N	D		
X	X	X	X	X	X		
Schedule 2		Enable		Day Plan 2		Days of Week	
Month of Year		On		Days of Month			
J	F	M	A	M	J	S	M
X	X	X	X	X	X	X	X
J	A	S	O	N	D		
X	X	X	X	X	X		

# 902.3 Traffic Control Signal Needs Studies (MUTCD Chapter 4C)

Missouri Department of Transportation  
[https://epg.modot.org/index.php?902.3\\_Traffic\\_Cont...](https://epg.modot.org/index.php?902.3_Traffic_Cont...)

## 902.3 Traffic Control Signal Needs Studies (MUTCD ...)

Oct 26, 2021 — To account for this effect in warrant analysis, the percentage of right turns used in warrant analysis is to be reduced as the right turn ...

## Contents

### 902.3.1 Studies and Factors for Justifying Traffic Control Signals (MUTCD Section 4C.01)

Table 902.3.1 Number of Right Turns to Include in a Warrant Analysis

### 902.3.2 Documentation of Warrants

### 902.3.3 Warrant 1, Eight-Hour Vehicular Volume (MUTCD Section 4C.02)

Table 902.3.3 Warrant 1, Eight-Hour Vehicular Volume

### 902.3.4 Warrant 2, Four-Hour Vehicular Volume (MUTCD Section 4C.03)

### 902.3.5 Warrant 3, Peak Hour (MUTCD Section 4C.04)

### 902.3.6 Warrant 4, Pedestrian Volume (MUTCD Section 4C.05)

### 902.3.7 Warrant 5, School Crossing (MUTCD Section 4C.06)

### 902.3.8 Warrant 6, Coordinated Signal System (MUTCD Section 4C.07)

### 902.3.9 Warrant 7, Crash Experience (MUTCD Section 4C.08)

### 902.3.10 Warrant 8, Roadway Network (MUTCD Section 4C.09)

### 902.3.11 Warrant 9, Intersection Near a Grade Crossing (MUTCD Section 4C.10)

Table 902.3.11.1 Warrant 9, Adjustment Factor for Daily Frequency of Rail Traffic

Table 902.3.11.2 Warrant 9, Adjustment Factor for Percentage of High-Occupancy Buses

Table 902.3.11.3 Warrant 9, Adjustment Factor for Percentage of Tractor-Trailer Trucks

## 902.3.1 Studies and Factors for Justifying Traffic Control Signals (MUTCD Section 4C.01)

**Standard.** An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.

The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:

Warrant 1, Eight-Hour Vehicular Volume

Warrant 2, Four-Hour Vehicular Volume

Warrant 3, Peak Hour

Warrant 4, Pedestrian Volume

Warrant 5, School Crossing

Warrant 6, Coordinated Signal System

Warrant 7, Crash Experience

Warrant 8, Roadway Network

Warrant 9, Intersection Near a Grade Crossing

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

**Support.** EPG 902.5.38.2 and EPG 902.5.38.3 contain information regarding the use of traffic control signals instead of gates and/or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.

**Guidance.** A traffic control signal should not be installed unless one or more of the signal warrants in this article are met. Locations meeting the guidelines in this article can be approved at the district level.

A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection. The removal of a non-warranted installation is rarely easy to accomplish.

A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow. Traffic signals that are too closely spaced can be a problem to coordinate and may result in a significant loss of operating efficiency. There are three primary areas of concern with close signal spacing:

1. Traffic Queuing. Queue spillback between intersections can cause a breakdown in signalized traffic flow. Ideally, signals are to be spaced to allow room for anticipated queues. A rule of thumb for spacing is eight times the largest cycle length used. An estimate of queues can be made using modeling software.

2. Signal Coordination. Signal spacing is an important factor in coordination of signals. In general, an analysis of signal coordination is to be done if a new signal will be in a coordinated system, and particularly if the distance from the nearest signal is less than 1000 feet.

3. Operating Efficiency. If the location of the proposed signal shows a potential for queue spillback problems or coordination problems, then the operation will result in a reduced efficiency for both the new signal as well as the adjacent signals. To quantify the reduction in efficiency, an analysis of signal timing and coordination is to be developed that addresses the queuing or coordination problem and compared to existing conditions using modeling software.

Parking on the approaches to the intersection should be reviewed. It may be necessary to restrict parking on one or more approaches in order to increase sight distance or to provide increased capacity at the intersection.

The engineering study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed above. If a separate channelized or "free" right with an adequate approach lane is available or proposed, the benefits of a traffic signal in accomplishing this movement are minimal. In such cases, the right-turning volumes for the affected approaches are not to be included in the warrant evaluation. Where the right turns are under signal control or where there is a free right with no adequate approach lane, right turns may be included in warrant analysis. Right turns are typically allowed on red and right turns only require gaps in one or two conflicting movements. As the right turn percentage of total approach volume increases, the benefit of signalization decreases. To account for this effect in warrant analysis, the percentage of right turns used in warrant analysis is to be reduced as the right turn percentage of total approach volume increases. If right turns on red are prohibited for an approach, the full right-turning volume is to be considered in warrant analysis. The following is a guide for determining the number of right turns to include in a warrant analysis.

**Table 902.3.1 Number of Right Turns to Include in a Warrant Analysis**

Proposed Right Turn Condition	Right Turn Percentage (Right Turn Volume/Total Approach Volume)	Percent Right Turn Used in Warrant Analysis
Free Right With Adequate Lane	Any	0
Signal Control or Free Right Without Adequate Approach	0 to 25	100
	25 to 50	75
	50 to 75	50
	75 to 100	25
RTOR Restricted	Any	100

Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.

Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.

At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Many times developers will submit projected volumes to justify the installation of a traffic signal. Projected volumes, if properly determined, can be accurate gauges of the expected traffic. Great care is to be taken evaluating an intersection for traffic signals when projections are used. The projections are to be part of a formal traffic impact study performed by a traffic engineering consultant. The consultant shall use the principles of the Institute of Transportation Engineers Trip Generation, latest edition when determining the projected volumes at the entrances in question. When projected volumes are used to warrant a traffic signal, the warrants is to be significantly exceeded to provide for reasonable error in the traffic projections used for the development.

Because of increased development along the state highway system by commercial and industrial complexes, along with certain public institutions and street developments, traffic flows are generated which require remedial measures to maintain efficient flow of traffic. Traffic signals can be considered for handling traffic at these developments using Warrant 1 or Warrant 3. To qualify privately owned or publicly owned developments for traffic control measures the applicant must first convey to the Commission, by permanent traffic control easement, that area of operation or area of work which falls on land not within the normal right of way boundaries. The requirements and conditions of the easement will be based on the traffic operational requirements.

A traffic control signal installed under projected conditions should have an engineering study done in the future (ideally within 1 year of putting the signal into stop-and-go operation) to determine if the signal is justified and original study methodology was accurate.

For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 ft., should be considered as one intersection.

**Option.** At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the "minor-street" volume and the corresponding single direction of opposing traffic on the major street as the "major-street" volume.

For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.

For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

**Support.** When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

**Option.** Engineering study data may include the following:

- A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
- B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
- C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
- D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
- E. The posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the uncontrolled approaches to the location.
- F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures and adjacent land use.
- G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.
- H. On-site photographs of all approaches and any special considerations.

The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B above:

- A. Delay Study - Vehicle-hours of stopped time delay determined separately for each approach.
- B. Gap Study - The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.
- C. Speed Study - The posted or statutory speed limit or the 85th-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.
- D. Pedestrian Delay Study - Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
- E. Queue Study - Queue length on stop-controlled approaches.
- F. Signal Coordination Study - A time-space diagram for the coordinated signal system for each timing plan to be used is developed or revised to include the proposed signal installation. The time-space diagram is based on normal free flow speed for that time of day. It is necessary to develop realistic signal timing and offsets for the new signals. The time-space diagram is reviewed to determine the affects of the new signal on vehicle platooning through the coordinated system. This study can be further enhanced by using a traffic modeling program to help visualize actual conditions.

All of the above counts and data are to be obtained on an average day period.

Adequate roadway capacity is always desirable and especially so at a signalized intersection. The widening of both the main highway and intersecting roadways may be necessary to reduce the delays caused by assignment of right of way at the intersection and the widening itself may reduce or eliminate the need for signalization. In general, it is always desirable to provide a left turn lane for each major approach at each intersection. This is especially so on a two-lane roadway where there are sizable volumes of left-turning traffic. The left turn lane provides a place to separately store left-turning traffic. Separating the through and turning vehicles will generally improve the capacity of the intersection as well as reducing the overall delay at the intersection and the opportunity for rear-end crashes.

## **902.3.2 Documentation of Warrants**

---

**Guidance.** Documentation of information pertaining to signal warrants should be completed and approved by district traffic. The district will be responsible for approving the warrants.

**Option.** Documentation of signal warrant information may include, but is not limited to:

## Appendix B: Synchro Modeling Results



Intersection						
Int Delay, s/veh	15.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑↓		↑	↑
Traffic Vol, veh/h	45	544	374	48	122	44
Future Vol, veh/h	45	544	374	48	122	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	84	91	85	69	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	648	411	56	177	54
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	467	0	-	0	1203	234
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	764	-
Critical Hdwy	4.13	-	-	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.219	-	-	-	3.519	3.319
Pot Cap-1 Maneuver	1093	-	-	-	190	769
Stage 1	-	-	-	-	618	-
Stage 2	-	-	-	-	459	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1093	-	-	-	180	769
Mov Cap-2 Maneuver	-	-	-	-	180	-
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	459	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.7	0	90.4			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1093	-	-	-	180	769
HCM Lane V/C Ratio	0.053	-	-	-	0.982	0.071
HCM Control Delay (s)	8.5	-	-	-	115.1	10
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	-	7.9	0.2

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↘		↑ ↗	↑ ↘		↔			↑ ↗	↑ ↘	
Traffic Vol, veh/h	3	507	1	0	337	109	0	0	0	69	0	7
Future Vol, veh/h	3	507	1	0	337	109	0	0	0	69	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	200	-	-	200	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	551	1	0	366	118	0	0	0	75	0	8
Major/Minor												
Major1		Major2			Minor1			Minor2				
Conflicting Flow All	484	0	0	552	0	0	741	1042	276	707	983	242
Stage 1	-	-	-	-	-	-	558	558	-	425	425	-
Stage 2	-	-	-	-	-	-	183	484	-	282	558	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1075	-	-	1014	-	-	305	228	721	322	247	759
Stage 1	-	-	-	-	-	-	482	510	-	578	585	-
Stage 2	-	-	-	-	-	-	801	550	-	701	510	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1075	-	-	1014	-	-	301	227	721	321	246	759
Mov Cap-2 Maneuver	-	-	-	-	-	-	301	227	-	321	246	-
Stage 1	-	-	-	-	-	-	481	508	-	576	585	-
Stage 2	-	-	-	-	-	-	793	550	-	699	508	-
Approach												
EB			WB			NB			SB			
HCM Control Delay, s	0			0			0		0	18.7		
HCM LOS							A			C		
Minor Lane/Major Mvmt												
Capacity (veh/h)	-	1075	-	-	1014	-	-	-	321	759		
HCM Lane V/C Ratio	-	0.003	-	-	-	-	-	-	0.234	0.01		
HCM Control Delay (s)	0	8.4	-	-	0	-	-	-	19.6	9.8		
HCM Lane LOS	A	A	-	-	A	-	-	-	C	A		
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-	0.9	0		

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	12	547	7	9	397	2	8	1	12	5	0	32											
Future Vol, veh/h	12	547	7	9	397	2	8	1	12	5	0	32											
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	200	-	-	200	-	-	-	-	-	-	-	50											
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	13	595	8	10	432	2	9	1	13	5	0	35											
Major/Minor																							
Major1		Major2			Minor1			Minor2															
Conflicting Flow All	434	0	0	603	0	0	861	1079	302	777	1082	217											
Stage 1	-	-	-	-	-	-	625	625	-	453	453	-											
Stage 2	-	-	-	-	-	-	236	454	-	324	629	-											
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94											
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32											
Pot Cap-1 Maneuver	1122	-	-	971	-	-	249	217	694	287	216	787											
Stage 1	-	-	-	-	-	-	439	475	-	556	568	-											
Stage 2	-	-	-	-	-	-	746	568	-	662	474	-											
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-											
Mov Cap-1 Maneuver	1122	-	-	971	-	-	234	212	694	276	211	787											
Mov Cap-2 Maneuver	-	-	-	-	-	-	234	212	-	276	211	-											
Stage 1	-	-	-	-	-	-	434	469	-	549	562	-											
Stage 2	-	-	-	-	-	-	706	562	-	641	468	-											
Approach																							
EB			WB			NB			SB														
HCM Control Delay, s	0.2		0.2		15.3			10.9															
HCM LOS	C						B																
Minor Lane/Major Mvmt																							
NBLn1		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2														
Capacity (veh/h)	374	1122	-	-	971	-	-	276	787														
HCM Lane V/C Ratio	0.061	0.012	-	-	0.01	-	-	0.02	0.044														
HCM Control Delay (s)	15.3	8.2	-	-	8.7	-	-	18.3	9.8														
HCM Lane LOS	C	A	-	-	A	-	-	C	A														
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1	0.1														

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↖	↖	↑
Traffic Vol, veh/h	39	30	54	35	20	126
Future Vol, veh/h	39	30	54	35	20	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	30	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	85	100	100	69	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	35	54	35	29	126
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	238	54	0	0	89	0
Stage 1	54	-	-	-	-	-
Stage 2	184	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	750	1013	-	-	1506	-
Stage 1	969	-	-	-	-	-
Stage 2	848	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	736	1013	-	-	1506	-
Mov Cap-2 Maneuver	736	-	-	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	832	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.5	0		1.4		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	736	1013	1506	-
HCM Lane V/C Ratio	-	-	0.053	0.035	0.019	-
HCM Control Delay (s)	-	-	10.2	8.7	7.4	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

**2: Agate Ave & 6th St Performance by approach**

Approach	EB	WB	SB	All
Stop Delay (hr)	0.0	0.0	0.8	0.8

**5: 4th St & Agate Ave Performance by approach**

Approach	EB	WB	SB	All
Stop Delay (hr)	0.0	0.0	0.2	0.2

**8: 5th St & Agate Ave Performance by approach**

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1

**13: 6th St & CR60 Performance by approach**

Approach	WB	NB	SB	All
Stop Delay (hr)	0.4	0.0	0.4	0.8

**Total Zone Performance**

Stop Delay (hr)	1.9
-----------------	-----

# Queuing and Blocking Report

Baseline

06/04/2025

## Intersection: 2: Agate Ave & 6th St

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	51	2	6	53	52
Average Queue (ft)	18	0	0	44	25
95th Queue (ft)	46	2	4	59	47
Link Distance (ft)		777	777	37	37
Upstream Blk Time (%)				29	2
Queuing Penalty (veh)				24	2
Storage Bay Dist (ft)		300			
Storage Blk Time (%)					
Queuing Penalty (veh)					

## Intersection: 5: 4th St & Agate Ave

Movement	EB	SB	SB
Directions Served	L	LT	R
Maximum Queue (ft)	19	72	31
Average Queue (ft)	1	34	7
95th Queue (ft)	10	62	28
Link Distance (ft)		494	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	200		50
Storage Blk Time (%)		3	0
Queuing Penalty (veh)		0	0

## Intersection: 8: 5th St & Agate Ave

Movement	EB	EB	EB	WB	NB	SB	SB
Directions Served	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	26	2	8	31	41	43	55
Average Queue (ft)	3	0	0	5	11	6	21
95th Queue (ft)	17	2	5	23	33	28	50
Link Distance (ft)		404	404		193	112	
Upstream Blk Time (%)					0		
Queuing Penalty (veh)					0		
Storage Bay Dist (ft)	200			200		50	
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

# Queuing and Blocking Report

Baseline

06/04/2025

## Intersection: 13: 6th St & CR60

Movement	WB	WB	SB	SB
Directions Served	L	R	L	T
Maximum Queue (ft)	98	48	48	149
Average Queue (ft)	30	15	4	32
95th Queue (ft)	76	37	26	104
Link Distance (ft)	480	480		348
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		30		
Storage Blk Time (%)		0	15	
Queuing Penalty (veh)		0	3	

## Zone Summary

Zone wide Queuing Penalty: 29

Intersection						
Int Delay, s/veh	5.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑↓		↑	↑
Traffic Vol, veh/h	66	488	582	106	57	48
Future Vol, veh/h	66	488	582	106	57	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	84	91	85	69	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	581	640	125	83	59
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	765	0	-	0	1454	383
Stage 1	-	-	-	-	703	-
Stage 2	-	-	-	-	751	-
Critical Hdwy	4.13	-	-	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.219	-	-	-	3.519	3.319
Pot Cap-1 Maneuver	846	-	-	-	132	616
Stage 1	-	-	-	-	453	-
Stage 2	-	-	-	-	465	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	846	-	-	-	119	616
Mov Cap-2 Maneuver	-	-	-	-	119	-
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	465	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.2	0	54.6			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	846	-	-	-	119	616
HCM Lane V/C Ratio	0.1	-	-	-	0.694	0.096
HCM Control Delay (s)	9.7	-	-	-	85.5	11.5
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.3	-	-	-	3.7	0.3

Intersection														
Int Delay, s/veh	2.3													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	1	15	483	1	1	3	523	103	1	1	0	75	0	15
Future Vol, veh/h	1	15	483	1	1	3	523	103	1	1	0	75	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	200	-	-	-	200	-	-	-	-	-	-	-	50
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	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	16	525	1	1	3	568	112	1	1	0	82	0	16
Major/Minor	Major1			Major2			Minor1			Minor2				
Conflicting Flow All	680	680	0	0	526	526	0	0	852	1248	263	929	1192	340
Stage 1	-	-	-	-	-	-	-	-	560	560	-	632	632	-
Stage 2	-	-	-	-	-	-	-	-	292	688	-	297	560	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	532	908	-	-	666	1037	-	-	253	172	735	222	186	656
Stage 1	-	-	-	-	-	-	-	-	480	509	-	435	472	-
Stage 2	-	-	-	-	-	-	-	-	692	445	-	687	509	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	868	868	-	-	910	910	-	-	242	168	735	217	182	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	242	168	-	217	182	-
Stage 1	-	-	-	-	-	-	-	-	470	499	-	426	470	-
Stage 2	-	-	-	-	-	-	-	-	672	443	-	672	499	-
Approach	EB			WB			NB			SB				
HCM Control Delay, s	0.3			0.1			23.4			27.8				
HCM LOS							C			D				
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2					
Capacity (veh/h)	198	868	-	-	910	-	-	217	656					
HCM Lane V/C Ratio	0.011	0.02	-	-	0.005	-	-	0.376	0.025					
HCM Control Delay (s)	23.4	9.2	-	-	9	-	-	31.2	10.6					
HCM Lane LOS	C	A	-	-	A	-	-	D	B					
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	1.6	0.1					

Intersection													
Int Delay, s/veh	0.6												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↘		↑ ↗	↑ ↘			↔			↑ ↗	↑ ↘	
Traffic Vol, veh/h	21	534	8	2	608	2	1	5	0	4	8	0	18
Future Vol, veh/h	21	534	8	2	608	2	1	5	0	4	8	0	18
Conflicting Peds, #/hr	0	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	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-	50
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	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	580	9	2	661	2	1	5	0	4	9	0	20
Major/Minor	Major1		Major2		Minor1		Minor2						
Conflicting Flow All	663	0	0	589	0	0	0	966	1298	295	1002	1301	332
Stage 1	-	-	-	-	-	-	0	631	631	-	666	666	-
Stage 2	-	-	-	-	-	-	0	335	667	-	336	635	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	922	-	-	982	-	-	0	209	160	701	197	160	664
Stage 1	-	-	-	-	-	-	0	436	473	-	415	456	-
Stage 2	-	-	-	-	-	-	0	653	455	-	652	471	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	922	-	-	982	-	-	0	199	156	701	192	156	664
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	199	156	-	192	156	-
Stage 1	-	-	-	-	-	-	0	425	461	-	405	455	-
Stage 2	-	-	-	-	-	-	0	632	454	-	632	459	-
Approach	EB		WB		NB		SB						
HCM Control Delay, s	0.3		0		17.8		14.9						
HCM LOS					C		B						
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2				
Capacity (veh/h)	292	922	-	-	982	-	-	192	664				
HCM Lane V/C Ratio	0.034	0.025	-	-	0.002	-	-	0.045	0.029				
HCM Control Delay (s)	17.8	9	-	-	8.7	-	-	24.6	10.6				
HCM Lane LOS	C	A	-	-	A	-	-	C	B				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1	0.1				

Intersection

Int Delay, s/veh 2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖ ↗ ↘ ↗ ↘ ↗					
Traffic Vol, veh/h	31	14	132	43	16	75
Future Vol, veh/h	31	14	132	43	16	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	30	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	85	100	100	69	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	31	16	132	43	23	75

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	253	132	0	0	175
Stage 1	132	-	-	-	-
Stage 2	121	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	736	917	-	-	1401
Stage 1	894	-	-	-	-
Stage 2	904	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	724	917	-	-	1401
Mov Cap-2 Maneuver	724	-	-	-	-
Stage 1	894	-	-	-	-
Stage 2	890	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	724	917	1401	-
HCM Lane V/C Ratio	-	-	0.043	0.018	0.017	-
HCM Control Delay (s)	-	-	10.2	9	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

---

**2: Agate Ave & 6th St Performance by approach**

---

Approach	EB	WB	SB	All
Stop Delay (hr)	0.1	0.0	0.6	0.7

---

**5: 4th St & Agate Ave Performance by approach**

---

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.3	0.3

---

**8: 5th St & Agate Ave Performance by approach**

---

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1

---

**13: 6th St & CR60 Performance by approach**

---

Approach	WB	NB	SB	All
Stop Delay (hr)	0.2	0.0	0.1	0.3

---

**Total Zone Performance**

---

Stop Delay (hr)	1.4
-----------------	-----

## Queuing and Blocking Report

06/04/2025

### Intersection: 2: Agate Ave & 6th St

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	64	7	32	52	48
Average Queue (ft)	27	0	2	35	25
95th Queue (ft)	57	6	16	60	46
Link Distance (ft)		777	777	37	37
Upstream Blk Time (%)				18	2
Queuing Penalty (veh)				9	1
Storage Bay Dist (ft)	300				
Storage Blk Time (%)					
Queuing Penalty (veh)					

### Intersection: 5: 4th St & Agate Ave

Movement	EB	WB	WB	NB	SB	SB
Directions Served	UL	UL	TR	LTR	LT	R
Maximum Queue (ft)	25	24	2	18	98	56
Average Queue (ft)	6	2	0	1	40	15
95th Queue (ft)	24	14	2	10	75	44
Link Distance (ft)		404		218	494	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200	200			50	
Storage Blk Time (%)					7	0
Queuing Penalty (veh)					1	0

### Intersection: 8: 5th St & Agate Ave

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	L	ULTR	LT	R
Maximum Queue (ft)	27	6	15	29	40	42
Average Queue (ft)	8	0	1	7	7	14
95th Queue (ft)	26	6	9	25	30	40
Link Distance (ft)		404		193	112	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200		200		50	
Storage Blk Time (%)					0	0
Queuing Penalty (veh)					0	0

# Queuing and Blocking Report

06/04/2025

---

## Intersection: 13: 6th St & CR60

---

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	R	L	T
Maximum Queue (ft)	60	28	6	8	42	69
Average Queue (ft)	22	9	0	0	3	11
95th Queue (ft)	52	28	5	5	21	46
Link Distance (ft)	480	480	37	37		348
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)				30		
Storage Blk Time (%)					0	7
Queuing Penalty (veh)					0	1

---

## Zone Summary

---

Zone wide Queuing Penalty: 13

---

Intersection						
Int Delay, s/veh	22					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↑↓		↖	↗
Traffic Vol, veh/h	47	586	399	50	126	45
Future Vol, veh/h	47	586	399	50	126	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	84	91	85	69	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	698	438	59	183	56
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	497	0	-	0	1286	249
Stage 1	-	-	-	-	468	-
Stage 2	-	-	-	-	818	-
Critical Hdwy	4.13	-	-	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.219	-	-	-	3.519	3.319
Pot Cap-1 Maneuver	1065	-	-	-	~ 168	752
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	433	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1065	-	-	-	~ 159	752
Mov Cap-2 Maneuver	-	-	-	-	~ 159	-
Stage 1	-	-	-	-	564	-
Stage 2	-	-	-	-	433	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.7	0	136			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1065	-	-	-	159	752
HCM Lane V/C Ratio	0.057	-	-	-	1.148	0.074
HCM Control Delay (s)	8.6	-	-	-	174.3	10.2
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	-	9.9	0.2
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s	+: Computation Not Defined		*: All major volume in platoon	

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↘		↑ ↗	↑ ↘		↔			↑ ↗	↑ ↘	
Traffic Vol, veh/h	17	539	1	0	361	123	0	0	0	84	0	16
Future Vol, veh/h	17	539	1	0	361	123	0	0	0	84	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	200	-	-	200	-	-	-	-	-	-	-	50
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	18	586	1	0	392	134	0	0	0	91	0	17
Major/Minor												
Major1		Major2			Minor1		Minor2					
Conflicting Flow All	526	0	0	587	0	0	819	1149	294	788	1082	263
Stage 1	-	-	-	-	-	-	623	623	-	459	459	-
Stage 2	-	-	-	-	-	-	196	526	-	329	623	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1037	-	-	984	-	-	267	197	702	282	216	735
Stage 1	-	-	-	-	-	-	440	476	-	551	565	-
Stage 2	-	-	-	-	-	-	787	527	-	658	476	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1037	-	-	984	-	-	257	194	702	278	212	735
Mov Cap-2 Maneuver	-	-	-	-	-	-	257	194	-	278	212	-
Stage 1	-	-	-	-	-	-	433	468	-	542	565	-
Stage 2	-	-	-	-	-	-	768	527	-	647	468	-
Approach												
EB			WB			NB		SB				
HCM Control Delay, s	0.3		0			0		21.9				
HCM LOS						A		C				
Minor Lane/Major Mvmt												
Capacity (veh/h)	-	1037	-	-	984	-	-	278	735			
HCM Lane V/C Ratio	-	0.018	-	-	-	-	-	0.328	0.024			
HCM Control Delay (s)	0	8.5	-	-	0	-	-	24.2	10			
HCM Lane LOS	A	A	-	-	A	-	-	C	B			
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	1.4	0.1			

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	12	590	7	9	423	2	8	1	12	6	0	33											
Future Vol, veh/h	12	590	7	9	423	2	8	1	12	6	0	33											
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	200	-	-	200	-	-	-	-	-	-	-	50											
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	13	641	8	10	460	2	9	1	13	7	0	36											
Major/Minor																							
Major1		Major2			Minor1			Minor2															
Conflicting Flow All	462	0	0	649	0	0	921	1153	325	828	1156	231											
Stage 1	-	-	-	-	-	-	671	671	-	481	481	-											
Stage 2	-	-	-	-	-	-	250	482	-	347	675	-											
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94											
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32											
Pot Cap-1 Maneuver	1095	-	-	933	-	-	225	196	671	263	195	771											
Stage 1	-	-	-	-	-	-	412	453	-	535	552	-											
Stage 2	-	-	-	-	-	-	732	552	-	642	451	-											
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-											
Mov Cap-1 Maneuver	1095	-	-	933	-	-	211	191	671	252	191	771											
Mov Cap-2 Maneuver	-	-	-	-	-	-	211	191	-	252	191	-											
Stage 1	-	-	-	-	-	-	407	448	-	529	546	-											
Stage 2	-	-	-	-	-	-	690	546	-	621	446	-											
Approach																							
EB			WB			NB			SB														
HCM Control Delay, s	0.2		0.2		16.2			11.4															
HCM LOS	C						B																
Minor Lane/Major Mvmt																							
Capacity (veh/h)	344	1095	-	-	933	-	-	-	252	771	-	-											
HCM Lane V/C Ratio	0.066	0.012	-	-	0.01	-	-	-	0.026	0.047	-	-											
HCM Control Delay (s)	16.2	8.3	-	-	8.9	-	-	-	19.7	9.9	-	-											
HCM Lane LOS	C	A	-	-	A	-	-	-	C	A	-	-											
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-	0.1	0.1	-	-											

Intersection

Int Delay, s/veh 2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖ ↗ ↑ ↘ ↙ ↑					
Traffic Vol, veh/h	41	31	56	36	20	131
Future Vol, veh/h	41	31	56	36	20	131
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	30	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	85	100	100	69	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	36	56	36	29	131

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	245	56	0	0	92
Stage 1	56	-	-	-	-
Stage 2	189	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	743	1011	-	-	1503
Stage 1	967	-	-	-	-
Stage 2	843	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	729	1011	-	-	1503
Mov Cap-2 Maneuver	729	-	-	-	-
Stage 1	967	-	-	-	-
Stage 2	827	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	729	1011	1503	-
HCM Lane V/C Ratio	-	-	0.056	0.036	0.019	-
HCM Control Delay (s)	-	-	10.2	8.7	7.4	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

**2: Agate Ave & 6th St Performance by approach**

---

Approach	EB	WB	SB	All
Stop Delay (hr)	0.0	0.0	0.9	1.0

**5: 4th St & Agate Ave Performance by approach**

---

Approach	EB	WB	SB	All
Stop Delay (hr)	0.0	0.0	0.3	0.3

**8: 5th St & Agate Ave Performance by approach**

---

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1

**13: 6th St & CR60 Performance by approach**

---

Approach	WB	NB	SB	All
Stop Delay (hr)	0.9	0.0	0.4	1.3

**Total Zone Performance**

---

Stop Delay (hr)	2.7
-----------------	-----

## Queuing and Blocking Report

06/04/2025

### Intersection: 2: Agate Ave & 6th St

Movement	EB	WB	SB	SB
Directions Served	L	TR	L	R
Maximum Queue (ft)	49	5	52	52
Average Queue (ft)	18	0	46	25
95th Queue (ft)	45	4	58	48
Link Distance (ft)		777	37	37
Upstream Blk Time (%)			36	2
Queuing Penalty (veh)			31	2
Storage Bay Dist (ft)	300			
Storage Blk Time (%)				
Queuing Penalty (veh)				

### Intersection: 5: 4th St & Agate Ave

Movement	EB	EB	WB	SB	SB
Directions Served	L	T	T	LT	R
Maximum Queue (ft)	32	1	4	92	43
Average Queue (ft)	5	0	0	41	14
95th Queue (ft)	23	1	4	75	41
Link Distance (ft)		404		494	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	200			50	
Storage Blk Time (%)			5	0	
Queuing Penalty (veh)			1	0	

### Intersection: 8: 5th St & Agate Ave

Movement	EB	EB	EB	WB	NB	SB	SB
Directions Served	L	T	TR	L	LTR	LT	R
Maximum Queue (ft)	31	9	3	33	34	38	51
Average Queue (ft)	4	0	0	3	13	6	22
95th Queue (ft)	21	6	3	19	33	27	49
Link Distance (ft)		404	404		193	112	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200			200		50	
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

# Queuing and Blocking Report

06/04/2025

---

## Intersection: 13: 6th St & CR60

---

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	R	L	T
Maximum Queue (ft)	134	41	3	2	52	149
Average Queue (ft)	41	16	0	0	6	35
95th Queue (ft)	144	38	3	2	32	105
Link Distance (ft)	480	480	37	37		348
Upstream Blk Time (%)	0			0		
Queuing Penalty (veh)	0			0		
Storage Bay Dist (ft)				30		
Storage Blk Time (%)				0	20	
Queuing Penalty (veh)				0	4	

---

## Zone Summary

---

Zone wide Queuing Penalty: 38

---

Intersection						
Int Delay, s/veh	7.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑↓		↑	↑
Traffic Vol, veh/h	68	536	620	110	59	50
Future Vol, veh/h	68	536	620	110	59	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	84	91	85	69	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	638	681	129	86	62
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	810	0	-	0	1558	405
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	812	-
Critical Hdwy	4.13	-	-	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.219	-	-	-	3.519	3.319
Pot Cap-1 Maneuver	814	-	-	-	113	596
Stage 1	-	-	-	-	431	-
Stage 2	-	-	-	-	436	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	814	-	-	-	101	596
Mov Cap-2 Maneuver	-	-	-	-	101	-
Stage 1	-	-	-	-	385	-
Stage 2	-	-	-	-	436	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.2	0	79.1			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	814	-	-	-	101	596
HCM Lane V/C Ratio	0.107	-	-	-	0.847	0.104
HCM Control Delay (s)	10	-	-	-	127.7	11.7
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.4	-	-	-	4.8	0.3

Intersection														
Int Delay, s/veh	4													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	1	34	518	1	1	3	559	121	1	1	0	94	0	29
Future Vol, veh/h	1	34	518	1	1	3	559	121	1	1	0	94	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	200	-	-	-	200	-	-	-	-	-	-	-	50
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	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	37	563	1	1	3	608	132	1	1	0	102	0	32
Major/Minor	Major1			Major2			Minor1			Minor2				
Conflicting Flow All	739	740	0	0	564	564	0	0	952	1388	282	1040	1322	370
Stage 1	-	-	-	-	-	-	-	-	640	640	-	682	682	-
Stage 2	-	-	-	-	-	-	-	-	312	748	-	358	640	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	488	862	-	-	630	1004	-	-	214	142	715	185	155	627
Stage 1	-	-	-	-	-	-	-	-	430	468	-	406	448	-
Stage 2	-	-	-	-	-	-	-	-	673	418	-	633	468	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	841	841	-	-	874	874	-	-	196	135	715	177	147	627
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	196	135	-	177	147	-
Stage 1	-	-	-	-	-	-	-	-	411	447	-	388	446	-
Stage 2	-	-	-	-	-	-	-	-	636	416	-	603	447	-
Approach	EB			WB			NB			SB				
HCM Control Delay, s	0.6			0.1			27.8			40.7				
HCM LOS							D			E				
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2					
Capacity (veh/h)	160	841	-	-	874	-	-	177	627					
HCM Lane V/C Ratio	0.014	0.045	-	-	0.005	-	-	0.577	0.05					
HCM Control Delay (s)	27.8	9.5	-	-	9.1	-	-	49.9	11					
HCM Lane LOS	D	A	-	-	A	-	-	E	B					
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	3.1	0.2					

Intersection													
Int Delay, s/veh	0.6												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓			↔		↑	↑↓		
Traffic Vol, veh/h	22	584	8	2	646	2	1	6	0	5	8	0	18
Future Vol, veh/h	22	584	8	2	646	2	1	6	0	5	8	0	18
Conflicting Peds, #/hr	0	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	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-	50
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	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	635	9	2	702	2	1	7	0	5	9	0	20
Major/Minor	Major1		Major2		Minor1		Minor2						
Conflicting Flow All	704	0	0	644	0	0	0	1043	1396	322	1073	1399	352
Stage 1	-	-	-	-	-	-	0	688	688	-	707	707	-
Stage 2	-	-	-	-	-	-	0	355	708	-	366	692	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	890	-	-	937	-	-	0	184	140	674	175	139	644
Stage 1	-	-	-	-	-	-	0	403	445	-	392	436	-
Stage 2	-	-	-	-	-	-	0	635	436	-	626	443	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	890	-	-	937	-	-	0	174	136	674	170	135	644
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	174	136	-	170	135	-
Stage 1	-	-	-	-	-	-	0	392	433	-	381	435	-
Stage 2	-	-	-	-	-	-	0	614	435	-	604	431	-
Approach	EB		WB		NB		SB						
HCM Control Delay, s	0.3		0		19.3		15.9						
HCM LOS					C		C						
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2				
Capacity (veh/h)	263	890	-	-	937	-	-	170	644				
HCM Lane V/C Ratio	0.045	0.027	-	-	0.002	-	-	0.051	0.03				
HCM Control Delay (s)	19.3	9.2	-	-	8.9	-	-	27.3	10.8				
HCM Lane LOS	C	A	-	-	A	-	-	D	B				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2	0.1				

Intersection

Int Delay, s/veh 2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	32	15	136	44	17	77
Future Vol, veh/h	32	15	136	44	17	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	30	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	85	100	100	69	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	18	136	44	25	77

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	263	136	0	0	180
Stage 1	136	-	-	-	-
Stage 2	127	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	726	913	-	-	1396
Stage 1	890	-	-	-	-
Stage 2	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	713	913	-	-	1396
Mov Cap-2 Maneuver	713	-	-	-	-
Stage 1	890	-	-	-	-
Stage 2	883	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	713	913	1396	-
HCM Lane V/C Ratio	-	-	0.045	0.019	0.018	-
HCM Control Delay (s)	-	-	10.3	9	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

**2: Agate Ave & 6th St Performance by approach**

---

Approach	EB	WB	SB	All
Stop Delay (hr)	0.1	0.0	0.6	0.7

**5: 4th St & Agate Ave Performance by approach**

---

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.5	0.5

**8: 5th St & Agate Ave Performance by approach**

---

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1

**13: 6th St & CR60 Performance by approach**

---

Approach	WB	NB	SB	All
Stop Delay (hr)	0.1	0.0	0.2	0.3

**Total Zone Performance**

---

Stop Delay (hr)	1.6
-----------------	-----

## Queuing and Blocking Report

06/04/2025

### Intersection: 2: Agate Ave & 6th St

Movement	EB	WB	SB	SB
Directions Served	L	TR	L	R
Maximum Queue (ft)	68	44	50	52
Average Queue (ft)	29	4	34	26
95th Queue (ft)	59	22	59	48
Link Distance (ft)		777	37	37
Upstream Blk Time (%)			19	2
Queuing Penalty (veh)			11	1
Storage Bay Dist (ft)	300			
Storage Blk Time (%)				
Queuing Penalty (veh)				

### Intersection: 5: 4th St & Agate Ave

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	UL	TR	UL	T	TR	LTR	LT	R
Maximum Queue (ft)	45	1	23	4	12	27	115	69
Average Queue (ft)	13	0	2	0	1	2	48	25
95th Queue (ft)	37	1	15	3	7	14	88	59
Link Distance (ft)			404	404	218	494		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	200		200				50	
Storage Blk Time (%)							10	0
Queuing Penalty (veh)							3	0

### Intersection: 8: 5th St & Agate Ave

Movement	EB	EB	EB	WB	NB	SB	SB
Directions Served	L	T	TR	L	ULTR	LT	R
Maximum Queue (ft)	27	3	4	15	29	32	31
Average Queue (ft)	7	0	0	1	8	7	13
95th Queue (ft)	26	3	3	9	26	28	38
Link Distance (ft)	404	404		193	112		
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200		200			50	
Storage Blk Time (%)						0	0
Queuing Penalty (veh)						0	0

# Queuing and Blocking Report

06/04/2025

## Intersection: 13: 6th St & CR60

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	R	L	T
Maximum Queue (ft)	57	24	7	4	39	88
Average Queue (ft)	21	10	0	0	6	11
95th Queue (ft)	47	28	4	3	29	55
Link Distance (ft)	480	480	37	37		348
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)				30		
Storage Blk Time (%)					0	7
Queuing Penalty (veh)					0	1

## Zone Summary

Zone wide Queuing Penalty: 17

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑↓		↑	↑
Traffic Vol, veh/h	0	712	399	49	0	45
Future Vol, veh/h	0	712	399	49	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	84	91	85	69	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	848	438	58	0	56
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	496	0	-	0	1315	248
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	848	-
Critical Hdwy	4.13	-	-	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.219	-	-	-	3.519	3.319
Pot Cap-1 Maneuver	1066	-	-	-	161	753
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	419	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1066	-	-	-	161	753
Mov Cap-2 Maneuver	-	-	-	-	161	-
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	419	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	10.2			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1066	-	-	-	-	753
HCM Lane V/C Ratio	-	-	-	-	-	0.074
HCM Control Delay (s)	0	-	-	-	0	10.2
HCM Lane LOS	A	-	-	-	A	B
HCM 95th %tile Q(veh)	0	-	-	-	-	0.2

Intersection

Int Delay, s/veh 15.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↗		↑ ↗	↑ ↗		↔	↔		↑ ↗	↑ ↗	
Traffic Vol, veh/h	63	492	1	0	360	123	0	0	0	209	0	15
Future Vol, veh/h	63	492	1	0	360	123	0	0	0	209	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									
Storage Length	200	-	-	200	-	-	-	-	-	-	-	50
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	68	535	1	0	391	134	0	0	0	227	0	16

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	525	0	0	536	0	0	868	1197	268	862	1130	263
Stage 1	-	-	-	-	-	-	672	672	-	458	458	-
Stage 2	-	-	-	-	-	-	196	525	-	404	672	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1038	-	-	1028	-	-	246	185	730	249	202	735
Stage 1	-	-	-	-	-	-	412	453	-	552	565	-
Stage 2	-	-	-	-	-	-	787	528	-	594	453	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1038	-	-	1028	-	-	229	173	730	237	189	735
Mov Cap-2 Maneuver	-	-	-	-	-	-	229	173	-	237	189	-
Stage 1	-	-	-	-	-	-	385	423	-	516	565	-
Stage 2	-	-	-	-	-	-	770	528	-	555	423	-

Approach	EB	WB		NB		SB			
HCM Control Delay, s	1	0		0		86.8			
HCM LOS				A		F			
<hr/>									
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	1038	-	-	1028	-	-	237	735
HCM Lane V/C Ratio	-	0.066	-	-	-	-	-	0.959	0.022
HCM Control Delay (s)	0	8.7	-	-	0	-	-	92.3	10
HCM Lane LOS	A	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	-	0.2	-	-	0	-	-	8.6	0.1

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	12	543	7	9	423	2	8	1	12	6	0	33											
Future Vol, veh/h	12	543	7	9	423	2	8	1	12	6	0	33											
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	200	-	-	200	-	-	-	-	-	-	-	50											
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	13	590	8	10	460	2	9	1	13	7	0	36											
Major/Minor																							
Major1		Major2			Minor1			Minor2															
Conflicting Flow All	462	0	0	598	0	0	870	1102	299	803	1105	231											
Stage 1	-	-	-	-	-	-	620	620	-	481	481	-											
Stage 2	-	-	-	-	-	-	250	482	-	322	624	-											
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94											
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32											
Pot Cap-1 Maneuver	1095	-	-	975	-	-	246	210	697	275	209	771											
Stage 1	-	-	-	-	-	-	442	478	-	535	552	-											
Stage 2	-	-	-	-	-	-	732	552	-	664	476	-											
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-											
Mov Cap-1 Maneuver	1095	-	-	975	-	-	231	205	697	264	204	771											
Mov Cap-2 Maneuver	-	-	-	-	-	-	231	205	-	264	204	-											
Stage 1	-	-	-	-	-	-	437	472	-	529	546	-											
Stage 2	-	-	-	-	-	-	691	546	-	642	470	-											
Approach																							
EB			WB			NB			SB														
HCM Control Delay, s	0.2		0.2		15.4			11.3															
HCM LOS	C						B																
Minor Lane/Major Mvmt																							
Capacity (veh/h)	370	1095	-	-	975	-	-	-	264	771													
HCM Lane V/C Ratio	0.062	0.012	-	-	0.01	-	-	-	0.025	0.047													
HCM Control Delay (s)	15.4	8.3	-	-	8.7	-	-	-	19	9.9													
HCM Lane LOS	C	A	-	-	A	-	-	-	C	A													
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-	0.1	0.1													

Intersection

Int Delay, s/veh 5.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖ ↗ ↘ ↗ ↘ ↗					
Traffic Vol, veh/h	10	61	30	19	38	34
Future Vol, veh/h	10	61	30	19	38	34
Conflicting Peds, #/hr	0	0	0	0	26	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	30	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	85	100	100	69	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	72	30	19	55	34

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	200	56	0	0	75
Stage 1	56	-	-	-	-
Stage 2	144	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	789	1011	-	-	1524
Stage 1	967	-	-	-	-
Stage 2	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	741	986	-	-	1486
Mov Cap-2 Maneuver	741	-	-	-	-
Stage 1	943	-	-	-	-
Stage 2	850	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	4.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	741	986	1486	-
HCM Lane V/C Ratio	-	-	0.013	0.073	0.037	-
HCM Control Delay (s)	-	-	9.9	8.9	7.5	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

**2: Agate Ave & 6th St Performance by approach**

---

Approach	EB	WB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.0

**5: 4th St & Agate Ave Performance by approach**

---

Approach	EB	WB	SB	All
Stop Delay (hr)	0.0	0.0	1.5	1.6

**8: 5th St & Agate Ave Performance by approach**

---

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1

**13: 6th St & CR60 Performance by approach**

---

Approach	WB	NB	SB	All
Stop Delay (hr)	0.1	0.0	0.0	0.1

**Total Zone Performance**

---

Stop Delay (hr)	1.8
-----------------	-----

# Queuing and Blocking Report

06/04/2025

## Intersection: 2: Agate Ave & 6th St

Movement	SB
Directions Served	R
Maximum Queue (ft)	56
Average Queue (ft)	24
95th Queue (ft)	48
Link Distance (ft)	37
Upstream Blk Time (%)	2
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

## Intersection: 5: 4th St & Agate Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	TR	LT	R
Maximum Queue (ft)	53	1	2	18	241	74
Average Queue (ft)	18	0	0	1	96	15
95th Queue (ft)	43	1	2	10	180	53
Link Distance (ft)			404	404	494	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200				50	
Storage Blk Time (%)				38	0	
Queuing Penalty (veh)				6	0	

## Intersection: 8: 5th St & Agate Ave

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	L	LTR	LT	R
Maximum Queue (ft)	25	2	31	27	47	58
Average Queue (ft)	4	0	5	12	7	23
95th Queue (ft)	18	2	23	31	30	50
Link Distance (ft)	404		193	112		
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200	200			50	
Storage Blk Time (%)				0	0	
Queuing Penalty (veh)				0	0	

# Queuing and Blocking Report

06/04/2025

---

## Intersection: 13: 6th St & CR60

---

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	R	L	T
Maximum Queue (ft)	28	44	6	37	27
Average Queue (ft)	8	22	0	3	2
95th Queue (ft)	28	38	4	19	16
Link Distance (ft)	480	480	37		348
Upstream Blk Time (%)			0		
Queuing Penalty (veh)			0		
Storage Bay Dist (ft)			30		
Storage Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	

---

## Zone Summary

---

Zone wide Queuing Penalty: 6

---

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑↓		↑	↑
Traffic Vol, veh/h	0	595	620	110	0	49
Future Vol, veh/h	0	595	620	110	0	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	84	91	85	69	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	708	681	129	0	60
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	810	0	-	0	1454	405
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	708	-
Critical Hdwy	4.13	-	-	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.219	-	-	-	3.519	3.319
Pot Cap-1 Maneuver	814	-	-	-	132	596
Stage 1	-	-	-	-	431	-
Stage 2	-	-	-	-	487	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	814	-	-	-	132	596
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	431	-
Stage 2	-	-	-	-	487	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	11.7			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	814	-	-	-	-	596
HCM Lane V/C Ratio	-	-	-	-	-	0.101
HCM Control Delay (s)	0	-	-	-	0	11.7
HCM Lane LOS	A	-	-	-	A	B
HCM 95th %tile Q(veh)	0	-	-	-	-	0.3

Intersection														
Int Delay, s/veh	8.4													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	1	102	1	449	1	3	558	120	1	1	0	153	0	28
Future Vol, veh/h	1	102	1	449	1	3	558	120	1	1	0	153	0	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	200	-	-	-	200	-	-	-	-	-	-	-	50
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	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	111	1	488	1	3	607	130	1	1	0	166	0	30
Major/Minor	Major1			Major2			Minor1			Minor2				
Conflicting Flow All	737	737	0	0	489	489	0	0	781	1214	245	905	1393	369
Stage 1	-	-	-	-	-	-	-	-	469	469	-	680	680	-
Stage 2	-	-	-	-	-	-	-	-	312	745	-	225	713	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	489	865	-	-	703	1070	-	-	285	180	755	232	141	628
Stage 1	-	-	-	-	-	-	-	-	544	559	-	407	449	-
Stage 2	-	-	-	-	-	-	-	-	673	419	-	757	434	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	858	858	-	-	946	946	-	-	243	156	755	207	122	628
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	243	156	-	207	122	-
Stage 1	-	-	-	-	-	-	-	-	473	486	-	354	447	-
Stage 2	-	-	-	-	-	-	-	-	638	417	-	657	377	-
Approach	EB			WB			NB			SB				
HCM Control Delay, s	1.8			0.1			24.2			60				
HCM LOS							C			F				
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2					
Capacity (veh/h)	190	858	-	-	946	-	-	207	628					
HCM Lane V/C Ratio	0.011	0.13	-	-	0.005	-	-	0.803	0.048					
HCM Control Delay (s)	24.2	9.8	-	-	8.8	-	-	69	11					
HCM Lane LOS	C	A	-	-	A	-	-	F	B					
HCM 95th %tile Q(veh)	0	0.4	-	-	0	-	-	5.8	0.2					

Intersection													
Int Delay, s/veh	0.7												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↘		↑ ↗	↑ ↘			↔		↑ ↗	↑ ↘		
Traffic Vol, veh/h	22	516	8	2	646	2	1	6	0	5	8	0	18
Future Vol, veh/h	22	516	8	2	646	2	1	6	0	5	8	0	18
Conflicting Peds, #/hr	0	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	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-	50
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	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	561	9	2	702	2	1	7	0	5	9	0	20
Major/Minor	Major1		Major2		Minor1		Minor2						
Conflicting Flow All	704	0	0	570	0	0	0	969	1322	285	1036	1325	352
Stage 1	-	-	-	-	-	-	0	614	614	-	707	707	-
Stage 2	-	-	-	-	-	-	0	355	708	-	329	618	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	890	-	-	999	-	-	0	208	155	712	186	155	644
Stage 1	-	-	-	-	-	-	0	446	481	-	392	436	-
Stage 2	-	-	-	-	-	-	0	635	436	-	658	479	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	890	-	-	999	-	-	0	197	151	712	180	151	644
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	197	151	-	180	151	-
Stage 1	-	-	-	-	-	-	0	434	468	-	381	435	-
Stage 2	-	-	-	-	-	-	0	614	435	-	635	466	-
Approach	EB		WB		NB		SB						
HCM Control Delay, s	0.4		0		17.8		15.5						
HCM LOS					C		C						
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2				
Capacity (veh/h)	293	890	-	-	999	-	-	180	644				
HCM Lane V/C Ratio	0.041	0.027	-	-	0.002	-	-	0.048	0.03				
HCM Control Delay (s)	17.8	9.2	-	-	8.6	-	-	26	10.8				
HCM Lane LOS	C	A	-	-	A	-	-	D	B				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2	0.1				

Intersection

Int Delay, s/veh 3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	14	32	83	26	33	35
Future Vol, veh/h	14	32	83	26	33	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	30	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	85	100	100	69	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	38	83	26	48	35

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	214	83	0	0	109
Stage 1	83	-	-	-	-
Stage 2	131	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	774	976	-	-	1481
Stage 1	940	-	-	-	-
Stage 2	895	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	749	976	-	-	1481
Mov Cap-2 Maneuver	749	-	-	-	-
Stage 1	940	-	-	-	-
Stage 2	866	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	4.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	749	976	1481	-
HCM Lane V/C Ratio	-	-	0.019	0.039	0.032	-
HCM Control Delay (s)	-	-	9.9	8.8	7.5	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

**2: Agate Ave & 6th St Performance by approach**

---

Approach	EB	WB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.1

**5: 4th St & Agate Ave Performance by approach**

---

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.1	0.0	0.0	0.8	1.0

**8: 5th St & Agate Ave Performance by approach**

---

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1

**13: 6th St & CR60 Performance by approach**

---

Approach	WB	NB	SB	All
Stop Delay (hr)	0.0	0.0	0.0	0.0

**Total Zone Performance**

---

Stop Delay (hr)	1.2
-----------------	-----

## Queuing and Blocking Report

06/04/2025

### Intersection: 2: Agate Ave & 6th St

Movement	WB	SB
Directions Served	TR	R
Maximum Queue (ft)	12	53
Average Queue (ft)	1	26
95th Queue (ft)	8	48
Link Distance (ft)	777	37
Upstream Blk Time (%)		2
Queuing Penalty (veh)		1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

### Intersection: 5: 4th St & Agate Ave

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	UL	T	TR	UL	TR	LTR	LT	R
Maximum Queue (ft)	70	6	18	21	27	33	177	75
Average Queue (ft)	28	0	1	2	2	2	69	29
95th Queue (ft)	58	5	12	13	13	14	131	69
Link Distance (ft)				404	218	494		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	200			200			50	
Storage Blk Time (%)							21	0
Queuing Penalty (veh)							6	0

### Intersection: 8: 5th St & Agate Ave

Movement	EB	EB	EB	WB	NB	SB	SB
Directions Served	L	T	TR	L	ULTR	LT	R
Maximum Queue (ft)	27	2	2	15	27	35	35
Average Queue (ft)	7	0	0	1	6	7	14
95th Queue (ft)	26	2	2	8	24	28	39
Link Distance (ft)	404	404		193	112		
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200			200		50	
Storage Blk Time (%)						0	0
Queuing Penalty (veh)						0	0

# Queuing and Blocking Report

06/04/2025

---

## Intersection: 13: 6th St & CR60

---

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	T	L	T
Maximum Queue (ft)	28	47	4	30	15
Average Queue (ft)	10	17	0	4	2
95th Queue (ft)	32	39	3	20	13
Link Distance (ft)	480	480	37		348
Upstream Blk Time (%)			0		
Queuing Penalty (veh)			0		
Storage Bay Dist (ft)			30		
Storage Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	

---

## Zone Summary

---

Zone wide Queuing Penalty: 7

---

## HCM 6th Signalized Intersection Summary

5: 4th St &amp; Agate Ave

06/04/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑			↔		↓	↑	↑
Traffic Volume (veh/h)	63	492	1	0	360	123	0	0	0	209	0	15
Future Volume (veh/h)	63	492	1	0	360	123	0	0	0	209	0	15
Initial Q (Q <sub>b</sub> ), 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	68	535	1	0	391	134	0	0	0	227	0	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	596	1966	4	194	1408	477	0	405	0	502	0	344
Arrive On Green	0.54	0.54	0.54	0.00	0.54	0.54	0.00	0.00	0.00	0.22	0.00	0.22
Sat Flow, veh/h	878	3639	7	869	2606	882	0	1870	0	1418	0	1585
Grp Volume(v), veh/h	68	261	275	0	265	260	0	0	0	227	0	16
Grp Sat Flow(s), veh/h/ln	878	1777	1869	869	1777	1712	0	1870	0	1418	0	1585
Q Serve(g_s), s	1.7	2.9	2.9	0.0	3.0	3.0	0.0	0.0	0.0	5.5	0.0	0.3
Cycle Q Clear(g_c), s	4.7	2.9	2.9	0.0	3.0	3.0	0.0	0.0	0.0	5.5	0.0	0.3
Prop In Lane	1.00		0.00	1.00		0.52	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	596	960	1010	194	960	925	0	405	0	502	0	344
V/C Ratio(X)	0.11	0.27	0.27	0.00	0.28	0.28	0.00	0.00	0.00	0.45	0.00	0.05
Avail Cap(c_a), veh/h	833	1440	1514	429	1440	1387	0	1313	0	1190	0	1113
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(l)	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.9	4.6	4.6	0.0	4.6	4.6	0.0	0.0	0.0	13.5	0.0	11.5
Incr Delay (d2), s/veh	0.1	0.2	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.6	0.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.2	0.6	0.6	0.0	0.6	0.6	0.0	0.0	0.0	1.5	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.0	4.7	4.7	0.0	4.8	4.8	0.0	0.0	0.0	14.2	0.0	11.5
LnGrp LOS	A	A	A	A	A	A	A	A	A	B	A	B
Approach Vol, veh/h	604				525				0		243	
Approach Delay, s/veh	4.9				4.8				0.0		14.0	
Approach LOS	A				A						B	
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	24.5		12.5		24.5		12.5					
Change Period (Y+Rc), s	4.5		4.5		4.5		4.5					
Max Green Setting (Gmax), s	30.0		26.0		30.0		26.0					
Max Q Clear Time (g_c+l1), s	6.7		7.5		5.0		0.0					
Green Ext Time (p_c), s	3.7		1.2		3.4		0.0					
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			6.4									
HCM 6th LOS			A									

# HCM 6th Signalized Intersection Capacity Analysis

5: 4th St & Agate Ave

06/04/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑			↔			↑	↑
Traffic Volume (veh/h)	63	492	1	0	360	123	0	0	0	209	0	15
Future Volume (veh/h)	63	492	1	0	360	123	0	0	0	209	0	15
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, 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		No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	535	1	0	391	134	0	0	0	227	0	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes		Yes			
Cap, veh/h	596	1966	4	194	1408	477	0	405	0	502	0	344
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
Prop Arrive On Green	0.54	0.54	0.54	0.00	0.54	0.54	0.00	0.00	0.00	0.22	0.00	0.22
Unsig. Movement Delay												
Ln Grp Delay, s/veh	6.0	4.7	4.7	0.0	4.8	4.8	0.0	0.0	0.0	14.2	0.0	11.5
Ln Grp LOS	A	A	A	A	A	A	A	A	A	B	A	B
Approach Vol, veh/h	604				525			0			243	
Approach Delay, s/veh	4.9				4.8			0.0			14.0	
Approach LOS	A				A						B	
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Case No		6.0		7.0		6.0		8.0				
Phs Duration (G+Y+Rc), s		24.5		12.5		24.5		12.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green (Gmax), s		30.0		26.0		30.0		26.0				
Max Allow Headway (MAH), s		5.2		5.2		5.3		0.0				
Max Q Clear (g_c+l1), s		6.7		7.5		5.0		0.0				
Green Ext Time (g_e), s		3.7		1.2		3.4		0.0				
Prob of Phs Call (p_c)		1.00		0.92		1.00		0.00				
Prob of Max Out (p_x)		0.02		0.00		0.01		0.00				
Left-Turn Movement Data												
Assigned Mvmt		5		7		1		3				
Mvmt Sat Flow, veh/h		878		1418		869		0				
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		3639		0		2606		1870				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		7		1585		882		0				
Left Lane Group Data												
Assigned Mvmt	0	5	0	7	0	1	0	3				
Lane Assignment		L		L+T		L						

# HCM 6th Signalized Intersection Capacity Analysis

5: 4th St & Agate Ave

06/04/2025

Lanes in Grp	0	1	0	1	0	1	0	0
Grp Vol (v), veh/h	0	68	0	227	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	878	0	1418	0	869	0	0
Q Serve Time (g_s), s	0.0	1.7	0.0	5.5	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	4.7	0.0	5.5	0.0	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	878	0	1440	0	869	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	20.0	0.0	8.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	17.0	0.0	8.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	1.7	0.0	5.5	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	596	0	502	0	194	0	0
V/C Ratio (X)	0.00	0.11	0.00	0.45	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	833	0	1190	0	429	0	0
Upstream Filter (l)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	5.9	0.0	13.5	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.6	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	6.0	0.0	14.2	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.2	0.0	1.4	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.2	0.0	1.5	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.08	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	1	0	0	0	1	0	1
Grp Vol (v), veh/h	0	261	0	0	0	265	0	0
Grp Sat Flow (s), veh/h/ln	0	1777	0	0	0	1777	0	1870
Q Serve Time (g_s), s	0.0	2.9	0.0	0.0	0.0	3.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	2.9	0.0	0.0	0.0	3.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	960	0	0	0	960	0	405
V/C Ratio (X)	0.00	0.27	0.00	0.00	0.00	0.28	0.00	0.00
Avail Cap (c_a), veh/h	0	1440	0	0	0	1440	0	1313
Upstream Filter (l)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	4.6	0.0	0.0	0.0	4.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.7	0.0	0.0	0.0	4.8	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.6	0.0	0.0	0.0	0.6	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

# HCM 6th Signalized Intersection Capacity Analysis

5: 4th St & Agate Ave

06/04/2025

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.6	0.0	0.0	0.0	0.6	0.0
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.00	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Right Lane Group Data</b>							
Assigned Mvmt	0	12	0	14	0	16	0
Lane Assignment		T+R		R		T+R	
Lanes in Grp	0	1	0	1	0	1	0
Grp Vol (v), veh/h	0	275	0	16	0	260	0
Grp Sat Flow (s), veh/h/ln	0	1869	0	1585	0	1712	0
Q Serve Time (g_s), s	0.0	2.9	0.0	0.3	0.0	3.0	0.0
Cycle Q Clear Time (g_c), s	0.0	2.9	0.0	0.3	0.0	3.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.00	0.00	1.00	0.00	0.52	0.00
Lane Grp Cap (c), veh/h	0	1010	0	344	0	925	0
V/C Ratio (X)	0.00	0.27	0.00	0.05	0.00	0.28	0.00
Avail Cap (c_a), veh/h	0	1514	0	1113	0	1387	0
Upstream Filter (l)	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	4.6	0.0	11.5	0.0	4.6	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.1	0.0	0.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.7	0.0	11.5	0.0	4.8	0.0
1st-Term Q (Q1), veh/ln	0.0	0.6	0.0	0.1	0.0	0.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.6	0.0	0.1	0.0	0.6	0.0
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.04	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Intersection Summary</b>							
HCM 6th Ctrl Delay			6.4				
HCM 6th LOS			A				

**5: 4th St & Agate Ave Performance by approach**

---

Approach	EB	WB	SB	All
Stop Delay (hr)	0.6	0.3	0.7	1.6

# Queuing and Blocking Report

06/04/2025

## Intersection: 5: 4th St & Agate Ave

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	TR	T	TR	LT	R
Maximum Queue (ft)	66	108	100	83	108	155	64
Average Queue (ft)	27	49	32	41	45	76	11
95th Queue (ft)	55	91	74	74	86	129	41
Link Distance (ft)				404	404	494	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200					50	
Storage Blk Time (%)					19	0	
Queuing Penalty (veh)					3	0	

## HCM 6th Signalized Intersection Summary

5: 4th St &amp; Agate Ave

06/04/2025



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	1	102	1	449	1	3	558	120	1	1	0	153
Future Volume (veh/h)	1	102	1	449	1	3	558	120	1	1	0	153
Initial Q (Q <sub>b</sub> ), veh	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	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
Work Zone On Approach		No				No				No		
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	1	488		3	607	130	1	1	0	166	
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	537	1016	906		552	1665	356	222	162	0	479	
Arrive On Green	0.57	0.57	0.57		0.57	0.57	0.57	0.17	0.17	0.00	0.17	
Sat Flow, veh/h	721	1777	1585		907	2913	622	398	945	0	1598	
Grp Volume(v), veh/h	111	1	488		3	370	367	2	0	0	0	166
Grp Sat Flow(s), veh/h/ln	721	1777	1585		907	1777	1758	1343	0	0	0	1598
Q Serve(g_s), s	3.4	0.0	6.7		0.1	3.9	4.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	6.7		6.7	3.9	4.0	3.0	0.0	0.0	0.0	3.0
Prop In Lane	1.00		1.00		1.00		0.35	0.50		0.00	1.00	
Lane Grp Cap(c), veh/h	537	1016	906		552	1016	1005	384	0	0	0	479
V/C Ratio(X)	0.21	0.00	0.54		0.01	0.36	0.37	0.01	0.00	0.00	0.00	0.35
Avail Cap(c_a), veh/h	743	1524	1359		811	1524	1508	1293	0	0	0	1290
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
Upstream Filter(l)	1.00	1.00	1.00		1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	6.1	3.2	4.6		6.7	4.0	4.1	12.1	0.0	0.0	0.0	13.3
Incr Delay (d2), s/veh	0.2	0.0	0.5		0.0	0.2	0.2	0.0	0.0	0.0	0.0	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
%ile BackOfQ(50%), veh/ln	0.3	0.0	1.0		0.0	0.7	0.7	0.0	0.0	0.0	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.2	3.2	5.1		6.7	4.3	4.3	12.1	0.0	0.0	0.0	13.7
LnGrp LOS	A	A	A		A	A	A	B	A	A	B	
Approach Vol, veh/h		600				740				2		
Approach Delay, s/veh		5.3				4.3				12.1		
Approach LOS		A				A				B		
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	24.5		10.5		24.5		10.5					
Change Period (Y+Rc), s	4.5		4.5		4.5		4.5					
Max Green Setting (Gmax), s	30.0		26.0		30.0		26.0					
Max Q Clear Time (g_c+l1), s	9.4		5.0		8.7		5.0					
Green Ext Time (p_c), s	4.4		0.9		4.8		0.0					
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay		5.9										
HCM 6th LOS		A										
<b>Notes</b>												
User approved ignoring U-Turning movement.												

## HCM 6th Signalized Intersection Summary

5: 4th St &amp; Agate Ave

06/04/2025



Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	0	28
Future Volume (veh/h)	0	28
Initial Q (Q <sub>b</sub> ), veh	0	0
Ped-Bike Adj(A_pbT)	1.00	
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1870	1870
Adj Flow Rate, veh/h	0	30
Peak Hour Factor	0.92	0.92
Percent Heavy Veh, %	2	2
Cap, veh/h	0	271
Arrive On Green	0.00	0.17
Sat Flow, veh/h	0	1585
Grp Volume(v), veh/h	0	30
Grp Sat Flow(s), veh/h/ln	0	1585
Q Serve(g_s), s	0.0	0.6
Cycle Q Clear(g_c), s	0.0	0.6
Prop In Lane	1.00	
Lane Grp Cap(c), veh/h	0	271
V/C Ratio(X)	0.00	0.11
Avail Cap(c_a), veh/h	0	1178
HCM Platoon Ratio	1.00	1.00
Upstream Filter(l)	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.3
Incr Delay (d2), s/veh	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.2
Unsig. Movement Delay, s/veh		
LnGrp Delay(d), s/veh	0.0	12.4
LnGrp LOS	A	B
Approach Vol, veh/h	196	
Approach Delay, s/veh	13.5	
Approach LOS	B	
Timer - Assigned Phs		

# HCM 6th Signalized Intersection Capacity Analysis

5: 4th St & Agate Ave

06/04/2025

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	1	102	1	449	1	3	558	120	1	1	0	153
Future Volume (veh/h)	1	102	1	449	1	3	558	120	1	1	0	153
Number	5	2	12		1	6	16	3	8	18	7	
Initial Q, veh	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
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
Work Zone On Approach			No				No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	1	488		3	607	130	1	1	0	166	
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes				Yes			Yes			Yes	
Cap, veh/h	537	1016	906		552	1665	356	222	162	0	479	
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
Prop Arrive On Green	0.57	0.57	0.57		0.57	0.57	0.57	0.17	0.17	0.00	0.17	
Unsig. Movement Delay												
Ln Grp Delay, s/veh	6.2	3.2	5.1		6.7	4.3	4.3	12.1	0.0	0.0	13.7	
Ln Grp LOS	A	A	A		A	A	A	B	A	A	B	
Approach Vol, veh/h	600				740			2				
Approach Delay, s/veh	5.3				4.3			12.1				
Approach LOS	A				A			B				
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Case No		6.0		7.0		6.0		8.0				
Phs Duration (G+Y+Rc), s		24.5		10.5		24.5		10.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green (Gmax), s		30.0		26.0		30.0		26.0				
Max Allow Headway (MAH), s		5.7		5.1		5.3		5.3				
Max Q Clear (g_c+l1), s		9.4		5.0		8.7		5.0				
Green Ext Time (g_e), s		4.4		0.9		4.8		0.0				
Prob of Phs Call (p_c)		1.00		0.85		1.00		0.85				
Prob of Max Out (p_x)		0.07		0.00		0.07		0.00				
Left-Turn Movement Data												
Assigned Mvmt		5		7		1		3				
Mvmt Sat Flow, veh/h		721		1598		907		398				
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		1777		0		2913		945				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1585		1585		622		0				
Left Lane Group Data												
Assigned Mvmt		0	5	0	7	0	1	0	3			
Lane Assignment		L		L+T		L		L+T				

## HCM 6th Signalized Intersection Capacity Analysis

5: 4th St &amp; Agate Ave

06/04/2025



Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	0	28
Future Volume (veh/h)	0	28
Number	4	14
Initial Q, veh	0	0
Ped-Bike Adj (A_pbT)	1.00	
Parking Bus Adj	1.00	1.00
Work Zone On Approach	No	
Lanes Open During Work Zone		
Adj Sat Flow, veh/h/ln	1870	1870
Adj Flow Rate, veh/h	0	30
Peak Hour Factor	0.92	0.92
Percent Heavy Veh, %	2	2
Opposing Right Turn Influence		
Cap, veh/h	0	271
HCM Platoon Ratio	1.00	1.00
Prop Arrive On Green	0.00	0.17
Unsig. Movement Delay		
Ln Grp Delay, s/veh	0.0	12.4
Ln Grp LOS	A	B
Approach Vol, veh/h	196	
Approach Delay, s/veh	13.5	
Approach LOS		B
Timer:		

# HCM 6th Signalized Intersection Capacity Analysis

5: 4th St & Agate Ave

06/04/2025

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	111	0	166	0	3	0	2
Grp Sat Flow (s), veh/h/ln	0	721	0	1598	0	907	0	1343
Q Serve Time (g_s), s	0.0	3.4	0.0	0.0	0.0	0.1	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	7.4	0.0	3.0	0.0	6.7	0.0	3.0
Perm LT Sat Flow (s_l), veh/h/ln	0	721	0	1439	0	907	0	1401
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1781	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	20.0	0.0	6.0	0.0	20.0	0.0	6.0
Perm LT Serve Time (g_u), s	0.0	16.0	0.0	3.0	0.0	13.3	0.0	3.0
Perm LT Q Serve Time (g_ps), s	0.0	3.4	0.0	0.0	0.0	0.1	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.50
Lane Grp Cap (c), veh/h	0	537	0	479	0	552	0	384
V/C Ratio (X)	0.00	0.21	0.00	0.35	0.00	0.01	0.00	0.01
Avail Cap (c_a), veh/h	0	743	0	1290	0	811	0	1293
Upstream Filter (l)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	6.1	0.0	13.3	0.0	6.7	0.0	12.1
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.4	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	6.2	0.0	13.7	0.0	6.7	0.0	12.1
1st-Term Q (Q1), veh/ln	0.0	0.3	0.0	0.9	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.3	0.0	1.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.05	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		
Lanes in Grp	0	1	0	0	0	1	0	0
Grp Vol (v), veh/h	0	1	0	0	0	370	0	0
Grp Sat Flow (s), veh/h/ln	0	1777	0	0	0	1777	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0
Lane Grp Cap (c), veh/h	0	1016	0	0	0	1016	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.00
Avail Cap (c_a), veh/h	0	1524	0	0	0	1524	0	0
Upstream Filter (l)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	3.2	0.0	0.0	0.0	4.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	3.2	0.0	0.0	0.0	4.3	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0

# HCM 6th Signalized Intersection Capacity Analysis

5: 4th St & Agate Ave

06/04/2025

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		T+R		R		T+R		
Lanes in Grp	0	1	0	1	0	1	0	0
Grp Vol (v), veh/h	0	488	0	30	0	367	0	0
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1758	0	0
Q Serve Time (g_s), s	0.0	6.7	0.0	0.6	0.0	4.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	6.7	0.0	0.6	0.0	4.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	0.35	0.00	0.00
Lane Grp Cap (c), veh/h	0	906	0	271	0	1005	0	0
V/C Ratio (X)	0.00	0.54	0.00	0.11	0.00	0.37	0.00	0.00
Avail Cap (c_a), veh/h	0	1359	0	1178	0	1508	0	0
Upstream Filter (l)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	4.6	0.0	12.3	0.0	4.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.2	0.0	0.2	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	5.1	0.0	12.4	0.0	4.3	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.9	0.0	0.2	0.0	0.6	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.0	0.0	0.2	0.0	0.7	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.09	0.00	0.04	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## Intersection Summary

HCM 6th Ctrl Delay 5.9

HCM 6th LOS A

## Notes

User approved ignoring U-Turning movement.

**5: 4th St & Agate Ave Performance by approach**

---

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	0.5	0.5	0.0	0.5	1.5

# Queueing and Blocking Report

06/04/2025

## Intersection: 5: 4th St & Agate Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	UL	T	TR	UL	T	TR	LTR	LT	R
Maximum Queue (ft)	96	24	116	30	113	133	21	135	74
Average Queue (ft)	39	1	48	2	55	58	1	62	22
95th Queue (ft)	75	12	90	15	95	105	10	111	62
Link Distance (ft)					404	404	218	494	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	200			200				50	
Storage Blk Time (%)							13	0	
Queuing Penalty (veh)							4	0	

## Appendix C: Traffic Volumes by Scenario





Figure 1 - 2025 AM



Figure 2 - 2025 PM



Figure 3 - 2030 AM



Figure 4 - 2030 PM

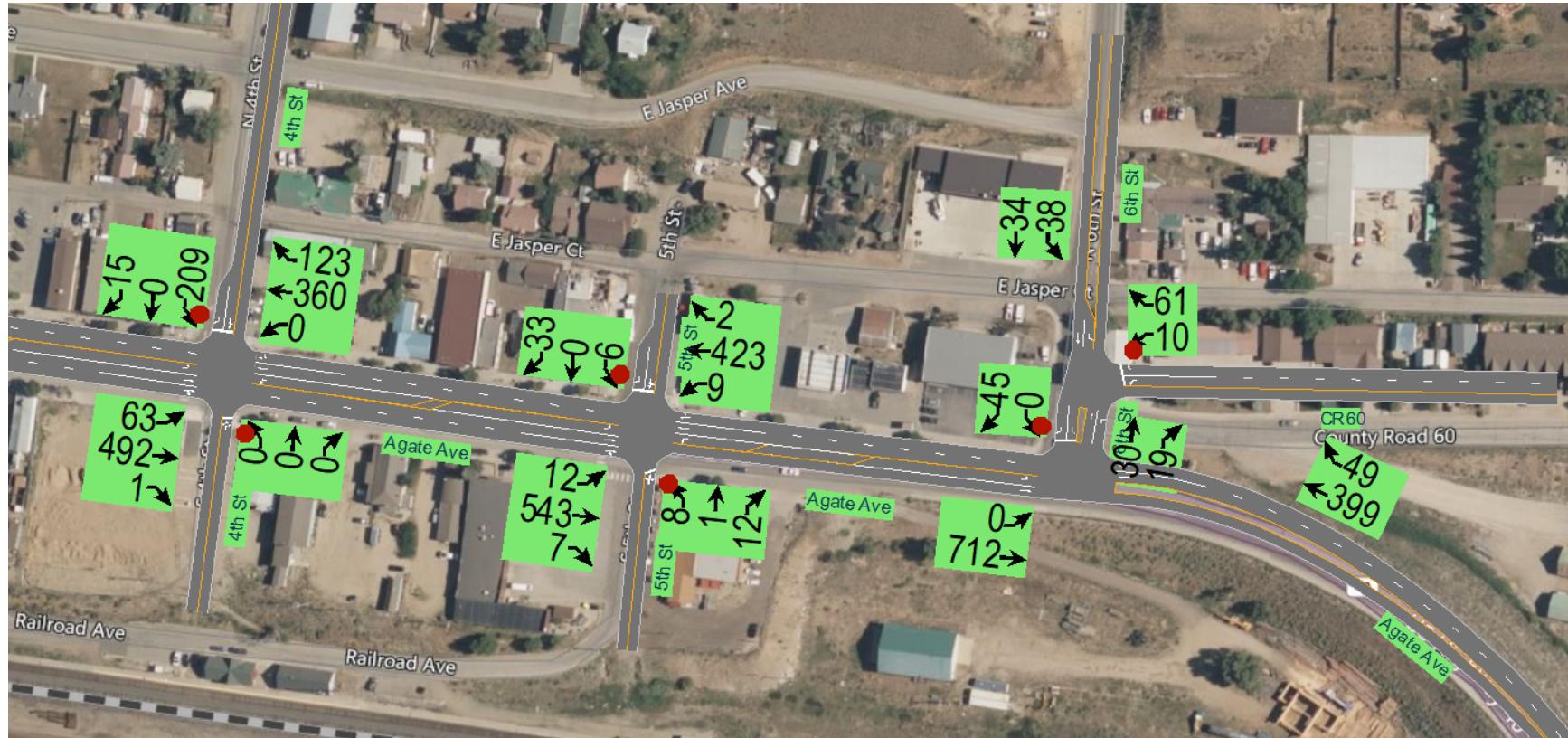


Figure 5 - 2030 AM DIVERSION

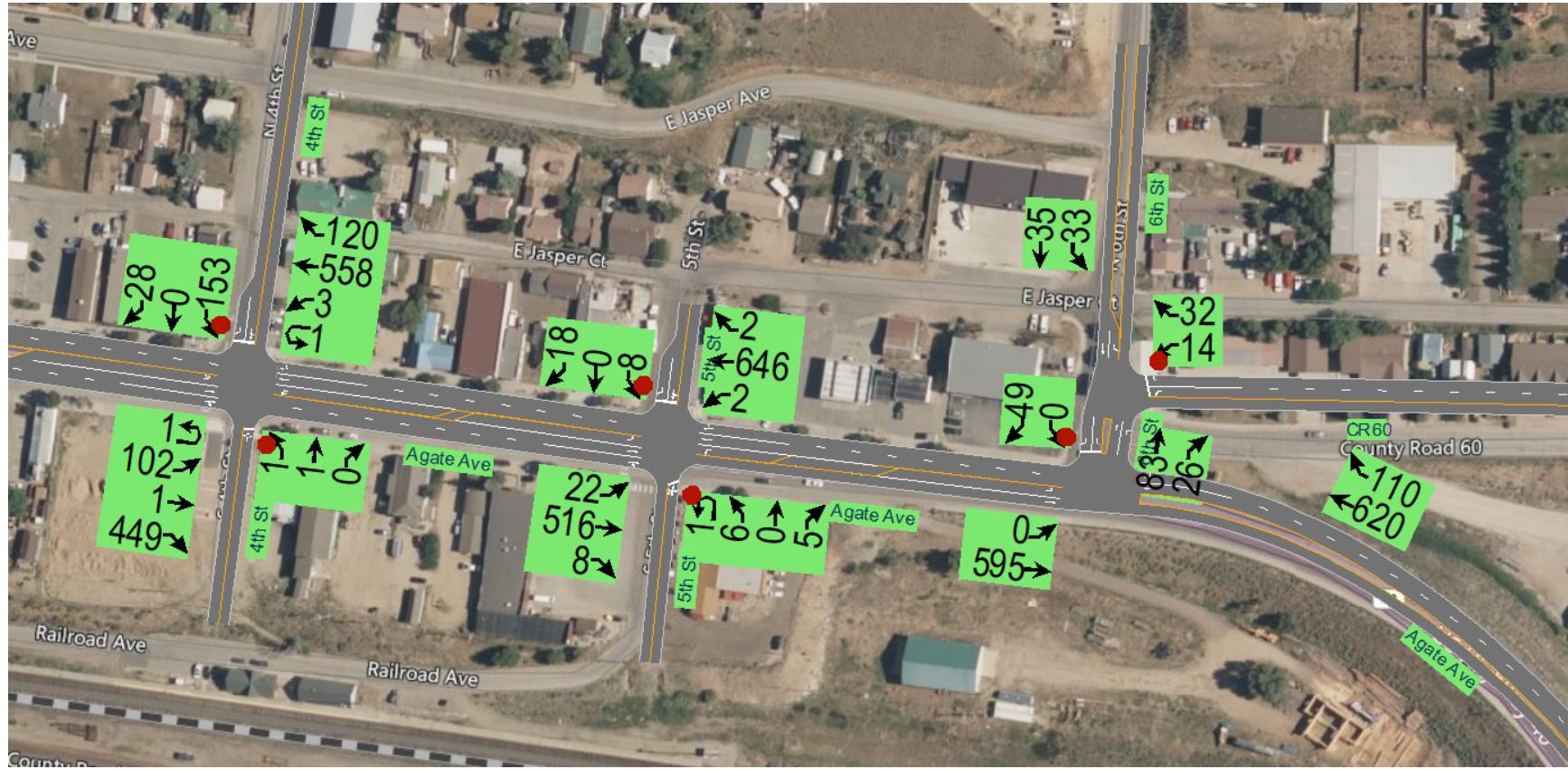


Figure 6 - 2030 PM DIVERSION

## Appendix D: 8-Hour Volumes



		4th Street																		Condition A Threshold		Condition B Threshold		Combination A Threshold		Combination B Threshold		Condition A		Condition B		Combination	
		Interval	EBL	EBC	EBT	EBU	NBL	NBR	NBT	NBU	SBL	SBR	SBT	SBU	WBL	WBR	WBT	WBU	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor			
Baseline (scaled to July)		2/19/2025 7:30	3	1	507	0	0	0	0	0	69	7	0	0	109	337	0	956	74	420	140	630	70	336	112	504	56	MET	MET	MET	NO		
Baseline (scaled to July)		2/19/2025 8:30	11	0	374	1	1	2	0	0	31	11	0	0	2	265	1	681	39	420	140	630	70	336	112	504	56	MET	NO	MET	NO		
2025 Diversion		2/19/2025 9:30	5	1	326	0	0	0	0	0	46	11	0	0	1	58	314	0	705	54	420	140	630	70	336	112	504	56	MET	NO	MET	NO	
2025 Diversion		2/19/2025 11:30	13	3	296	1	1	4	0	0	36	13	0	0	3	42	344	1	704	46	420	140	630	70	336	112	504	56	MET	NO	MET	NO	
2025 Diversion		2/19/2025 13:00	20	2	373	1	1	4	0	0	31	25	0	0	4	58	375	1	835	50	420	140	630	70	336	112	504	56	MET	NO	MET	NO	
2025 Diversion		2/19/2025 16:15	15	1	483	1	1	0	1	0	75	15	0	0	3	103	523	1	1131	86	420	140	630	70	336	112	504	56	MET	NO	MET	NO	
2025 Diversion		2/19/2025 17:30	14	1	335	0	1	0	0	0	47	15	0	0	0	94	364	0	808	59	420	140	630	70	336	112	504	56	MET	NO	MET	NO	
2030 Background + GMS		2/19/2025 7:30	48	1	462	0	0	0	0	0	191	7	0	0	0	109	337	0	956	196	420	140	630	70	336	84	504	56	MET	MET	MET	MET	
2030 Background + GMS		2/19/2025 8:30	36	0	349	1	1	2	0	0	110	11	0	0	2	26	265	1	681	118	420	140	630	70	336	84	504	56	MET	NO	MET	MET	
2030 Background + GMS		2/19/2025 9:30	33	1	298	0	0	0	0	0	91	11	0	0	1	58	314	0	705	99	420	140	630	70	336	84	504	56	MET	NO	MET	MET	
2030 Background + GMS		2/19/2025 11:30	44	3	265	1	1	4	0	0	88	13	0	0	3	42	344	1	704	98	420	140	630	70	336	84	504	56	MET	NO	MET	MET	
2030 Background + GMS		2/19/2025 13:00	60	2	332	1	1	4	0	0	87	25	0	0	4	58	375	1	835	106	420	140	630	70	336	84	504	56	MET	NO	MET	MET	
2030 Background + GMS		2/19/2025 14:00	53	1	312	0	2	2	1	0	78	21	0	0	2	46	383	0	796	94	420	140	630	70	336	84	504	56	MET	NO	MET	MET	
2030 Background + GMS		2/19/2025 16:15	81	1	417	1	1	0	1	0	132	15	0	0	3	103	523	1	1131	143	420	140	630	70	336	84	504	56	MET	MET	MET	MET	
2030 Background + GMS		2/19/2025 17:30	63	1	286	0	1	0	0	0	77	15	0	0	0	94	364	0	808	88	420	140	630	70	336	84	504	56	MET	NO	MET	MET	
2030 Diversion		2/19/2025 7:30	17	1	539	0	0	0	0	0	84	16	0	0	0	123	361	0	1041	95	420	140	630	70	336	112	504	56	MET	NO	MET	MET	
2030 Diversion		2/19/2025 8:30	21	0	397	1	1	2	0	0	40	18	0	0	2	35	283	1	741	53	420	140	630	70	336	112	504	56	MET	NO	MET	NO	
2030 Diversion		2/19/2025 9:30	16	1	348	0	0	0	0	0	57	18	0	0	1	68	334	0	768	70	420	140	630	70	336	112	504	56	MET	NO	MET	NO	
2030 Diversion		2/19/2025 11:30	24	3	317	1	1	5	0	0	46	20	0	0	3	51	365	1	767	61	420	140	630	70	336	112	504	56	MET	NO	MET	NO	
2030 Diversion		2/19/2025 13:00	34	2	399	1	1	5	0	0	44	36	0	0	5	70	401	1	913	71	420	140	630	70	336	112	504	56	MET	NO	MET	MET	
2030 Diversion		2/19/2025 14:00	23	1	379	0	2	2	1	0	45	31	0	0	2	57	408	0	871	68	420	140	630	70	336	112	504	56	MET	NO	MET	NO	
2030 Diversion		2/19/2025 16:15	34	1	518	1	1	0	1	0	94	29	0	0	3	121	559	1	1238	116	420	140	630	70	336	112	504	56	MET	NO	MET	MET	
2030 Diversion		2/19/2025 17:30	28	1	359	0	1	0	0	0	61	25	0	0	0	108	389	0	885	80	420	140	630	70	336	112	504	56	MET	NO	MET	MET	

Baseline (scaled to July)

Interval	6th Street										Condition A Threshold		Condition B Threshold		Combination A Threshold		Combination B Threshold		Condition A		Condition B		Combination		
	EBL	EBT	EBU	SBL	SBR	SBU	WBR	WBT	WBU	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor
2/19/2025 7:30	45	544	0	122	44	0	48	374	0	1011	155	420	140	630	70	336	112	504	56	NO	MET	NO	MET	MET	MET
2/19/2025 8:30	25	393	0	79	36	0	27	280	0	725	106	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 9:30	27	354	0	45	45	0	34	332	0	748	79	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 11:30	31	309	0	52	37	0	58	340	0	738	80	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 13:00	41	369	0	56	32	0	55	410	0	874	80	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 14:00	43	339	0	46	31	0	55	390	0	827	69	420	140	630	70	336	112	504	56	MET	NO	MET	NO	MET	NO
2/19/2025 16:15	66	488	0	57	48	0	106	582	0	1243	93	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 17:30	48	330	0	30	27	0	104	411	0	894	50	420	140	630	70	336	112	504	56	MET	NO	MET	NO	MET	NO

2025 Diversion

Interval	EBL	EBT	EBU	SBL	SBR	SBU	WBR	WBT	WBU	Major	Minor	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO
2/19/2025 7:30	666	0	0	44	0	48	374	0	1088	33	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 8:30	472	0	0	36	0	27	280	0	779	27	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 9:30	399	0	0	45	0	34	332	0	766	34	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 11:30	361	0	0	37	0	58	340	0	759	28	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 13:00	424	0	0	32	0	55	410	0	890	24	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 14:00	385	0	0	31	0	55	390	0	830	23	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 16:15	545	0	0	48	0	106	582	0	1234	36	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 17:30	360	0	0	27	0	104	411	0	875	21	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	

2030 Background + GMIS

Interval	EBL	EBT	EBU	SBL	SBR	SBU	WBR	WBT	WBU	Major	Minor	420	140	630	70	336	112	504	56	MET	MET	MET	MET	MET	MET
2/19/2025 7:30	47	586	0	126	45	0	50	399	0	1082	160	420	140	630	70	336	112	504	56	MET	MET	MET	MET	MET	MET
2/19/2025 8:30	26	423	0	82	37	0	28	298	0	776	110	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 9:30	28	383	0	47	47	0	35	353	0	800	81	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 11:30	32	336	0	53	39	0	60	361	0	789	82	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 13:00	42	404	0	58	33	0	57	437	0	940	83	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 14:00	44	372	0	48	32	0	57	416	0	889	72	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 16:15	68	536	0	59	50	0	110	620	0	1335	97	420	140	630	70	336	112	504	56	MET	NO	MET	MET	MET	NO
2/19/2025 17:30	50	364	0	31	28	0	108	438	0	960	52	420	140	630	70	336	112	504	56	MET	NO	MET	NO	MET	NO

2030 Diversion

Interval	EBL	EBT	EBU	SBL	SBR	SBU	WBR	WBT	WBU	Major	Minor	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO
2/19/2025 7:30	712	0	0	45	0	50	399	0	1162	34	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 8:30	505	0	0	37	0	28	298	0	831	26	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 9:30	430	0	0	47	0	35	353	0	818	35	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 11:30	390	0	0	39	0	60	361	0	811	29	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 13:00	462	0	0	33	0	57	437	0	955	26	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 14:00	419	0	0	32	0	57	416	0	892	24	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 16:15	596	0	0	50	0	110	620	0	1326	37	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	
2/19/2025 17:30	394	0	0	28	0	108	438	0	940	21	420	105	630	53	336	84	504	42	MET	NO	MET	NO	MET	NO	