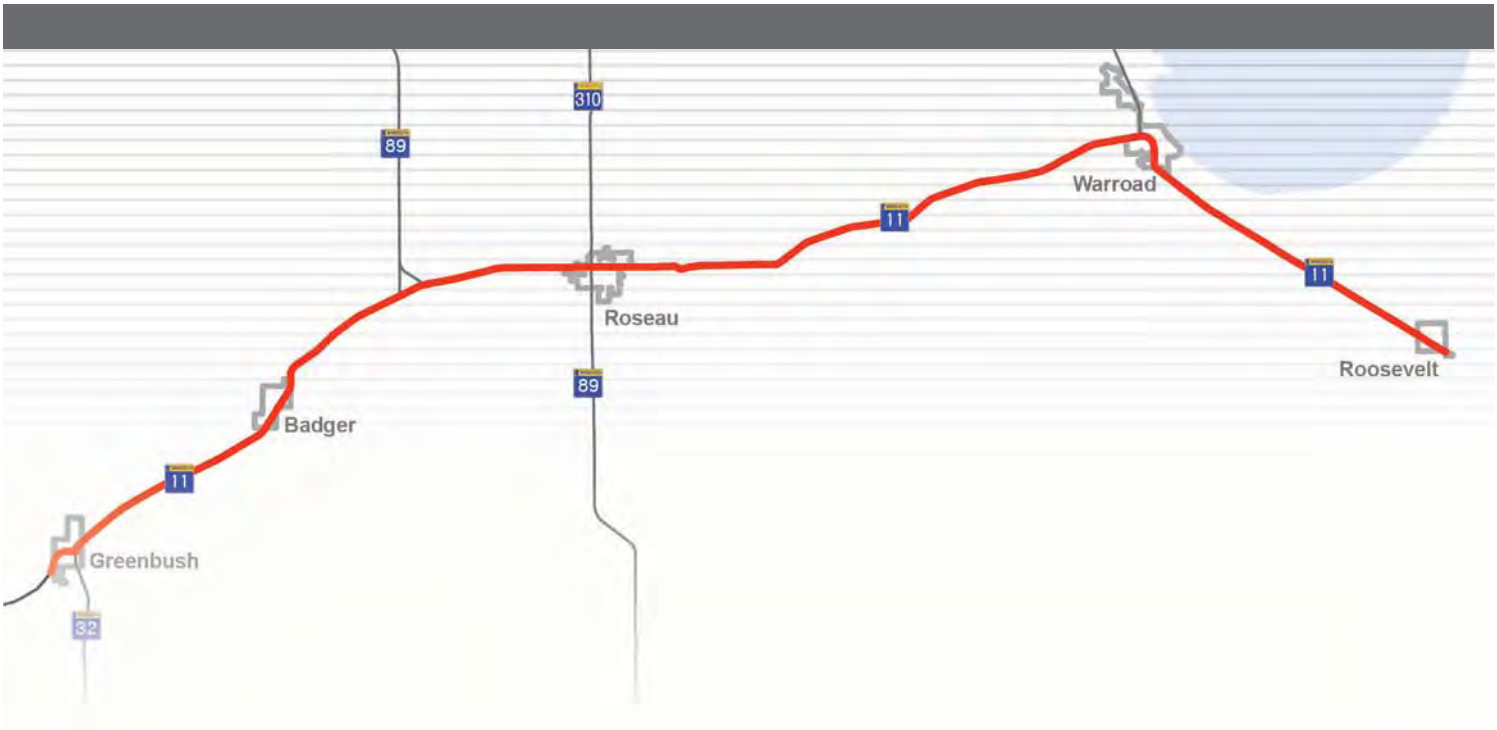

MINNESOTA DEPARTMENT OF TRANSPORTATION

HIGHWAY 11 CORRIDOR STUDY

September 2016

TH 11 CORRIDOR ASSESSMENT STUDY

MNDOT
ROSEAU COUNTY
NWRDC
CITY OF BADGER
CITY OF GREENBUSH
CITY OF ROOSEVELT
CITY OF ROSEAU
CITY OF WARROAD

September, 2016

Table of Contents

List of Figures

List of Tables

HIGHWAY 11 CORRIDOR STUDY

Executive Summary

August 2016

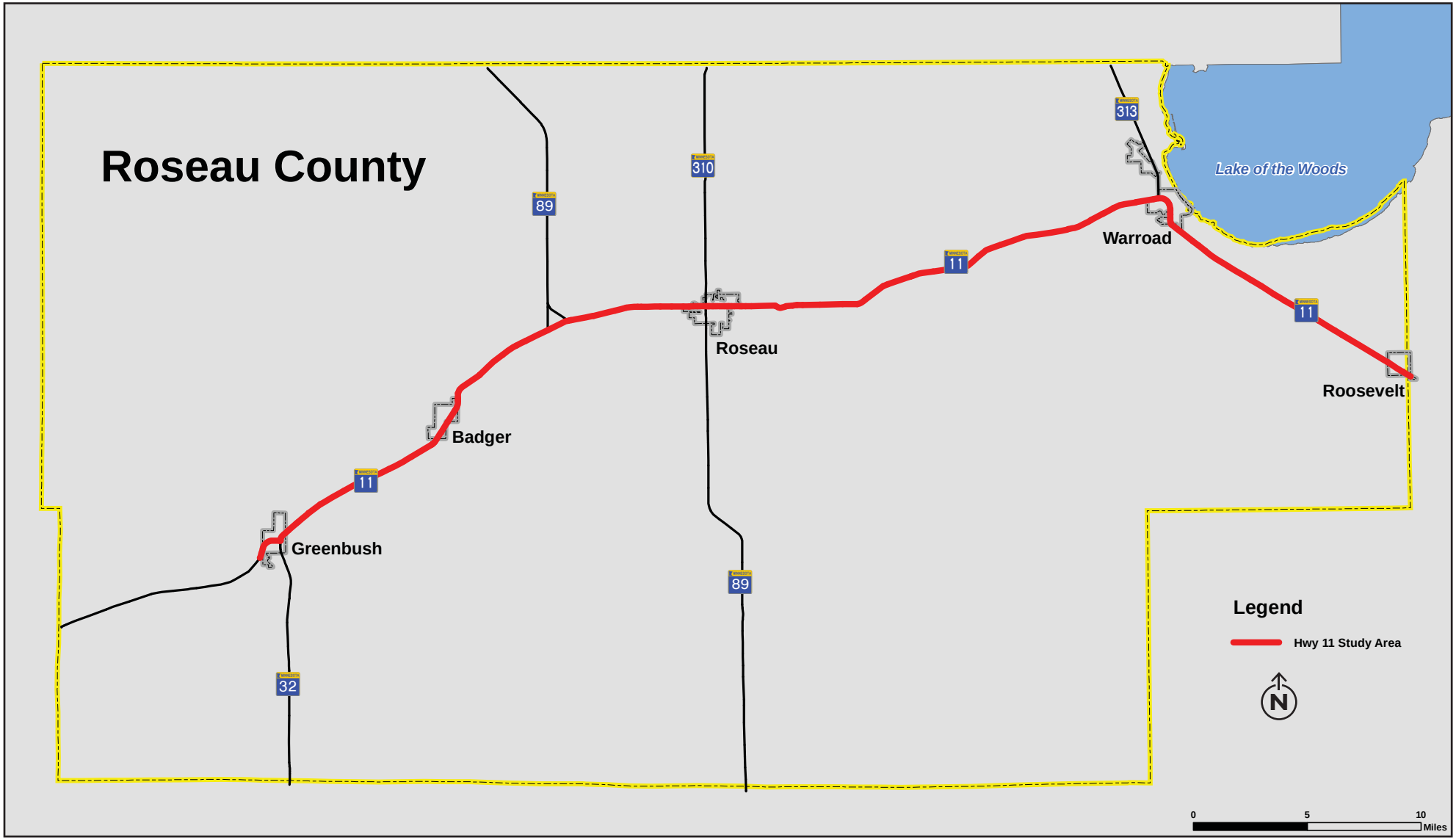

Figure 1: Corridor Study Limits

Study Partners

The Highway 11 Corridor Study was a joint effort between:

- MnDOT District 2
- Roseau County
- Northwest Regional Development Commission (NWRDC)
- City of Badger
- City of Greenbush
- City of Roosevelt
- City of Roseau
- City of Warroad

Corridor Context

Highway 11 in Roseau County is an important roadway that provides essential connections between a number of communities within Minnesota, and serves as a major route used for commerce between the US and Canada. The 60-mile corridor serves as the primary east-west arterial route for the communities of Greenbush, Badger, Roseau, Warroad, and Roosevelt. It is a primary link to one of four international border crossings that is open year-round, 24 hours per day; accordingly, the corridor supports a high number of freight trips. Highway 11 also provides regional access to recreational destinations including outdoor activities and resorts around Lake of the Woods. Along with these connections, the corridor is home to two large manufacturing facilities in Roseau (Polaris) and Warroad (Marvin Windows & Doors) that are vital to the stability of the local economy. The corridor is classified as a principal arterial route and, based on its important role in linking regional trade centers; the Minnesota Department of Transportation (MnDOT) has designated this segment of Highway 11 as a High Priority Regional Corridor.

Because of the role that Highway 11 plays within the region, the Highway 11 Corridor Study was initiated by MnDOT to identify existing and future conditions along the corridor. The focus of the study was to identify strategic improvements (along with ongoing maintenance and asset protection) that can be made between now and 2040 to provide for both safety and mobility on the corridor and to help support local and regional economies.

Study Objectives

The overall objective of the Highway 11 Corridor Study is to develop a long-term plan that identifies and prioritizes safety and mobility improvements that compliment ongoing maintenance and preservation activities and can be implemented between now and 2040. Strategic investments will require coordination with partner agencies and input from the public as projects move towards implementation.

Due to statewide challenges in securing adequate, predictable and stable sources of transportation funding, it is important for MnDOT and its partners to identify needs and to prioritize potential improvements. This requires a general understanding of existing and future conditions, identifying and agreeing on key problem areas, developing alternatives to solve those problems, and prioritizing investments so that the corridor can function to the best of its ability. To formalize this process, the study has established the following goals:

- Obtain community and agency agreement on identified needs, concerns, and opportunities in the corridor
- Identify improvements that address recognized safety concerns
- Identify improvements that increase travel predictability and reliability
- Identify mobility improvements that address congested intersections and/or corridor segments
- Identify projects that serve community, agency, and corridor needs and minimize negative impacts to the natural and cultural environment
- Identify projects that support community and economic development opportunities
- Identify improvements that are implementable over the next 20–25 years
- Prioritize improvements based on funding availability, community and stakeholder support, and identified need

Corridor Needs

The corridor study process included a review of existing demographics, development patterns, safety, and traffic conditions. Future traffic and development were also considered. This review was supplemented by public and agency input. The following corridor needs were identified through this process:

- **Safety improvements:** Safety problems were identified at five intersections and 11 highway segments.
- **Access management:** Ten segments were identified with high concentrations of driveway access to the highway. High concentration of access is associated with safety and congestion problems.
- **Congestion:** No areas of Highway 11 are currently congested. The current two-lane design will accommodate existing and future traffic. The exception is within the City of Warroad, where congestion is expected to occur by 2040.
- **Passing opportunities:** Highway users would like to see improved passing opportunities. Passing can be difficult due to the volume of truck and recreational vehicle/trailer traffic on the highway. Passing can also be difficult around shift changes at Polaris and Marvin Windows & Doors.

The study also identified ongoing maintenance and preservation needs to keep pavement, bridges, culverts, stormwater conveyances, traffic signals, and sidewalks in good condition. MnDOT will need to keep up with maintenance and preservation to avoid costly projects in the long term.

Project Identification and Prioritization

Based on the assessment of corridor needs, design concepts were developed to address issues at 13 key areas shown on **Figure 2.** The design concepts focused on the following:

- **Safety improvements:** reducing intersection skew, turn lanes
- **Access management:** frontage roads, center left-turn lanes, and closing/consolidating driveway access
- **Future congestion:** Expansion to three-lane roadway with center left-turn lanes
- **Passing opportunities:** Expansion super-two roadway by adding passing lanes, expansion to four-lane roadway in key locations

Projects were prioritized based on feedback from the public, study partners, and MnDOT staff. This feedback was used to categorize each recommended concept into three priority levels: A, B, and C. Concepts that address documented safety and congestion issues were ranked higher than other concepts. Project areas and prioritization are shown in **Table 1** and on **Figure 2**.

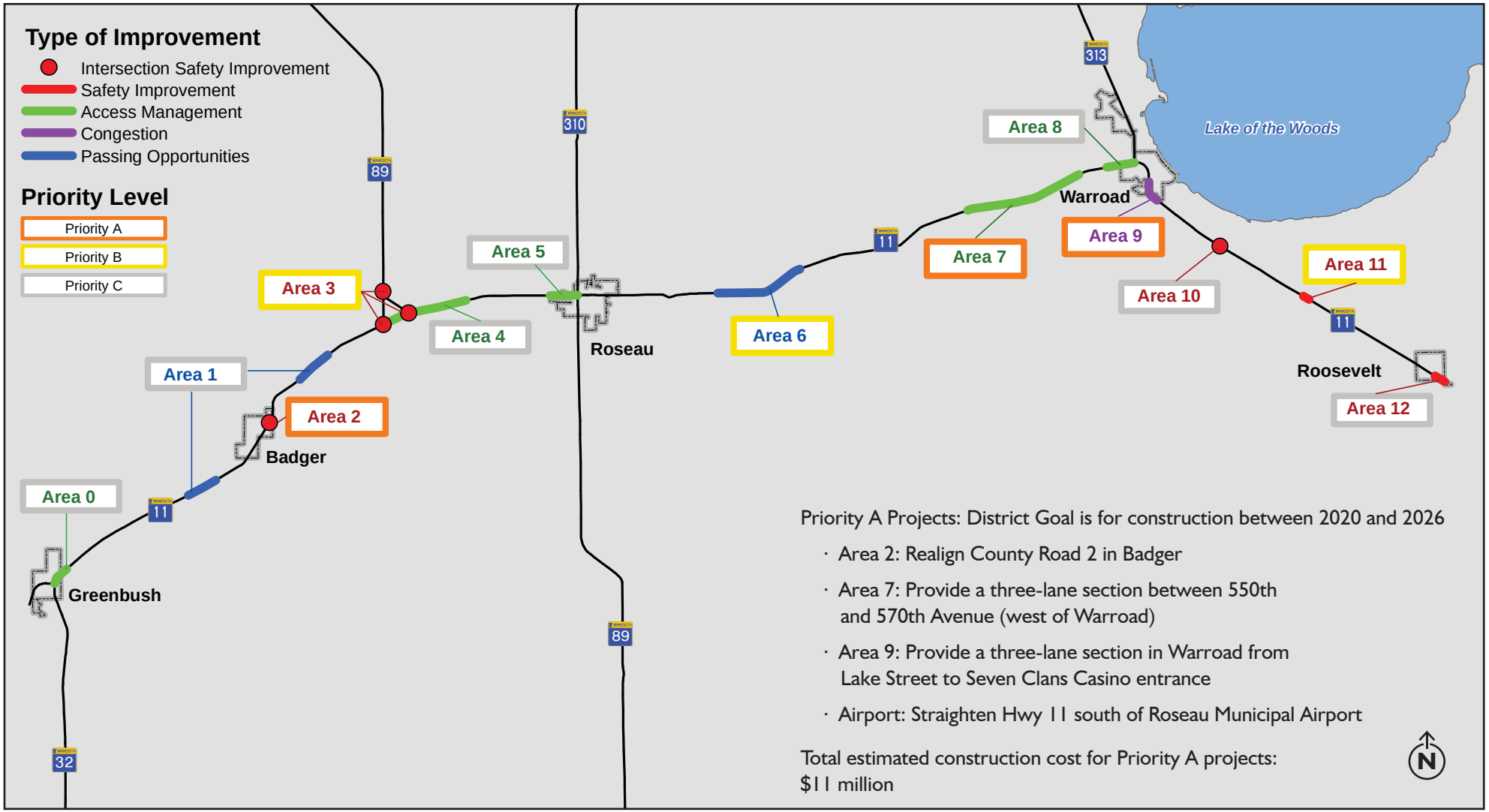

Figure 2: Priority Areas on Highway 11

Area	Option	Description	Estimated Cost	Priority Level
2	A	Realign Cty Rd in Badger and close/realign access north of Cty Rd 2	$1.9-2.2 million	A
7	B	Convert Hwy 11 to three-lane section between 550th and 570th Avenues and construct frontage road west of 560th Avenue	$2.3-2.5 million	A
9	A/C	Reconstruct Hwy 11 with three-lane section with sidewalk and no parking	$3-4 million	A
Airport	1	Realign Hwy 11 south of Roseau Municipal Airport	$3 million	A
3	A	Realign intersections so Hwy 308 is route to border and construct frontage road north of Hwy 11	$2-2.5 million	B
6	C	Construct staggered east and westbound passing lanes on new roadway alignment between 440th Avenue and Hay Creek	$1.2-1.5 million	B
7	D	Construct westbound passing lane between 530th and 550th Avenues	$1.5-2 million	B
11	A	Realign intersection with 650th Avenue and construct turn lanes at 650th Ave and Cty Rd 34	$500,000-700,000	B
0	A	Consolidate access between Hwy 32 and Cty Rd 4	$50,000-100,000	C
1	A	Construct eastbound bound passing lane between 290th Avenue and Cty Rd 26	$1.1-1.3 million	C
	B	Construct westbound passing lane between 250th Avenue and 260th Avenue	$0.9-1 million	C
4	B	Convert Hwy 11 to a three-lane section between 330th and 350th Avenues	$1.5-2 million	C
5	A/B	Consolidate access and construct/extend frontage roads between 380th Ave and Hwy 89	$400,000-500,000	C
8	A	Frontage roads south of Hwy 11, between 580th Ave and Hwy 313	$1.4-1.6 million	C
10	A	Realign Hwy 11 intersection with Cty Rd 12 and construct turn lanes	$1-1.2 million	C
12	A	Left turn lanes on Hwy 11 near 697th Avenue	$300,000-500,000	C

Table 1: Project Priorities

Implementation and Funding

The concepts developed as part of this study are high-level and will need refinement.

Additional design, studies, and public input will be needed for each of the recommended concepts to move forward.

Current funding for Highway 11 appears adequate for maintenance/preservation needs as well as limited smaller improvements such as turn lanes and shoulder widening. The larger projects recommended in the study are considered unfunded at this time. MnDOT will seek funding for these projects through competitive state and federal funding programs and as additional funding becomes available at the district level.

MnDOT aims to complete Priority A projects within the next 10 years. Given the need for additional study and design, 2020 is the soonest these projects would be constructed. The total estimated construction costs for Priority A projects is approximately $11 million. MnDOT intends to get these projects ready so that as funding becomes available, they are ready for construction. MnDOT will also work to tie improvements into planned maintenance and preservation projects, but opportunities to do so are limited given current funding levels.

To view more information about this study and the recommended improvements, please visit the MnDOT project website at: http://www.dot.state.mn.us/d2/projects/hwy11assessment/index.html

Section 1 Introduction

Trunk Highway 11 (TH 11) in Roseau County is an important roadway that provides essential connections between a number of communities within Minnesota, and serves as a major route used for commerce between the United States of America and Canada. The 60-mile corridor serves as the primary west-east arterial route for the communities of Greenbush, Badger, Roseau, Warroad, and Roosevelt (**Figure 1**). It is a primary link to one of four international border crossings that is open year-round, 24 hours per day; accordingly, the corridor supports a high number of freight trips. Highway 11 also provides regional access to recreational destinations including outdoor activities and resorts around Lake of the Woods. Along with these connections, the corridor is home to two large manufacturing facilities in Roseau (Polaris) and Warroad (Marvin Windows) that are vital to the stability of the local economy. The corridor is classified as a principal arterial route and, based on its important role in linking regional trade centers; the Minnesota Department of Transportation (MnDOT) has designated this segment of TH 11 as a High Priority Regional Corridor.

Because of the role that TH 11 plays within the region, the TH 11 Corridor Study was initiated by MnDOT to identify existing and future conditions along the corridor so that strategic improvements (along with ongoing maintenance and asset protection) can be made between now and 2040 to provide for both safety and mobility on the corridor and to help support local and regional economies.

This report is broken down into five primary sections that provide the reader with an understanding of the study background and purpose, study participation, existing and future conditions, options for improvements, and recommended improvements to be implemented over the next 25 years given funding and other constraints. The sections of the report include the following:

1. Introduction – Highlights the purpose of the study, the corridor partners, the Technical Advisory Committee, the study process, and the public involvement component.

2. Corridor Issues Identification and Confirmation – Documents existing and future issues related to demographics, land use, access, safety, traffic, and operations on the corridor.

3. Identification, Evaluation, and Selection of Alternatives – Describes alternatives for strategic investments that were considered for maintaining and improving conditions on the corridor. This section also identifies ongoing investments that MnDOT recognizes will be needed for ongoing maintenance and preservation on the corridor so that assets (pavement, bridges, culverts, traffic signals, sidewalks/curb ramps, and storm sewer) remain serviceable.

4. Implementation and Staging of Improvements – Sets forth the process by which individual projects, ongoing maintenance, corridor preservation activities and further study will be prioritized over the course of the next 25 years.

Roseau County

Lake of the Woods

Warroad

Roseau

Roosevelt

Badger

Greenbush

MINNESOTA 313
MINNESOTA 310
MINNESOTA 89
MINNESOTA 11
MINNESOTA 11
MINNESOTA 11
MINNESOTA 89
MINNESOTA 32

Legend

TH 11 Study Area

0 5 10 Miles

N
W E
S

Figure 1: Corridor Study Area

MINNESOTA DEPARTMENT OF TRANSPORTATION

5. Study Findings and Recommendations – Summarizes recommended improvements, their timing, and needs for additional study and investigation.

1.1 Study Objective and Goals

The overall objective of the TH 11 Corridor Study is to develop a long-term plan that identifies and prioritizes strategic safety and mobility improvements that compliment ongoing maintenance and preservation activities along TH 11 within Roseau County that can be implemented between now and 2040. Strategic investments will require coordination with partner agencies and input from the public as potential projects move forward for implementation. Projects recommended as a result of this study do not guarantee implementation within a specific timeframe due to uncertainty associated with funding and are not finalized; that is, additional input and refinement from partners and the public will occur before anything is constructed.

Because there have been statewide challenges in securing adequate, predictable and stable sources of transportation funding, it is imperative for MnDOT and its partners to identify what needs exist and to prioritize potential improvements. This requires obtaining a general understanding of existing and future conditions, identifying and agreeing on key problem areas, developing alternatives to solve those problems, and prioritizing investments so that the corridor can function to the best of its ability. To formalize this process, the study has established the following goals:

- Obtain community and agency agreement on identified needs, concerns, and opportunities in the corridor
- Identify improvements that address recognized safety concerns
- Identify improvements that increase travel predictability and reliability
- Identify mobility improvements that address congested intersections and/or corridor segments
- Identify projects that serve community, agency, and corridor needs and minimize negative impacts to the natural and cultural environment
- Identify projects that support community and economic development opportunities
- Identify improvements that are implementable over the next 20–25 years
- Prioritize improvements based on funding availability, community and stakeholder support, and identified need

1.2 Corridor Partners

The Highway 11 Corridor Study is a joint effort between:

- MnDOT
- Roseau County
- Northwest Regional Development Commission (NWRDC)
- City of Badger
- City of Greenbush
- City of Roosevelt
- City of Roseau
- City of Warroad

The corridor partners contributed to the development of the TH 11 Corridor Study in a number of ways. Most communities and agencies had representatives that served on the study's Technical Advisory Committee (TAC) whose role it was to guide the study. TAC members are familiar with the corridor and know what problems exist today and have an understanding of what improvements would be most beneficial to the overall corridor.

Members of the TAC provided input with regard to existing and future conditions, corridor needs, alternatives to be considered, and recommended solutions. The committee ensured that the correct issues were studied, viewpoints of local agencies and stakeholders were incorporated into the study, reasonable alternatives were developed and considered, and implementation of the proposed alternative would be consistent with local plans and policies. Members of the TAC also communicated information from the study back to their respective organizations and provided MnDOT with feedback from elected officials and key stakeholders.

1.3 Study Process

The TH 11 Corridor Assessment Study is a 25-year implementation plan that has incorporated the following main stages of plan development:

1. Organization and Initiation
2. Issue Identification and Confirmation
3. Identification and Evaluation of Alternatives
4. Implementation and Staging of Improvements

1.4 Stakeholder Outreach

Successful planning studies provide for effective decision-making that foster a cooperative spirit and build trust and relationships between and among partners and other stakeholders. These relationships are one of the most important elements in developing and implementing a corridor plan. The ultimate success of this plan will not hinge on this report, but will be judged on the partners' ability to continue to work together to implement the identified projects so

that safety and mobility are improved, impacts to adjacent resources are minimized, and the area grows economically. This requires early and ongoing involvement of interested stakeholders.

The Highway 11 Corridor Study used the following methods to promote stakeholder involvement:

Technical Advisory Committee:

As explained previously, the TAC plays an important role in communication information to constituents and elected officials, as well as providing constructive input into the plan's goals, objectives, strategies and recommendations.

Focus Group Meetings:

During the course of the study a series of focus group meetings were held to gain insight on existing problems on the corridor and to collect input on what stakeholders would like to see on Highway 11. The intent of the meetings was to reach out to a wide cross section of Highway 11 user groups so as to get a broader perspective on corridor needs and desires. Stakeholder groups that participated in the meetings included representatives of the following agencies/industries/interests throughout the corridor:

- Emergency responders
- Schools
- Business and chambers – commercial and retail establishments
- Manufactures
- Recreational-related businesses
- Agricultural businesses
- Trucking and transportation businesses
- Casino

Individual Business Meetings:

For businesses and stakeholder groups that were unable to attend focus group meetings, individual phone calls were made or separate meetings were held to gather their input on the corridor.

Design Charrette Meetings:

The consultant team hosted a design charrette meeting with MnDOT District 2 staff to identify potential ideas for addressing the key problems identified as part of the technical analyses completed as part of the study as well as the feedback received from the TAC and the focus group meetings.

The meeting was a day-long event that included over 20 staff from MnDOT with expertise in highway design, traffic operations, right of way acquisition, environmental impacts and knowledge of the Highway 11 corridor. Staff was separated into different groups and were given a problem area to address – they were provided with information on crashes, access, types of land use, travel speeds and known environmental constraints. They were given an hour to

identify potential solutions for that particular area. In locations where focus groups or TAC meetings had recommended potential solutions, those ideas were given to the group. Each group was given three areas and then the group came back together to share their problem area and the ideas that they generated. The group provided feedback and suggested changes.

The ideas were then taken by the consultant to be further refined for presentation to the TAC and at open house meetings.

Prior to meeting with MnDOT District 2 staff, a condensed version of the charrette meeting was conducted with members of the TAC. The consultant team brought forth the key problem areas identified by the technical analyses and feedback from the TAC and the focus group meetings at a TAC meeting. TAC members were asked to identify problem areas that they wanted to generate ideas for and broke into groups to draw up potential options. Towards the end of the meeting, the larger TAC got back together to discuss the ideas that were generated. These ideas were then taken to the meeting with MnDOT staff.

Open House Meetings:

Two open house meetings were held on April 28, 2016 to present information about the Highway 11 study and to gather input and feedback on key problem areas, potential solutions and suggestions for implementation in moving projects forward. The meetings were held simultaneously in the Cities of Warroad and Roseau so that attendees did not have to travel more than 30 miles.

Attendees were provided background information about the overall corridor study and the corridor as a whole. Information on safety, congestion, travel times, speed limits, access, etc. was provided so that attendees understood the context of the corridor. In addition, information about outreach activities and input received from corridor stakeholders was presented. Attendees were provided a booklet containing information about the key problem areas and the draft concepts that had been developed to address those problems. Attendees were also given "transportation dollars" to assign to the projects/concepts that they liked best and felt were most needed to improve safety and congestion on the corridor. This information was then tallied to help identify priorities for the corridor.

Along with the booklet and "transportation dollars", comment forms were provided for each of the concepts presented at the open house so that attendees could let MnDOT and the consultant team know what they liked or did not like about certain concepts. A summary of the comments is included in **Appendix A**.

Project Website:

As part of the study MnDOT provided a project website. The website was developed to facilitate communication with the public and interested stakeholders. Information on the website included:

- Background information about the study
- Technical memos related to: land use and environmental conditions, asset condition, traffic, roadway characteristics, prioritized needs, and concept development
- Maps showing the existing corridor and information relating bridges, pavement, sidewalk, safety and traffic
- Summaries of the focus group meetings
- An interactive map that allowed visitors to add items to the issues list or to comment on issues that had been identified through technical analyses or the focus group input
- Information about the open house meetings
- Final study report
- Contact information of MnDOT staff

Press Releases, Local Newsletter, and Radio Ads:

In advance of the open house meetings, MnDOT prepared and distributed press releases, put ads in the local newsletters and had radio ads.

Presentations at City Council Meetings:

MnDOT met with each of the city councils and the Roseau County Board to present information about the study and the concepts developed. Feedback from elected officials was then incorporated into the study findings and recommendations and used to modify potential concepts.

In addition to the above outreach activities, MnDOT is committed to continuing its dialogue with the corridor partners so that updates on study implementation can be shared and to collect ongoing feedback on how the corridor is working. MnDOT intends to meet with partners as new concerns emerge or there is an update to the implementation plan. This is in addition to efforts that will be spent on implementing plan priorities.

Section 2 Corridor Issue Identification and Confirmation

One of the key steps in the development of the Highway 11 Corridor Plan was the identification and confirmation of issues along and near the corridor. This process included completing technical analyses as well as input from TAC members, the focus group meetings and comments from the website. Without this step, concept development and corridor recommendations would have little context and may not appear to fully address the needs of those traveling on, living on or operating near the corridor. This section of the report summarizes existing and future conditions on Highway 11 in order to identify key problems and concerns. Full memos, which contain more detailed analyses, are available on the project website and by request from MnDOT District 2 staff.

There are nine subsections related to corridor issues identification and confirmation.

- Section 2.1 Demographics - population and employment
- Section 2.2 Growth Areas
- Section 2.3 Access – number and type
- Section 2.4 Safety – intersections and roadway segments
- Section 2.5 Traffic – traffic volumes now and expected in the future
- Section 2.6 Congestion – travel speeds and intersections and roadway segment congestion
- Section 2.7 Corridor User Input
- Section 2.8 Key Problem Area Summary

2.1 Demographics

The text on the following pages summarizes past, present, and projected demographics that influence use of Highway 11. In locations where population and employment growth occur, there will be additional transportation demands on Highway 11 and its supporting infrastructure that need to be taken into account.

Population

The population of Roseau County has remained fairly steady, with 4 percent population growth since 1990. As of the 2010 Census, the population of Roseau County was 15,629. Roseau (population 2,633) and Warroad (population 1,781) were the largest cities in the corridor, with both of those communities growing at a slightly faster rate than the county as a whole. Greenbush, Badger, and Roosevelt have lost population since 1990 (Source: US Census). **Table 1** on the following page shows past, current, and projected population in the corridor.

As shown in **Table 1**, Roseau County is expected to grow by 14 percent between 2010 and 2030, based on data from the Minnesota State Demographer's Office. While projections are not available at the city level, it is anticipated that Roseau and Warroad would experience larger population gains than the smaller cities. While the actual projected increase in population (in terms of raw numbers) is not very high, it is a relatively high percent increase for a county that only grew 4 percent between 1990 and 2010. The growth that is projected to occur will impact demand on the transportation network.

Table 1: Population in the TH 11 Corridor

	Roseau County	Greenbush	Badger	Roseau (City)	Warroad	Roosevelt
1990 Population	15,026	800	381	2,396	1,679	180
2000 Population	16,338	784	470	2,756	1,722	166
2010 Population	15,629	719	375	2,633	1,781	151
2020 Population Projection	*16,703*	Not Available				
2030 Population Projection	*17,771*					
Percent Change in population: 1990-2010	4	-10	-2	10	6	-16
Projected population change (percent): 2010-2030	14					

Employment

The number of jobs in Roseau County has grown since 2002. This is important, because Highway 11 connects the major employment centers in the county. As of 2011, 91 percent of the jobs in the county were located in one of the five Highway 11 corridor cities, which means that employees and shippers are using Highway 11 on a regular basis.

Between 2002 and 2011, the number of jobs increased in all corridor cities except for Warroad, which experienced a 7.3 percent decrease in jobs. The number of jobs in Greenbush nearly tripled during this time period. Badger saw a similar increase in the number of jobs within the city. Roseau experienced a 15 percent increase in jobs between 2002 and 2011 (Source: US Census). **Table 2** shows the most recent employment data for the TH 11 corridor.

Table 2: Employment in the TH 11 Corridor

	Roseau County	Greenbush	Badger	Roseau (City)	Warroad	Roosevelt*
2002	8124	118	138	3081	3960	9
2011	8604	345	269	3569	3671	12
Percent change between 2002-2011	6	192	95	16	-7	33

*Roosevelt data is from 2009 (most recent available data)

Employment projections are not available for Roseau County or TH 11 corridor cities. The Minnesota Department of Employment and Economic Development estimates that employment in Northwest Minnesota (which includes Roseau County) will increase 5.9 percent between 2012 and 2022. This is largely consistent with the anticipated changes in population for the area.

2.2 Land Use

The text on the following pages summarizes existing land uses along Highway 11 as well as identifies future growth areas along the corridor. Land use and growth along Highway 11 is important to existing and future traffic volumes, travel conditions and opportunities to make improvements on the corridor. It also plays an important role in access needs to and from the highway. Additional information about existing land use and zoning is included in the TH 11 Existing Land Use and Environmental Conditions Memorandum.

Existing Land Use

Within and near the cities along the corridor, there is a mix of commercial, manufacturing, residential, and park/recreational land uses. Commercial, manufacturing, and residential land use is more concentrated in Roseau and Warroad than the smaller communities of Badger, Greenbush, and Roosevelt. **Figures 2 – 6** show existing land uses near the five communities located on Highway 11. None of the cities have zoning ordinances that regulate access to Highway 11.

Roseau is the largest city in Roseau County and is home to several agencies and businesses that attract regional traffic. Polaris Industries is a major employer in Roseau, located just south of Highway 11 on Highway 89. Roseau is also home to Roseau County offices and the LifeCare Hospital. The Roseau Municipal Airport is located just east of Roseau city limits. Additionally, a US-Canadian border crossing is located 10 miles north of Roseau and draws traffic from Highway 11.

Warroad is the second largest city in Roseau County. Regional traffic is drawn to the community due to several large employers, including Marvin Windows & Doors, Heatmor, and the Warroad Hospital. Regional recreational traffic also uses Highway 11 in Warroad to access parks and resorts along Lake of the Woods. There is a 24-hour border crossing located 6 miles north of Warroad on Highway 313. Highway 11 is a primary route to access Highway 313 and the border crossing, particularly when the Roseau border crossing is closed (12-8 AM). Additionally, the city has an airport that is located north of Highway 11 on Highway 313. Outside city limits, but near the community is the current location of the Seven Clans Casino which is operated by the Red Lake Band of Chippewa Indians. The casino is a popular tourist and recreational location.

Land use is typically agricultural or rural residential between the cities. There are some exceptions to the generally agricultural land use pattern along Highway 11, including several auto repair and salvage businesses, trucking businesses, and manufactured home communities.

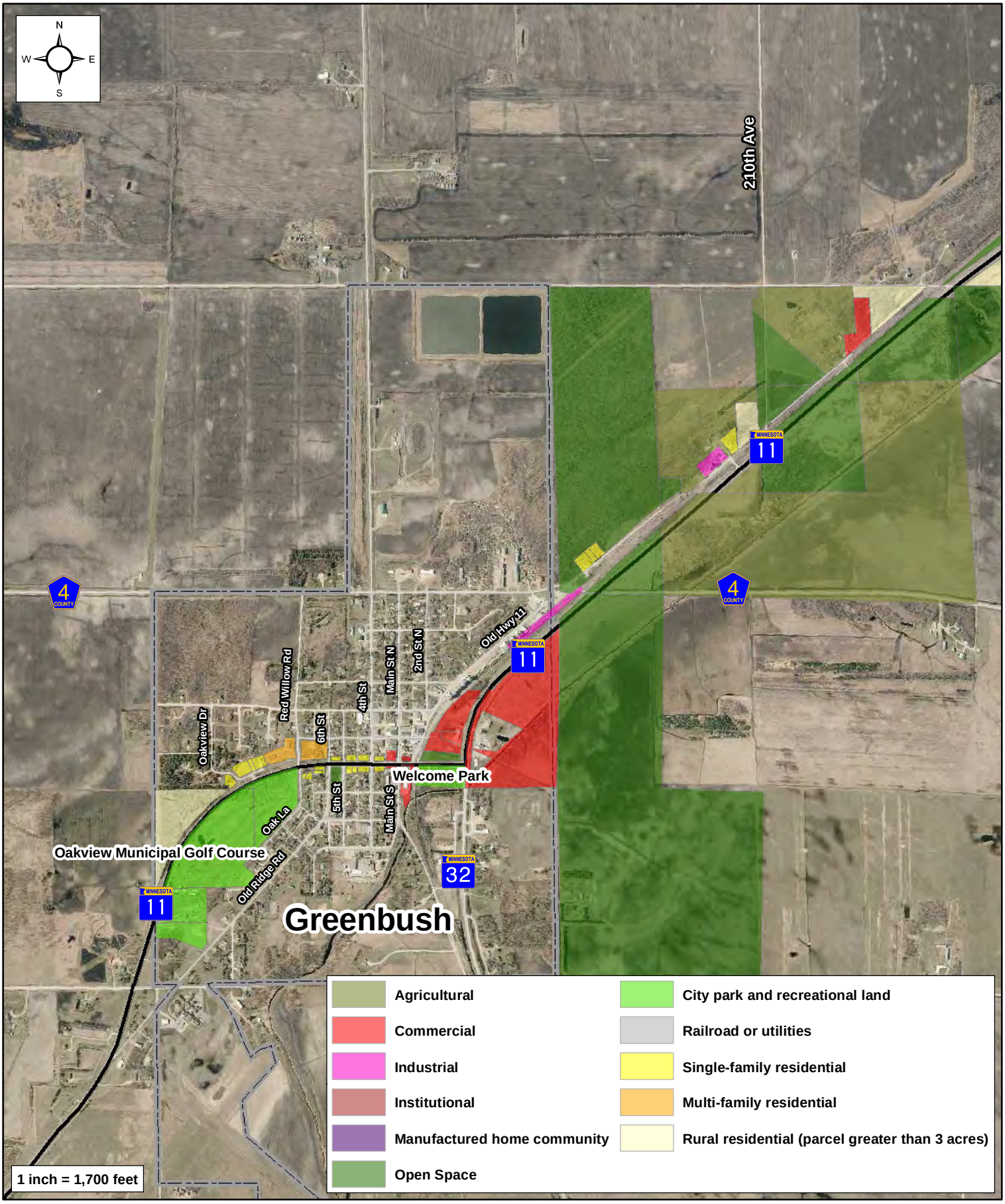

Figure 2
Greenbush Land Use

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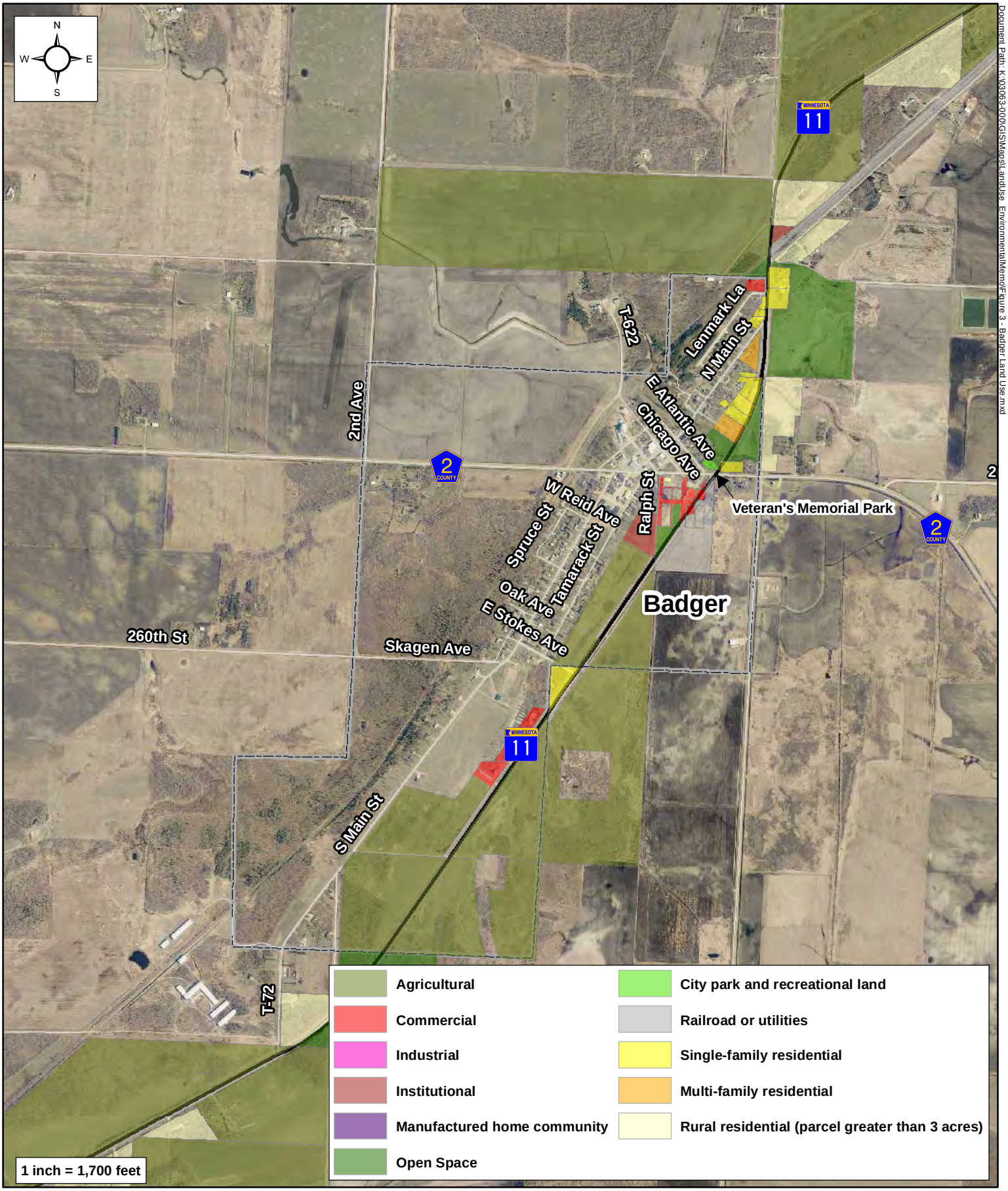
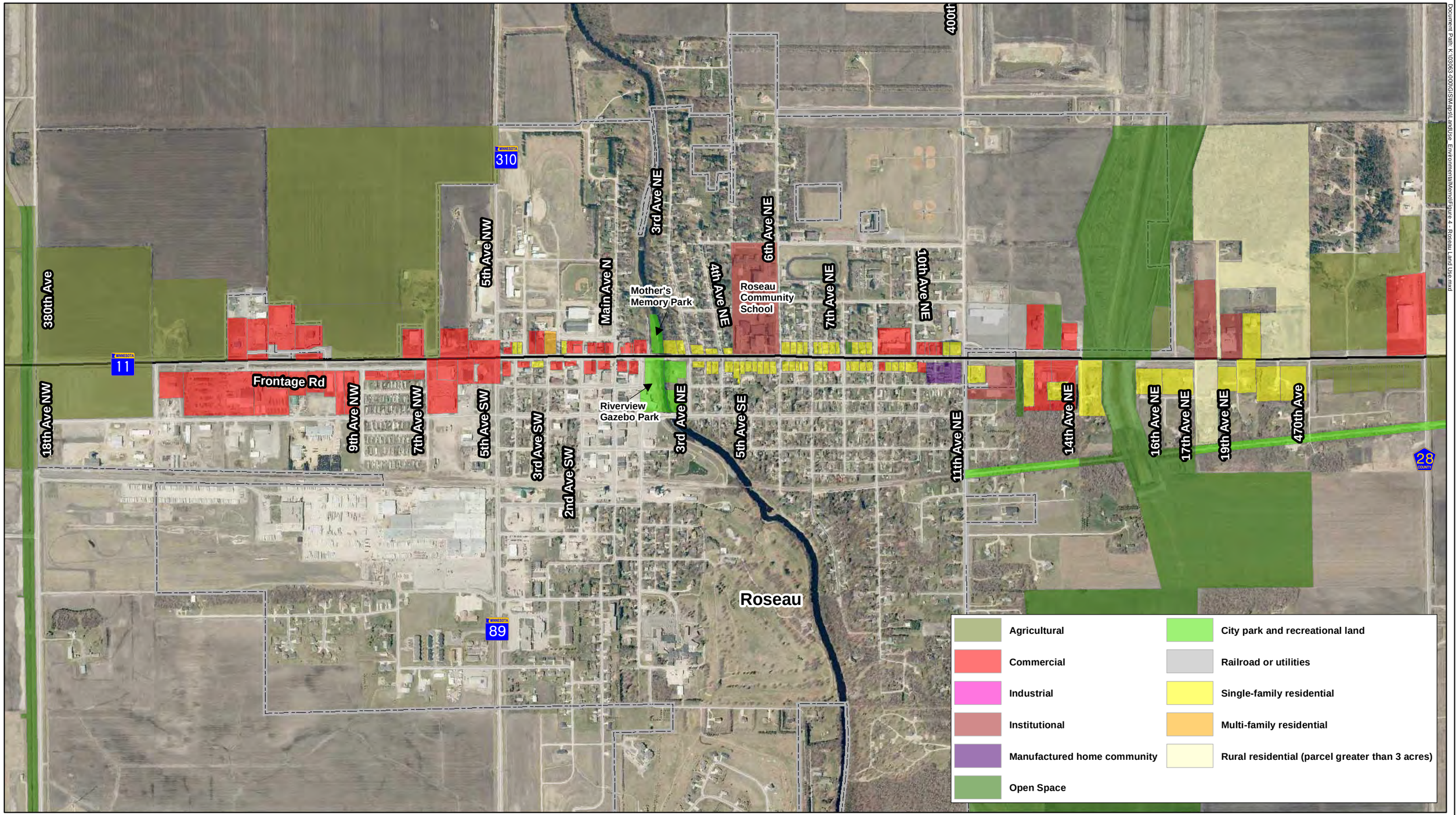


Figure 3
Badger Land Use



1 inch = 1,000 feet

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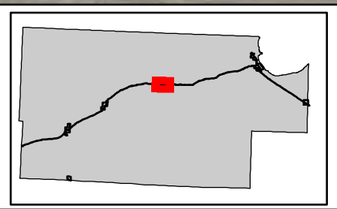

Figure 4
Roseau Land Use

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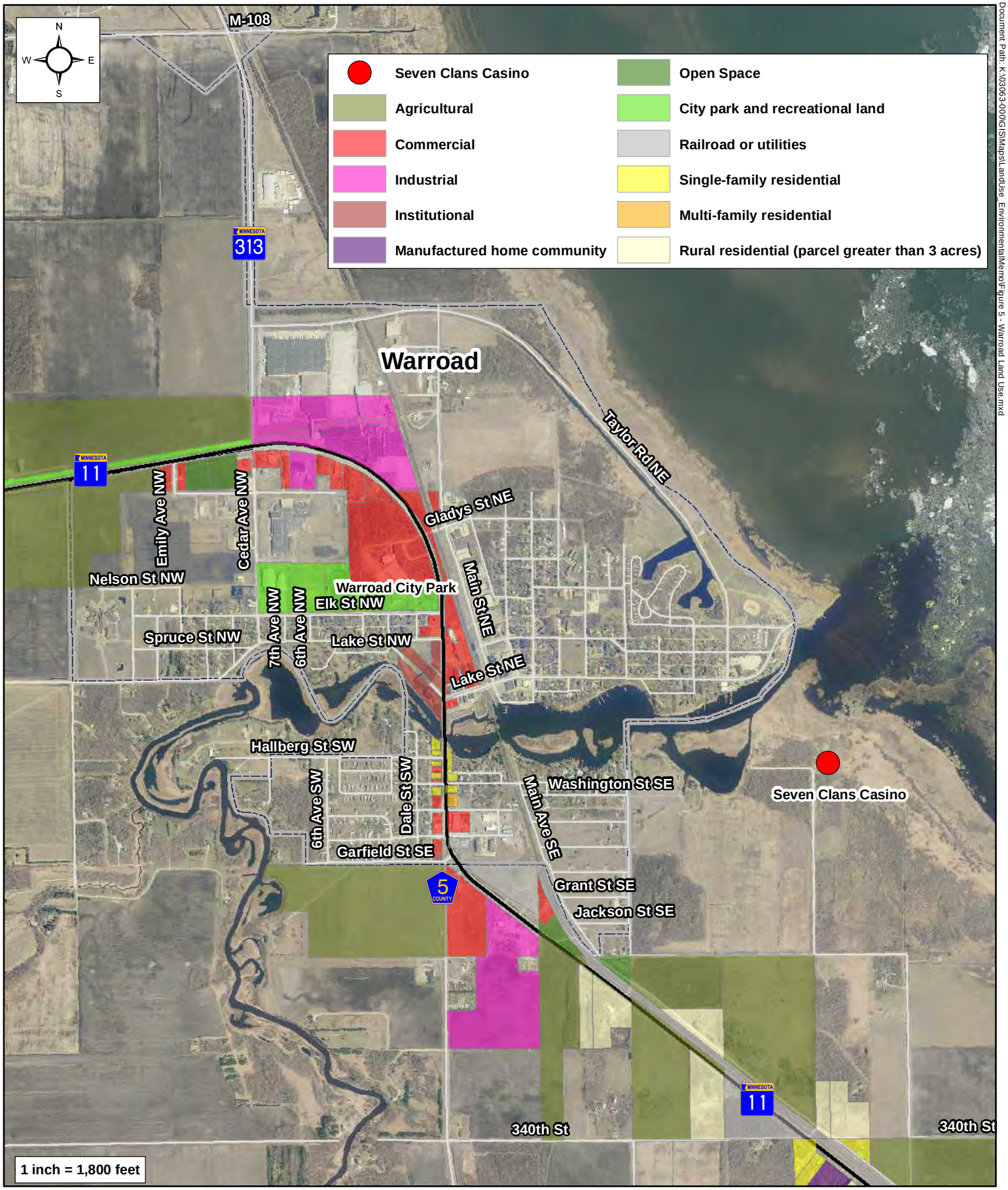
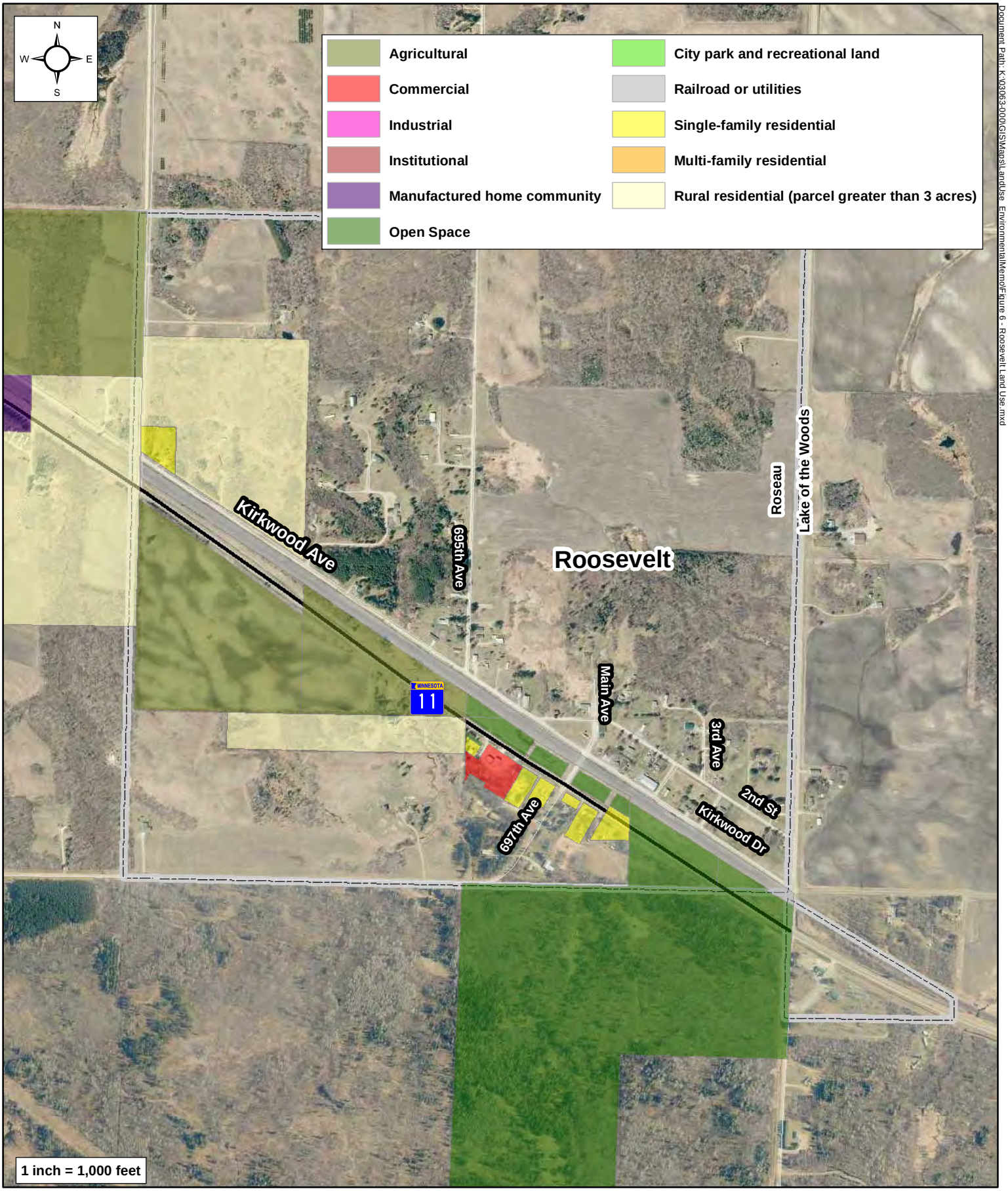


Figure 5
Warroad Land Use



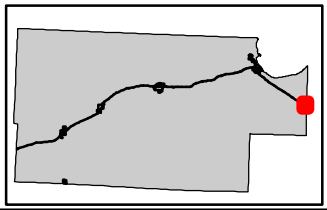


Figure 6
Roosevelt Land Use

Future Land Use and Growth Areas

At this time, there are no major growth areas that have been identified by the Cities of Greenbush and Roosevelt. In Badger, the Roseau County Co-op is considering expanding its storage facility south of Badger city limits. The existing facility is located north of TH 11 on 250th Street. Additionally, CHS-Northern Grain is considering relocating its grain elevators from its current location on James Street to a location south of Badger along Highway 11.

Most of the City of Roseau is developed with the exception of a few areas. Small areas that are still available for development include the land north of Highway 11 and east of 11th Avenue NE on the eastern end of town, the area west of 15th Avenue NW in the western end of town and some property adjacent to the existing Polaris site. The city indicated that growth on the western side of town was more likely in the short- to mid-term. A Roseau River diversion project was completed in fall 2015. The city anticipates development will be more desirable now that the diversion project is complete, as most of the city is no longer considered floodplain.

In the short- to mid-term, the City of Warroad anticipates future residential and commercial development on large city-owned and privately owned parcels west of Cedar Avenue NW. A residential development (Parker Farms) is also currently being planned along County State Aid Highway (CSAH) 45, southwest of city limits. This development will add traffic to CSAH 45 and Highway 11. Additionally, there is a potential commercial building development under consideration on Highway 11, south of Warroad city limits (between CSAH 5 and Laznicka Lane). The Red Lake Band of Chippewa Indians also has long-term plans for expanding the Seven Clans Casino site to bring more employment and tourists to the area.

2.3 Access

An issue closely linked to land use as well as safety and mobility is the amount and type of access to Highway 11. The more access that there is to the corridor, the more likely it is that a crash will occur and that there will be congestion. This is especially true for two-lane roadways like Highway 11. As shown in **Chart 1**, crash rates increase as the number of access points grows; and mobility decreases as shown in **Figure 7**.

Chart 1 – Amount of Access and Crash Rate Relationship

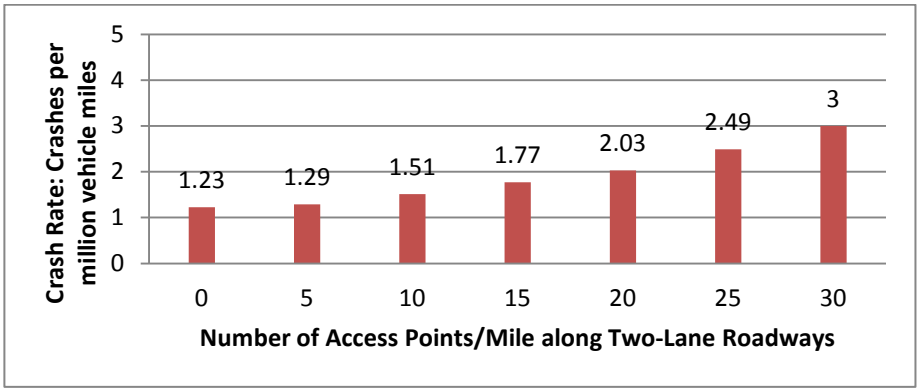
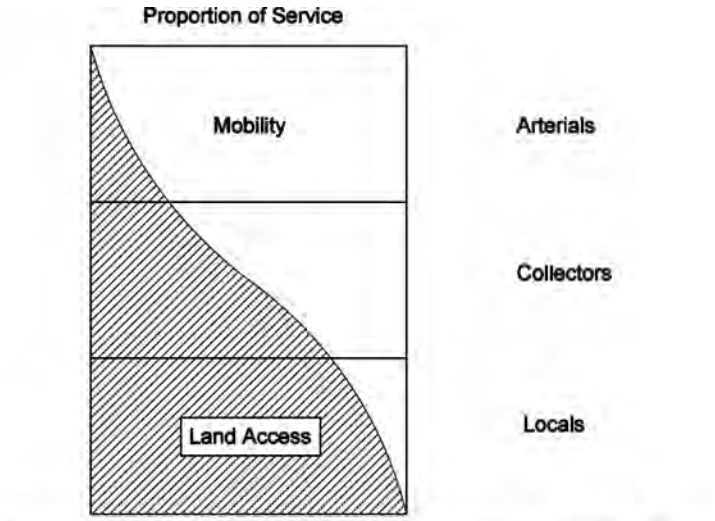


Figure 7 – Access Versus Mobility



Source: A Policy on Geometric Design of Highways and Streets, AASHTO, 2011 AASHTO Green Book

As part of this study, an inventory of all the access points along the corridor was taken. This inventory identified public street access points, private residential driveways, commercial driveways and field entrances. The intent of completing the access inventory was threefold. First, the inventory was completed to identify the location and type of access along the corridor. Second, the inventory was completed to identify the location and type of access that occurs. Second, the inventory was used to compare existing access to Access Spacing Guidelines developed by MnDOT for Highway 11. Finally, the inventory was completed to use as a tool to improve safety and mobility along the corridor.

The information on the following pages summarizes current access on the corridor, explains MnDOT's access guidelines for Highway 11 and identifies problem areas associated with access. Detailed information about current access and access management guidelines is included in the TH 11 Existing Roadway Conditions Memorandum which is available from MnDOT District 2. **Appendix B** includes figures showing the location of public road, driveway, and field access points along the entire Highway 11 corridor.

Current Access on TH 11

As can be seen in the figures included in **Appendix B**, there is a lot of access on Highway 11 within the study area. In fact there are approximately 600 access points within the 60-mile study area. This averages out to approximately 10 access points per mile. In some areas of the corridor, access points exceed 30 points per mile.

In total, the following access was observed on Highway 11:

- 126 public streets
- 349 residential driveways or field entrances
- 93 low-volume commercial entrances
- 29 high-volume commercial entrances

The amount of access is inconsistent with access guidelines established by MnDOT for the corridor as discussed in the section below.

MnDOT Access Management Guidelines for Highway 11

MnDOT has established access management guidelines to promote safety and efficient traffic operations on its highways. Most of Highway 11 does not meet MnDOT guidelines, as outlined in **Tables 3** and **4**. However, there are a number of driveways with access to the corridor that presently do not have any other alternatives. Unless these driveways are in an urbanizing area, there is generally little opportunity to find alternate access.

Table 3: MnDOT Access Management Guidelines for Highway 11

Land Use or Facility Type	Typical Posted Speed	Primary Full-Movement Intersection Spacing	Secondary Intersection Spacing	Driveway Allowance
Rural	45–65 mph	1 mile	½ mile	▪ If a property has access rights but no reasonably convenient and suitable alternative access is available, a driveway is permitted. ▪ The driveway should be located to minimize impacts to safety and operations. ▪ All driveways (Types 1 - 3) should be spaced in accordance with **Table 4**.
Urban/ Urbanizing	40–45 mph	½ mile	¼ mile	▪ If a property retains access rights but no reasonably convenient and suitable alternative is available, a driveway is permitted. ▪ MnDOT prefers to permit public streets rather than driveways. MnDOT should work with local agencies to encourage development of a supporting road system to serve the property. ▪ High-volume driveways should be spaced in accordance with **Table 4.** ▪ Driveways should be permitted as interim where a future supporting road system is anticipated.
Urban Core	30–40 mph	300–660 feet, dependent on block length		▪ If a property has access rights but no reasonably convenient and suitable alternative access is available, a driveway is permitted. ▪ Spacing will vary based on reasonableness of use and driveway expectancy.

Table 4: Spacing between Adjacent Driveways

Posted Speed (mph)	Rural (Types 1 & 2 – Single family, field access, or low-volume driveway) Spacing between Adjacent Driveways (feet) [(2)(4)]	Rural & Urban/Urbanizing (Type 3 – high-volume driveway) Spacing between Adjacent Driveways (feet) [(1)(2)(3)]
40	–	305
45	50	360
50	75	425
55	100*	495
60	100*	570

(1) Based on Stopping Sight Distance described in the AASHTO Green Book 2001 and the MnDOT Road Design Manual; uses posted speed instead of the design speed.

(2) Values shown in this table may be superseded to avoid the functional area of adjacent intersections and driveways, or to accommodate turn lanes for the proposed access.

(3) Spacing between adjacent driveways is based on a level roadway without any curvature. Additional distance may be needed in areas with curves.

(4) Spacing based on the Texas Transportation Institute "Safety of Driveways in Close Proximity to Each Other." Spacing was modeled for speeds between 45 mph and 60 mph. No data is available for other speeds.

*District 2 strives for a minimum of 300 feet between entrances in high speed (55+ miles per hour)

Based on the information presented above, there should only be approximately 60 full public street access locations on the corridor and 120 right-in/out access points on the corridor with a limited number of driveways. As can be seen in Appendix B and as summarized above, there are approximately 600 access points on the corridor.

Figure 8 shows the different roadway segments for Highway 11, whether or not access guidelines are met, and areas with concentrations of access. As can be seen on **Figure 8**, the only section of Highway 11 that meets MnDOT access spacing guidelines is in Warroad, between TH 313 and Gladys Street. All other areas of the corridor have access that is spaced more frequently than preferred based on MnDOT guidelines.

Key Access Management Problem Areas

It should be noted that the access guidelines established by MnDOT were developed after much of the access was already in place on the corridor. So, the inconsistency with the guidelines is not unexpected, especially in rural areas where there is a lack of supporting local roadways which should be providing access to development. It is, however, problematic, especially on the fringe areas of communities such as Roseau and Warroad and near smaller hamlets such as Fox and Salol. It is also problematic in some areas between Badger and Roseau where there are many single family homes constructed immediately adjacent to Highway 11.

Legend

- Does not meet MnDOT access spacing guidelines
- Access Management issue area - high concentration of access (does not meet guidelines)
- Meets MnDOT access spacing guidelines

Lake of the Woods

Roseau

Badger

Greenbush

Roosevelt

Warroad

Gladys St

Lake St

Cty Rd 5

0 5 10 Miles

N W E S

Figure 8: Access Management On Highway 11

MnDOT recognizes that it is not feasible or practical to eliminate all of the access that is inconsistent with MnDOT guidelines. Rather, it is emphasizing the importance of minimizing future access to the corridor to the extent practical as part of development and plat review at the county, city and township levels and addressing the areas where access is denser and/or is showing signs of emerging safety problems.

Based on a review of crash data (discussed in Section 2.4), and the location of access points, areas for reducing or modifying access along Highway 11 were identified. Areas include:

<u>High Concentration of Access and has Crashes</u>

- Badger – CSAH 2 to the northern end of town
- West of Warroad – 550th to 560th Avenues
- West of Warroad – 570th to 580th Avenues
- Warroad – Lake Street NE/CR 74 to CSAH 5

<u>High Concentration of Access with Fewer Crashes</u>

- East of Badger – Highway 308 to Highway 89
- East of Badger – Highway 89 to 340th Avenue

<u>Some Concentration of Access with Fewer Crashes</u>

- East of Badger – 350th to 360th Avenue
- East of Badger/West of Roseau – 360th to 370th Avenue
- Near Salol – 480th Avenue area

The above information does not suggest that access on Highway 11 should not be addressed in other areas. MnDOT should work with local communities to identify opportunities to modify access if crashes become an issue or as development/redevelopment occurs. While in practice, field access locations generally result in fewer safety problems because they are less frequently used, if they are not being used and can be eliminated, they should be.

2.4 Safety

Safety is always a primary concern for MnDOT – providing a safe corridor for travel is one of MnDOT's highest priorities for its investments. Understanding current conditions, crash patterns and trends as they exist today and how they may change as growth occurs is an important part of identifying and prioritizing locations where improvements should be focused. The information summarized on the following pages highlights identified crash trends and denotes problem areas at both the segment and intersection level. More detailed information about crashes on the corridor is found in the TH 11 Existing Traffic Characteristics Memorandum and the TH 11 Needs Assessment Memorandum. **Appendix C** has figures showing crash data for the most recent three years.

Crash Trends

The Highway 11 Corridor Study used crash data provided by MnDOT for the period between January 1, 2005 and December 31, 2014. This 10-year period was the most recent data available for the corridor. The data was further broken down three-year time periods to see if there were different trends occurring over time or if there were certain locations where safety has been an ongoing concern.

Data analyzed generally indicates that the number of crashes that are occurring has decreased over time, with the percent of fatal and Type A (incapacitating injuries) increasing slightly over the past three years. General trends observed from the data:

- Over the 10-year period there were approximately 460 crashes. This averages out to approximately 46 crashes per year.
    - Fatal and Type A crashes represent less than 2 percent of crashes
    - Other injury types represent 36 percent of crashes
    - Property damage represents 62.5 percent of crashes

- Over the three-year period between January 1, 2012 and December 31, 2014, there were approximately 42 crashes per year.
    - Fatal and Type A crashes represent 4 percent of crashes
    - Other injury types represent 35 percent of crashes
    - Property damage represents 61 percent of crashes

- Run off the road crashes were the most frequently type of crash to occur in both the 10-year (33 percent of crashes) and three-year (38 percent of crashes) time periods. These crashes also tend to result in more injuries than other types of crashes.

- Rear end and right angle crashes were also prevalent during both time periods. These crashes also have a tendency to be injury crashes.

Problem Areas – Segments

Larger corridor segments were identified in the early stages of the crash analysis. The corridor was broken into five segments based upon speeds and the number of lanes on the corridor. At a broader corridor level most of the larger corridor segments were considered to meet or were better than other similar segments within the state with regard to safety. There was one exception, the segment between Warroad and Roosevelt. In this area, the segment crash rate was worse than the statewide average, particularly in the three-year history.

Because the segments were long, smaller problem areas could have been lost in the analysis. As a double check on the safety, the ten-year and three-year crash histories were mapped to identify clusters of crashes to identify potential safety problems. **Appendix C** has maps showing the three-year data. Ten-year data was not included due to space constraints.

For the shorter segments, the three-year and 10-year data was reviewed to find crash clusters. In the three-year history, a crash cluster of five or more crashes was identified within a mile. For the 10-year history areas with a minimum of 10 crashes within a mile were generally considered. Some segments were identified in both the three-year and 10-year history and others just showed up in one time period. Segments included:

- Downtown Greenbush (10-year history)
- 310th – 320th Avenues east of Badger (10-year history)
- 320th – 330th Avenues east of Badger (three-year and 10-year history)
- 340th – 350th Avenues east of Badger (three-year and 10-year history)
- 370th – 380th/18th Avenues Roseau (three-year history)
- 420th – 430th Avenues near airport (10-year history with some in three-year history)
- 460th – 470th Avenues (10-year history)
- 490th – 500th Avenues (10-year history)
- 500th – 510th Avenues (10-year history)
- Near 530th Avenues (three-year history)
- 550th – 560th Avenues (10-year history)
- 560th – 570th Avenues (three-year and 10-year history)
- 650th – 660th Avenues (three-year and 10-year history)
- Within Roosevelt (three-year history)

Figure 9 shows the segments with crash clusters in the three-year and 10-year histories along with intersection crashes (see section below) that exceed statewide crash and severity rates.

Problem Areas – Intersections

Crash data was analyzed for the numerous public intersections located along the corridor using the three-year and 10-year data. Data was used to calculate intersection crash and severity rates at locations with multiple crashes. The crash and severity rates for the individual intersections were then compared to typical crash rates at similar intersections within the state.

Tables 5 and 6 highlight problem intersections related to crash and severity rates for the 10-year and three-year histories. Some intersections are reflected in both time periods. Intersections with a critical crash rate highlighted in red indicate that the intersection has a statistically significant crash rate and that problems at that location are not random. Crash and severity rates highlighted in orange indicate that either the crash rate or the severity rate is above statewide average. These locations are a concern as well and should continue to be monitored. Please note – the tables only includes intersections that were found to have a crash rate or a severity rate at or above the statewide average in its respective time period. Additional intersections were analyzed and are included in the TH 11 existing Traffic Characteristics Memo.

Legend

Three Year Intersection Crash Analysis

- Above statewide average crash and severity rates
- Above statewide critical crash rate and average severity rate

Crash Clusters

- 3-year history
- 10-year history
- 3 and 10-year history

Lake of the Woods

Warroad

Cty Rd 34

Roosevelt

Roseau

11th Ave NE

18th Ave NW

3rd Ave NE

University Ave/Cty Rd 2

Badger

Greenbush

MINNESOTA 313
MINNESOTA 310
MINNESOTA 89
MINNESOTA 11
MINNESOTA 32

0 5 10 Miles

N W E S

Figure 9: Safety on Highway 11

[redacted]

Table 5: Intersection Crash and Severity Rates – 10-Year History

Location	Number of Crashes	Daily Entering Vehicles	Crash Rate[1]			Severity Rate		Notes
			Calculated	Average	Critical[2]	Calculated	Average	
TH 11 and TH 32	4	3,575	0.31	0.28	0.56	0.38	0.47	3
TH 11 and CSAH 2/University Avenue	12	3,505	0.94	0.28	0.57	1.17	0.47	3
TH 11 and 340th Avenue	3	3,375	0.22	0.28	0.56	0.51	0.47	3 and 4
TH 11 and Timberline Manufactured Home Park East Entrance	3	4,025	0.20	0.28	0.55	0.48	0.47	3 and 4
TH 11 and CSAH 12	5	2,970	0.46	0.28	0.60	0.92	0.47	3
TH 11 and CSAH 34	3	1,660	0.50	0.28	0.72	1.16	0.47	3

[1] Intersection crash rates are expressed in crashes per million entering vehicles

[2] Critical crash rates are expressed in crashes per million entering vehicles with a 0.95 confidence level

[3] Average crash and severity rates are from MnDOT 2013 green sheets for rural through-stop intersections

[4] AADT used to determine daily entering vehicles estimated using engineering judgement for one or both minor approaches when no AADT data is available

Table 6: Intersection Crash and Severity Rates – Three-Year History

Location	Number of Crashes	Daily Entering Vehicles	Crash Rate[1]			Severity Rate		Notes
			Calculated	Average	Critical[2]	Calculated	Average	
TH 11 and CSAH 2/University Avenue	5	3,500	1.30	0.25	0.80	1.82	0.41	3
TH 11 and TH 89	3	3,290	0.83	0.25	0.82	1.11	0.41	3
TH 11 and 3rd Avenue	2	6,800	0.27	0.18	0.50	0.40	0.26	4 and 5
TH 11 and 11th Avenue	2	6,000	0.30	0.18	0.53	0.30	0.26	4 and 5
TH 11 and CSAH 34	2	1,660	1.10	0.25	1.13	2.20	0.41	3

[1] Intersection crash rates are expressed in crashes per million entering vehicles

[2] Critical crash rates are expressed in crashes per million entering vehicles with a 0.95 confidence level

[3] Average crash and severity rates are from MnDOT 2013 green sheets for rural through-stop intersections

[4] Average crash and severity rates are from MnDOT 2013 green sheets for urban through-stop intersections

[5] AADT used to determine daily entering vehicles estimated using engineering judgement for one or both minor approaches when no AADT data is available

Fatal and Type A Crashes

Along with identifying clusters of crashes on roadway segments and intersections that have high crash and/or severity rates, the safety analysis also identified locations where fatal crashes or Type A (most severe injury crashes) occurred. MnDOT has been focusing on these types of crashes when identifying problems on corridors. Locations on Highway 11 with fatal or Type A crashes in the last 10 years include:

- Near 220th Avenue (fatal)
- Near 420th Avenue (fatal)
- Near 510th Avenue (fatal)
- Near 530th Avenue (fatal)
- Near Seven Clans Casino (fatal)
- Near 375th Avenue (Type A)
- At 430th Avenue (Type A)
- Near CSAH 34/650th Avenue (Type A)

Of the eight crashes, six are represented in the crash cluster segments previously identified. Only the fatal crashes near 220th Avenue and Seven Clans Casino are not included.

2.5 Traffic Volumes

Traffic volumes and the type of traffic using Highway 11 play a significant role in how well the roadway functions from both a mobility and safety perspective. To assess current and future traffic volumes on the corridor, a number of resources were utilized. These resources included:

- Average annual daily traffic (AADT) information dating back 20 years
- Traffic counts conducted in 2015 – segment and turning movement
- Heavy commercial average daily traffic (HCADT) information dating back 18 years
- Planned growth areas
- Anticipated population and employment growth

The information summarized on the following pages provides information on existing and projected traffic volumes. A more detailed analysis of traffic volumes on Highway 11 is available in the TH 11 Existing Traffic Characteristics Memorandum and the TH 11 Future Conditions Memorandum.

Existing Traffic Volumes

MnDOT regularly counts the number of vehicles that use its roadways. This data is useful in understanding where congestion may be occurring, what changes in travel patterns happen over time, what destinations people are going to, comparing roadways in the network, what types of improvements might be needed, and how serious a crash location may be. Traffic data is recorded as annual, average daily traffic (AADT) and heavy commercial average daily traffic (HCADT).

Annual average daily traffic (AADT) is the amount of traffic that is likely to be on the roadway during a typical weekday. **Figure 10** shows AADT for 2014 as well as projected traffic volumes for 2040 (discussed in the next section). It also contains information on congestion which is discussed in Section 2.6 of this report.

Existing traffic in the rural areas of the corridor varies between 1,000-6,000 vehicles per day, with the highest traffic volumes between TH 89 and Roseau and between Roseau and Warroad. The highest traffic volumes on Highway 11 are concentrated within the Cities of Roseau and Warroad. Volumes range between 6,000 and 9,000 vehicles per day within these communities. **Table 7** includes historic traffic data for Highway 11, including the most recent traffic count data collected by MnDOT. For purposes of traffic reporting, Highway 11 is broken into 17 segments.

As noted at the beginning of this section, it is important to understand the type of traffic that is using Highway 11. Corridors that have a high number or a high percent of trucks operate differently than those that do not. For example, highways that have a lot of truck traffic will likely experience poorer operations at signalized intersections because it is harder for trucks to get up to speed once a traffic signal turns from red to green. It can also make it more difficult for motorists to find opportunities to pass – there are generally fewer gaps to find opportunities to pass and trucks are harder to see around, making it more uncomfortable for drivers to do so. To better understand the role that trucks play on Highway 11, heavy commercial average daily traffic was also reviewed. **Table 8** includes historic and current traffic data on Highway 11.

Truck traffic on the corridor varies from 110 trucks a day near TH 89 (border crossing – trucks turn off at this location on Highway 11 from both the west and east, resulting in little through truck traffic in this segment) to 570 trucks per day in Warroad. While these numbers do not suggest a high number of trucks overall, in some areas on the corridor they are a high percent of the traffic given the daily volumes on Highway 11. In 2009 MnDOT completed the Western Minnesota Freight study which identified Highway 11 as a Tier 2 freight corridor. This special designation has been used to help identify corridors that are important to freight movements and to help prioritize highway investments.

Future Traffic Volumes

To better understand what traffic would look like on Highway 11 in 2040, traffic projections were made for the different corridor segments. Five different methods were considered for projecting future traffic volumes on Highway 11. These methods included: compounding, straight-line growth, a one percent per year growth rate, a two and a half percent growth rate, and applying the current MnDOT growth factor for Roseau County. Based upon the historic data, projected population growth and employment trends, changing demographics related to age and employment and consultation with communities on the corridor, it was recommended that the MnDOT growth factor of 1.3 be used to project future traffic volumes. Because the MnDOT growth factor is usually only applied to 20-year projections, it was factored for an additional six years to get to 2040.

Legend

Intersection Level of Service - 2040

A or B - Delay of less than 20 seconds

Anticipated traffic conditions in 2040

Uncongested

Nearing Congestion

Congested

X,000-X,000 2014 Annual Average Daily Traffic

X,000-X,000 2040 Projected Daily Traffic

Lake of the Woods

3,000-6,000

5,000-8,000

3,000-4,000

6,000-9,000

5,000-8,000

8,000-12,000

2,000-3,000

2,000-5,000

1,000-4,000

2,000-5,000

Badger

Greenbush

Roosevelt

Roseau

18th Ave NW

Warroad

Lake St

Hallberg St

Garfield St

Cty Rd 5

8,000-11,000

6,000-8,000

0 5 10 Miles

N W E S

Figure 10: Existing and Future Traffic On Highway 11

Table 7: Historic and Existing Annual Average Daily Traffic (AADT) Volumes

Segment	From	To	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014
1	Western Limit of Greenbush	Junction with TH 32 in Greenbush	2,150	2,550	2,600	2,400	2,650	2,850	2,800	2,700	2,550	2,450	2,450
2	Junction with TH 32 in Greenbush	CSAH 2/University Avenue in Badger	2,400	2,300	2,450	2,450	2,500	2,700	2,550	2,400	2,450	2,750	2,500
3	CSAH 2/University Avenue in Badger	TH 308	2,400	2,300	2,450	2,450	2,500	2,700	2,550	2,400	2,450	2,750	2,750
4	TH 308	Western Junction with TH 89	3,400	2,100	2,950	3,400	3,200	3,300	2,950	3,200	2,950	2,850	2,800
5	Western Junction with TH 89	CR 120/380th Avenue	3,750	2,500	4,050	4,250	4,250	4,400	4,000	4,200	3,900	3,400	3,600
6	CR 120/380th Avenue	Junction with TH 310/89/5th Avenue in Roseau	6,700	8,000	9,000	8,700	9,300	10,100	8,100	8,700	8,300	7,700	8,700
7	Junction with TH 310/89/5th Avenue in Roseau	Main Avenue North in Roseau	8,300	6,500	9,100	8,700	9,800	10,200	8,600	8,400	8,000	7,800	7,800
8	Main Avenue North in Roseau	3rd Avenue Northeast in Roseau	6,800	7,600	8,500	7,700	8,800	9,500	8,700	8,000	6,600	6,800	6,300
9	3rd Avenue Northeast in Roseau	CSAH 24/11th Avenue in Roseau	6,300	6,200	6,600	6,000	8,900	7,200	6,100	6,300	6,100	5,900	5,700
10	CSAH 24/11th Avenue in Roseau	CSAH 46	3,250	2,800	2,700	2,400	2,600	3,400	3,000	3,150	3,400	3,700	3,900
11	CSAH 46	TH 313 in Warroad	4,500	3,900	4,050	4,000	4,350	4,750	4,300	4,250	4,500	4,500	4,400
12	TH 313 in Warroad	Lake Street NW in Warroad	5,900	6,400	6,100	7,900	6,500	6,400	6,800	6,500	6,500	6,200	6,800
13	Lake Street Northwest in Warroad	CSAH 74/Lake Street Northeast in Warroad	8,300	7,100	8,800	11,100	9,500	9,300	8,400	8,100	7,800	7,700	7,600
14	CSAH 74/Lake Street Northeast in Warroad	Hallberg Street Southwest in Warroad	8,000	8,000	8,800	9,200	9,600	9,100	8,700	8,000	8,100	7,700	7,500
15	Hallberg Street Southwest in Warroad	Garfield Street Southeast in Warroad	6,500	7,000	7,100	8,000	10,200	6,900	6,500	6,300	6,400	6,800	6,300
16	Garfield Street Southeast in Warroad	CSAH 12	3,450	3,100	4,000	4,950	4,950	4,300	3,550	3,400	3,550	3,400	3,550
17	CSAH 12	Roseau–Lake of the Woods County Line	1,800	1,800	1,800	2,250	1,700	1,750	1,650	1,650	1,800	1,650	1,550

Table 8: Historic and Existing Heavy Commercial Average Daily Traffic (HCADT)

Segment	From	To	1998	2000	2002	2004	2006	2008	2010	2012
1	Western Limit of Greenbush	Junction with TH 32 in Greenbush	145	150	240	250	250	155	145	140
2	Junction with TH 32 in Greenbush	CSAH 2/University Avenue in Badger	170	180	320	350	330	No Data	No Data	160
3	CSAH 2/University Avenue in Badger	TH 308	170	180	320	350	330	230	235	265
4	TH 308	Western Junction with TH 89	180	190	280	250	230	105	100	110
5	Western Junction with TH 89	CR 120/380th Avenue	210	220	340	350	320	195	180	160
6	CR 120/380th Avenue	Junction with TH 310/89/5th Avenue in Roseau	310	320	640	860	680	405	390	360
7	Junction with TH 310/89/5th Avenue in Roseau	Main Avenue North in Roseau	290	300	790	850	710	590	570	560
8	Main Avenue North in Roseau	3rd Avenue Northeast in Roseau	280	290	740	780	720	560	470	485
9	3rd Avenue Northeast in Roseau	CSAH 24/11th Avenue in Roseau	250	260	740	580	490	445	435	420
10	CSAH 24/11th Avenue in Roseau	CSAH 46	165	170	370	240	210	220	245	265
11	CSAH 46	TH 313 in Warroad	200	210	470	360	330	320	340	335
12	TH 313 in Warroad	Lake Street NW in Warroad	300	310	500	640	680	650	650	460
13	Lake Street Northwest in Warroad	CSAH 74/Lake Street Northeast in Warroad	330	340	680	900	820	790	770	570
14	CSAH 74/Lake Street Northeast in Warroad	Hallberg Street Southwest in Warroad	330	340	690	880	850	780	800	570
15	Hallberg Street Southwest in Warroad	Garfield Street Southeast in Warroad	300	310	720	690	650	630	650	500
16	Garfield Street Southeast in Warroad	CSAH 12	240	250	410	460	390	370	390	370
17	CSAH 12	Roseau–Lake of the Woods County Line	170	180	220	230	220	215	235	215

As was previously shown in **Figure 10**, future volumes on the corridor are expected to be higher in 2040 than they are today. To better understand the timing of some of the growth, the overall future projections were broken into five-year increments for the different corridor segments on Highway 11. Future traffic volumes are reported for the years 2020, 2025, 2030, 2035 and 2040. Future segments were subdivided slightly from the existing segments to provide a better understanding of the growth areas on the corridor and to more accurately reflect different roadway geometrics (number of lanes) and speeds. **Table 9** shows the projected traffic volumes for Highway 11 using MnDOT's growth factor (1.3) for Roseau County.

As shown in **Figure 10** and can be seen in **Table 9**, future volumes on Highway 11 are expected to range between 2,000 and 8,000 cars a day in the more rural areas and are anticipated to be between 8,000 and 12,000 cars a day in the more urbanized areas of Roseau and Warroad.

2.6 Travel Speeds and Congestion

Comments from stakeholders, focus group attendees and members of the TAC indicate that there is a strong perception that Highway 11 is congested, especially during factory shift changes in Roseau and Warroad. To better understand existing and future conditions on Highway 11, several different analyses were conducted. These analyses included:

- Travel time runs
- Driver expectations
- Existing roadway segment capacity analysis
- Existing intersection capacity analysis
- Future roadway segment capacity analysis
- Future intersection capacity analysis

The following pages summarize key information from these analyses. More detailed information is available in the TH 11 Existing Traffic Characteristics Memorandum, the TH 11 Future Conditions Memorandum and the TH 11 Future Needs Assessment Memorandum.

Travel Time Runs

As part of the Highway 11 Corridor Study, the consultant team conducted actual travel time runs on the corridor. The travel time runs were conducted during the AM and PM peak periods as well as during the midday peak (lunch time). The intent of conducting the travel time runs was to identify locations where congestion may be occurring, to denote travel speeds on the corridor and to note motorist behavior.

Six travel time runs were performed in each direction of travel for three different time intervals: AM peak, midday peak, and PM peak. While driving the corridor, data was collected on the speed of travel, as well as any variance experienced and its cause. During data collection, the driver was to maintain steady flow with traffic, including situations where traffic exceeded the posted speed limit. Drivers were instructed to not be the lead car, but to be a part of traffic flow.

Table 9: Future Highway 11 Traffic Volumes by Segment - 2020 to 2040

Segment	From	To	Most Recent Traffic Volume (2014)	2020 to 2040 Traffic Volume Projections				
				2020 Volume	2025 Volume	2030 Volume	2035 Volume	2040 Volume
1	Western Limit of Greenbush	East of Oakview Dr. in Greenbush	2,450	2,651	2,830	3,022	3,227	3,446
2	East of Oakview Dr.	Junction with TH 32 in Greenbush	2,450	2,651	2,830	3,022	3,227	3,446
3	Junction with TH 32	0.2 miles north/east of the TH 32 Junction	2,500	2,705	2,888	3,084	3,293	3,516
4	0.2 miles north/east of the TH 32 Junction	850 feet south of CSAH 2/University Ave in Badger	2,500	2,705	2,888	3,084	3,293	3,516
5	850 feet south of CSAH 2/University Avenue	CSAH 2/University Avenue in Badger	2,500	2,705	2,888	3,084	3,293	3,516
6	CSAH 2/University Ave	South of the north junction of CSAH 3	2,750	2,975	3,177	3,392	3,622	3,868
7	South of the north junction of CSAH 3	TH 308	2,750	2,975	3,177	3,392	3,622	3,868
8	TH 308	Western Junction with TH 89	2,800	3,029	3,235	3,454	3,688	3,938
9	Western Junction with TH 89	CR 120/380th Ave	3,600	3,895	4,159	4,441	4,742	5,063
10	CR 120/380th Ave	0.2 miles east of CR 120/380th Ave in Roseau	8,700	9,412	10,051	10,732	11,459	12,236
11	0.2 miles east of CR 120/380th Ave	7th Ave SW in Roseau	8,700	9,412	10,051	10,732	11,459	12,236
12	7th Ave SW	Junction with TH 310/89/5th Ave in Roseau	8,700	9,412	10,051	10,732	11,459	12,236
13	Junction with TH 310/89/5th Ave	Main Ave North in Roseau	7,800	8,439	9,011	9,622	10,274	10,970
14	Main Ave North	3rd Ave NE in Roseau	6,300	6,816	7,278	7,771	8,298	8,861
15	3rd Ave NE	CSAH 24/11th Ave in Roseau	5,700	6,167	6,585	7,031	7,508	8,017
16	CSAH 24/11th Ave	CSAH 46	3,900	4,219	4,505	4,811	5,137	5,485
17	CSAH 46	TH 313 in Warroad	4,400	4,760	5,083	5,428	5,796	6,188
18	TH 313	300 feet north of Elk St NW in Warroad	6,800	7,357	7,856	8,388	8,957	9,564
19	300 feet north of Elk St NW	Lake St NW in Warroad	6,800	7,357	7,856	8,388	8,957	9,564
20	Lake St NW in Warroad	CSAH 74/Lake St NE in Warroad	7,600	8,222	8,780	9,375	10,010	10,689
21	CSAH 74/Lake St NE	Hallberg St SW in Warroad	7,500	8,114	8,664	9,252	9,879	10,548
22	Hallberg St SW	Garfield St SW in Warroad	6,300	6,816	7,278	7,771	8,298	8,861
23	Garfield St SW	200 feet east/south CSAH 5	3,550	3,841	4,101	4,379	4,676	4,993
24	200 feet east/south CSAH 5	CSAH 12	3,550	3,841	4,101	4,379	4,676	4,993
25	CSAH 12	Roseau–Lake of the Woods County Line	1,550	1,677	1,791	1,912	2,042	2,180

Data collected during the travel time runs show no major issues with traffic flow or mobility. Travel times were consistent across all the travel periods. Within city limits where there are lower posted speeds, traffic flows followed posted speed limits consistently. In rural areas traffic was free flowing at posted speeds roughly 60 percent of the time. The other 40 percent of the time traffic flows exceeded posted speed limits, with traffic travelling in the high 50 mph and low 60 mph range.

During the travel runs, there were a few occasions were incidents or slower traffic was observed and did create short disruptions in traffic flow. Because there are opportunities to pass along TH 11, these incidents had a small impact on the overall traffic flow. However, they do create a situation where traffic wants to, and does pass. This was observed when trucks were the lead vehicles in platoons. Often, the drivers immediately behind the trucks were looking for opportunities to pass. When there was a more cautious driver immediately behind a truck or recreational vehicle, and that driver is unwilling to pass, longer queues can form. Sometimes more aggressive drivers would pass multiple vehicles at a time to get around truck traffic. It should be noted that traffic was generally still travelling at or above posted speeds during these incidents.

Driver Expectations and Speed Limits

Based on the travel time run and congestion analysis (next sections), it was clear that drivers on Highway 11 have low tolerance for delay and have high expectations with regard to travel speeds and congestion. Comments from the focus groups, stakeholders and TAC members all indicate that drivers want to travel between 60 and 64 miles per hour. Most drivers were not content to drive 55 miles per hour and would start to pass other vehicles if they were not exceeding that speed.

This creates safety problems on the corridor. Drivers that are unable to go as fast as they desire are more likely to take chances in order to pass slower moving vehicles.

As part of a statewide assessment of posted speeds on corridors throughout the state, Highway 11 is planned to have its speed limit raised to 60 miles per hour (in locations with existing posted speeds of 55 miles per hour) sometime this year. The increased speed limit should help to address driver expectations on the corridor and provide some more consistency in travel speeds by most users.

Corridor Congestion – Roadway Segments

A roadway's capacity indicates how many vehicles may use a roadway before it experiences congestion. Capacity is dependent upon the number of lanes on a corridor as a starting point. Additional variation (more or less capacity) on an individual segment is influenced by a number of factors including: amount of access, type of access, peak hour percent of traffic, directional split of traffic, truck percent, opportunities to pass, and amount of turning traffic and availability of dedicated turn lanes. **Table 10** lists planning-level thresholds that indicate a roadway's capacity.

Table 10: Planning-level Roadway Capacity

Roadway Type	Maximum Daily Traffic (two-way)
Two-lane, undivided – urban	8,000 – 10,000 vehicles
Two-lane, undivided – rural	14,000 – 15,000 vehicles
Three-lane – urban	14,000 – 17,000 vehicles
Four-lane undivided – urban	18,000 – 22,000 vehicles
Four-lane divided – urban	28,000 – 32,000 vehicles
Four-lane divided – rural	32,000 – 36,000 vehicles

Highway 11 is a two-lane roadway with 12-foot wide travel lanes for a majority of the corridor. Two sections of roadway through the Cities of Roseau and Warroad are three-lane sections with center left-turn lanes.

Congestion along a roadway is judged to exist when the ratio of traffic volume to roadway capacity (v/c ratio) approaches or exceeds 1.0. Volume to capacity ratios measure the amount of current traffic (AADT) divided by the maximum daily traffic that can be accommodated. The v/c ratio is used to measure the capacity of a corridor segment. However, it does not provide information on intersection operations (those are discussed later in this section).

At a planning-level, if a v/c ratio is 1.0 or higher, the roadway is considered over capacity and will likely experience routine congestion. A v/c ratio between 0.86 and 0.99 is considered nearing being congested and a v/c ration 0.85 or less is considered uncongested.

Existing Congestion

Based on the existing traffic volumes for the corridor and the thresholds identified above, none of the existing segments are considered congested. **Table 11** shows the existing v/c ratios for the Highway 11 segments. The segment closest to being "near congested" is the segment in Warroad between CSAH 74/Lakes Street NE and Hallberg Street SW.

Future Congestion

Forecast traffic volumes do not exceed planning-level thresholds in the rural areas of the corridor, indicating that these segments of TH 11 will remain uncongested for the next 25 years. Within Roseau and Warroad, 2040 forecast traffic volumes range between 8,000 and 12,000 vehicles per day. These volumes can be accommodated without congestion in the two- and three-lane sections of Roseau.

In Warroad, however, the segment between Lake Street/CSAH 74 and Hallberg Street SW is expected to be congested by 2040, with the segment between Hallberg Street SW and Garfield Street SW approaching congestion. Forecast volumes exceed the planning-level thresholds for the existing two-lane urban roadway (8,000-10,000 vehicles per day). **Table 12** shows the future v/c ratios for the Highway 11 segments. Segments nearing congestion are highlighted in yellow and segments considered congested are highlighted in red.

Table 11: Existing Traffic Volumes and Volume/Capacity Ratios

Segment	From	To	Existing Characteristics			Maximum Capacity	2014	
			Posted Speed	# of Lanes	Design Type[1]		Volume	V/C Ratio
1	Western Limit of Greenbush	East of Oakview Dr. in Greenbush	55	2	R-1	15,000	2,450	0.16
2	East of Oakview Dr.	Junction with TH 32 in Greenbush	30	2	U-1	10,000	2,450	0.25
3	Junction with TH 32	0.2 miles north/east of the TH 32 Junction	40	2	U-1	10,000	2,500	0.25
4	0.2 miles north/east of the TH 32 Junction	850 feet south of CSAH 2/University Ave in Badger	55	2	R-1	15,000	2,500	0.17
5	850 feet south of CSAH 2/University Avenue	CSAH 2/University Avenue in Badger	50	2	R-2	15,000	2,500	0.17
6	CSAH 2/University Ave	South of the north junction of CSAH 3	50	2	R-2	15,000	2,750	0.18
7	South of the north junction of CSAH 3	TH 308	55	2	R-1	15,000	2,750	0.18
8	TH 308	Western Junction with TH 89	55	2	R-1	15,000	2,800	0.19
9	Western Junction with TH 89	CR 120/380th Ave	55	2	R-1	15,000	3,600	0.24
10	CR 120/380th Ave	0.2 miles east of CR 120/380th Ave in Roseau	45	2	U-3	17,000	8,700	0.58
11	0.2 miles east of CR 120/380th Ave	7th Ave SW in Roseau	45	3	U-3	17,000	8,700	0.51
12	7th Ave SW	Junction with TH 310/89/5th Ave in Roseau	30	3	U-2	17,000	8,700	0.51
13	Junction with TH 310/89/5th Ave	Main Ave North in Roseau	30	3	U-2	17,000	7,800	0.46
14	Main Ave North	3rd Ave NE in Roseau	30	3	U-2	17,000	6,300	0.37
15	3rd Ave NE	CSAH 24/11th Ave in Roseau	30	3	U-2	17,000	5,700	0.34
16	CSAH 24/11th Ave	CSAH 46	55	2	R-1	15,000	3,900	0.26
17	CSAH 46	TH 313 in Warroad	55	2	R-1	15,000	4,400	0.29
18	TH 313	300 feet north of Elk St NW in Warroad	40	3	U-3	17,000	6,800	0.4
19	300 feet north of Elk St NW	Lake St NW in Warroad	30	3	U-2	17,000	6,800	0.4
20	Lake St NW in Warroad	CSAH 74/Lake St NE in Warroad	30	3	U-2	17,000	7,600	0.45
21	CSAH 74/Lake St NE	Hallberg St SW in Warroad	30	2	U-1	10,000	7,500	0.75
22	Hallberg St SW	Garfield St SW in Warroad	30	2	U-1	10,000	6,300	0.63
23	Garfield St SW	200 feet east/south CSAH 5	30	2	U-1	10,000	3,550	0.36
24	200 feet east/south CSAH 5	CSAH 12	55	2	R-1	15,000	3,550	0.24
25	CSAH 12	Roseau–Lake of the Woods County Line	55	2	R-1	15,000	1,550	0.1

[1] Design Types

Code	Definition	Volume Threshold
U-1	Two-lane urban at 30 – 40 mph	10,000 AADT
U-2	Three-lane urban at 30 mph	17,000 AADT
U-3	Three-lane urban at 40 – 45 mph	17,000 AADT
R-1	Two-lane rural at 55 – 60 mph	15,000 AADT
R-2	Two-lane rural at 50 mph	15,00 AADT

Table 12: Future Traffic Volumes and Volume/Capacity Ratios

Segment	From	To	Existing Characteristics			Maximum Capacity	2035		2040	
			Posted Speed	# of Lanes	Design Type[1]		Volume	V/C Ratio	Volume	V/C Ratio
1	Western Limit of Greenbush	East of Oakview Dr. in Greenbush	55	2	R-1	15,000	3,227	0.22	3,446	0.23
2	East of Oakview Dr.	Junction with TH 32 in Greenbush	30	2	U-1	10,000	3,227	0.32	3,446	0.34
3	Junction with TH 32	0.2 miles north/east of the TH 32 Junction	40	2	U-1	10,000	3,293	0.33	3,516	0.35
4	0.2 miles north/east of the TH 32 Junction	850 feet south of CSAH 2/University Ave in Badger	55	2	R-1	15,000	3,293	0.22	3,516	0.23
5	850 feet south of CSAH 2/University Avenue	CSAH 2/University Avenue in Badger	50	2	R-2	15,000	3,293	0.22	3,516	0.23
6	CSAH 2/University Ave	South of the north junction of CSAH 3	50	2	R-2	15,000	3,622	0.24	3,868	0.26
7	South of the north junction of CSAH 3	TH 308	55	2	R-1	15,000	3,622	0.24	3,868	0.26
8	TH 308	Western Junction with TH 89	55	2	R-1	15,000	3,688	0.25	3,938	0.26
9	Western Junction with TH 89	CR 120/380th Ave	55	2	R-1	15,000	4,742	0.32	5,063	0.34
10	CR 120/380th Ave	0.2 miles east of CR 120/380th Ave in Roseau	45	2	U-3	17,000	11,459	0.67	12,236	0.72
11	0.2 miles east of CR 120/380th Ave	7th Ave SW in Roseau	45	3	U-3	17,000	11,459	0.67	12,236	0.72
12	7th Ave SW	Junction with TH 310/89/5th Ave in Roseau	30	3	U-2	17,000	11,459	0.67	12,236	0.72
13	Junction with TH 310/89/5th Ave	Main Ave North in Roseau	30	3	U-2	17,000	10,274	0.60	10,970	0.65
14	Main Ave North	3rd Ave NE in Roseau	30	3	U-2	17,000	8,298	0.49	8,861	0.52
15	3rd Ave NE	CSAH 24/11th Ave in Roseau	30	3	U-2	17,000	7,508	0.44	8,017	0.47
16	CSAH 24/11th Ave	CSAH 46	55	2	R-1	15,000	5,137	0.34	5,485	0.37
17	CSAH 46	TH 313 in Warroad	55	2	R-1	15,000	5,796	0.39	6,188	0.41
18	TH 313	300 feet north of Elk St NW in Warroad	40	3	U-3	17,000	8,957	0.53	9,564	0.56
19	300 feet north of Elk St NW	Lake St NW in Warroad	30	3	U-2	17,000	8,957	0.53	9,564	0.56
20	Lake St NW in Warroad	CSAH 74/Lake St NE in Warroad	30	3	U-2	17,000	10,010	0.59	10,689	0.63
21	CSAH 74/Lake St NE	Hallberg St SW in Warroad	30	2	U-1	10,000	9,879	0.99	10,548	1.05
22	Hallberg St SW	Garfield St SW in Warroad	30	2	U-1	10,000	8,298	0.83	8,861	0.89
23	Garfield St SW	200 feet east/south CSAH 5	30	2	U-1	10,000	4,676	0.47	4,993	0.50
24	200 feet east/south CSAH 5	CSAH 12	55	2	R-1	15,000	4,676	0.31	4,993	0.33
25	CSAH 12	Roseau–Lake of the Woods County Line	55	2	R-1	15,000	2,042	0.14	2,180	0.15

[1] Design Types

Code	Definition	Volume Threshold
U-1	Two-lane urban at 30 – 40 mph	10,000 AADT
U-2	Three-lane urban at 30 mph	17,000 AADT
U-3	Three-lane urban at 40 – 45 mph	17,000 AADT
R-1	Two-lane rural at 55 – 60 mph	15,000 AADT
R-2	Two-lane rural at 50 mph	15,00 AADT

Corridor Congestion – Intersections

As shown by the travel time runs and highway segment analysis there are no operational problems today in general and limited ones expected in the future. The same type of analysis was completed for key intersections on the corridor to ensure that intersections were operating acceptably today and in the future. Due to the number of intersections on the corridor, MnDOT and the consultant identified five key locations where a better understanding of traffic was desired. These intersections are listed in Table 13.

Table 13: Key Intersections Analyzed

	Intersection with TH 11 and	Community	Intersection Type
1.	TH 32	Greenbush	Stop control for TH 11
2.	CR 120/380th/18th Avenues	Roseau	Stop control for side street
3.	TH 89/TH 310	Roseau	Signal
4.	TH 313	Warroad	Signal
5.	CR 74/Lake Street NE	Warroad	Signal

Intersections are evaluated on how well they operate by a measure called level of service (LOS). Intersections are given a ranking of LOS A through LOS F. LOS "A" represents the best operations and "F" represents the poorest operations. At LOS A, motorists experience very little delay. At LOS F conditions, motorists experience severe congestion and extreme delay, i.e., gridlock. Although LOS A conditions represents the best possible level of traffic flow, the cost to construct intersections to such a high standard exceeds the benefits. Within an urbanized or urbanizing area, it is generally regarded that LOS D provides an acceptable level of service.

LOS was analyzed at the five intersections listed above, based on existing traffic conditions and 2040 forecast traffic conditions. The intent of the analysis was to identify movements (through or turning) and overall LOS that reach LOS D either currently or in 2040. There are no intersections or movements now or in the future identified as LOS D or worse. All five intersections operate at a LOS A or B today and in 2040. **Figure 10** shows the results of the 2040 operational analysis.

2.7 Corridor User Input

The previous subsections of this chapter have noted the technical analyses that were completed to identify and better understand problems on Highway 11. In addition to the technical analyses, input from corridor users was also collected. Issues brought up on the project website, by TAC members, in focus groups and stakeholders that have spoken with MnDOT staff was also documented as part of the study. In general, issues brought up by corridor users were reflected in the technical analyses that were completed. Problems related to safety, general drivability, truck traffic, passing opportunities and shift change traffic platoons all have been documented as part of the technical memos and the previous sections of this report.

There was, however, one issue that was repeatedly mentioned but failed to present itself in the data. This issue was the need for additional travel lanes on Highway 11. Group after group and numerous individual stakeholders expressed the "need" for Highway 11 to be four lanes. Based on existing and projected traffic volumes, Highway 11 is not near to needing four travel lanes.

What emerged from the discussions after follow-up questions were asked was that there is a need for better and safer passing opportunities along the corridor. While Highway 11 has numerous passing zones, it is hard for motorists to see around larger trucks or for those that are stuck in a platoon of vehicles to safely and legally pass. Discussions quickly shifted from the idea of needing four lanes on Highway 11 to desiring "Super Two" opportunities for passing. A super two design provides dedicated passing lanes for a minimum of a mile so that faster traffic can get around slower traffic without having to drive into oncoming traffic.

Further discussions also revealed that the greatest desire for these locations was between the Cities of Roseau and Warroad, where much of the traffic on Highway 11 is concentrated. Users asked for opportunities for super designs to be incorporated into the study.

Corridor users also agreed that increasing the posted speed to 60 miles per hour should also help the situation. Most people indicated that 60 miles per hour was a more reasonable limit and was more consistent with how many motorists were currently driving.

2.8 Summary of Key Problem Areas

Based on the information summarized in the previous subsections and in the technical memos prepared as part of this project, a limited number of problem areas were identified for further investigation. Many of the problem areas identified have needs reflected in multiple topic areas (safety, mobility, access). Design concepts were developed to address the issues at many of these areas. Two locations with safety concerns (3rd and 11th Avenues) did not have any clear design solutions to the problems, so concepts were not developed at these locations. Ongoing monitoring of these locations is encouraged to better understand what is occurring.

It should be noted that the area near the Roseau Municipal Airport was identified for safety reasons due to the number and severity of crashes in the general vicinity. MnDOT District 2 is completing a separate study of the entire airport area and will be developing potential solutions/concepts as a part of that study. This study did not develop concepts/solutions for the airport area.

Concepts were developed for a total of 13 areas and are split into more and less complex problem areas. These areas are shown in **Figure 11.**

Type of Improvement

- Intersection Safety Improvement
- Safety Improvement
- Access Management
- Congestion
- Passing Opportunities

Area 0:
1 Concept

Area 1:
2 Concepts

Area 2:
2 Concepts

Area 3:
4 Concepts

Area 4:
2 Concepts

Area 5:
1 Concept

Area 6:
4 Concepts

Area 7:
4 Concepts

Area 8:
1 Concept

Area 9:
2 Concepts

Area 10:
1 Concept

Area 11:
1 Concept

Area 12:
2 Concepts

Greenbush

Badger

Roseau

Warroad

Roosevelt

Lake of the Woods

MINNESOTA 89

MINNESOTA 310

MINNESOTA 313

MINNESOTA 11

MINNESOTA 32

0 5 10 Miles

N W E S

Figure 11: Problem Areas on Highway 11

More complex areas:

0. TH 11 north of TH 32 in Greenbush: Access
1. 250th to 310th Avenues near Badger: Passing opportunities
2. CSAH 2/University Avenue to CR 3 in Badger: Safety and Access
3. Highway 308 to Highway 89 near Roseau: Safety and Access
4. 330th to 350th Avenues near Roseau: Safety and Access
5. CR 120/18th Avenue/380th Avenue to Highway 89 in Roseau: Safety and Access
6. 440th Avenue to Hay Creek west of Warroad: Passing opportunities
7. 530th to 570th Avenues west of Warroad: Safety and Access
8. 580th Avenue/CSAH 35 to Highway 313 in Warroad: Access
9. Lake Street/CR 74 to Seven Clans Casino in Warroad: Future congestion

Less complex areas:

10. CSAH 12 intersection east of Warroad: Safety
11. CSAH 34 and 650th Avenue intersections east of Warroad: Safety
12. 695th Avenue to Rocky Point Road in Roseau: Safety

Section 3 Identification, Evaluation, and Selection of Alternatives

Alternatives for Highway 11 were developed based on the corridor issue and identification process described previously in Section 2 as well as implementing ongoing maintenance and preservation activities to keep the base infrastructure of Highway 11 in adequate condition. The sections below describe the process to identify, develop and select alternatives to address issues on Highway 11. The first subsection summarizes ongoing maintenance and preservation activities that are programmed over the next 10 years and are expected to be completed during the remainder of the study time period (through 2040). The second subsection describes the need for additional turn lanes and shoulder widening on Highway 11 based upon MnDOT design or access management standards. The third subsection describes the concepts developed to address the issues identified in Section 2 for the key problem areas. The fourth subsection describes the recommended concepts for future study and implementation.

3.1 Ongoing Maintenance and Preservation Activities

Over the next ten years, the bulk of District 2 funding for Highway 11 is dedicated to ongoing maintenance and preservation activities. These activities are necessary to care for MnDOT assets in the corridor and to keep pavement, structures, stormwater conveyances, traffic control, and sidewalks in working order. In some cases, maintenance and preservation activities are an opportunity to improve the function of the corridor by widening shoulders, adding turn lanes, or bringing facilities into compliance with the Americans with Disabilities Act (ADA). However, these projects generally do not introduce significant changes to the corridor.

As part of this study, asset management needs were identified over the next 25 years. These needs are described in detail in the TH 11 Asset Management Memorandum. In response to these needs, District 2 has developed a 10 year program to address immediate maintenance and preservation needs on the corridor. **Table 14** lists programmed maintenance and preservation activities anticipated to occur by 2025. These activities are shown on **Figure 12**.

In addition to the activities specifically listed in Table 14, MnDOT District 2 plans to clean, repair, and replace culverts as part of programmed resurfacing projects. District 2 will also consider adding high priority turn lanes as part of resurfacing projects; however, the ability to incorporate turn lane improvements will be limited by preservation project budgets.

It should be noted that not all preservation needs will be met through the District 2 ten year program. Some preservation needs will remain unmet. The ten year program does not include sidewalk repair/ADA improvements in Greenbush, culvert cleaning/repair/replacement between Greenbush and Roseau, and storm sewer replacement in Warroad. It is likely that these activities will be incorporated when possible into resurfacing projects that occur between 2026 and 2040. These preservation needs are also shown on **Figure 12**.

Preservation activities in ten year plan

- Bridge Rehabilitation
- Traffic Signal Rehabilitation
- Culvert Cleaning, Repair, or Replacement
- Storm Sewer Repairs
- Sidewalk Preservation/ADA
- Resurface

Preservation needs not included in ten year plan

- Culvert Cleaning, Repair, or Replacement
- Sidewalk Preservation/ADA
- Storm Sewer Replacement

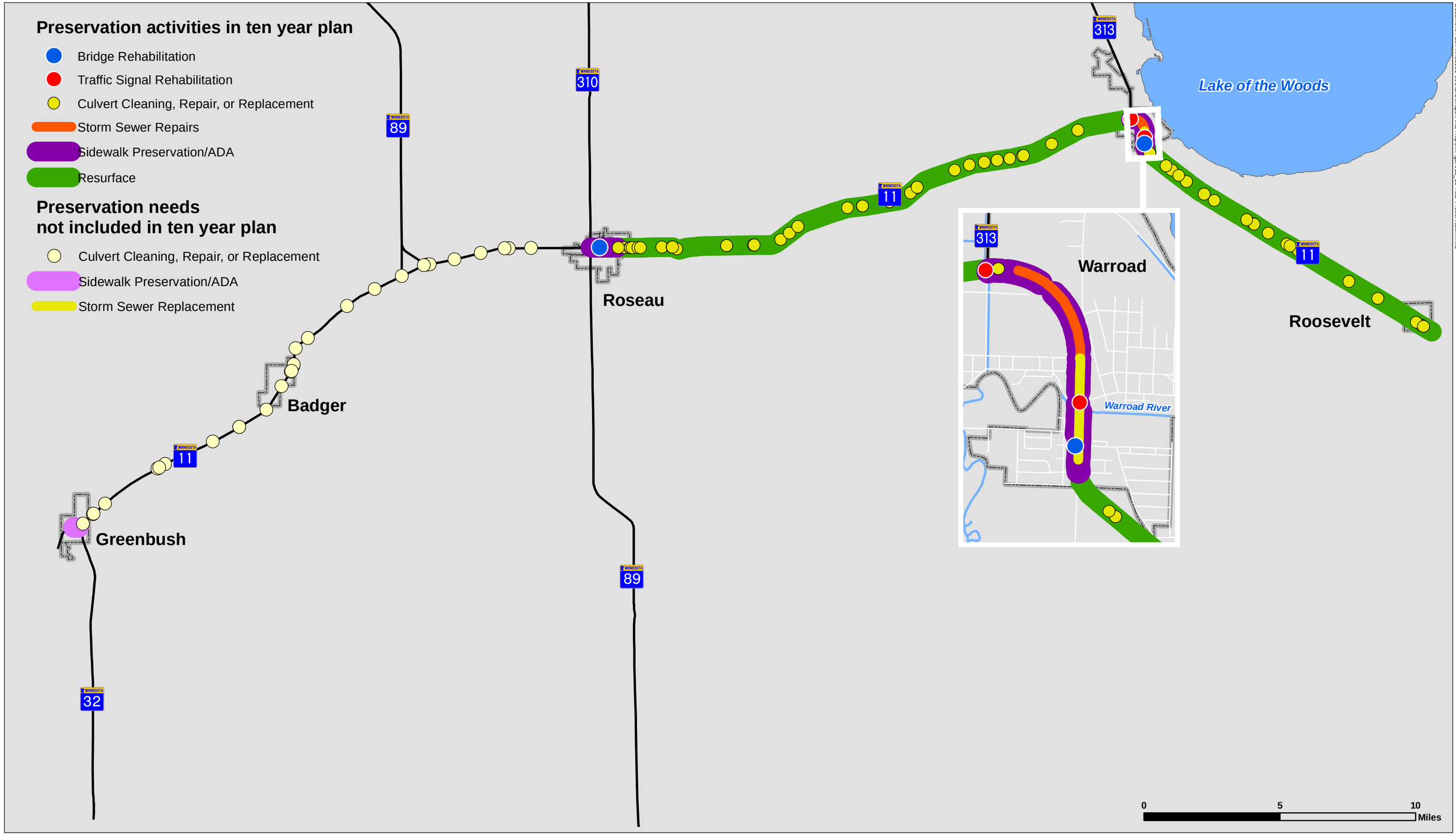


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Figure 12: 10 Year Preservation Needs on Highway 11

[redacted]

Table 14: 10-year Planned Preservation Activities on TH 11

Year	Project Limits	Description
2019	TH 313 to CSAH 5 in Warroad	Replace 4,960 feet of sidewalk, replace all curb ramps and add two curb ramps, signal improvements, storm sewer repair
2024	TH 89 to 11th Avenue in Roseau	Mill and overlay (resurfacing), replace 3,860 feet of sidewalk, replace all curb ramps
2024	11th Avenue in Roseau to 1.5 miles west of TH 313	Mill and overlay (resurfacing), possible turn lane installation, culvert cleaning/repair/replacement
2024	Bridge over Warroad River	Bridge rehabilitation – anticipated beam repair and re-decking
2024	CSAH 5 in Warroad to Rocky Point Rd in Roosevelt	Mill and overlay (resurfacing), shoulder widening near Warroad, possible turn lane installation, culvert cleaning/repair/replacement
2025	Bridge over Roseau River	Bridge rehabilitation – anticipated painting, low-slump overlay, and repair to approach panels.

While not programmed, information from evaluating the different assets on the corridor makes it clear that additional pavement resurfacing will be needed on the corridor. Based on pavement condition information provided by MnDOT, general timeframes were established for the time period between 2025 and 2040. In addition to the pavement rehabilitation, it is recommended that culverts be inspected in advance of the pavement projects so that repairs and replacements can be incorporated into the projects along with turn lane construction and shoulder widening where needed. It is recognized that additional funding will likely be needed for turn lane and shoulder widening activities. **Table 15** identifies pavement projects that are likely needed between 2025 and 2040 that are currently not programmed. Additional bridge projects involving major repair and/or replacement are not expected between 2025 and 2040 based upon their existing condition.

Table 15: Pavement Rehabilitation and/or Reconstruction Projects Anticipated between 2025 and 2040

Year	Project Limits	Description
2026 or sooner	Foresness Road to Hwy 32 in Greenbush	Pavement rehabilitation – Mill and overlay anticipated
2030	Hwy 313 to south of Cty Rd 5 in Warroad	Pavement rehabilitation – Mill and overlay anticipated
2032	Hwy 32 to 360th Ave between Greenbush and Roseau	Pavement rehabilitation – Mill and overlay anticipated

3.2 Additional Safety Improvements – Turn Lanes

Turn lanes have proven to be an effective measure in reducing crashes on highway facilities as well as enhancing mobility. They are noted in several publications as an effective counter measure in reducing rear end and angle crashes in both urban and rural environments. They are especially effective in reducing the severity of crashes in locations where travel speeds are higher. A detailed analysis of existing turn lanes is described in the TH 11 Turn Lane Assessment Memorandum. The text below describes the safety concerns related to turn lanes and identifies priority locations for construction of turn lanes.

There is little consistency on Highway 11 with regard to turn lanes outside of the three-lane sections in Roseau and Warroad, which have a continuous left-turn lane. The inconsistent use of turn lanes can be confusing to motorists and can create situations where drivers may unexpectedly be turning. This can result in rear end crashes, run off the road crashes and sideswipe crashes. Additionally, if left-turning motorists feel rushed because they see the car behind them is not slowing they may turn in front of oncoming traffic, further increasing the likelihood of a crash. Lack of dedicated turn lanes can also result in inconsistent use of the shoulder.

To strategically address the issues described above, turn lane criteria were reviewed to guide the identification of locations where it may be appropriate to construct dedicated turn lanes. There are several sources that can be used to determine the need for turn lanes. At MnDOT, engineering judgement is considered in a number of cases, along with recommendations from guidance documents such as the Road Design Manual and Access Management Manual. A summary of guidance is available in the Highway 11 Turn Lane Assessment Memo.

Priority Locations for Turn Lanes

With all of the access points on the Highway 11 corridor it can be challenging to prioritize locations for dedicated turn lanes, especially since the Road Design Manual would suggest that their construction is warranted at all public streets along the corridor and should be considered at other locations such as industrial and commercial centers and locations where multiple

residential units are served by a driveway. Unfortunately, funding constraints and the magnitude of existing access on Highway 11 suggest that this is not going to be feasible in the short-term and would be challenging to achieve even over the long-term.

The approach that was used in this study was to combine the recommendations laid out in the Road Design and Access Management Manuals. Because right-turn lanes are significantly less expensive than left-turn lanes, right-turn lanes are recommended at all public street locations as outlined in the Road Design Manual. Access Management Manual Warrants are used to guide construction of the more expensive left-turn lanes. Following the Road Design Manual for right-turn lanes provides consistency in terms of driver expectations when approaching public street locations given the amount of access on the corridor. Using the Access Management Manual for the left-turn lanes focuses priorities on those locations that have rationale beyond being a public street location. While using the warrants outlined in the Access Management Manual for construction of left-turn lanes does not result in consistency that may be readily apparent to drivers, it follows a process that can be easily documented and shows prioritization. The sections below identify high and medium priority locations for turn lanes. The location of high priority turn lanes are shown on **Figure 13**.

Highest Priority – Safety Problem Locations

Priorities first take into consideration locations with safety problems. Locations with high crash and/or severity rates (above statewide average) or have crashes that are correctable with turn lane construction are the highest priority for constructing left- and/or right-turn lanes.

Based on safety information for the most recent three-year history, turn lanes are recommended at the following locations outside of the three-lane sections:

- TH 11 & CSAH 2/University Avenue in Badger – Left-turn lanes
- TH 89 – "Y" area west of Roseau – Left-turn lanes
- CSAH 34 – between Warroad and Roosevelt – Left- and right-turn lanes

Crash data for the corridor should be reviewed regularly to ensure that additional locations for turn lanes are considered for safety reasons.

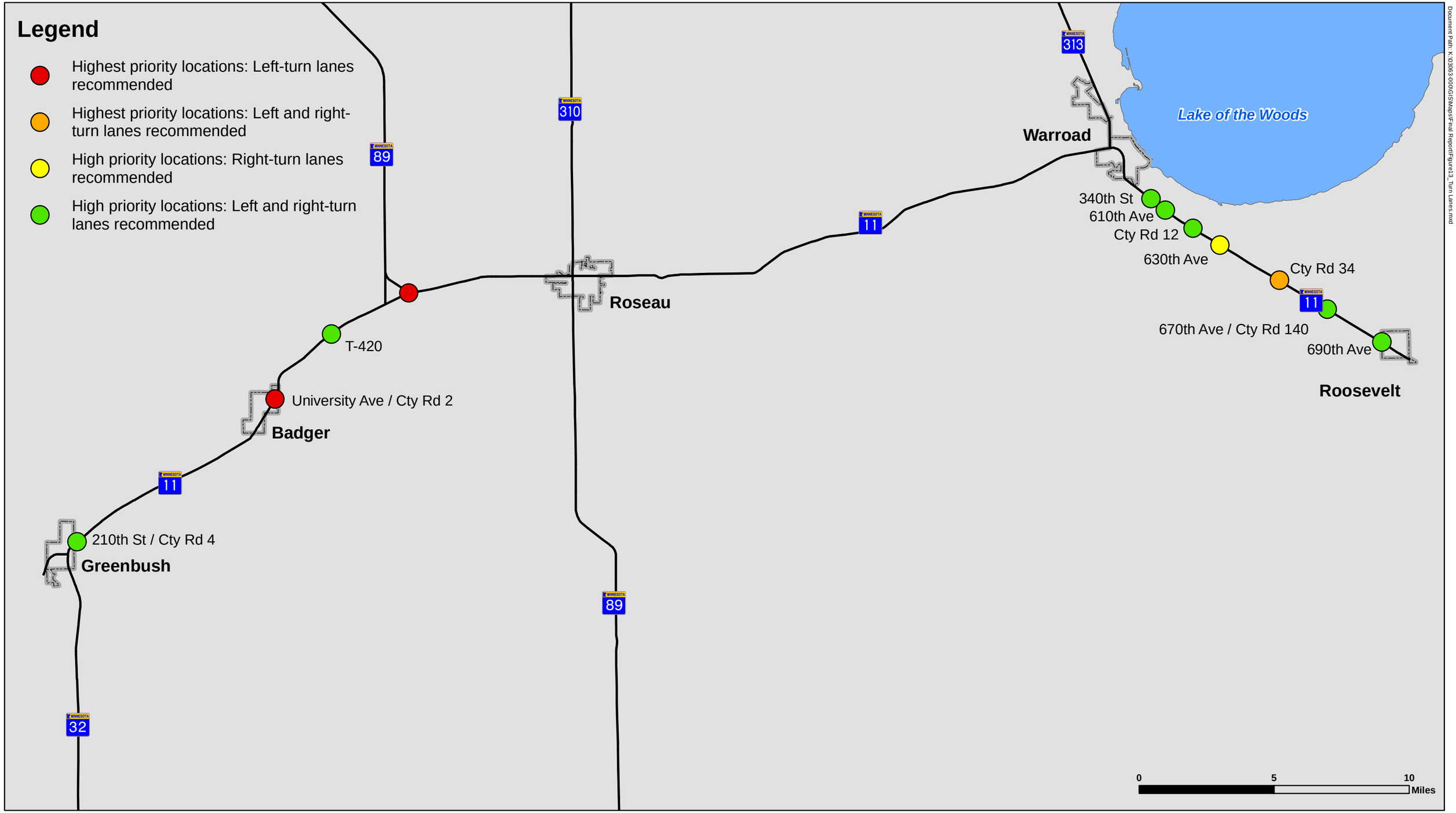

Figure 13: Turn Lane Recommendations

High Priority – Railroad Stacking Distance

Another priority for turn lane construction includes locations where there is the potential for train and vehicle traffic to conflict. Where the stacking distance between TH 11 and the railroad is 100 feet or less, there is potential for traffic to back up on TH 11. Locations where this occurs include:

- CSAH 4/210th Street in Greenbush – Left- and right-turn lanes
- CSAH 2/University Avenue in Badger – Left-turn lanes
- T-420 in Badger – Left- and right-turn lanes
- 340th Street in Warroad – Left- and right-turn lanes
- 610th Avenue in Warroad – Left- and right-turn lanes
- CSAH 12 in Warroad – Left- and right-turn lanes
- 630th Avenue in Warroad – Right-turn lanes
- CSAH 34 in Swift/Roosevelt – Left- and right-turn lanes
- CR 140/670th Avenue in Roosevelt – Left- and right-turn lanes
- 690th Avenue in Roosevelt – Left- and right-turn lanes

If a left-turn lane is not feasible due to costs and/or environmental constraints a bypass lane should be considered at "T" intersections.

High Priority – Left-Turn Lane Volume Warrants

Another priority for turn lane construction includes locations where cross street volumes meet the thresholds for left-turn lanes. While data was not collected as part of this study, volumes from MnDOT traffic flow maps were consulted. Most roadways that do not have posted volumes would be anticipated to have lower traffic since they are not state aid routes. Additionally, a majority of the city streets that would have higher traffic volumes that are not on the State Aid System are within the three-lane roadway sections of the corridor, which have dedicated left-turn lanes. The only location outside of the three-lane section, where cross street volumes are available, that suggests a warrant for a left-turn lane is:

- CSAH 5 in Warroad

If a left-turn lane is not feasible due to costs and/or environmental constraints a bypass lane should be considered at "T" intersections.

Medium Priority – Right-Turn Lanes as Part of Roadway Preservation/Rehabilitation Projects

Right-turn lanes are recommended at all public street locations as part of roadway preservation projects in the non-three-lane sections. A list of these roadways is available in the TH 11 Turn Lane Assessment Memo. There are approximately 80 locations where right-turn lanes would be considered. It should be noted that sight distance, feasibility, spacing, etc. should be reviewed by the District Traffic Engineer as part of the review and recommendation process during the preservation/rehabilitation project development.

Medium Priority – Left-Turn Lanes as Part of Roadway Preservation/Rehabilitation Projects

For public street and commercial/industrial/residential driveway locations that do not meet crash, railroad or volume thresholds (based on traffic flow maps) for the construction of dedicated left-turn lanes, the District Traffic Engineer should review sight distance and freight turning movements during the preservation/rehabilitation project development. Updated crash data for the most recent three-year history should also be reviewed for correctable crashes and crash/severity rates. If a left-turn lane is not feasible due to costs and/or environmental constraints a bypass lane should be considered at "T" intersections.

3.3 Concept Development and Evaluation for Key Problem Areas

Development of concepts to address the key problem areas identified in Section 2 involved a number of steps and included input from technical individuals as well as corridor users. This subsection provides background on how the concepts were identified and developed, what concepts were developed for each of the key problem areas – including a high-level conceptual sketch, and how those concepts were evaluated to better understand if they address the identified need. In addition, information on general expected construction was also identified along with expected right of way needs. The final portion of this subsection summarizes the evaluation and prioritization process for selecting concepts to move forward for further study and additional input from stakeholders.

Concept Development Background

Once the key problem areas were identified and agreed to by the Technical Advisory Committee (TAC), the concept development process began. Several methods were used to generate concepts – independent ideas from the consultant, design charrettes with TAC members and MnDOT staff, additional refinements and ideas after the first sets of concepts were developed, and feedback from the public. This process started with the Technical Advisory Committee (TAC). TAC members completed a mini charrette where they broke into groups and selected the problem areas that they were most interested in and worked with MnDOT and consultant staff to develop and draw up potential options. TAC members developed multiple options for the different areas and then got together as a group to discuss what they had developed and what process they used to come up with their various concepts.

The information developed with the TAC was then utilized at a day-long charrette with MnDOT District 2 staff. A similar process was repeated with the technical experts at District 2 along with the consultant staff. As a result of the process, additional concepts were added to the list; existing concepts were modified slightly; and some ideas were discarded. Following the meeting, the consultant reviewed the ideas, made additional changes or modifications based on physical and environmental constraints and design standards and presented the revised concepts to MnDOT District 2 staff for review and comment. The concepts were modified a couple of times going back and forth between MnDOT and the consultant. The concepts were

then presented to the TAC for review and comment. TAC member comments were taken and the concepts were then revised again with additional MnDOT input.

Concept Description

In many locations, multiple concepts were developed as options to address problems in the corridor. **Figure 11** shows the location of the problem areas. **Table 16** provides a listing of the various concepts with a short description and construction cost. Following Table 16 is a one to two page summary for each of the problem areas and the various concepts developed to address the problems. Information is provided on the following:

- Project area and limits
- Primary improvement
- Number of concepts/alternatives developed
- Problem the concept(s) address
- Description of the concept
- Estimated construction costs
- Estimated right of way needs – number of parcels impacted
- Environmental concerns
- Overall risks to the concept
- Benefits associated with the concept

Following the summary of the concepts are stick figures that represent the major improvements associated with the concept. Detailed concept layouts for each of the areas are available for viewing and downloading on MnDOT's project website: http://www.dot.state.mn.us/d2/projects/hwy11assessment/index.html

Detailed concepts are not provided within the body of this report due to page size limitations. Some concepts cover multiple miles of improvements which are not legible at a smaller report size. Additional details about the concepts (beyond what is provided in the one to two page summaries) are available in the TH 11 Concept Development Memo.

Table 16: Summary Table of Problem Area Concepts

Area	Location	Option	Description	Estimated Construction Cost
0	Greenbush	A	Consolidate access between Hwy 32 and Cty Rd 4	$50,000-$100,000
1	Badger	A	Super-two roadway with eastbound bound passing lane between 290th Avenue and Cty Rd 26	$1,100,000-$1,300,000
		B	Super-two roadway with westbound passing lane between 250th Avenue and 260th Avenue	$900,000-$1,000,000
2	Badger	A	Realign Cty Rd 2 0.5 mile east of Highway 11 and close/realign access north of Cty Rd 2	$1,900,000-$2,200,000
		B	Realign Cty Rd 2 1.25 miles east of Highway 11 and close/realign access north of Cty Rd 2	$3,000,000-$4,000,000
3	Between Badger and Roseau	A	Realign intersections so Hwy 308 is route to border and construct frontage road north of Hwy 11	$2,000,000-$2,500,000
		B	Realign intersections so Hwy 308 is route to border and convert Hwy 11 to a three-lane section	$2,000,000-$2,500,000
		C	Hwy 89 realignment and frontage road or three-lane section	$4,000,000-$5,000,000
		D	Hwy 89 intersection realignment and frontage road or three-lane section	$1,800,000-$2,200,000
4	West of Roseau	A	Frontage road between 330th and 350th Avenues	$1,500,000-$2,000,000
		B	Convert Hwy 11 to a three-lane section between 330th and 350th Avenues	$1,000,000-$1,300,000
5	Roseau	A	Consolidate access and construct/extend frontage roads between 380th Ave and Hwy 89: Access at 7th Ave NW	$400,000-$500,000
		B	Consolidate access and construct/extend frontage roads between 380th Ave and Hwy 89: Access at 9th Ave NW	$400,000-$500,000
6	Between Roseau and Warroad	A	Super-two roadway with eastbound passing lane between 450th Avenue and Hay Creek	$1,200,000-$1,500,000
		B	Super-two roadway with eastbound passing lane on new roadway alignment between 440th Avenue and Hay Creek	$7,000,000-$8,000,000
		C	Super-two roadway with staggered east and westbound passing lanes on new roadway alignment between 440th Avenue and Hay Creek	$7,000,000-$8,000,000
		D	Four-lane roadway on new alignment between 440th Avenue and Hay Creek	$8,000,000-$9,000,000
7	West of Warroad	A	Convert Hwy 11 to three-lane section between 550th and 570th Avenues and construct backage road west of 560th Avenue	$2,300,000-$2,500,000
		B	Convert Hwy 11 to three-lane section between 550th and 570th Avenues and construct frontage road west of 560th Avenue	$2,300,000-$2,500,000
		C	Reconstruct Hwy 11 on new alignment between 530th Avenue and east of 570th Avenue	$8,500,000-$9,500,000
		D	Super-two roadway with westbound passing lane between 530th and 550th Avenues	$1,500,000-$2,000,000
8	Warroad	A	Frontage roads south of Hwy 11, between 580th Ave and Hwy 313	$1,400,000-$1,600,000
9	Warroad	A	Reconstruct Hwy 11 with three-lane section with sidewalk and no parking	$3,000,000-$4,000,000
		B	Reconstruct Hwy 11 with three-lane section with sidewalk and parking on one side	$3,000,000-$4,000,000
		C	Reconstruct Hwy 11 with three-lane section and realign intersection with Cty Rd 5	$3,000,000-$4,000,000
10	East of Warroad	A	Realign Hwy 11 intersection with Cty Rd 12 and construct turn lanes	$1,000,000-$1,200,000
11	East of Warroad	A	Realign intersection with 650th Avenue and construct turn lanes at 650th Ave and Cty Rd 34	$500,000-$700,000
12	Roosevelt	A	Left turn lanes on Hwy 11 near 697th Avenue	$300,000-$500,000
		B	Westbound bypass lane west of 697th Avenue	$100,000-$200,000

Area 0: Highway 11 in Greenbush

Project Area: City of Greenbush

Limits: Highway 11 between Highway 32 and County Road 4/210th Street

Primary Improvement: Consolidate access

Number of Alternatives: 1

Problem Addressed: High concentration of access north of Highway 11 and Highway 32 intersection.

Option A: Consolidate access north of Highway 32

Description:

- Construct new driveways on the west side of Highway 11 to consolidate access to one point and close two existing driveways
- Close driveway north of liquor store and consolidate access to existing driveway north of gas station.

Estimated Construction Costs: $50,000-$100,000

Right of Way Needs: Right of way will be needed from two parcels in order to create the shared access point and individual driveways on the west/north side of the corridor.

Environmental Concerns: Potential for contamination near gas station.

Risks: Contamination.

Benefits: Improve safety:

- Consolidate access to reduce conflict points

Figure 14 - Area 0 - Option A

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Area 1: Highway 11 between 250th Avenue and 310th Avenue

Project Area: East and West of the City of Badger

Limits: Highway 11 between 250th Avenue and 310th Avenue

Primary Improvement: Construct passing lanes on Highway 11 to create a super-two roadway

Number of Alternatives: 2

Problem Addressed: User desire for passing opportunities

Option A: Super-two roadway with eastbound bound passing lane between 290th and Cty Rd 26

Description:

Expand Highway 11 to a super-two roadway between 290th Avenue and Cty Rd 26:

- Eastbound passing lane for 0.86 miles

Access Modifications:

- Square up entrance to gravel pit south of Highway 11, opposite Cty Rd 26.

Estimated Construction Costs: $1,100,000-$1,300,000

Right of Way Needs: No right of way needs are anticipated.

Environmental Concerns: Potential for state-listed rare features near the project area.

Risks:

- Rare features
- Length of passing lane is not ideal – short

Benefits: Safety and mobility improvements:

- Eastbound vehicles could pass without using oncoming travel lanes.

Option B: Super-two roadway with westbound passing lane between 250th Avenue and 260th Avenue

Description:

Expand Highway 11 to a super-two roadway between 250th Avenue and Main Street:

- Westbound passing lane for 0.8 miles

Access Modifications:

- Close on field access point on the south side of Highway 11, west of 260th Avenue.

Estimated Construction Costs: $900,000-$1,000,000

Right of Way Needs: No right of way needs are anticipated.

Environmental Concerns: None anticipated.

Risks:

- Length of passing lane is not ideal - short

Benefits: Safety and mobility improvements:

- Westbound vehicles could pass without using oncoming travel lanes.

Figure 15 - Area 1 - Option A

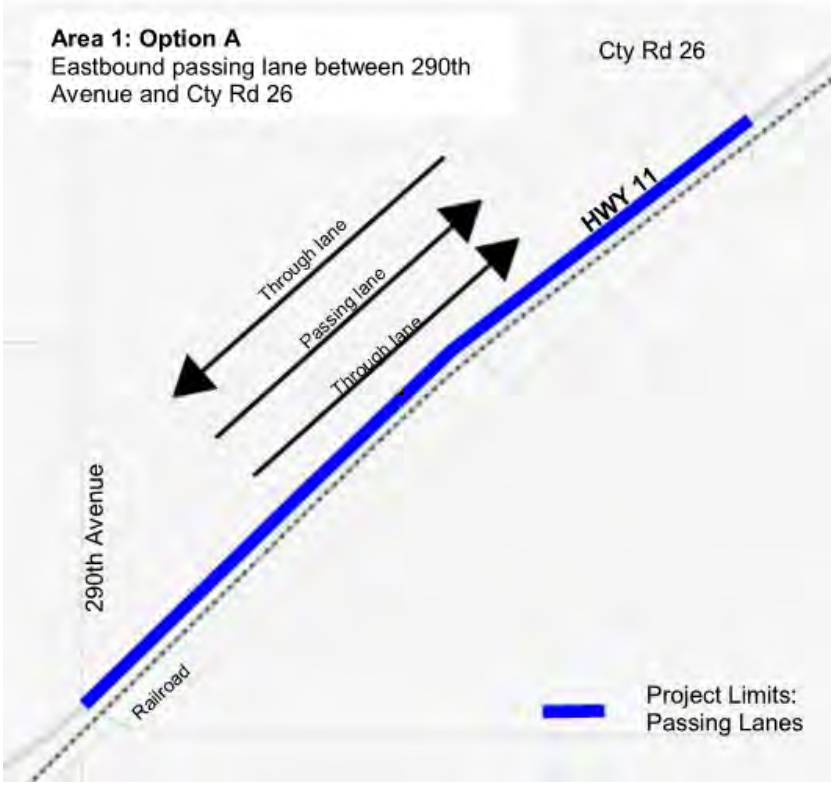
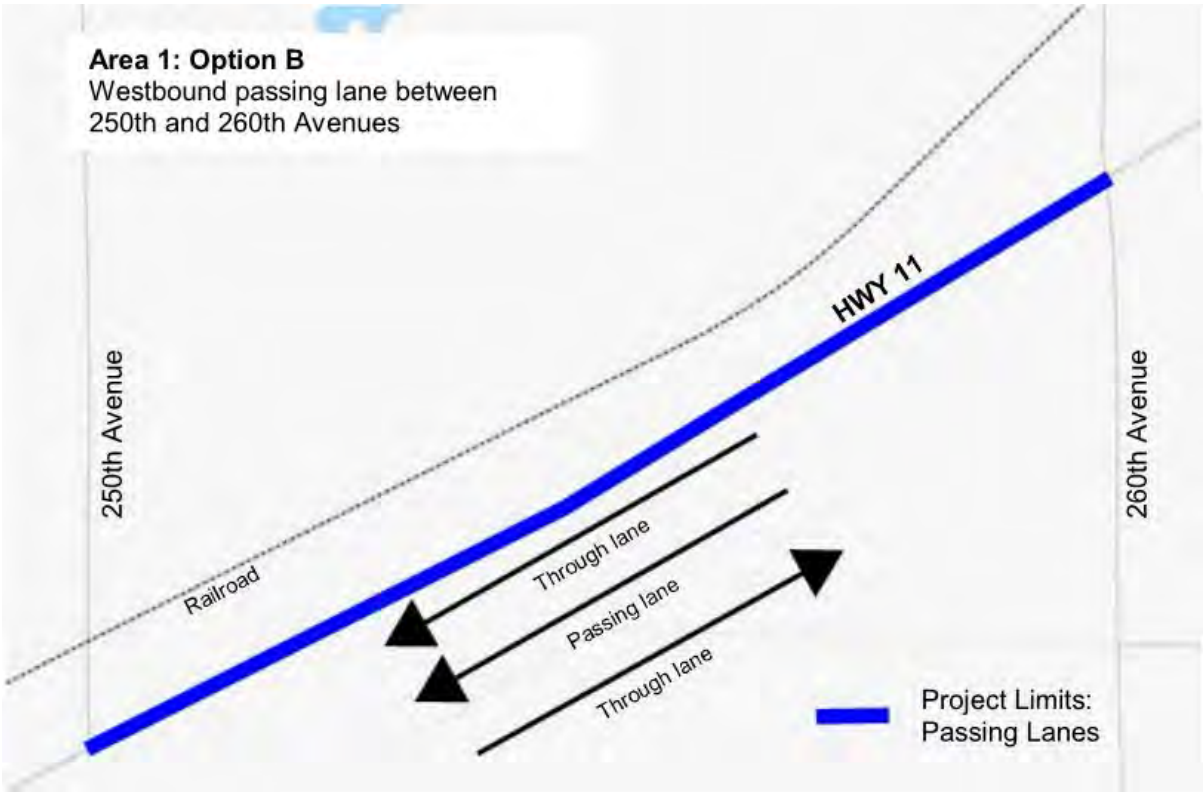


Figure 16 - Area 1 - Option B



Area 2: Cty Rd 2/University Avenue to Cty Rd 3 in Badger

Project Area: City of Badger

Limits: TH 11 from Cty Rd 2/University Ave to Cty Rd 3, Cty Rd 2 from TH 11 to 1.25 miles east of TH 11

Primary Improvement: Realign intersection of TH 11 and Cty Rd 2 and manage access

Number of Alternatives: 2

Problem Addressed: Safety problems at skewed intersection (TH 11 and Cty Rd 2) , high concentration of access north of Cty Rd 2

Option A: Realign Cty Rd 2 0.5 miles east of TH 11 and close/realign access north of Cty Rd 2	Option B: Realign Cty Rd 2 1.25 miles east of TH and close/realign access north of Cty Rd 2
Description: Relocate the existing intersection of Hwy 11 and Cty Rd 2 south of its current location	**Description:** Relocate the existing intersection of Hwy 11 and Cty Rd 2 south of its current location
Realign intersections and roadways: ▪ Realign Chicago Avenue ▪ Realign Cty Rd 2 for 0.5 mile west of Hwy 11 ▪ Realign North Main Street ▪ Realign Old Highway 11 to intersect Hwy 11 directly across from North Main Street	**Realign intersections and roadways:** ▪ Realign Chicago Avenue ▪ Realign Cty Rd 2 for 1.25 mile west of Hwy 11 ▪ Realign North Main Street ▪ Realign Old Highway 11 to intersect Hwy 11 directly across from North Main Street
Access Modifications: ▪ Close Atlantic Avenue in a cul-de-sac ▪ Close the 280th St intersection with Hwy 11 ▪ Close and realign several driveways	**Access Modifications:** ▪ Close Atlantic Avenue in a cul-de-sac ▪ Close the 280th St intersection with Hwy 11 ▪ Close and realign several driveways
Estimated Construction Costs: $1,900,000-$2,200,000	**Estimated Construction Costs:** $3,000,000-$4,000,000
Right of Way Needs: Right of way anticipated from 13 parcels, with a total take of the Citizens State Bank, and larger acquisitions from two parcels.	**Right of Way Needs:** Right of way anticipated from 13 parcels, with a total take of the Citizens State Bank, and larger acquisitions from three parcels.
Environmental Concerns: Contamination at Roseau County Coop; wetland impacts.	**Environmental Concerns:** Contamination at Roseau County Coop; potential for wetland impacts.
Risks: Contamination at Roseau County Coop; cost of right of way acquisition.	**Risks:** Contamination at Roseau County Coop; cost of right of way acquisition.
Benefits: Improve safety: ▪ Reduce skew at several intersections ▪ Consolidate access to reduce conflict points	**Benefits:** Improve safety: ▪ Reduce intersection skew and horizontal curves ▪ Consolidate access to reduce conflict points

Figure 17 - Area 2 - Option A

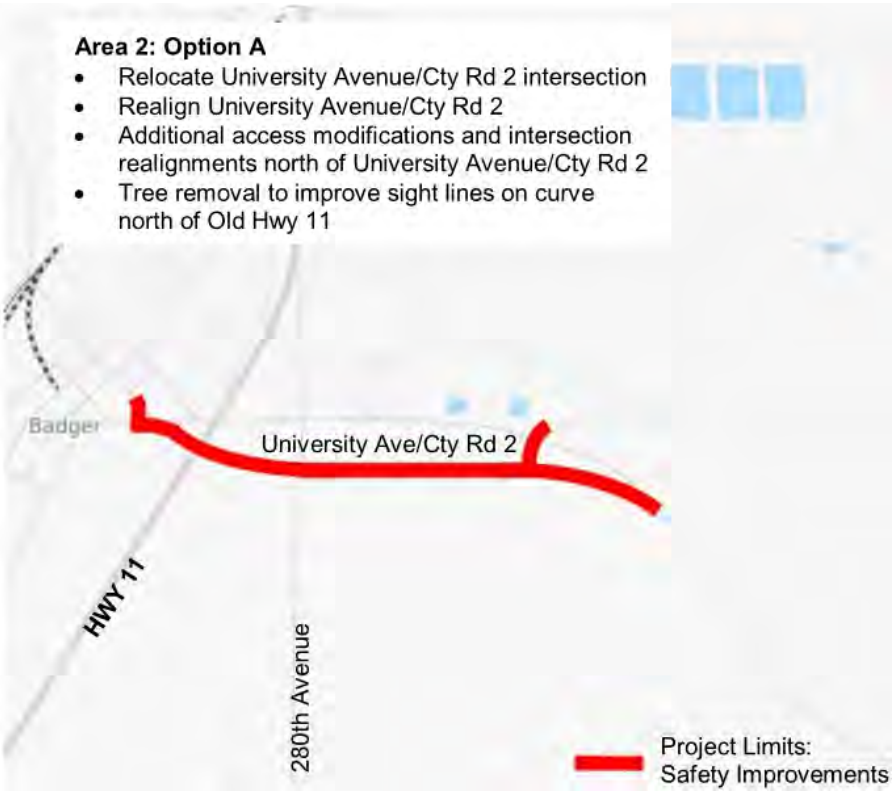
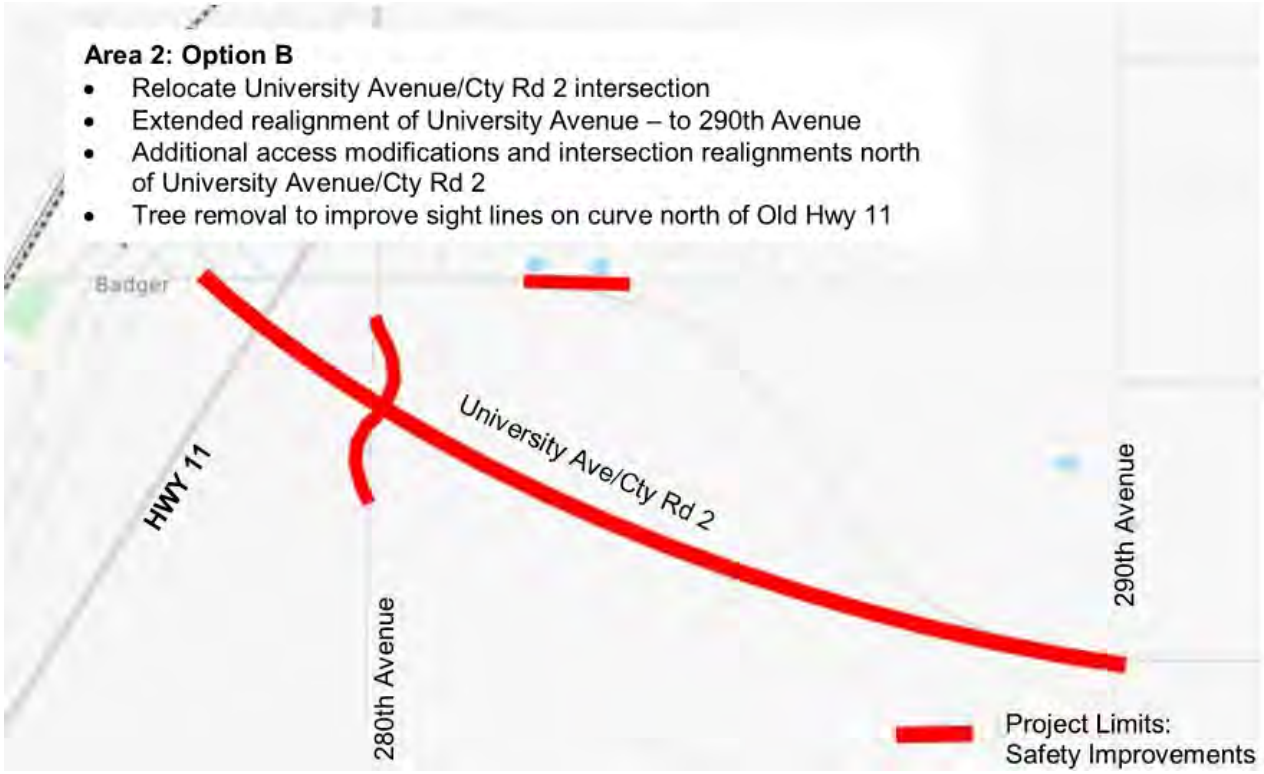


Figure 18 - Area 2 - Option B



Area 3: Highway 11 between Highway 308 and Highway 89

Project Area: Between the Cities of Badger and Roseau
Limits: TH 11 between Highway 308 and Highway 89, intersection of Highway 308 and Highway 89
Primary Improvement: Realign intersections and address access management issues
Number of Alternatives: 4
Problem Addressed: Safety problems due to intersection skew: TH 11 intersects both Hwy 308 and Hwy 89 at a skewed angle, Hwy 89 and Hwy 308 currently intersect with each other in a "Y" intersection. High concentration of access on TH 11 between Hwy 308 and Hwy 89.

Option A: Realign intersections so Hwy 308 is route to border and construct frontage road north of TH 11	Option B: Realign intersections so Hwy 308 is route to border and convert TH 11 to a three-lane section
Description: **Intersection Realignments:** ▪ Realign Hwy 11 and Hwy 308 to intersect at 90 degree angles ▪ Close existing intersection of Hwy 11 and Hwy 89: Hwy 89 traffic would use 330th Avenue ▪ Realign Hwy 89 and Hwy 308 intersection to intersect at a 90 degree angle ▪ Realign 310th Street intersection with Hwy 89 **Access Modifications:** ▪ Construct frontage road north of Hwy 11 between Hwy 308 and Hwy 89 ▪ Close several driveways on Hwy 11 **Estimated Construction Costs:** $2,000,000-$2,500,000 **Right of Way Needs:** Right of way from 13 parcels. **Environmental Concerns:** Potential for state-listed rare features. **Risks:** Cost of right of way acquisition and requirement that Hwy 89 connects to border. **Benefits:** Improve safety: ▪ Realign intersections to 90 degree angles ▪ Consolidate access onto Hwy 11	**Description:** **Intersection Realignments:** ▪ Realign Hwy 11 and Hwy 308 to intersect at 90 degree angles ▪ Close existing intersection of Hwy 11 and Hwy 89: Hwy 89 traffic would use 330th Avenue ▪ Realign Hwy 89 and Hwy 308 intersection to intersect at a 90 degree angle ▪ Realign 310th Street intersection with Hwy 89 **Roadway Expansion:** ▪ Expand Hwy to three-lane section between Hwy 308 and Hwy 89 **Estimated Construction Costs:** $2,000,000-$2,500,000 **Right of Way Needs:** Right of way from seven parcels. **Environmental Concerns:** Potential for state-listed rare features near the project area. **Risks:** Cost of right of way acquisition and requirement that Hwy 89 connects to border. **Benefits:** Improve safety: ▪ Realign intersections to 90 degree angles ▪ Center turn lane would reduce conflicts between through and turning vehicles

Area 3: Highway 11 between Highway 308 and Highway 89 (Continued)

Option C: Hwy 89 realignment and frontage road or three-lane section

Description:

Intersection Realignments:

- Realign Hwy 89 so it intersects Hwy 11 at a 90 degree angle
- Realign 330th Avenue so it intersects Hwy 89 at a 90 degree angle
- Close existing intersection of Hwy 11 and Hwy 308: Hwy 308 traffic would use Hwy 89
- Realign Hwy 89, Hwy 308, and 310th Street so intersections are at 90 degree angles

Access Modifications/Roadway Expansion Options:

- Frontage road **OR** three-lane section between Hwy 308 and Hwy 89

Estimated Construction Costs: $4,000,000-$5,000,000

Right of Way Needs: Right of way from up to 11 parcels.

Environmental Concerns: Potential for state-listed rare features.

Risks: Cost of right of way acquisition.

Benefits: Improve safety:

- Realign intersections to 90 degree angles
- Consolidate access onto Hwy 11

Option D: Hwy 89 intersection realignment and frontage road or three-lane section

Description:

Intersection Realignments:

- Realign Hwy 89 intersection with Hwy 11 to intersect at a 90 degree angle
- Close existing intersection of Hwy 11 and Hwy 308: Hwy 308 traffic would use Hwy 89
- Realign Hwy 89, Hwy 308, and 310th Street so intersections are at 90 degree angles

Access Modifications/Roadway Expansion Options:

- Frontage road **OR** three-lane section between Hwy 308 and Hwy 89

Estimated Construction Costs: $1,800,000-$2,200,000

Right of Way Needs: Right of way from up to nine parcels.

Environmental Concerns: Potential for state-listed rare features near the project area.

Risks: Cost of right of way acquisition.

Benefits: Improve safety:

- Realign intersections to 90 degree angles
- Center turn lane would reduce conflicts between through and turning vehicles

Figure 19 - Area 3 - Option A

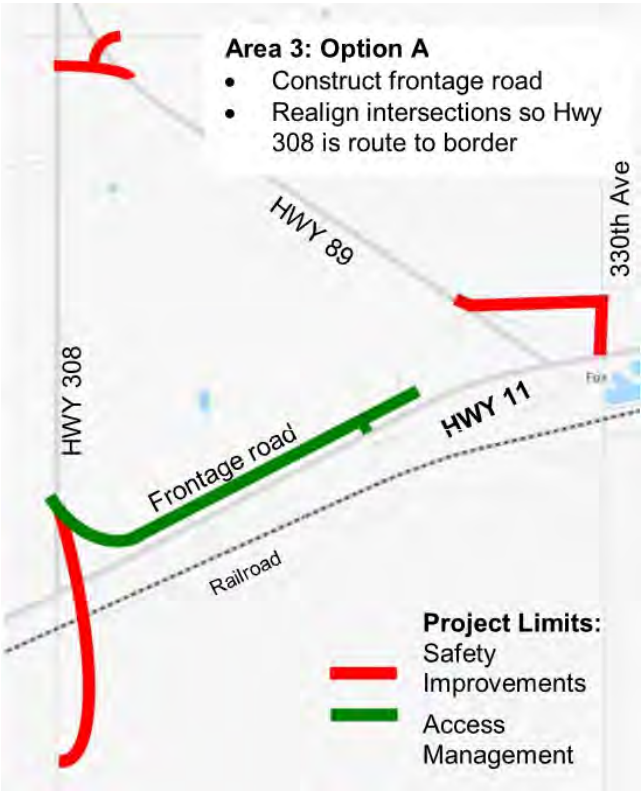


Figure 20 - Area 3 - Option B

Figure 21 - Area 3 - Option C

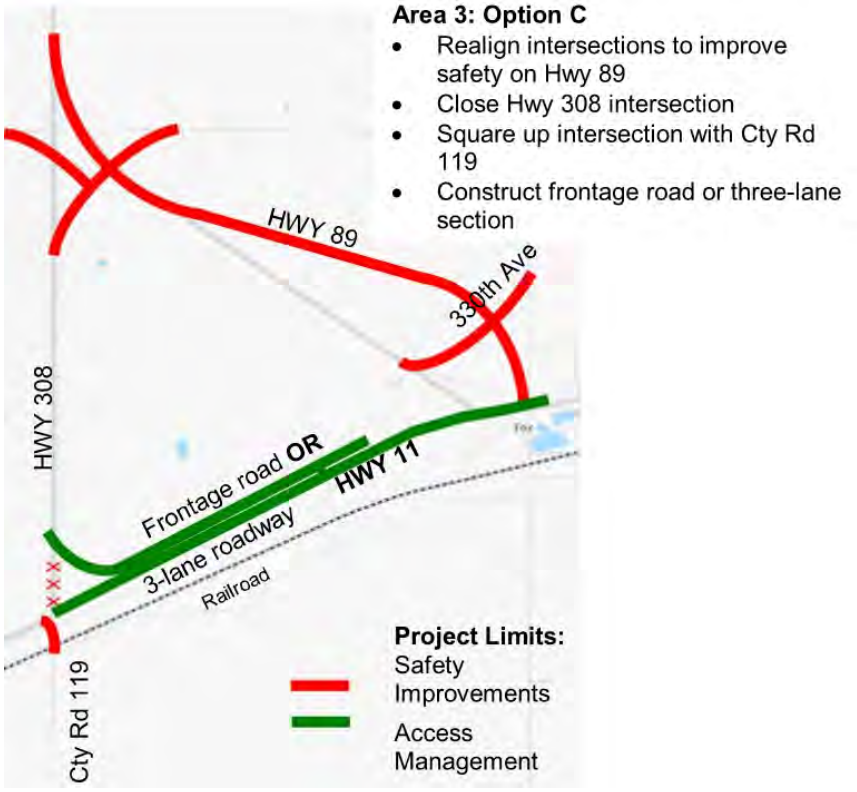


Figure 22 - Area 3 - Option D

Area 4: Highway 11 between 330th and 350th Avenues west of Roseau

Project Area: West of City of Roseau

Limits: Highway 11 from 330th Avenue to 350th Avenue

Primary Improvement: Address existing access control issues on this section of Hwy 11

Number of Alternatives: 2

Problem Addressed: High concentration of access onto Hwy 11, safety issues at intersection with 340th Avenue

Option A: Frontage road between 330th and 350th Avenues

Description:

- Construct frontage road north of Hwy 11 between 330th and 350th Avenues, with access between 330th and 340th Avenues and at the auto repair/salvage business

Access Modifications:

- Realign driveway access south of Hwy 11
- Close 11 driveways and two field entrances

Estimated Construction Costs: $1,500,000-$2,000,000

Right of Way Needs: Right of way from five parcels

Environmental Concerns: Possible contamination near the auto repair/salvage business (not documented in Minnesota Pollution Control records).

Risks: Cost of right of way acquisition and possible contamination

Benefits: Safety and mobility improvements:

- Consolidate access onto Hwy 11
- Bypass lane will reduce conflicts between through and turning vehicles, particularly trucks.

Option B: Convert TH 11 to a three-lane between 330th and 350th Avenues

Description:

- Expand Hwy 11 to three lanes
- Eastbound and westbound left and right turn lanes at 340th Avenue

Access Modifications:

- Close three field entrances
- Realign and consolidate driveways

Estimated Construction Costs: $1,100,000-$1,300,000

Right of Way Needs: Limited amount of right of way for some driveway altering on one parcel

Environmental Concerns: Possible contamination near the auto repair/salvage business (not documented in Minnesota Pollution Control records)

Risks: Possible contamination near the auto repair/salvage site. Higher-speed three-lane section

Benefits: Safety and mobility improvements:

- Consolidate access onto Hwy 11
- Three-lane roadway and turn lanes will reduce conflicts between turning and through vehicles, particularly trucks.

Figure 23 - Area 4 - Option A

Figure 24 - Area 4 - Option B

Area 5: Highway 11 between Cty Rd 120/18th Avenue/380th Avenue and Highway 89 in Roseau

Project Area: City of Roseau
Limits: Cty Rd 120/18th Ave/380th Ave to Highway 89
Primary Improvement: Consolidate access and construct frontage roads
Number of Alternatives: 2
Problem Alternative is Addressing: High concentration of access

Option A: Consolidate access and construct/extend frontage roads with access at 7th Avenue NW	Option B: Consolidate access and construct/extend frontage roads with access at 9th Avenue NW
Description: **North Frontage Road:** • Extend frontage road north of Hwy 11 to the existing Holiday gas station, with Hwy 11 access at 7th Ave NW • Close three access points to Hwy 11 **South Frontage Road:** • Extend frontage road south of Hwy 11 to Cenex gas station with Hwy 11 access at 7th Ave NW • Close three access points to Hwy 11 **Turn Lanes:** • Westbound right and left turn lanes at Cty Rd 120 – built in 2015 • Eastbound right and left turn lanes at 15th Avenue NW **Estimated Construction Costs:** $400,000-$500,000 **Right of Way Needs:** No right of way for the improvements to Hwy 11. Construction of the frontage roads would require right of way from a total of six parcels. **Environmental Concerns:** Contamination at gas station and near north frontage road **Risks:** Cost of right of way acquisition, contamination. **Benefits:** Safety and mobility improvements by consolidating access onto Hwy 11	**Description:** **North Frontage Road:** • Extend frontage road north of Hwy 11 to Holiday gas station, with Hwy 11 access at 9th Ave NW and 450 ft west of Hwy 310 • Close four access points to Hwy 11 **South Frontage Road:** • Extend frontage road south of Hwy 11 to Cenex gas station with Hwy 11 access at 9th Ave NW and 450 ft west of Hwy 89 • Close three access points to Hwy 11 **Turn Lanes:** • Westbound right and left turn lanes at Cty Rd 120 – built in 2015 • Eastbound right and left turn lanes at 15th Avenue NW **Estimated Construction Costs:** $400,000-$500,000 **Right of Way Needs:** No right of way for the improvements to Hwy 11. Construction of the frontage roads would require right of way from a total of six parcels. **Environmental Concerns:** Contamination at gas station and near north frontage road **Risks:** Cost of right of way acquisition, contamination. **Benefits:** Safety and mobility improvements by consolidating access onto Hwy 11

Figure 25 - Area 5 - Option A

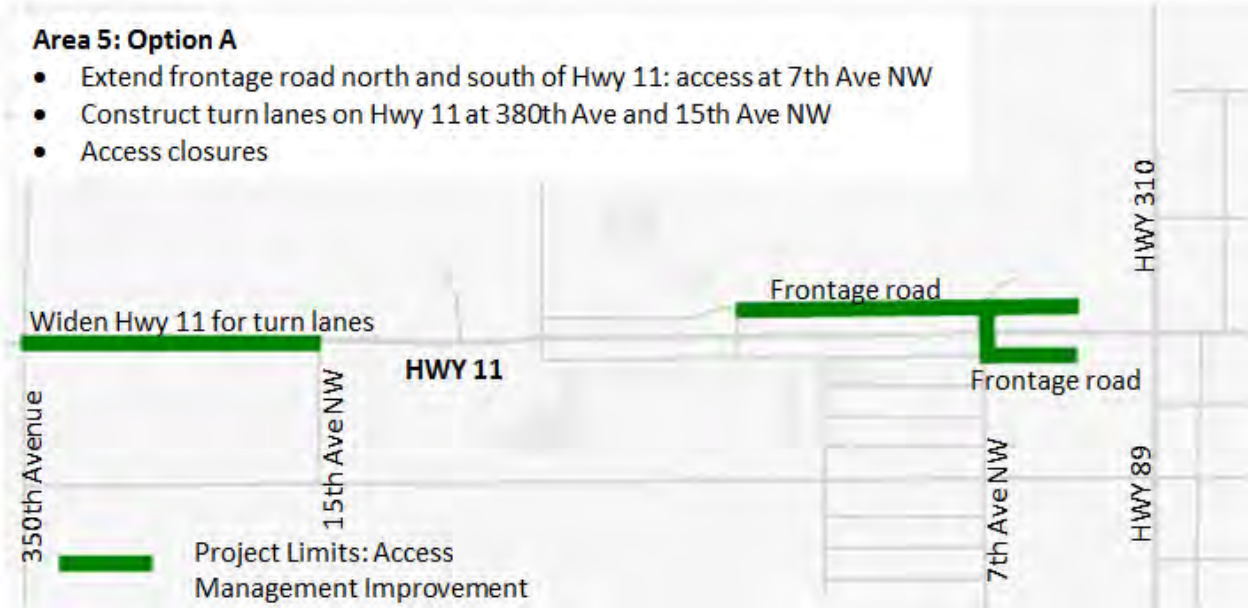
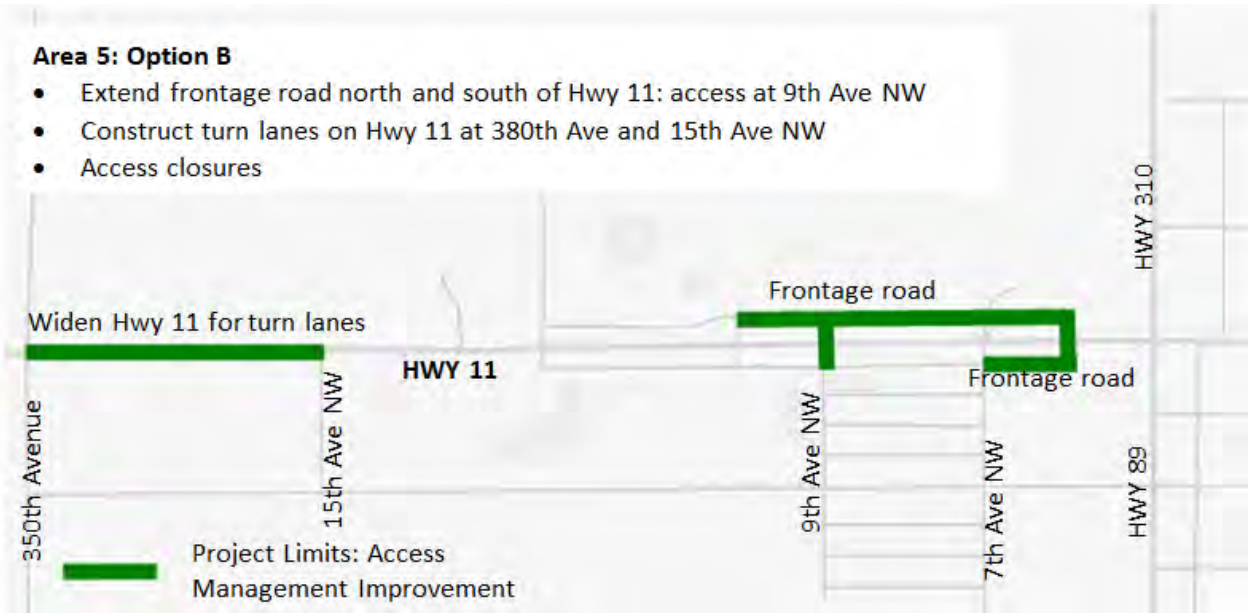


Figure 26 - Area 5 - Option B



Area 6: Hwy 11 between 440th Avenue and Hay Creek west of Warroad

Project Area: West of City of Warroad

Limits: Hwy 11 between 440th Avenue and Hay Creek

Primary Improvement: Construct passing lanes on Hwy 11 to create a super-two roadway

Number of Alternatives: 4

Problem Addressed: Community desire for more passing opportunities between Roseau and Warroad.

Option A: Super-two roadway with eastbound passing lane between 450th Avenue and Hay Creek

Description: Expand Hwy 11 to a super-two roadway between 450th Avenue and Hay Creek:

- Eastbound passing lane for 1.25 miles
- East and westbound left and right turn lanes at Cty Rd 9/460th Avenue

Estimated Construction Costs: $1,200,000-$1,500,000

Right of Way Needs: None.

Environmental Concerns: None identified.

Risks: Safety concerns due to passing lane extending through Cty Rd 9. Skew at TH 11 and Cty Rd 9 intersection.

Benefits: Safety and mobility:

- Passing lanes
- Turn lanes

Option B: Super-two roadway with eastbound passing lane on new roadway alignment between 440th Avenue and Hay Creek

Description: New roadway alignment between 440th Avenue and Hay Creek, following an abandoned railroad bed:

- Eastbound passing lane for 1 .5 miles
- Realign Cty Rd 9/460th Street intersection
- Mitigate trail in new right of way

Estimated Construction Costs: $7,000,000-$8,000,000

Right of Way Needs: 2 miles of former railroad right of way from the Roseau County Trailblazers. Additional right of way from up to 13 parcels.

Environmental Concerns: Relocate existing ATV/snowmobile trail.

Risks: Right of way acquisition and mitigation for the trail.

Benefits: Safety and mobility:

- Passing lanes
- Turn lanes
- Reduced access onto Hwy 11

Area 6: Hwy 11 between 440th Avenue and Hay Creek west of Warroad (Continued)	
Option C: Super-two roadway with staggered east and westbound passing lanes on new roadway alignment between 440th Avenue and Hay Creek	**Option D: Four-lane roadway on new alignment between 440th Avenue and Hay Creek**
Description: New roadway alignment between 440th Avenue and Hay Creek, following an abandoned railroad bed: ▪ Staggered passing lanes: eastbound passing lane for 0.8 mile, westbound passing lane for 0.8 mile ▪ Realign Cty Rd 9/460th Street intersection ▪ Mitigate trail in new right of way **Estimated Construction Costs:** $7,000,000-$8,000,000 **Right of Way Needs:** 2 miles of former railroad right of way from the Roseau County Trailblazers. Additional right of way from up to 13 parcels. **Environmental Concerns:** Relocate existing ATV/snowmobile trail. **Risks:** Right of way acquisition and mitigation for the trail. Length of passing lane is not ideal – would prefer to have a mile. **Benefits:** Safety and mobility: ▪ Passing lanes ▪ Turn lanes ▪ Reduced access onto Hwy 11	**Description:** New roadway alignment between 440th Avenue and Hay Creek, following an abandoned railroad bed: ▪ Four-lane roadway between existing Hwy 11 and Cty Rd 9 (1.5 miles) ▪ Realign Cty Rd 9/460th Street intersection ▪ Mitigate trail in new right of way **Estimated Construction Costs:** $8,000,000-$9,000,000 **Right of Way Needs:** 2 miles of former railroad right of way from the Roseau County Trailblazers. Additional right of way from up to 13 parcels. **Environmental Concerns:** Relocate existing ATV/snowmobile trail. **Risks:** Right of way acquisition and mitigation for the trail. Four-lane roadways have higher crash rates than other road design types – access has to be controlled to the roadway to minimize that risk. **Benefits:** Safety and mobility: ▪ Passing lanes ▪ Turn lanes ▪ Reduced access onto Hwy 11

Figure 27 - Area 6 - Option A

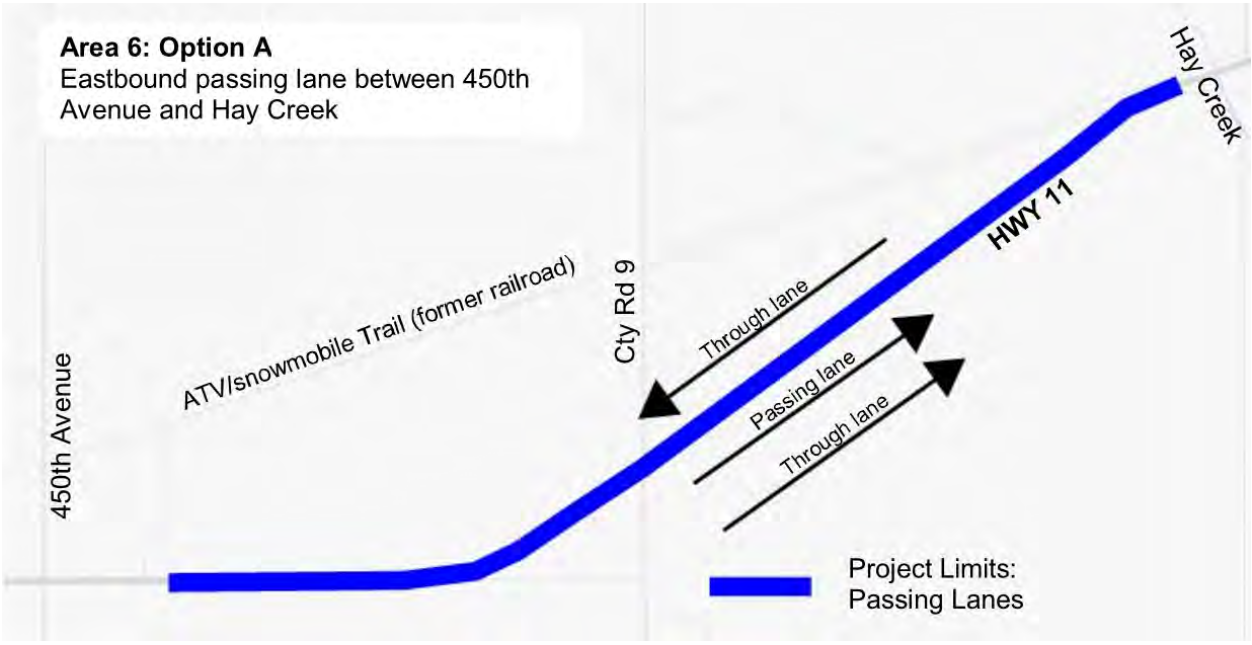


Figure 28 - Area 6 - Option B

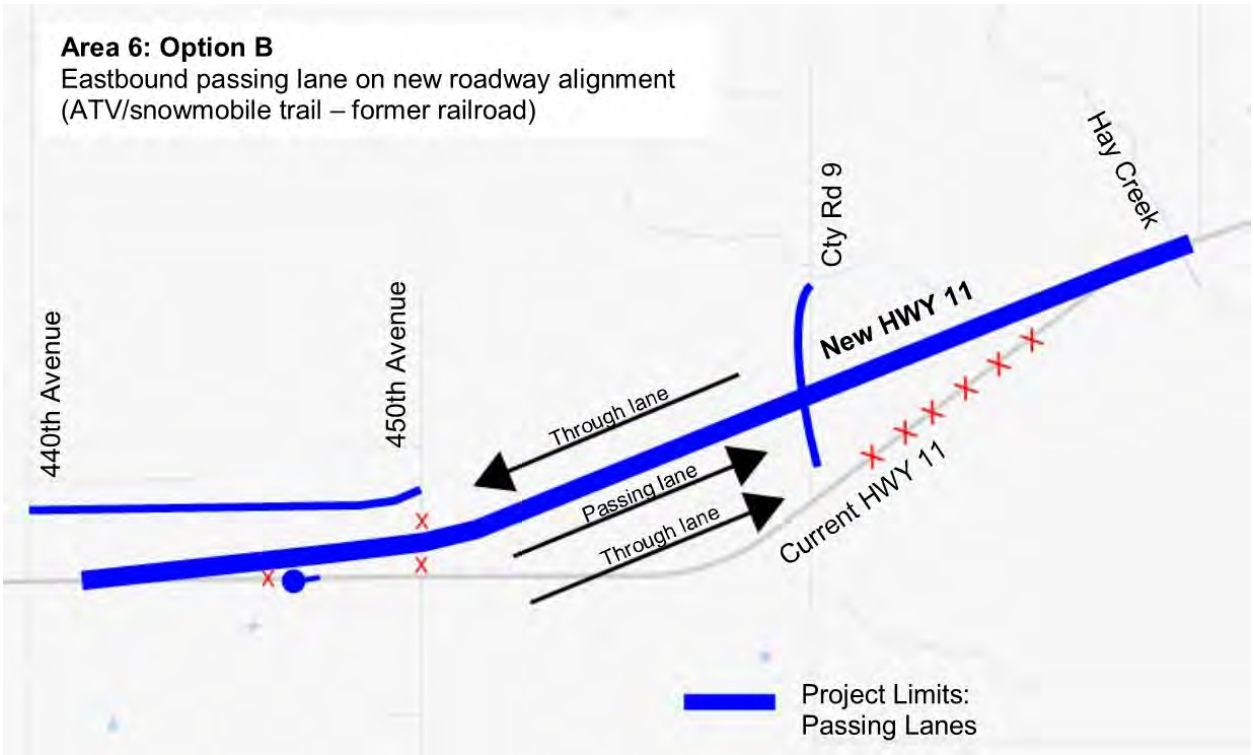


Figure 29 - Area 6 - Option C

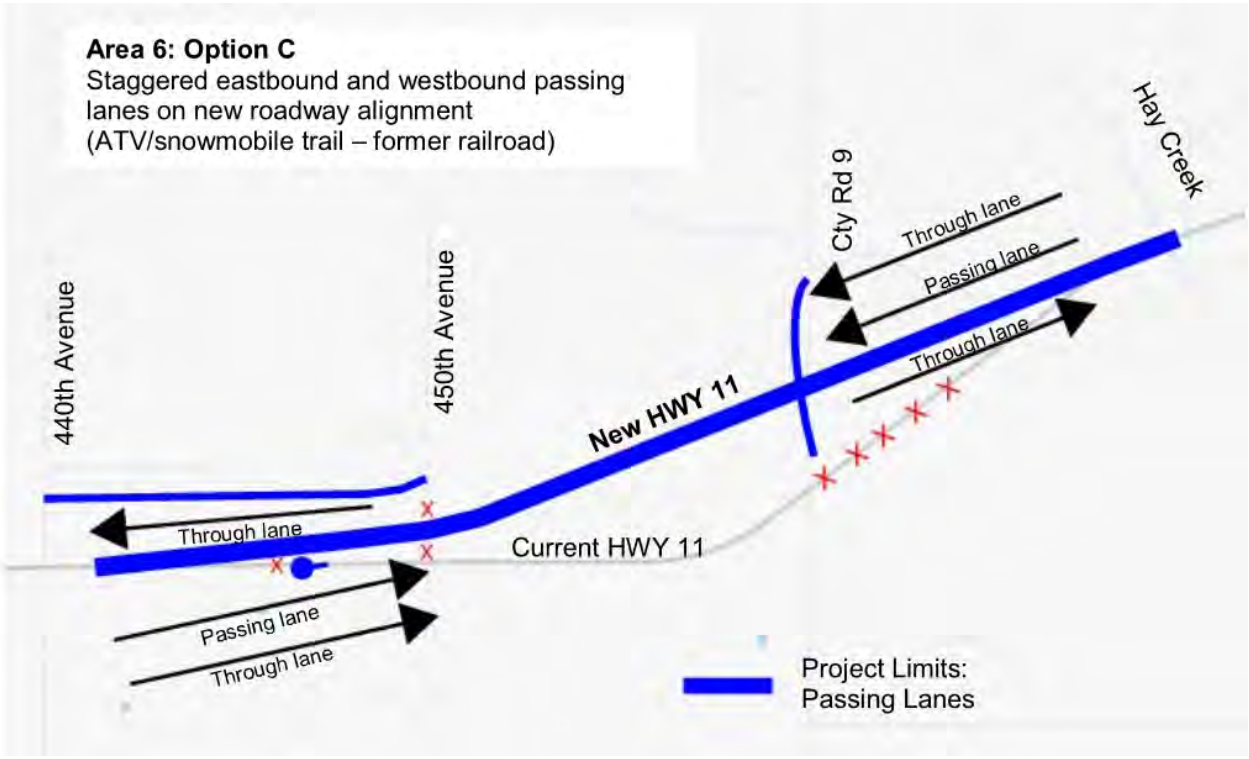


Figure 30 - Area 6 - Option D

Area 7: Hwy 11 between 530th and 570th Avenues in Warroad

Project Area: City of Warroad

Limits: Hwy 11 from 530th Street to 570th Street

Primary Improvement: Consolidate access and construct turn lanes and passing lanes

Number of Alternatives: 4

Problem Addressed: High concentration of access and skewed intersections

Option A: Convert Hwy 11 to three-lane section and construct backage road west of 560th Avenue	Option B: Convert Hwy 11 to a three-lane section and construct frontage road west of 560th Avenue
Description: Expand TH 11 to a three-lane section between 550th and 570th Avenues: ▪ Realign intersections with 560th Avenue and 350th Street ▪ Consolidate access via backage road and driveways	**Description:** Expand TH 11 to a three-lane section between 550th and 570th Avenues: ▪ Realign intersections with 560th Avenue and 350th Street ▪ Consolidate access via frontage road and driveways
Estimated Construction Costs: $2,300,000-$2,500,000	**Estimated Construction Costs:** $2,300,000-$2,500,000
Right of Way Needs: Right of way from seven parcels. Limited amount of right of way needed for driveway altering on five parcels.	**Right of Way Needs:** Right of way from five parcels.
Environmental Concerns: Potential for state-listed rare features near the project area	**Environmental Concerns:** Potential for state-listed rare features near the project area
Risks: Cost of right of way acquisition	**Risks:** Cost of right of way acquisition
Benefits: Safety and mobility: ▪ Consolidate access (close seven driveways) ▪ Three-lane roadway would reduce conflicts between through and turning vehicles ▪ Realign intersection to 90 degree angles	**Benefits:** Safety and mobility: ▪ Consolidate access (close seven driveways) ▪ Three-lane roadway would reduce conflicts ▪ Realign intersection to 90 degree angles

Area 7: Hwy 11 between 530th and 570th Avenues in Warroad (Continued)	
Option C: Reconstruct Hwy 11 on new alignment between 530th Avenue and east of 570th Avenue	**Option D: Super-two roadway with westbound passing lane between 530th and 550th Avenues**
Description: New roadway alignment between 530th and 570th Avenues, following an abandoned railroad bed: ▪ Westbound passing lane for 1.5 miles, eastbound passing lane for 1.5 miles ▪ Current Hwy 11 would remain for property access **Estimated Construction Costs:** $8,500,000-$9,500,000 **Right of Way Needs:** 4.5 miles of former railroad right of way from the Roseau County Trailblazers. Additional right of way needed from up to 28 parcels. **Environmental Concerns:** Potential for state-listed rare features near the project area, relocate ATV/snowmobile trail. **Risks:** Cost of right of way, impact to ATV/ snowmobile trail, Highway 11 turnback, business impacts. **Benefits:** Safety and mobility: ▪ Reduced access points (35 fewer access points) ▪ Passing lane	**Description:** Expand Hwy 11 to a super-two roadway between 530th and 550th Avenues: ▪ Westbound passing lane for 1.5 miles ▪ Westbound left turn lane between 549th Avenue and a driveway west of 544th Avenue ▪ Eastbound and westbound left and right turn lanes at 550th Avenue **Estimated Construction Costs:** $1,500,000-$2,000,000 **Right of Way Needs:** None. **Environmental Concerns:** Potential wetland impacts south of Hwy 11 near 544th Avenue. **Risks:** Turn lanes in addition to passing lanes may be confusing for motorists. **Benefits:** Safety and mobility: ▪ Passing lanes ▪ Turn lanes ▪ Can be paired with option 7A or 7B

Figure 31 - Area 7 - Option A

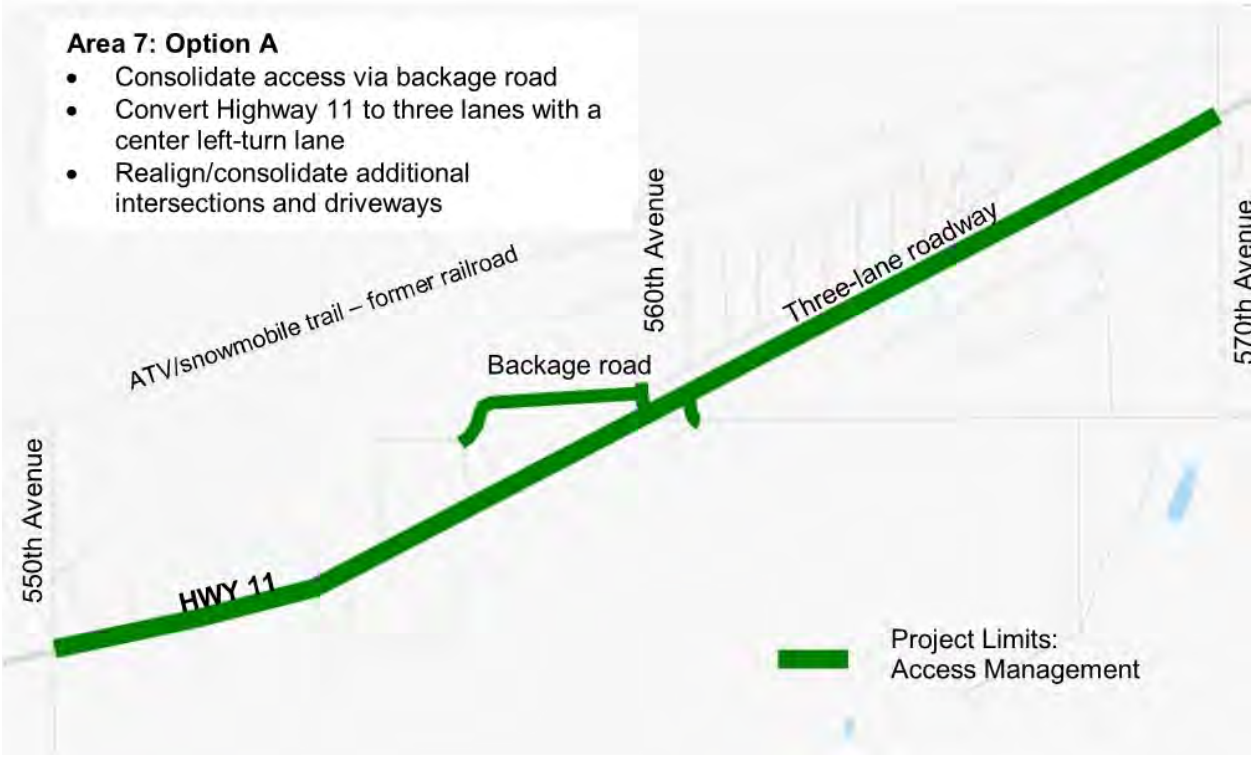


Figure 32 - Area 7 - Option B

Figure 33 - Area 7 - Option C

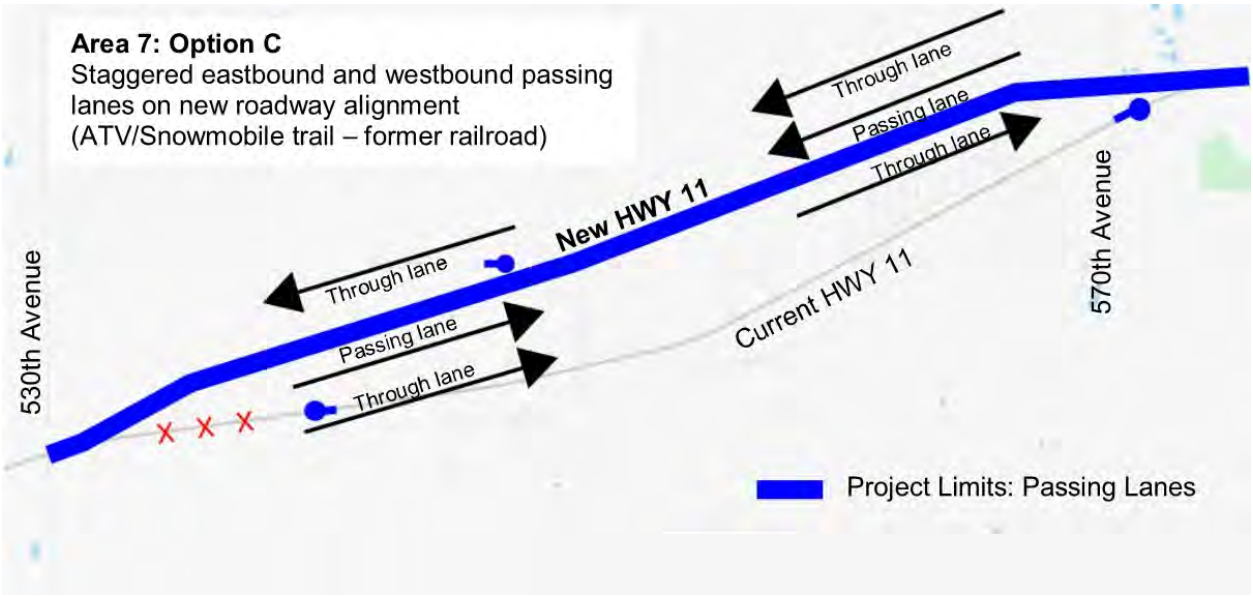
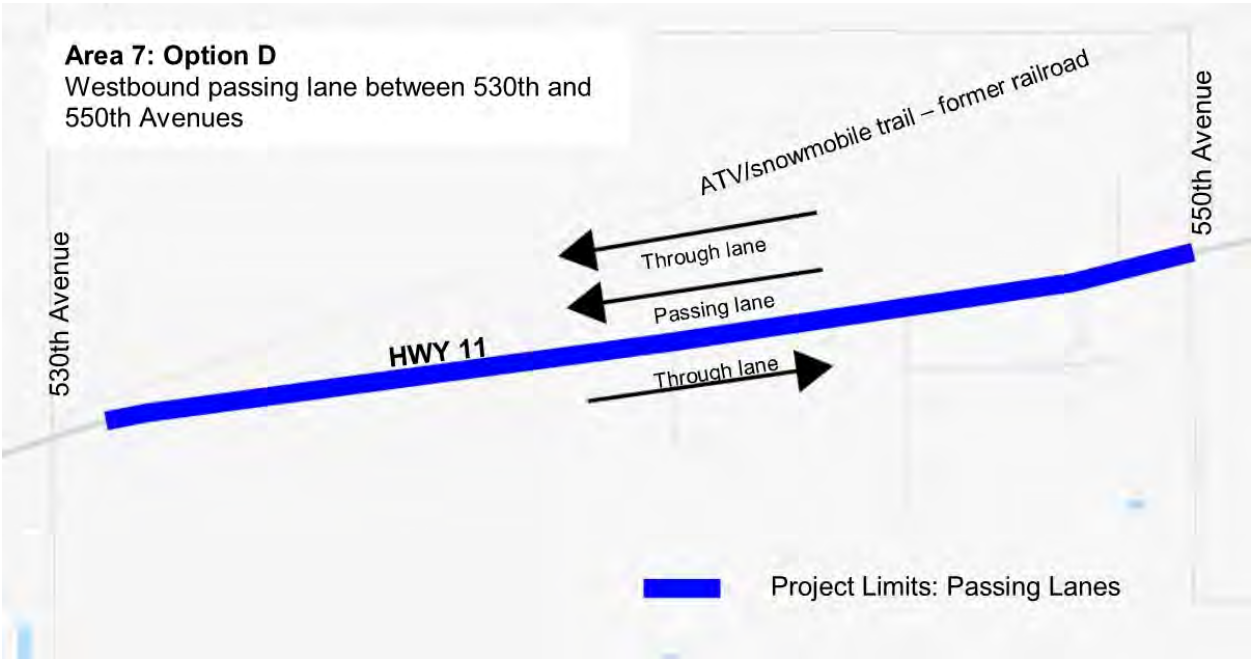


Figure 34 - Area 7 - Option D



Area 8: Hwy 11 between 580th Avenue/Cty Rd 35 and TH 313 in Warroad

Project Area: City of Warroad

Limits: Hwy 11 between 580th Avenue/Cty Rd 35 and Hwy 313

Primary Improvement: Construct frontage roads south of Hwy 11

Number of Alternatives: 1

Problem Addressed: This is a preventative alternative to limit access onto Hwy 11 as development occurs west of Hwy 313. Limiting access to Hwy 11 will preserve the safety and traffic operations of this segment as development occurs.

Option A: Frontage roads south of Hwy 11

Description:

- Frontage road south of Hwy 11 linking Cty Rd 35 with Cherne Drive NW
- New north-south road linking south frontage road with Hwy 11
- Left and right turn lanes at new intersection with Hwy 11
- East and westbound left and right turn lanes at Cty Rd 35 and Emily Avenue NW

Estimated Construction Costs: $1,400,000-$1,600,000

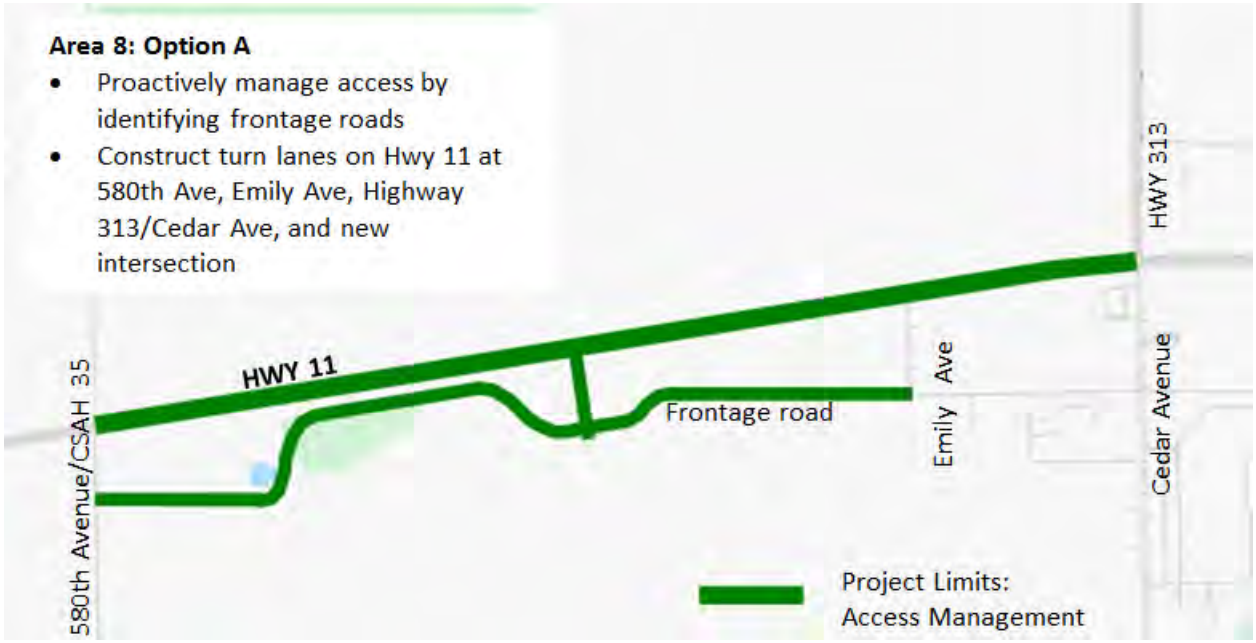
Right of Way Needs: Right of way acquisition would not be required for improvements to Hwy 11. Right of way would be required from four parcels in order to construct the frontage road. It is expected that the City of Warroad would seek right of way dedication as these parcels are developed.

Environmental Concerns: Potential for state-listed rare features near the project area, potential for wetland impacts south of Hwy 11 near Cty Rd 35.

Risks: Right of way acquisition

Benefits: Proactively addresses the safety and traffic operations problems that can occur if an area is developed without access management.

Figure 35 - Area 8 - Option A



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Area 9: Hwy 11 between Cty Rd 74/Lake Street NE and Seven Clans Casino in Warroad

Project Area: City of Warroad
Limits: Cty Rd 74/Lake Street NE to Seven Clans Casino entrance
Primary Improvement: Convert existing two-lane section to a three-lane section
Number of Alternatives: 2
Problem Addressed: Future mobility, access management, sidewalk and ADA conditions

Option A: Three-lane section with sidewalk and no parking	Option B: Three-lane with sidewalk and parking on one side
Description: Convert Hwy 11 to a three-lane section between Cty Rd 74 and Seven Clans Casino: ▪ Rural section south of Garfield Street SW would have 8 foot shoulders ▪ Urban section between Cty Rd 74 and Garfield Street would have six foot shoulders and five foot sidewalks ▪ Southbound left and northbound right turn lanes at Cty Rd 74 ▪ Option for roundabout at Cty Rd 5 ▪ Option to widen bridge during 2024 rehab **Estimated Construction Costs:** $3,000,000-$4,000,000 **Right of Way Needs:** At this time, it does not appear that any right of way is needed. Boulevard and lane widths could be reduced in spots. **Environmental Concerns:** State-listed rare features in and near the Warroad River, contamination at gas station. **Risks:** Contamination, cost associated with maintenance of the sidewalk. Species impacts are anticipated to be a low risk. **Benefits:** Mobility and safety improvements: ▪ Center turn lanes reduce turning conflicts and improve traffic operations ▪ Continuous sidewalk	**Description:** Convert Hwy 11 to three-lane section between Cty Rd 74 and Seven Clans Casino: ▪ Rural section south of Garfield Street SW would have 8 foot shoulders ▪ Urban section between Cty Rd 74 and Garfield Street would have one 10 foot parking lane, one four foot shoulder and five foot sidewalks ▪ Southbound left and northbound right turn lanes at Cty Rd 74 ▪ Option for roundabout at Cty Rd 5 ▪ Option to widen bridge during 2024 rehab **Estimated Construction Costs:** $3,000,000-$4,000,000 **Right of Way Needs:** At this time, it does not appear that any right of way is needed. Boulevard and lane widths could be reduced in spots. **Environmental Concerns:** Impacts to state-listed rare features in and near the Warroad River, contamination at gas station. **Risks:** Contamination, cost associated with maintenance of the sidewalk. Species impacts are anticipated to be a low risk. **Benefits:** Mobility and safety improvements: ▪ Center turn lanes reduce conflicts and improve traffic operations ▪ Continuous sidewalk ▪ Preserves parking on one side

Area 9: Hwy 11 between Cty Rd 74/Lake Street NE and Seven Clans Casino in Warroad (Continued)

Project Area: City of Warroad
Limits: Cty Rd 74/Lake Street NE to Seven Clans Casino entrance
Primary Improvement: Convert existing two-lane section to a three-lane section
Number of Alternatives: 3
Problem Alternative is addressing: Future mobility, access management, sidewalk and ADA conditions

Option C: Three-lane section with realignment of Cty Rd 5

Description:

- Convert Hwy 11 to a three-lane section between Cty Rd 74 and Seven Clans Casino: either Option A or Option B are compatible with Option C
- Realign Cty Rd 5 to intersect Hwy 11 approximately 750 feet southeast of the existing intersection
- Extend McKinley Street NW to meet Hwy 11 at a right angle

Estimated Construction Costs: $3,000,000-$4,000,000

Right of Way Needs: At this time, it does not appear that any right of way is needed. Boulevard and lane widths could be reduced in spots.

Environmental Concerns: State-listed rare features in and near the Warroad River, contamination at gas station.

Risks: Contamination, cost associated with maintenance of the sidewalk. Species impacts are anticipated to be a low risk.

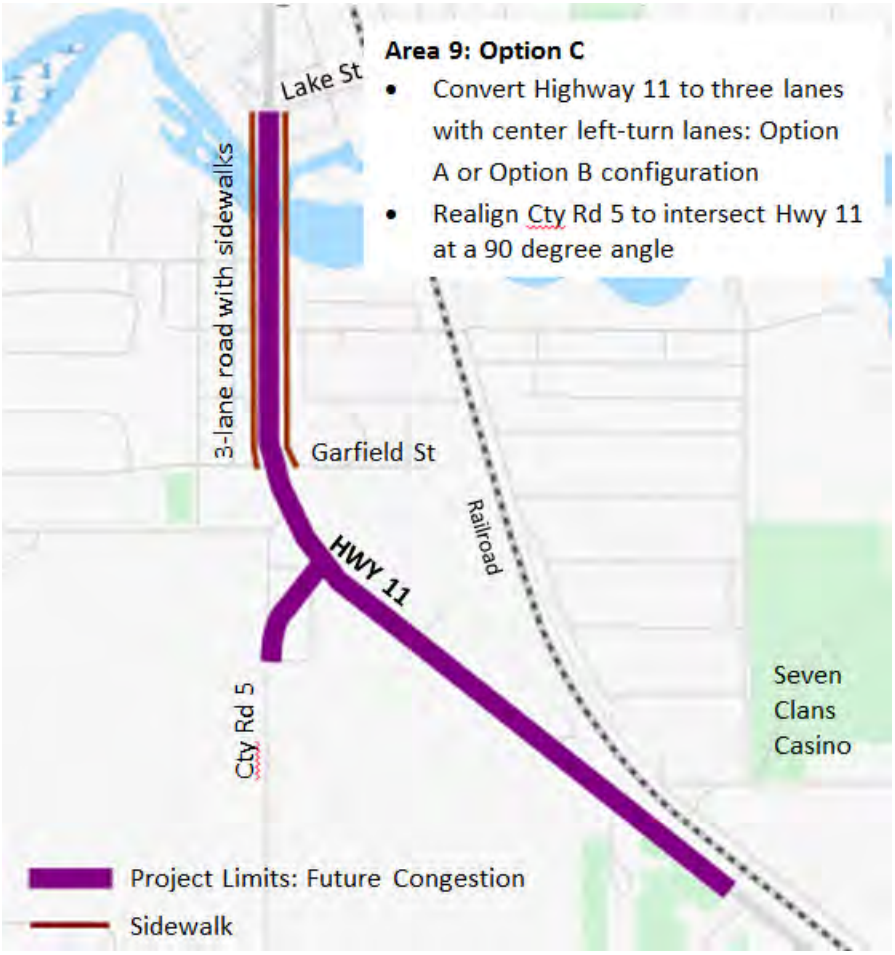
Benefits: Mobility and safety improvements:

- Realign intersections to 90 degree angles
- Center turn lanes reduce turning conflicts and improve traffic operations
- Continuous sidewalk

Figure 36 - Area 9 - Option A

Figure 37 - Area 9 - Option B

Figure 38 - Area 9 – Option C



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Area 10: Hwy 11 intersection with Cty Rd 12 between Warroad and Roosevelt

Project Area: East of City of Warroad

Limits: Hwy 11 intersection with Cty Rd 12

Primary Improvement: Realign intersection and construct turn lanes

Number of Alternatives: 1

Problem Addressed: Safety problems at skewed intersection

Option A: Realign Hwy 11 intersection with Cty Rd 12 and construct turn lanes

Description:

- Realign the Hwy 11 intersection with Cty Rd 12 to intersect at right angles
- East and westbound right and left turn lanes on Hwy 11
- North and southbound right and through-left turn lanes on Cty Rd 12
- Extend Kirkwood Drive to meet the realigned Cty Rd 12

Estimated Construction Costs: $1,000,000-$1,200,000

Right of Way Needs: Right of way would be required from two parcels.

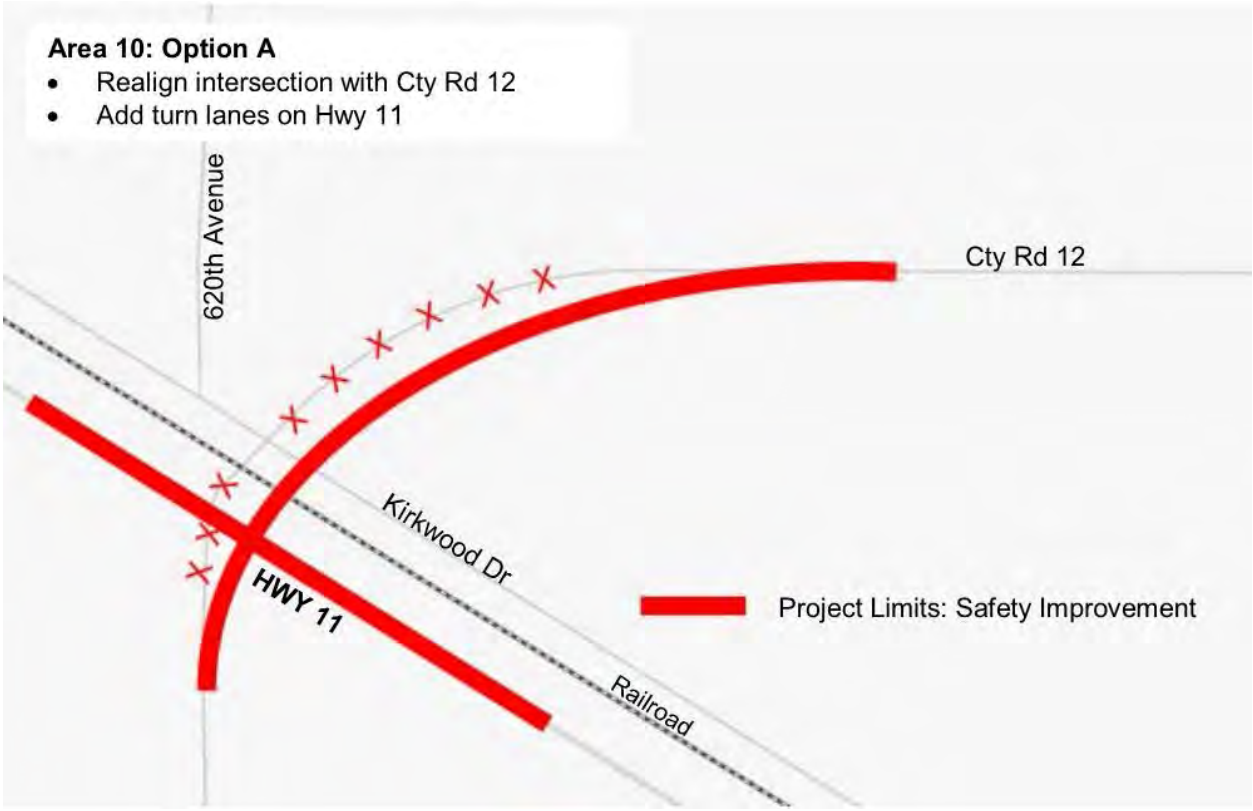
Environmental Concerns: Potential for minor wetland impacts south of Hwy 11.

Risks: Railroad coordination.

Benefits: Safety and mobility improvements:

- Realign intersection to 90 degree angles
- Turn lanes to reduce conflicts between through and turning vehicles

Figure 39 - Area 10 - Option A



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Area 11: Cty Rd 34 and 650th Avenue intersections between Warroad and Roosevelt

Project Area: East of the city of Warroad

Limits: Hwy 11 intersections with Cty Rd 34 and 650th Avenue

Primary Improvement: Realign intersections and construct turn lanes

Number of Alternatives: 1

Problem Addressed: Safety problems at Cty Rd 34 and 650th Avenue

Option A: Realign intersection with 650th Avenue and construct turn lanes

Description:

- Realign the intersection with 650th Avenue to intersect Hwy 11 at a 90 degree angle
- Eastbound right turn lanes and westbound left turn lanes at 650th Avenue
- Eastbound left turn lanes and westbound right turn lanes at Cty Rd 34

Estimated Construction Costs: $500,000-$700,000

Right of Way Needs: This option would require right of way from one parcel.

Environmental Concerns: None identified.

Risks: None identified.

Benefits: Safety and mobility improvements:

- Intersection realignment to reduce skew
- Turn lanes to reduce conflicts between through and turning vehicles

Figure 40 - Area 11 - Option A

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Area 12: Hwy 11 near Roosevelt

Project Area: City of Roosevelt

Limits: 695th Avenue to Rocky Point Road

Primary Improvement: Construct turn lanes

Number of Alternatives: 2

Problem Addressed: Safety problems on Hwy 11 near Roosevelt

Option A: Left turn lanes on Hwy 11 near 697th Avenue	Option B: Westbound bypass lane west of 697th Avenue
Description: Widen Hwy 11 east and west of 697th Avenue: ▪ Left turn lanes at 697th Avenue ▪ Left turn lanes at driveways near gas station. ▪ Consolidate access	**Description:** ▪ Expand Hwy 11 to provide a westbound bypass lane near the gas station west of 697th Avenue ▪ Consolidate access
Estimated Construction Costs: $300,000-$500,000	**Estimated Construction Costs:** $100,000-$200,000
Right of Way Needs: No right of way anticipated.	**Right of Way Needs:** No right of way anticipated.
Environmental Concerns: Potential for minor wetland impacts.	**Environmental Concerns:** Potential for minor wetland impacts.
Risks: None identified.	**Risks:** None identified.
Benefits: Safety and mobility improvements: ▪ Turn lanes would reduce conflicts between through and turning vehicles ▪ Consolidation of access	**Benefits:** Safety and mobility improvements concentrated near gas station: ▪ Turn lanes would reduce conflicts between through and turning vehicles ▪ Consolidation of access

Figure 41 - Area 12 - Option A

Figure 42 - Area 12 - Option B

3.4 Recommended Concepts for Future Study and Implementation

The concepts described in Section 3.3 were presented to stakeholders for review and prioritization. Attendees were asked to review the concepts for each area and select priorities for implementation at the March TAC meeting, April Open Houses and meetings with Marvin Staff, and May meetings with MnDOT District 2 staff. Concepts for the Roseau Municipal Airport area were developed through a separate study but were displayed for review and prioritization at the open house meetings.

Based on this feedback, 16 concepts were recommended for future study and implementation. The recommended concepts for future study are listed in **Table 17** on the next page. Generally, only one concept per area was selected to move forward. The exception is Areas 1, 5, 7 and 9. In Areas 1 and 7 several concepts can move forward separately as they are proposed in different locations within the larger area. In Area 5, Option B was developed following feedback at the public open houses. This option has not yet been shown to the public. Both options will be considered for implementation to address access management issues in Area 5. In Area 9, Option C was developed following public input about the skew of the CSAH 5 intersection in Warroad. This option will be considered in conjunction with 9A as implementation moves forward.

Table 17: Recommended Concepts for Further Study and Implementation

Area	Option	Description
0	A	Consolidate access between Hwy 32 and Cty Rd 4
1	A	Super-two roadway with eastbound bound passing lane between 290th Avenue and Cty Rd 26
	B	Super-two roadway with westbound passing lane between 250th Avenue and 260th Avenue
2	A	Realign Cty Rd 2 0.5 mile east of Highway 11 and close/realign access north of Cty Rd 2
3	A	Realign intersections so Hwy 308 is route to border and construct frontage road north of Hwy 11
4	B	Convert Hwy 11 to a three-lane section between 330th and 350th Avenues
5	A/B	Consolidate access and construct/extend frontage roads between 380th Ave and Hwy 89
6	C	Super-two roadway with staggered east and westbound passing lanes on new roadway alignment between 440th Avenue and Hay Creek
7	B	Convert Hwy 11 to three-lane section between 550th and 570th Avenues and construct frontage road west of 560th Avenue
	D	Super-two roadway with westbound passing lane between 530th and 550th Avenues
8	A	Frontage roads south of Hwy 11, between 580th Ave and Hwy 313
9	A/C	Reconstruct Hwy 11 with three-lane section with sidewalk and no parking
10	A	Realign Hwy 11 intersection with Cty Rd 12 and construct turn lanes
11	A	Realign intersection with 650th Avenue and construct turn lanes at 650th Ave and Cty Rd 34
12	A	Left turn lanes on Hwy 11 near 697th Avenue
Airport Alternatives		
1		Straighten Hwy 11 south of Roseau Municipal Airport

As mentioned above, the project team also asked for feedback on priorities within the corridor. This feedback was used to categorize each recommended concept into three priority levels: A, B, and C. In some cases, concepts were a higher priority to the public than to District 2 staff and vice-versa. In those cases, the project team reviewed the discrepancy and made a recommendation based on the priorities identified through the Needs Assessment. Concepts that address documented safety and congestion issues were generally ranked higher than other concepts.

Recommended concepts are listed by priority level in **Table 18** on the next page. Priority A concepts are considered the highest priority for further study and implementation. The implementation of these concepts is further discussed in Section 4.

Table 18: Recommended Priorities for Implementation

Area	Option	Description	Priority Level
2	**A**	Realign Cty Rd 2 0.5 mile east of Highway 11 and close/realign access north of Cty Rd 2	A
7	**B**	Convert Hwy 11 to three-lane section between 550th and 570th Avenues and construct frontage road west of 560th Avenue	A
9	**A/C**	Reconstruct Hwy 11 with three-lane section with sidewalk and no parking	A
Airport	**1**	Straighten Hwy 11 south of Roseau Municipal Airport	A
3	**A**	Realign intersections so Hwy 308 is route to border and construct frontage road north of Hwy 11	B
6	**C**	Super-two roadway with staggered east and westbound passing lanes on new roadway alignment between 440th Avenue and Hay Creek	B
7	**D**	Super-two roadway with westbound passing lane between 530th and 550th Avenues	B
11	**A**	Realign intersection with 650th Avenue and construct turn lanes at 650th Ave and Cty Rd 34	B
0	**A**	Consolidate access between Hwy 32 and Cty Rd 4	C
1	**A**	Super-two roadway with eastbound bound passing lane between 290th Avenue and Cty Rd 26	C
	B	Super-two roadway with westbound passing lane between 250th Avenue and 260th Avenue	C
4	**B**	Convert Hwy 11 to a three-lane section between 330th and 350th Avenues	C
5	**A/B**	Consolidate access and construct/extend frontage roads between 380th Ave and Hwy 89	C
8	**A**	Frontage roads south of Hwy 11, between 580th Ave and Hwy 313	C
10	**A**	Realign Hwy 11 intersection with Cty Rd 12 and construct turn lanes	C
12	**A**	Left turn lanes on Hwy 11 near 697th Avenue	C

Section 4 Implementation and Staging of Improvements

The sections below describe considerations for implementation and staging of recommended improvements. The recommended concepts described in Section 3 are high-level planning concepts and have not gone through extensive study, design, or public input. The first section below describes recommended next steps to complete thorough design and review of each concept. The second section includes recommendations for coordination with supporting agencies in Roseau County. The third section describes potential funding opportunities. The fourth section summarizes the recommended staging of improvements to TH 11.

4.1 Studies and Public Input

Additional design, studies, and public input will be needed for each of the recommended concepts to move forward. The purpose of the TH 11 Corridor Assessment Study was to develop a long-term plan for improvements to TH 11. The concepts developed as part of this study are high-level and will need additional refinement. Preliminary and final design will need to be completed. Environmental review and permitting will be required, with the exact requirements to be determined based on the scope of the project and funding source(s). District 2 will need to coordinate with local and reviewing agencies prior to implementation, including cities and townships, Roseau County, and the Minnesota Department of Natural Resources. Additional public involvement will also be necessary as part of project design and environmental review.

4.2 Coordination with Supporting Agencies

Access management and turn lane improvements can be advanced more quickly with the cooperation of local agencies. To implement access management improvements, MnDOT will need to work with local agencies to limit direct access to TH 11. In urbanized areas, highway overlay zoning could be considered to minimize access.

There will also be opportunities to implement improvements in coordination with development along TH 11. MnDOT can work with local agencies to limit direct access and construct frontage roads with new development. MnDOT can also work with local agencies and developers to install turn lanes as part of development.

4.3 Funding Availability

Funding availability and priorities will have a strong influence on the implementation of the projects in the Highway 11 corridor. District 2 spending is guided by the Minnesota State Highway Investment Plan (MnSHIP), a 20-year plan for the state highway system. MnSHIP establishes performance measures and spending targets that guide spending throughout MnDOT. MnSHIP includes 9

investment categories with funding targets for each category. District 2 has specific targets established in MnSHIP, as displayed in **Table 19**. It should be noted that MnDOT is currently updating MnSHIP. The most recent plan was completed in 2013. Investment category targets may change in late 2016.

An estimated 20-year budget for the Highway 11 study area was developed based on the District 2 average annual budget of $41.5 million. The project study area comprises approximately 4 percent of District 2. Assuming 4 percent of the district budget would be allocated to Highway 11, approximately $1,660,000 would be available annually for Highway 11 preservation and improvements. $33.2 million would be available for the study area over 20 years (2020-2040). This does not include programmed projects in the 2016-2019 State Transportation Investment Program (STIP). **Table 19** below shows the approximate amount of funding that would be allocated to the Highway 11 study area, distributed into the nine MnSHIP investment categories. The following section includes a discussion of how these funds could be used in project implementation.

Table 19: MnSHIP Investment Targets

MnSHIP Investment Category	District 2 Target (Percent)	District 2 20-Year Budget for Highway 11
Pavement Condition	47	$15,604,000
Bridge Condition	23	$7,636,000
Roadside Infrastructure Condition	9	$2,988,000
Traveler Safety	4	$1,328,000
IRC Mobility	0	$0
Bicycle Infrastructure	2	$664,000
Accessible Pedestrian Infrastructure	2	$664,000
Regional and Community Initiatives	3	$996,000
Project Support (design, right of way, etc.)	10	$3,320,000
Total	**100**	**$33,200,000**

4.4 Implementation and Funding Recommendations

The sections below outline implementation recommendations for three categories of projects on the Highway 11 corridor: preservation needs, smaller corridor safety improvements, and larger corridor safety/targeted expansion projects. Each section outlines the cost of recommended projects and possible funding sources for implementation.

4.4.1 Preservation Needs

District 2 has established preservation needs over the 2020-2040 timeframe. Preservation needs include mill and overlay projects, repair and replacement of centerline culverts and storm sewer, sidewalk repair and construction, and bridge rehabilitation. These needs were identified based on a review of the existing condition of MnDOT assets on Highway 11, as detailed in the TH 11 Asset Management Memorandum. Preservation needs and associated costs are displayed in **Table 20** below.

Table 20: 20-Year Preservation Needs

Preservation Needs	Assumed Costs		20 Year Needs		Costs	MnSHIP Category
Mill & Overlay	$250,000	per mile	60	miles	$15,000,000	Pavement
Centerline Culverts	$60,000	each	55	culverts	$3,300,000	Roadside Infrastructure
Warroad Storm Sewer Improvements	$250,000		1	project	$250,000	Roadside Infrastructure
Sidewalk	$100	per linear foot	5140	Feet	$514,000	Accessible Pedestrian Infrastructure
Bridge Rehabilitation (9059, 5814, 8580)	$2,000,000		3	projects	$2,000,000	
Total					**$21,064,000**	

As shown in **Table 20**, preservation needs are anticipated to require approximately $21 million over the 2020-2040 timeframe. Preservation needs will be met through the District 2 budget as established in MnSHIP. Preservation needs would require 63 percent of the anticipated 20-year budget for Highway 11 ($33 million). Preservation needs and costs are generally aligned with the district's MnSHIP investment category targets as described in Section 4.3.

4.4.2 Smaller Corridor Safety Improvements

Once 20-year preservation needs are addressed, approximately $12 million remains in the 20-year budget for Highway 11. The remaining funding is recommended to be allocated to additional corridor improvements ($8.5 million) and project support ($3.5 million).The remaining budget for corridor improvements is recommended to be allocated towards smaller corridor safety improvements: strategic turn lanes and shoulder widening improvements. Specific turn lane and shoulder widening needs were identified in the **TH 11 Needs Assessment**.

These improvements would fall under the traveler safety, bicycle infrastructure, and regional/community investment categories. In many cases, these improvements could be integrated with preservation projects (such as mill and overlay projects).

4.4.3 Larger Corridor Safety/Targeted Expansion Projects

The projects recommended for further study and implementation (outlined in Section 3.4) are considered larger corridor safety/targeted expansion projects. These are considered unfunded under current funding forecasts. The district will need to seek additional funding to complete these projects. These projects could be completed using funding from several state and federal competitive funding programs outlined below.

Highway Safety Improvement Program (HSIP)

HSIP is a federal funding program that provides funding for transportation safety improvements. The Greater Minnesota HSIP solicitation is administered by the MnDOT Office of Traffic, Safety, and Technology. The most recent solicitation (August 2015) required a minimum 10 percent local match. The maximum federal funding available per project was $1 million. Solicitations are generally released on an annual basis. Of the projects recommended in this study, the most competitive ones will be those addressing documented safety problems.

Corridor Investment Management Strategy (CIMS)

CIMS is a state funding program targeted towards collaborative and innovative investments on MnDOT trunk highways. Funding is allocated to projects that improve quality of life, environmental health, or economic competitiveness in collaboration with local agency partners. The most recent solicitation was held in 2013. At that time, the maximum award was $10 million, with up to 90 percent of project costs eligible for CIMS funding. The date of the next CIMS solicitation is unknown. Projects that demonstrate a partnership with local governments (cities and Roseau County) will be the most competitive of those recommended in this study.

Corridors of Commerce

Corridors of Commerce is a state funding program that provides funding for transportation projects that support economic growth. Priorities include projects that will provide construction jobs and enhance the movement of goods and people. This program has received funding from the state Legislature over the last several years; however, the future of this program is uncertain at this time. It is anticipated that this program will be re-vamped and funded in the future. Targeted expansion

projects (super-two and three-lane expansions) are likely to be the most competitive under future Corridors of Commerce solicitations.

Transportation Economic Development Program (TED)
TED is a state funding program administered as a partnership between MnDOT and the Minnesota Department of Employment and Economic Development (DEED). The program is focused on transportation projects that support economic development and improve the state's economic competitiveness. Funding solicitations are typically released every one to two years, with the most recent release in 2015. Of the projects recommended in this study, the most competitive ones will be those that facilitate local economic development.

Freight Funding Programs
Over the last several years there has been an increased focus on freight (rail and trucking) at the federal and state level. Federal and state freight funding programs are expected to be announced in 2016 or 2017. While the details of these programs are yet to be determined, the most competitive projects included in this study will be targeted expansion projects that enhance freight mobility and safety.

The funding in these programs is allocated through competitive solicitation processes. **Table 21** on the following page lists the recommended projects and their possible funding sources. It is recommended that District 2 apply for these funding programs as solicitations are released.

4.4.4 Anticipated Timeline for Implementation

MnDOT District 2 aims to complete Priority A projects within the next 10 years. Given the need for additional study and design, 2020 is the soonest these projects would be constructed. The total estimated construction cost for these projects is $11 million. District 2 intends to get these projects ready to accelerate as funding becomes available. Below are specific considerations for each of the Priority A projects:

- **Area 2 in Badger:** District 2 would seek HSIP funding for construction as soon as 2021. MnDOT will need to coordinate with Roseau County and could possibly partner to apply for funding. HSIP is unlikely to fully fund the project as it often does not fund full roadway realignment.
- **Area 7 west of Warroad:** District 2 has identified Option 7B as the District's official Shelf Project for 2020, meaning it is first in line to be advanced to 2020 if additional funding becomes available. If additional funding does not become available, the district will try to incorporate the project into the 10-year plan, likely tied to preservation improvements in 2024.
- **Area 9 in Warroad:** Sidewalk and signal improvements are scheduled in 2019. It appears that the existing width of TH 11 is adequate for a three-lane section between Lake Street and Garfield Street. The district will look at opportunities to chip-seal or re-seal TH 11 and restripe it as a three-lane section. Improvements near CSAH 5 will need to be coordinated with the county.

- **Airport area:** The district will continue to work with FAA and MnDOT Aeronautics to develop an approved alignment within the next six months. Once the alignment is approved, the district will proceed with developing construction plans and adding the project to the 10-year plan.

Once Priority A projects are programmed, the district will work to program Priority B projects. The district will work to tie improvements into planned preservation projects, but this will be challenging in the current funding environment. District 2 intends to evaluate passing lane needs district-wide and will prioritize passing lane needs once those studies have been completed. The district will evaluate incorporating passing lanes into upcoming preservation projects.

Table 21: Recommended Funding Sources for Implementation of Larger Projects

Recommended project area	Potential funding sources
Area 0	Scope and anticipated costs of this project do not match well with competitive funding programs
Area 1	Corridors of Commerce, Freight Program
Area 2	HSIP
Area 3	HSIP
Area 4	Corridors of Commerce, Freight Program
Area 5	Corridors of Commerce, Freight Program
Area 6	Corridors of Commerce, Freight Program
Area 7	Corridors of Commerce, Freight Program
Area 7	Corridors of Commerce, Freight Program
Area 8	TED
Area 9	CIMS
Area 10	HSIP
Area 11	HSIP
Area 12	HSIP
Airport Area	HSIP

Section 5 Study Findings and Recommendations

The information in this section concludes the Highway 11 Corridor Study. The first section summarizes general corridor findings. The second section is a compilation of recommendations for long-term management and targeted capacity improvements for Highway 11.

5.1 Study Findings

The Highway Corridor Study included a thorough review of existing and future conditions on the corridor. This review was supplemented by public and agency involvement. Based on these factors, the following findings were made:

1. Highway 11 is an important corridor that provides connections between a number of communities within Roseau County, northern Minnesota, and Canada. It provides commuter-type services to commercial and employment nodes, serves as a conduit for moving commercial, agricultural and manufacturing products, and provides access to recreational destinations on Lake of the Woods.

2. Highway 11 is a relatively flat corridor with gentle curves for a large portion of the corridor. There are a limited number of streams and creeks that bisect Highway 11.

3. The majority of the population and employment growth is expected to occur in the communities of Roseau and Warroad. As more people and jobs continue to cluster around these areas, traffic will continue to grow on Highway 11 and there will be additional demand for access and connections to Highway 11 unless supporting roadway networks are also developed.

4. Roseau County, and cities and townships within the county have jurisdiction over local land use and zoning.

5. On average, approximately 42 crashes occur each year on the corridor. Of these crashes, fatal crashes and Type A injury (most severe injury crashes) represent 4 percent of crashes on the corridor. Other injury crashes make up 35 percent of the crashes and 61 percent involve only property damage. This translates to one to two fatal or Type A injuries, 14 to 15 injuries and 25 to 26 property damage crashes each year.

6. Run off the road crashes were the most frequent type of crash to occur on Highway 11. These crashes have a tendency to result in injuries.

7. Existing traffic volumes range between 1,550 vehicles a day in the far eastern portion of the corridor to approximately 9,000 in Roseau. Currently there are no locations where existing traffic volumes exceed the capacity of Highway 11; that is, there are no regularly congested locations.

8. Travel time runs confirmed that there was little reoccurring congestion on Highway 11. The travel time runs indicated that traffic can and does travel at or above posted speeds. Based on feedback from the public and stakeholder groups, driver expectations are that they should be able to travel at least 60 miles per hour. MnDOT recently raised the posted speed on Highway 11 to 60 miles per hour.

9. Truck traffic (also referred to as Heavy Commercial Average Daily Traffic) plays an important role on Highway 11. Truck traffic volumes range between 110 and 570 vehicles a day. This represents anywhere from approximately 4 percent trucks to 14 percent trucks. Most highways do not exceed 10 percent trucks.

10. Most local roadways that intersect Highway 11 have lower traffic volumes and do not exceed their design capacity. There are no congested roadways intersecting with Highway 11.

11. Because traffic volumes are low on most intersecting roadways, there is a limited need for traffic signals on Highway 11. Presently there are four signalized intersections on Highway 11. These signals are located in the Cities of Roseau and Warroad. These intersections do not experience poor levels of service.

12. Future traffic volumes are expected to increase on Highway 11 as additional population and employment growth occur. Most of the corridor is expected to remain below its design capacity; that is, little congestion is expected. The exception to this is in the City of Warroad where traffic volumes on Highway 11 from County Road 74/Lake Street East are expected to exceed the design of a two-lane roadway.

13. The Canadian Northern Railway runs parallel to Highway 11 between Warroad and the eastern project limits (and beyond). There are approximately 17 trains a day that use this route. The Minnesota Northern Railway serves the western portion of study area from Greenbush to Roseau. Train service is limited on this route. For the most part, train service was not identified as a problem except for near the Seven Clans Casino (east of Warroad) when there are events such as concerts.

14. Access on Highway 11 exceeds the recommendations developed as part of MnDOT's Access Management Guidelines. As a whole, there are approximately 600 access points on Highway 11, which averages out to 10 full access points per mile. MnDOT's guidelines recommend one full access every mile and one modified access (right-in/out or three-quarter) every half mile.

15. There are a limited number of turn lanes at public street intersections on Highway 11. Most intersections do not have them.

16. There are few roadways that are parallel to Highway 11 on the local roadway network. Thus, most land adjacent to the corridor has direct driveway access to the corridor rather than to a frontage or backage roadway.

5.2 Study Recommendations

A number of recommendations are included as part of the Highway 11 Corridor Study. Some of the recommendations are project or improvement specific; some are more policy directed; and some guide future steps that will need to be initiated in order to complete implementation of identified changes. The recommendations will require support and continued participation from all of the study partners; these items do not apply just to MnDOT.

1. Study Adoption – The corridor partners should review and adopt the Highway 11 Corridor Study through a resolution of formal endorsement. As part of their approval, it is expected that the communities will work with MnDOT on the long-term implementation of the study.

2. Ongoing Corridor Team – MnDOT should establish an ongoing corridor team that will bring the corridor partners back together as new issues emerge or there are changes to the implementation plan.

3. Annual Review – MnDOT should continue to monitor crash records, corridor traffic volumes, access changes and performance over time to determine how the corridor is changing.

4. Maintenance and Preservation – MnDOT has identified a number of ongoing maintenance and preservation activities that should occur on Highway 11 in order to keep pavement, bridges, sidewalks, culverts, storm sewer systems, traffic signal and other assets in good repair. As part of these projects there may be some limited opportunity to construct turn lanes or widen shoulders.

    A. Programmed Improvements (2019 – 2025)

        i. 2019 – TH 313 to CSAH 5 in Warroad – replace sidewalk, replace curb ramps, signal improvements, storm sewer repair
        ii. 2024 – TH 89 to 11th Avenue in Roseau – mill and overlay, replace sidewalk, replace curb ramps
        iii. 2024 – 11th Avenue in Roseau to 1.5 miles west of TH 313 – mill and overlay, possible turn lane construction, culvert cleaning/repair/replacement
        iv. 2024 – Bridge over Warroad River in Warroad – bridge rehabilitation including beam repair and re-decking

v. 2024 – CSAH 5 in Warroad to Rocky Point Road in Roosevelt – mill and overlay, shoulder widening near Warroad, possible turn lane construction, culvert cleaning/repair/replacement
vi. 2025 – Bridge over Roseau River in Roseau – bridge rehabilitation including painting, low-slump overlay, and repair to approach panels

B. Anticipated Pavement Projects (2025 – 2040 – funding identified but not programmed yet)

i. 2026 – Foresness Road to Highway 32 in Greenbush – mill and overlay
ii. 2030 – Highway 313 to south of CSAH 5 in Warroad – mill and overlay
iii. 2032 – Highway 32 to 360th Avenue between Greenbush and west of Roseau – mill and overlay

C. American With Disabilities Act Sidewalk Improvements (no funding identified or programmed)

i. 2026 – sidewalk improvements in Greenbush

5. Additional Safety Improvements – More Minor in Nature - A number of turn lanes and locations were identified as being needed to improve both safety and mobility on Highway 11. Current budgets do not allow for construction of a majority of these turn lanes. However, the priorities outlined in this study should be implemented as funding occurs, as mill and overlay or rehabilitation projects are constructed, or as part of larger projects (identified below). In addition to turn lanes, funding opportunities for future shoulder widening on the section of Highway 11 east of Warroad should be pursued.

6. Larger Projects – A number of more significant investments will be needed to address the key problem areas identified within the body of this plan. Most of these are stand-alone projects that address such issues as safety, capacity, access management, and user expectations. Additional funding will be needed in order to implement the larger projects. These investments were prioritized based on MnDOT Statewide investment targets and from feedback received from corridor partners and stakeholders. The following priorities or groupings were established:

A. Priority A:
- Area 2: Realign Cty Road 2 and close/realign access north of Cty Rd 2
- Area 7: Access management improvements between 550th and 570th Avenues
- Area 9: Reconstruct Highway 11 with three-lane section in Warroad
- Airport Area: Address sharp curve south of Roseau Municipal Airport

B. Priority B
    - Area 3: Realign intersections with TH 308 and TH 89, manage access
    - Area 6: Passing lanes between 440th Avenue and Hay Creek
    - Area 7: Passing lane between 530th and 550th Avenues
    - Area 11: Realign intersection with 650th Avenue and construct turn lanes at 650th Ave and Cty Rd 34
C. Priority C
    - Area 0: Consolidate access between Hwy 32 and Cty Rd 4 in Greenbush
    - Area 1: Passing lanes between 250th Avenue and Cty Rd 26
    - Area 4: Access management between 330th and 350th Avenues
    - Area 5: Consolidate access and construct/extend frontage roads between 380th Ave and Hwy 89
    - Area 8: Frontage roads south of Hwy 11, between 580th Ave and Hwy 313
    - Area 10: Realign Hwy 11 intersection with Cty Rd 12 and construct turn lanes
    - Area 12: Turn lanes and access management near 697th Avenue

7. Future Studies – MnDOT and the corridor partners should pursue additional scoping and environmental studies on items identified in Number 6 above so that designs can be furthered, local agency and public support is obtained, right of way can be preserved (if needed) and construction can realistically be programmed.

8. Land Use and Access Management – Based on the objective and goals of the Highway 11 Corridor Study, it is recommended that communities along Highway 11 that have land use and zoning authority consider adopting access management policies and development ordinances that help limit future access to Highway 11 and instead direct it to local roadways or future local roadways. The following lists outlines general types of land use and access policies that should be considered:

    A. As part of development review, direct access to local streets instead of Highway 11.
    B. Require right-turn lanes at all new commercial and public street entrances off of Highway 11.
    C. Require left-turn lanes at all new commercial and public street entrances off of Highway 11.
    D. Do not rezone property for more intensive use unless there is a local roadway that can serve the proposed development.
    E. Allow temporary access to Highway 11 if no other feasible alternative is available; however, plan on these entrances being relocated to a local roadway as adjacent parcels develop and/or the local roadway is constructed. This can help orient buildings, parking lots, etc. to allow for the local road system to develop.

F. Require developments to provide adequate right of way for improvements to Highway 11 identified in this study and/or for future frontage/backage road development.

MnDOT staff should be available to attend meetings of planning commissions, city councils and county boards to explain why limiting access to Highway 11 is important, to provide background information about the study and to answer questions asked by elected and appointed officials.

9. Local Roadway Network – Local communities should work to develop their own transportation plans or update them as part of their overall comprehensive plans. These plans can be used by communities to show where future local roadways should be developed over the short- and long-term and as development and redevelopment occurs near Highway 11. The plans could show locations of access to Highway 11 and alternate routes that could serve properties that are adjacent to Highway 11. These plans will be useful for developers and property owners to understand what the local transportation network should look like and how their property fits into that network.

   Assistance from staff with MnDOT and the Northwest Regional Development Commission could be used to develop local plans.

10. Proactive Activities – It is recommended that MnDOT and its partners continue to monitor land use trends and development pressure to assess potential loss of critical right of way needed for the larger projects. If property becomes available for sale in locations were larger projects are identified and that property is needed for the project – advance purchase of the property should be pursued if funding allows.

11. Funding – Given the limited amount of funding available for transportation investments at the state and local levels, it is important for corridor partners to continue to educate the public about the corridor study, the funding needed to achieve the goals outlined in the study and opportunities to work together to implement the projects identified in the study.

    MnDOT and the corridor partners should continue to pursue a variety of funding sources at regional, state, and federal levels whether it be through grants or targeted programs. In addition, the corridor partners should consider pursuing potential public/private partnerships with some of the larger employers in the area.

Appendix A Open House Summary

Building a legacy – *your* legacy.

701 Xenia Avenue South
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Minneapolis, MN 55416
Tel: 763-541-4800
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Memorandum

To: ***Darren Laesch, PE, MnDOT District 2***

From: ***Jack Corkle, PTP, AICP, WSB & Associates***
Rose Ryan, AICP, WSB & Associates

Date: ***May 5, 2016***

Re: ***TH 11 Corridor Assessment***
Public Open Houses and Meetings in Roseau and Warroad
WSB Project No. 03063-000

The purpose of this meeting summary is to document attendance and comments at four meetings held for the TH 11 Corridor Assessment. The meetings were held on April 28 at the following locations:

- Meeting with Marvin Windows & Doors Commercial Operations, Marvin Headquarters: 12:30-1:30 p.m.
- Meeting with Marvin general employees, Marvin Headquarters: 2:00-4:00 p.m.
- Roseau Public Open House, Roseau City Center: 3:00-5:30 p.m.
- Warroad Public Open House, Warroad Public Safety Building: 4:30-6:30 p.m.

The public open house meetings were publicized via a press release that was distributed to local media and posted on the MnDOT's District 2 website. The meetings were also publicized on local radio and in a daily news flyer. Invitations were emailed and mailed to stakeholders that were invited to participate in focus groups conducted in summer 2015. The meeting with Marvin general employees was publicized via the company newsletter and on flyers posted at Marvin Headquarters.

Attendance

Sign in sheets indicate approximate attendance as follows:

- Marvin commercial operations: 7 attendees
- Marvin general employees: 20 attendees (11 signed in)
- Roseau open house: 32 attendees
- Warroad open house: 7 attendees

Sign-in sheets are attached at the end of the memo.

Meeting Format

All meetings were held in an informal open house format. The meeting materials included background information about the TH 11 Corridor Assessment, draft concepts to address issues in each area of the corridor, and information about a separate study looking at alternatives near the Roseau Municipal

Airport. Attendees were asked to prioritize improvements to TH 11 through a transportation dollar exercise described in the following section.

Priorities from Transportation Dollar Exercise

Meeting attendees were asked to prioritize design concepts by allocating 20 "transportation dollars" to the concepts of their choice. Participants could put all $20 on one concept or spread their dollars over many different areas based on their priorities. **Table 1** on the following page displays the results of the prioritization exercise. Cells shown in green indicate concepts that received 20 or more dollars.

Attendees generally prioritized concepts that were located closer to the meeting site – Roseau meeting attendees focused more on concepts near Roseau, and Warroad meeting attendees focused more on concepts near Warroad. Attendees at the meeting in Roseau were also given the opportunity to allocate transportation dollars towards three alternatives in the airport area (developed as part of a separate study). The sections below describe the results of the prioritization exercise at each meeting, followed by a discussion of overall priorities compiled over all four meetings.

Roseau Open House

Airport Alternative 1 was by far the highest priority for Roseau open house attendees. This alternative received $262 in the prioritization exercise. Other priorities included the following:

- Area 1 Options A and B: Passing lanes near Badger (both received $19)
- Area 5 Option A: Frontage Roads/Access Management in Roseau ($31)
- Area 6 Option A: Eastbound passing lane between 450th Avenue and Hay Creek ($45)
- Area 7 Option D: Westbound passing lane between 530th and 550th Avenues ($33)

Warroad Open House

The highest priorities at the Warroad Open House were as follows:

- Area 7 Option B: Three-lane section between 550th and 570th Avenues and frontage road west of 560th Avenue ($34)
- Area 8 Option A: Frontage roads between 580th Avenue and TH 313 in Warroad ($14)
- Area 12 Option A: Left turn lanes near 697th Avenue ($15)

Marvin Meetings

Marvin employees prioritized the following concepts:

- Area 6 Option B: Super-two roadway with eastbound passing lane on new roadway alignment between 440th Avenue and Hay Creek ($24)
- Area 7 Option B: Three-lane section between 550th and 570th Avenues and frontage road west of 560th Avenue ($45)
- Area 7 Option C: Reconstruct TH 11 on new alignment between 530th and 570th Avenues ($52)
- Area 8 Option A: Frontage roads between 580th Avenue and TH 313 in Warroad ($26)
- Area 9 Option A: Reconstruct TH 11 in Warroad as three-lane roadway with sidewalk and no parking ($90)

Table 1: Results of Transportation Dollar Prioritization Exercise

Area	Option	Description	Roseau	Warroad	Marvin	Total - per option	Total - per area	Overall Ranking by Area
0	A	Consolidate access between Hwy 32 and Cty Rd 4	2	0	0	2	2	14
1	A	Super-two roadway with eastbound bound passing lane between 290th Avenue and Cty Rd 26	19	0	5	24	24	11
	B	Super-two roadway with westbound passing lane between 250th Avenue and 260th Avenue	19	0	5	24		
2	A	Realign Cty Rd 2 0.5 mile east of Highway 11 and close/realign access north of Cty Rd 2	12	0	5	17	50	5
	B	Realign Cty Rd 2 1.25 miles east of Highway 11 and close/realign access north of Cty Rd 2	16	0	17	33		
3	A	Realign intersections so Hwy 308 is route to border and construct frontage road north of Hwy 11	5	0	5	10	20	13
	B	Realign intersections so Hwy 308 is route to border and convert Hwy 11 to a three-lane section	1	0	3	4		
	C	Hwy 89 realignment and frontage road or three-lane section	3	0	0	3		
	D	Hwy 89 intersection realignment and frontage road or three-lane section	3	0	0	3		
4	A	Frontage road between 330th and 350th Avenues	11	0	0	11	37	8
	B	Convert Hwy 11 to a three-lane section between 330th and 350th Avenues	16	0	10	26		
5	A	Consolidate access and construct/extend frontage roads between 380th Ave and Hwy 89	31	0	3	34	34	9
6	A	Super-two roadway with eastbound passing lane between 450th Avenue and Hay Creek	45	0	1	46	101	4
	B	Super-two roadway with eastbound passing lane on new roadway alignment between 440th Avenue and Hay Creek	0	0	24	24		
	C	Super-two roadway with staggered east and westbound passing lanes on new roadway alignment between 440th Avenue and Hay Creek	0	0	16	16		
	D	Four-lane roadway on new alignment between 440th Avenue and Hay Creek	10	0	5	15		

Area	Option	Description	Roseau	Warroad	Marvin	Total - per option	Total - per area	Overall Ranking by Area
7	A	Convert Hwy 11 to three-lane section between 550th and 570th Avenues and construct backage road west of 560th Avenue	6	2	10	18	216	2
	B	Convert Hwy 11 to three-lane section between 550th and 570th Avenues and construct frontage road west of 560th Avenue	13	34	45	92		
	C	Reconstruct Hwy 11 on new alignment between 530th Avenue and east of 570th Avenue	1	8	52	61		
	D	Super-two roadway with westbound passing lane between 530th and 550th Avenues	33	0	12	45		
8	A	Frontage roads north and south of Hwy 11, between 580th Ave and Hwy 313	9	14	26	49	49	6
9	A	Reconstruct Hwy 11 with three-lane section with sidewalk and no parking	0	8	90	98	107	3
	B	Reconstruct Hwy 11 with three-lane section with sidewalk and parking on one side	3	0	6	9		
10	A	Realign Hwy 11 intersection with Cty Rd 12 and construct turn lanes	5	5	16	26	26	10
11	A	Realign intersection with 650th Avenue and construct turn lanes at 650th Ave and Cty Rd 34	4	5	12	21	21	12
12	A	Left turn lanes on Hwy 11 near 697th Avenue	17	15	9	41	41	7
	B	Westbound bypass lane west of 697th Avenue			0	0		
		Airport Alternatives						
	1	Straighten TH 11 south of Roseau Municipal Airport	262	NA	NA	262	271	1
	2	Realign TH 11 to have a more gradual curve south of Roseau Municipal Airport	0	NA	NA	0		
	3	Realign TH 11 approximately 0.25 miles south of current alignment near Roseau Municipal Airport	9	NA	NA	9		

Overall Priorities
Additional priorities emerge when the transportation dollars are added up over all three meeting sites. The following concepts received over $20 total over all meeting sites. Several options in Areas 6 and 7 received more than $20. The options listed in bold received the most dollars of the options in Areas 6 and 7.

- Area 1 Options A and B: Passing lanes near Badger ($24 each)
- Area 2 Option B: Realign Cty Rd 2 1.25 miles east of TH 11 ($33)
- Area 4 Option B: Three-lane section between 330th and 350th Avenues west of Roseau ($26)
- Area 5 Option A: Frontage Roads/Access Management in Roseau($34)
- **Area 6 Option A: Eastbound passing lane between 450th Avenue and Hay Creek ($46)**
- Area 6 Option B: Super-two roadway with eastbound passing lane on new roadway alignment between 440th Avenue and Hay Creek ($24)
- **Area 7 Option B: Three-lane section between 550th and 570th Avenues and frontage road west of 560th Avenue ($92)**
- Area 7 Option C: Reconstruct TH 11 on new alignment between 530th and 570th Avenues ($61)
- Area 7 Option D: Westbound passing lane between 530th and 550th Avenues ($45)
- Area 8 Option A: Frontage roads between 580th Avenue and TH 313 in Warroad ($49)
- Area 9 Option A: Reconstruct TH 11 in Warroad as three-lane roadway with sidewalk and no parking ($98)
- Area 10 Option A: Realign intersection with Cty Rd 12 ($26)
- Area 11 Option A: Realign intersections and construct turn lanes at 650th Avenue and Cty Rd 34 ($21)
- Area 12 Option A: Left turn lanes near 697th Avenue ($41)
- Airport Alternative 1: Straighten TH 11 south of Roseau Municipal Airport ($262)

Verbal Comments from the Meetings

As noted above, the meetings were held in an informal open house format. MnDOT and consultant staff were available to respond to questions and comments. Comments and questions focused primarily on traffic and passing opportunities on TH 11. Many attendees were concerned about current and future traffic on TH 11 and had questions about future expansion of the highway. Attendees were supportive of super-two and four-lane options as ways to improve passing opportunities. One attendee noted that many drivers have not realized that the speed limit has increased to 60 mph and requested additional speed limit signs on the corridor.

Some residents expressed support for reconstructing TH 11 on a new alignment (Area 7 Option C) but prioritized other options because they did not think this option was feasible.

Warroad and Marvin attendees were very supportive of expanding TH 11 to three lanes in Area 9 (Lake Street to Seven Clans Casino), including business owners along the corridor. Several attendees were supportive of the roundabout option at CSAH 5. Others were not supportive of the roundabout.

Staff also responded to questions and comments from property owners that would be impacted by specific concepts. A representative from the Central Bank of Roseau asked questions about impacts and right of way acquisition processes related to options at Area 2 in Badger. A representative from the Cenex in Roseau was not supportive of Area 5 Option A due to the proposed access changes. The owner of a business located on TH 11 in Area 7 was opposed to Option C (reconstructing TH 11 on a new alignment) due to the impacts to businesses along TH 11.

Written Comments from the Meetings

Eight written comments were completed by meeting attendees. Comments were written on comment cards as well as concepts and issues maps. Written comments are attached to the end of this memo. Comments are summarized on the following page by area.

- 250th Street: Trucks cannot make the turn to and from TH 11 – square up this intersection or make the turning radius larger.
- Area 2:
    - The field east of 280th Avenue is wet and there is often standing water
    - A bike path connection is desired at the end of the proposed cul-de-sac of existing CSAH 2, on the east side of TH 11.
    - Extend Old Hwy 11 to square up with North Main Street.
- Area 5: Owner of Cenex C-Store is opposed to access closure on TH 11 as it would impact ease of access for customers.
- 430th Ave: Norfarms Seeds representative noted that their facility attracts about 10 trucks a day, with 70 percent of traffic coming from the west.
- Area 7 Option C: Shifting traffic further from housing seems safer than other options.
- Area 9 Option A: Two comments in support of a roundabout at CSAH 5.
- Cty Rd 2 in Swift: Request for similar turn lane and intersection realignment as shown in Area 11 Option A (at 650th Avenue). Cty Rd 2 is used heavily by logging trucks.

Attachments

Sign in sheet
Written comments

Staff Meeting

Highway 11 Meeting
Thursday, April 28
Marvin Windows & Doors

NAME	MAILING ADDRESS	TELEPHONE NO.	E-MAIL ADDRESS
Dan Lykken	58707 County Rd #13 Warroad, MN 56763	218-791-9838	danlyk@marvin.com
Mike Scheef	208 Lake ST NW Warroad MN 56763	218-386-4032	Mikesch@marvin.com
Mike Erikson	65866 280th St. Roosevelt, MN 56673	218-386-4109	Mikeer@Marvin.com
Steven Hahn	66397 Swedes Jackpine Rd Grygla MN	218-294-6286	
Boyd Olmstead	County Rd 112-PO Box 454 Roseau MN	218-242-5034	Boydol@marvin.com
Chris Jones	811 LAKE ST NE WARROAD, MN 56763	218-386-4272	Chrisj@marvin.com
Tom Caspersen	35060 Pine Ridge Rd Warroad, MN 56763	218-452-1010	TomCasp@Marvin.com

Highway 11 Meeting
Thursday, April 28
Marvin Windows & Doors

NAME	MAILING ADDRESS	TELEPHONE NO.	E-MAIL ADDRESS
Jonathan MacArthur	P.O. Box 938, Warroad, MN. 56763	904-534-7181	JonathanM@Marvin.com
Bob Evans	PO Box 820, Warroad, MN 56763	218 386 2009	BobEvans@Marvin.com
Tony Jensen	60650 County Road 2, Warroad, MN 56763	218 386 2234	tonyj@marvin.com
Roxanne Kalk	990 Noble Dr NW Baudette MN 56623	218-386-4293	roxannek@marvin.com
Brad Knudson	63671 County Road 2 Roosevelt (Swift), MN 56673	386-4296	bradk@marvin.com
Skip Borneman	41050 Cnty Rd. 2, Roseau, MN	218-424-3183	Leslieb@marvin.com
Paloma Lang	61084 290th St, Warroad MN 56763	386-4123	palomal@marvin.com
Megan Johanneson	27380 Cty. Rd. 9 Roseau, MN 56751	386-4346	meganj@marvin.com
Joleen Kezar	33409 592nd Ave Warroad, MN 56763	386-4223	joleenk@marvin.com
Alissa Pantee	35163 Pine Ridge Rd Warroad MN 56763	386 4284	alissap@marvin.com
Jenn Janson	55715 State Hwy 11 Warroad MN 56763	386-4290	jenniferj@marvin.com

Highway 11 Open House Meeting
Thursday, April 28
Warroad

NAME	MAILING ADDRESS	TELEPHONE NO.	E-MAIL ADDRESS
Steve Hagen	310 Main Ave Warroad, MN	218-386-1244	hagen4@live.com
Myles Hoyenga Roseau County Trail Blazer	68224 Co Rd #140 Roosevelt MN.	218-689-6889	MKHoyenga@Gmail.Com
Dave Palm	69517 Kirkwood Dr Roosevelt MN 56673 Warroadschool	218-386-1153	david_Palm@warroad.k12.mn.us
Leland Hendrickson	69734 State Highway 11, PO Box 121 Roosevelt MN 56673	218-442-5631	
GLENDA PHILLIPE	1002 LAKE St. Warroad, MN 56763	202-997 9085	glenda@mkcable.net
RICK SWANK	50143 STATE HWY 11 SALOL	218-463-1000	swanks66@yahoo.com
Nancy Calder	57337 350th St NW, Warroad	218-242-3778	caldervlogging@mncable.net

Highway 11 Open House Meeting
Thursday, April 28
Roseau

NAME	MAILING ADDRESS	TELEPHONE NO.	E-MAIL ADDRESS
Charlie Walsh	705 SOUTH MAIN ST Badger MN 56714	218-528-3277	
KELLY CHRISTIANSON	1504 CENTER ST. WEST ROSEAU, MN 56751	218-463-1805	
Steve Gust	604 5th Ave SW. Roseau MN 56751	218-463-1421	
Brett Rima	715 Delmore Dr. Roseau, MN 56751	218-463-4302	
Troy Schroeder	109 S Minnesota St. Warroad MN 56762	218-745-9107	
RON KJELLAND	32598 482ND AVE SALOL MN 56756	218-463-0110	
Steve Dahl	1212 7th Ave SE Roseau, MN	218-463-1569	
CHRIS HAMNESS	BOX 399 ROSEAU, MN	218 463-0707	
Travis Backhaus	31647 430 AVE ROSEAU	463-1018	
Danny Gross	400 Center St. E Roseau	218-689-3874	
Dave Dirks	22233 Cty Rd 21 Roseau	218-689-7732	

Highway 11 Open House Meeting
Thursday, April 28
Roseau

NAME	MAILING ADDRESS	TELEPHONE NO.	E-MAIL ADDRESS
James Jenson	26655 Co. Rd 2 Badger	528-3591	mlj@wiktel.com
Lyle Grindy	25501 County Road 121 Roseau	463-3348	LGrindy@gmail.com
Gary Slater	P.O. Box 245 Roseau, Minn	469-2533	gmslater@wiktel.com
Mark Olafson	44323 300th St Roseau	218(242) 2216	
Roger Falk	35191 500th Ave Salol, MN.	218-242-0172	
Dan Dahl	41015 330th St Salol MN	218-463-2592	ddahl@co.roseau.mn.us
Rick Brogdon	303 2nd Ave SW	918-200-3233	Rick.Brogdon@Polaris.com
Larry Guggisberg	509 3rd Street NE, Roseau	218-463-6366	
David Drown	Roseau		
Amy Bassingthwaite	610 Carl Court Roseau		
Pat Novacek	606 Elk Ct Roseau.	218-463-1549	

Roseaupromotions@mmedia.net

Highway 11 Open House Meeting
Thursday, April 28
Roseau

NAME	MAILING ADDRESS	TELEPHONE NO.	E-MAIL ADDRESS
Craig McMillin	304 Center St E. Roseau, MN 56751	218-242-9067	Craig@BBDSLTD.com
Jeff Ballard	719 2nd Ave SW Roseau MN 56751	218-689-8889	jeff.ballard@polaris.com
Jeff Pelowski	Roseau	218-242-4601	pelowski@co.roseau.mn.us
Sonya Peterson	1101 16th St SW Roseau, MN 56751	218-242-3433	tspeterson2003@yahoo.com
Darcin Smedsmo	29587 380th Ave Roseau MN 56751	218-469-3370	roseau.mn@americinn.com
Jack Swanson	210- 6th Avenue SE Roseau, 56751,	218 463 3360	KJ102@MNCABLE.NET
Harry Ignaszewski Patty Ignaszewski	21755 State Hwy 11 Greenbush MN 56726 " "	218-782-2315 "	harry.ignaszewski@polaris.com pattyi@co.roseau.mn.us
Greg Halvorson	State Hwy 310	218-463-2119	
Gene Bordeau	Roseau		

Area 7: 530th Avenue to 570th Avenue in Warroad

Option C

Comment: Pushing the traffic further from the highly populated area seems like the safest option

Area 9: Cty Rd 74/Lake Street NE to Seven Clans Casino

Option 9A

Comment:

MY VOTE IS FOR 9A w/ ROUNDABOUT

Area 9: Cty Rd 74/Lake Street NE to Seven Clans Casino

Option A

Comment: Include Roundabout option

Area 11: Cty Rd 34 and 650th Avenue intersections between Warroad and Roosevelt

Option ____

Comment: Would like to see same turn lane / realignment for County Road 2 intersection (swift). Used heavily by logging trucks - more volume than 650th street.

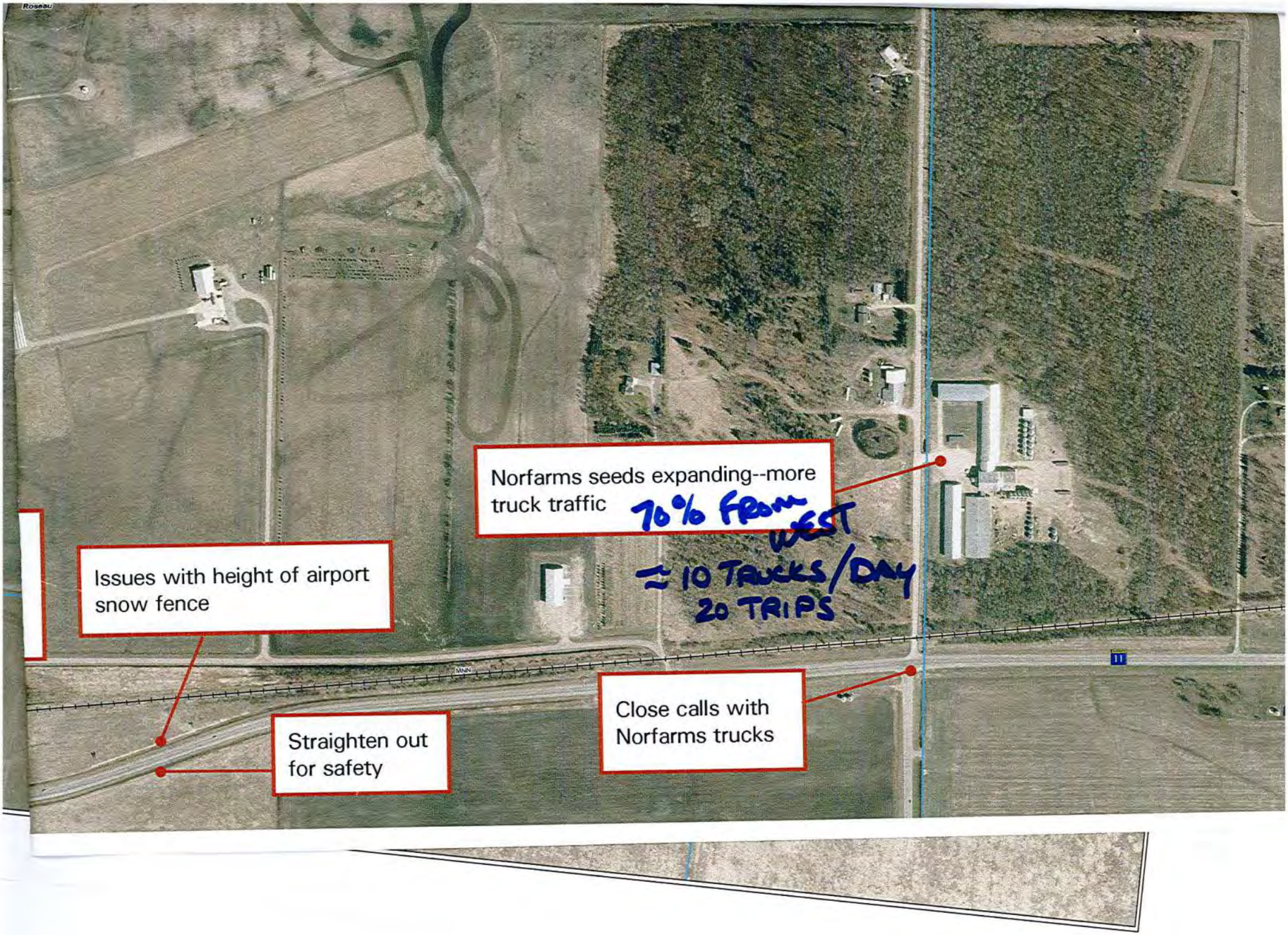
Area 5: Cty Rd 12/18th Avenue/380th Avenue to Hwy 89 in Roseau

Option _____

Comment:

WE OWN CONOCO C-STORE & I WOULD BE AGAINST CLOSING DOWN OUR ACCESS ALONG #11. EVEN WITH PUTTING IN A FRONTAGE ROAD IT WOULD CONSIDERABLY EFFECT OUR TRAFFIC ACCESS..

KELLY CHRISTIANSON 218-469-9410


Roseau
Norfarms seeds expanding--more truck traffic
70% FROM WEST
≈ 10 TRUCKS/DAY
20 TRIPS
Issues with height of airport snow fence
Straighten out for safety
Close calls with Norfarms trucks
MNN
11

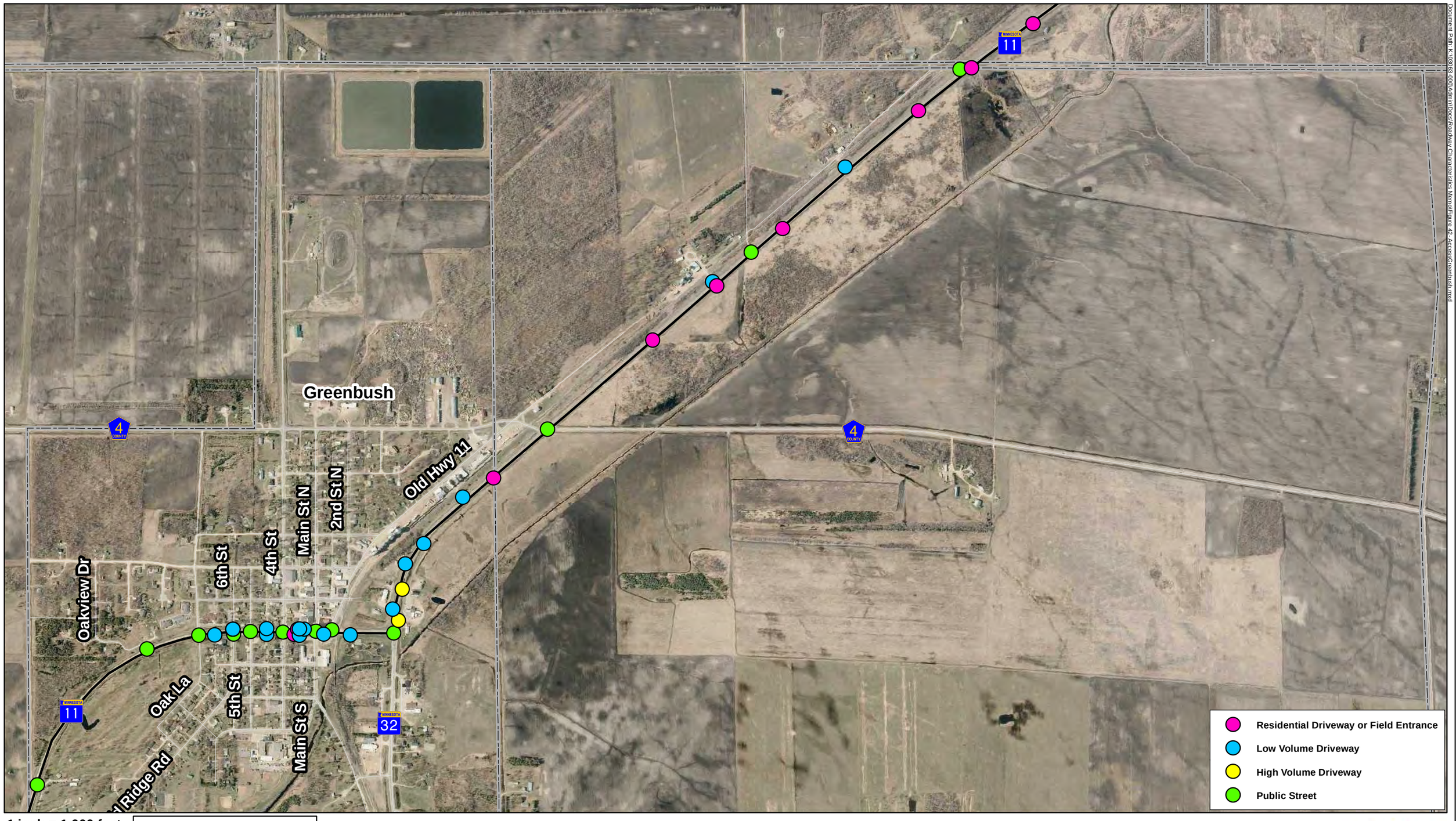
Google earth

feet 1000
meters 500

trucks can't make turns
More Radius larger
or Square up roadway

Comments on Area 2: Badger

Appendix B Corridor Access Figures



1 inch = 1,000 feet

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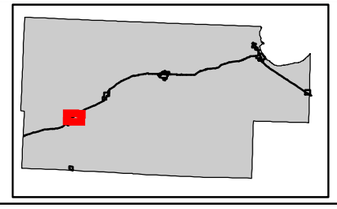

Figure 1 - Access Points
Greenbush

MINNESOTA DEPARTMENT OF TRANSPORTATION

1 inch = 1,250 feet

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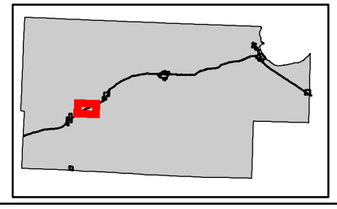
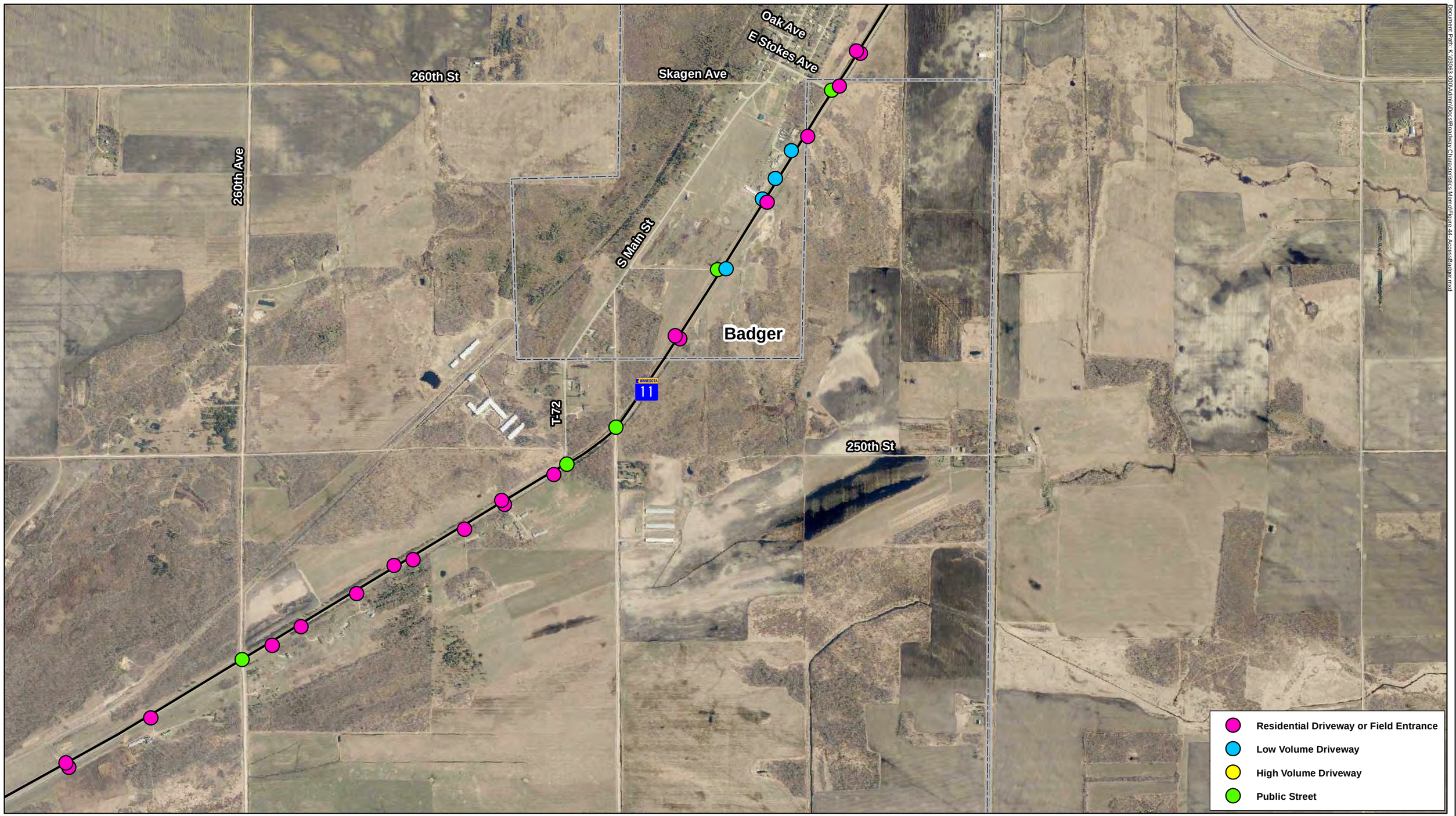


Figure 2 - Access Points
Greenbush East

MINNESOTA DEPARTMENT OF TRANSPORTATION



1 inch = 1,250 feet

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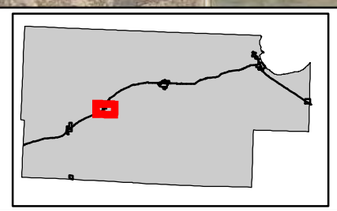

Figure 3 - Access Points
Badger South

MINNESOTA DEPARTMENT OF TRANSPORTATION

MINNESOTA 11

Badger

N Main St

W Reid Ave

265th St

270th St

300th Ave

Residential Driveway or Field Entrance
Low Volume Driveway
High Volume Driveway
Public Street

1 inch = 1,250 feet

N
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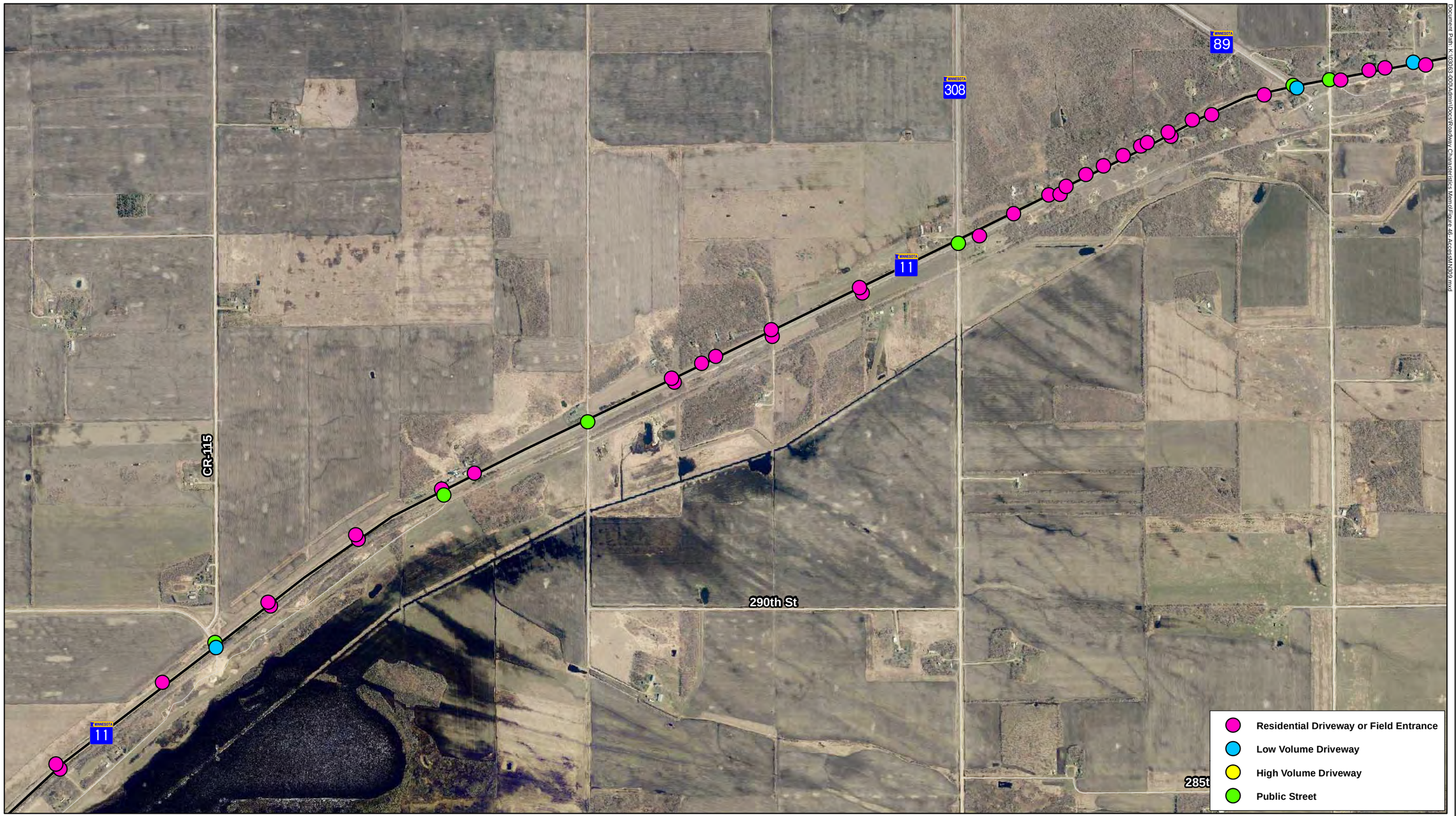
Figure 4 - Access Points
Badger North

MINNESOTA DEPARTMENT OF TRANSPORTATION



1 inch = 1,250 feet

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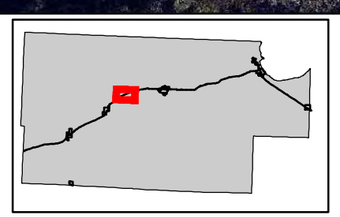

Figure 5 - Access Points
TH 308

MINNESOTA DEPARTMENT OF TRANSPORTATION

1 inch = 1,250 feet

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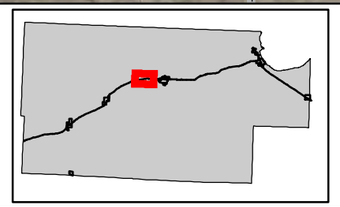
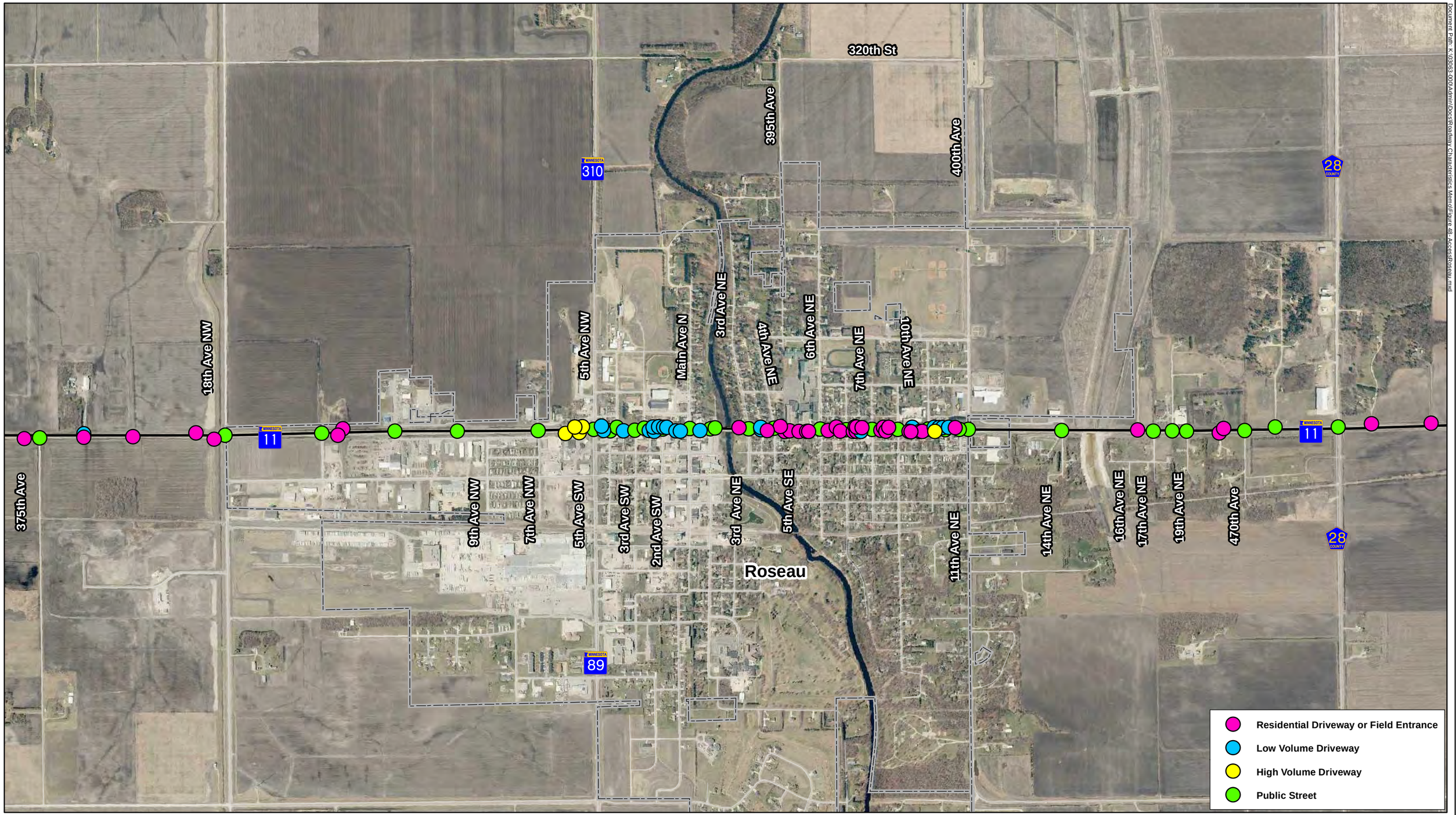


Figure 6 - Access Points East of TH 308

MINNESOTA DEPARTMENT OF TRANSPORTATION



1 inch = 1,250 feet

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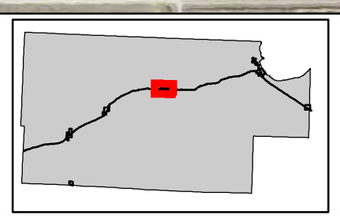

Figure 7 - Access Points
Roseau

MINNESOTA DEPARTMENT OF TRANSPORTATION

1 inch = 1,250 feet

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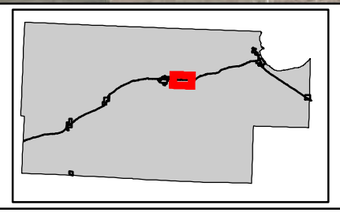
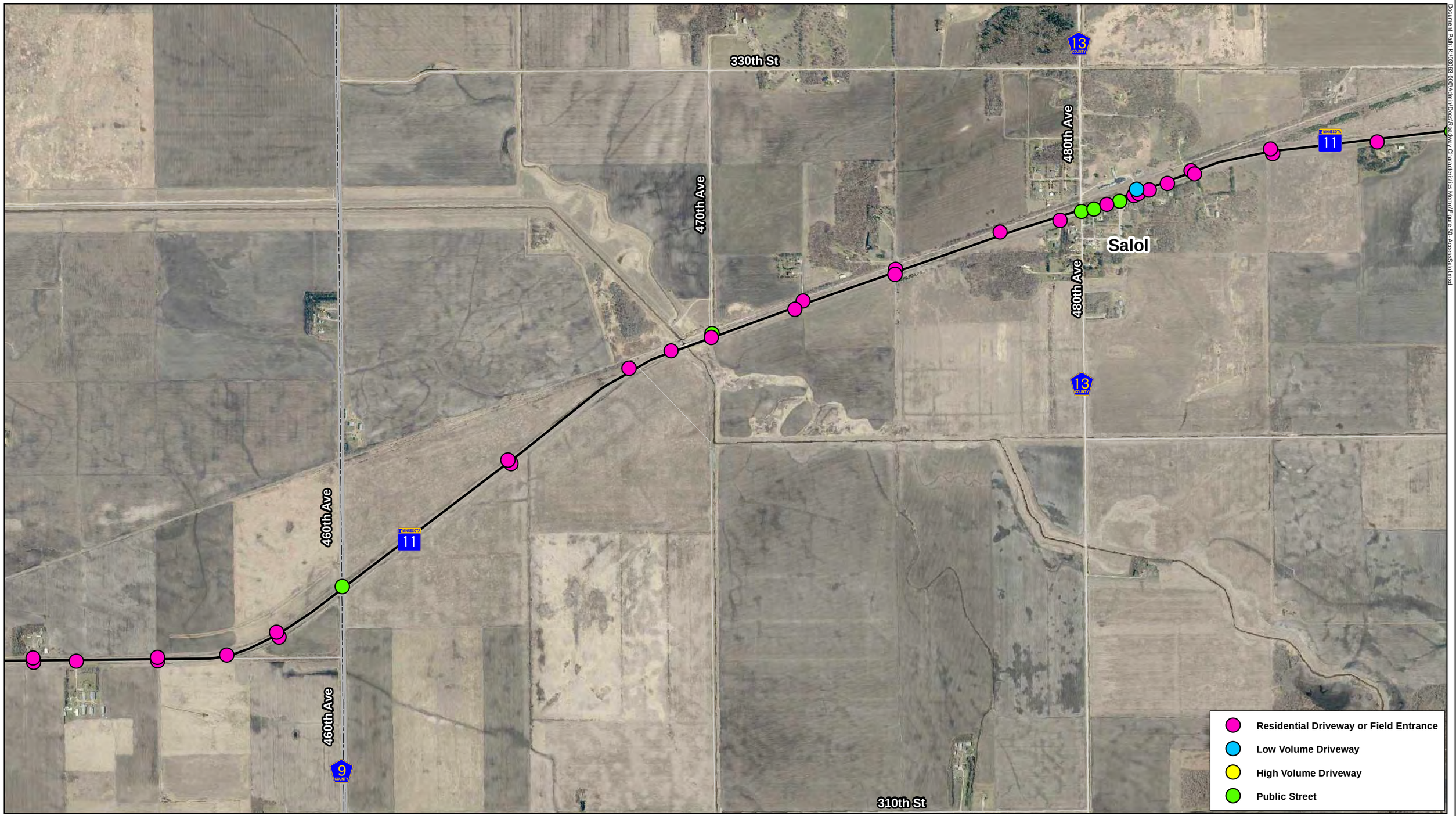


Figure 8 - Access Points
Roseau Airport

MINNESOTA DEPARTMENT OF TRANSPORTATION



1 inch = 1,250 feet

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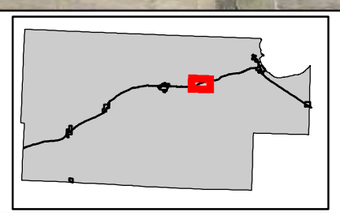

Figure 9 - Access Points
Salol

MINNESOTA DEPARTMENT OF TRANSPORTATION

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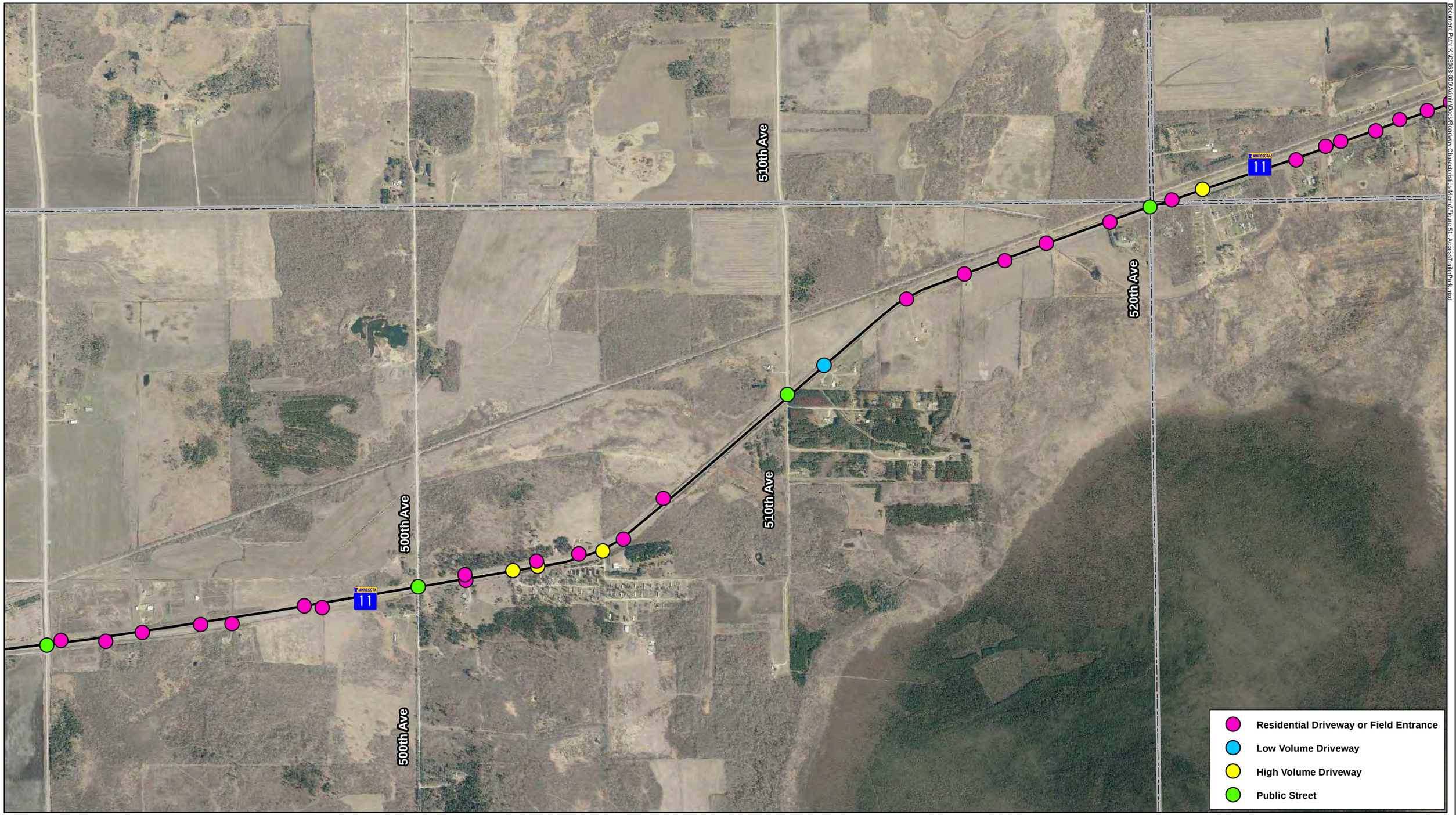

1 inch = 1,250 feet

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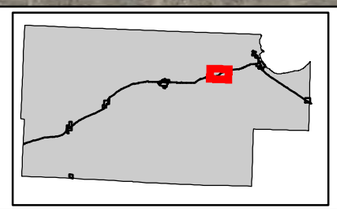
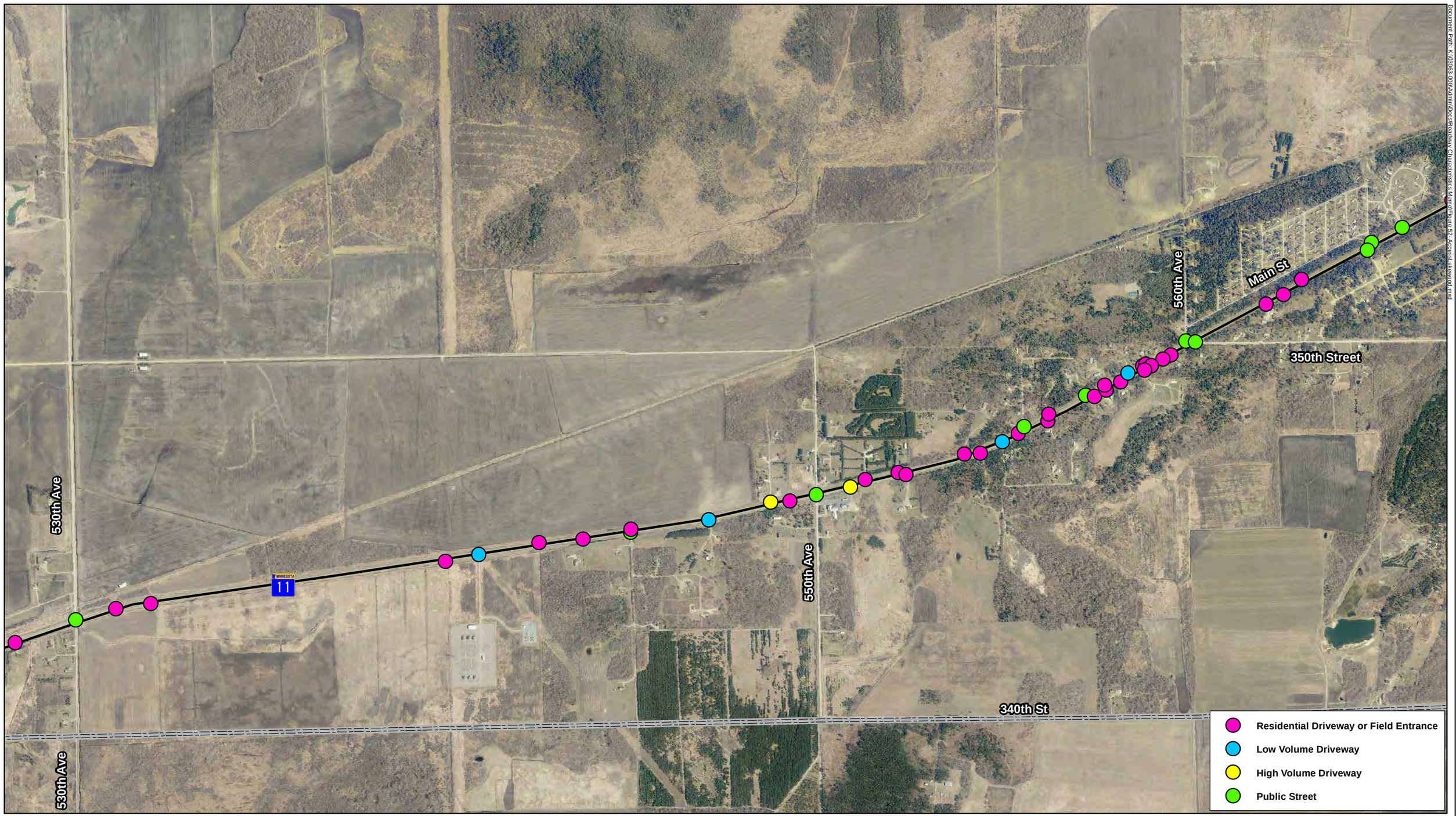


Figure 10 - Access Points
510th Avenue Area

MINNESOTA DEPARTMENT OF TRANSPORTATION



1 inch = 1,250 feet

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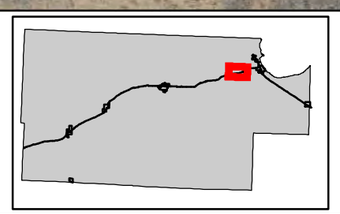
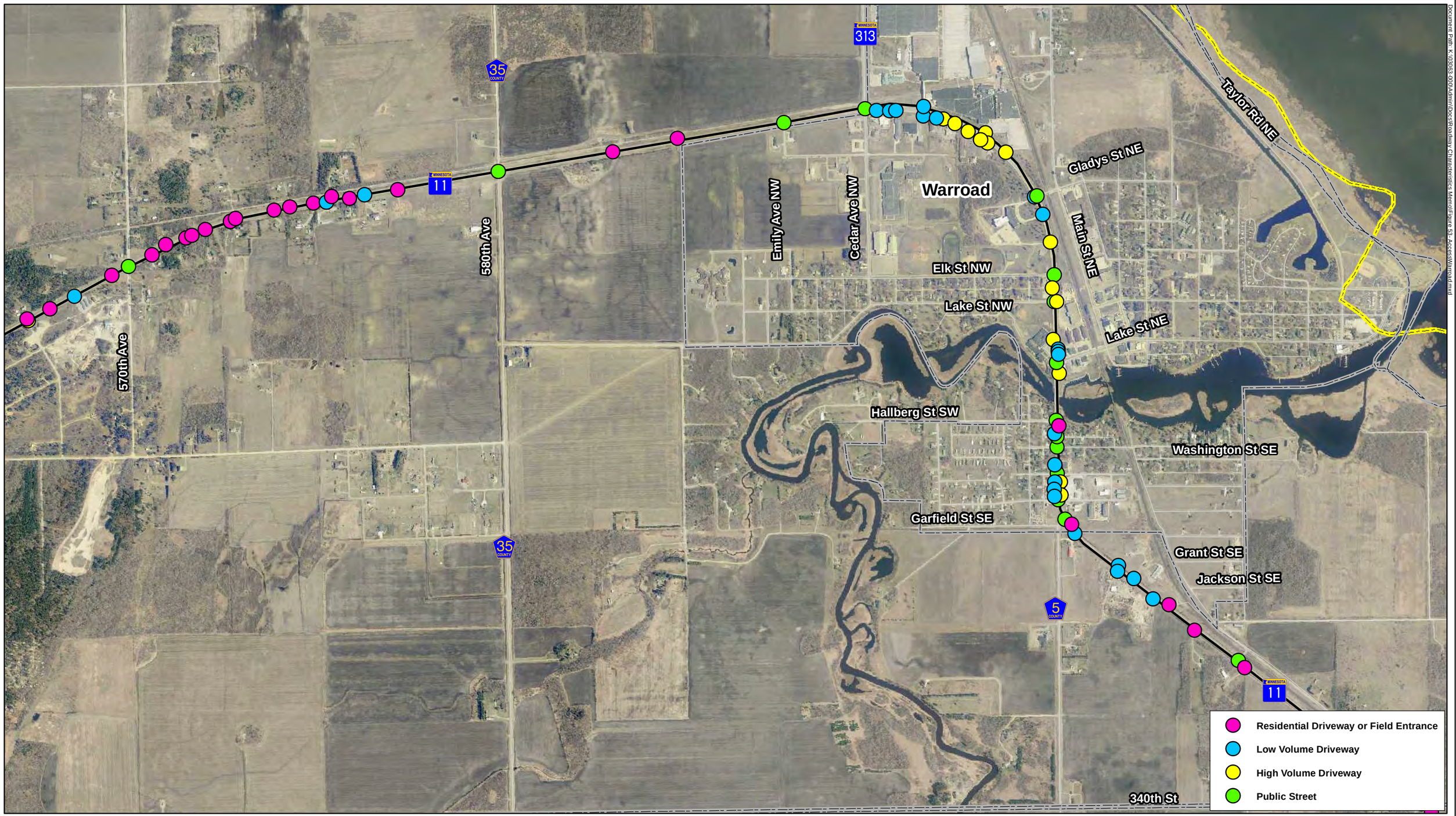


Figure 11 - Access Points
Lakewood Area

MINNESOTA DEPARTMENT OF TRANSPORTATION



1 inch = 1,250 feet

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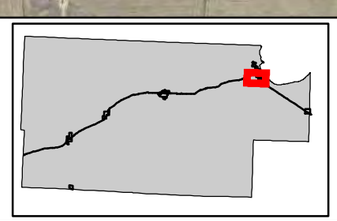


Figure 12 - Access Points
Warroad

MINNESOTA DEPARTMENT OF TRANSPORTATION

340th St

T-537

T-527

T-356

T-250

T-283

610th Ave

620th Ave

MINNESOTA 11

12 DAKOTA

Residential Driveway or Field Entrance

Low Volume Driveway

High Volume Driveway

Public Street

1 inch = 1,250 feet

N

W E

S

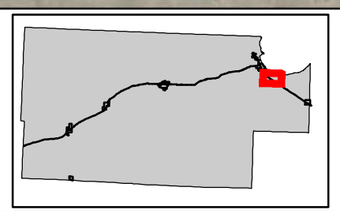
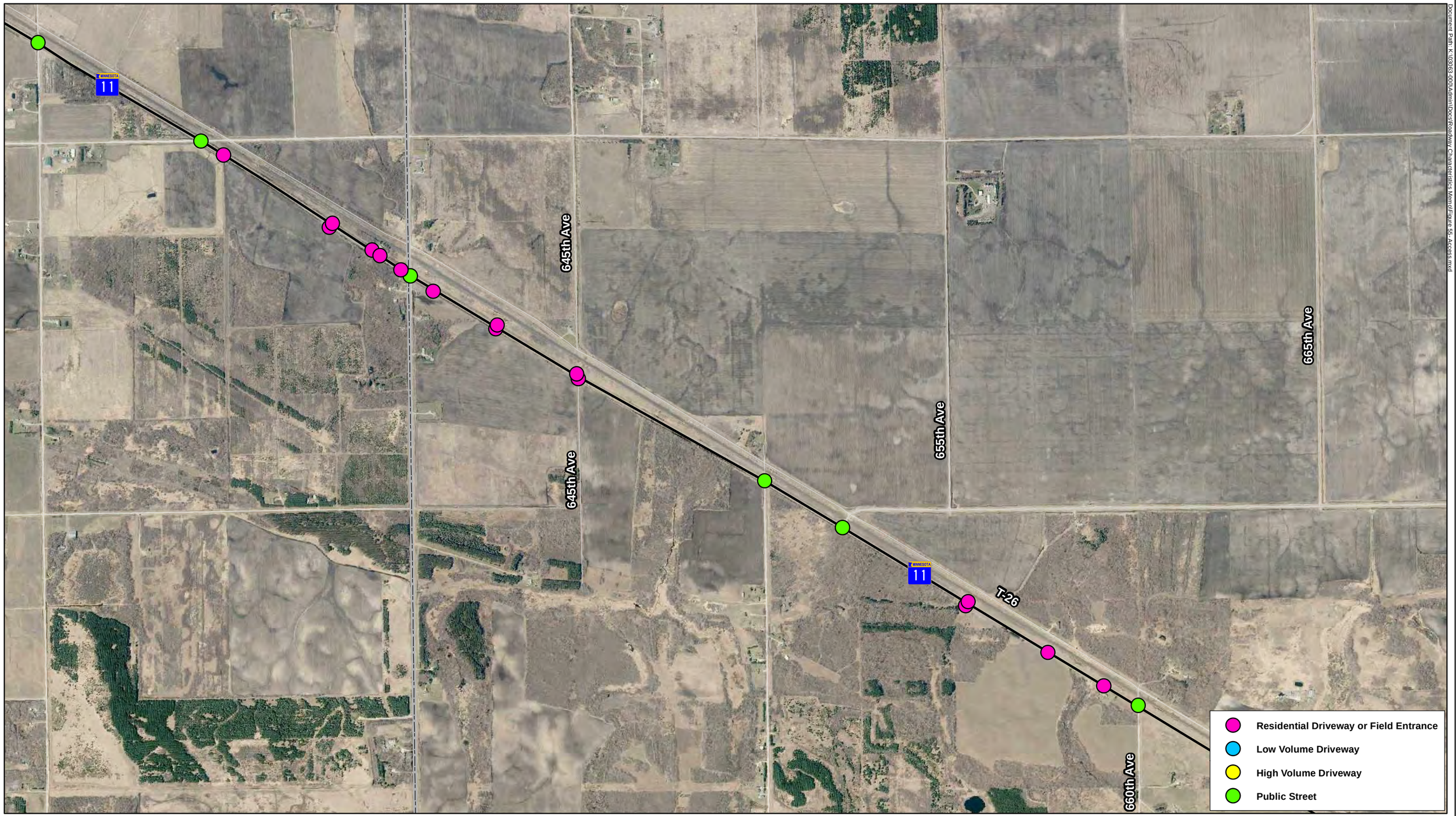


Figure 13 - Access Points South/East of Warroad

MINNESOTA DEPARTMENT OF TRANSPORTATION



1 inch = 1,250 feet

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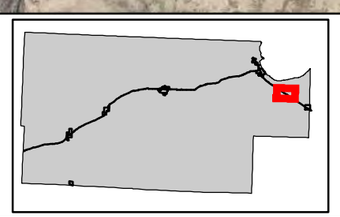
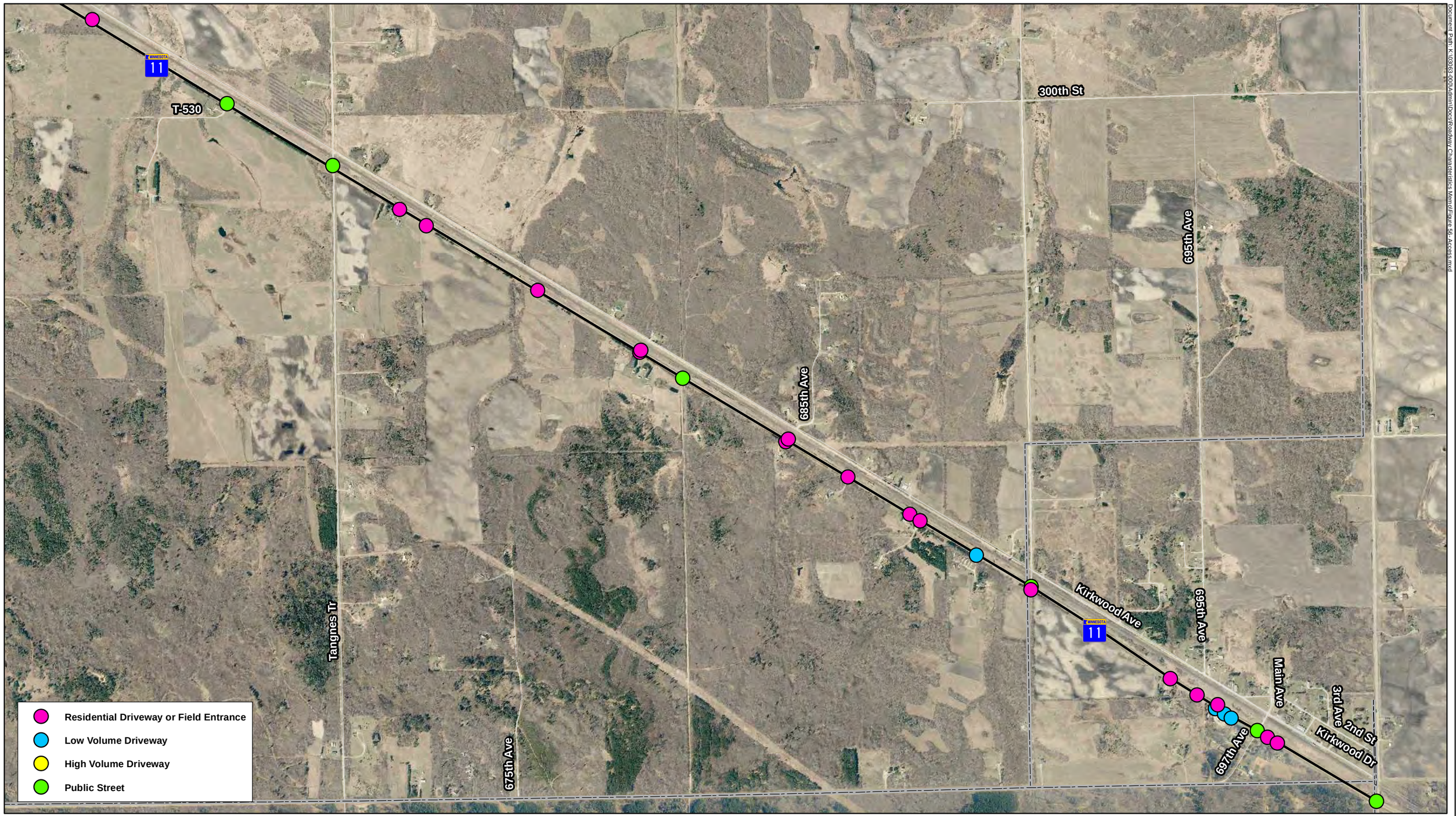


Figure 14 - Access Points
645th Avenue Area

MINNESOTA DEPARTMENT OF TRANSPORTATION



1 inch = 1,350 feet

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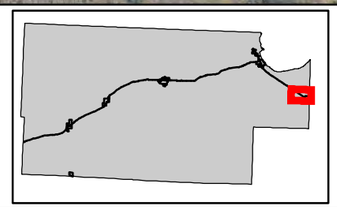

Figure 15 - Access Points
Roosevelt

MINNESOTA DEPARTMENT OF TRANSPORTATION

Appendix C Crash Data and Figures

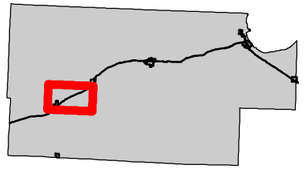

Figure 1 - Three-Year Crash History

Greenbush

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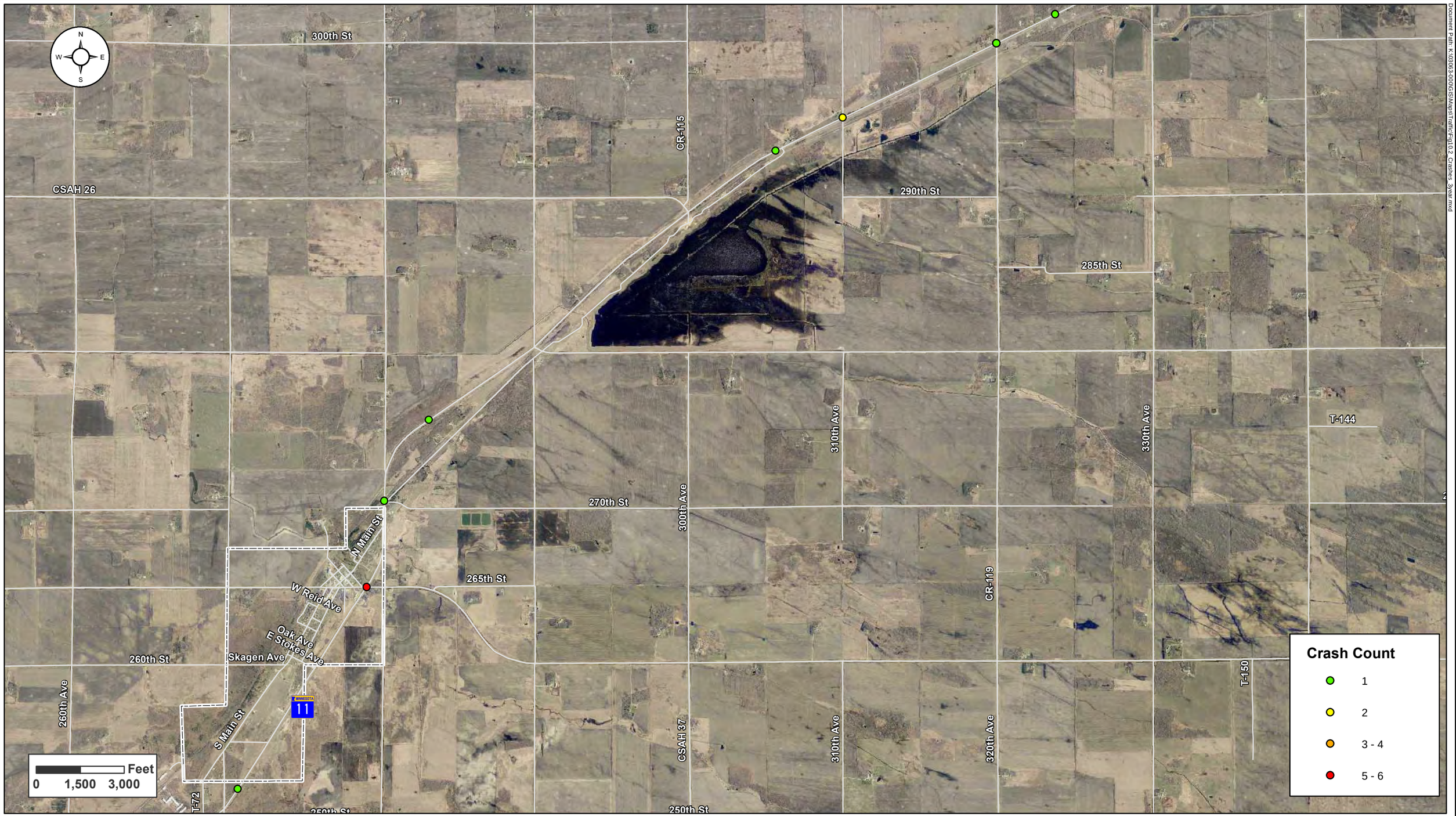


Figure 2 – Three-Year Crash History

Badger

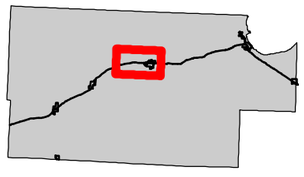
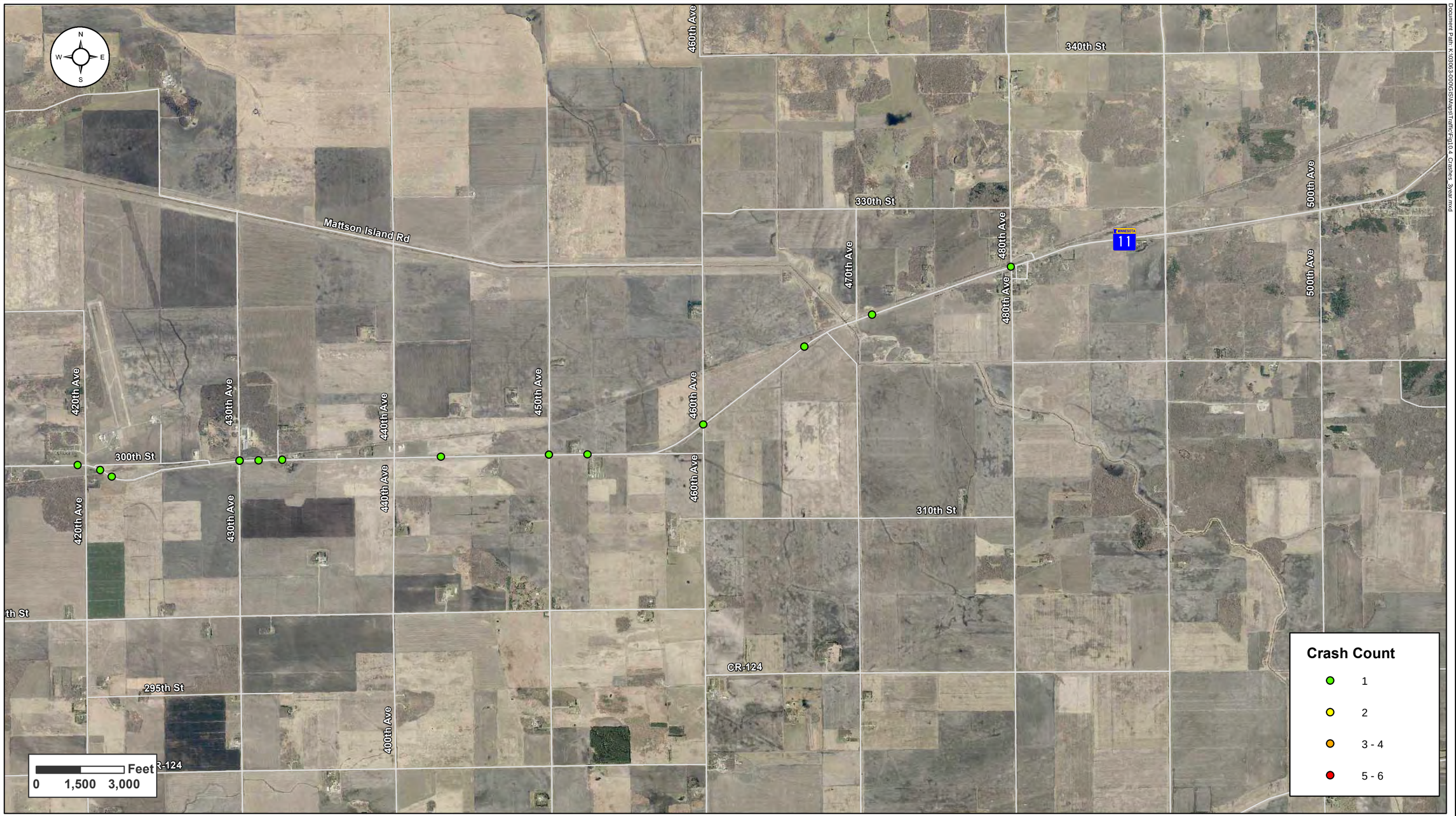


Figure 3 – Three-Year Crash History

Roseau



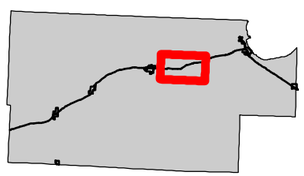
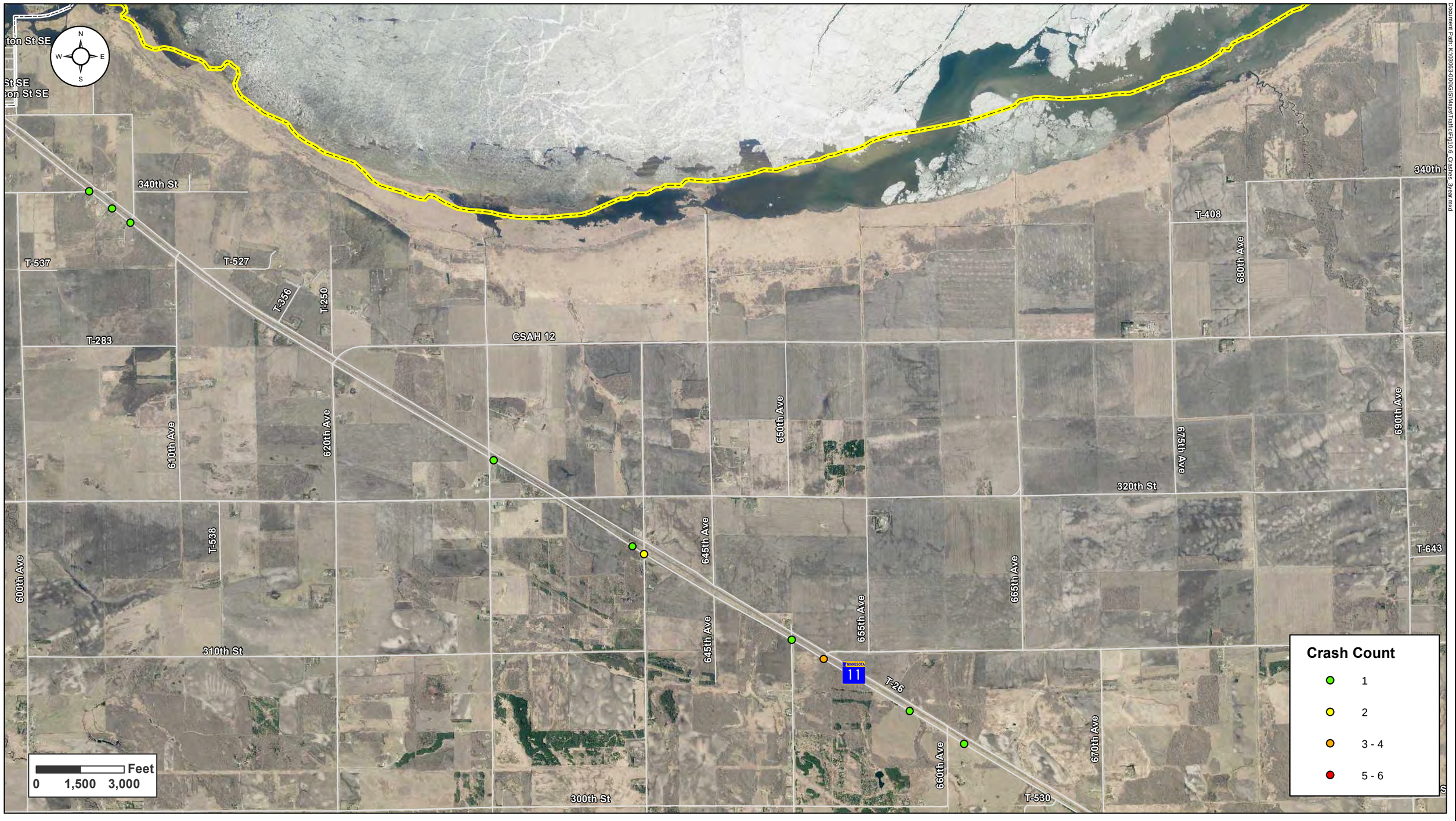


Figure 4 – Three-Year Crash History

Salol

Figure 5 – Three-Year Crash History

Salol to Warroad



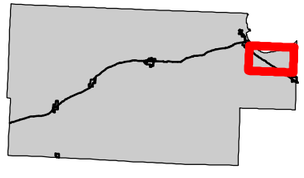
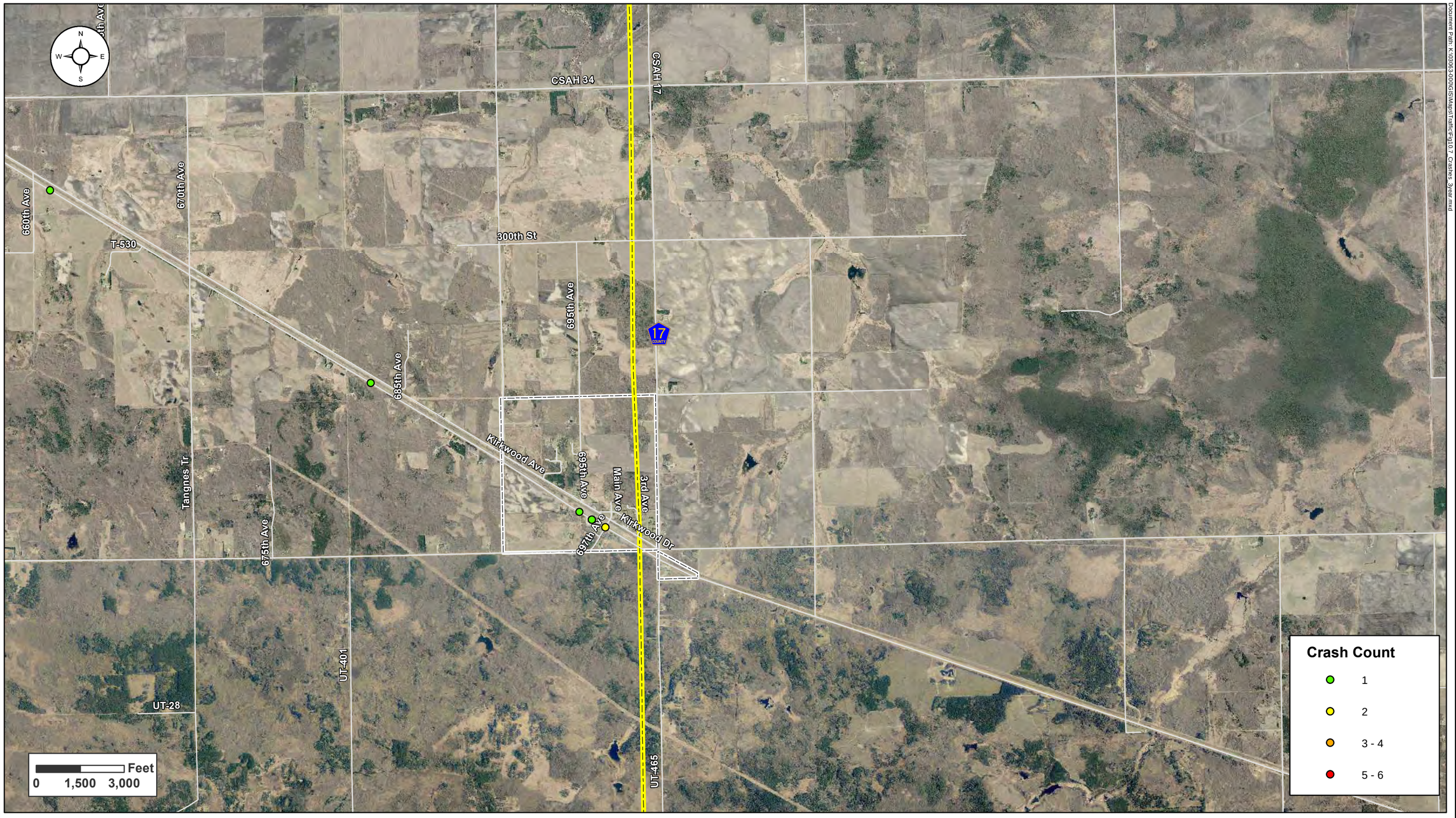


Figure 6 – Three-Year Crash History

East of Warroad



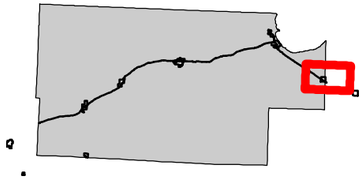


Figure 7 – Three-Year Crash History
Roosevelt