

2022 Intersection Control Ranking System (ICRS) Report



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Introduction

Background and Purpose

The Intersection Control Ranking System (ICRS) is a County Board approved policy for prioritizing the installation of traffic control improvements on roadways under Washington County's jurisdiction. Traffic control improvements primarily include the installation of traffic signals and roundabouts, but may also include all-way stops, turn restrictions, or other modifications to improve traffic operations. The policy was originally adopted on November 11, 1994, and revisions were approved by the County Board on July 21, 2015.

The policy was originally adopted because Washington County's continued robust growth invariably leads to a growing number of requests to install traffic signals at intersections on the County roadway system. Since the County has limited funding and staff resources to deliver traffic signal projects, the ICRS was established to provide a data-driven process for identifying the intersections that are the highest priorities for traffic control projects. The ICRS continues to serve that same purpose today, providing a fair and consistent benchmark for evaluating and prioritizing traffic control improvements countywide.

How Intersections Are Chosen For Inclusion

Intersections that are included in the annual ICRS Report are selected by one of three methods:

- County staff may include intersections based on observations by staff, or upon request of elected officials, residents, or roadway users.
- Cities or townships request that an intersection be included based their observations (the County may request assistance from the city or township in collecting the traffic data necessary to analyze the intersection).
- County staff may include an intersection that has been counted by a city, township, or private developer as part of an area traffic study to show where it ranks relative to the other intersections on the list.

Intersections that are selected to be included in the annual ICRS Report in any given year will not necessarily be included in future reports. For example, an intersection which is selected to be studied and included in the 2022 ICRS Report, but which ranks near the bottom of the prioritization list and does not meet traffic signal warrants, will likely not be included in the 2023 ICRS Report unless traffic volumes or patterns have changed significantly at that location. Intersections which are close to meeting traffic signal warrants will generally be kept on the list, but might not be counted every year.

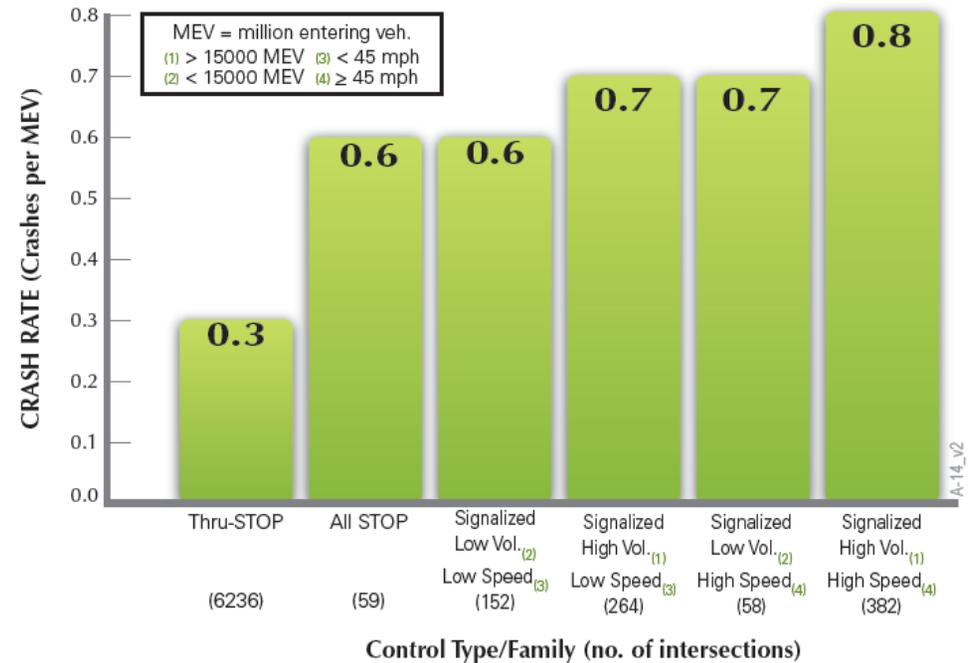
Contact Information

This report was published in March 2023 by Washington County Public Works Traffic Engineering staff.
Any questions regarding the content of this report can be directed to 651-430-4300
or publicworks@co.washington.mn.us.

Traffic Signals Are Not Safety Devices

Although traffic signals are often perceived as a safety enhancement, statewide data shows that traffic signals actually tend to increase overall crash risk when installed at intersections. However, traffic signals are sometimes necessary to prevent unreasonable delays to certain movements, or to ensure the orderly operation of unusually complex traffic patterns. Traffic signals do have the potential to reduce the occurrence of certain crash types, but the overall number of crashes typically increases, especially rear-end crashes, so the expected benefits of the traffic signal must be carefully weighed against the expected increase in overall crashes.

For pedestrians, traffic signals can be useful devices to create gaps in vehicle traffic for pedestrians to cross when such gaps are unreasonably infrequent. However, although signals can limit delays for pedestrians to cross, the average delay to pedestrians usually increases substantially, as pedestrians must wait for the signal to change even during periods of low traffic volume. A pedestrian who finds the wait time to be unreasonable might choose to cross illegally against the signal, with potentially deadly consequences. Even at traffic signals, pedestrians rely on drivers to obey the indications and to properly yield to pedestrians when turning, but drivers may not see pedestrians when their attention is focused on other parts of the intersection. Of the over 4,000 vehicle-pedestrian crashes at intersections in Minnesota from 2007-2011, 53 percent occurred at signalized intersections.^[1]



Note: Only for Trunk Highway Intersections

Intersection Crashes (1 of 2)

Source: 2004-2006 Minnesota TIS Crash Data

Source

[1] "Minnesota's Best Practices for Pedestrian/Bicyclist Safety". Minnesota Department of Transportation Office of Traffic, Safety and Technology. September 2013.

Traffic Signal Warrants Explained

Traffic signal warrants are prescribed by the Manual on Uniform Traffic Control Devices (MUTCD), which is the national document that provides a uniform policy for all traffic control devices on all public streets, roads, highways, and private streets that are open to public travel. The Minnesota MUTCD (MnMUTCD) is referenced in Minnesota Statute 169.06, is adopted by the Minnesota Commissioner of Transportation, and is binding on roadways. The MnMUTCD is the legal standard of care used by courts when the use, misuse, overuse, or lack of traffic control devices is the subject of litigation.

Because traffic signals often increase overall crash rates and overall delay to users, traffic signal warrants are used as benchmark thresholds, below which a traffic signal might be expected to do more harm than good. There are nine warrants listed in the MnMUTCD, though many of them apply only in very unusual cases and thus are not usually evaluated. Below is a summary of the four warrants which are analyzed within Washington County's Intersection Control Ranking System (ICRS):

[Warrant 1: Eight-Hour Volume](#)

Warrant 1 is most applicable to locations that have moderately high traffic throughout the entire day. Three categories are provided within this warrant, and each category provides a set of minimum traffic levels for the major and minor street, depending on the number of lanes. The minimum traffic must be met for eight hours within a given category for this warrant to be satisfied, though the eight hours need not be consecutive. This warrant is usually most applicable at the intersection of two regional roadways or entrances to commercial areas.

[Warrant 2: Four-Hour Volume](#)

Warrant 2 is usually most applicable at intersections with collector streets that see daily sustained periods of very heavy traffic, such as during morning and evening peak periods, even if traffic levels are low throughout the remainder of the day. This warrant is evaluated by plotting the traffic volumes for the intersection approaches for each hour of the day on a graph and determining which hours, if any, exceed a prescribed set of minimum values. For this warrant to be satisfied, at least four hours of the day must be plotted above the minimum values prescribed.

[Warrant 3: Peak Hour Volume](#)

Warrant 3 is usually most applicable at locations that have extremely high daily traffic peaks despite low volumes throughout the rest of the day. Metro agencies including Washington County do not normally consider this warrant alone to be sufficient justification to install a traffic signal, but it may be considered in combination with other factors including the severity of the peak delays and the availability of alternate routes. This warrant is evaluated by plotting the traffic volumes of the intersection approaches for each hour of the day on a graph and determining which hours, if any exceed a prescribed set of minimum values, which are higher than those used for evaluating Warrant 2. For this warrant to be satisfied, at least one hour of the day must be plotted above the minimum values prescribed.

[Warrant 7: Crash Experience](#)

This warrant is intended to capture unusual situations where a high number of crashes has already occurred and where a signal is determined to be an effective strategy to reduce such crashes. Only certain crash types can be considered for this warrant, including right-angle crashes and left turns into oncoming traffic. Other crash types such as rear-ends, deer crashes, and sideswipe crashes are unlikely to be reduced with the installation of a traffic signal and therefore are not included. This warrant first requires adequate trial of other remedial measures which might include improving signing, clearing sight corners, adding or reconfiguring lanes, or other such strategies.

[All-Way Stop Control Warrants](#)

The MnMUTCD also contains warrants for the installation of All-Way Stop control, which are also evaluated when such control might be an appropriate solution for the intersection.

[Roundabouts in the ICRS](#)

The MnMUTCD does not contain warrants for roundabout control; however, common engineering practice dictates that traffic signal warrants or all-way stop warrants may be applied.

MnMUTCD website link:

<http://www.dot.state.mn.us/trafficeng/publ/mutcd/index.html>



How the ICRS Works

How Points Are Assigned

The Intersection Control Ranking System (ICRS) utilizes four of the traffic signal warrants from the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD), along with traffic counts and recent crash data to prioritize intersections under County jurisdiction for traffic control improvements. As discussed on the previous page, traffic signal warrants define the minimum traffic conditions that should be present before a traffic signal is installed, to ensure that they are only installed in favorable situations that improve intersection operations. ICRS prioritization is based on the total number of points for each intersection, which are assigned as follows:

Traffic Signal Warrant Points

This value is based on the number of hours that an intersection satisfies the following traffic signal warrants:

Warrant 1: Eight-Hour Volume (Condition A, B, and A+B)

An intersection receives one point for each hour for which the traffic levels satisfy this warrant, up to a maximum of 12 points. Points are not cumulative across the three conditions. In other words, an intersection only receives the maximum points from Condition A, B, or A+B.

Warrant 2: Four-Hour Volume

An intersection receives one point for each hour for which the traffic levels satisfy this warrant, up to a maximum of 6 points.

Warrant 3: Peak Hour Volume

An intersection receives one point for each hour for which the traffic levels satisfy this warrant, up to a maximum of 4 points.

Crash History Points

This value is based on the most recent three years of correctable crash data at the intersection. Correctable crashes are crashes that are considered correctable by the installation of a traffic signal or roundabout. These typically include right-angle crashes (T-bone) and left turn crashes between vehicles traveling in opposing directions. Rear-end crashes, run-off-road crashes, and deer crashes, for example, are typically not considered correctable by a signal or a roundabout, and are therefore excluded in this analysis.

An intersection receives one point for each correctable property damage or minor injury crash, and three points for each correctable fatal or serious injury crash during the three year period. The sum is then divided by three, to account for the three years of data.

The traffic signal warrant points and the crash history points are then added together for an intersection total, and the intersections are ranked by total points using a spreadsheet.

Further Analysis

Simply satisfying one or more traffic signal warrants or ranking highly on the ICRS prioritization list doesn't always mean that the installation of a traffic signal or roundabout is the best option at a particular location. For each intersection included in the ICRS, County staff evaluates the intersection for potential intersection improvements. Among the items the staff consider when analyzing intersections:

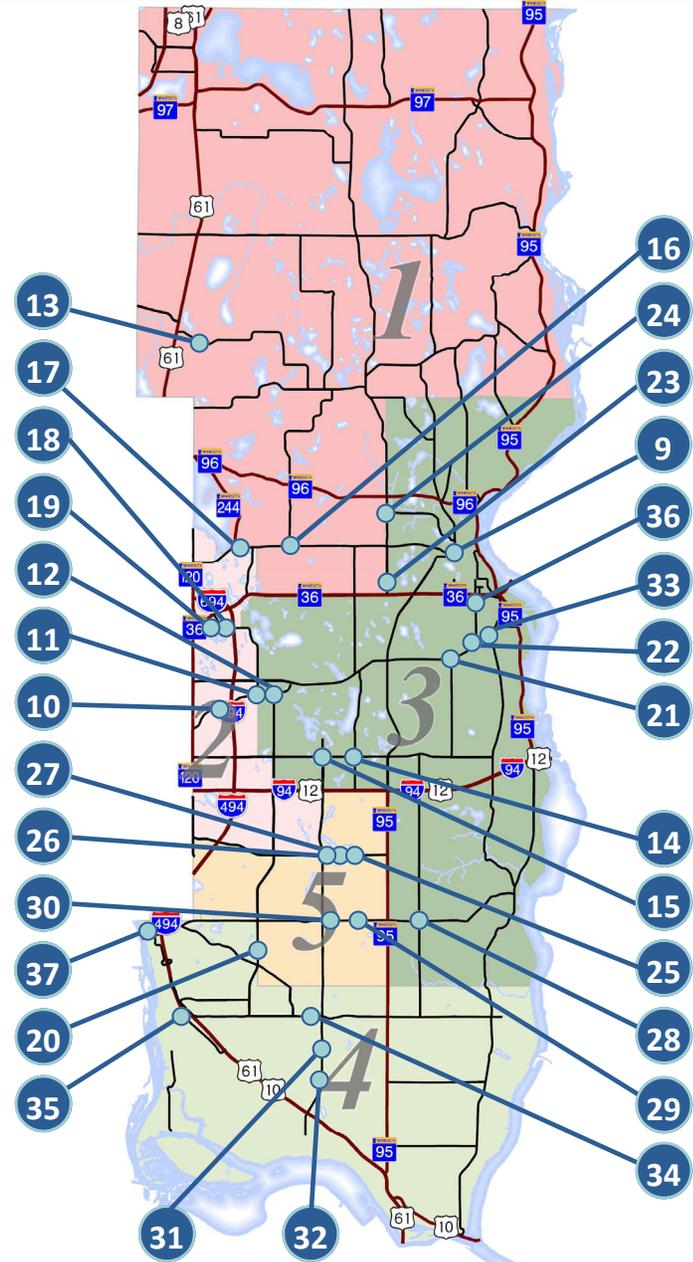
- Access spacing to adjacent intersections, and spacing from nearby traffic signals and/or roundabouts.
- Existing and future traffic volumes, and whether they're relatively balanced or unbalanced between the major and minor approaches.
- Types of traffic control at nearby intersections.

Often times other alternatives to traffic signals or roundabouts, such as signing and/or striping improvements, geometric improvements, or turn restrictions, may actually be the best option to improve intersection safety and/or mobility.

The ICRS policy also doesn't mean that the County will automatically install a signal or roundabout every year. There may be years when there are no intersections that are a priority for traffic control improvements, and there may be years when County staff determines that more than one intersection is a priority for improvements. The ICRS simply provides a way to prioritize intersections in a fair and consistent manner. County staff may also advance or postpone potential projects based on the Capital Improvement Plan (CIP) or other factors.

Intersections Analyzed for 2022

A total of 29 intersections were included in the Intersection Control Ranking System (ICRS) Report for 2022. The following pages provide an in-depth look at each of the intersections that are included in the report. Because this report is prepared for the Washington County Board of Commissioners, the map located on the right side of this page shows the location of each of the intersections by Commissioner District, along with their corresponding page number.



CSAH 5 (Owens Street) & CSAH 12 (Myrtle Street)

Existing Conditions

The intersection of CSAH 5 (Owens Street) & CSAH 12 (Myrtle Street) is located in the City of Stillwater, and is currently controlled by an all-way stop. The intersection experiences delays during the peak hours, and congestion on the northbound and southbound approaches can exceed several blocks during the PM peak hour. The intersection is included in the ICRS Report because County staff have concerns about these backups and how they affect the safety of nearby intersections, and because this intersection annually ranks at or near the top among intersections studied as part of the report.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **12 of 8 Required Hours**

Warrant 1B: **5 of 8 Required Hours**

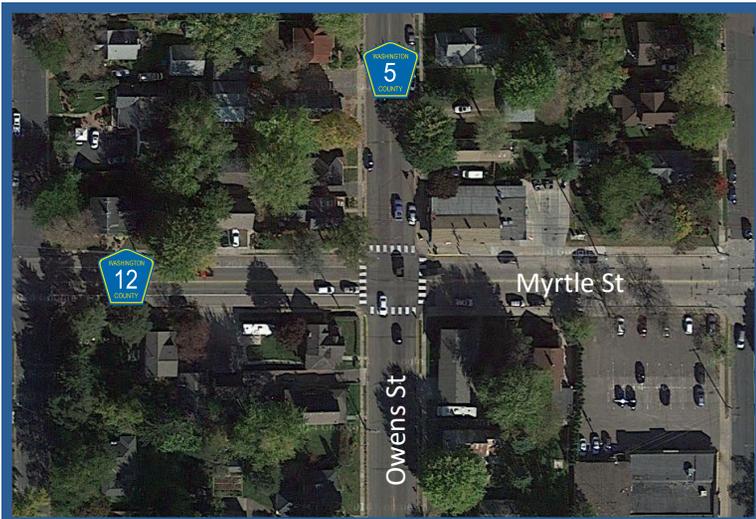
Warrant 1(A+B): **11 of 8 Required Hours**

Warrant 2: **9 of 4 Required Hours**

Warrant 3: **3 of 1 Required Hours**

Warrant 7: **Not Met**

2022 ICRS Rank: 2nd



Aerial Photo of Intersection

All-Way Stop Warrant, by the numbers:

All-Way Stop: **12 of 8 Required Hours**

This intersection currently operates as an all-way stop.

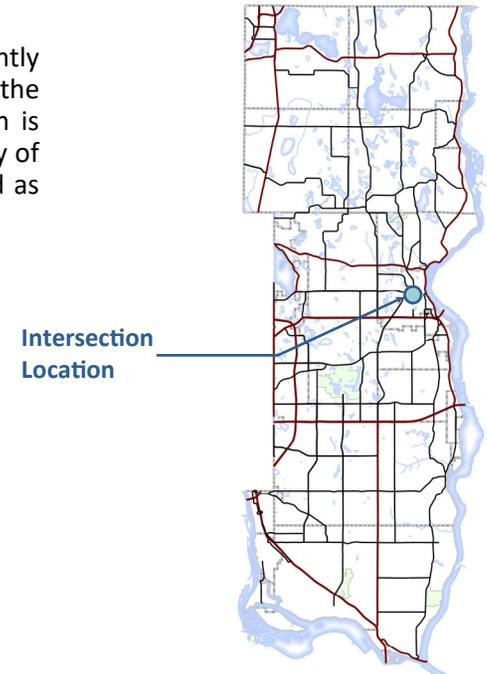
Traffic Count Conducted in **2018**

ICRS Recommendation

The intersection currently meets Warrant 1A (Eight-Hour Volume - Minimum Vehicular Volume), Warrant 1(A+B) (Combination of Warrants), Warrant 2 (Four-Hour Volume), and Warrant 3 (Peak Hour Volume) for traffic signal installation. However, even though this intersection clearly meets traffic signal warrants, the installation of a signal would pose numerous challenges:

- A traffic signal would increase speeds in the area when the lights are green.
- Narrow sidewalks and minimal right-of-way would make it difficult to install traffic signal poles and pedestrian push-buttons without obstructing the sidewalk.
- The existing intersection geometry would not function safely under traffic signal control, and modifying the lane arrangement would result in some loss of on-street parking.

County staff remain concerned about congestion in this area and its effect on safety, and remain ready to support an intersection improvement project at the CSAH 5 and CSAH 12 intersection if and when such a project is supported by the City. The County will continue to evaluate this intersection as traffic volumes continue to change as a result of growth and other area road projects.



CSAH 6 (Stillwater Boulevard) & Hadley Avenue

Existing Conditions

The intersection of CSAH 6 (Stillwater Boulevard) & Hadley Avenue is located in the City of Oakdale, and is currently controlled by an all-way stop. It experiences delays during peak hours. This intersection was included in the 2019 ICRS Report because local residents have observed congestion and crashes at this intersection, especially when traffic has been detoured through this intersection from nearby construction projects, and it has scored highly enough to remain in subsequent versions of the report.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **4 of 8 Required Hours**
Warrant 1B: **1 of 8 Required Hours**
Warrant 1(A+B): **4 of 8 Required Hours**
Warrant 2: **2 of 4 Required Hours**
Warrant 3: **0 of 1 Required Hour**
Warrant 7: **Not Met**

2022 ICRS Rank: **9th**



Aerial Photo of Intersection

All-Way Stop Warrant, by the numbers:

All-Way Stop: **14 of 8 Required Hours**

This intersection currently operates as an all-way stop.

Traffic Count Conducted in **2019**

ICRS Recommendation

In the 2019 and 2020 ICRS Reports, this intersection met Warrant 7 for traffic signal installation, which is for intersections that simultaneously meet both certain crash and volume thresholds. That is not the case in this year's version of the report, which includes crashes from 2019-2021. It is recommended that this intersection remain an all-way stop at this time for the following reasons:

- Modifying the intersection will require substantial right-of-way purchases and would encroach on existing residential parcels.
- Construction adjacent to this area along TH 120 (Century Ave) and at the CSAH 10/I-694 interchange likely caused unusually high traffic volumes in this area during the 2019 traffic counting period, particularly along Hadley Avenue.

In the MnMUTCD, one condition of Warrant 7 says that a traffic control signal shall be considered after "an adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency." A second stop sign was added to the southbound approach late in 2018 to improve the visibility of the traffic control devices to southbound drivers. That may have helped to address one of the more common crash types.

Intersection Location



CSAH 6 (Stillwater Boulevard) & CSAH 13 (Ideal Ave/Helmo Ave)

Existing Conditions

The intersection of CSAH 6 (Stillwater Boulevard) & CSAH 13 (Ideal Avenue)/Helmo Avenue is located on the border of the Cities of Oakdale and Lake Elmo, and is currently controlled by an all-way stop. It experiences minor delays during peak hours. This intersection is included in the ICRS Report because County staff have observed occasional but significant congestion on the southbound CSAH 13 approach during the PM peak hour in previous years.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **3 of 8 Required Hours**
Warrant 1B: **0 of 8 Required Hours**
Warrant 1(A+B): **2 of 8 Required Hours**
Warrant 2: **3 of 4 Required Hours**
Warrant 3: **0 of 1 Required Hour**
Warrant 7: **Not Met**

2022 ICRS Rank: **10th**

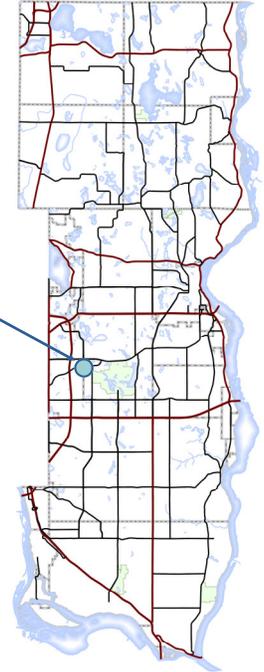
All-Way Stop Warrant, by the numbers:

All-Way Stop: **12 of 8 Required Hours**

This intersection currently operates as an all-way stop.

Traffic Count Conducted in **2022**

Intersection
Location



Aerial Photo of Intersection

ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation, although it is close to meeting Warrant 2 (Four-Hour Volume). It is not recommended for intersection control changes at this time due to the following reasons:

- Although the intersection currently experiences some minor congestion during peak hours, and has occasional longer backups during the PM peak hour, it is operating efficiently during the majority of the day.
- The intersection is currently operating safely, with a crash rate around the average rate for similar intersections on county roads statewide.
- Installing a traffic signal or roundabout would require significant geometric changes to the roadway, which would be costly. Any such modifications would likely require acquisition of private property, and might also impact a major sewer pump station that is located in the southwest quadrant of the intersection.

For these reasons, it is recommended that this intersection remain all-way stop controlled at this time.

CSAH 6 (Stillwater Boulevard) & CSAH 13 (Inwood Avenue)

Existing Conditions

The intersection of CSAH 6 (Stillwater Boulevard) & CSAH 13 (Inwood Avenue) is located in the City of Lake Elmo, and is currently controlled by an all-way stop. It experiences minor delays during peak hours on the northbound, westbound, and eastbound approaches. This intersection is included in the ICRS Report because it is located in an area of the County that is experiencing increased development and traffic growth, and County staff have been interested in evaluating the intersection to determine any operational issues.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **5 of 8 Required Hours**

Warrant 1B: **1 of 8 Required Hours**

Warrant 1(A+B): **3 of 8 Required Hours**

Warrant 2: **4 of 4 Required Hours**

Warrant 3: **2 of 1 Required Hours**

Warrant 7: **Not Met**

2022 ICRS Rank: **4th (Tie)**



Aerial Photo of Intersection

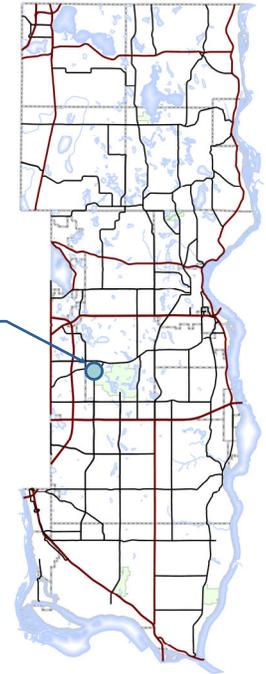
All-Way Stop Warrant, by the numbers:

All-Way Stop: **12 of 8 Required Hours**

This intersection currently operates as an all-way stop.

Traffic Count Conducted in **2021**

Intersection
Location



ICRS Recommendation

Although the intersection currently meets Warrant 2 (Four-Hour Volume) and Warrant 3 (Peak Hour Volume) for traffic signal installation, it is not recommended for intersection control changes at this time due to the following reasons:

- Although the intersection currently experiences some minor congestion during peak hours, it is operating efficiently as an all-way stop during the majority of the day.
- The intersection is currently operating safely, with a crash rate around the average rate for similar intersections on county roads statewide. There were zero reported crashes at this intersection during the 2019-2021 study period.
- Installing a traffic signal or roundabout would require significant geometric changes to the roadway, which would be costly. Any such modifications would also likely require acquisition of private property.

For these reasons, it is recommended that this intersection remain an all-way stop at this time. The intersection will continue to be monitored in the future, and will be reevaluated if there are significant changes to traffic patterns or volumes.

CSAH 8 (Egg Lake Road) & Goodview Avenue

Existing Conditions

The intersection of CSAH 8 (Egg Lake Road) & Goodview Avenue is located in the City of Hugo, and is currently controlled by sidestreet stop control. The County was asked to evaluate this intersection because of the skew of the intersection, which makes it difficult for drivers of vehicles on southbound Goodview Avenue when trying to cross or turn onto CSAH 8, particularly during busy times of the day.

Traffic Signal Warrants, by the numbers:

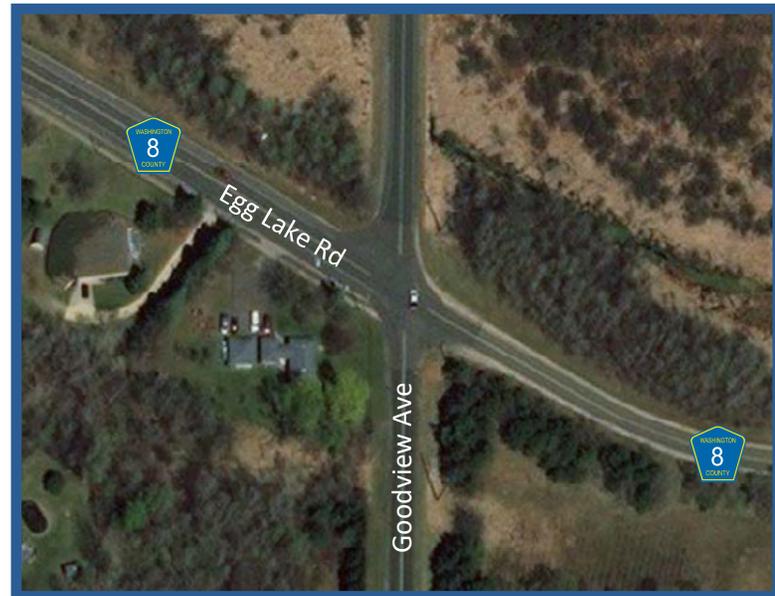
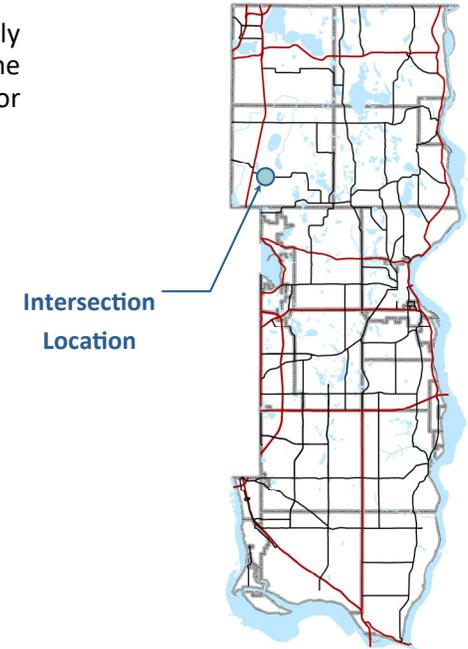
- Warrant 1A: **0 of 8 Required Hours**
- Warrant 1B: **0 of 8 Required Hours**
- Warrant 1(A+B): **0 of 8 Required Hours**
- Warrant 2: **0 of 4 Required Hours**
- Warrant 3: **0 of 1 Required Hour**
- Warrant 7: **Not Met**

2022 ICRS Rank: 29th (Tie)

All-Way Stop Warrant, by the numbers:

All-Way Stop: **0 of 8 Required Hours**

Traffic Count Conducted in **2019**



Aerial Photo of Intersection

ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation. It is recommended that the intersection remain sidestreet stop controlled at this time. The intersection operates efficiently during the majority of the day, and despite the skewed layout, the intersection is currently operating safely, with a crash rate around the average rate for similar intersections on county roads statewide. Under existing traffic volumes, the installation of a traffic signal would be expected to increase overall delay and increase the crash rate at the intersection.

The County acknowledges that the skew of this intersection does pose challenges from a sight line perspective, and this intersection does rank highly in the County Road Safety Plan. Signing improvements were made in recent years to address safety concerns on this segment. This includes intersection signing improvements, as well as the installation of an electronic speed display beneath the Speed Limit 35 miles per hour sign approaching the intersection from the east, which has proven to be an effective strategy for speed reduction.

Additional development in the area will require ongoing evaluation of this intersection.

CSAH 10 (10th Street N) & CSAH 17/17B (Lake Elmo Avenue)

Existing Conditions

The intersection of CSAH 10 (10th Street N) & CSAH 17/17B (Lake Elmo Avenue) is located in the City of Lake Elmo and is controlled by an all-way stop. This intersection is located in an area of the County that is experiencing increased development and traffic growth, and it currently experiences delays during peak hours. The adjacent project on Interstate 94 which began in 2022 caused traffic volumes to spike on CSAH 10 in this area during construction, and that project will continue into 2023. This intersection was included in the 2020 ICRS Report to determine if all-way stop control is still appropriate, and it has scored highly enough to remain in subsequent years to remain in the report.

Traffic Signal Warrants, by the numbers:

- Warrant 1A: **0 of 8 Required Hours**
- Warrant 1B: **0 of 8 Required Hours**
- Warrant 1(A+B): **0 of 8 Required Hours**
- Warrant 2: **0 of 4 Required Hours**
- Warrant 3: **0 of 1 Required Hours**
- Warrant 7: **Not Met**

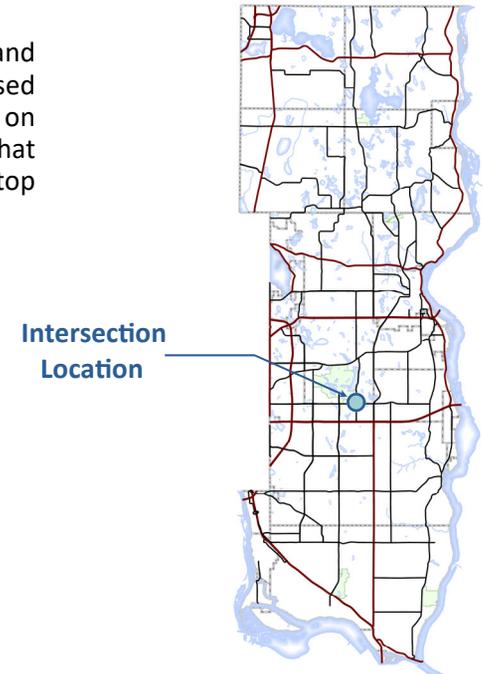
2022 ICRS Rank: **25th (Tie)**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **5 of 8 Required Hours**

This intersection currently operates as an all-way stop.

Traffic Count Conducted in **2020**



Aerial Photo of Intersection

ICRS Recommendation

Even though this intersection didn't meet the All-Way Stop Warrant according to the counts that were conducted in November 2020, it is presumed that the count volumes were depressed due to there being less traffic during the pandemic.

This intersection will remain an all-way stop at this time. Although the intersection currently experiences congestion during peak hours, it operates efficiently for the majority of most days. Also, installing a traffic signal or roundabout would require significant geometric modifications to the roadway.

All four of the correctable crashes in the analysis period involved a westbound vehicle failing to stop, and all were listed as having occurred during the early evening. County staff will observe this westbound approach to determine if any changes are appropriate.

CSAH 10 (10th Street N) & CSAH 19 (Keats Avenue)

Existing Conditions

The intersection of CSAH 10 (10th Street N) & CSAH 19 (Keats Avenue) is located in the City of Lake Elmo, and is controlled by an all-way stop. It currently experiences delays during peak hours. The north leg of the intersection serves as the entrance and exit for Lake Elmo Park Reserve, so it can experience surges in traffic, particularly during holiday weekends or park events such as the annual Bluegrass Festival. This intersection is located in an area of the County that is experiencing increased development and traffic growth. This intersection is included in the 2022 ICRS Report because all-way stop controlled intersections with a large number of approach lanes similar to this one can sometimes have operational issues and/or create driver confusion, and because it has ranked highly on previous versions of this report.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **3 of 8 Required Hours**

Warrant 1B: **4 of 8 Required Hours**

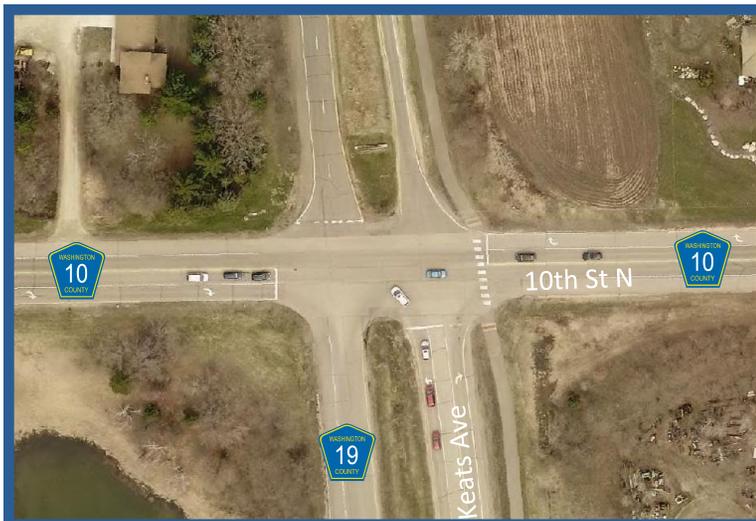
Warrant 1(A+B): **7 of 8 Required Hours**

Warrant 2: **3 of 4 Required Hours**

Warrant 3: **1 of 1 Required Hours**

Warrant 7: **Not Met**

2022 ICRS Rank: 4th (Tie)



Aerial Photo of Intersection

All-Way Stop Warrant, by the numbers:

All-Way Stop: **13 of 8 Required Hours**

This intersection currently operates as an all-way stop.

Traffic Count Conducted in **2018**

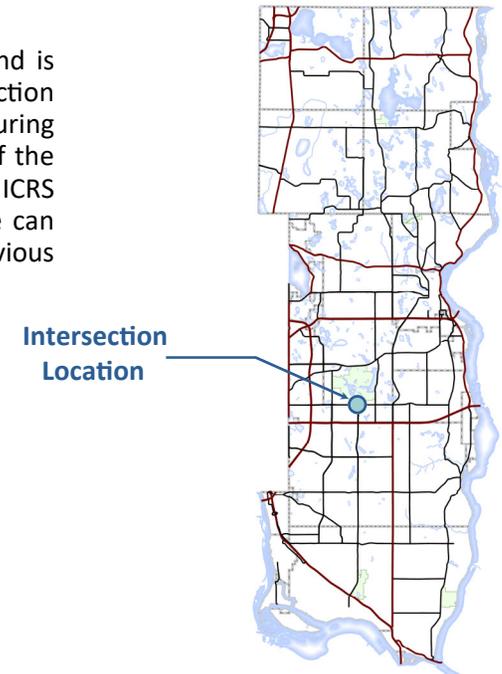
ICRS Recommendation

Although the intersection currently meets Warrant 3 (Peak Hour Volume) for traffic signal installation, it is planned to remain an all-way stop at this time due to the following reasons:

- The intersection is currently operating safely, with a crash rate around the average rate for similar intersections on county roads statewide.
- Although the intersection currently experiences congestion during peak hours, it is operating efficiently during the majority of the day.

However, County staff acknowledge that the intersection currently does meet a warrant and is ranked highly on the ICRS.

Installing a roundabout or traffic signal at this intersection will require significant road work, and it would be prudent if such work also included addressing flooding issues west and south of the intersection. Therefore, it is recommended that this intersection be considered for a future Capital Improvement Plan (CIP) project.



Intersection Location

CSAH 12 (75th Street N) & CSAH 9 (Jamaca Avenue)

Existing Conditions

The intersection of CSAH 12 (75th Street N) & CSAH 9 (Jamaca Avenue) is located in the City of Grant, and is currently controlled by sidestreet stop control. The intersection currently experiences delays and queuing issues for right turning vehicles on the southbound CSAH 9 approach during an approximately 10-15 minute period in the morning, when the nearby schools have their arrival times.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **2 of 8 Required Hours**

Warrant 1(A+B): **0 of 8 Required Hours**

Warrant 2: **0 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

2022 ICRS Rank: 13th (Tie)



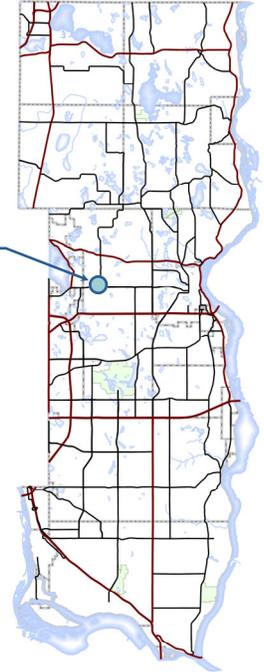
Aerial Photo of Intersection

All-Way Stop Warrant, by the numbers:

All-Way Stop: **11 of 8 Required Hours**

Traffic Count Conducted in **2019**

Intersection
Location



ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation. It does meet the warrant for All-Way Stop. However, it is not recommended for intersection control changes at this time due to the following reasons:

- Though it meets the All-Way Stop Warrant, much of the minor street volume turns right. Requiring all CSAH 12 traffic to stop would likely increase the crash rate on CSAH 12 while increasing delay to all movements.
- Although the intersection currently experiences some minor congestion on the southbound approach during the AM peak hour, the congestion typically lasts only 10-15 minutes and it is operating efficiently during the majority of the day.
- Under existing traffic volumes, the installation of a traffic signal would be expected to increase overall delay and increase the crash rate at the intersection.
- Installing a roundabout would require significant geometric modifications to the roadway, which would be costly. It would also likely require acquisition of private property.

It is recommended that this intersection remain sidestreet stop controlled at this time. County staff will continue to monitor this intersection as traffic growth continues.

CSAH 12 (Stillwater Road) & East Avenue/Hallam Avenue

Existing Conditions

The intersection of CSAH 12 (Stillwater Road) & East Avenue/Hallam Avenue is located in the City of Mahtomedi, and is currently controlled by sidestreet stop control. The southbound East Avenue approach currently experiences delays at several times of the day, particularly during peak hours, during the arrival and dismissal times for nearby Mahtomedi schools, and during church services at St. Andrews Church, which is located immediately northeast of the intersection. The intersection also serves as the primary crossing location across CSAH 12 for residents of a nearby apartment complex to walk to and from the convenience store located in the northwest quadrant of the intersection.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **5 of 8 Required Hours**

Warrant 1(A+B): **0 of 8 Required Hours**

Warrant 2: **3 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

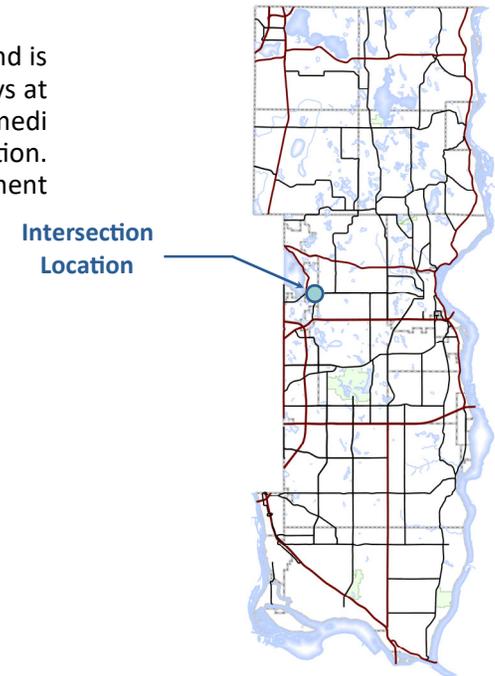
Warrant 7: **Not Met**

2022 ICRS Rank: 6th (Tie)

All-Way Stop Warrant, by the numbers:

All-Way Stop: **4 of 8 Required Hours**

Traffic Count Conducted in **2016**



Aerial Photo of Intersection

ICRS Recommendation

Although the intersection currently does not meet any warrants for traffic signal installation, it is close to meeting Warrant 2 (Four-Hour Volume) and expected to meet that warrant in the near future. The County is therefore planning for the installation of a traffic signal at this location due to the sometimes excessive delays on the southbound East Avenue approach, the significant number of pedestrian crossings at the currently uncontrolled pedestrian crossing, which has the potential for “multiple-threat” pedestrian crashes due to multiple lanes of approach from the west.

A traffic signal is planned to be installed at this location during Stage 2 of the Management and Safety Project programmed for 2024 on this segment of CSAH 12. As part of the project, there will be sidewalk, pedestrian ramp, and crosswalk improvements for the benefit of pedestrians using the intersection, and the Hallam approach on the south leg will be widened to provide a dedicated right turn lane for the future signal.

CSAH 13 (50th Street N) & Hadley Avenue - East Junction

Existing Conditions

The intersection of CSAH 13 (50th Street N) & Hadley Avenue is located in the City of Oakdale, and is currently controlled by sidestreet stop control. Left turns on the northbound Hadley Avenue approach sometimes experience delays during peak hours. The County was asked to evaluate this intersection as a part of the ICRS Report because the occasional delays on the northbound approach are becoming more frequent, and it scored has scored highly enough in previous years to remain in the report.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **5 of 8 Required Hours**

Warrant 1B: **3 of 8 Required Hours**

Warrant 1(A+B): **6 of 8 Required Hours**

Warrant 2: **3 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

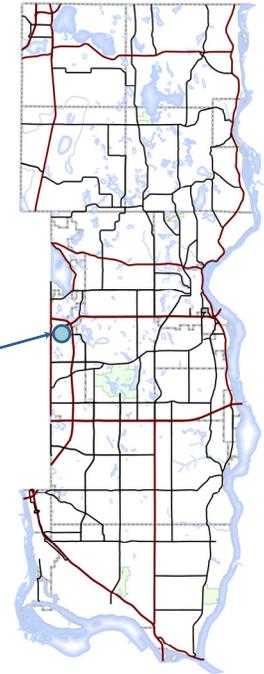
2022 ICRS Rank: 8th

All-Way Stop Warrant, by the numbers:

All-Way Stop: **3 of 8 Required Hours**

Traffic Count Conducted in **2021**

Intersection
Location



Aerial Photo of Intersection

ICRS Recommendation

The nearby TH 36 & Hadley Avenue Interchange Project was completed in 2019. A turning movement count taken in 2021 indicated that traffic volumes appear to have rebounded to prepandemic levels at this intersection, reasonably matching volumes when this intersection was last counted in 2017.

Although the intersection currently meets Warrant 2 (Four-Hour Volume) for traffic signal installation, it is not recommended for intersection traffic control changes at this time. While left turns from the northbound Hadley Avenue approach sometimes experience delays during peak hours, the delays are typically not excessive, and the intersection operates efficiently during the majority of the day. Also, the installation of a traffic signal would require the construction of a dedicated left-turn lane on CSAH 13.

It is recommended that this intersection remain sidestreet stop controlled.

CSAH 13 (Hadley Avenue) & 50th Street N - West Junction

Existing Conditions

The intersection of CSAH 13 (Hadley Avenue) & 50th Street N is located in the City of Oakdale, and is currently controlled by sidestreet stop control. Left turns on the eastbound 50th Street N approach sometimes experience delays during peak hours. This intersection is also adjacent to the Oakdale North Fire Station. The County originally included this intersection as a part of the ICRS Report to evaluate the impact of construction at Hadley Avenue and TH 36 just north of this intersection, and because the nearby east junction of 50th Street N and Hadley Avenue is also being studied.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **1 of 8 Required Hours**

Warrant 1(A+B): **0 of 8 Required Hours**

Warrant 2: **0 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

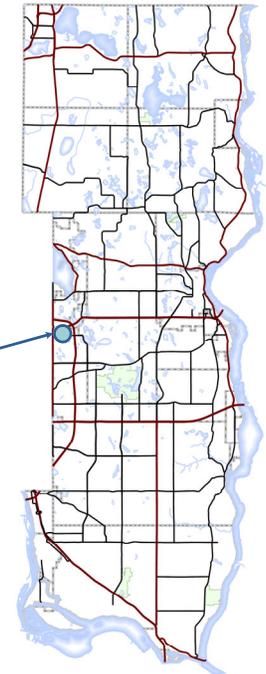
2022 ICRS Rank: 25th (Tie)

All-Way Stop Warrant, by the numbers:

All-Way Stop: **1 of 8 Required Hours**

Traffic Count Conducted in **2021**

Intersection
Location



Aerial Photo of Intersection

ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation, nor does it meet the warrant for an All-Way Stop. It is not recommended for intersection control changes at this time.

CSAH 13 (Radio Drive) & Dale Road

Existing Conditions

The intersection of CSAH 13 (Radio Drive) & Dale Road is located in the City of Woodbury, and is currently controlled by all-way stop control. Left turns from the Dale Road approach experienced delays during peak hours prior to the conversion of traffic control to all-way stop control; now, the stop-controlled approaches on Radio Drive can result in backups during peak hours. The City of Woodbury first requested that the County evaluate this intersection as part of the 2019 ICRS Report, and due to its high ranking it remains in the 2022 ICRS Report.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **4 of 8 Required Hours**

Warrant 1(A+B): **1 of 8 Required Hours**

Warrant 2: **2 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

2022 ICRS Rank: **11th**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **5 of 8 Required Hours**

This intersection currently operates as an all-way stop.

Traffic Count Conducted in **2021**

Intersection
Location



Aerial Photo of Intersection

ICRS Recommendation

Although the traffic volume from the sidestreet is currently below the threshold to meet warrants for a traffic signal or an all-way stop, the prevailing speed and traffic volume on CSAH 13 combined with the increasing volume of southbound left turns has been a growing source of concern. A bypass lane was present for southbound traffic, but was considered insufficient to handle the high volume of left turns. To proactively address these issues, the traffic control at this intersection was converted to an all-way stop in July 2022, with the southbound lane striping converted to provide a short dedicated left turn lane.

There is currently a project to expand CSAH 13 between Hargis Parkway and Military Road in the County's Capital Improvement Plan (CIP). Preliminary design and public engagement related to that project are slated to occur in 2023. Final design and right-of-way acquisition are currently planned to begin in 2025, with construction expected to take place beginning in either 2027 or 2028.

The long-term traffic control at this intersection will be reevaluated as part of the CIP project.

CSAH 14 (40th Street N/Olinda Blvd) & CR 65 (Oakgreen Avenue)

Existing Conditions

The intersection of CSAH 14 (40th Street N/Olinda Boulevard) & CR 65 (Oakgreen Avenue) is located in Baytown Township, and is currently controlled by sidestreet stop control on the minor approach. CR 65 will be fully reconstructed from CSAH 10 (10th Street N) to CSAH 14 (40th Street N/Olinda Boulevard) during 2023. This intersection is included in the 2022 ICRS Report to evaluate whether modifying the intersection control will be appropriate after this project is completed.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **0 of 8 Required Hours**

Warrant 1(A+B): **0 of 8 Required Hours**

Warrant 2: **0 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

2022 ICRS Rank: 29th

All-Way Stop Warrant, by the numbers:

All-Way Stop: **0 of 8 Required Hours**

Traffic Count Conducted in **2022**

Intersection
Location



Aerial Photo of Intersection

ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation. It is therefore not recommended for intersection control changes at this time due to the following reasons:

- The intersection is currently operating safely, with a crash rate around the average rate for similar intersections on county roads statewide. There were zero reported crashes at this intersection during the 2019-2021 study period.
- The in-place traffic control serves the current level of traffic appropriately.

This intersection is planned to remain sidestreet stop-controlled.

CSAH 14/24 (Osgood Avenue) & CSAH 14 (47th Street N)

Existing Conditions

The intersection of CSAH 14/24 (Osgood Avenue) & CSAH 14 (47th Street N) is located in Baytown Township, and is currently controlled by a temporary all-way stop. A Union Pacific railroad track crosses CSAH 14 at-grade immediately south of the intersection. The existing temporary all-way stop was installed by the County in August of 2015 after a Union Pacific construction project created a severe bump on CSAH 14, and a temporary all-way stop was deemed to be the only viable and effective short-term solution to the problem. This intersection is included in the 2022 ICRS Report because the County currently has a project under design that would modify the grades of CSAH 14 and CSAH 24 in order to address the severe bump at the crossing.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **1 of 8 Required Hours**

Warrant 1(A+B): **1 of 8 Required Hours**

Warrant 2: **0 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

2022 ICRS Rank: 20th (Tie)

Traffic Count Conducted in **2018**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **8 of 8 Required Hours**

Although the intersection is currently being controlled by a temporary all-way stop that was installed as an interim measure, an all-way stop is not a viable long-term solution at this location due to safety issues associated with a stop condition being located adjacent to a railroad crossing.

Intersection
Location



Aerial Photo of Intersection

ICRS Recommendation

As a part of the proposed intersection project that is planned in the County's Capital Improvement Plan for construction in 2023, the western end of 47th Street N will be realigned 100 feet to the north and the temporary all-way stop will be removed.

The MnMUTCD contains a traffic signal warrant, Warrant 9, which pertains to intersections near at-grade railroad crossings. County staff determined that the intersection **will** meet this warrant upon completion of the planned construction project. Thus, installation of a traffic signal system has been included in the project plans, and the proposed signal operation will be coordinated with the operation of the railroad crossing gates. It is anticipated that a traffic signal at this intersection will be operational in 2024.

Until this project is constructed and the traffic signal is operational, it is recommended that the intersection remain a temporary all-way stop, due to the severe bump at the crossing.

CSAH 15 (Manning Avenue) & 62nd Street N

Existing Conditions

The intersection of CSAH 15 (Manning Avenue) & 62nd Street N is located on the border of the City of Grant and the City of Stillwater, and is currently controlled by sidestreet stop control. Left turns from the westbound 62nd Street approach currently experience delays during peak hours. These delays vary based on seasonal traffic, including traffic entering the adjacent apple orchard. This intersection is included in the ICRS Report because County staff have heard from residents that increasing traffic volumes on CSAH 15 are making it more difficult to find gaps in traffic during busy times of the day.

Traffic Signal Warrants, by the numbers:

- Warrant 1A: **0 of 8 Required Hours**
- Warrant 1B: **2 of 8 Required Hours**
- Warrant 1(A+B): **1 of 8 Required Hours**
- Warrant 2: **1 of 4 Required Hours**
- Warrant 3: **0 of 1 Required Hour**
- Warrant 7: **Not Met**

2022 ICRS Rank: **13th (Tie)**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **0 of 8 Required Hours**

Traffic Count Conducted in **2022**

Intersection Location



Aerial Photo of Intersection

ICRS Recommendation

When this intersection was previously counted in 2017, it met Warrant 3 (Peak Hour Volume), and was close to meeting Warrant 2 (Four-Hour Volume), for traffic signal installation. The volumes were lower when it was counted in 2022, and the intersection no longer meets any signal warrants.

It is expected that increasing traffic volumes and nearby development will cause this intersection to rank highly on the ICRS in the future. The east leg of this will likely be reconstructed in conjunction with adjacent development in the area. It is expected that a traffic signal could be warranted and installed at that time.

Construction of an interchange at TH 36 and Manning Avenue just south of this intersection was completed in 2022. It is possible that detours that were required as part of that project affected traffic patterns, and those will readjust to preconstruction conditions. County staff will continue to observe the impact that adjacent interchange may have on this intersection in future years.

CSAH 15 (Manning Avenue) & CR 64 (McKusick Road)

Existing Conditions

The intersection of CSAH 15 (Manning Avenue) & CR 64 (McKusick Road) is located on the border of the City of Grant and the City of Stillwater, and is currently controlled by sidestreet stop control. The westbound CR 64 and eastbound McKusick Road approaches currently experience delays, particularly during peak hours. This intersection is included in the ICRS Report because increasing traffic volumes on CSAH 15 are making it difficult to find gaps in traffic during busy times of the day.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**
Warrant 1B: **3 of 8 Required Hours**
Warrant 1(A+B): **0 of 8 Required Hours**
Warrant 2: **1 of 4 Required Hours**
Warrant 3: **0 of 1 Required Hour**
Warrant 7: **Not Met**

2022 ICRS Rank: **24th**



Aerial Photo of Intersection

All-Way Stop Warrant, by the numbers:

All-Way Stop: **0 of 8 Required Hours**

Traffic Count Conducted in **2020**

ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation. It is therefore not recommended for intersection control changes at this time.

County staff expects that this intersection is a likely candidate for traffic signal installation in the future, and believes the relatively low ranking in this year's ICRS can be attributed in part to reduced traffic volumes due to the affects of the pandemic when the count took place. The Brown's Creek Trail Bridge was designed to accommodate a future traffic signal, and dedicated left turn lanes were installed on CSAH 15 in 2014 to improve safety and set up the CSAH 15 approaches to easily accommodate a future signal.

Installing a traffic signal would require extensive geometric modifications to the westbound and eastbound approaches, which would need to be widened to accommodate left and right turn lanes so that a potential traffic signal could operate efficiently and safely. This widening would also likely require acquisition of private property.

In the meantime, it is recommended that this intersection remain sidestreet stop controlled.

Intersection Location



CSAH 16 (Valley Creek Road) & Dancing Waters Pkwy/Woodcrest Dr

Existing Conditions

The intersection of CSAH 16 (Valley Creek Road) & Dancing Waters Parkway/Woodcrest Drive is located in the City of Woodbury, and is currently controlled by an all-way stop. This intersection was originally included in the 2018 ICRS Report because jurisdiction over this section of Valley Creek Road was transferred to Washington County, and due to the marked pedestrian crossing on the east leg. Safety research has demonstrated that providing crosswalk markings across multi-lane uncontrolled approaches, in the absence of other controls, significantly increases pedestrian crash risk. This intersection has scored highly enough to remain in the 2022 ICRS Report.

Traffic Signal Warrants, by the numbers:

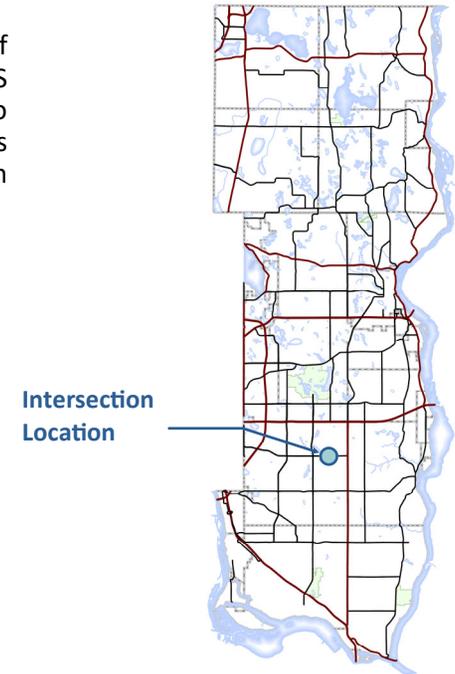
Warrant 1A: **1 of 8 Required Hours**
Warrant 1B: **2 of 8 Required Hours**
Warrant 1(A+B): **1 of 8 Required Hours**
Warrant 2: **1 of 4 Required Hours**
Warrant 3: **0 of 1 Required Hour**
Warrant 7: **Not Met**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **7 of 8 Required Hours**

This intersection currently operates as an all-way stop.

Traffic Count Conducted in **2018**



2022 ICRS Rank: **13th (Tie)**



Aerial Photo of Intersection

ICRS Recommendation

This intersection currently does not meet any warrants for traffic signal installation. It is however close to meeting the warrant for an all-way stop.

The intersection is currently operating safely, with a crash rate below the average rate for similar intersections on county roads statewide. Despite the concern with the marked multi-lane crosswalk on the east leg, there were no pedestrian-related crashes during the 2019-2021 study period and only one crash in total.

Nonetheless, due to the crosswalk on the east leg, the lane configuration, and the overall traffic volumes at the intersection, the County converted the intersection from sidestreet stop control to all-way stop control in 2022 with the support of the City of Woodbury.

County staff will continue to monitor this intersection. This intersection is a candidate for the installation of a roundabout or traffic signal in future years.

CSAH 16 (Valley Creek Road) & Eagle Creek Lane

Existing Conditions

The intersection of CSAH 16 (Valley Creek Road) & Eagle Creek Lane is located in the City of Woodbury, and is currently controlled by sidestreet stop control. This intersection is included in the 2022 ICRS Report because due to concerns from local residents about finding gaps in traffic to make turns from Eagle Creek Lane onto Valley Creek Road.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **5 of 8 Required Hours**

Warrant 1B: **13 of 8 Required Hours**

Warrant 1(A+B): **11 of 8 Required Hours**

Warrant 2: **11 of 4 Required Hours**

Warrant 3: **4 of 1 Required Hour**

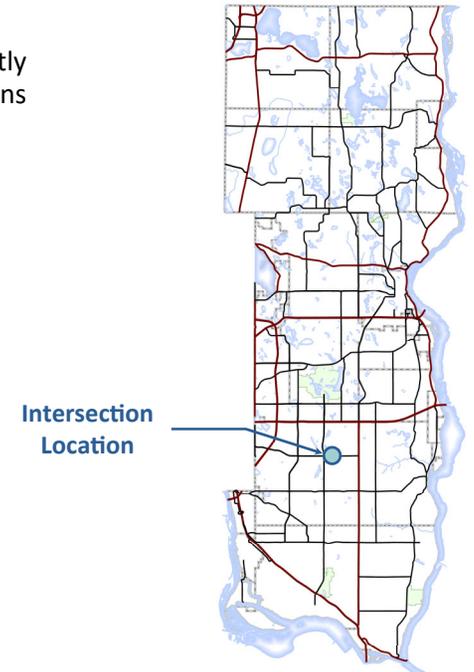
Warrant 7: **Crash and Volume Components Met**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **10 of 8 Required Hours**

Traffic Count Conducted in **2022**

2022 ICRS Rank: **1st**



Aerial Photo of Intersection

ICRS Recommendation

This intersection meets Warrant 1B (Interruption of Continuous Traffic on the Major Approaches), the combination Warrant 1(A+B), Warrant 2 (Four-Hour Warrant), Warrant 3 (Peak Hour Warrant), and Warrant 7 (Crash Experience), and ranks first in this edition of the Intersection Control Ranking System. In addition, there is a history of crashes at this intersection that would be considered correctable by the installation of a traffic signal.

This intersection is only 550 feet from the nearby signal at the CSAH 16 (Valley Creek Road) and CSAH 19 (Woodbury Drive) intersection. This spacing is far short of county access spacing guidelines and presents a number of challenges.

County staff will initiate discussions with city staff to explore potential changes to improve safety at this intersection.

CSAH 16 (Valley Creek Road) & Saint John's Drive

Existing Conditions

The intersection of CSAH 16 (Valley Creek Road) & Saint John's Drive is located in the City of Woodbury, and is currently controlled by sidestreet stop control. Jurisdiction over the section of Valley Creek Road between Woodbury Drive and Manning Avenue was transferred to Washington County in 2018. At the time this roadway was transferred, there was a marked pedestrian crossing across the uncontrolled east leg. Safety research has demonstrated that providing crosswalk markings across multi-lane uncontrolled approaches, in the absence of other controls, significantly increases pedestrian crash risk. This intersection was originally included in the 2018 ICRS Report due to concerns regarding that unmarked crossing. That marked crossing has since been discontinued, yet this intersection has still scored highly enough to remain in subsequent editions of the ICRS Report.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **2 of 8 Required Hours**

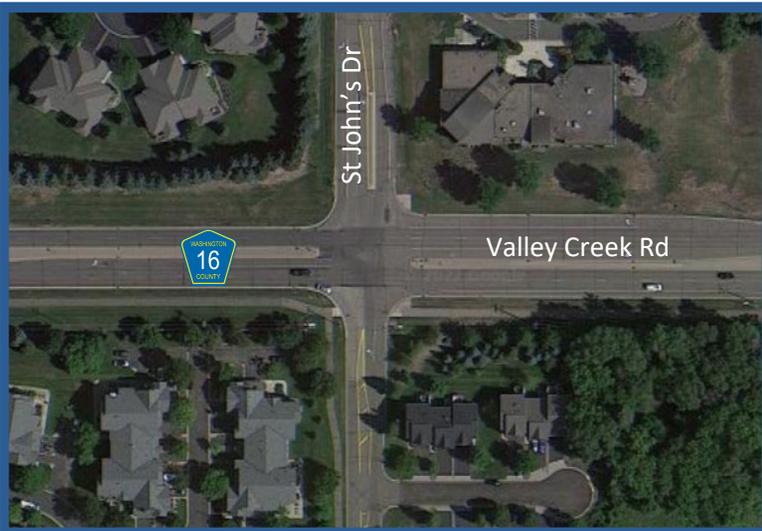
Warrant 1(A+B): **0 of 8 Required Hours**

Warrant 2: **1 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

2022 ICRS Rank: 12th



Aerial Photo of Intersection

All-Way Stop Warrant, by the numbers:

All-Way Stop: **3 of 8 Required Hours**

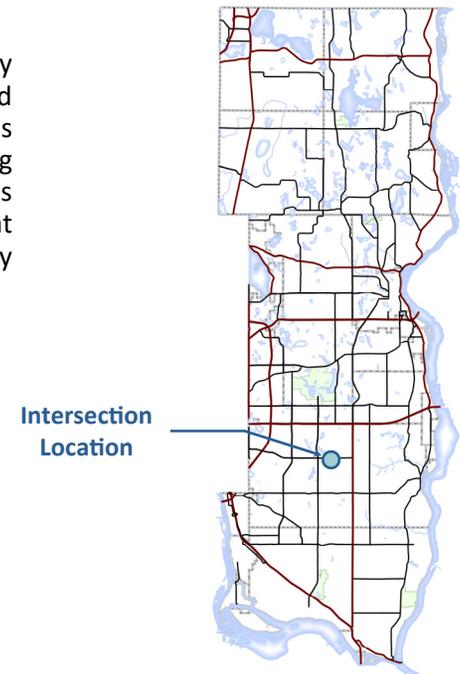
Traffic Count Conducted in **2018**

ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal or all-way stop installation. However, there were four crashes during this study period that could have potentially been corrected by the presence of either an all-way stop or traffic signal, and all of those correctable crashes involved a northbound vehicle.

Northbound drivers may have had a misperception that this intersection was all-way stop-controlled, based on an evaluation of the recent crash data. The County therefore added supplemental plaques reading "CROSS TRAFFIC DOES NOT STOP" below the stop signs on the minor approaches to reinforce that this intersection is only stop-controlled on the minor approaches. These signs were installed in conjunction with the 2022 installation of an all-way stop at the intersection of CSAH 16 at Dancing Waters Parkway/Woodcrest Drive.

County staff will continue to monitor this intersection in future years.



CSAH 18 (40th Street S) & CR 71 (Neal Avenue)

Existing Conditions

The intersection of CSAH 18 (40th Street S) & County Road 71 (Neal Avenue) is located in the City of Afton, and is currently controlled by sidestreet stop control for the northbound and southbound CR 71 approaches. The intersection lies in a rural area of the County, though it serves as a primary east-west connection for people traveling between Afton and Woodbury.

This intersection is located in the 2022 ICRS Report due to concerns regarding crashes at this intersection, even after additional countermeasures on the minor approaches were installed in 2019.

Traffic Signal Warrants, by the numbers:

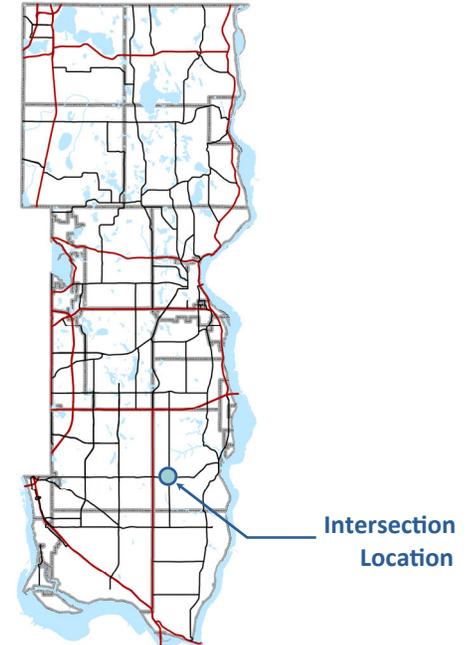
Warrant 1A: **0 of 8 Required Hours**
Warrant 1B: **0 of 8 Required Hours**
Warrant 1(A+B): **0 of 8 Required Hours**
Warrant 2: **0 of 4 Required Hours**
Warrant 3: **0 of 1 Required Hour**
Warrant 7: **Not Met**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **0 of 8 Required Hours**

Traffic Count Conducted in **2019**

2022 ICRS Rank: 18th (Tie)



Aerial Photo of Intersection

ICRS Recommendation

This intersection was originally included in the 2019 ICRS report due to a crash that occurred during that year. In the summer of 2019, the northbound and southbound stop signs were reinstalled closer to the edge of the roadway so they would be more within the approaching driver's cone of vision. Also, red flashing beacons were added atop the stop signs on the northbound and southbound approaches to increase their conspicuity to approaching motorists.

It is recommended that this intersection remain two-way stop controlled at this time for the following reasons:

- The intersection volumes do not meet any signal warrants, failing to meet any warrant for a single hour.
- All-Way Stop warrants are not met for a single hour.

County staff plan to upgrade the red flashing beacons to a more reliable solar LED system in 2023, with flashing red lights installed around the perimeter of the stop signs on the minor approaches. County staff will continue to monitor this intersection.

CSAH 18 (Bailey Road) & Cottage Grove Drive/Settlers Ridge Parkway

Existing Conditions

The intersection of CSAH 18 (Bailey Road) & Cottage Grove Drive/Settlers Ridge Parkway is located in the City of Woodbury, and is currently controlled by an all-way stop. This intersection is included in the 2022 ICRS Report because it is located in an area of the County that is experiencing increased development and traffic growth. In addition, several injury crashes occurred at this location in 2013 when CSAH 18 was being used as a detour route for a construction project on CSAH 19, which caused local residents to raise safety concerns about the intersection. County staff were interested in evaluating the intersection to verify that it was operating safely and efficiently.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **0 of 8 Required Hours**

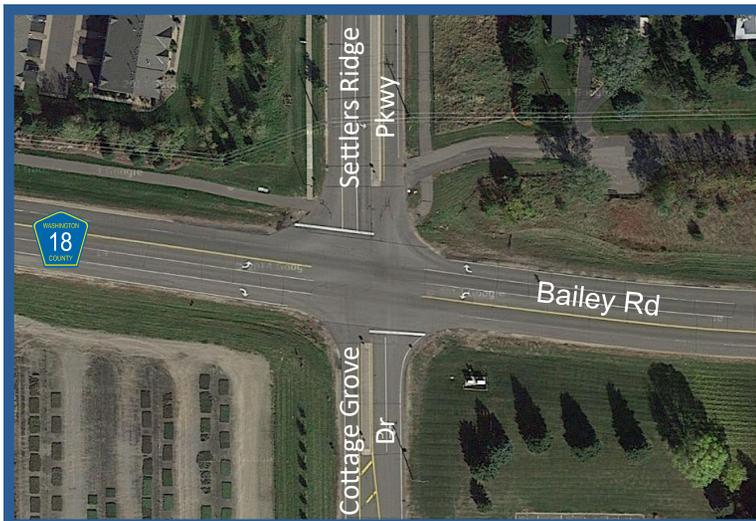
Warrant 1(A+B): **0 of 8 Required Hours**

Warrant 2: **0 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

2022 ICRS Rank: **16th (Tie)**



Aerial Photo of Intersection

All-Way Stop Warrant, by the numbers:

All-Way Stop: **12 of 8 Required Hours**

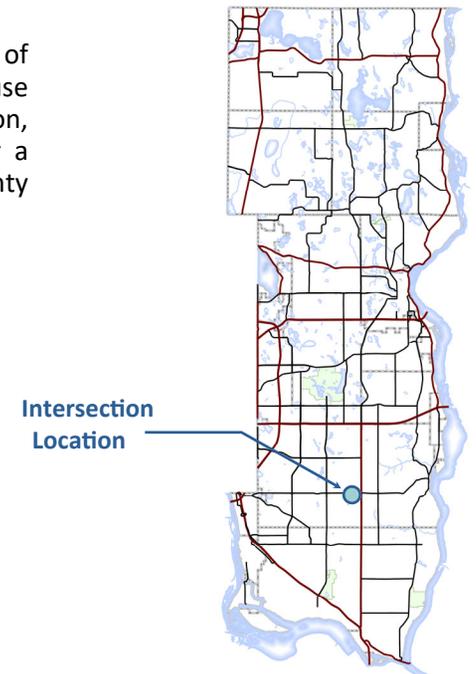
This intersection currently operates as an all-way stop.

Traffic Count Conducted in **2019**

ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation. However, there had been a consistent pattern of crashes involving southbound vehicles at this intersection, including a spate that occurred toward the end of the 2019-2021 study period. As a result, the County converted this intersection from sidestreet to all-way stop control during the summer of 2022, with the support of the City of Woodbury.

This intersection is a candidate for a roundabout installation in the future, and this intersection was recently selected to receive \$2 million in Highway Safety Improvement Funding to aid in the construction of one. It is anticipated that a roundabout will be constructed at this intersection during the 2027 construction season.



CSAH 18 (Bailey Road) & Monticello Drive

Existing Conditions

The intersection of CSAH 18 (Bailey Road) & Monticello Drive is located in the City of Woodbury, and is currently controlled by sidestreet stop control. The south leg of the intersection serves as one of two access points to St. Ambrose Church and School, which is located immediately southwest of the intersection. The northbound approach currently experiences delays during the AM drop-off and PM pick-up times for the school and before and after church services. Inbound vehicle movements into the St. Ambrose site also have limited capacity due to the short available weaving distance within the site, sometimes leading to queuing in the left turn lane.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **2 of 8 Required Hours**

Warrant 1(A+B): **0 of 8 Required Hours**

Warrant 2: **0 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **0 of 8 Required Hours**

Traffic Count Conducted in **2022**

2022 ICRS Rank: **20th (Tie)**



Aerial Photo of Intersection



ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation. In fact, turning movement counts showed lower traffic volumes in 2022 than when it was last counted in 2017. It is therefore not recommended for intersection control changes at this time due to the following reasons:

- The intersection is currently operating safely, with a crash rate at or below the average rate for similar intersections in the Metro area. In fact, there were zero reported crashes during the 2019-2021 study period for this intersection.
- Under existing traffic volumes, the installation of a traffic signal would be expected to increase overall delay and increase the crash rate at the intersection.
- Although the intersection experiences congestion on the northbound approach during the peak times for the St. Ambrose site, the congestion lasts for only a short duration. The intersection is operating efficiently during the majority of the day on both weekdays and weekends.
- The installation of a traffic signal would not improve the inbound capacity into the site.

Due to the above reasons it is recommended that this intersection remain sidestreet stop controlled at this time.

CSAH 19 (Keats Avenue) & 80th Street S

Existing Conditions

The intersection of CSAH 19 (Keats Avenue) & 80th Street S is located in the City of Cottage Grove, and is currently controlled by an all-way stop. This intersection is included in the 2022 ICRS Report because it is located in an area of the County that is experiencing increased development and traffic growth, and the County has received comments from the City of Cottage Grove and from residents regarding vehicles sometimes failing to stop.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **2 of 8 Required Hours**

Warrant 1B: **4 of 8 Required Hours**

Warrant 1(A+B): **5 of 8 Required Hours**

Warrant 2: **4 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

2022 ICRS Rank: **6th (Tie)**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **7 of 8 Required Hours**

This intersection currently operates as an all-way stop.

Traffic Count Conducted in **2018**

ICRS Recommendation

While this intersection didn't meet all required hours of the all-way stop warrant based on the 2018 traffic count, it likely would have if the count had taken place one hour longer into the evening. The intersection currently meets Warrant 2 (Four-Hour Volume) for traffic signal installation.

This intersection has a Capital Improvement Plan (CIP) project programmed for construction in 2026 in anticipation of continued traffic growth in the area. That project will likely involve the construction of a roundabout. Until then, it is recommended that this intersection remain all-way stop-controlled. The intersection currently experiences some minor congestion during peak hours, but it is operating efficiently during the majority of the day. The intersection is also currently operating safely, with one total reported crash during the 2019-2021 study period.

In 2019, County staff added red flashing beacons for the northbound and southbound approaches to increase the conspicuity of the intersection control to approaching motorists and address concern that drivers were running the stop signs. These will be upgraded to a more reliable solar LED system in 2023, with flashing red lights installed around the perimeter of the stop signs on these approaches.



Aerial Photo of Intersection

CSAH 19 (Keats Avenue) & 90th Street S/Ravine Parkway - South Jct

Existing Conditions

The intersection of CSAH 19 (Keats Avenue) & 90th Street S/Ravine Parkway is located in the City of Cottage Grove, and is currently sidestreet stop controlled. This intersection is included in the 2022 ICRS Report because it is located in an area of the County that is experiencing increased development and traffic growth. Also, the County has received feedback in the past from area residents that this is a difficult intersection to navigate, particularly from the minor approaches, and that CSAH 19 is difficult to cross for vehicles, bicyclists, and pedestrians.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **0 of 8 Required Hours**

Warrant 1B: **2 of 8 Required Hours**

Warrant 1(A+B): **0 of 8 Required Hours**

Warrant 2: **0 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

Warrant 7: **Not Met**

All-Way Stop Warrant, by the numbers:

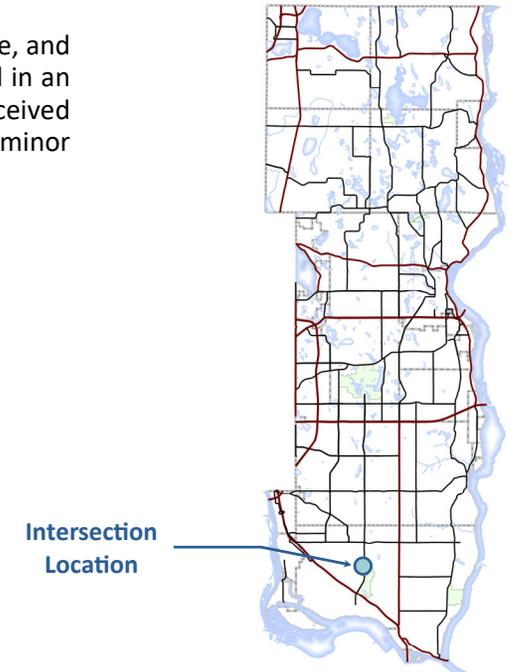
All-Way Stop: **0 of 8 Required Hours**

Traffic Count Conducted in **2019**

2022 ICRS Rank: **18th (Tie)**



Aerial Photo of Intersection



ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation. It is therefore not recommended for intersection control changes at this time due to the following reasons:

- Although the westbound and eastbound approaches currently experience minor delays during portions of the day, the intersection is operating efficiently during the majority of the day.
- Under existing volumes, the installation of a traffic signal would be expected to increase overall delay and increase the crash rate at the intersection.

County staff will continue to monitor crash patterns at this intersection in future years. In the meantime, it will remain sidestreet stop controlled.

CSAH 21/14 (Stagecoach Trail) & CSAH 14 (47th Street N)

Existing Conditions

The intersection of CSAH 21/14 (Stagecoach Trail) & CSAH 14 (47th Street N) is located in Baytown Township, and is currently controlled by sidestreet stop control. This intersection is located adjacent to areas of recent development, as well as a nearby school. This was included in the 2019 ICRS Report due to concerns regarding delay from the minor approach. It has scored high enough in subsequent years to remain in the 2022 ICRS Report.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **1 of 8 Required Hours**

Warrant 1B: **0 of 8 Required Hours**

Warrant 1(A+B): **0 of 8 Required Hours**

Warrant 2: **1 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

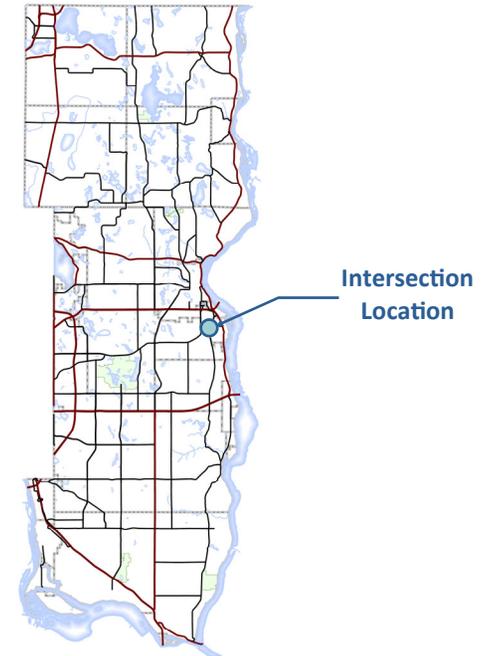
Warrant 7: **Not Met**

2022 ICRS Rank: 20th (Tie)

All-Way Stop Warrant, by the numbers:

All-Way Stop: **6 of 8 Required Hours**

Traffic Count Conducted in **2019**



Aerial Photo of Intersection

ICRS Recommendation

The intersection is not recommended for intersection control changes at this time due to the following reasons:

- The intersection is currently operating safely, with a crash rate below the average rate for similar intersections on county roads statewide, and zero total reported crashes during the 2019-2021 study period.
- This intersection does not meet any warrants for traffic signal installation. It also does not meet warrants for an All-Way Stop.
- Although the left turns from eastbound CSAH 14 often experience delays during peak hours, the delays are typically not severe, and the intersection is operating efficiently during the majority of the day.
- The installation of an all-way stop would hinder CSAH 21 traffic during all hours of the day, and might increase rear end crashes.
- In 2017, left turn lanes were constructed for the northbound and southbound approaches to reduce rear end crash risk for traffic in those directions. This has also reduced delay for traffic making the eastbound-to-northbound movement.

CSAH 22 (70th Street S) & Joliet Avenue

Existing Conditions

The intersection of CSAH 22 (70th Street N) & Joliet Avenue is located in the City of Cottage Grove, and is currently controlled by sidestreet stop control. This intersection is located in an area that is undergoing steady growth, near several new housing developments. This intersection was included in the 2021 ICRS Report at the request of the City of Cottage Grove due to resident concerns about safety and wait times when crossing CSAH 22 as a pedestrian or bicyclist, and scored highly enough to remain in this year's report.

Traffic Signal Warrants, by the numbers:

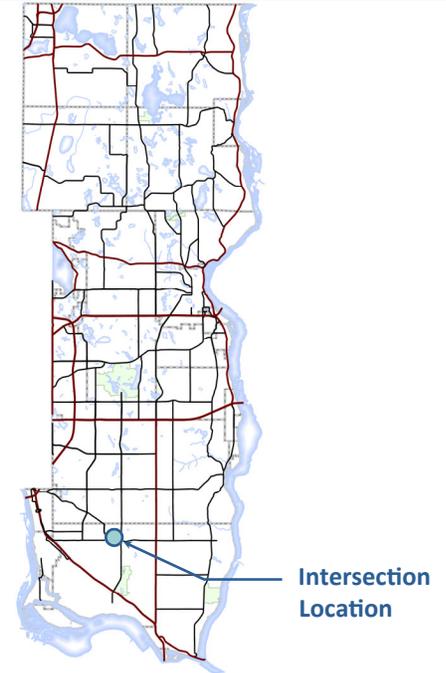
- Warrant 1A: **0 of 8 Required Hours**
- Warrant 1B: **2 of 8 Required Hours**
- Warrant 1(A+B): **0 of 8 Required Hours**
- Warrant 2: **0 of 4 Required Hours**
- Warrant 3: **0 of 1 Required Hour**
- Warrant 7: **Not Met**

All-Way Stop Warrant, by the numbers:

- All-Way Stop: **1 of 8 Required Hours**

Traffic Count Conducted in **2021**

2022 ICRS Rank: **20th (Tie)**



Aerial Photo of Intersection

ICRS Recommendation

The traffic counts taken at this intersection in September 2021 indicate that it currently does not meet any warrants for traffic signal installation or all-way stop control. There were also zero reported crashes during the 2019-2021 study period.

This intersection provides a link in the area sidewalk and trail network; however, current pedestrian and bicycle crossings of CSAH 22 during favorable weather totaled only 29 per day, with a maximum observed rate of six crossings per hour. Current guidance would suggest that this location is not a suitable site for a pedestrian beacon or uncontrolled crosswalk due to the observed speed and number of lanes. Although a traffic signal can be useful to create gaps and limit delay for pedestrians, a traffic signal will also substantially increase typical pedestrian delay, and is not a proven strategy to reduce pedestrian crashes.

Washington County will continue to monitor this intersection in light of anticipated continued growth and updated safety guidance with respect to pedestrian crossing treatment options. In the meantime, it is recommended that this intersection remain sidestreet stop controlled.

CSAH 22 (Summit Avenue) & Saint Paul Park Road

Existing Conditions

The intersection of CSAH 22 (Summit Avenue) & Saint Paul Park Road is located in the City of Saint Paul Park, and is currently controlled by sidestreet stop control. This intersection has been experiencing issues related to heavy truck traffic since truck access from the oil refinery to the Glen Road interchange was restricted in the early 2000's. The County has received requests for increased traffic control at this intersection over the years from residents and truck drivers, due to safety concerns related to the lack of gaps in traffic for loaded tanker trucks making left turns from St. Paul Park Road onto northbound CSAH 22.

Traffic Signal Warrants, by the numbers*:

Warrant 1A: **11 of 8 Required Hours**

Warrant 1B: **8 of 8 Required Hours**

Warrant 1(A+B): **13 of 8 Required Hours**

Warrant 2: **6 of 4 Required Hours**

Warrant 3: **2 of 1 Required Hour**

Warrant 7: **Not Met**

*NOTE Trucks counted as 3 equivalent passenger vehicles at this location due to the unusually high truck percentages, and their size and acceleration characteristics.

2022 ICRS Rank: 3rd



Aerial Photo of Intersection

All-Way Stop Warrant, by the numbers:

All-Way Stop: **9 of 8 Required Hours**

Not recommended, because the proximity to adjacent intersections would be problematic.

Traffic Count Conducted in **2018**

ICRS Recommendation

Prior to 2012, annual County analyses of this intersection did not indicate that the intersection was meeting traffic signal warrants. County staff took a different look at the intersection in late 2012, electing to count each semi truck as 3 equivalent passenger vehicles due to their size and acceleration characteristics. Using these criteria, the intersection meets several warrants for traffic signal installation. County staff now concur that the installation of a traffic signal could be beneficial at this location and could allow for the removal of the "no turn on red" restriction at the southbound exit ramp, which was installed to create gaps in traffic at St. Paul Park Road.

However, the City of St. Paul Park withheld support for a traffic signal at this location in early 2013, and asked that the County instead try and improve the operation of the traffic signals at the US 61/10 & CSAH 22 interchange¹. The County subsequently completed a traffic signal improvement project in the interchange area in late 2016.

County staff remain ready to support proceeding with a traffic signal design and programming a signal installation at the CSAH 22 & Saint Paul Park Road intersection if and when such a project is supported by the City.

1.) https://www.republicaneagle.com/news/government/st-paul-park-city-council-opposes-fourth-stoplight-near-hwy-61-summit-avenue/article_e34b9938-38ce-5f1f-bf48-8a458f13cf79.html



Intersection Location

CSAH 24 (Osgood Avenue) & CSAH 26 (59th Street N)

Existing Conditions

The intersection of CSAH 24 (Osgood Avenue) & CSAH 26 (59th Street N) is located in the City of Oak Park Heights, and is currently controlled by sidestreet stop control. The west leg of this intersection was modified to include frontage road traffic from 60th Street S west of the intersection as the result of a 2022 construction project led by Washington County. The intersection is included in the ICRS Report because County staff have been interested in evaluating it following the frontage road realignment to determine if there are any operational or safety issues.

Traffic Signal Warrants, by the numbers:

Warrant 1A: **1 of 8 Required Hours**

Warrant 1B: **0 of 8 Required Hours**

Warrant 1(A+B): **1 of 8 Required Hours**

Warrant 2: **0 of 4 Required Hours**

Warrant 3: **0 of 1 Required Hour**

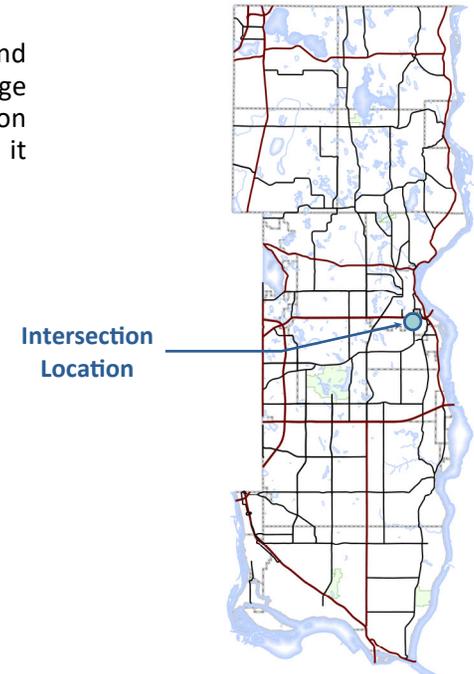
Warrant 7: **Not Met**

2022 ICRS Rank: 25th (Tie)

All-Way Stop Warrant, by the numbers:

All-Way Stop: **6 of 8 Required Hours**

Traffic Count Conducted in **2022**



Aerial Photo of Intersection

ICRS Recommendation

The intersection currently does not meet any warrants for traffic signal installation. It is closer to meeting an all-way stop warrant based on 2022 counts than it was in 2016. Nonetheless, it is not recommended for intersection control changes at this time due to the following reasons:

- Although the westbound and eastbound 59th Street approaches currently experience minor delays during portions of the day, the intersection is operating efficiently during the majority of the day.
- The southbound left-turn lane as currently constructed is insufficient to support signalized operation.

This intersection will remain sidestreet stop controlled both now and after completion of the project. However, County staff will continue to monitor this intersection, as it is a possible candidate for traffic signal installation in the future.

CSAH 38 (Maxwell Avenue) & Red Rock Road

Existing Conditions

The intersection of CSAH 38 (Maxwell Avenue) & Red Rock Road is located in the City of Newport, and is currently controlled by sidestreet stop control. Traffic on the eastbound Red Rock Road approach sometimes experiences delays during peak hours due to southbound congestion extending from the I-494 interchange. The County was asked to evaluate this intersection as a part of the 2018 ICRS Report due to difficulty for drivers on the Red Rock Road approach finding gaps, particularly due to the high volume of truck traffic in the area, as well as safety concerns, and it has scored well enough to remain included in subsequent reports.

Traffic Signal Warrants, by the numbers*:

Warrant 1A: **0 of 8 Required Hours**
Warrant 1B: **2 of 8 Required Hours**
Warrant 1(A+B): **2 of 8 Required Hours**
Warrant 2: **0 of 4 Required Hours**
Warrant 3: **0 of 1 Required Hour**
Warrant 7: **Not Met**

All-Way Stop Warrant, by the numbers:

All-Way Stop: **5 of 8 Required Hours**

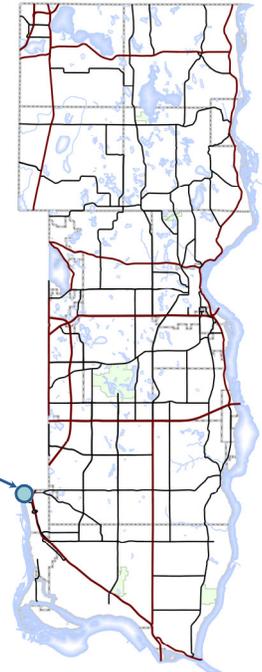
Traffic Count Conducted in **2018**

*NOTE Trucks counted as 3 equivalent passenger vehicles at this location due to the unusually high truck percentages, and their size and acceleration characteristics.

2022 ICRS Rank: 16th (Tie)



Aerial Photo of Intersection



ICRS Recommendation

County staff elected to count each semi truck as 3 equivalent passenger vehicles due to their size and acceleration characteristics when evaluating this intersection. Though this intersection sometimes experiences congestion during the morning peak hours, it is not recommended for intersection traffic control changes at this time due to the following reasons:

- Under existing traffic volumes, the installation of a traffic signal would be expected to increase overall delay and increase the crash rate at the intersection.
- Although the installation of an all-way stop would reduce delays on the eastbound approach during peak traffic times, the overall delay at the intersection would be expected to be significantly worse than existing conditions due to the congestion that an all-way stop would cause on CSAH 38.

The Minnesota Department of Transportation recently completed a project to improve capacity on westbound I-494 west of the Wakota Bridge over the Mississippi River. This project, as well as changes in commuting patterns as a result of the pandemic, may have alleviated some of the congestion at the CSAH 38 and Red Rock Road intersection during peak hours. County staff will monitor traffic levels at this intersection in the future.

Summary

Of the twenty-nine intersections that were included in the 2022 Intersection Control Ranking System (ICRS) Report, seven of them met one or more of the MnMUTCD traffic signal warrants. The chart below summarizes each of the seven intersections, including their rank in the ICRS, the warrants that were met at each location, and how each of the intersections is being addressed by the Public Works Department.

The remaining intersections not listed in this table do not meet any traffic signal warrants. County staff will continue to monitor those intersections, paying particular attention to ones that rank highly and are close to meeting warrants. Full ranking information can be found on the following page.

ICRS Rank	Intersection	City and/or Township	Warrants Met	Status
1	CSAH 16 (Valley Creek Rd) & Eagle Creek Ln	Woodbury	8-Hour, 4-Hour, Peak Hour, Crash Experience	Washington County will initiate discussions with the City of Woodbury to explore potential changes to improve safety at this intersection.
2	CSAH 5 (Owens St) & CSAH 12 (Myrtle St)	Stillwater	8-Hour, 4-Hour, Peak Hour	County staff remain ready to support an intersection improvement project if and when such a project is supported by the City.
3	CSAH 22 (Summit Ave) & Saint Paul Park Rd	Saint Paul Park	8-Hour, 4-Hour, Peak Hour	County staff remain ready to support a traffic signal if supported by the City.
4 (Tie)	CSAH 10 (10th St N) & CSAH 19 (Keats Ave)	Lake Elmo	Peak Hour	This intersection will remain all-way stop controlled at this time. However, County staff acknowledge that this intersection meets warrants and ranks highly, and recommend it be considered for a future Capital Improvement Plan (CIP) project.
4 (Tie)	CSAH 6 (Stillwater Blvd) & CSAH 13 (Inwood Ave)	Lake Elmo	4-Hour, Peak Hour	This intersection is recommended to remain an all-way stop at this time. County staff will continue to monitor this intersection, and it may be a candidate for a future CIP project.
6 (Tie)	CSAH 19 (Keats Ave) & 80th St S	Cottage Grove	4-Hour	This intersection will remain all-way stop controlled at this time. The intersection may be a candidate for a future CIP project as funding becomes available.
20 (Tie)	CSAH 14/24 (Osgood Avenue) & CSAH 14 (47th Street N)	Baytown Township	Intersection Near a Grade Crossing	A traffic signal will likely be installed in 2024 as part of an upcoming project going out for bid that will realign the intersection northward and address the bump at the railroad crossing.

2022 Washington County Intersection Control Ranking System (ICRS)

2022 Rank	Intersection	Year Data Collected	MN MUTCD Traffic Volume Warrants (Hours Met)					Warrant Points	2019-2021 Correctable Crashes		Crash Points	Total ICRS Points
			Warrant 1A	Warrant 1B	Warrant 1(A+B)	Warrant 2	Warrant 3		K & A	B, C, & PDO		
1	CSAH 16 (Valley Creek Rd) + Eagle Creek Ln	(1) 2022	5	12	11	6	4	22	0	16	5.3	27.3
2	CSAH 5 (Owens St) & CSAH 12 (Myrtle St)	2018	12	5	11	6	3	21	0	2	0.7	21.7
3	CSAH 22 (Summit Ave) & St. Paul Park Rd	2018	11	8	12	6	2	20	0	3	1.0	21.0
T4	CSAH 6 (Stillwater Blvd) & CSAH 13 (Inwood Ave)	2021	5	1	3	4	2	11	0	0	0.0	11.0
T6	CSAH 19 (Keats Ave) & 80th St S	(2) 2018	2	4	5	4	0	9	0	1	0.3	9.3
T4	CSAH 10 (10th St N) & CSAH 19 (Keats Ave)	2022	3	4	7	3	1	11	0	0	0.0	11.0
T20	CSAH 14/24 (Osgood Ave) & CSAH 14 (47th St N)	(2,3) 2018	0	1	1	1	0	2	0	0	0.0	2.0
T6	CSAH 12 (Stillwater Rd) & East Ave/Hallam Ave	2016	0	5	0	3	0	8	0	4	1.3	9.3
8	CSAH 13 (50th St N) & Hadley Ave - East Junction	2021	5	3	6	3	0	9	0	0	0.0	9.0
9	CSAH 6 (Stillwater Blvd) & Hadley Ave	2019	4	1	4	2	0	6	0	7	2.3	8.3
10	CSAH 6 (Stillwater Blvd) & CSAH 13 (Ideal Ave)/Helmo Ave	2022	3	0	2	3	0	6	1	2	1.7	7.7
11	CSAH 13 (Radio Dr) & Dale Rd	2021	0	4	1	2	0	6	0	1	0.3	6.3
12	CSAH 16 (Valley Creek Rd) & Saint John's Drive	2018	0	2	0	1	0	3	0	4	1.3	4.3
T13	CSAH 12 (75th St N) & CSAH 9 (Jamaca Ave)	2019	0	2	0	0	0	2	1	0	1.0	3.0
T13	CSAH 15 (Manning Ave) & 62nd St N	2022	0	2	1	1	0	3	0	0	0.0	3.0
T13	CSAH 16 (Valley Creek Rd) & Dancing Waters/Woodcrest Dr	2018	1	2	1	1	0	3	0	0	0.0	3.0
T16	CSAH 18 (Bailey Rd) & Cottage Grove Dr/Settlers Ridge Pkwy	2019	0	0	0	0	0	0	1	5	2.7	2.7
T16	CSAH 38 (Maxwell Ave) & Red Rock Road	2018	0	2	2	0	0	2	0	2	0.7	2.7
T18	CSAH 19 (Keats Ave) & 90th St S/Ravine Pkwy	2019	0	2	0	0	0	2	0	1	0.3	2.3
T18	CSAH 18 (40th St S) at CR 71 (Neal Ave)	2022	0	0	0	0	0	0	1	4	2.3	2.3
T20	CSAH 18 (Bailey Rd) & Monticello Dr	2022	0	2	0	0	0	2	0	0	0.0	2.0
T20	CSAH 21/14 (Stagecoach Trl N) & CSAH 14 (47th St N)	2019	1	0	0	1	0	2	0	0	0.0	2.0
T20	CSAH 22 (70th St S) & Joliet Ave	2021	0	2	0	0	0	2	0	0	0.0	2.0
24	CSAH 15 (Manning Ave) & CR 64 (McKusick Rd)	2020	0	0	0	0	0	0	1	2	1.7	1.7
T25	CSAH 10 (10th St N) & CSAH 17/17B (Lake Elmo Ave)	2020	0	0	0	0	0	0	0	4	1.3	1.3
T25	CSAH 13 (Hadley Ave) & 50th St N - West Junction	2021	0	1	0	0	0	1	0	1	0.3	1.3
T25	CSAH 24 (Osgood Ave) & CSAH 26 (59th St N)	2022	1	0	1	0	0	1	0	1	0.3	1.3
28	CSAH 8 (Egg Lake Rd) + Goodview Ave	2019	0	0	0	0	0	0	0	2	0.7	0.7
29	CSAH 14 (40th St N) at CR 65 (Oakgreen Ave)	2022	0	0	0	0	0	0	0	0	0.0	0.0

MEETS WARRANTS

MEETS A ONE-HOUR WARRANT

DOES NOT MEET WARRANTS

- NOTES:** A.) Warrants 1A (Eight-Hour Volume, Minimum Vehicular Volume), 1B (Eight-Hour Volume, Interruption of Continuous Traffic), and 1(A+B) (Combination of Eight-Hour Warrants) receive 1 point for each hour met, up to a maximum of 12 points. Warrant 1A, 1B, and 1(A+B) are not cumulative; the highest of these values is added to the total.
- B.) Warrant 2 (Four-Hour Volume) receives 1 point for each hour met, up to a maximum of 6 points.
- C.) Warrant 3 (Peak Hour Volume) receives 1 point for each hour met, up to a maximum of 4 points.
- D.) Warrant 7 (Crash Experience) receives 1 point per 3 years for each correctable crash over a 3 year study period, except for correctable fatal and "A" injury crashes which receive 3 points. The total is then divided by 3 to provide a value per year of data.
- 1) This intersection also meets Warrant 7: Crash Experience.
 - 2) These intersections meet warrants, and were therefore moved above the dividing line, even though other intersections listed below rank higher in points.
 - 3) This intersection meets Warrant 9: Intersection Near a Grade Crossing.