



SAFE ROUTES TO SCHOOL



FOND DU LAC BAND OF LAKE SUPERIOR CHIPPEWA SAFE ROUTES TO SCHOOL ENGINEERING STUDY

July, 2021



ACKNOWLEDGEMENTS

The Study was made possible by funding from the Minnesota Department of Transportation (MnDOT). Special thanks to the individuals below who provided their expertise, time, and feedback for this Study to ensure it encompassed the needs of the children and broader community who will benefit when walking, rolling, or bicycling from these improvements.

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EXECUTIVE SUMMARY

The Fond du Lac Band of Lake Superior Chippewa Safe Routes to School (SRTS) Engineering Study (herein known as “the Study”) sought to improve the safety, comfort, and connectivity for children walking, rolling, or bicycling at or near Fond du Lac Ojibwe School (herein referred to as “the school”). The study focused on key study intersections and roadways near the school, as well as on-site review of the school. The overall objective of the study was to complete a technical analysis of multimodal improvements. The desired multimodal elements include better multimodal connectivity (i.e., on-street pedestrian path), enhanced crossings at key locations and major intersections, and on-site modifications at the school. Safe Routes to School is a national program intended to improve safety for children to access school and encourage a more active lifestyle through physical activity.

The Fond du Lac Band of Lake Superior Chippewa Safe Routes to School Engineering Study was led by the Fond du Lac Tribe and illustrates strategies and potential improvements as recommended by Fond du Lac’s planner or planning department. The Study organizes needs and justifies future requests made by the Fond du Lac Tribe and/or Fond du Lac Ojibwe Area Schools to implement the potential improvements proposed in this Study.

EXISTING CONDITIONS

Project Location and Focus Schools

The school is located on the Fond du Lac Band of Lake Superior Chippewa Reservation approximately 2.5 miles west of Minnesota State Highway 33 in the town of Cloquet, MN, along Big Lake Road (also known as County State Aid Highway 7 (CSAH 7)). Fond du Lac Ojibwe Schools, Independent School District No. 1 serves the Fond du Lac Tribe. The District serves approximately 745 students, of which 24 percent of the students attend the school involved in this study. The school is bounded to the north by Big Lake Road and to the west by University Road. The school is set in a rural location, without any major residential developments in any direction. The closest residential developments to the school are about 0.5 miles west of the Big Lake Road and University Road/Brevator Road intersection and approximately 0.80 miles east along Airport Road.

Previous Plans and Other Studies

Other applicable studies were reviewed as a part of the planning process including:

- *Fond du Lac Band of Lake Superior Chippewa Transportation Safety Plan (2017)*
- *Fond du Lac Ojibwe School Safe Routes to School Plan (2015)*
- *Fond du Lac Ojibwe School Safe Routes to School Plan (2009)*

Transportation Network

At Fond du Lac Ojibwe School, the sidewalk and bicycle network connecting the school to the surrounding neighborhoods in the area is minimal. Existing infrastructure includes onsite pedestrian facilities such as sidewalks along and near certain sides of the school or in the parking lot to that is adjacent along the northside. Additionally, there is a marked midblock crossing with a flashing beacon 275 feet south of Big Lake Road that ties into the existing trail on the east side of University Road. A multi-use trail exists along Big Lake Road throughout the study area.

Big Lake Road has a roadway width of approximately 24-feet just counting the lane widths, and including the shoulders is approximately 42-feet wide. University Road adjacent to the east side of the school that is a two-lane roadway with a turn lane at the Big Lake Road intersection, is classified as a minor collector, and has an existing cross section that is approximately 25-feet wide just counting the width of the lanes and 46-feet wide when including the shoulder widths. Trettel Lane, approximately 1-mile east of University Road/Brevator Road, is a two-lane roadway with a northbound right-turn lane at Big Lake Road, is classified as a minor collector, is approximately 22-feet wide with narrow shoulders and is rural in context with no curb and gutter present on either side.

Existing conditions were reviewed to establish a baseline to compare to future conditions, as well as to identify current issues from a safety and capacity perspective. Evaluation of the existing conditions includes a review of traffic volumes, roadway characteristics, and an intersection capacity analysis. It should be noted based on the existing traffic analysis; a traffic control change is not recommended. In addition to existing conditions, the future year 2040 conditions were reviewed to determine if any operational issues are expected at the study intersections under long-term conditions. To account for general background growth and development in the area, an annual growth rate of 2 percent was applied to the existing peak hour traffic volumes to develop year 2040 background traffic forecasts. The year 2040 results confirm that the existing traffic control will be sufficient in the future as well.

Analyzed crashes include ten years of vehicle-to-bicycle and vehicle-to-pedestrian crashes, as well as all crashes over the last five years. Due to the multimodal focus of this Study, ten years of data was used to provide a larger sample size of data. The data was derived from MnDOT's Minnesota Crash Mapping Analysis Tool (MnCMAT2) and includes recorded crashes by law enforcement that provide crash details and approximate location. A total of 8 crashes were recorded over the last five years along the study roadways (See Figure 6). Of those, 2 resulted in serious injuries, 1 minor injury, and 4 possible injuries (shown in Figure 7). The remaining crash was property damage. Four of the crashes occurred at the Big Lake Road and University Road/Brevator Road intersection, 2 occurred at the Big Lake Road and Trettel Lane, and 2 others occurred along the corridor not at intersections. There were two pedestrian or bicycle crashes that occurred over the 10-year period, one resulted in possible injury whereas the second one resulted in serious injury.

EXECUTIVE SUMMARY

IDENTIFIED NEEDS

Broadly identified needs include multimodal connectivity along Big Lake Road, crossing enhancements at major intersections to overcome barriers, and additional uncontrolled crossings to better interconnect the network.

Crossing Intersections

Enhance crossing infrastructure or traffic control at key locations to improve the safety and comfort of those walking, rolling, or bicycling, as well as ensure they are not barriers for children to do so. This includes along Big Lake Road at University Road/Brevator Road and Trettel Lane.

Connectivity to Walk, Roll, or Bike

Improve sidewalk connections from the school to the surrounding areas, as well as on the school property. Additional lighting needs may be considered to improve safety.

ALTERNATIVE EVALUATION

Project alternatives previously developed by Carlton County (see Appendix B) and Fond du Lac Tribe (see Appendix C) were reviewed to determine if the proposed improvements are adequate for the identified issues and the context of the area roadway network. The Carlton County project prepared plans as part of the upcoming County reclamation project that will be resurfacing and restriping Big Lake Road between University Road/Brevator Road and Pinewood Drive. Whereas, the Fond du Lac Tribe is leading a project that provides access to the school campus and University Road.

Project alternatives are based upon evaluated opportunities that would improve or eliminate identified needs and issues. This section organizes potential improvements and project opportunities to address the two high-level needs identified by the Study using the latest state and national guidance. Potential projects were vetted using engineering judgment and reviewed by both the Fond du Lac Tribe, Carlton County, and MnDOT.

Crossing Intersections

Analysis of crossing infrastructure and traffic control upgrades at crossings along Big Lake Road, University Road, Brevator Road, and Trettel Lane to improve the safety and comfort for children crossing to overcome these potential barriers.

Connectivity to Walk, Roll, or Bike

Evaluation of enhanced multimodal infrastructure as it relates to installing continuous sidewalks on University Road from the school to Big Lake Road, as well as on the school property.

EXECUTIVE SUMMARY

Major Intersection Crossings

The major intersections along Big Lake Road at University Road/Brevator Road and Trettel Lane are crucial locations for multimodal enhancements. Potential crossing infrastructure at each intersection was reviewed using the latest guidance from the Federal Highway Administration's (FHWA) *Safe Transportation for Every Pedestrian (STEP) Guide (2018)* and National Association of City Transportation Officials (NACTO) along with reviewing the potential for traffic control modifications.

University Road/Brevator Road

The proposed Carlton County plans include a resurfacing of Big Lake Road through the University Road/Brevator Road intersection, constructing new pedestrian curb ramps in the northwest, northeast, and southeast quadrants, and painting crosswalks and adding crossing signs on the north and east approaches of the intersection. No traffic control modifications are planned to be implemented as part of this project.

A further review of national guidance was completed to ensure no additional enhancements should be implemented at this intersection. Based on the further review of the FHWA and MN MUTCD guidance, the proposed improvements included within the County reclamation project appear adequate for the study intersection.

An existing and future year 2040 warrants analyses were completed to determine if the intersection volumes meet or exceed the thresholds for a potential traffic control modification. No traffic control changes are expected to be warranted at this intersection and the current two-way stop control is expected to be adequate for the traffic volumes.

Trettel Lane

The proposed Carlton County plans include a resurfacing of Big Lake Road through the Trettel Lane intersection, constructing new pedestrian curb ramps in all quadrants, and painting crosswalks and adding crossing signs on the north, south, and east approaches of the intersection. No traffic control modifications are planned to be implemented as part of this project.

A further review of national guidance was completed to ensure no additional enhancements should be implemented at this intersection. Based on the review of the FHWA and MN MUTCD guidance, the proposed improvements included within the County reclamation project appear adequate for the study intersection.

An existing and future year 2040 warrants analyses were completed to determine if the intersection volumes meet or exceed the thresholds for a potential traffic control modification. No traffic control changes are expected to be warranted at this intersection and the current two-way stop control is expected to be adequate for the traffic volumes.

EXECUTIVE SUMMARY

Connectivity to Walk, Roll, or Bike

University Road provides access to the schools and other amenities for children within the Fond du Lac Reservation. This project is currently being led by the Fond du Lac Tribe and includes various sidewalk improvements within the school campus area and along the west side of University Road for approximately 600 feet.

In addition to the County led projects occurring on Big Lake Road, additional improvements are planned along University Road, south of Big Lake Road. An enhanced pedestrian crossing (RRFB) on University Road, approximately 275 feet south of Big Lake Road will be installed by the County (and paid for by the Tribe). Currently, there is a flashing beacon sign at the location of the proposed crossing. Therefore, based on the proposed design and review of the FHWA STEP guidance, the proposed crossing infrastructure should be adequate for the crossing.

The additional internal sidewalk and crossing connection improvements that Fond du Lac Tribe plans to implement, provide for easy pedestrian circulation throughout the school campus and community amenities and appear adequate for the campus area. However, additional internal lighting options were not currently proposed as part of the project and may offer additional safety benefits to the study area.

Pedestrian scale lighting could improve visibility and enhance safety at the internal crosswalks within the tribal campus area, specifically at internal crossing locations.

Proposed Improvements

The detailed review of the proposed County and Tribal improvements slated to be constructed this year determined that the improvements are adequate for the study intersections and internal sidewalk network. These improvements will help provide additional connectivity within the study area and improve safety for everyone who walks, bikes, or rolls through campus. Additional lighting improvements could be considered within the internal school roadway network to improve overall visibility and safety of all roadway users.

Demonstration Project

A Safe Routes to School demonstration project was completed by MnDOT at both the Big Lake Road and University Road/Brevator Road intersection and the Big Lake Road and Trettel Lane intersection in October 2020. Demonstration projects are short term, low-cost, temporary roadway projects used to pilot potential long-term design solutions to improve walking, bicycling and public spaces. The demonstration project reviewed the potential of eliminating the eastbound left-turn lanes and constructing a median refuge island for pedestrians on the west approach of each intersection. While separate from the Safe Routes to School Engineering Study, the findings may be crucial to future roadway designs within the study area.

EXECUTIVE SUMMARY

PROPOSED PROJECTS

The previously planned projects (i.e., County reclamation project and Tribe sidewalk and school campus crossings) and proposed lighting project identified through this Study in Figure 16. Table 1 summarizes key project items such as the estimated cost for the proposed lighting project.

Table 1. Proposed Project

ID	Location	Project Type	Description	Estimated Cost ¹
L1	Various locations on the school property	Lighting	Pedestrian Scale Lighting	\$15,000 per location

¹Cost estimates by SRF Consulting Group, Inc. The costs only include applicable infrastructure and do not estimate other elements such as right-of-way, tree removal, mobilization, etc.

Fond du Lac Ojibwe School



Proposed Improvements

Cloquet, MN

Figure 1



Focus School



School Boundary



County Crossing Improvements



Potential Lighting Location (Per the SRTS L1 Proposed Project)



County RRFB Location



EXECUTIVE SUMMARY

NEXT STEPS

This Study offers a review of the proposed infrastructure improvements to enhance access, mobility, and safety throughout the Fond du Lac Reservation and Fond du Lac Ojibwe School. These improvements, planned by Carlton County and by the Fond du Lac Tribe should be celebrated as an accomplishment. The proposed next steps are important as they will seek to maximize any future plan and study improvements that will enhance an area of the Fond du Lac Reservation where children cannot safely or comfortably walk, roll, or bike today.

- **Agency Coordination:** Identify a champion and regularly coordinate within a small team that includes various agency and school district representatives as well as other area stakeholders.
- **Identify Priorities:** Prioritized projects using the Study and small group discussion.
- **Focused Timeline and Action Plan:** Create a timeline and action plan that identifies planned improvements, responsible parties, the estimated cost, and associated time period. The action plan will focus implementation, identify synergies with other planned projects, and allow agencies to be prepared for funding opportunities.
- **Celebrate wins!**



Big Lake Road looking east (west of Trettel Lane) Source: Associated Consulting Services, 2020

ENGINEERING STUDY FRAMEWORK

This engineering study is organized into six chapters outlined herein:



Chapter 1: Introduction

Study introduction and Safe Routes to School program background.



Chapter 2: Existing Conditions Analysis

Outlines the quantitative and qualitative approach undertaken for the Study and foundational elements to support the planning process.



Chapter 3: Issues Identification and Needs Summary

Identifies issues and summarizes needs from the existing conditions analysis. Issues could include an unsafe crossing or sidewalk gap for example.



Chapter 4: Alternative Evaluation

Analyzes potential infrastructure opportunities and evaluates opportunities to address known issue areas. Potential improvements are identified within two broadly defined options.



Chapter 5: Proposed Projects

Summarizes the planned and proposed transportation infrastructure improvements derived from the alternative evaluation.



Chapter 6: Next Steps

Actionable next steps to organize project champions and implement the Study's proposed improvements.



CHAPTER 1: INTRODUCTION

STUDY BACKGROUND

The Fond du Lac Band of Lake Superior Chippewa Safe Routes to School (SRTS) Engineering Study sought to improve the safety, comfort, and connectivity for children walking, rolling, or bicycling near the Fond du Lac Ojibwe School. The study focused on key study intersections and roadways near (i.e., within one-block) the school, as well as on-site review of the school. The Study's overall objective was to complete a technical analysis of multimodal improvements. The desired multimodal elements include better multimodal connectivity, enhanced crossings at key locations and major intersections, and on-site modifications at the school.

The Fond du Lac Band of Lake Superior Chippewa Safe Routes to School Engineering Study was led by the Fond du Lac Band of Lake Superior Chippewa Tribe and illustrates strategies and potential improvements as recommended by Fond du Lac's planner or planning department. The Study organizes needs and justifies future requests made by the Fond du Lac Tribe and/or Fond du Lac Ojibwe Area Schools to implement the potential improvements proposed in this Study.

WHAT IS SAFE ROUTES TO SCHOOL?

Safe Routes to School (SRTS) is a program that receives federal and state funding in Minnesota with the objective of making it safer for children to walk, roll, or bike to school and encourage more active lifestyles through physical activity. The program began in 2005 with federal funding and has continued to receive support from all levels of government. The Minnesota Department of Transportation (MnDOT) administers the SRTS program in Minnesota which includes technical and programmatic support, as well as competitive grant funds for SRTS studies, programs, education, and infrastructure. The statewide program is guided by the five-year Minnesota Safe Routes to School Strategic Plan, which was completed in September 2020 with a vision for youth in Minnesota to safely, confidently, and conveniently walk, bike, and roll to school and in daily life.¹

The current Strategic Plan updates the 2015 Plan and establishes a five-year action plan for MnDOT, the Minnesota Department of Health, the Minnesota Department of Education, and other participating agencies and partners. There are six overarching goals that guide the Strategic Plan, as well as a three-phase strategic planning process. Visit the Safe Routes to School webpage hosted by MnDOT for more information or to view the Strategic Plan.

¹ MnDOT. (n.d.). *About Safe Routes to School*. <http://www.dot.state.mn.us/saferoutes/about.html>




SRTS focuses on a multidisciplinary approach guided by the “6 E’s”:

- **Evaluation** – Understand the issues that need to be addressed and the projects and/or programs of each of the following 5 E’s that could be most effective.
- **Education** – Classes and activities that teach children (and their parents or guardians) pedestrian, bicycle, and traffic safety skills, the benefits of walking, rolling, or bicycling to school, the best route to get to school, and the positive impacts on personal health and the environment.
- **Encouragement** – Events and activities that create interest in both students and parents to walk, roll, or bike to school.
- **Equity** – Ensure that SRTS initiatives benefit all, with specific attention toward addressing barriers and inclusivity for lower-income students, students of color, and others that face ongoing disparities.
- **Enforcement** – Strategies to deter unsafe behavior of drivers and other modes to encourage all road users to obey traffic laws and share the transportation network safely around schools.
- **Engineering** – Infrastructure improvements designed to enhance the safety of children (and more broadly benefit parents, guardians, and/or community members) walking, rolling, bicycling, and driving along school routes.

The Study focuses on the “engineering” component to enhance the built environment for children walking, rolling, or bicycling near the school. It was funded and supported by MnDOT to complete planning and conceptual design for local agencies and school districts across Minnesota.

SAFE ROUTES TO SCHOOL CAN:

Reduce the risk of PEDESTRIAN INJURY BY 44 PERCENT 

Help build desirable communities by making it **EASIER AND SAFER FOR FAMILIES** and neighbors to walk and bike to school together.

 **BRING MORE RESOURCES** to Greater Minnesota communities.

In 2015, **THREE OUT OF FOUR** Safe Routes to School state-funded **INFRASTRUCTURE GRANTS** were awarded to communities in Greater Minnesota.

GET KIDS MORE ACTIVE 

Students who start walking or biking to school benefit from **47 MORE MINUTES OF PHYSICAL ACTIVITY PER WEEK.**

 **Help reduce vehicle congestion & IMPROVE AIR QUALITY** around schools.

 Traffic-related air pollution **INCREASES** a child’s risk of developing **ASTHMA.**

Source: Minnesota Department of Health



CHAPTER 2: EXISTING CONDITIONS ANALYSIS

Existing conditions data provides a foundation in which to identify issue areas, organize opportunities that attempt to resolve those issues, and summarize potential improvements. The following section outlines school-specific data and previous planning efforts, data analyzed for the existing transportation system, operations, and safety, and school circulation and accessibility.

STUDY LOCATION AND FOCUS SCHOOLS

This section documents the study location and focus school impacted by the proposed improvements.

Location

The school is located on the Fond du Lac Band of Lake Superior Chippewa Reservation approximately 2.5 miles west of Minnesota State Highway 33 in the town of Cloquet, MN, along Big Lake Road (also known as County State Aid Highway 7 (CSAH 7)), as shown in Figure 2. The Fond du Lac Reservation has a population of approximately 4,240 (2010 Census).

The following details the school's location as well as the residential character and density. Residential density can be the precursor for a higher propensity to walk or bike; however, due to the rural context density is less of an identifier as opposed to other elements such as broader multimodal connectivity and accessibility.

The school is bounded to the north by Big Lake Road and to the west by University Road. The school is set in a rural location, without any major residential developments in any direction. The closest residential developments to the school are approximately 0.5 miles west of the Big Lake Road and University Road/Brevator Road intersection and approximately 0.80 miles east along Airport Road. An analysis of residential property density indicates that there is no real dense residential neighborhood within the study area of the school.



Project Area and Focus School
 Cloquet, MN
 Figure 2

-  Focus School
-  School Boundary
-  Destination



Focus School

Fond du Lac Ojibwe Schools, Independent School District No. 1 serves the Fond du Lac Tribe. The District serves approximately 745 students, of which 24 percent of the students attend the school involved in this study (see Table 2).

Table 2. Focus School Overview

Focus School	Location	Student Population
Fond du Lac Ojibwe School	Immediately west of University Road and approximately 900 feet south of Big Lake Road	182

Source: 2020-2021 Parent/Family/Student Handbook – Fond du Lac Ojibwe School

Residential locations identify the potential SRTS benefit from enhanced multimodal infrastructure along and across Big Lake Road and University Road/Brevator Road and is helpful toward understanding the routes students could use to access the school. Potential improvements for those key areas such as busy intersection are important to ensure a location is not a barrier for children to access their school safely, comfortably, and conveniently.



Fond du Lac Ojibwe School. Source: Associated Consulting Services, 2020



PREVIOUS PLANS AND OTHER STUDIES

A review of previous plans and ongoing studies was completed to identify supportive planning elements and synergies with the Study.

Fond du Lac Band of Lake Superior Chippewa Transportation Safety Plan (2017)

- Perform roadway safety audits
- Develop multi-use paths and pathway lighting projects including along Big Lake Road and at the Trettel Lane intersection

Fond du Lac Ojibwe School Safe Routes to School Plan (2015)

- Improve multimodal connections to residential housing and the City of Cloquet
- Improve pedestrian crossing safety along Big Lake Road at University Road/Brevator Road and Trettel Lane
- Monitor bicycle racks

Fond du Lac Ojibwe School Safe Routes to School Plan (2009)

- Improve the pedestrian facility connections between the school and residential housing
- Conduct a sign study
- Install crossing designations
- Connect the school to the tribal center
- Obtain bicycle racks

The previous applicable planning documents align with the vision that better accommodates children walking, rolling, or bicycling.

TRANSPORTATION NETWORK

The transportation network was reviewed to identify existing infrastructure for walking, rolling, or bicycling, as well as driving on, or adjacent to, the school's campus. The review includes multimodal facilities such as sidewalks, bike lanes, and marked crossings, as well as school access and connectivity for all transportation modes. The following sections summarize each transportation mode as it exists today (see Figure 3).

Fond du Lac Ojibwe School



Existing Transportation Network

Cloquet, MN

Figure 3



Focus School



Side-Street Stop-Controlled Intersection



School Crossing Sign



Trail





Walking, Rolling, and Bicycling

At Fond du Lac Ojibwe School, the sidewalk and bicycle network connecting the school to the surrounding neighborhoods in the area is minimal. Existing infrastructure includes onsite pedestrian facilities such as sidewalks along and near certain sides of the school or in the parking lot to that is adjacent along the northside. Additionally, there is a marked midblock crossing with a flashing beacon 275 feet south of Big Lake Road that ties into the existing trail on the east side of University Road (see photo below). A multi-use trail exists along Big Lake Road throughout the study area. The primary needs for Fond du Lac Ojibwe School include greatly improving multimodal connectivity in all directions from the school to the surrounding area, intersection crossing improvements such as the Big Lake Road and University Road/Brevator Road intersection.



Crosswalk to Head Start on University Road looking south. Source: Associated Consulting Services, 2020

Multimodal Activity

Pedestrian counts were collected on Tuesday, September 15, 2020, at the study intersections during the a.m. and p.m. peak hours and for the entire day and is shown in Table 3.

Table 3. Existing Weekday Pedestrian Activity

Crossing Location	SB Approach (AM / PM / All Day)	WB Approach (AM / PM / All Day)	NB Approach (AM / PM / All Day)	EB Approach (AM / PM / All Day)
Big Lake Road and University Road/Brevator Road	0/0/0	0/0/0	0/0/1	0/0/0
Big Lake Road and Trettel Lane	0/0/0	0/0/2	0/0/17	1/0/2

Source: Associated Consulting Services

1) NOTE: All Day counts are 14-hour counts from 6:00 a.m. to 8:00 p.m.



During the a.m. and p.m. peak hours a total of 1 and 2 pedestrians, respectively, were counted crossing the two intersections along Big Lake Road. The sole a.m. peak hour crossing occurred on the eastbound approach of the Big Lake Road and Trettel Lane intersection. During the course of the entire day, a total of 23 pedestrians were counted crossing the two intersections along Big Lake Road. The majority of the crossings occurred at the Big Lake Road and Trettel Lane intersection, approximately 96 percent, followed by approximately 4 percent at the Big Lake Road and University Road/Brevator Road intersection immediately north of the school. Additional pedestrian counts can be found in Appendix A.

Roadway Network

The roadways in the study area include University Road adjacent to the east side of the school that is a two-lane roadway with a turn lane at the Big Lake Road intersection, is classified as a minor collector, and has an existing cross section that is approximately 25-feet wide just counting the width of the lanes and 46-feet wide when including the shoulder widths. While the roadway is in a relatively rural area population wise, it still has curb and gutter present on both sides. Big Lake Road is a two-lane roadway with turn lanes at all major and some minor intersections and is classified as a major collector west of the intersection with Trettel Lane, which is just north of the school. East of the intersection with Trettel Lane, Big Lake Road is classified as a minor arterial. Big Lake Road has a roadway width of approximately 24-feet just counting the lane widths, and including the shoulders is approximately 42-feet wide. The roadway is rural in context with minimal curb and gutter present on either side. Trettel Lane, approximately 1-mile east of University Road/Brevator Road, is a two-lane roadway with a northbound right-turn lane at Big Lake Road, is classified as a minor collector, is approximately 22-feet wide with narrow shoulders and is rural in context with no curb and gutter present on either side.

Traffic Volume

Intersection turning movement counts (TMCs) for the a.m. and p.m. peak hours were collected onsite at the following Study intersections along Big Lake Road:

- University Road/Brevator Road
- Trettel Lane

Vehicular activity was also identified using MnDOT's average annual daily traffic (AADT) volumes. Traffic volumes play a key role in determining appropriate multimodal infrastructure such as a bike lane versus off-street trail or the type of pedestrian and bicycle crossing treatments (i.e., a marked crosswalk versus a rectangular rapid flashing beacon (RRFB)). The existing estimated intersection turning movement counts are shown in Figure 4 for the peak periods at the three study intersections along Big Lake Road. The AADT volumes along Big Lake Road, University Road/Brevator Road, and Trettel Lane, are also shown on Figure 4.

Fond du Lac Ojibwe School



Existing Turning Movement Counts

Cloquet, MN

Figure 4



Traffic Speed

Traffic speeds were not collected as a part of this school study. However, it should be noted that Big Lake Road has a posted speed limit of 50 miles per hour (mph) between University Road/Brevator Road and Pinewood Drive. The speed limit decreases to 30 mph east of Pinewood Drive. University Road/Brevator Road has a posted speed limit of 55 mph north of Big Lake Road and 35 mph south of Big Lake Road with a school zone speed limit of 20 mph. Additionally Trettel Lane south of Big Lake Road has a posted speed limit of 30 mph, while Trettel Lane north of Big Lake Road has a posted speed limit of 35 mph.

Traffic Operations

Existing conditions were reviewed to establish a baseline to compare to future conditions, as well as to identify current issues from a safety and capacity perspective. Evaluation of the existing conditions includes a review of traffic volumes, roadway characteristics, and an intersection capacity analysis, which are summarized in the following sections.

Weekday a.m. and p.m. peak period vehicular turning movement and pedestrian/bicyclist counts were collected at the Big Lake Road and University Road/Brevator Road and Big Lake Road and Trettel Lane intersections on Tuesday, September 15, 2020.

Historical average daily traffic (ADT) volumes were initially provided by MnDOT and modified to coincide with the turning movements collected within the study area.

An operations analysis was conducted to determine how traffic is currently operating at the study intersections. All intersections were analyzed using Synchro/SimTraffic and the Highway Capacity Manual (HCM). Capacity analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are ranked from LOS A through LOS F. The LOS results are based on average delay per vehicle results from SimTraffic, which correspond to the delay threshold values shown in Table 4. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. Overall intersection LOS A through C is generally considered acceptable by drivers in this region.

Table 4. Level of Service Criteria for Signalized and Unsignalized Intersections

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	LOS Designation Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50



For side-street stop controlled intersections, special emphasis is given to providing an estimate for the level of service of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop control can be described in two ways. First, consideration is given to the overall intersection level of service. This takes into account the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approach. Since the mainline does not have to stop, the majority of delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high levels of delay (poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during peak hours.

Results of the existing operations analysis shown in Table 5 indicate that all study intersections operate at an acceptable LOS A during the a.m. and p.m. peak hours with the existing traffic control, and geometric layout. No significant side-street delays or queuing issues were observed. It should be noted based on the existing traffic analysis; a traffic control change is not recommended.

Table 5. Existing Peak Hour Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Big Lake Road and University Road/Brevator Road ⁽¹⁾	A/A	6 sec.	A/A	6 sec.
Big Lake Road and Trettel Lane ⁽¹⁾	A/A	7 sec.	A/A	9 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

In addition to existing conditions, the future year 2040 conditions were reviewed to determine if any operational issues are expected at the study intersections under long-term conditions. To account for general background growth and development in the area, an annual growth rate of 2 percent was applied to the existing peak hour traffic volumes to develop year 2040 background traffic forecasts, which are shown in Figure 5. This growth rate was discussed with and agreed upon by the County and is consistent with historical growth in the study area based on MnDOT AADT volumes.

To determine how the study intersections will operate under year 2040 conditions, all intersections were again analyzed using a combination of Synchro/SimTraffic and the Highway Capacity Manual (HCM). Results of the year 2040 intersection capacity analysis shown in Table 6 indicate that all study intersections operate at an acceptable LOS A during the a.m. and p.m. peak hours with the existing traffic control, and geometric layout. No significant side-street delays or queuing issues were observed. The year 2040 results confirm that the existing traffic control will be sufficient in the future as well.

Fond du Lac Ojibwe School



Year 2040 Turning Movement Counts

Cloquet, MN

Figure 5



Focus School



A.M. Peak Hour Volume



P.M. Peak Hour Volume



Side-Street Stop-Controlled Intersection



Average Annual Daily Traffic





Table 6. Year 2040 Peak Hour Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Big Lake Road and University Road/Brevator Road ⁽¹⁾	A/A	9 sec.	A/B	11 sec.
Big Lake Road and Trettel Lane ⁽¹⁾	A/A	9 sec.	A/B	15 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

SCHOOL ACCESS AND SITE OPERATIONS

Access to the school properties include drop-off and pick-up in a vehicle by a parent or guardian or school bus. Adjacent access is critical to ensure no barriers exist (e.g., parking lot that cannot accommodate parent drop-off and pick-up) and that the sites operate acceptably. Multimodal access, a central objective of the Study, is analyzed in separate sections throughout the document.

Drop-off and Pick-up Activity

Parents are only allowed to enter the section of the northwest parking lot northwest of the curb, based on what posted signage on the wide curb states. Therefore, parents are supposed to pull into the northwest parking lot from the north and drop off and pickup students on the far side of the curb from the school in the parking lot. The parents are then supposed to pull out and proceed to exit the parking lot by way of the east access onto University Road.

School Bus

Fond du Lac Ojibwe Schools provides school bus transportation to students at the study school. Based on data obtained from the School District approximately 91.5 percent of students at Little Fond du Lac Ojibwe School take the school bus in the morning and/or afternoon.

Within the school, the bus circulation on-site does not operate within the same parking lot area as the parent drop-off/pick-up does. At Fond du Lac Ojibwe School, the buses turn off of University Road into the north access, turn left past the wide curb, pullup to the school to drop off or pickup students, then proceed to exit the parking lot by way of the east access back onto University Road. No issues with bus circulation were noted by school district staff.



Fond du Lac Ojibwe School Drop-Off/Pick-Up and Bus Area: Associated Consulting Services, 2020

SAFETY ANALYSIS

Crash analysis is a critical piece of the existing conditions data review process. Analyzed crashes include ten years of vehicle-to-bicycle and vehicle-to-pedestrian crashes, as well as all crashes over the last five years. Due to the multimodal focus of this Study, ten years of data was used to provide a larger sample size of data. The manner of collision was also studied over the last five years which details the way in which the crash occurred (e.g., rear end). The data was derived from MnDOT's Minnesota Crash Mapping Analysis Tool (MnCMAT2) and includes recorded crashes by law enforcement that provide crash details and approximate location.

Fond du Lac Ojibwe School







All Crashes (2016-2020)

A total of 8 crashes were recorded over the last five years along the study roadways (see Figure 6). Of those, 2 resulted in serious injuries, 1 minor injury, and 4 possible injuries (shown in Figure 7). The remaining crash was property damage. Four of the crashes occurred at the Big Lake Road and University Road/Brevator Road intersection, 2 occurred at the Big Lake Road and Trettel Lane, and 2 others occurred along the corridor not at intersections.

Of the 4 crashes at the Big Lake Road and University Road/Brevator Road intersection, 2 were weather related and 2 were caused by a driver failing to obey the stop sign. It does not appear that any of the crashes were school related. At the Big Lake Road and Trettel Lane intersection, there was one pedestrian crash detailed later and the other was caused by a driver falling asleep. One of the 2 remaining segment crashes included a pedestrian crash which will be detailed in the next section, and the other crash was a collision with an animal on a Saturday.










**All Crashes by Manner of Collision
(2016-2020)**
Cloquet, MN
Figure 6

-  Focus School
-  Angle (3)
-  Front to Front (0)
-  Front to Rear (0)
-  Sideswipe (1)
-  Other (4)



All Crashes by Severity (2016 - 2020)
 Cloquet, MN
 Figure 7

-  Focus School
-  Fatal (0)
-  Serious Injury (2)
-  Minor Injury (1)
-  Possible Injury (4)
-  Property Damage Only (1)
-  Unknown Severity (0)



Pedestrian and Bicycle Crashes (2011-2020)

There were two pedestrian or bicycle crashes that occurred over the 10-year period (see Figure 8). The first pedestrian crash occurred in 2016 along Big Lake Road between Trettel Lane and Pinewood Drive but did not involve a student. The crash resulted in a possible injury. The second crash occurred on June 30, 2020, at approximately 1:30 p.m. at the Big Lake Road and Trettel Lane intersection. This crash involved a school aged bicyclist being hit by a vehicle traveling along Big Lake Road and hit the student crossing Big Lake Road at the intersection. While the crash did involve a school aged person, it did not occur before or after school as school was not in session for the summer. The crash resulted in serious injury.








Fond du Lac Ojibwe School



Pedestrian and Bicycle Crashes by Severity (2011-2020)

Cloquet, MN

Figure 8

-  Focus School
-  Fatal (0)
-  Serious Injury (1)
-  Minor Injury (0)
-  Possible Injury (1)
-  Property Damage Only (0)
-  Unknown Severity (0)



CHAPTER 3: ISSUE IDENTIFICATION AND NEEDS SUMMARY

The next step in the planning process includes the application of existing conditions data to understand gaps and issues that will highlight areas of need. Those locations will be the focus of the Study to devise opportunities to develop solutions for those items.

IDENTIFIED TRANSPORTATION ISSUES

The access, circulation, and/or multimodal transportation issues include broad themes to devise key needs for further consideration at Fond du Lac Ojibwe School (see Figure 9). Intersections and sidewalks adjacent to or near the school campus represent a barrier for children to walk, roll, or bike safely or comfortably to the school.

Issue /Opportunity#1

There are no marked crossing locations at the Big Lake Road and University Road/Brevator Road and Big Lake Road and Trettel Lane intersections.

Issue /Opportunity#2

Lack of sidewalks along University Road and within the school property.

SUMMARY OF NEEDS

The needs are informed by the broad issues defined for the Study (see corresponding colors).

Crossing Intersections

Enhance crossing infrastructure or traffic control at key locations to improve the safety and comfort of those walking, rolling, or bicycling, as well as ensure they are not barriers for children to do so. This includes along Big Lake Road at University Road/Brevator Road and Trettel Lane.

Connectivity to Walk, Roll, or Bike

Improve sidewalk connections from the school to the surrounding areas, as well as on the school property. Additional lighting needs may be considered to improve safety.

Fond du Lac Ojibwe School




Identified Issues

Cloquet, MN

Figure 9

 Focus School

 Identified multimodal issue



CHAPTER 4: ALTERNATIVE EVALUATION

Project alternatives previously developed by Carlton County (see Appendix B) and Fond du Lac Tribe (see Appendix C) were reviewed to determine if the proposed improvements are adequate for the identified issues and the context of the area roadway network. The Carlton County project prepared plans as part of the upcoming County reclamation project that will be resurfacing and restriping Big Lake Road between University Road/Brevator Road and Pinewood Drive. Whereas the Fond du Lac Tribe is leading a project that provides access to the school campus and University Road.

This section organizes the proposed improvements and reviews other potential improvements and project opportunities to address the high-level safety needs using the latest state and national guidance.

IMPROVEMENT EVALUATION SUMMARY

Potential improvements evaluated for Fond du Lac Ojibwe School are summarized below.

Crossing Intersections	Analysis of crossing infrastructure and traffic control upgrades at crossings along Big Lake Road, University Road, Brevator Road, and Trettel Lane to improve the safety and comfort for children crossing to overcome these potential barriers.
Connectivity to Walk, Roll, or Bike	Evaluation of enhanced multimodal infrastructure as it relates to installing continuous sidewalks on University Road from the school to Big Lake Road, as well as on the school property.

MAJOR INTERSECTION CROSSINGS

The major intersections along Big Lake Road at University Road/Brevator Road and Trettel Lane are crucial locations for multimodal enhancements. Potential crossing infrastructure at each intersection was reviewed using the latest guidance from the Federal Highway Administration’s (FHWA) *Safe Transportation for Every Pedestrian (STEP) Guide (2018)* and National Association of City Transportation Officials (NACTO) along with reviewing the potential for traffic control modifications.

University Road/Brevator Road

The proposed Carlton County plans include a resurfacing of Big Lake Road through the University Road/Brevator Road intersection, constructing new pedestrian curb ramps in the northwest, northeast, and southeast quadrants, and painting crosswalks and adding crossing signs on the north and east approaches of the intersection. No traffic control modifications are planned to be implemented as part of this project.



A further review of national guidance was completed to ensure no additional enhancements should be implemented at this intersection. A review of the FHWA STEP guidance, shown in Figure 10, indicates that based on the speed limit (50 miles per hour) along the Big Lake Road corridor, average annual daily traffic (AADT) volumes, and the roadway geometry, the only required crossing treatment would be to paint high visibility crosswalk markings, provide parking restrictions, adequate nighttime lighting levels, and crossing warning signs. Additional items that could be considered for the intersection but are not required, include “Stop Here for Pedestrians” signing, curb extensions, pedestrian refuge islands, or a pedestrian hybrid beacon (PHB). Note, an RRFB is not recommended for consideration due to both the vehicle speed and roadway geometry.

Figure 10. University Road/Brevator Road FHWA STEP Guidance Analysis

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	① 2 4 5 6	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 9
3 lanes with raised median (1 lane in each direction)	① 2 3 4 5	① ③ 5 7 9	① ③ 5 7 9	① 3 4 5 7 9	① ③ 5 7 9	① ③ 5 7 9	① ③ 4 5 7 9	① ③ 5 7 9	① ③ 5 9
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	① 2 3 4 5 6 7 9	① ③ 5 6 7 9	① ③ 5 6 7 9	① 3 4 5 6 7 9	① ③ 5 6 7 9	① ③ 5 6 7 9	① ③ 4 5 6 7 9	① ③ 5 6 7 9	① ③ 5 6 9
4+ lanes with raised median (2 or more lanes in each direction)	① ③ 5 7 8 9	① ③ 5 7 8 9	① ③ 5 8 9	① ③ 5 7 8 9	① ③ 5 7 8 9	① ③ 5 8 9	① ③ 5 7 8 9	① ③ 5 8 9	① ③ 5 8 9
4+ lanes w/o raised median (2 or more lanes in each direction)	① ③ 5 6 7 8 9	① ③ 5 6 7 8 9	① ③ 5 6 8 9	① ③ 5 6 7 8 9	① ③ 5 6 7 8 9	① ③ 5 6 8 9	① ③ 5 6 7 8 9	① ③ 5 6 8 9	① ③ 5 6 8 9

Given the set of conditions in a cell,

- # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
 - Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
 - Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*
- The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

- 1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
- 2 Raised crosswalk
- 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- 4 In-Street Pedestrian Crossing sign
- 5 Curb extension
- 6 Pedestrian refuge island
- 7 Rectangular Rapid-Flashing Beacon (RRFB)**
- 8 Road Diet
- 9 Pedestrian Hybrid Beacon (PHB)**

■ = University Road/Brevator Road

Source: Safe Transportation for Every Pedestrian (STEP) Guide (2018), Federal Highway Administration

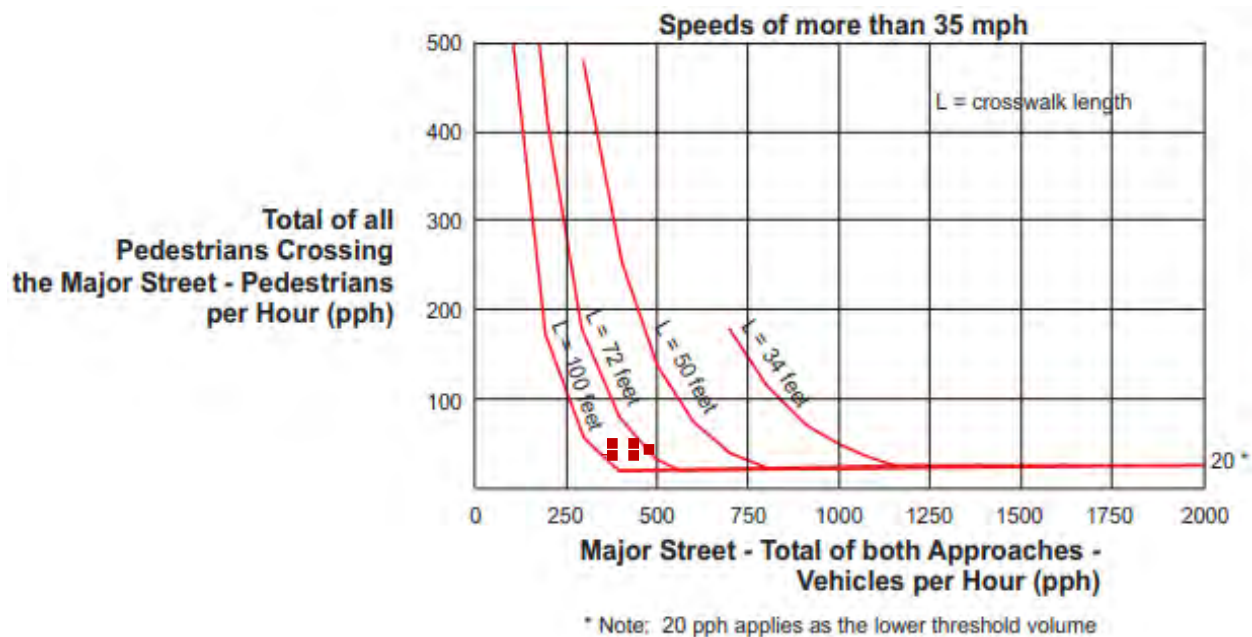


Pedestrian Hybrid Beacon

The FHWA defines a PHB (also known as a “HAWK”) as distinct from pre-timed traffic signals and constant flash warning beacons because it is only activated by pedestrians when needed and uses differently designed signal heads over the roadway.² PHBs reduce pedestrian and bicycle crashes by nearly 70 percent and have a driver yield compliance of over 90 percent. Due to the existing posted speed limit (50 mph) along Big Lake Road, a PHB could be implemented to ensure accessible crossings for those of all ages and abilities. An RRFB would be acceptable if the posted speed limit were reduced to 35 mph or less along with additional geometric modifications.

Using the Minnesota MUTCD guidance shown in Figure 11, it was determined that a PHB would not be warranted per turning movement counts (TMCs) and pedestrian and bicycle counts collected in September 2020 at the Big Lake Road and University Road/Brevator Road intersection. The overall total daily pedestrian crossings of Big Lake Road did not exceed 20 pedestrians per hour at any point through the day. The major street traffic volumes are approximately 350 to 475 vehicles (sum of the eastbound and westbound traffic volumes during the a.m. and p.m. peak hours, respectively). The crossing distance of approximately 50 feet was estimated for the existing roadway width.

Figure 11. University Road/Brevator Road PHB Warrant Analysis for Higher Speed Roadways (>35 mph)



■ ■ = hourly range of the sum for peak hour eastbound and westbound volumes
 Source: Minnesota Manual on Uniform Traffic Control Devices (September 2020)

² https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa14014/



Based on the review of the FHWA and MN MUTCD guidance, the proposed improvements included within the County reclamation project appear adequate for the study intersection.

Traffic Control Review

In addition to reviewing the proposed improvements for the intersection, a preliminary review of a traffic control modification at the intersection of Big Lake Road and University Road/Brevator Road to an all-way stop control, traffic signal, or roundabout was reviewed. A warrants analysis was completed, and attached within Appendix C, to determine if the intersection volumes meet or exceed the thresholds for a potential traffic control modification. Using traffic volumes collected in September 2020, along with estimated year 2040 traffic volumes based on growth rates provided by the County, the intersection is not expected to meet either multi-way stop or traffic signal warrants under existing or year 2040 conditions. Additionally, if these warrants are not met, typically a roundabout would not be justified to be constructed. Therefore, no traffic control changes are expected to be warranted at this intersection and the current two-way stop control is expected to be adequate for the traffic volumes. Note, installing unwarranted traffic control devices can be detrimental to safety for roadway users and is not recommended.

Trettel Lane

The proposed Carlton County plans include a resurfacing of Big Lake Road through the Trettel Lane intersection, constructing new pedestrian curb ramps in all quadrants, and painting crosswalks and adding crossing signs on the north, south, and east approaches of the intersection. No traffic control modifications are planned to be implemented as part of this project.

A further review of national guidance was completed to ensure no additional enhancements should be implemented at this intersection. A review of the FHWA STEP guidance, shown in Figure 12, indicates that based on the speed limit (50 mph) along the Big Lake Road corridor, average annual daily traffic (AADT) volumes, and the roadway geometry, the only required crossing treatment would be to paint high visibility crosswalk markings, provide parking restrictions, adequate nighttime lighting levels, and crossing warning signs. Additional items that could be considered for the intersection but are not required include “Stop Here for Pedestrians” signing, curb extensions, pedestrian refuge islands, or a pedestrian hybrid beacon. Note, an RRFB is not recommended for consideration due to both the vehicle speed and roadway geometry.



Figure 12. Trettel Lane FHWA STEP Guidance Analysis

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	1 2	1	1	1	1	1	1	1	1
	4 5 6	5 6	5 6	4 5 6	5 6	5 6	4 5 6	5 6	5 6
3 lanes with raised median (1 lane in each direction)	1 2 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
	4 5	5	5	4 5	5	5	4 5	5	5
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	1 2 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
	4 5 6	5 6	5 6	4 5 6	5 6	5 6	4 5 6	5 6	5 6
4+ lanes with raised median (2 or more lanes in each direction)	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
	5	5	5	5	5	5	5	5	5
4+ lanes w/o raised median (2 or more lanes in each direction)	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
	5 6	5 6	5 6	5 6	5 6	5 6	5 6	5 6	5 6

Given the set of conditions in a cell,

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- 4 In-Street Pedestrian Crossing sign
- 5 Curb extension
- 6 Pedestrian refuge island
- 7 Rectangular Rapid-Flashing Beacon (RRFB)**
- 8 Road Diet
- 9 Pedestrian Hybrid Beacon (PHB)**

■ ■ = Trettel Lane

Source: Safe Transportation for Every Pedestrian (STEP) Guide (2018), Federal Highway Administration

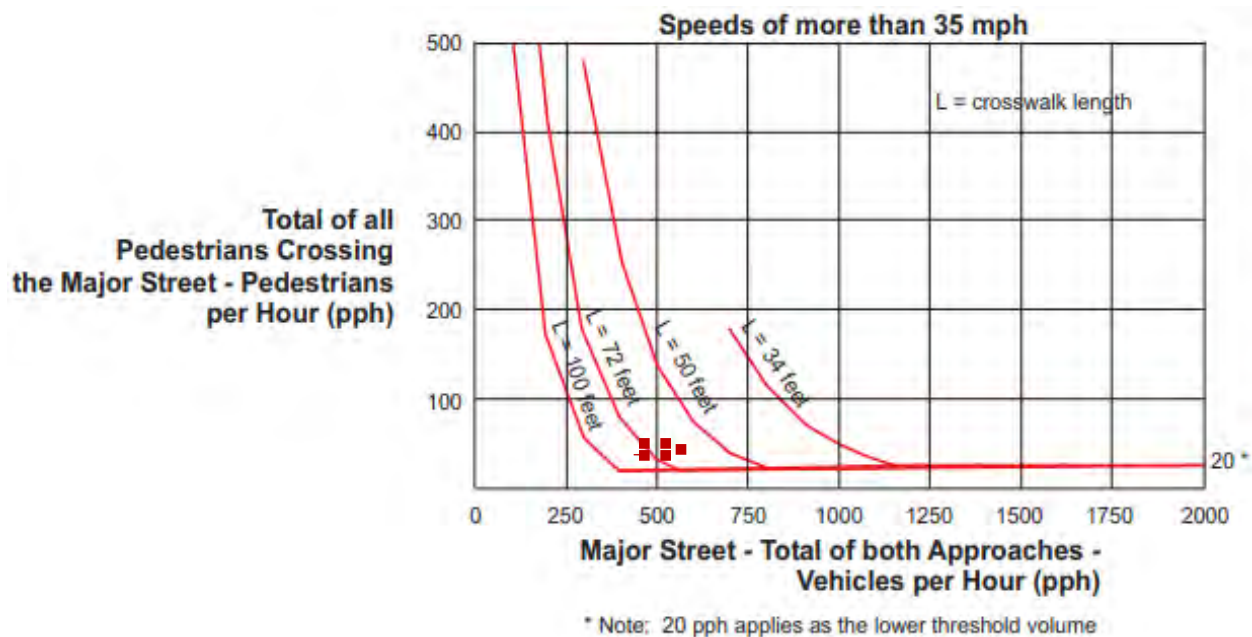


Pedestrian Hybrid Beacon

The FHWA defines a PHB (also known as a “HAWK”) as distinct from pre-timed traffic signals and constant flash warning beacons because it is only activated by pedestrians when needed and uses differently designed signal heads over the roadway.³ PHBs reduce pedestrian and bicycle crashes by nearly 70 percent and have a driver yield compliance of over 90 percent. Due to the existing posted speed limit (50 mph) along Big Lake Road, a PHB could be implemented to ensure accessible crossings for those of all ages and abilities. An RRFB would be acceptable if the posted speed limit were reduced to 35 mph or less along with additional geometric modifications.

Using the Minnesota MUTCD guidance shown in Figure 13, it was determined that a PHB would not be warranted per turning movement counts (TMCs) and pedestrian and bicycle counts collected in September 2020 at the Big Lake Road and Trettel Lane intersection. The overall total daily pedestrian crossings of Trettel lane did not exceed 20 pedestrians per hour at any point through the day. The major street traffic volumes are approximately 450 to 575 (sum of the eastbound and westbound traffic volumes during the a.m. and p.m. peak hours, respectively). The crossing distance of approximately 50 feet was estimated for the existing roadway width.

Figure 13. Trettel Lane PHB Warrant Analysis for Higher Speed Roadways (>35 mph)



■ ■ = hourly range of the sum for peak hour eastbound and westbound volumes
 Source: Minnesota Manual on Uniform Traffic Control Devices (September 2020)

³ https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa14014/



Based on the review of the FHWA and MN MUTCD guidance, the proposed improvements included within the County reclamation project appear adequate for the study intersection.

Traffic Control Review

In addition to reviewing the proposed improvements for the intersection, a preliminary review of a traffic control modification at the intersection of Big Lake Road and Trettel Lane to an all-way stop control, traffic signal, or roundabout was reviewed. A warrants analysis was completed, and attached within Appendix C, to determine if the intersection volumes meet or exceed the thresholds for a potential traffic control modification. Using traffic volumes collected in September 2020, along with estimated year 2040 traffic volumes based on growth rates provided by the County, the intersection is not expected to meet either multi-way stop or traffic signal warrants under existing or year 2040 conditions. Additionally, if these warrants are not met, typically a roundabout would not be justified to be constructed. Therefore, no traffic control changes are expected to be warranted at this intersection and the current two-way stop control is expected to be adequate for the traffic volumes. Note, installing unwarranted traffic control devices can be detrimental to safety for roadway users and is not recommended.

CONNECTIVITY TO WALK, ROLL, OR BIKE

University Road provides access to the schools and other amenities for children within the Fond du Lac Reservation. This project is currently being led by the Fond du Lac Tribe. A detailed layout, shown in Appendix D, includes various sidewalk improvements within the school campus area and along the west side of University Road for approximately 600 feet.

In addition to the previously mentioned County led projects occurring on Big Lake Road, additional improvements are planned along University Road, south of Big Lake Road. An enhanced pedestrian crossing (RRFB) of University Road, approximately 275 feet south of Big Lake Road will be installed by the County (and paid for by the Tribe). Currently, there is a flashing beacon sign at the location of the proposed crossing.

A detailed review of the pedestrian crossing on University Road was completed to determine if any additional enhancements may be required. A review of the FHWA STEP guidance, shown in Figure 14, indicates that based on the speed limit (35 mph, 20 mph school zone) along University Road, average annual daily traffic (AADT) volumes, and the roadway geometry, the only required crossing treatment would be to paint high visibility crosswalk markings, provide parking restrictions, adequate nighttime lighting levels, and crossing warning signs. Additional items that could be considered for the intersection but are not required include curb extensions, pedestrian refuge islands, a rectangular rapid flashing beacon (RRFB) or a pedestrian hybrid beacon.



Figure 14. University Road FHWA STEP Guidance Analysis

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	① 2	①	①	①	①	①	①	①	①
	4 5 6	5 6	5 6	4 5 6	5 6	5 6	4 5 6	5 6	5 6
3 lanes with raised median (1 lane in each direction)	① 2 3	① ③	① ③	① ③	① ③	① ③	① ③	① ③	① ③
	4 5	5	5	4 5	5	5	4 5	5	5
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	① 2 3	① ③	① ③	① ③	① ③	① ③	① ③	① ③	① ③
	4 5 6	5 6	5 6	4 5 6	5 6	5 6	4 5 6	5 6	5 6
4+ lanes with raised median (2 or more lanes in each direction)	① ③	① ③	① ③	① ③	① ③	① ③	① ③	① ③	① ③
	5	5	5	5	5	5	5	5	5
4+ lanes w/o raised median (2 or more lanes in each direction)	① ③	① ③	① ③	① ③	① ③	① ③	① ③	① ③	① ③
	5 6	5 6	5 6	5 6	5 6	5 6	5 6	5 6	5 6

Given the set of conditions in a cell,

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The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

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- 4 In-Street Pedestrian Crossing sign
- 5 Curb extension
- 6 Pedestrian refuge island
- 7 Rectangular Rapid-Flashing Beacon (RRFB)**
- 8 Road Diet
- 9 Pedestrian Hybrid Beacon (PHB)**

■ ■ University Road

Source: Safe Transportation for Every Pedestrian (STEP) Guide (2018), Federal Highway Administration

Therefore, based on the proposed design and review of the FHWA STEP guidance, the proposed crossing infrastructure should be adequate for the crossing.

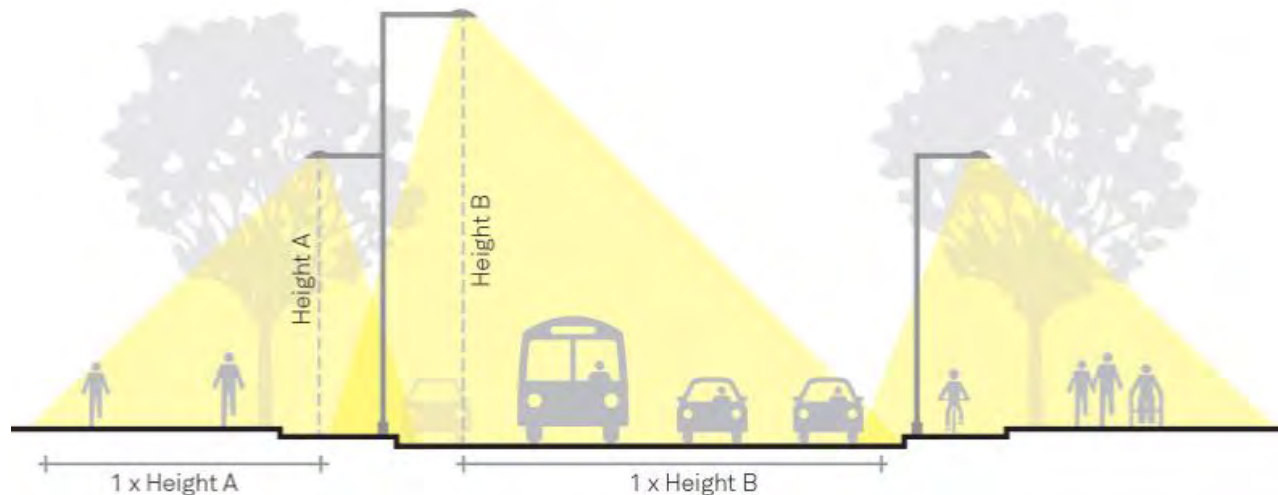
The additional internal sidewalk and crossing connection improvements that Fond du Lac Tribe plans to implement, provide for easy pedestrian circulation throughout the school campus and community amenities and appear adequate for the campus area. However, additional internal lighting options were not currently proposed as part of the project and may offer additional safety benefits to the study area.



Pedestrian-Scale Lighting

Pedestrian-scale lighting is shorter and more frequently placed roadway corridor lighting that better illuminates people walking, rolling, or bicycling as opposed to typical light poles specifically oriented for vehicles (see Figure 15). Such lighting becomes even more important at roadway crossings as identified in the *Information Report on Lighting Design for Midblock Crosswalks (2008)* by the FHWA. The shorter lighting increases the lux (amount of light in lumens per square meter) which is recommended at 20 to 40 lux at five feet above the road surface within a crosswalk to provide adequate vertical illumination. Typically, pedestrian-scaled lighting is approximately 10 to 15 feet tall (and not more than 20 feet) and is spaced every 50 feet along a corridor or within ten feet of a crosswalk. Actual spacing is dependent upon surrounding context and topography. Pedestrian-scale lighting has been shown to reduce all types of injury crashes by 59 percent.⁴

Figure 15. Lighting Design Guidance for Pedestrians and Bicyclists



Source: *Lighting Design Guidance, Global Designing Cities Initiative*

Pedestrian scale lighting could improve visibility and enhance safety at the internal crosswalks within the tribal campus area, specifically at internal crossing locations.

⁴ Uncontrolled Pedestrian Crosswalk Quick Reference Guidance, Minnesota Local Road Research Board (2020)



PROPOSED IMPROVEMENTS

The detailed review of the proposed County and Tribal improvements slated to be constructed this year determined that the improvements are adequate for the study intersections and internal sidewalk network. These improvements will help provide additional connectivity within the study area and improve safety for everyone who walks, bikes, or rolls through campus. Additional lighting improvements could be considered within the internal school roadway network to improve overall visibility and safety of all roadway users.

DEMONSTRATION PROJECT

A Safe Routes to School demonstration project was completed by MnDOT at both the Big Lake Road and University Road/Brevator Road intersection and the Big Lake Road and Trettel Lane intersection in October 2020. Demonstration projects are short term, low-cost, temporary roadway projects used to pilot potential long-term design solutions to improve walking, bicycling and public spaces. The demonstration project reviewed the potential of eliminating the eastbound left-turn lanes and constructing a median refuge island for pedestrians on the west approach of each intersection. While separate from the Safe Routes to School Engineering Study, the findings may be crucial to future roadway designs within the study area. The demonstration project concept layouts and draft project summary and evaluation are included within Appendix E.



Big Lake Road and University Road/Brevator Road intersection looking west (photo taken during the demonstration project). Source: Associated Consulting Services, 2020



CHAPTER 5: PROPOSED PROJECTS

This chapter shows the previously planned projects (i.e., County reclamation project and Tribe sidewalk and school campus crossings) and proposed lighting project identified through this Study in Figure 16. Table 7 summarizes key project items such as the estimated cost for the proposed lighting project.

Table 7. Proposed Project

ID	Location	Project Type	Description	Estimated Cost ¹
L1	Various locations on the school property	Lighting	Pedestrian Scale Lighting	\$15,000 per location

¹Cost estimates by SRF Consulting Group, Inc. The costs only include applicable infrastructure and do not estimate other elements such as right-of-way, tree removal, mobilization, etc.

OTHER POTENTIAL PROJECTS OR IMPROVEMENTS

Other potential projects that were discussed with and desired by Fond du Lac Tribal staff that could be considered in the future, but were determined to be outside of the Safe Routes to School Engineering Study Scope include:

Airport Road Pedestrian Loop: This loop would include a pedestrian path or sidewalk constructed along University Road south of the school campus to Airport Road, extended along Airport Road to Trettel Lane, and the connected north on Trettel Lane to Big Lake Road. Tribal staff shared that a number of pedestrians use this route for exercise and prefer it to walking along Big Lake Road due to lower vehicle volumes and speeds. The addition of these sidewalks connected to Big lake Road would complete a full loop of the area. Further evaluation would be needed to determine the feasibility and cost of the pedestrian path or sidewalk connection and may be considered as part of a future safety plan.

Big Lake Road Beautification/Landscaping: The Tribe expressed their desire to identify landscaping improvements along Big Lake Road to improve the aesthetics of the corridor and bring an urban feel to the rural roadway network. This is a desire to provide a more pedestrian and bicycle friendly corridor and encourage easier and safer transportation for all modes.

Cultural Center: As the Cultural Center expands near the northwest quadrant of the Big Lake Road and University Road/Brevator Road intersection, determine if additional crosswalks are needed along Big Lake Road to connect the school and tribal campus area with the Cultural Center. This could include additional crosswalk markings or enhancements.

Fond du Lac Ojibwe School



Proposed Improvements

Cloquet, MN

Figure 16



Focus School



School Boundary



County Crossing Improvements



Potential Lighting Location (Per the SRTS L1 Proposed Project)



County RRFB Location





CHAPTER 6: NEXT STEPS

This Study offers a review of the proposed infrastructure improvements to enhance access, mobility, and safety throughout the Fond du Lac Reservation and Fond du Lac Ojibwe School. These improvements, planned by Carlton County and by the Fond du Lac Tribe should be celebrated as an accomplishment. Actionable next steps were organized for the Fond du Lac Tribe and Fond du Lac Ojibwe Area Schools to help implement any future improvements to the area outside of the scope of this Study. The proposed next steps are important as they will seek to maximize any future plan and study improvements that will enhance an area of the Fond du Lac Reservation where children cannot safely or comfortably walk, roll, or bike today.

AGENCY COORDINATION

The most critical step toward implementing future potential infrastructure is to identify a champion within the Fond du Lac Tribe that will devote some portion of their time implementing any future plan or study findings. Some local agencies (e.g., public works) or school districts employ Safe Routes to School coordinators to pursue project implementation in addition to managing the other “6 E’s”. Otherwise, champions could be applicable City/County representatives as their time permits.

It is also helpful to organize a small team or committee (ideal size of five or less members) that include representatives from the City/County, school district, and school staff (i.e., school principals), as well as key stakeholders if applicable. The group’s objective can include identifying funding opportunities and creatively financing projects, building relationships and educating the community about the planned improvements, and prioritizing projects identified in the Study. It may be helpful to have this group maintain a regular meeting schedule such as monthly to quarterly meeting frequencies to maintain proper engagement.

IDENTIFY PRIORITIES

Prioritizing projects is essential toward implementing projects in an orderly and timely process. Key questions to consider include:

- What project would provide the most benefit relative to cost and effort?
- What does Fond du Lac Tribe and Fond du Lac Ojibwe Area Schools view as key improvements?
- Which projects could be incorporated into other work already taking place?
- Which project is most likely to receive funding?



FOCUSED TIMELINE AND ACTIONABLE STEPS

Once priorities are identified, create a timeline of short- (0-1 years), mid- (1-3 years), and long-term goals (3-5 years). Do not extend past five years as that is a reasonable amount of time to require updated analysis and planning. The action plan does not need to be detailed and can simply identify planned improvements, responsible parties, the estimated cost, and associated time period. The action plan will help the group to focus next steps and keep on track, progress the plan forward each meeting, and be prepared for funding opportunities. Additionally, integrating with work already planned by city, county, and state agencies, or the school district, will ensure cost effective implementation when those synergies arise. It is important to remember that project implementation takes time and each small step forward continues that longer progression forward towards eventual success.

CELEBRATE WINS

Make sure to celebrate wins and promote the completion of Safe Routes to School projects (Walk and Bike to School Days are good times to do so) to educate the public and promote the program that is critical to children's health (47 more minutes of physical activity per week) and their ability to walk, roll, or bike to school.

Don't Hibernate, Participate!
Winter Walk Day is Feb. 5th

MINNESOTA
**SAFE
ROUTES
TO SCHOOL**

Celebrate Winter
**WALK AND BIKE
TO SCHOOL**
Condon Park Elementary
With Us!

For more information, visit: www.mnsaferoutestoschool.org

Source: MnDOT

APPENDICIES

Appendix A – Additional Pedestrian Counts

Appendix B – Alternatives Developed by Carlton County

Appendix C – Warrants Analyses

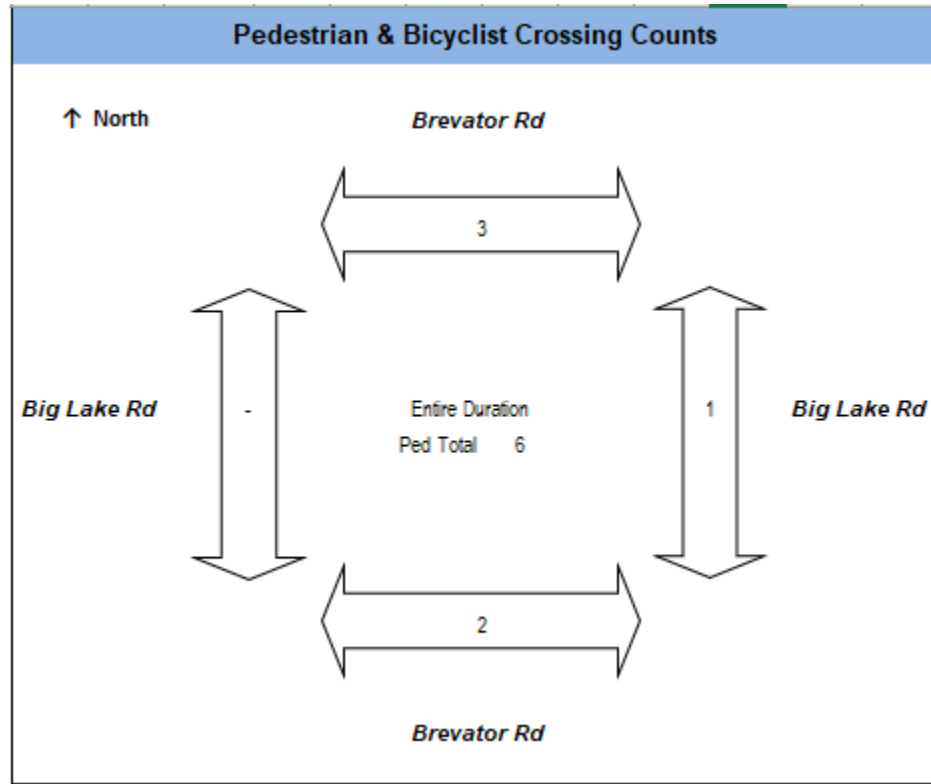
Appendix D – Tribal Center Campus Trail Map

Appendix E – Demonstration Project Concept Layouts and Summary

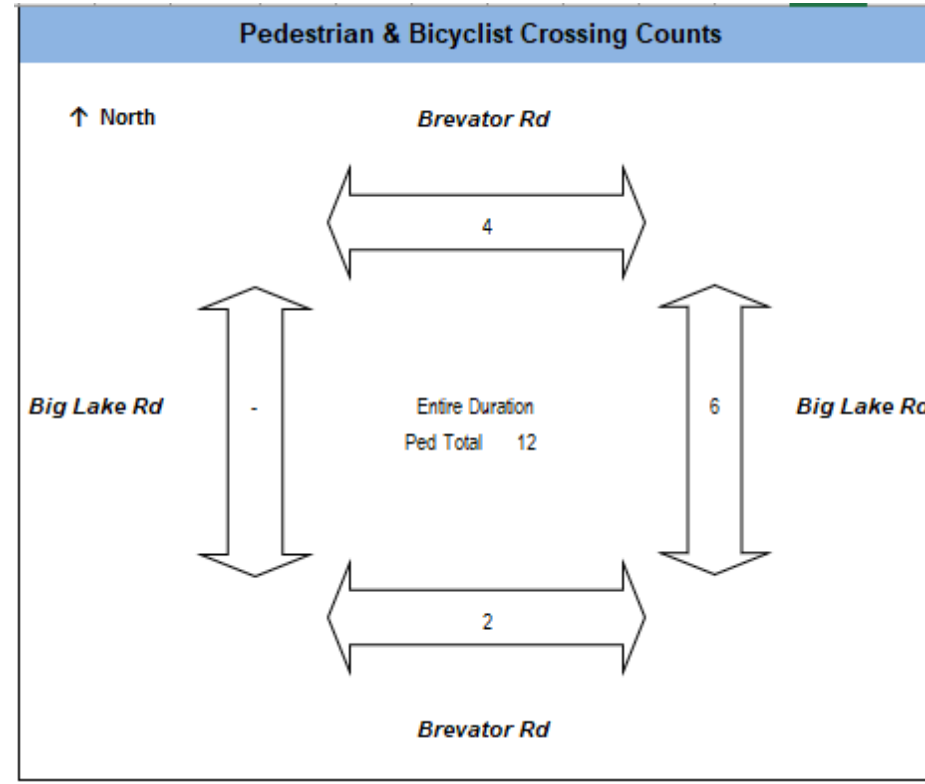
APPENDIX A

Big Lake Road and University Road/Brevator Road Intersection (14-hour counts from 6:00 a.m. to 8:00 p.m.)

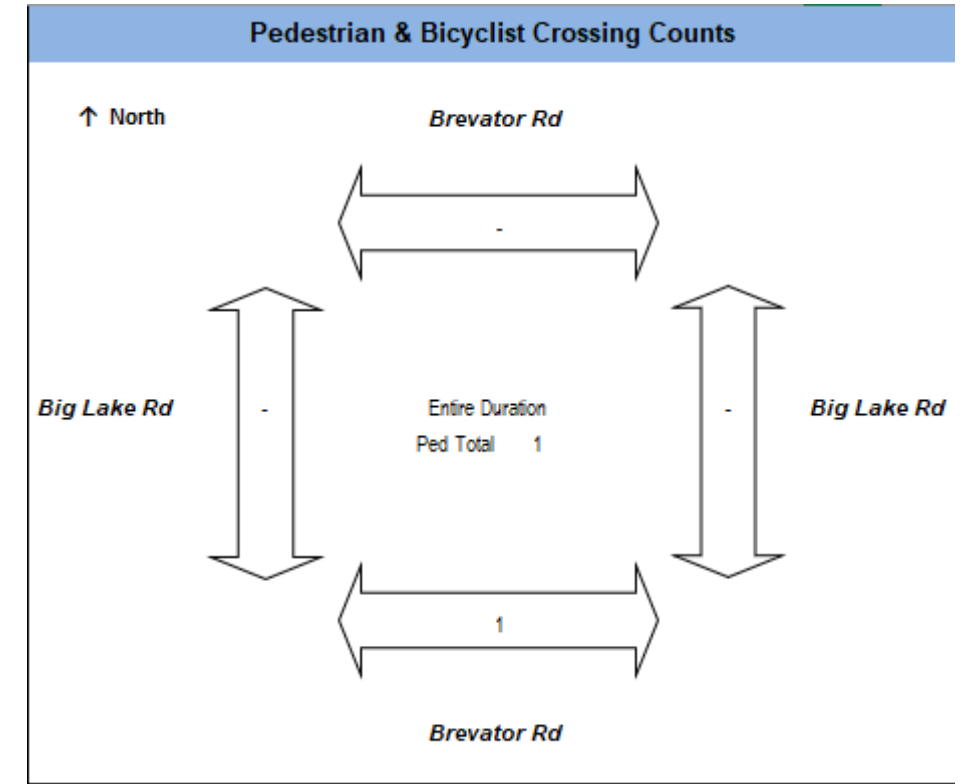
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Sunday, September 13, 2020

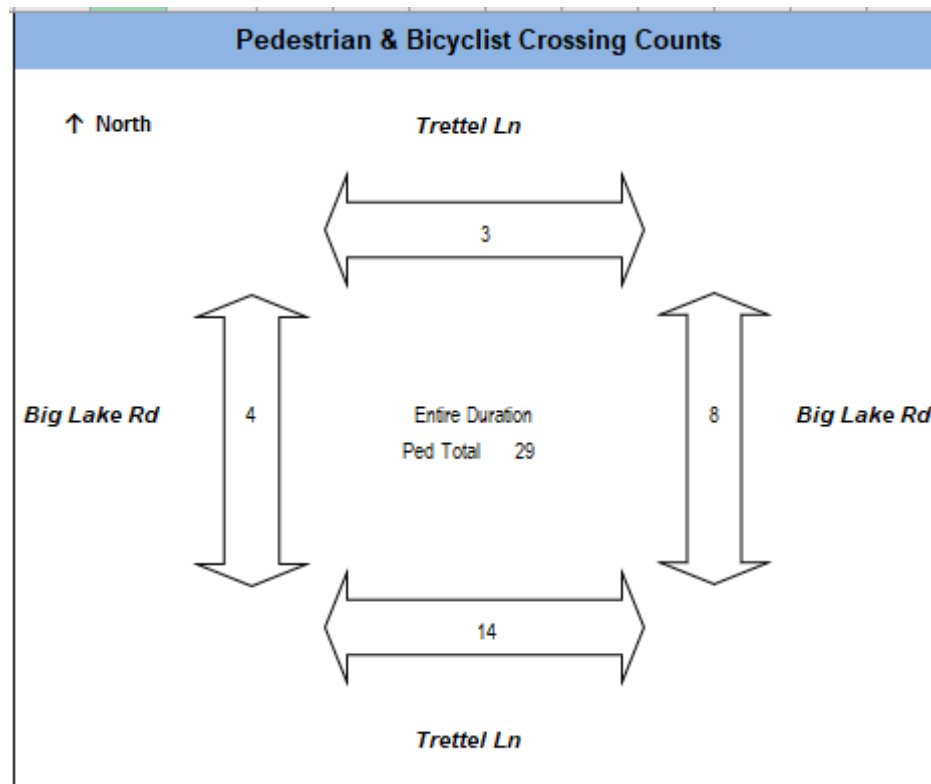


Tuesday, September 15, 2020

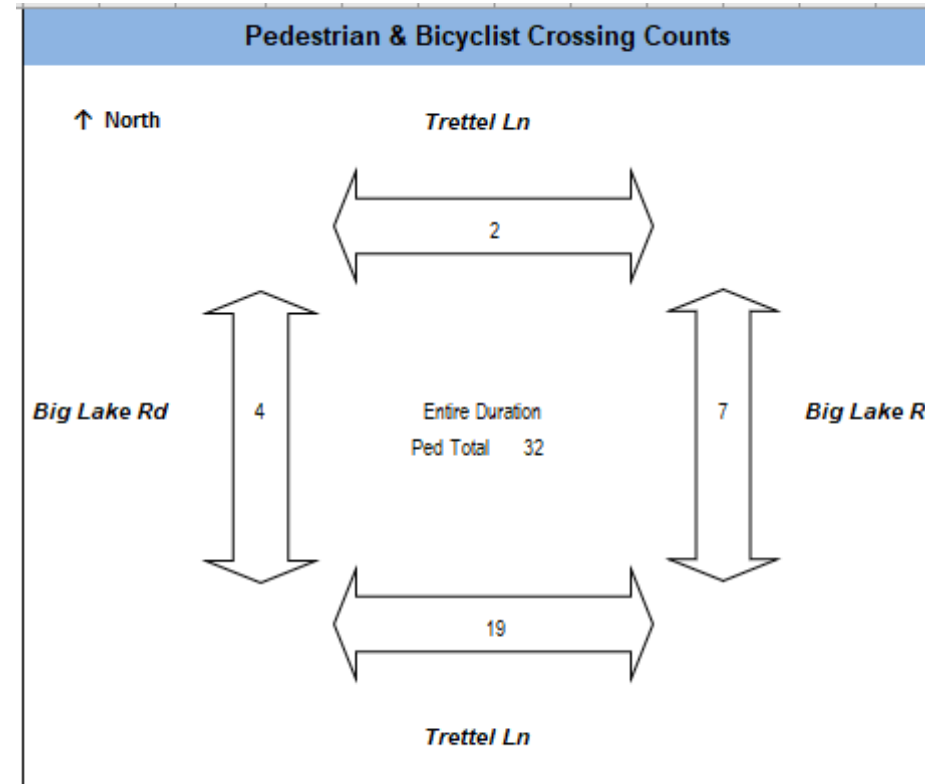


Big Lake Road and Trettel Lane Intersection (14-hour counts from 6:00 a.m. to 8:00 p.m.)

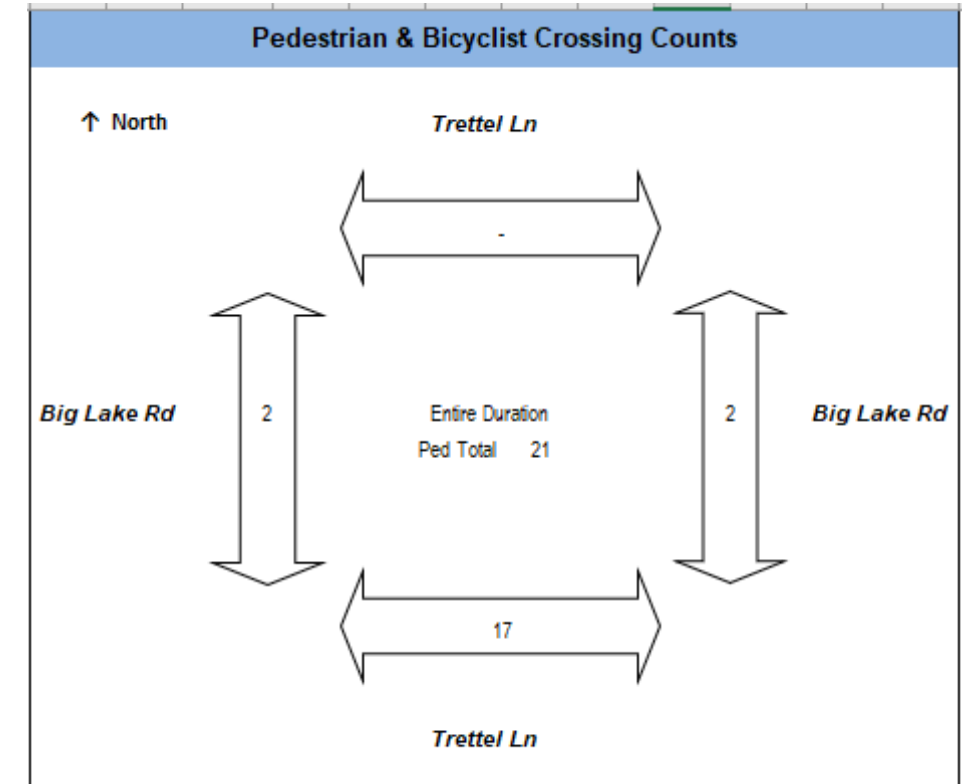
Saturday, September 12, 2020



Sunday, September 13, 2020



Tuesday, September 15, 2020



APPENDIX B



C.S.A.H. 5
(BREVATOR RD)

€

STA. 802+95 TO 803+36, 51' LT.
PLACE: 126 S.F. CROSSWALK MULTI-COMPONENT GROUND IN (WR)

STA. 802+91, 51' LT.
CONSTRUCT ONE-WAY DIRECTIONAL PEDESTRIAN CURB RAMP
PLACE: 36 S.F. 6" CONCRETE WALK
PLACE: 12 S.F. TRUNCATED DOMES

STA. 803+94, 46' LT.
REMOVE: 20' CURB AND GUTTER
PLACE: 20' CONCRETE CURB AND GUTTER, DESIGN B624

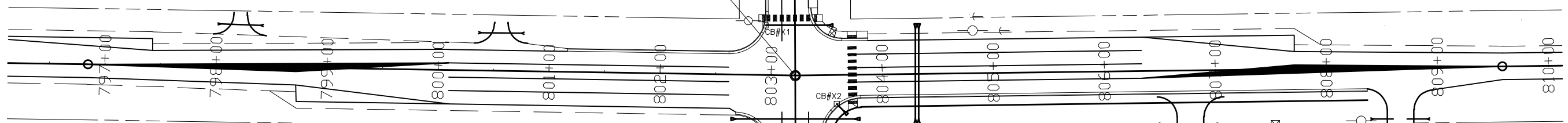
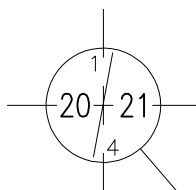
STA. 803+36 TO 803+69, 36'-61' LT.
PLACE: 228 S.F. 6" CONCRETE WALK
PLACE: 40 S.F. 6" CONCRETE WALK
CONSTRUCT 5'X8' CONCRETE SPILLWAY AT
LOWPOINT TO DRAIN INTO EXISTING DITCH

STA. 803+77 TO 803+87, 36' LT.
PLACE: 60 S.F. 6" CONCRETE WALK

STA. 803+43, 51' LT.
CONSTRUCT ONE-WAY DIRECTIONAL PEDESTRIAN CURB RAMP
PLACE: 48 S.F. 6" CONCRETE WALK
PLACE: 12 S.F. TRUNCATED DOMES

STA. 803+36 TO 803+87, 33'-61' LT.
PLACE: 67' CONCRETE CURB AND GUTTER, DESIGN B624

STA. 803+73, 36' LT.
CONSTRUCT ONE-WAY DIRECTIONAL PEDESTRIAN CURB RAMP
PLACE: 48 S.F. 6" CONCRETE WALK
PLACE: 16 S.F. TRUNCATED DOMES



CSAH 7
(BIG LAKE RD)

CB#X1 AND X2 LEAVE IN-PLACE

STA. 803+73, 26' RT.
CONSTRUCT ONE-WAY DIRECTIONAL PEDESTRIAN CURB RAMP
PLACE: 48 S.F. 6" CONCRETE WALK
PLACE: 16 S.F. TRUNCATED DOMES

STA. 803+73, 26' LT. TO 19' RT.
PLACE: 192 S.F. CROSSWALK MULTI-COMPONENT GROUND IN (WR)

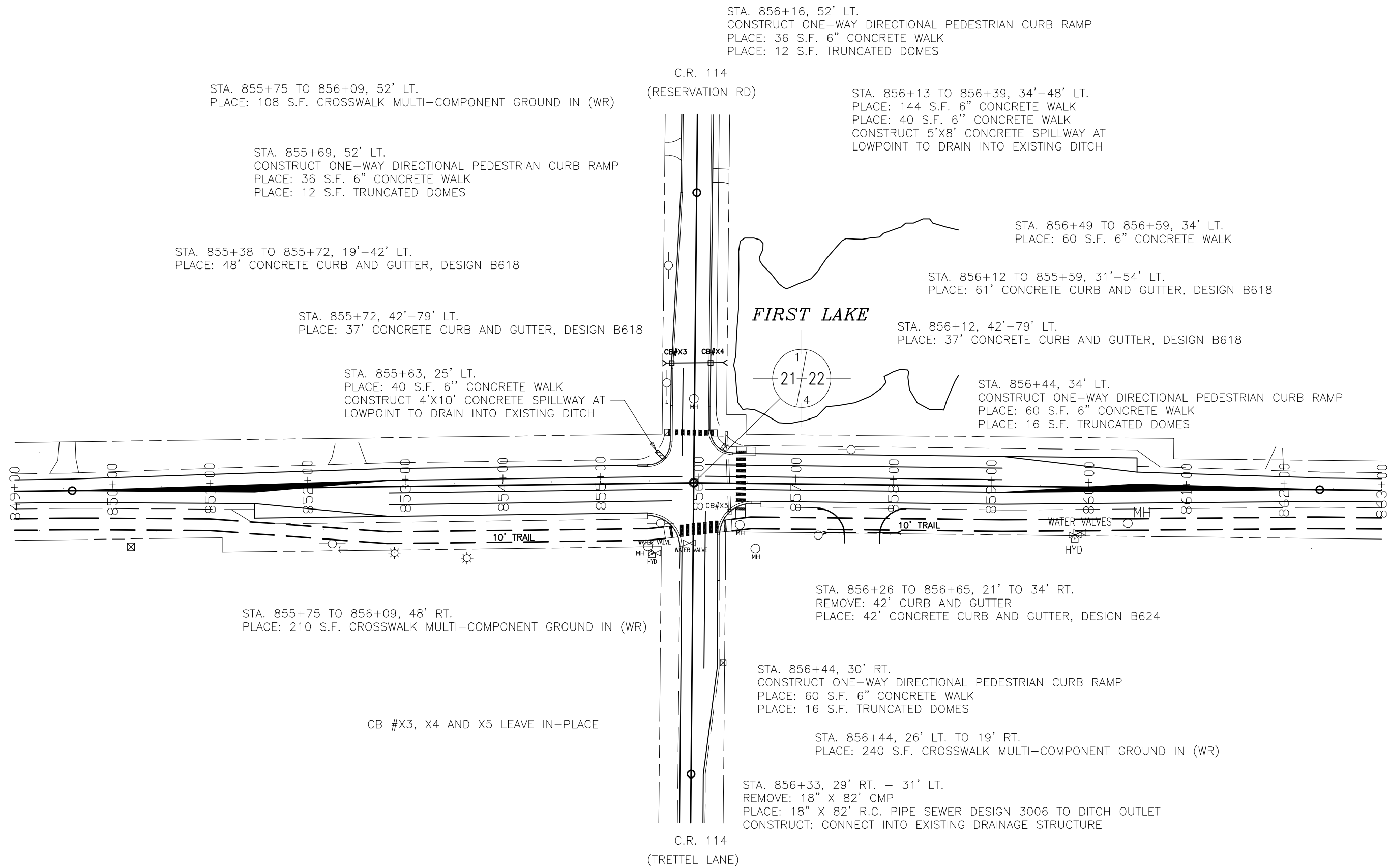
STA. 803+54 TO 803+81, 20' TO 33' RT.
REMOVE: 30' CURB AND GUTTER
PLACE: 30' CONCRETE CURB AND GUTTER, DESIGN B624

C.S.A.H. 5
(UNIVERSITY RD)

Appendix
B-1

INTERSECTION OF C.S.A.H. 7 AND C.S.A.H. 5

PLAN VIEW DETAIL SHEET



STA. 855+75 TO 856+09, 52' LT.
PLACE: 108 S.F. CROSSWALK MULTI-COMPONENT GROUND IN (WR)

STA. 855+69, 52' LT.
CONSTRUCT ONE-WAY DIRECTIONAL PEDESTRIAN CURB RAMP
PLACE: 36 S.F. 6" CONCRETE WALK
PLACE: 12 S.F. TRUNCATED DOMES

STA. 855+38 TO 855+72, 19'-42' LT.
PLACE: 48' CONCRETE CURB AND GUTTER, DESIGN B618

STA. 855+72, 42'-79' LT.
PLACE: 37' CONCRETE CURB AND GUTTER, DESIGN B618

STA. 855+63, 25' LT.
PLACE: 40 S.F. 6" CONCRETE WALK
CONSTRUCT 4'X10' CONCRETE SPILLWAY AT
LOWPOINT TO DRAIN INTO EXISTING DITCH

STA. 856+16, 52' LT.
CONSTRUCT ONE-WAY DIRECTIONAL PEDESTRIAN CURB RAMP
PLACE: 36 S.F. 6" CONCRETE WALK
PLACE: 12 S.F. TRUNCATED DOMES

C.R. 114
(RESERVATION RD)

STA. 856+13 TO 856+39, 34'-48' LT.
PLACE: 144 S.F. 6" CONCRETE WALK
PLACE: 40 S.F. 6" CONCRETE WALK
CONSTRUCT 5'X8' CONCRETE SPILLWAY AT
LOWPOINT TO DRAIN INTO EXISTING DITCH

STA. 856+49 TO 856+59, 34' LT.
PLACE: 60 S.F. 6" CONCRETE WALK

STA. 856+12 TO 855+59, 31'-54' LT.
PLACE: 61' CONCRETE CURB AND GUTTER, DESIGN B618

STA. 856+12, 42'-79' LT.
PLACE: 37' CONCRETE CURB AND GUTTER, DESIGN B618

STA. 856+44, 34' LT.
CONSTRUCT ONE-WAY DIRECTIONAL PEDESTRIAN CURB RAMP
PLACE: 60 S.F. 6" CONCRETE WALK
PLACE: 16 S.F. TRUNCATED DOMES

C.S.A.H. 7
(BIG LAKE RD)

STA. 855+75 TO 856+09, 48' RT.
PLACE: 210 S.F. CROSSWALK MULTI-COMPONENT GROUND IN (WR)

STA. 856+26 TO 856+65, 21' TO 34' RT.
REMOVE: 42' CURB AND GUTTER
PLACE: 42' CONCRETE CURB AND GUTTER, DESIGN B624

STA. 856+44, 30' RT.
CONSTRUCT ONE-WAY DIRECTIONAL PEDESTRIAN CURB RAMP
PLACE: 60 S.F. 6" CONCRETE WALK
PLACE: 16 S.F. TRUNCATED DOMES

STA. 856+44, 26' LT. TO 19' RT.
PLACE: 240 S.F. CROSSWALK MULTI-COMPONENT GROUND IN (WR)

CB #X3, X4 AND X5 LEAVE IN-PLACE

STA. 856+33, 29' RT. - 31' LT.
REMOVE: 18" X 82' CMP
PLACE: 18" X 82' R.C. PIPE SEWER DESIGN 3006 TO DITCH OUTLET
CONSTRUCT: CONNECT INTO EXISTING DRAINAGE STRUCTURE

C.R. 114
(TRETTEL LANE)

Appendix
B-2

INTERSECTION OF C.S.A.H. 7 AND C.R. 114
PLAN VIEW DETAIL SHEET

APPENDIX C



WARRANTS ANALYSIS

Year 2020

Big Lake Road (CSAH 7) at University Road/Brevator Road (CSAH 5)
 Safe Routes to School Engineering Study
 Fond du Lac Reservation, Carlton County

Background Information	Location : Fond du Lac Reservation, Carlton County	Speed (mph)	Lanes	Approach	
	Date: 10/14/2020	50	2 or more	Major Approach 1:	Eastbound Big Lake Road (CSAH 7)
	Analysis Prepared By: Edwin Jarquin	50	2 or more	Major Approach 3:	Westbound Big Lake Road (CSAH 7)
	Population Less than 10,000: Yes	35	1	Minor Approach 2:	Northbound University Road (CSAH 5)
	Seventy Percent Factor Used: Yes	55	1	Minor Approach 4:	Southbound Brevator Road (CSAH 5)

Warrants Analysis: Warrants 1A, 1B, and 1C	Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met		Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met		Met Same Hours		Combination		MWSA (C)		
					420	630				105	53	Condition A	Condition B	A	B	210	140	
6 - 7 AM	68	43	111			7	27	27										
7 - 8 AM	138	106	244			15	78	78		X							X	
8 - 9 AM	95	142	237			23	54	54		X							X	
9 - 10 AM	78	107	185			15	34	34										
10 - 11 AM	82	110	192			26	58	58		X								
11 - 12 AM	95	143	238			20	50	50									X	
12 - 1 PM	117	170	287			29	63	63		X							X	
1 - 2 PM	104	178	282			31	56	56		X							X	
2 - 3 PM	101	150	251			28	64	64		X							X	
3 - 4 PM	91	178	269			34	45	45									X	
4 - 5 PM	137	222	359			48	71	71		X							X	
5 - 6 PM	90	199	289			22	59	59		X							X	
6 - 7 PM	70	110	180			16	55	55		X								
7 - 8 PM	60	121	181			15	45	45										
												0	0	0	0	0	0	0

Warrant Summary	Warrant and Description		Hours Met	Hours Required	Met/Not Met
	MWSA (C):	Multiway Stop Applications Condition C	0	8	Not Met
Warrant 1A:	Minimum Vehicular Volume	0	8	Not Met	
Warrant 1B:	Interruption of Continuous Traffic	0	8	Not Met	
Warrant 1C:	Combination of Warrants	0	8	Not Met	
Warrant 2:	Four-Hour Vehicular Volume	0	4	Not Met	
Warrant 3B:	Peak Hour	0	1	Not Met	



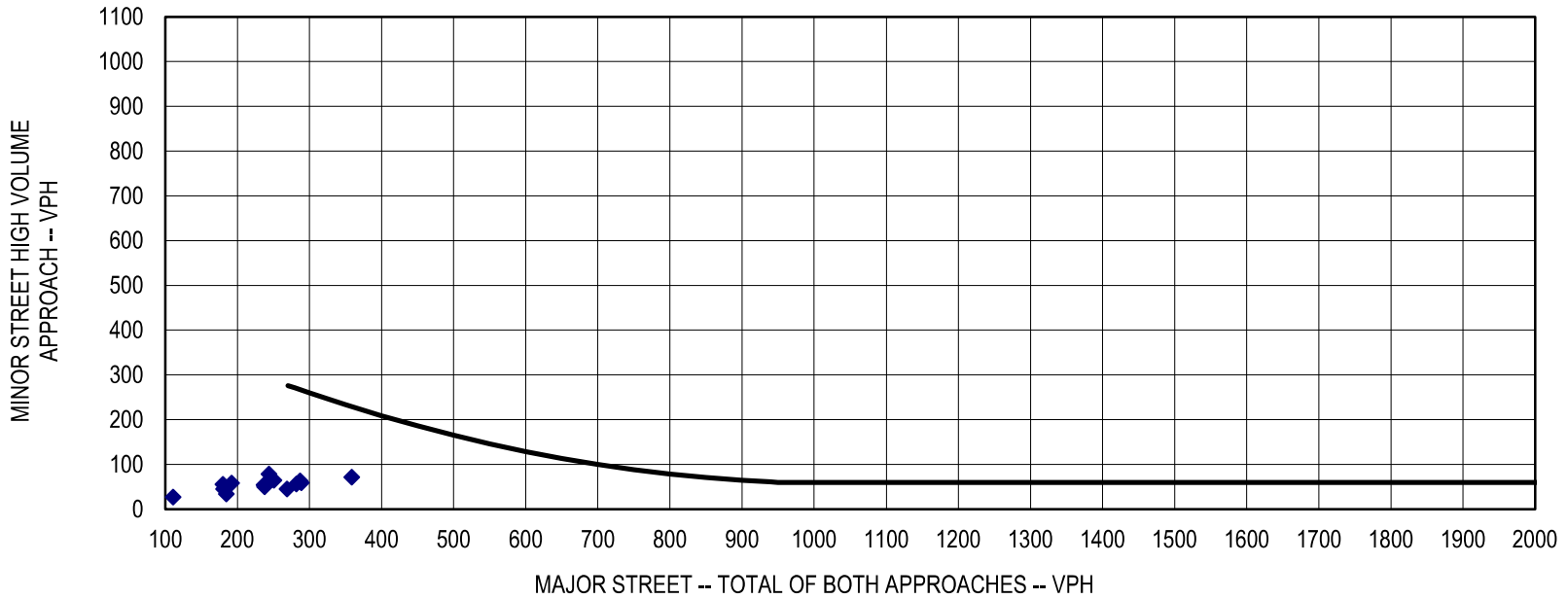
WARRANTS ANALYSIS

Year 2020

Big Lake Road (CSAH 7) at University Road/Brevator Road (CSAH 5)
Safe Routes to School Engineering Study
Fond du Lac Reservation, Carlton County

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



Number of Hours Satisfying Requirements:

- Notes:
1. 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 60 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
 2. INTERSECTION IS EITHER (1) WITHIN A COMMUNITY LESS THAN 10,000 POPULATION OR (2) HAS SPEEDS ABOVE 40 MPH ON MAJOR STREET



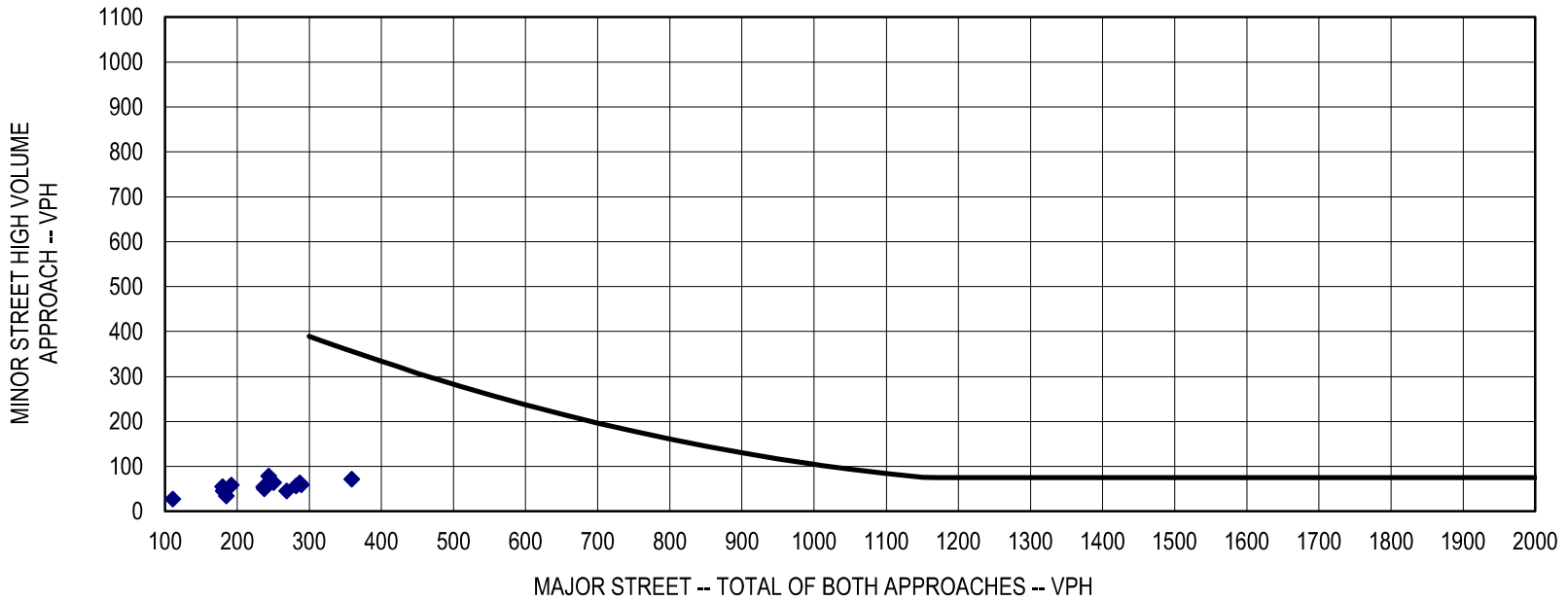
WARRANTS ANALYSIS

Year 2020

Big Lake Road (CSAH 7) at University Road/Brevator Road (CSAH 5)
Safe Routes to School Engineering Study
Fond du Lac Reservation, Carlton County

WARRANT 3 - PEAK HOUR

Warrants Analysis: Warrant 3



Number of Hours Satisfying Requirements:

- Notes:
1. 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
 2. INTERSECTION IS EITHER (1) WITHIN A COMMUNITY LESS THAN 10,000 POPULATION OR (2) HAS SPEEDS ABOVE 40 MPH ON MAJOR STREET



WARRANTS ANALYSIS

Year 2020

Big Lake Road (CSAH 7) at Trettel Lane (CR 114)
 Safe Routes to School Engineering Study
 Fond du Lac Reservation, Carlton County

Background Information	Location :	Fond du Lac Reservation, Carlton County	Speed (mph)	Lanes	Approach
	Date:	10/20/2020	50	2 or more	Major Approach 1: Eastbound Big Lake Road (CSAH 7)
	Analysis Prepared By:	Edwin Jarquin	50	2 or more	Major Approach 3: Westbound Big Lake Road (CSAH 7)
	Population Less than 10,000:	Yes	30	1	Minor Approach 2: Northbound Trettel Lane (CR 114)
	Seventy Percent Factor Used:	Yes	35	1	Minor Approach 4: Southbound Trettel Lane (CR 114)

Warrants Analysis: Warrants 1A, 1B, and 1C	Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met		Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met		Met Same Hours		Combination		MWSA (C)	
					420	630				105	53	Condition A	Condition B	A	B	210	140
	6 - 7 AM	89	51	140			2	7	7								
7 - 8 AM	178	174	352			2	33	33									X
8 - 9 AM	146	188	334			12	24	24									X
9 - 10 AM	116	136	252			9	32	32									X
10 - 11 AM	148	141	289			9	29	29									X
11 - 12 AM	134	174	308			20	32	32									X
12 - 1 PM	192	239	431	X		18	42	42									X
1 - 2 PM	162	213	375			23	25	25									X
2 - 3 PM	164	174	338			19	30	30									X
3 - 4 PM	152	210	362			22	31	31									X
4 - 5 PM	226	246	472	X		29	27	29									X
5 - 6 PM	163	237	400			9	36	36									X
6 - 7 PM	118	131	249			6	28	28									X
7 - 8 PM	107	145	252			6	25	25									X
												0	0	0	0	0	

Warrant Summary	Warrant and Description	Hours Met	Hours Required	Met/Not Met
	MWSA (C):	Multiway Stop Applications Condition C	0	8
Warrant 1A:	Minimum Vehicular Volume	0	8	Not Met
Warrant 1B:	Interruption of Continuous Traffic	0	8	Not Met
Warrant 1C:	Combination of Warrants	0	8	Not Met
Warrant 2:	Four-Hour Vehicular Volume	0	4	Not Met
Warrant 3B:	Peak Hour	0	1	Not Met



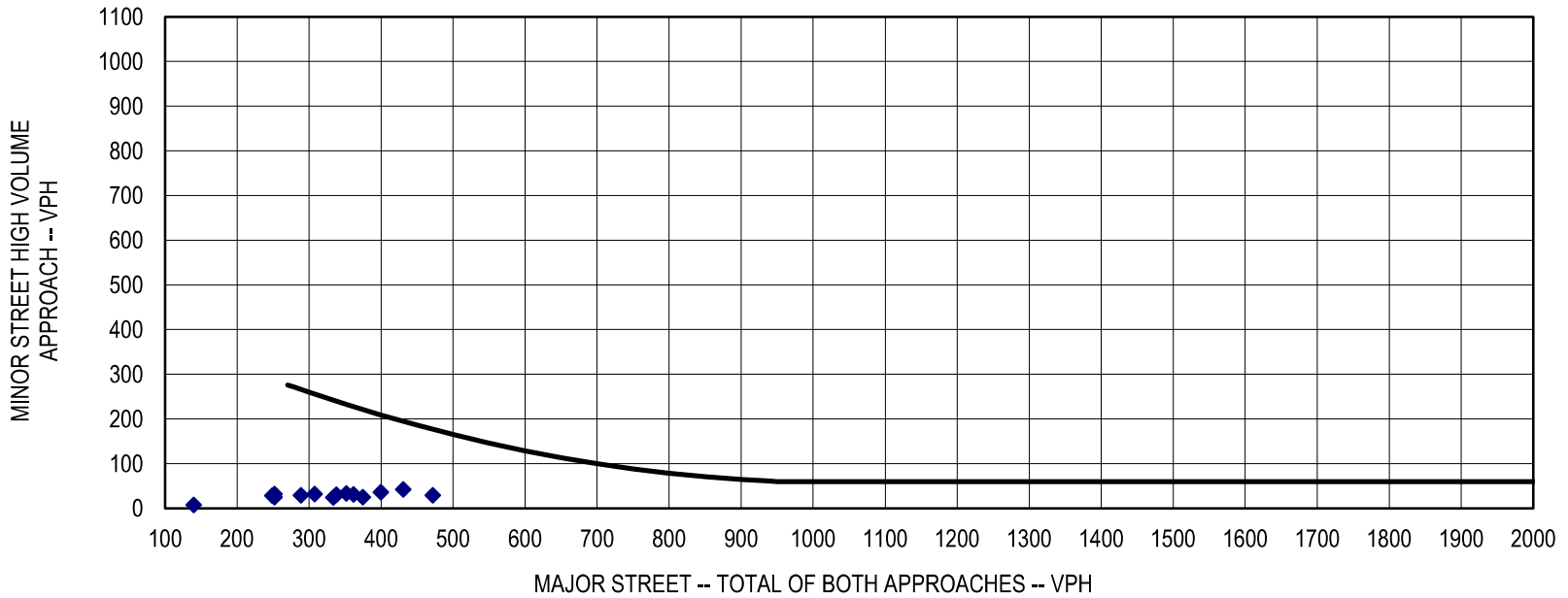
WARRANTS ANALYSIS

Year 2020

Big Lake Road (CSAH 7) at Trettel Lane (CR 114)
Safe Routes to School Engineering Study
Fond du Lac Reservation, Carlton County

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



Number of Hours Satisfying Requirements:

- Notes:
1. 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 60 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
 2. INTERSECTION IS EITHER (1) WITHIN A COMMUNITY LESS THAN 10,000 POPULATION OR (2) HAS SPEEDS ABOVE 40 MPH ON MAJOR STREET.



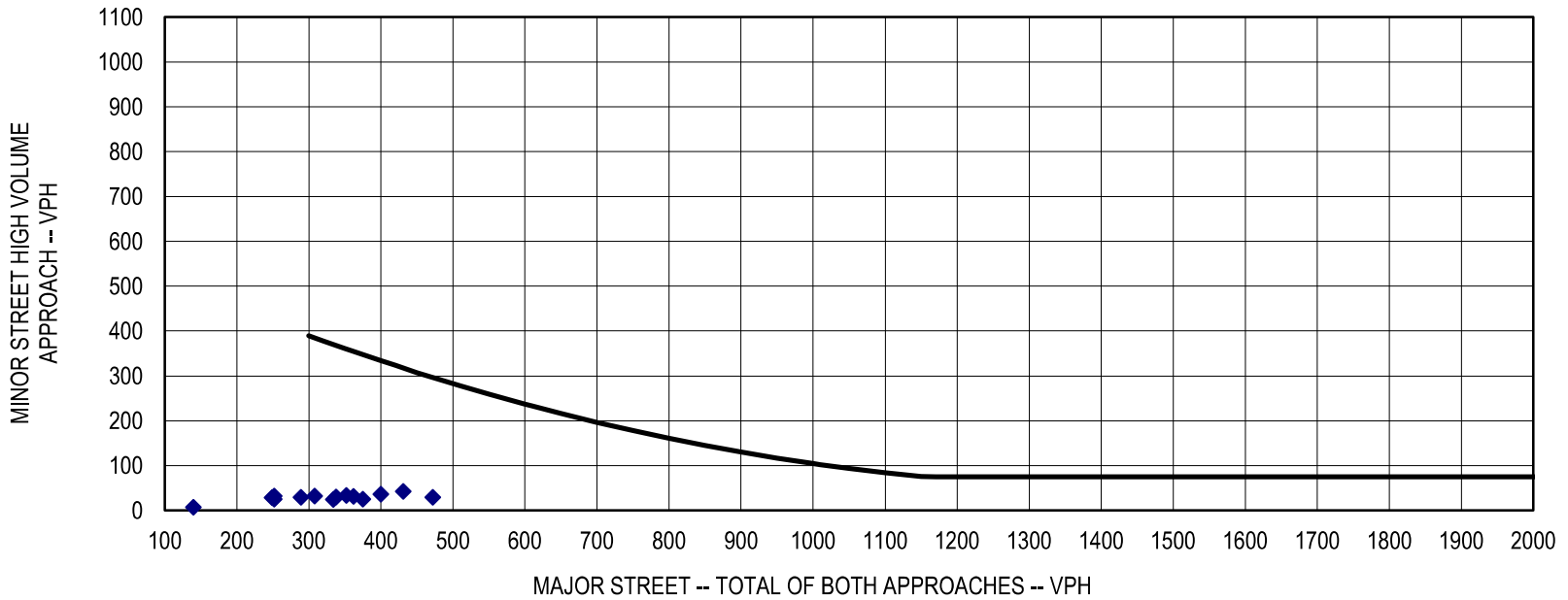
WARRANTS ANALYSIS

Year 2020

Big Lake Road (CSAH 7) at Trettel Lane (CR 114)
Safe Routes to School Engineering Study
Fond du Lac Reservation, Carlton County

Warrants Analysis: Warrant 3

WARRANT 3 - PEAK HOUR



Number of Hours Satisfying Requirements:

- Notes:
1. 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
 2. INTERSECTION IS EITHER (1) WITHIN A COMMUNITY LESS THAN 10,000 POPULATION OR (2) HAS SPEEDS ABOVE 40 MPH ON MAJOR STREET.



WARRANTS ANALYSIS

Year 2040

Big Lake Road (CSAH 7) at University Road/Brevator Road (CSAH 5)

Safe Routes to School Engineering Study

Fond du Lac Reservation, Carlton County

Background Information	Location : Fond du Lac Reservation, Carlton County	Speed (mph)	Lanes	Approach			
	Date: 10/21/2021	50	2 or more	Major Approach 1:	Eastbound Big Lake Road (CSAH 7)		
	Analysis Prepared By: Edwin Jarquin	50	2 or more	Major Approach 3:	Westbound Big Lake Road (CSAH 7)		
	Population Less than 10,000: Yes	35	1	Minor Approach 2:	Northbound University Road (CSAH 5)		
	Seventy Percent Factor Used: Yes	55	1	Minor Approach 4:	Southbound Brevator Road (CSAH 5)		

	Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met		Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met		Met Same Hours		Combination		MWSA (C)		
					420	630				105	53	Condition A	Condition B	A	B	210	140	
Warrants Analysis: Warrants 1A, 1B, and 1C	6 - 7 AM	105	65	170			15	45	45									
	7 - 8 AM	210	160	370			25	120	120	X	X			X		X	X	
	8 - 9 AM	145	215	360			35	85	85		X			X		X		
	9 - 10 AM	120	165	285			25	55	55		X					X		
	10 - 11 AM	125	170	295			40	90	90		X					X		
	11 - 12 AM	145	215	360			35	80	80		X					X		
	12 - 1 PM	180	255	435	X		45	100	100		X			X		X	X	
	1 - 2 PM	160	270	430	X		50	85	85		X			X		X		
	2 - 3 PM	155	225	380			45	100	100		X			X		X	X	
	3 - 4 PM	140	270	410			55	70	70		X					X		
	4 - 5 PM	210	335	545	X		75	110	110	X	X	X		X	X	X	X	
	5 - 6 PM	140	300	440	X		35	90	90		X			X		X		
	6 - 7 PM	110	170	280			25	85	85		X					X		
	7 - 8 PM	95	185	280			25	70	70		X					X		
												1	0	7	1	4		

Warrant Summary	Warrant and Description		Hours Met	Hours Required	Met/Not Met	
	MWSA (C):	Multiway Stop Applications Condition C	4	8	Not Met	
Warrant 1A:	Minimum Vehicular Volume	1	8	Not Met		
Warrant 1B:	Interruption of Continuous Traffic	0	8	Not Met		
Warrant 1C:	Combination of Warrants	1	8	Not Met		
Warrant 2:	Four-Hour Vehicular Volume	0	4	Not Met		
Warrant 3B:	Peak Hour	0	1	Not Met		



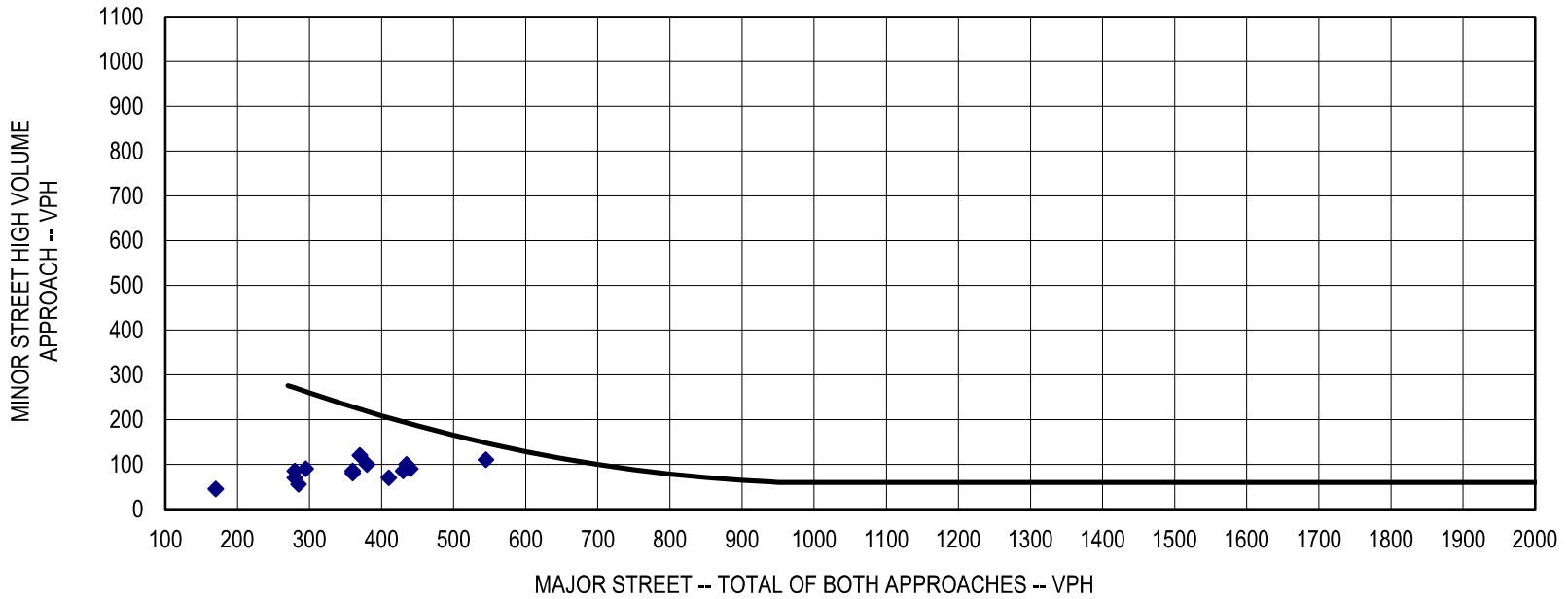
WARRANTS ANALYSIS

Year 2040

Big Lake Road (CSAH 7) at University Road/Brevator Road (CSAH 5)
Safe Routes to School Engineering Study
Fond du Lac Reservation, Carlton County

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



Number of Hours Satisfying Requirements:

- Notes:
1. 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 60 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
 2. INTERSECTION IS EITHER (1) WITHIN A COMMUNITY LESS THAN 10,000 POPULATION OR (2) HAS SPEEDS ABOVE 40 MPH ON MAJOR STREET



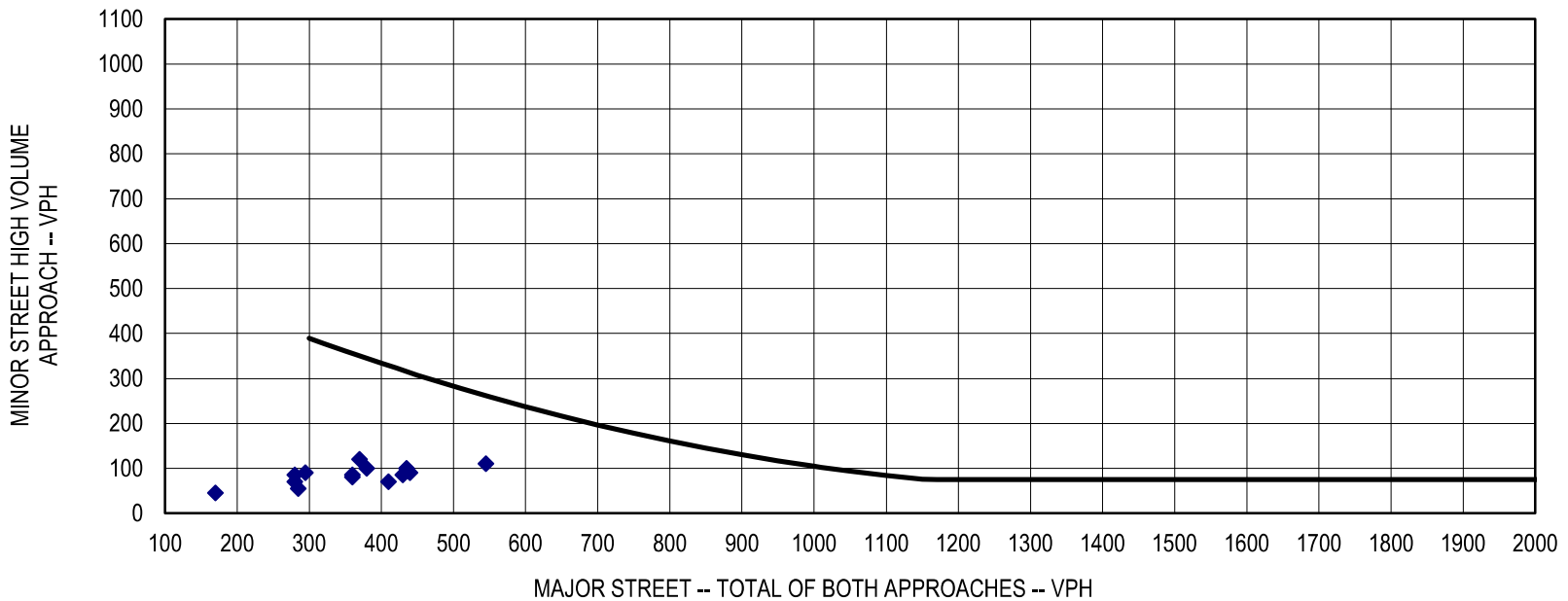
WARRANTS ANALYSIS

Year 2040

Big Lake Road (CSAH 7) at University Road/Brevator Road (CSAH 5)
Safe Routes to School Engineering Study
Fond du Lac Reservation, Carlton County

Warrants Analysis: Warrant 3

WARRANT 3 - PEAK HOUR



Number of Hours Satisfying Requirements:

- Notes:
1. 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
 2. INTERSECTION IS EITHER (1) WITHIN A COMMUNITY LESS THAN 10,000 POPULATION OR (2) HAS SPEEDS ABOVE 40 MPH ON MAJOR STREET



WARRANTS ANALYSIS

Year 2040

Big Lake Road (CSAH 7) at Trettel Lane (CR 114)
 Safe Routes to School Engineering Study
 Fond du Lac Reservation, Carlton County

Background Information	Location :	Fond du Lac Reservation, Carlton County	Speed (mph)	Lanes	Approach
	Date:	10/20/2020	50	2 or more	Major Approach 1: Eastbound Big Lake Road (CSAH 7)
	Analysis Prepared By:	Edwin Jarquin	50	2 or more	Major Approach 3: Westbound Big Lake Road (CSAH 7)
	Population Less than 10,000:	Yes	30	1	Minor Approach 2: Northbound Trettel Lane (CR 114)
	Seventy Percent Factor Used:	Yes	35	1	Minor Approach 4: Southbound Trettel Lane (CR 114)

Warrants Analysis: Warrants 1A, 1B, and 1C	Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met		Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met		Met Same Hours		Combination		MWSA (C)	
					420	630				105	53	Condition A	Condition B	A	B	210	140
	6 - 7 AM	135	80	215			5	15	15								
7 - 8 AM	270	265	535	X		5	55	55		X							X
8 - 9 AM	220	285	505	X		20	40	40									X
9 - 10 AM	175	205	380			15	50	50									X
10 - 11 AM	225	215	440	X		15	45	45									X
11 - 12 AM	205	260	465	X		30	50	50									X
12 - 1 PM	290	360	650	X	X	30	65	65		X		X		X			X
1 - 2 PM	245	320	565	X		40	40	40									X
2 - 3 PM	250	260	510	X		30	45	45									X
3 - 4 PM	230	315	545	X		35	50	50									X
4 - 5 PM	340	370	710	X	X	45	45	45									X
5 - 6 PM	245	355	600	X		15	55	55		X							X
6 - 7 PM	180	200	380			10	45	45									X
7 - 8 PM	165	220	385			10	40	40									X
												0	1	0	6	0	

Warrant Summary	Warrant and Description	Hours Met	Hours Required	Met/Not Met
	MWSA (C): Multiway Stop Applications Condition C	0	8	Not Met
	Warrant 1A: Minimum Vehicular Volume	0	8	Not Met
	Warrant 1B: Interruption of Continuous Traffic	1	8	Not Met
	Warrant 1C: Combination of Warrants	0	8	Not Met
	Warrant 2: Four-Hour Vehicular Volume	0	4	Not Met
	Warrant 3B: Peak Hour	0	1	Not Met



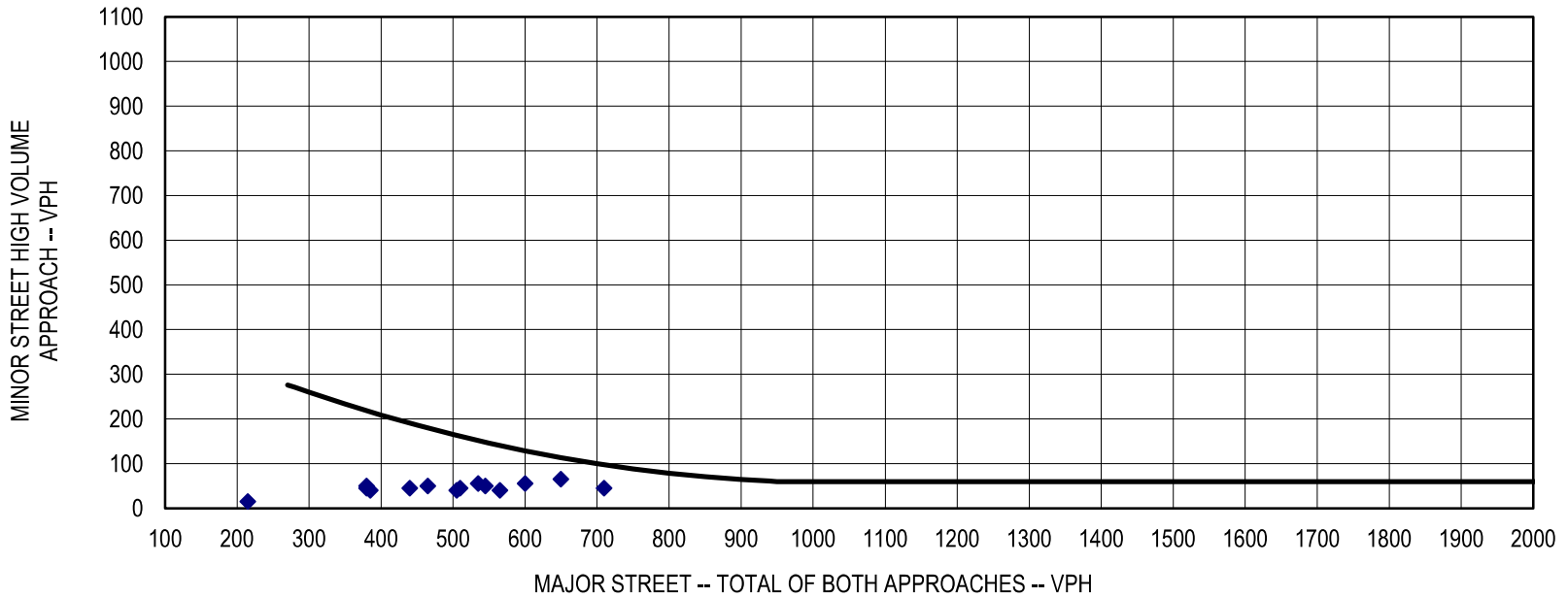
WARRANTS ANALYSIS

Year 2040

Big Lake Road (CSAH 7) at Trettel Lane (CR 114)
Safe Routes to School Engineering Study
Fond du Lac Reservation, Carlton County

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



Number of Hours Satisfying Requirements:

- Notes:
1. 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 60 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
 2. INTERSECTION IS EITHER (1) WITHIN A COMMUNITY LESS THAN 10,000 POPULATION OR (2) HAS SPEEDS ABOVE 40 MPH ON MAJOR STREET.



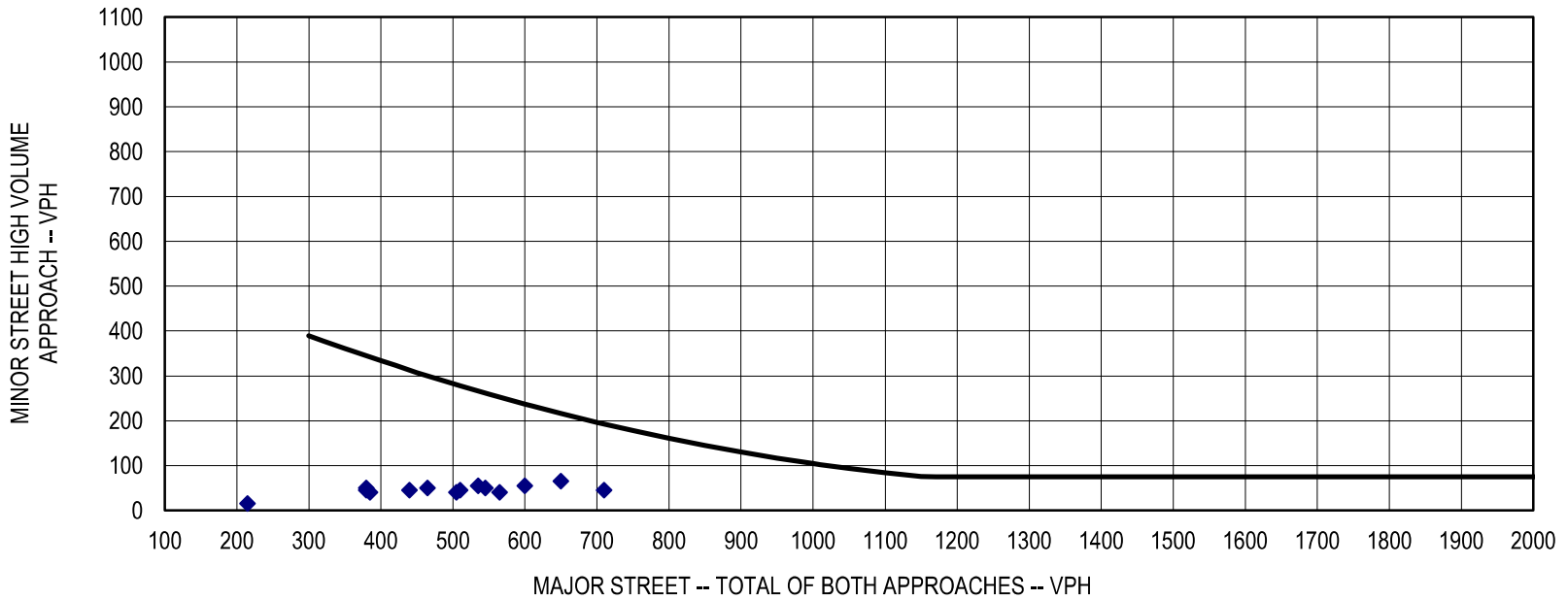
WARRANTS ANALYSIS

Year 2040

Big Lake Road (CSAH 7) at Trettel Lane (CR 114)
Safe Routes to School Engineering Study
Fond du Lac Reservation, Carlton County

Warrants Analysis: Warrant 3

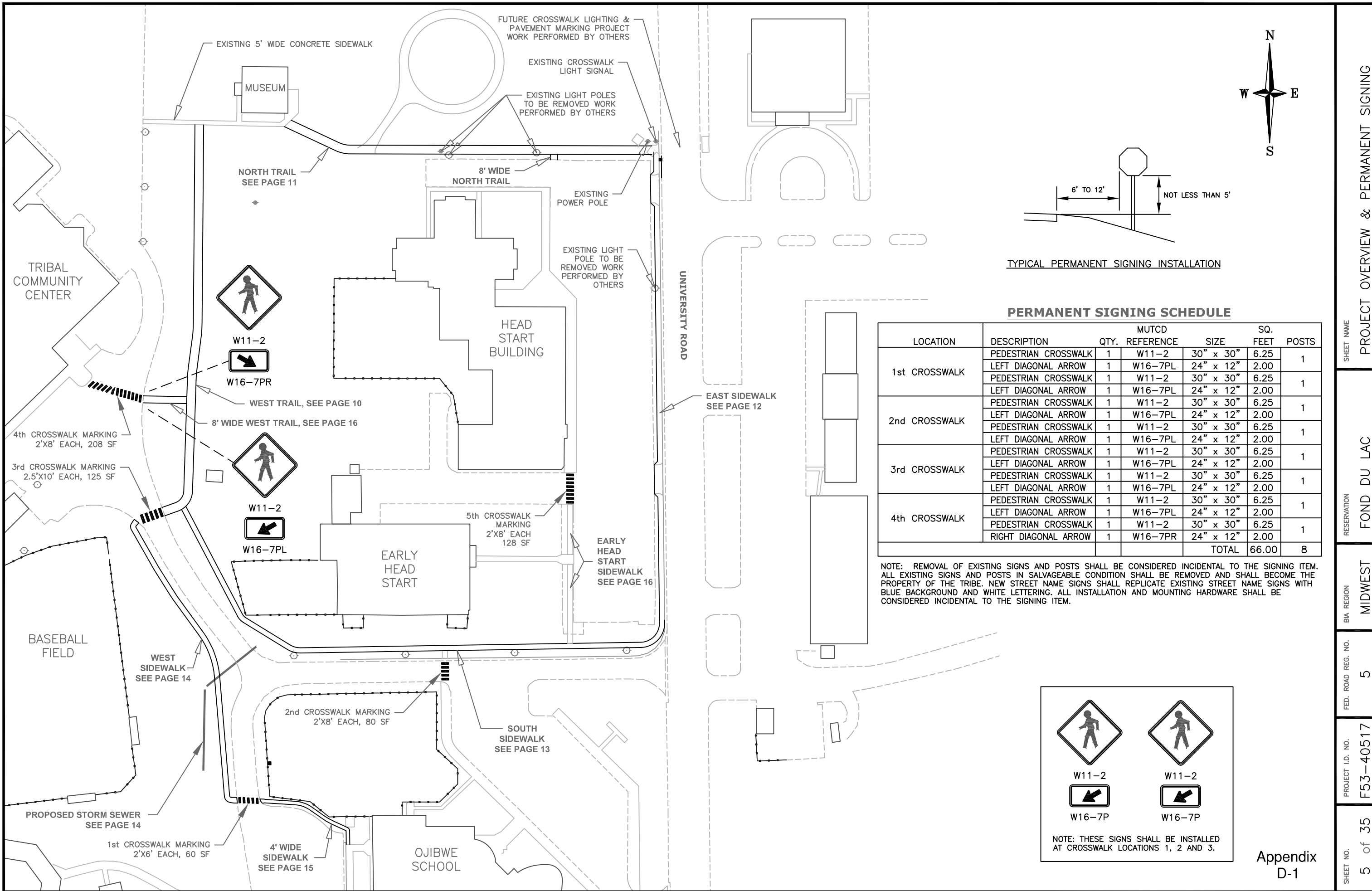
WARRANT 3 - PEAK HOUR



Number of Hours Satisfying Requirements: 0

- Notes:
- 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
 - INTERSECTION IS EITHER (1) WITHIN A COMMUNITY LESS THAN 10,000 POPULATION OR (2) HAS SPEEDS ABOVE 40 MPH ON MAJOR STREET.

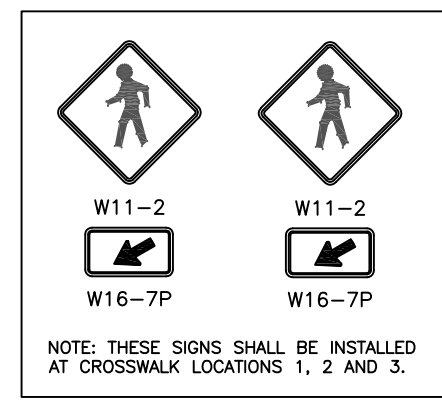
APPENDIX D



PERMANENT SIGNING SCHEDULE

LOCATION	DESCRIPTION	QTY.	MUTCD REFERENCE	SIZE	SQ. FEET	POSTS
1st CROSSWALK	PEDESTRIAN CROSSWALK	1	W11-2	30" x 30"	6.25	1
	LEFT DIAGONAL ARROW	1	W16-7PL	24" x 12"	2.00	
	PEDESTRIAN CROSSWALK	1	W11-2	30" x 30"	6.25	1
	LEFT DIAGONAL ARROW	1	W16-7PL	24" x 12"	2.00	
2nd CROSSWALK	PEDESTRIAN CROSSWALK	1	W11-2	30" x 30"	6.25	1
	LEFT DIAGONAL ARROW	1	W16-7PL	24" x 12"	2.00	
	PEDESTRIAN CROSSWALK	1	W11-2	30" x 30"	6.25	1
	LEFT DIAGONAL ARROW	1	W16-7PL	24" x 12"	2.00	
3rd CROSSWALK	PEDESTRIAN CROSSWALK	1	W11-2	30" x 30"	6.25	1
	LEFT DIAGONAL ARROW	1	W16-7PL	24" x 12"	2.00	
	PEDESTRIAN CROSSWALK	1	W11-2	30" x 30"	6.25	1
	LEFT DIAGONAL ARROW	1	W16-7PL	24" x 12"	2.00	
4th CROSSWALK	PEDESTRIAN CROSSWALK	1	W11-2	30" x 30"	6.25	1
	LEFT DIAGONAL ARROW	1	W16-7PL	24" x 12"	2.00	
	PEDESTRIAN CROSSWALK	1	W11-2	30" x 30"	6.25	1
	RIGHT DIAGONAL ARROW	1	W16-7PR	24" x 12"	2.00	
TOTAL					66.00	8

NOTE: REMOVAL OF EXISTING SIGNS AND POSTS SHALL BE CONSIDERED INCIDENTAL TO THE SIGNING ITEM. ALL EXISTING SIGNS AND POSTS IN SALVAGEABLE CONDITION SHALL BE REMOVED AND SHALL BECOME THE PROPERTY OF THE TRIBE. NEW STREET NAME SIGNS SHALL REPLICATE EXISTING STREET NAME SIGNS WITH BLUE BACKGROUND AND WHITE LETTERING. ALL INSTALLATION AND MOUNTING HARDWARE SHALL BE CONSIDERED INCIDENTAL TO THE SIGNING ITEM.



APPENDIX E



Appendix E-1

SITE 1
 BIG LAKE RD (CSAH 7) & UNIVERSITY RD/BREVATOR RD
 FOND DU LAC BAND OF LAKE SUPERIOR CHIPPEWA

DEMONSTRATION PROJECT CONCEPT LAYOUT

DATE: SEPTEMBER 23, 2020

I HEARBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

CERTIFIED BY: Michael E. Kotila PRINTED NAME: MICHAEL E. KOTILA LIC. NO. 19254

DATE: 9-23-2020

APPROVED: Hannah Pritchard Digitally signed by Hannah Pritchard MNDOT PEDESTRIAN & BICYCLE ENGINEER
 DATE: 2020.09.24 08:59:36 -05'00'



<p>SITE 2 BIG LAKE RD (CSAH 7) & TRETTEL LN (CR 114)/RESERVATION RD FOND DU LAC BAND OF LAKE SUPERIOR CHIPPEWA</p>	<p>DEMONSTRATION PROJECT CONCEPT LAYOUT</p>	<p>DATE: SEPTEMBER 23, 2020</p> <p>I HEARBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA</p> <p>CERTIFIED BY: <i>Michael E. Kotila</i> PRINTED NAME: MICHAEL E. KOTILA LIC. NO. 19254</p> <p>DATE: 9-23-2020</p>	<p>APPROVED: Hannah Pritchard Digitally signed by Hannah Pritchard Date: 2020.09.24 09:00:13 -05'00"</p> <p>MNDOT PEDESTRIAN & BICYCLE ENGINEER</p>
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Fond du Lac Band of Lake Superior Chippewa Big Lake Road Safe Routes to School Demonstration Project Project Summary and Evaluation



ACKNOWLEDGMENTS

Thanks to Carlton County, Fond du Lac Ojibwe School, and Fond du Lac Band of Lake Superior Chippewa (FDL) staff for contributing time and expertise to this project. In particular, we are grateful for the participation of the following:

- Jamie Adams, FDL Economic Development Planner
- Jason Holliday, FDL Planning Director
- KaRee Lockling, FDL Injury Prevention Coordinator
- Samantha Martin, SHIP
- Jennifer Murray, Superintendent
- JinYeene Neumann, Carlton County Engineer
- Carlton County Sign Shop staff



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More Local

Two Safe Routes to School demonstration projects to open along Big Lake Road

Starting in mid-October, two intersections along Big Lake Road will look a bit different. The Tribe is working with state and county partners to install temporary street improvements to provide more comfortable spaces for people walking and biking. The two installations, referred to as "demonstration projects," will be installed at the intersections of Big Lake Road and University Road/Brevator Road and at Big Lake Road and Trettel Lane/Reservation Road. Demonstration projects use low-cost and temporary materials like traffic paint and flexible plastic posts to test and evaluate potential long-term roadway changes.

Over the past several months, the Tribe has been working with the Minnesota Department of Transportation (MnDOT) and Carlton County to identify the challenges faced for people walking and biking across Big Lake

Road (also known as Carlton County Road 7). The two intersections were chosen based on nearby destinations in the area, including the Fond du Lac Ojibwe School. The June 30 crash that left a 13-year old bicyclist seriously injured reinforced the need for changes to the roadway. "Several projects over the years have identified these intersections as dangerous. Tribal members have told us that drivers are going too fast on Big Lake Road and it makes it very hard to cross," said MnDOT Project Manager Hannah Pritchard.

The goal of the project is to make walking and biking across Big Lake Road easier, safer, and more comfortable. It will use paint and flexible plastic posts to reduce crossing distances, narrow the roadway to slow traffic, and increase visibility of people walking and biking. "A demonstration project gives the Fond du Lac community

a chance to try things out before they become permanent. It also raises awareness of some of the challenges for people walking and biking in the area," Pritchard said.

The outcomes from this demonstration project could influence more permanent changes, too. Next spring, Carlton County plans to resurface this section of Big Lake Road and will be considering how to make it more welcoming to people walking and biking. Project staff plan to evaluate the installation by measuring speeds and administering a public perception survey.

The design shown with this article is scheduled to be installed the week of Oct. 12. People driving in the area should expect to slow down on Big Lake Road as crews install the project. Once installed, one of two turn lanes in each direction at both intersections will be closed, though drivers will



still be able to make all turning movements from a shared lane. "The left and right turn lanes were just installed at these intersections a few years ago, but we thought it was important to find space for people crossing Big Lake Road to be able to cross one direction at a time. We're hopeful that drivers will adapt to the change easily," said Pritchard.

This project is funded by the Minnesota Department of

Transportation through their Safe Routes to School program and is being installed in partnership with Carlton County. To learn more about demonstration projects, visit <https://dot.state.mn.us/saferoutes/demonstration-projects.html> or contact MnDOT Project Manager Hannah Pritchard at hannah.pritchard@state.mn.us.







Introduction

Demonstration projects are short-term, low-cost, temporary roadway projects used to pilot potential long-term design solutions to improve walking, bicycling, and public spaces. Projects may include, but are not limited to, bicycle lanes, crosswalk markings, curb extensions, and median safety islands.

Demonstration projects allow public agencies, community partners, and people walking, bicycling, taking transit, and driving to evaluate potential infrastructure improvements before potentially investing in permanent changes.

The demonstration project installed on Big Lake Road originated from a Safe Routes to School (SRTS) plan completed in 2015. Working with the County to create the SRTS Plan, the Arrowhead Regional Development Commission (ARDC) identified locations near the Fond du Lac Ojibwe School that were barriers for students and families walking and biking to school. The plan recommended to meet with Carlton County to review the existing conditions for students walking or bicycling through these intersections. Safety issues were identified as well as potential improvement measures.

In an effort to build momentum toward permanent implementation, MnDOT worked with local stakeholders to pilot recommendations at two high-priority locations using a demonstration project.

This summary describes the planning, design, and implementation of the Big Lake Road demonstration project, and includes findings from the project evaluation.



Project Overview

The 2015 Fond du Lac Ojibwe School SRTS Plan identified locations on surrounding streets where students were facing challenges when walking and biking to school. Often, these challenges were due to wide streets and lack of separated space, resulting in high vehicle speeds, reduced visibility, and poor driver yielding behavior.

The intersections of Big Lake Road (CR 7) at Brevator/University Rd and Reservation Rd/Trettel Ln were observed to be particularly challenging for students walking to and from the School. Additionally, the UMN Road Safety Institute identified pedestrian safety as FDL's top concern, and noted Big Lake Road as a "hot spot." Furthermore, the Fond du Lac Tribal Transportation Safety Plan identified Big Lake Road "at-risk," including the intersection of Big Lake Road & Trettel Lane. The UMN Humphrey School identified 31 crossings per day at Big Lake Road & Trettel Lane and recommended to consider equity in future roadway improvements, not just efficiency.

There has been general interest in this geographic area from other partners after a June 2020 crash; this includes MnDOT Office of Traffic Engineering, State Aid (Statewide), MnDOT District 1, MnDOT District 1 State Aid, and Carlton County (with a focus on upcoming work on Big Lake Road). There is a parallel SRTS Engineering Study happening on this corridor, which started in the summer of 2020.

The photos on the right show long crossings across multiple lanes, large corner radii, and unmarked crosswalks without crossing signs (top left: Big Lake Road & Reservation Rd/Trettel Ln; top right: Big Lake Road & Brevator/University Rd). The bottom photo shows a recently completed sidepath on the south side of Big Lake Road between University Rd and Trettel Ln.

Because of their proximity to the school and the documented challenges, these two intersections were selected by local stakeholders and the County Engineer to pilot high visibility crosswalks, lane reductions, median refuge islands, and curb extensions using traffic paint and flex posts.



Making it Happen

CHOOSE LOCATION (AUGUST 2020):

MnDOT and consultant staff met with the County Engineer and staff from FDL to review recommendations from previous studies (including the 2015 SRTS Plan) and determine which infrastructure recommendations, if piloted as a demonstration project, would have the greatest impact on safe and comfortable walking and biking to school. From this meeting and subsequent conversations, the intersections of Big Lake Road at Brevator/University Rd and Reservation Rd/Trettel Ln were selected for a demonstration project.

DESIGN (SEPTEMBER 2020): MnDOT and consultant staff worked with the Carlton County Engineer to design the intersection to reduce crossing distances, calm traffic, and improve visibility (see example concept design for one of the two intersections to the right). District and local transportation staff were consulted to check that school buses, emergency vehicles and freight vehicles were able to be accommodated within the intersections.

Once the design was finalized and reviewed by the County Engineer, MnDOT and consultant staff ordered the demonstration project materials.

INSTALLATION (OCTOBER 2020):

Approximately 16 FDL, MnDOT, consultant, and Carlton County staff installed the demonstration project on October 13.

First, the intersections' pavement was

cleaned of debris. Next, the curb lines were outlined with chalk following the design dimensions, and the interiors were painted with earth tone paint. The curb extensions were outlined with white paint and lined with white flex posts.

In coordination with traffic control crews, high-visibility crosswalks were painted using paint and a rectangular stencil. Median refuge islands were painted using yellow lines and yellow flex posts. Temporary crossing signs were placed at crosswalks and in advance on far west and east Big Lake Road project extents. Lane assignment signs and arrow modifications were made to reflect lane reductions implemented as part of the project.

Photos of the installation are shown on the following page.



PROJECT SUMMARY

INSTALLATION DATE: October 2020

DAYS TO INSTALL: 1

MATERIAL COST: ~\$30,000 (including signs, posts and bases that can be reused on future projects)

STAFF USED TO INSTALL:

Approximately 16

FEATURED ELEMENTS INSTALLED:

- Seven curb extensions
- Seven high-visibility crosswalks
- Four lane reductions
- Two median refuge islands





Evaluation and Results

Thoughtful evaluation can help to build support for active transportation and achieve long-term goals around equitable street design. Carlton County and FDL can use information and data collected before and after the installation to inform changes to the project design. This section discusses evaluation tools used and the results received.

IN-PERSON OBSERVATION AND PHOTOS

During installation, project staff and partners observed the demonstration project area while noting and discussing conflicts, circulation patterns, and the behavior of people sharing the road. Following the installation, the team observed again and concluded the following:

- School bus drivers and private vehicles appeared to approach the intersection and make turning movements at slower speeds
- People waiting to cross Big Lake Road were able to stand within the temporary curb extensions and median refuge islands for increased visibility
- During the time the demonstration project was installed, a few flex posts were damaged at the curb extensions due to large vehicles making the turns.

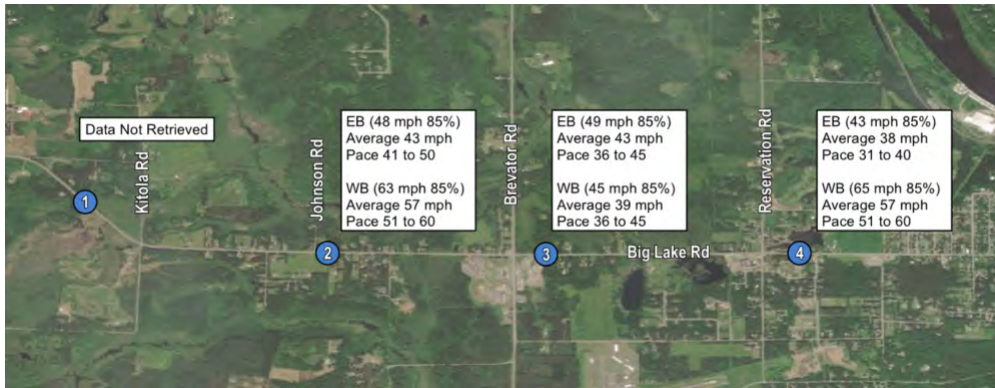
MOTOR VEHICLE DATA COLLECTION

Tubes were set on October 13 at four locations along Big Lake Road. The posted speed limit on Big Lake Road is 50 MPH. The purpose of the data collection effort was to collect weekday bi-directional speed data on the roadway immediately after the completion of the Demonstration Project installation at the two intersections.

Three of the four locations retrieved speed data, and only one site retrieved data for the full three days. The inconsistent amount of data retrieved between each site is likely attributed to several external factors, including a truck or heavy vehicle pinching the tube or the tube not being taut enough.

A summary of the speed data is shown in the table and figure below and on the following page. The data summarizes the total amount of time the tubes were in-place, including time that overlapped with the demonstration project installation

Location on Big Lake Road (CR 7)	Data Retrieved	85 th Percentile Speed		Average Speed	
		Eastbound	Westbound	Eastbound	Westbound
1. West of Kitola Rd	0 hours				
2. East of Johnson Rd	30 hours	48 MPH	63 MPH	43 MPH	57 MPH
3. East of Brevator Rd/University Rd	18 hours	49 MPH	45 MPH	43 MPH	39 MPH
4. East of Reservation Rd	3 days	43 MPH	65 MPH	38 MPH	57 MPH



which occurred throughout the full day on October 13.

Overall, the eastbound travel speeds were lower than the 50 MPH posted speed limit, especially at the location east of Reservation Rd. Westbound travel speeds exceeded the 50 MPH posted speed limit near the Johnson Road and Reservation Road intersections. Lower westbound speeds were experienced near the University Road intersection, which may have been impacted by the demonstration project installation activity and traffic control.

PUBLIC SURVEY AND COMMUNICATION

Carlton County and project partners provided a press release and informational signs to invite community members to engage with the project and provide input. The informational signs included a short description of the project, contact information, and a QR code and link to access a public perception survey.

There were a limited number of recorded surveys; however, the majority of respondents indicated that traveling feels easier and safer with the changes, it is easier to see other road users, and driver speeds are lower. Overall, most people felt positive about the temporary changes becoming permanent. Respondents indicated that they like the following about the demonstration project:

- "It slowed down the traffic which is a plus"
- "It brought attention to the fact that something else is needed to ensure better safety to this intersection"
- "Crosswalks for pedestrians"

Ideas for improvement included lowering the speed limit, additional signage to encourage motorists to slow down, and a need to "continue the study to ensure that safety for all residents, both pedestrian and vehicles, is addressed."

Recommendations for Long-Term Change

Carlton County and partner stakeholders are interested in improving active transportation safety and connectivity in the near- and long-term. This demonstration project is a step towards safer and more comfortable walking and biking to and from Fond du Lac Ojibwe School, as well as other origins and destinations on either side of Big Lake Road. The designs evaluated during the demonstration project can provide several long-term benefits:

- Shorter pedestrian and bicyclist crossing distances
- Better pedestrian and bicyclist visibility at corners
- Slower driver turning movements and approach speeds
- Increased space for landscaping and other site furnishings

WHAT ASPECTS OF THE PROJECT WORKED WELL?

- The project was a chance to quickly and efficiently plan, design, install, and evaluate the project.

- The project made it easier and safer to walk and bike in the area through:
 - Shortened crossing distances and increased visibility of people crossing the street.
 - Potential for increased yielding by motorists, due to slower speeds and increased conspicuity of the crosswalks
 - Engagement around new ideas to promote active transportation

WHAT ASPECTS OF THE PROJECT COULD BE REFINED FOR LONG-TERM CHANGE?

- Share illustrative concepts of more permanent designs with the public. This could help avoid confusion by showing residents what long-term changes to the site could look like and could better communicate the project's intent.
- Educate families that drive to school about the importance of Safe Routes to School and appropriate driving behavior near schools.

- Consider using thermoplastic to create pavement markings. This material lasts longer than traditional traffic paint.

WHAT COULD BE CONSIDERED LONG-TERM?

- **STREET RESURFACING:** Carlton County plans to resurface 16th Street NE in the near future. It is recommended that more permanent elements of the demonstration project are incorporated into the scoping of this project.
- **WINTER MAINTENANCE:** Long-term design should consider winter maintenance and allow snow plows to navigate through curb extensions and median refuge islands. Reflective markers on poles and painted curbs can provide additional guidance. Street maintenance leaders should be included in the design of long-term intersection changes.

RECOMMENDED NEXT STEPS

- Coordinate with local leaders to discuss permanent changes
- Use the findings presented here and other data to develop additional design documents for a long-term concept
- Gather public and stakeholder input regarding the proposed long-term project