



STEELE COUNTY BOARD OF COMMISSIONERS WORK SESSION AGENDA

Administration Center - 630 Florence Avenue – Owatonna, MN 55060

*Steele County's Mission:
Driven to deliver quality services in a respectful and fiscally responsible way.*

TUESDAY, APRIL 8, 2025 at 4:00 PM
County Boardroom, Steele County Administration Center

Agenda

1. Call to Order
2. CSAH 2/CSAH 43/CR 171/CR 180 Intersection Improvement Feasibility Study (Havana)
3. Human Services Update
4. Other Business

Adjourn

Disclaimer: This agenda has been prepared to provide information regarding an upcoming meeting of the Steele County Board of Commissioners. This document does not claim to be complete and is subject to change.



Steele County Agenda Item

Request for Board Action

Subject: CSAH 2/CSAH 43/CR 171/CR 180 (Havana) Intersection Improvement Feasibility Study

Department: Highway

Committee: Public Works

Committee Meeting Date: March 4, 2025

Work Session Date: April 8, 2025

Board Meeting Date: April 8, 2025

Consent Agenda: ☐ Yes ☒ No

Resolution: ☐ Yes ☒ No

Policy Committee Recommendation:

Present the CSAH 2/CSAH 43/CR 171/CR 180 (Havana) Intersection Improvement Feasibility Study at a work session for review by the Board and to move this item to the regular meeting for a formal selection of the preferred alternative (Alternative 4)

Recommendation:

Accept recommendation of the CSAH 2/CSAH 43/CR 171/CR 180 (Havana) Intersection Improvement Feasibility Study to construct Alternative 4

Background (*Including Budget Impact*):

The 2025-2029 Highway Capital Improvement Plan includes a project to improve the intersection of CSAH 2, CSAH 43, CR 171 and CR 180 in Havana Township. The skewed and closely spaced intersections of the county highways, along with poor intersection site lines and the close proximity to a railroad crossing, contributes to the intersection having the highest crash rates in the county. The County retained WHKS to complete a feasibility study, study possible alternatives, and then recommend an alternative for construction. The Department has held two public information meetings receiving feedback on the alternatives. WHKS has completed a draft report with recommendations. In summary, the project team evaluated 5 alternatives. The project team has selected Alternative 4 as the preferred alternative after considering public input and balancing project costs and impacts. An analysis of the alternatives and the cost estimates are available in the report.

Attachments:

Feasibility Study of CSAH 2/CSAH 43/CR 171/CR 180 Intersection Improvements*
Project presentation slides

*Due to large size (170 pages), attachments to Appendix F and all of Appendix G have been omitted but are available on request.



1

Project Team



Brandon Theobald, P.E. - Project Manager
Brandyn Chezick, P.E. - Project Engineer



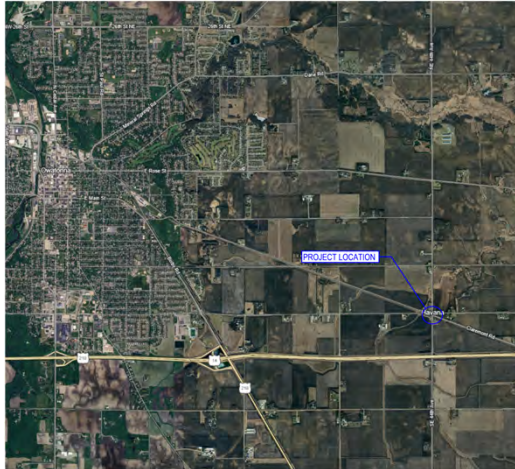
Paul Sponholz, P.E. - County Engineer



2

Agenda

- ▶ Project Need
- ▶ Alternatives
- ▶ Public Engagement
- ▶ Alternatives Comparison
- ▶ Funding & Next Steps
- ▶ Questions



whks

3

Project Need

- ▶ Safety
 - ▶ Top Ranked Crash Location - 2040 Transportation Plan
 - ▶ High Risk Intersection - 2012 County Road Safety Plan
- ▶ Increased Traffic
 - ▶ 2011 Owatonna East Beltline Corridor Study
 - ▶ Future residential growth on CSAH 43
 - ▶ Board approval of CSAH 43 alignment
 - ▶ 2021 US 14 Reconstruction
 - ▶ Tripled the traffic on CSAH 43

whks

4

Public Engagement

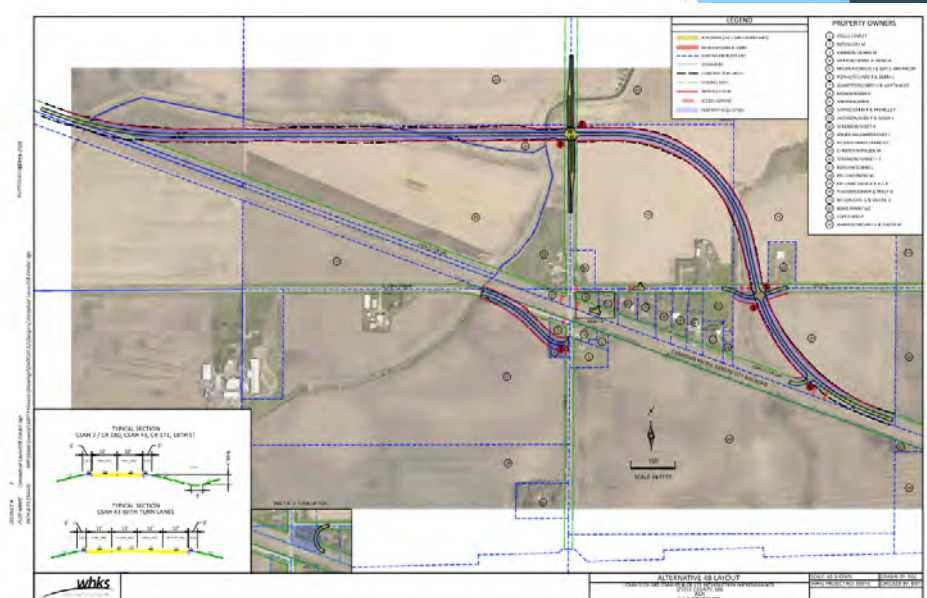
- ▶ Meeting #1 - Reviewed 4 Alternatives
 - ▶ Major concerns with residential relocations
 - ▶ Concerns with farmland impacts
 - ▶ Explore multi-way stop control
- ▶ CPKC Railroad
 - ▶ Preferred Alternative 4
 - ▶ Did not affect RR crossing
- ▶ Meeting #2 - Discuss Preferred Alternative (Alternative 4)
 - ▶ Concerns with Sorenson & Thamert farmland impacts
 - ▶ Construct 18th St SE relocation at later date
 - ▶ Hammerhead ends on Claremont Rd & CR 171
 - ▶ Construct U-turn at later date
 - ▶ Explore Alternative 4B

whks

9

Proposed Alternative 4B

- ▶ Additional property impacts
- ▶ County drainage ditch impacted
- ▶ Increased bridge length
- ▶ Increased cost
 - ▶ \$6,960,000



whks

10

Concept Comparison Matrix				
Steele County CSAH 2/CR 180, CSAH 43 & CR 171 Intersection Improvements				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Roadway	Existing roadway alignment. Roundabout intersection control.	Shift roadway alignment north to CR 171. Two-way stop intersection control.	Shift roadway alignment slightly north of CR 171. Two-way stop intersection control.	Shift roadway alignment farther north of CR 171. Two-way stop intersection control.
Considerations				
Geometrics	Curved approaches to reduce driver speed entering the intersection. Existing intersection skew remains. No increase in storage space between intersection and RR crossing.	Reduce number of intersections near RR crossing. Remove intersection skew. Additional storage space for vehicles between intersection and RR crossing. CSAH 43 turn lanes extend through RR crossing. Room for future improvements to intersection.	Reduce number of intersections near RR crossing. Remove intersection skew. Increased additional storage space for vehicles between intersection and RR crossing. CSAH 43 turn lanes extend through RR crossing. Room for future improvements to intersection.	Reduce number of intersections near RR crossing. Remove intersection skew. Greatest additional storage space for vehicles between intersection and RR crossing. Shift CSAH 43 turn lanes north, avoiding impacts to the RR crossing. Room for future RR overpass and improvements to intersection.
Right of Way Acquisition	Most residential property acquisition. Minimal farmland acquisition.	Moderate residential property acquisition, moderate farmland property acquisition.	Major residential property acquisition, major farmland property acquisition.	Minimal residential properties, most farmland property.
Relocations	Relocation required for four property owners.	Relocation required for four property owners including one multi-resident apartment building.	Relocation required for three property owners.	Relocation required for one property owner. Owner has previously contacted County to discuss sale of property.
Cost	\$3,440,000	\$4,710,000	\$4,500,000	\$5,620,000
Visual Ranking ● Most Feature Improvement/Least Considerations ● Some Feature Improvement/Some Considerations ● Less Improvement/Major Considerations ● Least Feature Improvement/Most Considerations				

11

Funding & Next Steps

Funding

- ▶ State Aid Funds
- ▶ Turnback Funds - Approximately \$2,000,000
- ▶ County Funds

Next Steps

- ▶ Approve Feasibility Report April 2025
- ▶ Approve Final Design Contract May 2025
- ▶ Construction Spring 2026

12



Questions and Answers

Thank you!

whks



engineers + planners + land surveyors

FEASIBILITY STUDY OF CSAH 2/CR 180, CSAH 43 AND CR 171 INTERSECTION IMPROVEMENTS

Prepared for:
Steele County, Minnesota Highway Department

Table of Contents

Table of Contents	2
Project Location	4
Project Need	5
Safety	5
Changes to Traffic	5
Proposed Concept Alternatives	6
Alternative 1 – Roundabout	6
Alternative 2 – Realign CSAH 2 / CR 180 to CR 171	6
Alternative 3 – Realign CSAH 2 / CR 180 slightly north of CR 171	6
Alternative 4 – Realign CSAH 2 / CR180 & CSAH 43 farther north of CR 171	6
Alternative 4B – Realign CSAH 2 / CR 180 to the north property line of adjacent farmland	7
Traffic Control Analysis	7
Traffic Volume	7
Crash History.....	7
Level of Service/ Capacity	7
Warrant Analysis	8
Right of Way Impacts.....	8
Fee Acquisition & Relocation	8
Fee Acquisition	9
Temporary Easement	9
Engagement and Input.....	10
Open House #1	10
Coordination with CPKC Railroad.....	12
Open House #2	12
Environmental Impacts.....	13
Wetlands	13
Floodplains	13
Environmental Review	15
Hydraulics	16
Proposed Alternative Cost Estimates	17
Recommended Alternative	17
Grant and Funding Opportunities	18
State Aid Funds	18
Local Road Improvement Program (LRIP).....	18
Turnback Funds.....	18
Federal – Highway Safety Improvement Program (HSIP).....	18

Federal – Railway Highway Crossing Program (Section 130).....	18
Local Option Sales Tax.....	18
Appendix A: Alternative Layouts	19
Appendix B: Cost Estimates	25
Appendix C: Property Map.....	27
Appendix D: Public Engagement	28
Appendix E: Decision Matrix	38
Appendix F: ICE Report.....	50
Appendix G: Wetland Delineation Report.....	136

Project Location

The project encompasses three intersections located in the village of Havana, approximately 3 miles southeast of the City of Owatonna. The main intersection includes County State Aid Highway 2 (CSAH 2) / County Road 180 (CR 180) and County State Aid Highway 43 (CSAH 43). The second intersection of 18th Street SE and CSAH 43 is located 160 feet to the south of CSAH 2 / CR 180. The third intersection of County Road 171 (CR 171) and CSAH 43 and 110 feet north of CSAH 2 / CR 180. A railroad crossing for the Canadian Pacific Kansas City (CPKC) Railroad is located between the intersection of CSAH 2 / CR 180 and CSAH 43, and the intersection of 18th Street SE and CSAH 43.



Map of the project location



Inset Map of the project location

Project Need

Safety

Multiple vehicular crashes have been reported at the intersection of CSAH 2 / CR 180 and CSAH 43. The 2040 Transportation Plan prepared by Steele County identified the intersection as the top ranked crash location in the county based on 2016 – 2020 crash data. Another study, the 2012 County Road Safety Plan also showed the intersection as a high-risk intersection.

The project area includes three intersections and a railroad crossing that are spaced close together, resulting in multiple decisions that need to be processed by a driver in a short amount of time. CSAH 2 / CR 180, CSAH 43 and CR 171 are all high-speed roadways, and have less time to react to cross-traffic that pulls out onto the road at the wrong time. The distance between the railroad crossing and CSAH 2 / CR 180 is approximately 80 feet, which limits the storage space available for vehicles to wait when a train is traveling through the railroad crossing. This distance is especially tight for semi-trailers, which frequently use the intersection to turn right from northbound CSAH 43 to eastbound CSAH 2 / CR 180. The alignment of CSAH 2 / CR 180 runs at a 20-degree skew in relation to CSAH 43 and causes poor sight distance when drivers travelling along CSAH 43 need to watch for cross traffic on CSAH 2 / CR 180.

Changes to Traffic

In 2021, MnDOT reconstructed US Highway 14 (US 14) between Dodge Center and Owatonna. The project expanded the number of lanes from 2 to 4 and reduced the number of access points for local and county roads to the highway. As a result, CSAH 43 is now the only location for local traffic to access US 14 for a 9.5 mile stretch between Claremont and Owatonna. This has led to an increase in traffic on CSAH 43, in addition to an increase in semi-truck traffic using northbound CSAH 43 to eastbound CR 180 to access the Al-Corn Clean Fuel facility just outside of Claremont. The old US 14 roadway was turned back to the County, and became CSAH 2, which also lead to a change in traffic volumes on CSAH 2 / CR 180.

CSAH 43 was also designated as the future location of a major beltline as the City of Owatonna residential development expands to the east. The 2011 Owatonna East Beltline Corridor Study conducted by WSB concluded that the existing alignment of CSAH 43 should be used as the beltway and anticipated an increase in traffic volumes travelling along the roadway. The County has also planned to eventually expand CSAH 43 to a 4-lane roadway, and MnDOT has committed to building an interchange at the intersection of US 14 and CSAH 43 as traffic grows.

The County is also planning to improve a railroad underpass along CR 180 to the west of the project intersection. This project would increase the vertical clearance between the railroad bridge and CR 180 to meet state aid standards and is expected to increase the amount of truck traffic traveling along CR 180.

The combination of crash history at the intersection and anticipated increases in traffic along both corridors indicates a clear need to improve the intersection.

Proposed Concept Alternatives

Four different intersection layouts were explored as alternatives to the existing intersection layout to improve safety. The goal of each alternative was to try and either improve the geometric layout of the existing intersection, reduce the number of intersections, or provide additional spacing between the intersections to reduce driver speed crossing the intersections, reduce the number of decisions made by the driver and create additional time to make those decisions.

Alternative 1 – Roundabout

The first alternative looked at replacing the intersections of CSAH 2 / CR 180 and CSAH 43 and CR 171 and CSAH 43 with a five-legged roundabout. Roundabouts are a very effective traffic control measure that can be implemented to reduce the number of severe right-angle crashes at an intersection. The intersection of 18th Street SE and CSAH 43 would remain as side street stop control but would be relocated further south of the existing intersection. A display of Alternative 1 can be found in Appendix A.

Alternative 2 – Realign CSAH 2 / CR 180 to CR 171

The second alternative shifted the alignment of CSAH 2 / CR 180 to the north, running through the middle of a farm field, then parallel to the existing alignment of CR 171. The proposed CR 171 would intersect as a tee intersection into the new alignment for CSAH 2 / CR 180, and the new intersection for CSAH 2 / CR 180 would be relocated to the north of the existing intersection with side street stop control. Right and left turn lanes would be added to CSAH 43 for northbound and southbound traffic at the intersection with CSAH 2 / CR 180. The intersection of 18th Street SE and CSAH 43 would remain as side street stop control but would be relocated further south of the existing intersection. An additional intersection off the new alignment for CSAH 2 / CR 180 would be added to provide access to the residential houses along the existing CSAH 2 / CR 180 alignment. The CPKC railroad crossing would be widened to accommodate the northbound turn lanes for CSAH 43 traffic. A display of Alternative 2 can be found in Appendix A.

Alternative 3 – Realign CSAH 2 / CR 180 slightly north of CR 171

The third alternative shifted the alignment of CSAH 2 / CR 180 farther north of the existing CR 171 intersection. The new alignment of CSAH 2 / CR 180 would run along the southwest edge of a farm field and through the backyards of some residential lots. The proposed CR 171 would intersect as a tee intersection into the new alignment for CSAH 2 / CR 180, and the new intersection for CSAH 2 / CR 180 would be relocated to the north of the existing intersection with side street stop control. Right and left turn lanes would be added to CSAH 43 for northbound and southbound traffic at the intersection with CSAH 2 / CR 180. The intersection of 18th Street SE and CSAH 43 would remain as side street stop control but would be relocated further south of the existing intersection. An additional intersection off the new alignment for CSAH 2 / CR 180 would be added to provide access to the residential houses along the existing CSAH 2 / CR 180 alignment. The CPKC railroad crossing would be widened to accommodate the northbound turn lanes for CSAH 43 traffic. A display of Alternative 3 can be found in Appendix A.

Alternative 4 – Realign CSAH 2 / CR180 & CSAH 43 farther north of CR 171

The fourth alternative shifted the alignment of CSAH 2 / CR 180 far enough north that the proposed CSAH 2 / CR 180 and CSAH 43 intersection/turn lanes are out of the existing CR 171 intersection. The proposed CSAH 43 intersection would utilize side street stop sign control on CSAH 2 / CR 180. The new alignment of CSAH 2 / CR 180 would run along the southwest edge of one farm field and through the middle of two farm fields. The proposed CR 171 would intersect into the new alignment for CSAH 2 / CR 180. Right and left turn lanes would be added to CSAH 43 for northbound and southbound traffic

at the intersection with CSAH 2 / CR 180. The intersection of 18th Street SE and CSAH 43 would remain as side street stop control but would be relocated further south of the existing intersection. An additional intersection off the new alignment for CSAH 2 / CR 180 would be added to provide access to the residential houses along the existing CSAH 2 / CR 180 alignment. The CPKC railroad crossing would remain as-is. A display of Alternative 4 can be found in Appendix A.

Alternative 4B – Realign CSAH 2 / CR 180 to the north property line of adjacent farmland

Another alternative was briefly considered to shift CSAH 2 / CR 180 even further north to minimize the acquisition impacts to the farmland on the northwest and northeast sides of the existing CSAH 43 and CR 171 intersection. See the Open House #2 section of this report for additional analysis. A display of Alternative 4B can be found in Appendix A.

Traffic Control Analysis

WHKS prepared an Intersection Control Evaluation (ICE) Report for the intersection to determine which traffic control is desirable at the intersection of CSAH 2 / CR 180 and CSAH 43.

Traffic Volume

24-hour traffic counts were recorded at all three intersections and extrapolated the future 20-year volumes on all roadways based on annual compounding growth and the anticipated growth provided in the 2011 Beltline Corridor Study. The volumes of each intersection can be found in Appendix F. The data determined that CSAH 43 had the highest peak hour traffic, then CSAH 2 / CR 180, then CR 171 and finally 18th Street SE.

Crash History

The report also analyzed the previous 10 years (2014 – 2024) of crash history at the intersection using MnDOT's MnCMAT database. From 2014 to 2024, there were 15 recorded crashes at the three intersections: nine crashes at the CSAH 2 / CR 180 and CSAH 43 intersection, four crashes at the CR 171 and CSAH 43 intersection, and two crashes at the 18th Street SE and CSAH 43 intersection. Most of the crashes (47%) were right angle crashes, with eight crashes resulting in some type of injury. A detailed list of crash data can be found in Appendix F.

The crash data was entered into MnDOT's online crash calculator to determine the intersection crash rate per million vehicles entering the intersection. This crash rate is compared to the state's crash rate goal of 1.0 crash per million entering vehicles (MEV) for all intersections. Based on the current traffic counts and crash data, the crash rate at the location was 1.81 MEV. This result is higher than MnDOT's crash rate goal and was consistent with crash data from the 2040 Transportation Plan.

Level of Service/ Capacity

The ICE Report used the 20-year volumes calculated from the traffic counts and analyzed the average delay in vehicles per second for a roundabout, traffic signal, multi-way stop, and side street stop control at the intersection. This analysis is based on Highway Capacity Manual methodology, where Level of Service is given a letter grade based on the delay at an intersection. An intersection at LOS A represents good operations (less delay) and an intersection at LOS F represents poor operations (more delay). An intersection at LOS E is considered at capacity. A summary of LOS for each traffic control alternative can be found in Appendix F.

The analysis for all forms of traffic control provided an acceptable LOS.

Warrant Analysis

The Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) lists a variety of warrants that can be examined at a particular intersection to determine if multi-way stop control or traffic signal control is warranted for traffic control. There are no warrants for the installation of roundabouts. However, MnDOT's current policy states that roundabouts are considered warranted if traffic volumes meet the criteria for either multi-way stop or traffic signal control warrants. The warrant summary for the intersection of CSAH 2 / CR 180 and CSAH 43 can be found in Appendix F.

None of the Multi-way Stop Warrants were met based on the criteria.

Signal Control warrants 1-8 were not met based on the criteria. Warrant 9 would be met if future traffic is observed and the current intersection alignment is not improved. The existing queue distance between the intersection of CSAH 2 / CR 180 and CSAH 43 and the railroad crossing is only 65 feet, where 130 feet would be required. All four proposed alternative layouts meet the queue distance requirement, so Warrant 9 would not be met.

NCHRP report 825 Exhibit 17 suggests that two-way stop control is appropriate for all proposed alternatives.

Right of Way Impacts

All the proposed alternatives will result in Right of Way impacts to adjacent property owners. A project map of all adjacent parcels can be found in Appendix C.

Fee Acquisition & Relocation

Alternative 1 will require the acquisition and relocation of four parcels that contain single unit residential homes. Parcels 07-018-2201, 07-017-3301, and 07-020-4411 would be required to construct the roundabout; and parcel 07-019-1103 would be required to re-align 18th Street SE.

Alternative 2 will require the acquisition and relocation of four parcels: three containing single unit residential homes, and one containing multi-unit residential apartments. Parcels 07-018-2201, 07-017-3301, and 07-020-4412 would be required to construct the re-aligned CSAH 2 / CR 180 intersection; and parcel 07-019-1103 would be required to re-align 18th Street SE.

Alternative 3 will require the acquisition and relocation of three parcels that contain single unit residential homes. Parcels 07-018-2201 and 07-017-3301 would be required to construct the re-aligned CSAH 2 / CR 180 intersection; and parcel 07-019-1103 would be required to re-align 18th Street SE.

Alternative 4 will require the acquisition and relocation of one parcel that contains a single unit residential home. Parcel 07-019-1103 would be required to re-align 18th Street SE.

It should be noted that in Alternatives 2, 3, and 4, Parcel 07-020-4411 would need to be purchased to construct the cul-de-sac or curve option along Claremont Road (existing CSAH 2 / CR 180) as shown on Inset A of each display. The installation of a hammerhead, as shown on the main displays, would not require the acquisition of parcel 07-020-4411.

The property owner of parcel 07-019-1103 has previously been in contact with Steele County about selling the property.

Relocation assistance and benefits for the relocation of a property owner require extensive requirements and special knowledge to perform relocation services. It is recommended that the County work directly with MnDOT Office of Land Management regarding the handling of property relocation.

Fee Acquisition

Alternative 1 will require partial acquisition of farmland from two parcels. Part of parcel 07-017-3300 would be required to construct the roundabout, and part of parcel 07-019-1100 would be required to re-align 18th Street SE.

Alternative 2 will require partial acquisition of farmland from five parcels. Part of parcels 07-017-3300, 07-017-2400, 07-020-4100, and 07-020-1100 would be required to re-align CSAH 2 / CR 180 and part of parcel 07-019-1100 would be required to re-align 18th Street SE.

Alternative 3 will require partial acquisition of seven parcels: four parcels containing farmland and three parcels containing the backyard of a single unit residential home. Part of Parcels 07-018-2200, 07-017-3300, 07-020-4406, 07-020-4404, 07-020-4401, and 07-020-4100 would be required to re-align CSAH 2 / CR 180 and part of parcel 07-019-1100 would be required to re-align 18th Street SE.

Alternative 4 will require partial acquisition of farmland from five parcels. Part of parcels 07-018-2200, 07-017-3300, 07-017-2400, and 07-020-4100 would be required to re-align CSAH 2 / CR 180 and part of parcel 07-019-1100 would be required to re-align 18th Street SE.

Partial acquisition of all properties would need to follow the Acquisition process provided in Chapter 5.2 of the MnDOT State Aid Manual.

Temporary Easement

All four alternatives will require temporary easement from multiple parcels for grading work during construction.

A summary of Right of Way Impacts can be found below:

RIGHT OF WAY IMPACTS						
		Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Relocation + Fee Acquisition	No. Parcels	4	4	3	1	
	Acres	15.80	15.32	14.80	0.44	
Fee Acquisition	No. Parcels	2	5	7	5	
	Acres	1.03	6.39	6.21	13.41	
Total Acquisition Impacts *	Relocations	4	4	4	1	
	Acres	16.83	21.71	21.01	13.73	

Table 1 – A summary of Right of Way impacts

* There may be opportunities to sell existing Right of Way along the existing roadway alignment back to individual property owners during final design and reduce the total acquisition of Right of Way for each alternative.

Engagement and Input

WHKS and the County met with residents of Havana and additional members of the public on two separate occasions to discuss the project, share the proposed alternatives, and receive feedback. The first open house was held on October 10, 2024, and the second open house was held on January 30, 2025. Both open houses were held at the Havana Town Hall. All four project alternatives were also shared with CPKC Railroad for their comments and feedback. A preliminary utility information meeting was held on January 23, 2025, with companies that have utilities within the project limits to inform them of the project and the anticipated improvements. Additional utility coordination will be required during the final design process.

Open House #1

At the first open house, the design team presented Alternatives 1, 2, 3, and 4 to all open house attendees and collected comments and feedback. The following is a summary of comments that were received. A list of attendees to the first open house can be found in Appendix D.

Alternative 1:

- Residential owners whose homes were impacted by the project strongly objected to relocating due to construction of the roundabout.
- One residential owner had concerns about the raised median of the roundabout approach section limiting access in and out of their driveway.
- The residential house located on parcel 07-019-1103 is a rental. The property owner has been in contact with Steele County about selling the property.

Alternative 2:

- Residential owners whose homes were impacted by the project strongly objected to relocating due to the realignment of CSAH 2 / CR 180.
- The owner of parcel 07-020-4100 disliked how the realignment of CSAH 2 / CR 2180 in this alternative cut through the middle of his farm. It would make the parcel unfarmable.
- There was a request to terminate Claremont Road (existing CSAH 2 / CR 180) using a hammerhead instead of a cul-de-sac to prevent relocating the property owner of parcel 07-020-4411.
- There was a request to explore realigning CSAH 43 and the CSAH 2 / CR 180 intersection to the east, through parcel 07-020-4409. According to residents, the house on the property was not in use, only the garage was being used. They would rather see this property acquired than the other properties with homes that were occupied.

Alternative 3:

- Residential owners whose homes were impacted by the project strongly objected to relocating due to the realignment of CSAH 2 / CR 180.
- Owners of farmland on parcels 07-017-3300 and 07-020-4100 preferred this alternative due to the minimal impacts to their farmable land.
- The owner of parcel 07-017-3301 would rather sell his rental house on this property with Alternatives 1, 2, and 3 than lose more farmland with Alternative 4.
- The property owners on parcels 07-020-4404 and 07-020-4401 strongly objected to this alternative because the realignment of CSAH 2 / CR 180 ran through a sizeable portion of their backyards. They also believed the realignment would impact their septic systems and additional underground utilities. The owner of parcel 07-020-4401 stated he would want to be bought out completely and relocated if this option was selected.

Alternative 4:

- Residential owner of Parcel 07-020-4411 disliked the curve shown in this option because it would take out his house. The owner preferred the construction of two hammerheads to save his house and was open to a future purchase agreement with the County to be executed when the house changes occupancy or ownership
- The owner of parcel 07-017-3300 strongly objected to this alternative due to the large impacts to his farmable land. The realignment of CSAH 2 / CR 180 also went through the septic system of his house, and ran through the location of a future shed, house, and septic system he planned to build.
- The owner of parcel 07-017-3201 was concerned about the re-aligned roadway being closer to her house as she has children playing in the yard.
- There was a request to explore relocating CSAH 2 / CR 180 up to Havana Road and turning the existing intersection of CSAH 2 / CR 180 and CSAH 43 into a tee intersection.
- There was a request made by multiple residents to convert the stop control at the intersection of CSAH 2 / CR 180 and CSAH 43 to multi-way stop control instead of realigning the intersection.

The design team made the following changes to each alternative based on feedback from the first open house:

Alternative 1:

- Explored providing median access on the approach legs of the roundabout to allow full access into residential driveways

Alternative 2:

- Replaced the cul-de-sac ending on Claremont Road (existing CSAH 2 / CR 180) with a hammerhead to avoid additional residential property acquisitions and relocations.
- Explored realigning CSAH 43 to the east. This option was ultimately abandoned due to the size of horizontal curve needed on CSAH 43, the relocation of a railroad crossing, and the recommendation of the 2011 Owatonna East Beltline Corridor study to leave CSAH 43 on its existing alignment.

Alternative 3:

- Replaced the cul-de-sac ending on Claremont Road (existing CSAH 2 / CR 180) with a hammerhead to avoid additional residential property acquisitions and relocations.
- Shifted CSAH 2 / CR 180 alignment further north to reduce impacts to residential backyards and septic systems.

Alternative 4:

- Shifted CSAH 2 / CR 180 alignment further east to eliminate impact to construction of future structures on parcel 07-017-3300
- Replaced horizontal curve connecting Claremont Road (existing CSAH 2 / CR 180) to existing CR 171 with two hammerheads to avoid additional residential property acquisitions and relocations.
- Shifted the intersection of CR 171 and CSAH 2 / CR 180 to the south, away from parcel 07-017-2400.
- Explored relocating CSAH 2 / CR 180 up to Havana Road. This option was ultimately abandoned due to the additional length of roadway on Havana Road needed to be widened and paved to meet state aid standards, and due to the large skew of the existing intersection of Havana Road and CR 180 further west.
- Re-evaluated the need for multi-way stop signs at the intersection. It was determined that multi-way stop control could be implemented as a short term, temporary solution to try and reduce the amount of high-speed right-angle crashes at the intersection. It would also function as a

transition for shifting stop control from CSAH 43 to CSAH 2 / CR 180. It was not recommended as a long-term permanent solution to the intersection, as multi-way stop was unwarranted, and did nothing to alleviate the geometric sight distance and decision-making issues the intersection currently faces. See ICE Report in Appendix F for details.

Coordination with CPKC Railroad

CPKC Railroad was asked to review the four alternatives and provide feedback to the design team. A summary of their feedback is provided below:

- The Railroad preferred Alternative 4 out of all the options because it did not require a widening of the railroad crossing to accommodate additional turn lanes and provided the most storage spaces for vehicles when a trail was crossing the tracks.
- Alternative 4 provides the most distance between the intersections and the railroad tracks for construction of a future overpass

A copy of the correspondence with the railroad can be found in Appendix D.

Open House #2

At the second open house, the design team prepared a slideshow discussing an overview of the project, and presented their preferred Alternative, a refined version of Alternative 4. The following is a summary of comments that were received. A list of attendees to the first open house can be found in Appendix D.

- Residential owners whose homes were impacted by the project preferred this alternative because it did not require the acquisition and relocation of their home.
- Residential owners preferred the addition of hammerheads to terminate Claremont Road (existing CSAH 2 / CR 180) and existing CR 171.
- The owner of parcel 07-017-3300 strongly objected to Alternative 4 due to the large impacts to his farmable land.
- The owner of parcel 07-018-2200 understood the safety issues at the intersection, and the need to relocate CSAH 2 / CR 180 to the north was a desirable long-term solution. Even if that meant the realigned roadway would run through his farmland. He requested that the design team explore placing additional horizontal curves along realigned CSAH 2 / CR 180 to shift the roadway to the south and leave a larger chunk of farmable land on his property.
- There was a request to explore shifting CSAH 2 / CR 180 and the intersection with CSAH 43 further north, just south of the property lines of 07-018-2200 and 07-017-3300, to try and mitigate the impacts to farmable land for both properties. WHKS explored this realignment option but ultimately rejected the idea, as the roadbed would sit over an existing floodway and drainage ditch CD 1 and would require a petition to modify or re-route the drainage ditch. Discussions with the Steele County Local Governing Unit determined that this alternative would not be approved for a floodplain permit due to the hardship caused to drainage ditch CD 1. Alternative 4B would also shift the turn lanes for CSAH 43 up into an existing bridge and require the existing structure to be widened. The cost of Alternative 4B would drastically increase due to the additional roadway length required to shift the alignment that far north and was estimated to be \$6,960,000. The minimal additional benefit gained by shifting the roadway is not enough to offset the major floodplain concerns, the additional bridge widening project, and the added project cost.
- It was decided that the relocation of SE 18th Street and CSAH 43 intersection be implemented at a later date to eliminate the need to relocate any property owners as part of the immediate project.

Environmental Impacts

Wetlands

WHKS performed a Level 2 Wetland Delineation to determine the presence and location of wetlands within the boundaries of the proposed alternatives. Level 2 delineations include an on-site assessment to determine the wetland boundaries. The wetland delineation identified seven different wetlands within the project area. Six of the delineated wetlands are anticipated to be regulated under Section 404 of the Clean Water Act (CWA). Five of the delineated wetlands would be regulated under the Minnesota Wetland Conservation Act (WCA). There is also a county drainage ditch within the project limits, County Drainage Ditch #1. This drainage ditch is part of the County Drainage System and is managed by the County Drainage Authority.

As stated in the wetland delineation report, we also recommend that a copy of the report be submitted to the U.S. Army Corps of Engineers, WCA Local Government Unit (LCU) and Minnesota DNR as part of any permit application for impacts to aquatic resources. A table summarizing impacts to delineated wetlands for each alternative is provided below:

A copy of the wetland delineation report can be found in Appendix G.

WETLAND IMPACTS						
Aquatic Resource ID	Area (acres)	Alternative 1 Impacts (acres)	Alternative 2 Impacts (acres)	Alternative 3 Impacts (acres)	Alternative 4 Impacts (acres).	
1	2.00				0.14	
2	0.22				0.16	
3	0.14				0.03	
4	0.34	0.08	0.11	0.13	0.34	
5	0.41				0.15	
6	1.29		0.08	0.27	0.30	
7	1.61				0.18	
TOTAL		0.08	0.19	0.40	1.30	

Table 2 – A summary of Wetland Impacts

Floodplains

Floodplains were identified within the project area using the MN DNR Lake & Flood Elevations Online mapping tool. See the figure below for limits of the floodplain:

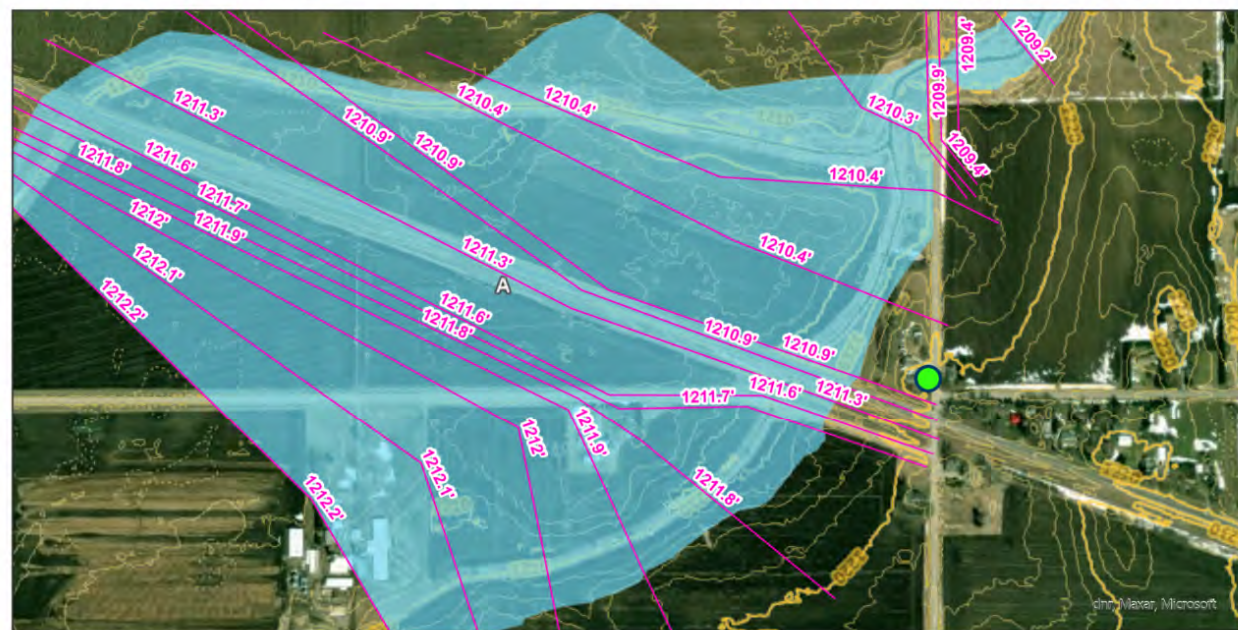


Figure 1 – A map of floodplains within the project area

WHKS held a pre-permit coordination call with Jeff Weiss and Gary Bennett from the MnDNR Floodplains program on 2/13/2025 to discuss potential floodplain impacts from the proposed alternatives. It was noted that the current floodplain map does not appear to account for an area of raised upland located above the 100-year base flood elevations noted in pink in Figure 1 between the two tributaries that form the upstream limits of the area of study. A detailed hydraulic model would need to be completed during final design to update the existing hydraulic model with current LiDAR terrain as well as to delineate the floodway limits along the eastern tributary.

Alternatives 2 and 3 will require a floodplain permit for extension of the existing triple box culvert due to the re-aligned CSAH 2 / CR 180 roadway. Alternative 4 will require a floodplain permit, as the re-aligned CR 180 will run through the floodplain located west of CSAH 43 and will also run through the floodway of the unnamed drainage ditch. The Alternative 4 roadway berm would likely be able to be constructed along the area of upland between the two tributaries as shown in Figure 1. Detailed hydraulic analysis will need to be performed to update the existing hydraulic model with current LiDAR terrain and to delineate the floodway limits, and a “no-rise certification” will need to be documented with the construction of the proposed roadbed and the installation of a new drainage structure along the unnamed drainage ditch.

Environmental Review

Each alternative was compared to the state environmental review requirements listed in the Minnesota Rules Chapter 4410. Table 3 and Table 4 summarize the roadway and wetland project thresholds that would trigger an Environmental Assessment Worksheet (EAW) or an Environmental Impact Statement (EIS):

4410.4300 EAW THRESHOLDS									
Threshold		Threshold Met?							
		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Yes	No	Yes	No	Yes	No	Yes	No
Subp. 22	Construction of road on a new location over one mile in length of two or more lanes, exclusive of auxiliary lanes		X		X		X	X	
	Construction of additional through lanes or passing lanes on an existing road for a length of two or more miles, exclusive of auxiliary lanes		X		X		X		X
	The addition of one or more new interchanges to a completed limited access highway		X		X		X		X
Subp. 27	Projects that will change or diminish the course, current, or cross section of one acre or more of any public water or public waters wetland except for those to be drained without a permit according to Minnesota Statutes, chapter 103G		X		X		X		X
	Projects that will cause an impact to a total of one acre or more of wetlands, regardless of type, excluding public waters wetlands, if any part of the wetland is within a shoreland area, a delineated floodplain, a state or federally designated wild and scenic rivers district, the Minnesota River Project Riverbend area, or the Mississippi headwaters area		X		X		X		X

Table 3 – EAW Threshold Summary

4410.4400 EIS THRESHOLDS									
Threshold		Threshold Met?							
		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Yes	No	Yes	No	Yes	No	Yes	No
Subp. 16	Construction of a road on a new location which is four or more lanes in width and two or more miles in length		X		X		X		X
Subp. 20	Projects that will eliminate a public water or public waters wetland		X		X		X		X

Table 4 – EIS Threshold Summary

Based on the thresholds provided, Alternative 4 is the only Alternative that would require preparation of an EAW.

WHKS explored whether this project could be considered exempt from the EAW process. Chapter 4410.4600 subp.14.A states that highway safety improvement projects can be exempt from preparation of an EAW. A “Highway Safety Improvement Project”, according to Chapter 4410.0200 subp.39 is a project designed to improve safety of highway locations that have been identified as hazardous or potentially hazardous. Projects in this category include the removal, relocation, remodeling, or shielding of roadside hazards; installation or replacement of traffic signals; and the geometric correction of identified high accident locations requiring the acquisition of minimal amounts of right-of-way. Alternative 4 requires the acquisition of multiple acres of right of way to construct and would not be considered a minimal amount of right of way. The exemption would not apply.

If the selected alternative is funded using federal funds, it will automatically require the preparation of environmental documentation as described in Chapter 5.1 of the MnDOT State Aid Manual.

Hydraulics

There were four (4) roadway alternative layouts considered for this feasibility study and required drainage structure sizing recommendations. Drainage structures were analyzed using Autodesk 2024 Hydraflow Express or HEC-RAS 6.5 based on recommended drainage structure types. The runoff for the 2-year through 100-year design storms were obtained from StreamStats for unnamed tributary draining under CSAH 2 / CR 180 near Havana, MN. Drainage structure sizing recommendations were based on the minimum overtopping flood frequency outlined in the Minnesota 2024 Drainage Manual Chapter 5.

The recommended drainage structure sizing for each alternative is as followed:

1. Alternative 1:
 - a. No change to Bridge No. 95786 on SE 18th Street as part of this project.
 - b. Extend the concrete box culverts of Bridge No. 96797 on CSAH 2 / CR 180 as needed to meet proposed grading limits.
 - c. Recommended channel shaping and sediment removal per the field investigation site photos of Bridge No. 95786 and Bridge No. 96797. Proper channel shaping should reduce future sediment deposits, but the county should set a maintenance schedule for annual site visits. Sediment deposits removal will restore the culverts to their full design capacity.
2. Alternative 2 & Alternative 3:
 - a. No change to Bridge No. 95786 on SE 18th Street as part of this project.
 - b. Extend the concrete box culverts of Bridge No. 96797 on CSAH 2 / CR 180 as needed to meet proposed grading limits.
 - c. Recommended channel shaping and sediment removal per the field investigation site photos of Bridge No. 95786 and Bridge No. 96797. Proper channel shaping should reduce future sediment deposits, but the county should set a maintenance schedule for annual site visits. Sediment deposits removal will restore the culverts to their full design capacity.
 - d. Install two (2) separate segments of 36"x58.5" reinforced concrete arch pipe or equivalent 48" reinforced concrete pipe for each culvert crossing on CR 171 East.
 - e. Install two (2) separate segments of 30" reinforced concrete pipe for each culvert crossing on CSAH 2 / CR 180 East.

3. Alternative 4:

- a. No change to Bridge No. 95786 on SE 18th Street as part of this project.
- b. Remove concrete box culverts of Bridge No. 96797 on CSAH 2 / CR 180 per the exhibit.
- c. Recommended channel shaping and sediment removal per the field investigation site photos of Bridge No. 95786 and Bridge No. 96797. Proper channel shaping should reduce future sediment deposits, but the county should set a maintenance schedule for annual site visits. Sediment deposits removal will restore the culverts to their full design capacity.
- d. Install double 8'x6' precast concrete box culverts and single 14'x8' precast concrete box culvert OR 70' x 35' concrete slab span bridge. Additional flood plain coordination and HEC-RAS modeling will be needed to establish the floodway, which may result in a longer bridge length than 70'.
- e. Install two (2) separate segments of 36"x58.5" reinforced concrete arch pipe or equivalent 48" reinforced concrete pipe for each culvert crossing on CR 171 East.
- f. Install two (2) separate segments of 30" reinforced concrete pipe for each culvert crossing on CSAH 2 / CR 180 East.

Proposed Alternative Cost Estimates

The estimated project costs for each alternative are shown in below:

	ALTERNATE 1	ALTERNATE 2	ALTERNATE 3	ALTERNATE 4	ALTERNATE 4B
TOTAL COST	\$3,440,000	\$4,710,000	\$4,500,000	\$5,620,000	\$6,960,000

Table 5 – Cost Estimate for proposed intersection improvements

Recommended Alternative

Alternatives were compared based on the conceptual cost of construction, benefit and utilization provided to the public, and feedback received from the Public Information Meetings. A Decision Matrix with the three alternatives was also compiled to visually compare the benefits and costs of each option. The Decision Matrix is in Appendix E.

Alternative 4 was identified as the preferred option because it did not result in the acquisition and relocation of any residential houses, it provided the most space between the railroad tracks, CSAH 2 / CR 180, and 18th Street SE for future improvements to the intersection. It also provides the most room for a future railroad overpass when future traffic demands are met and provides the most space at the intersection of CSAH 2 / CR 180 and CSAH 43 for future upgrades to the intersection. The cost of Alternative 4 was also comparable to the costs of Alternatives 2 and 3 but provided far greater short-term and long-term benefits.

Alternative 4 also does not require any modifications to the existing CPKC railroad crossing.

Grant and Funding Opportunities

State Aid Funds

State Aid Funding is used by counties and cities for reconstruction, construction, and maintenance projects on designated state aid routes. Funds can be spent on a wide variety of roadway and structural items. The amount of funding available each year varies and is determined using a distribution formula that is established by statutes and the respective county and city screening boards.

Local Road Improvement Program (LRIP)

LRIP provides funding to local agencies for construction, reconstruction, and reconditioning projects with regional significance. Funding is split between the TH Corridor Projects Account, Local Road Account for Routes of Regional Significance, and the Rural Road Safety Account. Items eligible for funding include any reasonable elements of roadway construction, and includes many landscaping, fencing, lighting, and other aesthetic items. The Rural Road Safety Account is intended to assist counties on capital improvement projects on CSAH that are intended to reduce traffic crashes, deaths, injuries and property damage.

Turnback Funds

The County received turnback funds from MnDOT as part of the TH 14 realignment project in 2022. These funds are available after a route has been released from the TH system and may be used for road or bridge construction, R/W, Engineering, utility relocation, railroad adjustment and locally furnished materials or labor.

Federal – Highway Safety Improvement Program (HSIP)

This program is part of the Infrastructure Investment and Jobs Act (IIJA) and is intended to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal land. Projects eligible for funding include intersection safety projects, construction and improvement of railway-highway grade crossing safety feature, construction or installation of features, measures and road designs to calm traffic and reduce vehicle speeds, installation or upgrades of traffic control devices for pedestrians and bicyclists, roadway improvements that provide separation between motor vehicles and bicyclists and pedestrian security features design to slow or stop a motor vehicle.

- Estimated \$3.177 billion available for FY 2025 and \$3.246 billion available for FY 2026

Federal – Railway Highway Crossing Program (Section 130)

The Railway Highway Crossing Program is part of the IIJA and provides funding for the elimination of hazards at public railway-highway crossings. Funds are set-aside from the HSIP apportionment, and an annual set-aside of \$245 million scheduled from FY 2022 through FY 2026

Local Option Sales Tax

The County has funds available from an additional local sales tax that could be used for additional funding. This funding source should be considered as a last resort, and other grant and/or funding opportunities should be explored before using this source.

Appendix A: Alternative Layouts

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1-NOV-2024
PLOTTED/REVISED:

LEGEND

ROADWAYS (INCLUDING TURN LANES)

RAISED MEDIAN & CURBS

EXISTING PROPERTY LINE

SHOULDERS

CONSTRUCTION LIMITS

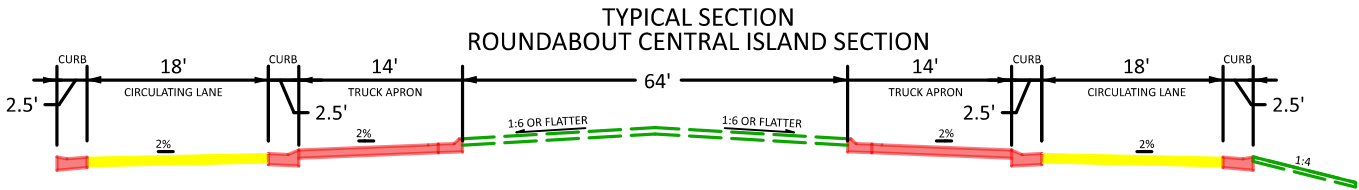
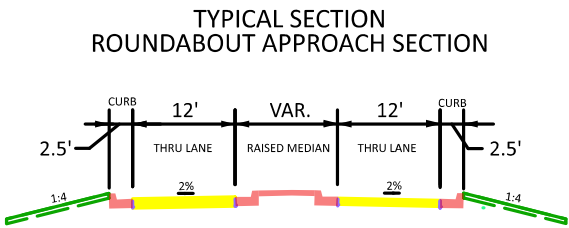
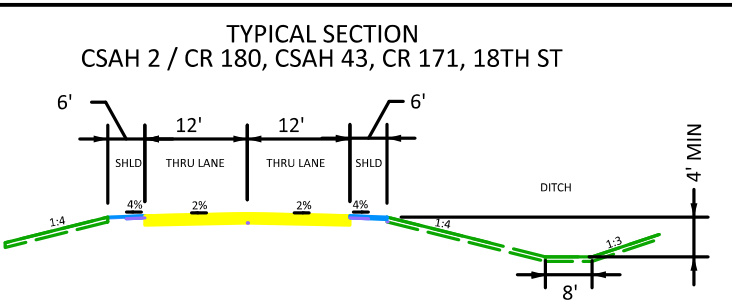
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PROPOSED ROW

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ACCESS CLOSURE

PROPERTY ACQUISITION



PROPERTY OWNERS

1

STEELE COUNTY

2

EATON/JOEL M

3

JOHNSON/DENNIS W

4

IVERSON/DENNIS & PATRICIA

5

MILLER/NICHOLAS J & GAYLE ANN MILLER

6

PIEPHO/RICHARD R & DEBRA J

7

SCHAEFER/RICHARD C & LOLETA ALICE

8

BROWN/ROGER D

9

SPATENKA/MARK

10

GATHJE/DARIN R & MICHELLE K

11

JACOBSON/JUDD P & SUSAN L

12

SORENSEN/SCOTT G

13

JENSEN-GALLAHER/KELSEY J

14

PICHTER FAMILY FARMS LLC

15

CHRISTEY/KATHLEEN M

16

SORENSEN/KENNETH E

17

RENCHIN/DENNIS L

18

BELLOWS/PATRICIA L

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THAMERT/JOHN R & TRACY G

21

NELSON/JACE G & VALERIE A

22

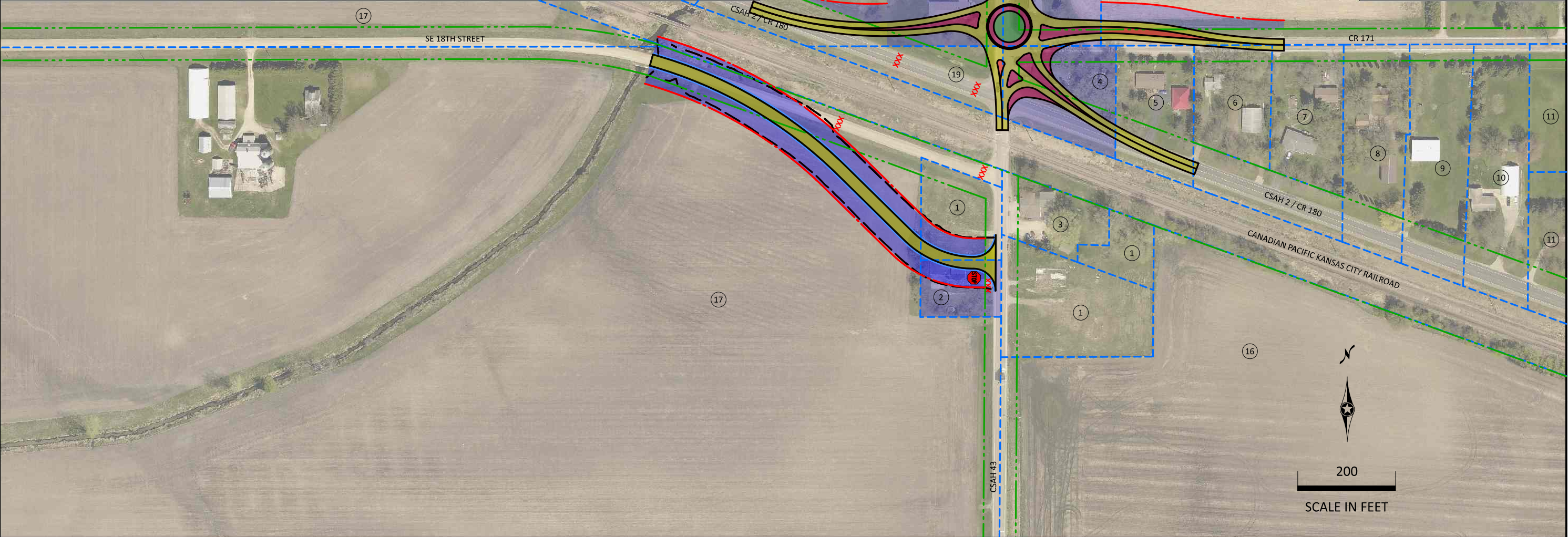
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COPP/CHRIS P

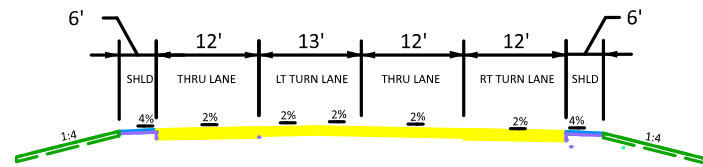
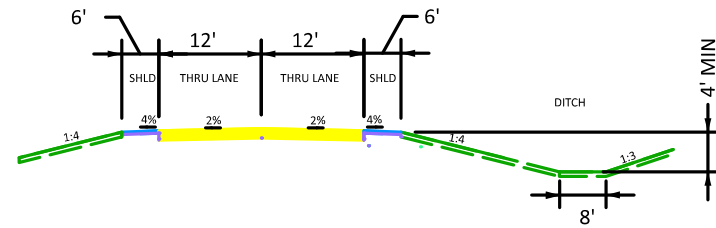
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WANOUS/MICHAEL F & TERESA M

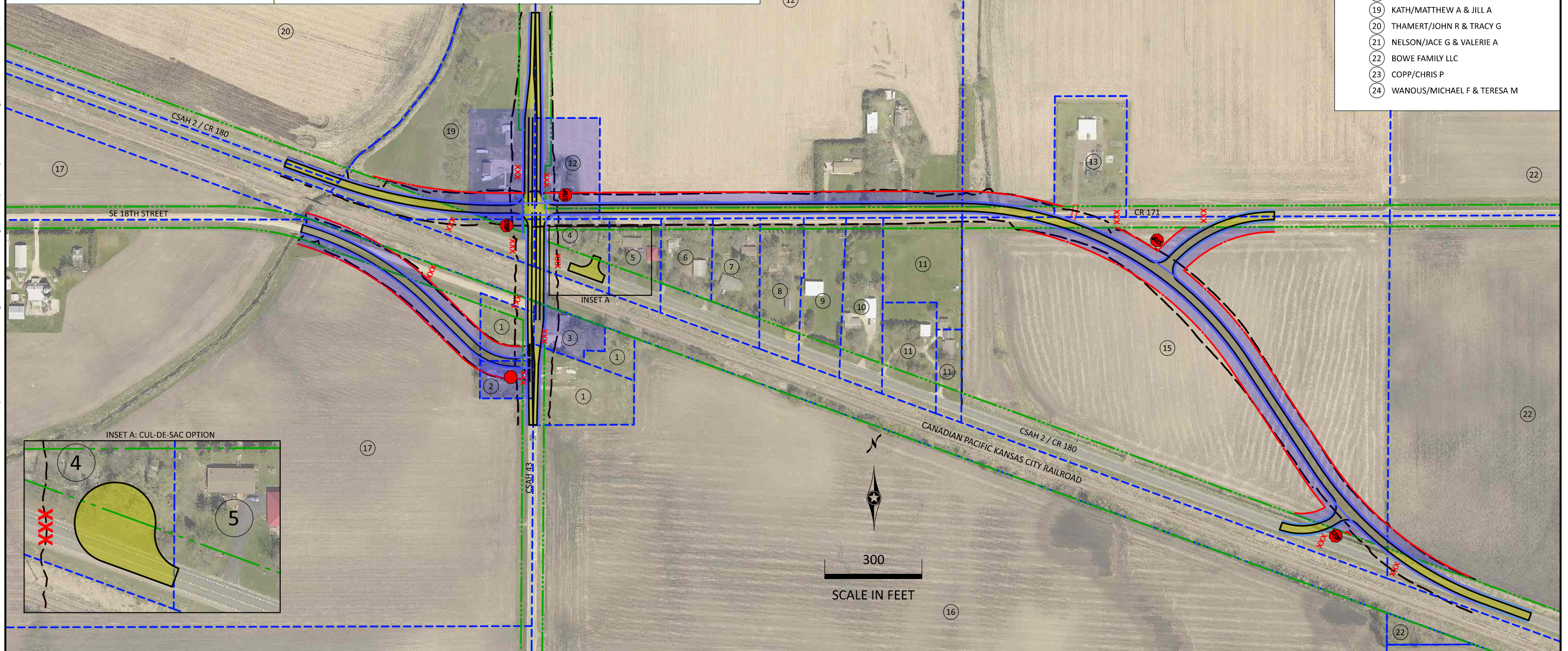


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	RAISED MEDIAN & CURBS
	EXISTING PROPERTY LINE
	SHOULDERS
	CONSTRUCTION LIMITS
	EXISTING ROW
	PROPOSED ROW
	ACCESS CLOSURE
	PROPERTY ACQUISITION



- 1 STEELE COUNTY
- 2 EATON/JOEL M
- 3 JOHNSON/DENNIS W
- 4 IVERSON/DENNIS & PATRICIA
- 5 MILLER/NICHOLAS J & GAYLE ANN MILLER
- 6 PIEPHO/RICHARD R & DEBRA J
- 7 SCHAEFER/RICHARD C & LOLETA ALICE
- 8 BROWN/ROGER D
- 9 SPATENKA/MARK
- 10 GATHJE/DARIN R & MICHELLE K
- 11 JACOBSON/JUDD P & SUSAN L
- 12 SORENSON/SCOTT G
- 13 JENSEN-GALLAHER/KELSEY J
- 14 PICHNER FAMILY FARMS LLC
- 15 CHRISTEY/KATHLEEN M
- 16 SORENSON/KENNETH E
- 17 RENCHIN/DENNIS L
- 18 BELLOWES/PATRICIA L
- 19 KATH/MATTHEW A & JILL A
- 20 THAMERT/JOHN R & TRACY G
- 21 NELSON/JACE G & VALERIE A
- 22 BOWE FAMILY LLC
- 23 COPP/CHRIS P
- 24 WANOUS/MICHAEL F & TERESA M



CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS
STEELE COUNTY, MN
2025
S.A.P. XXX-XXX-XXX

WHKS PROJECT NO: 10073

CHECKED BY: BWT

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6-NOV-2024
PLOTTED/REVISED:

LEGEND

ROADWAYS (INCLUDING TURN LANES)

RAISED MEDIAN & CURBS

EXISTING PROPERTY LINE

SHOULDERS

CONSTRUCTION LIMITS

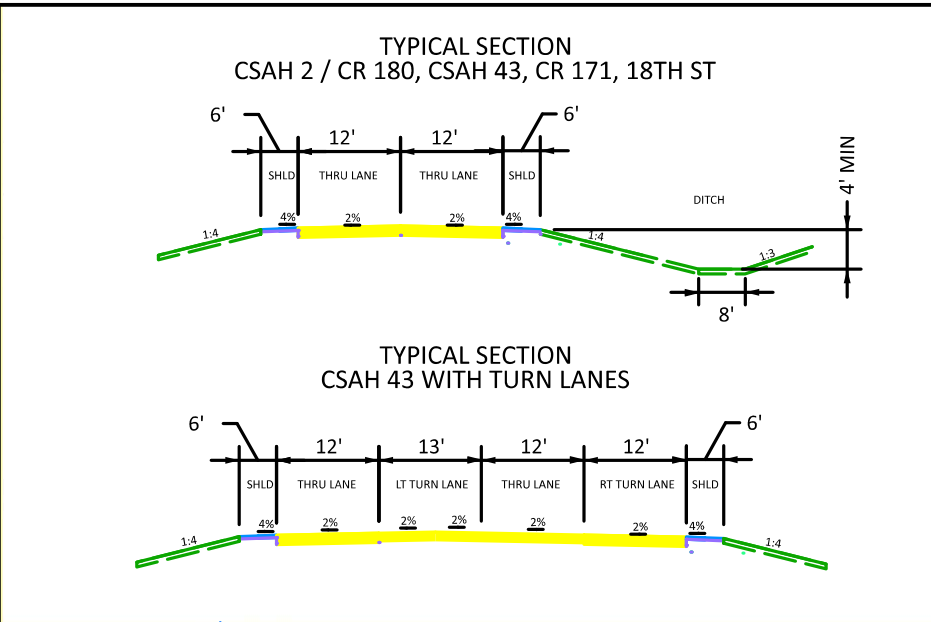
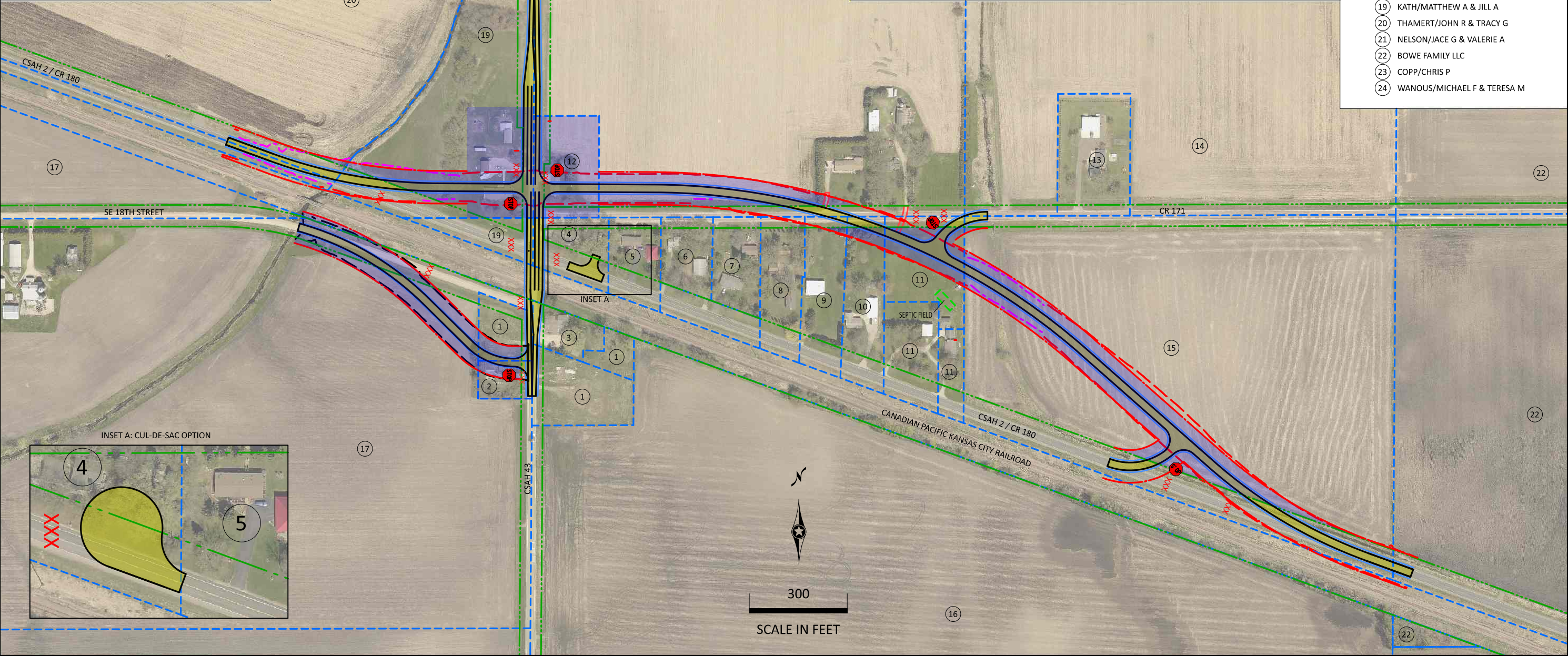
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PROPOSED ROW

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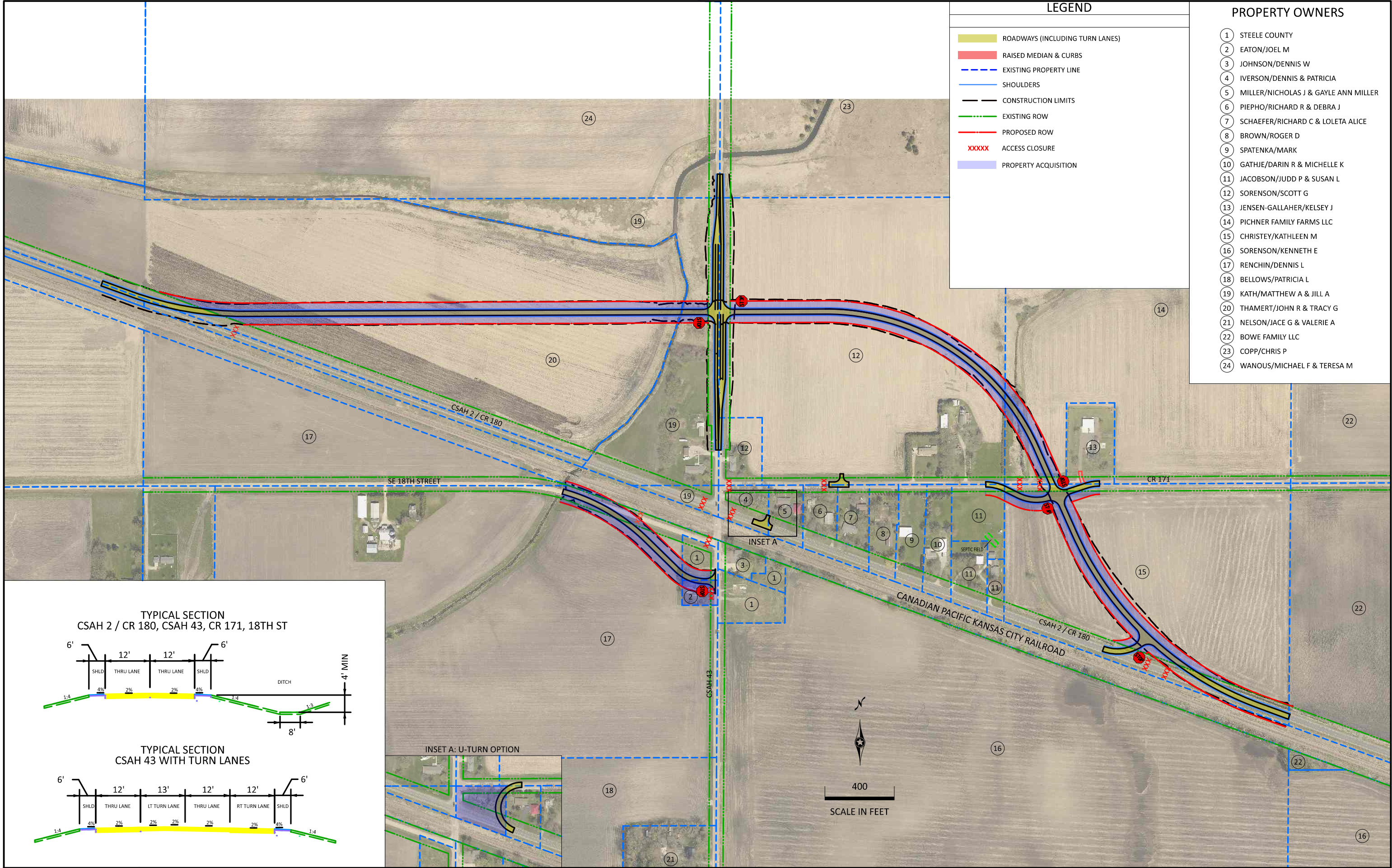
ACCESS CLOSURE

PROPERTY ACQUISITION



PROPERTY OWNERS	
1	STEELE COUNTY
2	EATON/JOEL M
3	JOHNSON/DENNIS W
4	IVERSON/DENNIS & PATRICIA
5	MILLER/NICHOLAS J & GAYLE ANN MILLER
6	PIEPHO/RICHARD R & DEBRA J
7	SCHAEFER/RICHARD C & LOLETA ALICE
8	BROWN/ROGER D
9	SPATENKA/MARK
10	GATHJE/DARIN R & MICHELLE K
11	JACOBSON/JUDD P & SUSAN L
12	SORENSEN/SCOTT G
13	JENSEN-GALLAHER/KELSEY J
14	PICHTER FAMILY FARMS LLC
15	CHRISTEY/KATHLEEN M
16	SORENSEN/KENNETH E
17	RENCHIN/DENNIS L
18	BELLOWS/PATRICIA L
19	KATH/MATTHEW A & JILL A
20	THAMERT/JOHN R & TRACY G
21	NELSON/JACE G & VALERIE A
22	BOWE FAMILY LLC
23	COPP/CHRIS P
24	WANOUS/MICHAEL F & TERESA M

DISTRICT #: 6
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PLOTTED/REVISED: 16-JAN-2025



LEGEND

ROADWAYS (INCLUDING TURN LANES)

RAISED MEDIAN & CURBS

EXISTING PROPERTY LINE

SHOULDERS

CONSTRUCTION LIMITS

EXISTING ROW

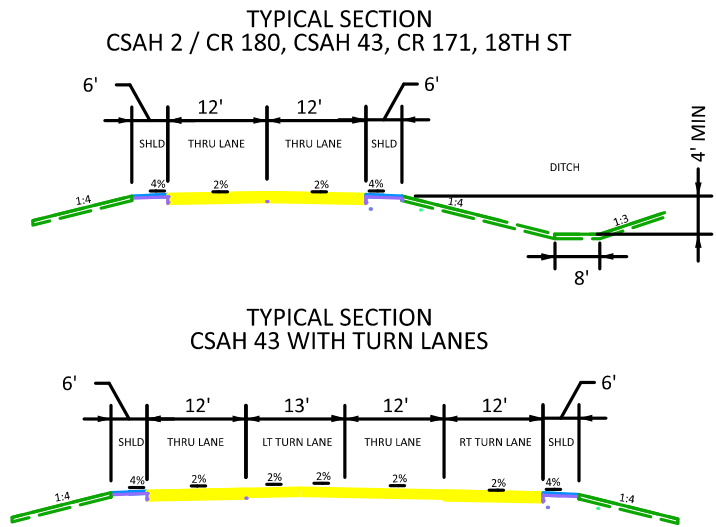
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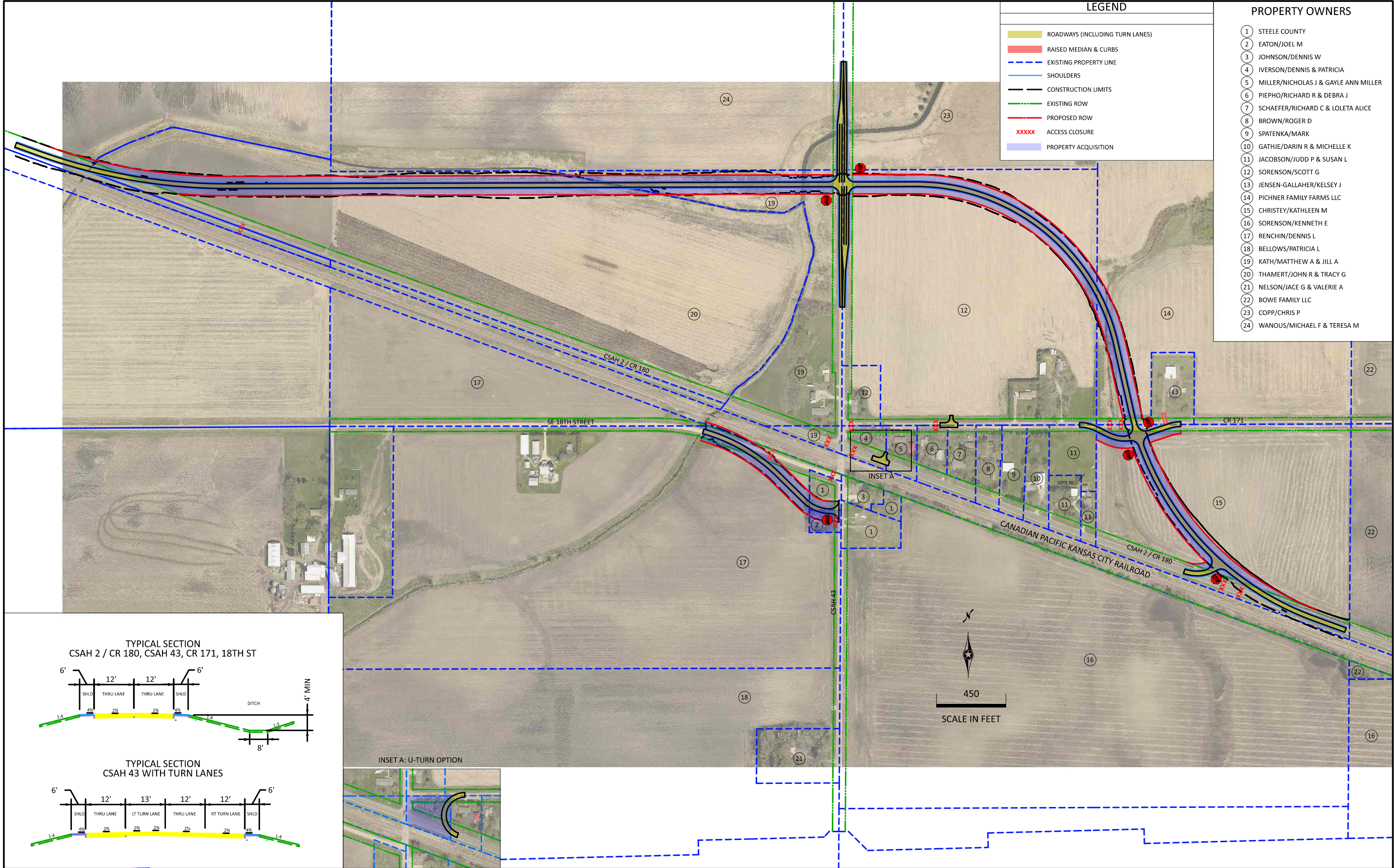
PROPERTY ACQUISITION

PROPERTY OWNERS	
1	STEELE COUNTY
2	EATON/JOEL M
3	JOHNSON/DENNIS W
4	IVERSON/DENNIS & PATRICIA
5	MILLER/NICHOLAS J & GAYLE ANN MILLER
6	PIEPHO/RICHARD R & DEBRA J
7	SCHAEFER/RICHARD C & LOLETA ALICE
8	BROWN/ROGER D
9	SPATENKA/MARK
10	GATHJE/DARIN R & MICHELLE K
11	JACOBSON/JUDD P & SUSAN L
12	SORENSEN/SCOTT G
13	JENSEN-GALLAHER/KELSEY J
14	PICHNER FAMILY FARMS LLC
15	CHRISTEY/KATHLEEN M
16	SORENSEN/KENNETH E
17	RENCHIN/DENNIS L
18	BELLOWS/PATRICIA L
19	KATH/MATTHEW A & JILL A
20	THAMERT/JOHN R & TRACY G
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22	BOWE FAMILY LLC
23	COPP/CHRIS P
24	WANOUS/MICHAEL F & TERESA M



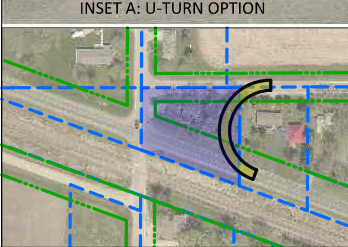
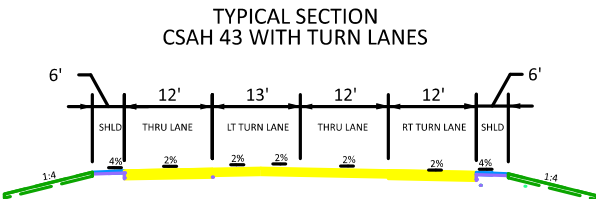
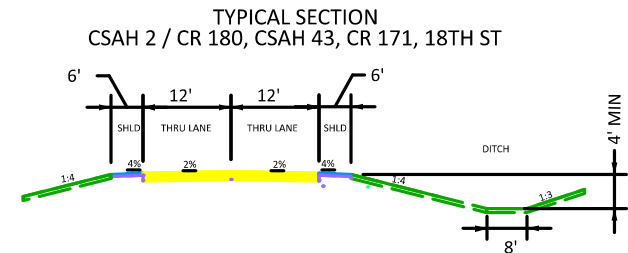
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PLOTTED/REVISED FEB-2025



LEGEND	
	ROADWAYS (INCLUDING TURN LANES)
	RAISED MEDIAN & CURBS
	EXISTING PROPERTY LINE
	SHOULDERS
	CONSTRUCTION LIMITS
	EXISTING ROW
	PROPOSED ROW
	ACCESS CLOSURE
	PROPERTY ACQUISITION

PROPERTY OWNERS	
1	STEELE COUNTY
2	EATON/JOEL M
3	JOHNSON/DENNIS W
4	IVERSON/DENNIS & PATRICIA
5	MILLER/NICHOLAS J & GAYLE ANN MILLER
6	PIEPHO/RICHARD R & DEBRA J
7	SCHAEFER/RICHARD C & LOLETA ALICE
8	BROWN/ROGER D
9	SPATENKA/MARK
10	GATHJE/DARIN R & MICHELLE K
11	JACOBSON/JUDD P & SUSAN L
12	SORENSEN/SCOTT G
13	JENSEN-GALLAHER/KELSEY J
14	PICHNER FAMILY FARMS LLC
15	CHRISTEY/KATHLEEN M
16	SORENSEN/KENNETH E
17	RENCHIN/DENNIS L
18	BELLOWS/PATRICIA L
19	KATH/MATTHEW A & JILL A
20	THAMERT/JOHN R & TRACY G
21	NELSON/JACE G & VALERIE A
22	BOWE FAMILY LLC
23	COPP/CHRIS P
24	WANOUS/MICHAEL F & TERESA M



ALTERNATIVE 4B LAYOUT	
CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS	
STEELE COUNTY, MN	
2025	
S.A.P. XXX-XXX-XXX	

SCALE: AS SHOWN	DRAWN BY: BGC
WHKS PROJECT NO: 10073	CHECKED BY: BWT

Appendix B: Cost Estimates

ALTERNATIVE 1 COST ESTIMATE

Item No	Description	Unit	Total Quantity	Unit Price	Total Item Cost
Roadway					
Base Roadway Items					
2104.504	REMOVE PAVEMENT	SQ YD	6200	\$10.00	\$62,000.00
2106.507	EXCAVATION - COMMON	CU YD	6663	\$15.00	\$99,945.00
2106.507	SELECT GRANULAR EMBANKMENT (CV)	CU YD	3332	\$25.00	\$83,300.00
2106.507	COMMON EMBANKMENT (CV)	CU YD	4997.25	\$7.00	\$34,980.75
2118.509	AGGREGATE SURFACING CLASS 2	TON	682	\$30.00	\$20,460.00
2211.507	AGGREGATE BASE (CV) CLASS 5	CU YD	1599	\$40.00	\$63,960.00
2360.504	TYPE SP 12.5 NON WEARING COURSE MIXTURE	TON	1125	\$100.00	\$112,500.00
2360.509	TYPE SP 12.5 WEARING COURSE MIXTURE	TON	1125	\$100.00	\$112,500.00
2531.503	CONCRETE CURB & GUTTER DESIGN B612	LF	3340	\$35.00	\$116,900.00
2531.503	CONCRETE CURB & GUTTER DESIGN S524	LF	4790	\$35.00	\$167,650.00
2531.504	CONCRETE MEDIAN	SQ YD	1964	\$85.00	\$166,940.00
	INTAKE	EACH	16	\$5,000.00	\$80,000.00
	15" RCP	LF	600	\$120.00	\$72,000.00
	18" RCP	LF	400	\$120.00	\$48,000.00
	24" RCP CULVERT	LF	234	\$130.00	\$30,420.00
	24" RCP APRON	EACH	4	\$1,700.00	\$6,800.00
	CHANNEL SHAPING	LS	1	\$2,000.00	\$2,000.00
	LIGHTING (5% OF ROADWAY ITEMS)	LS	2		\$64,017.79
Roadway Items Subtotal Cost					
Rounded to nearest \$10,000					\$1,340,000.00
Roadway Contingency Cost					
Estimated at 25% Base Roadway Items Subtotal Cost					\$335,000.00
Roadway Mobilization Cost					
Estimated at 10% Base Roadway Items Subtotal Cost					\$134,000.00
Roadway Traffic Control Cost					
Estimated at 5% Base Roadway Items Subtotal Cost					\$67,000.00
Roadway Engineering and Design Cost					
Estimated at 18% Base Roadway Items Subtotal Cost					\$241,200.00
Roadway Right of Way Cost					
Parcel	all parcel costs based on 2024 est. market value plus 25% increase for relocation expenses				
4					\$210,000.00
19					\$530,000.00
12					\$210,000.00
2					\$210,000.00
Building Structure Demolition		EACH	6	\$ 25,000.00	\$150,000.00
Misc. Acreage		ACRE	1.03	\$ 10,000.00	\$10,300.00
Subtotal					\$1,320,000.00
Total Cost					
Rounded to nearest \$10,000					\$3,440,000.00

ALTERNATIVE 2 COST ESTIMATE

Item No	Description	Unit	Total Quantity	Unit Price	Total Item Cost
Roadway					
Base Roadway Items					
2104.504	REMOVE PAVEMENT	SQ YD	6200	\$10.00	\$62,000.00
2106.507	EXCAVATION - COMMON	CU YD	6663	\$15.00	\$99,945.00
2106.507	SELECT GRANULAR EMBANKMENT (CV)	CU YD	3332	\$25.00	\$83,300.00
2106.507	COMMON EMBANKMENT (CV)	CU YD	4997.25	\$7.00	\$34,980.75
2118.509	AGGREGATE SURFACING CLASS 2	TON	682	\$30.00	\$20,460.00
2211.507	AGGREGATE BASE (CV) CLASS 5	CU YD	1599	\$40.00	\$63,960.00
2360.504	TYPE SP 12.5 NON WEARING COURSE MIXTURE	TON	1125	\$100.00	\$112,500.00
2360.509	TYPE SP 12.5 WEARING COURSE MIXTURE	TON	1125	\$100.00	\$112,500.00
2531.503	CONCRETE CURB & GUTTER DESIGN B612	LF	3340	\$35.00	\$116,900.00
2531.503	CONCRETE CURB & GUTTER DESIGN S524	LF	4790	\$35.00	\$167,650.00
2531.504	CONCRETE MEDIAN	SQ YD	1964	\$85.00	\$166,940.00
	INTAKE	EACH	16	\$5,000.00	\$80,000.00
	15" RCP	LF	600	\$120.00	\$72,000.00
	18" RCP	LF	400	\$120.00	\$48,000.00
	24" RCP CULVERT	LF	234	\$130.00	\$30,420.00
	24" RCP APRON	EACH	4	\$1,700.00	\$6,800.00
	CHANNEL SHAPING	LS	1	\$2,000.00	\$2,000.00
	LIGHTING (5% OF ROADWAY ITEMS)	LS	2		\$64,017.79
Roadway Items Subtotal Cost					
Rounded to nearest \$10,000					\$1,340,000.00
Roadway Contingency Cost					
Estimated at 25% Base Roadway Items Subtotal Cost					\$335,000.00
Roadway Mobilization Cost					
Estimated at 10% Base Roadway Items Subtotal Cost					\$134,000.00
Roadway Traffic Control Cost					
Estimated at 5% Base Roadway Items Subtotal Cost					\$67,000.00
Roadway Engineering and Design Cost					
Estimated at 18% Base Roadway Items Subtotal Cost					\$241,200.00
Roadway Right of Way Cost					
Parcel	all parcel costs based on 2024 est. market value plus 25% increase for relocation expenses				
4					\$210,000.00
19					\$530,000.00
12					\$210,000.00
2					\$210,000.00
Building Structure Demolition		EACH	6	\$ 25,000.00	\$150,000.00
Misc. Acreage		ACRE	1.03	\$ 10,000.00	\$10,300.00
Subtotal					\$1,320,000.00
Total Cost					
Rounded to nearest \$10,000					\$3,440,000.00

ALTERNATIVE 3 COST ESTIMATE

Item No	Description	Unit	Total Quantity	Unit Price	Total Item Cost
Roadway					
Roadway Items					
2104.504	REMOVE PAVEMENT	SQ YD	13444	\$10.00	\$134,440.00
2106.507	EXCAVATION - COMMON	CU YD	22785	\$15.00	\$341,775.00
2106.507	SELECT GRANULAR EMBANKMENT (CV)	CU YD	12969	\$25.00	\$324,225.00
2106.507	COMMON EMBANKMENT (CV)	CU YD	9,755	\$7.00	\$68,285.00
2118.509	AGGREGATE SURFACING CLASS 2	TON	741	\$30.00	\$22,230.00
2211.507	AGGREGATE BASE (CV) CLASS 5	CU YD	4323	\$40.00	\$172,920.00
2360.504	TYPE SP 12.5 NON WEARING COURSE MIXTURE	TON	3097	\$100.00	\$309,700.00
2360.509	TYPE SP 12.5 WEARING COURSE MIXTURE	TON	4377	\$100.00	\$437,700.00
	8'x8' PRECAST CONCRETE BOX CULVERT	LF	40	\$1,200.00	\$48,000.00
	8'X8' PRECAST CONCRETE BOX CULVERT END SECTION	EACH	4	\$24,000.00	\$96,000.00
	10'X8' PRECAST CONCRETE BOX CULVERT	LF	20	\$1,600.00	\$32,000.00
	10'X8' PRECAST CONCRETE BOX CULVERT END SECTION	EACH	2	\$33,500.00	\$67,000.00
	24" RCP PIPE CULVERT	LF	125	\$130.00	\$16,250.00
	24" RCP APRON	EACH	3	\$1,700.00	\$5,100.00
	30" RCP PIPE CULVERT	LF	233	\$200.00	\$46,600.00
	30" RCP PIPE APRON	EACH	4	\$2,000.00	\$8,000.00
	48" RCP PIPE CULVERT	LF	98	\$375.00	\$36,750.00
	48" RCP PIPE APRON	EACH	2	\$3,800.00	\$7,600.00
	CHANNEL SHAPING	LS	1	\$3,000.00	\$3,000.00
Roadway Items Subtotal Cost					
	Rounded to nearest \$10,000				\$2,180,000.00
Roadway Contingency Cost					
	Estimated at 20% Base Roadway Items Subtotal Cost				\$436,000.00
Roadway Mobilization Cost					
	Estimated at 10% Base Roadway Items Subtotal Cost				\$218,000.00
Roadway Traffic Control Cost					
	Estimated at 5% Base Roadway Items Subtotal Cost				\$109,000.00
Roadway Engineering and Design Cost					
	Estimated at 18% Base Roadway Items Subtotal Cost				\$392,400.00
Wetland Mitigation Impacts Cost					
		ACRE	0.4	\$51,000.00	\$20,400.00
Right of Way Cost					
Parcel	all parcel costs based on 2024 est. market value plus 25% increase for relocation expenses				
19					\$530,000.00
12					\$210,000.00
2					\$210,000.00
	Building Structure Demolition	EACH	5	\$ 25,000.00	\$125,000.00
	Misc. Acreage	ACRE	6.21	\$ 10,000.00	\$62,100.00
	Subtotal				\$1,140,000.00
Total Cost					
	Rounded to nearest \$10,000				\$4,500,000.00

ALTERNATIVE 4 COST ESTIMATE

Item No	Description	Unit	Total Quantity	Unit Price	Total Item Cost
Roadway					
Base Roadway Items					
2104.504	REMOVE PAVEMENT	SQ YD	17420	\$10.00	\$174,200.00
2106.507	EXCAVATION - COMMON	CU YD	41044	\$15.00	\$615,660.00
2106.507	SELECT GRANULAR EMBANKMENT (CV)	CU YD	18303	\$25.00	\$457,575.00
2106.507	COMMON EMBANKMENT (CV)	CU YD	16,090	\$7.00	\$112,630.00
2118.509	AGGREGATE SURFACING CLASS 2	TON	713	\$30.00	\$21,390.00
2211.507	AGGREGATE BASE (CV) CLASS 5	CU YD	6101	\$40.00	\$244,040.00
2360.504	TYPE SP 12.5 NON WEARING COURSE MIXTURE	TON	4351	\$100.00	\$435,100.00
2360.509	TYPE SP 12.5 WEARING COURSE MIXTURE	TON	6178	\$100.00	\$617,800.00
	8'x6' PRECAST CONCRETE BOX CULVERT	LF	136	\$1,600.00	\$217,600.00
	8'x6' PRECAST CONCRETE BOX CULVERT END SECTION	EACH	4	\$25,000.00	\$100,000.00
	14'x8' PRECAST CONCRETE BOX CULVERT	LF	68	\$2,000.00	\$136,000.00
	14'x8' PRECAST CONCRETE BOX CULVERT END SECTION	EACH	2	\$35,000.00	\$70,000.00
	24" RCP PIPE CULVERT	LF	206	\$130.00	\$26,780.00
	24" RCP APRON	EACH	4	\$1,700.00	\$6,800.00
	30" RCP PIPE CULVERT	LF	118	\$200.00	\$23,600.00
	30" RCP PIPE APRON	EACH	4	\$2,000.00	\$8,000.00
	48" RCP PIPE CULVERT	LF	280	\$375.00	\$105,000.00
	48" RCP PIPE APRON	EACH	4	\$3,800.00	\$15,200.00
	CHANNEL SHAPING	LS	1	\$4,000.00	\$4,000.00
Roadway Items Subtotal Cost					
Rounded to nearest \$10,000					\$3,390,000.00
Roadway Contingency Cost					
Estimated at 20% Base Roadway Items Subtotal Cost					\$678,000.00
Roadway Mobilization Cost					
Estimated at 10% Base Roadway Items Subtotal Cost					\$339,000.00
Roadway Traffic Control Cost					
Estimated at 5% Base Roadway Items Subtotal Cost					\$169,500.00
Roadway Engineering and Design Cost					
Estimated at 18% Base Roadway Items Subtotal Cost					\$610,200.00
Wetland Mitigation Impacts Cost					
		ACRE	1.3	\$51,000.00	\$66,300.00
Right of Way Cost					
Parcel	all parcel costs based on 2024 est. market value plus 25% increase for relocation expenses				
2					\$210,000.00
	Building Structure Demolition	EACH	1	\$ 25,000.00	\$25,000.00
	Misc. Acreage	ACRE	13.41	\$ 10,000.00	\$134,100.00
Subtotal					\$370,000.00
Total Cost					
Rounded to nearest \$10,000					\$5,620,000.00

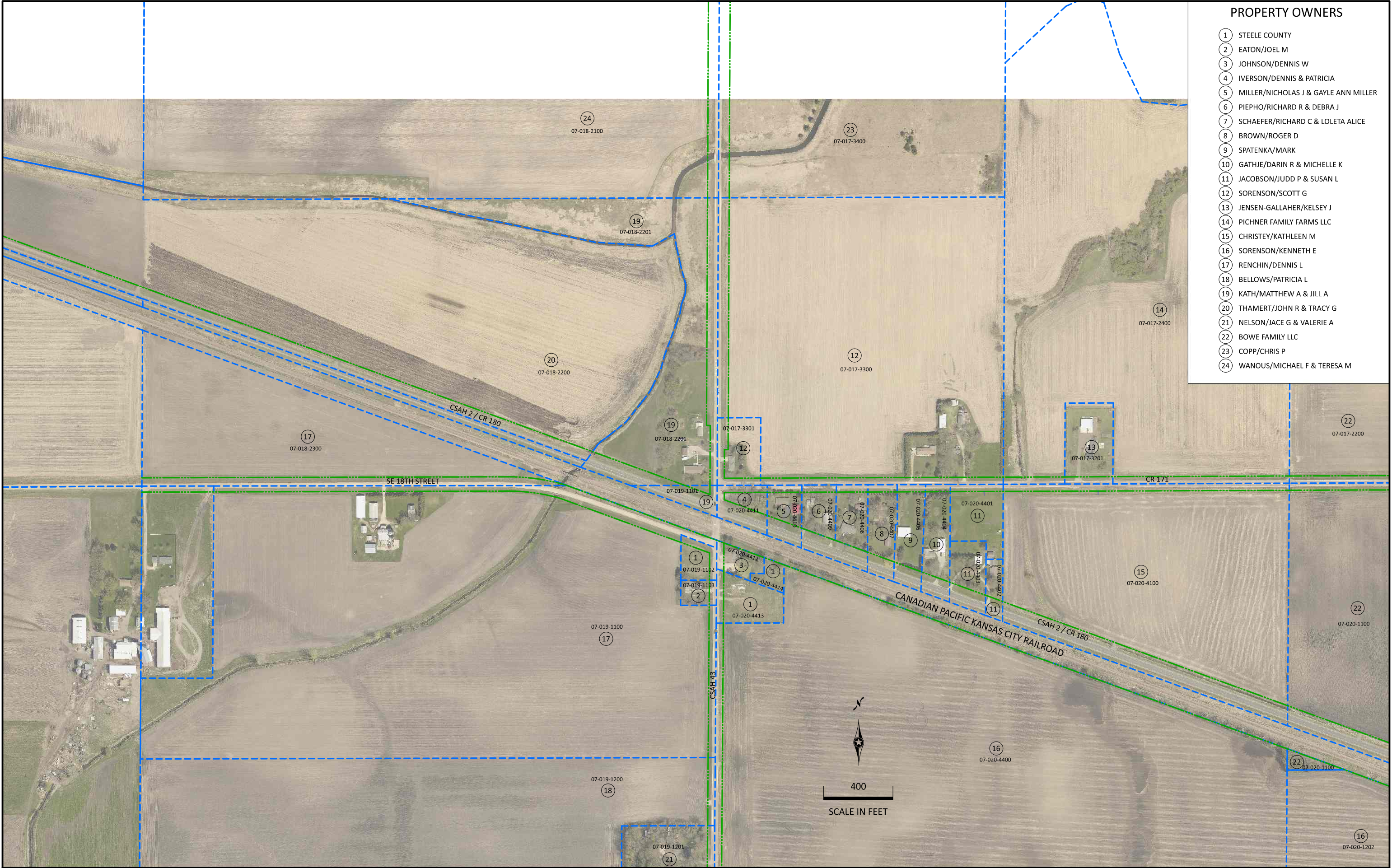
ALTERNATIVE 4B COST ESTIMATE

Item No	Description	Unit	Total Quantity	Unit Price	Total Item Cost
Roadway					
Base Roadway Items					
	Based on 25% increase in roadway length over Alt 4				\$4,237,500.00
Roadway Items Subtotal Cost					
	Rounded to nearest \$10,000				\$4,240,000.00
Roadway Contingency Cost					
	Estimated at 20% Base Roadway Items Subtotal Cost				\$848,000.00
Roadway Mobilization Cost					
	Estimated at 10% Base Roadway Items Subtotal Cost				\$424,000.00
Roadway Traffic Control Cost					
	Estimated at 5% Base Roadway Items Subtotal Cost				\$212,000.00
Roadway Engineering and Design Cost					
	Estimated at 18% Base Roadway Items Subtotal Cost				\$763,200.00
Wetland Mitigation Impacts Cost					
		ACRE	1.25	\$51,000.00	\$63,750.00
Right of Way Cost					
Parcel	all parcel costs based on 2024 est. market value plus 25% increase for relocation expenses				
2					\$210,000.00
	Building Structure Demolition	EACH	1	\$ 25,000.00	\$25,000.00
	Misc. Acreage	ACRE	17.98	\$ 10,000.00	\$179,800.00
Subtotal					\$410,000.00
Total Cost					
	Rounded to nearest \$10,000				\$6,960,000.00

Appendix C: Property Map

PLOTTED/REVISED: 27-FEB-2025

PLOT NAME: Conceptual Layout4 Exhibit



PROPERTY OWNERS

- 1 STEELE COUNTY
- 2 EATON/JOEL M
- 3 JOHNSON/DENNIS W
- 4 IVERSON/DENNIS & PATRICIA
- 5 MILLER/NICHOLAS J & GAYLE ANN MILLER
- 6 PIEPHO/RICHARD R & DEBRA J
- 7 SCHAEFER/RICHARD C & LOLETA ALICE
- 8 BROWN/ROGER D
- 9 SPATENKA/MARK
- 10 GATHJE/DARIN R & MICHELLE K
- 11 JACOBSON/JUDD P & SUSAN L
- 12 SORENSON/SCOTT G
- 13 JENSEN-GALLAHER/KELSEY J
- 14 PICHNER FAMILY FARMS LLC
- 15 CHRISTEY/KATHLEEN M
- 16 SORENSON/KENNETH E
- 17 RENCHIN/DENNIS L
- 18 BELLOWS/PATRICIA L
- 19 KATH/MATTHEW A & JILL A
- 20 THAMERT/JOHN R & TRACY G
- 21 NELSON/JACE G & VALERIE A
- 22 BOWE FAMILY LLC
- 23 COPP/CHRIS P
- 24 WANOUS/MICHAEL F & TERESA M



PROPERTY MAP

CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS

STEELE COUNTY, MN

2025

S.A.P. XXX-XXX-XXX

SCALE: AS SHOWN	DRAWN BY: BGC
WHKS PROJECT NO: 10073	CHECKED BY: BWI

Appendix D: Public Engagement

D.1: Open House #1 Attendance

STEELE COUNTY CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS

Project No. 10073
October 10, 2024
5:00pm – 7:00pm

SIGN-IN SHEET

NAME	REPRESENTING	PHONE NO.	EMAIL
1. Monte Mowry	self	507-455-0913	mowrys/lazy meadows@gmail.com
2. Larry Schubert	HAWANA TOWN SHIP	507 456 6882	
3. John Bowe	HAWANA	507-456-4607	
4. Mark Burnham	HAWANA	507/456-4552	
5. Deb Burnham	"	507/456-4906	
6. Laurie Wolhart	"	507-456-2880	lwolhart@gmail.com
7. Michelle Gathje	Hawana	(507) 475-0837	dmgathje@gmail.com
8. Dawn Gathje	Hawana	(507) 456-0752	dmgathje@gmail.com
9. Richard Schaefer	HAWANA	507 676-0970	RVRRR75@outlook.com
10. Lolera Schaefer	HAWANA	507-676-0825	
11. Susan Johnson	self	507-456-7535	susiebauer58@hotmail.com
12.			
13.			
14.			
15.			

STEELE COUNTY CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS

SIGN-IN SHEET

NAME	REPRESENTING	PHONE NO.	EMAIL
16. ALEX EBENHOH	Self	507 475 1100	ALEX.EBENHOH@GMAIL.COM
17. DENNIS IVERSON	Self	507-475-0519	ddiverson52@gmail.com
18. Patricia Hersel	Self	507-475-0518	LI
19. Lolita Bersefer	Self	507-676-0825	mstingcat333@gmail.com
20. Kim H. H. H.	Self	507-456-2161	kimmmk@ymail.com
21. Lynn Eaton	Self	507-456-0795	llynneatonfamily@hotmail.com
22. Glenn Engstrom	ARM of MN	612-247-3068	gengstrom@armofmn.com
23. Nick Miller	Nick Miller	507-390-1774	
24. John Tracy Thernest		507-456-3857	
25. Jeanne Righner		507-456-8786	
26. Melissa Zimmerman		507 696-1960	lysselynn13@gmail.com
27. Kent Schmidt	Self	507-456-1523	
28.			
29.			
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STEELE COUNTY CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS

Project No. 10073
October 10, 2024
5:00pm – 7:00pm

SIGN-IN SHEET

	NAME	REPRESENTING	PHONE NO.	EMAIL
1.	Scott Sorenson	Scott Sorenson	612 414 7783	SSorenson100@gmail.com
2.	Tom Carowu	Scott Sorenson	607 791-3690	etgourmet@cox.net
3.	Steve Schickling	Scott Sorenson	776-881-1967 cell	Steve.Schickling@gmail.com
4.	Kurt Eastberg	Scott Sorenson	612 244 3224	98catfan@gmail.com
5.	Miller	Mike Miller	507-390-1774	
6.	Thomas Sorenson	Scott Sorenson	612-670-5120	tommy.sorenson100@gmail.com
7.	Steve Sorenson	Scott Sorenson	507 676 7162	STEVE@STEELECOUNTYIA.com
8.	Rich Green	Steele County, MN	507 451-3813	drg@greenmfg.com
9.	Jill & Matt Kath	Kath	507-456-0504	jill.kath@yahoo.com
10.	BRIAN D. SCHMIDT	SELF	507-451-9614	
11.	Angie Jensen	Self	507-456-3885	jensenstroemoung@gmail.com
12.	Dean Schram	Daughter Jensen	507-456-1102	deanschram@gmail.com
13.	Hebey Jensen-Gallagher	Hebey Jensen-Gallagher	507-213-6469	hamilcawen@gmail.com
14.				
15.				

STEELE COUNTY CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS

SIGN-IN SHEET

	NAME	REPRESENTING	PHONE NO.	EMAIL
16.	Greg Krueger	Steele County	507-456-6601	greg.krueger@co.steele.mn.us
17.	James Brady	Steele County	507-202-0804	Jim.Brady@Live.com
18.	Steve Doughty	Steve's Service	507-456-4969	steveservicing@gmail.com
19.	Gale Jorgensen	Self	612-2143723	watersprite57@yahoo.com
20.	Jace + Val Nelson	Self	507-390-2596	jvnelson@yahoo.com
21.				
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D.2: Open House #2 Attendance

STEELE COUNTY CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS

Project No. 10073
January 30, 2025
5:00pm – 7:00pm

SIGN-IN SHEET

NAME	REPRESENTING	PHONE NO.	EMAIL
1. Jim Abbe	Steele County Commission	507-456-0786	
2. LAURIE Wolhart	Clerk, Havana	507-456-2880	havanaclerk@gmail.com
3. LARRY Schubert	Havana Township	507 676 6882	
4. JAKE JACOBSON		507 676 7168	STEELDUST R3@GMAIL.COM
5. GRANT QUAM		507-455-0338	gquam@gmail.com
6. JACKSON KNUDSON	STEELE CO.	507-686-0112	jackson.knudson@steelecounty.mn.gov
7. John Bower		456-4607	BowerJohn1@AOL.com
8. Jeanne Pichner		507-456-8786	JeanneP193@gmail.com
9. Roger Canoll		507-456-5606	None
10. Kent Schmidt		507-456-1523	
11. Gabe Jorgensen		612-214 3723	watersprite57@yahoo.com
12. Lynn & Joel Eaton		507-456-0795	eatonfamily11@hotmail.com
13. Michelle Mathye	Steele	(507) 475-0831	cmgathye@gmail.com
14.			
15.			

STEELE COUNTY CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS

Project No. 10073

January 30, 2025

5:00pm – 7:00pm

SIGN-IN SHEET

	NAME	REPRESENTING	PHONE NO.	EMAIL
1.	Byrl Schaefer	Self + wife	507-676-0970	BURWORD 75 @ Outlook.com
2.	Paul Grochen-		507-259-3039	
3.				
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STEELE COUNTY CSAH 2/CR 180, CSAH 43 & CR 171 INTERSECTION IMPROVEMENTS

Project No. 10073
January 30, 2025
5:00pm – 7:00pm

SIGN-IN SHEET

NAME	REPRESENTING	PHONE NO.	EMAIL
1. Matt & Jill Kath	Matt & Jill Kath	507-475-8551	
2. Tim Nelson	Tim Nelson	507-213-9614	
3. Tanner Kennedy		507-676-7956	
4. Thomas Sorenson	Scott Sorenson	612-670-5120	
5. Mark Spatenko		507-475-1983	
6. Val Nelson		507-390-2596	
7. Melissa Zimmerman			
8. Dennis Karcher		507-457-1277	
9.			
10.			
11.			
12.			
13.			
14.			
15.			

D.3: CPKC Railroad Correspondence

Brandyn Chezick

From: Brandon Theobald
Sent: Monday, December 2, 2024 4:22 PM
To: Brandyn Chezick
Cc: Eric Tott
Subject: FW: [EXTERNAL] FW: 193376B, Waseca Subdivision MP 83.9

Brandon Theobald, P.E. | Associate
Voice: 507.288.3923 | www.whks.com



From: Sponholz, Paul <Paul.Sponholz@SteeleCountyMN.gov>
Sent: Monday, December 2, 2024 3:31 PM
To: Brandon Theobald <BTheobald@Whks.com>
Subject: [EXTERNAL] FW: 193376B, Waseca Subdivision MP 83.9

Brandon,

CPKC prefers Concept 4. I also talked to Brian over the phone before he sent this email. Concepts 2 & 3 aren't desirable to him with the turn lanes over the track and the potential of traffic queues sitting on the track.

Paul Sponholz, P.E. | County Engineer

Steele County | PO Box 890, 3000 Hoffman Dr NW, Owatonna, MN 55060-0890
O: (507) 444-7671 | M: (507) 475-2253 | Paul.Sponholz@SteeleCountyMN.gov

From: Brian Osborne <Brian.Osborne@cpkcr.com>
Sent: Monday, December 2, 2024 3:27 PM
To: Sponholz, Paul <Paul.Sponholz@SteeleCountyMN.gov>
Cc: Larry Lloyd <Larry.Lloyd@cpkcr.com>; Daniel Sabatka (<Daniel_Sabatka@cpr.ca> <Daniel_Sabatka@cpr.ca>
Subject: RE: 193376B, Waseca Subdivision MP 83.9

Paul,
After receiving the plans CPKC would go with option 4 than 3. Option 4 just has better turn lanes for traffic by the tracks. It also has room for an overpass in the future.

Thank You

Brian Osborne
Manager of Public Works
120 South 6th Street Suite 700

MPLS, MN 55402
Cell-612-760-2945



NEW EMAIL ADDRESS: Brian.Osborne@cpkcr.com

Canadian Pacific Emergency Number: 1-800-716-9132
Canadian Pacific Call-Before-You-Dig: 1-866-291-0741
Call-Before-You-Dig National Hotline: 811

For Faster Processing, Please Use The FRA Public Data Base to Find Subdivision and Mile Post
<https://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/Crossing/Crossing.aspx>

All Utility Permits and Utility Crossing Permits Must Be Submitted at
https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12

Permits@kcsouthern.com

From: Sponholz, Paul <Paul.Sponholz@SteeleCountyMN.gov>
Sent: Tuesday, November 26, 2024 10:08 AM
To: Brian Osborne <Brian.Osborne@cpkcr.com>
Cc: Larry Lloyd <Larry.Lloyd@cpkcr.com>; Daniel Sabatka (<Daniel_Sabatka@cpr.ca> <Daniel_Sabatka@cpr.ca>
Subject: 193376B, Waseca Subdivision MP 83.9

This Message Is From an External Sender

This email did not originate from CPKC. Please exercise caution with any links or attachments.

Brian,

We are working on another project near or across the subject rail crossing to make some safety improvements with construction scheduled for 2026. This intersection in the unincorporated village of Havana is one of most hazardous intersections in the county; including a truck vs train crash in 2019. The intersection has seen a significant increase in traffic with the expansion of US 14, closure of several other area rail crossings. It especially takes a lot grain truck traffic headed to the Al Corn Ethanol Plant to the east near Claremont which is serviced by this rail line.

We'll be realigning the intersections of CSAH 2 (Claremont Rd), CSAH 43, CR 180 and CR 171 to combine and spread out the distance between intersections and rail crossing, and remove skews if possible.

Would you provide comments on the 4 concepts attached to help us determine a preferred option, preferably by December 13? If you'd like, we can set up a Teams meeting to discuss.

In summary the concepts are:

Concept 1: Roundabout. Yield line is approximately 150 feet from the center of the track. No change at the crossing. Impacts to residential properties are very high, so we are unlikely to choose this option.

Concept 2: Realign CSAH 2/CR 180 to CR 171, combines intersection and moves it about 200 feet from the center of track. Increases width of crossing to about 70 feet with the skew (includes four 12' lanes (two thru and two turn lanes) with two 6' shoulders). Turn lanes would be over the track, so could introduce occasional queuing of traffic over track.

Concept 3: Realign CSAH 2/CR 180 to about 90 feet north of CR 171, combines intersection and moves it about 290 feet from the center of track. Increases width of crossing to about 70 feet with the skew (includes four 12' lanes (two thru and two turn lanes) with two 6' shoulders). Turn lanes would be over the track, but near their beginning compared to Concept 2. Traffic less likely to queue over track, but still possible.

Concept 4: Realign CSAH 2/CR 180 to CR 171, combines intersection and moves it about 950 feet from the center of track. No changes necessary for the crossing. Turn lanes are north of the track. Significant farmland impacts, but this is looking to be our preferred option for many reasons. And it appears to have the least impact on the railroad.

Currently the crossing is controlled passively by stop signs. The intersection to the north is also controlled by a stop sign, so currently, trucks stopping for CSAH 2/CR 180/Claremont Rd have their trailer over the track when waiting for clearing the road. If the railroad is supportive, we are supportive of seeing if a diagnostic would change this to gates and flashing lights, and then fund the crossing controls with a federal or state crossing improvement program.





Paul Sponholz, P.E. | County Engineer

Steele County | PO Box 890, 3000 Hoffman Dr NW, Owatonna, MN 55060-0890

O: (507) 444-7671 | M: (507) 475-2253 | Paul.Sponholz@SteeleCountyMN.gov

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Appendix E: Decision Matrix

Concept Comparison Matrix



Steele County | CSAH 2/CR 180, CSAH 43 & CR 171 Intersection Improvements

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Roadway	Existing roadway alignment. Roundabout intersection control.	Shift roadway alignment north to CR 171. Two-way stop intersection control.	Shift roadway alignment slightly north of CR 171. Two-way stop intersection control.	Shift roadway alignment farther north of CR 171. Two-way stop intersection control.
Considerations				
Geometrics	Curved approaches to reduce driver speed entering the intersection. Existing intersection skew remains. No increase in storage space between intersection and RR crossing. ●	Reduce number of intersections near RR crossing. Remove intersection skew. Additional storage space for vehicles between intersection and RR crossing. CSAH 43 turn lanes extend through RR crossing. Room for future improvements to intersection. ●	Reduce number of intersections near RR crossing. Remove intersection skew. Increased additional storage space for vehicles between intersection and RR crossing. CSAH 43 turn lanes extend through RR crossing. Room for future improvements to intersection. ●	Reduce number of intersections near RR crossing. Remove intersection skew. Greatest additional storage space for vehicles between intersection and RR crossing. Shift CSAH 43 turn lanes north, avoiding impacts to the RR crossing. Room for future RR overpass and improvements to intersection. ●
Right of Way Acquisition	Most residential property acquisition. Minimal farmland acquisition. ●	Moderate residential property acquisition, moderate farmland property acquisition. ●	Major residential property acquisition, major farmland property acquisition. ●	Minimal residential properties, most farmland property. ●
Relocations	Relocation required for four property owners. ●	Relocation required for four property owners including one multi-resident apartment building. ●	Relocation required for three property owners. ●	Relocation required for one property owner. Owner has previously contacted County to discuss sale of property. ●
Cost	\$3,440,000 ●	\$4,710,000 ●	\$4,500,000 ●	\$5,620,000 ●

Visual Ranking

- Most Feature Improvement/Least Considerations
 ● Some Feature Improvement/Some Considerations
 ● Less Improvement/Major Considerations
 ● Least Feature Improvement/Most Considerations



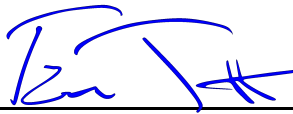
Appendix F: ICE Report

**INTERSECTION CONTROL EVALUATION REPORT
FOR
CSAH 2/CR 180, CSAH 43, and CR 171**

HAVANA, MINNESOTA

Prepared for:
Steele County, MN
2025

I hereby certify that this plan, specification or report
was prepared by me or under my direct supervision
and that I am a duly Licensed Professional Engineer
under the laws of the State of Minnesota.



Eric J. Tott, P.E., PTOE

02-24-2025

Date

54543

License. No.



whks

engineers + planners + land surveyors

Table of Contents

Project Description	3
Intersection Location	3
Existing Intersection Characteristics.....	4
Proposed Configurations.....	5
Alternative 1:	5
Alternative 2:	6
Alternative 3:	6
Alternative 4:	7
Traffic Volumes	7
Existing Traffic.....	7
Traffic Changes Due to Planned Roadway Improvements.....	9
Traffic Redistribution Based on Proposed Alternatives	9
Intersection Analyses.....	12
Capacity Analysis.....	13
Alternative 1	13
Alternatives 2-4: Side-Street Stop Control	13
Alternatives 2-4: Multi-Way Stop Control	14
Alternatives 2-4: Traffic Signal Control.....	14
Safety Analysis	15
Alternative 1	15
Alternatives 2-4	15
Warrant Analysis	16
Site Review	17
Findings and Recommendations	18
Capacity Analysis.....	18
Alternative 1	18
Alternatives 2-4.....	18
Safety Analysis	18
Alternative 1	18
Alternatives 2-4.....	18
Warrant Analysis.....	18
Summary of Findings.....	19
References	20

Appendix

Appendix A Traffic Count Data

Appendix B Intersection Capacity Analysis Reports

Appendix C Intersection Capacity Analysis Reports

Appendix D Intersection Capacity Analysis Reports

Appendix E Intersection Capacity Analysis Reports

Appendix F Crash Data

Appendix G Warrants

Appendix H Alternative Exhibits

Project Description

An intersection control evaluation (ICE) report has been prepared for the intersection of CSAH 2/CR 180, CSAH 43, and CR 171 in Steele County, Minnesota. The report applies the signal justification warrants, as outlined in the *Minnesota Manual on Uniform Traffic Control Devices (MUTCD)* and uses engineering methods outlined in the *Highway Capacity Manual, 6th Edition*. Several alternative layouts for the intersection have been proposed and analyzed in this report, including the findings of different traffic control evaluations.

The purpose of the report is to determine which type of intersection control is the most beneficial for the intersection. Specifically, this report will evaluate whether side-street stop, multi-way stop, traffic signal, or a roundabout is the most beneficial method of traffic control for the intersection.

Intersection Location

The intersections of SE 44th Avenue (CSAH 43) with CR 171, CSAH 2/CR 180, and 18th Street are located in the City of Havana, Minnesota. The study area lies in the east central region of Steele County. Currently, the area surrounding the intersection is mixed agricultural / residential (See Figure 1).



Figure 1 – Location Map

Existing Intersection Characteristics

CSAH 43 / CR 171 Intersection

The CSAH 43 / CR 171 intersection is a three-legged intersection. CSAH 43 is a north-south route. The side street, CR 171 is an east-west route with stop control on CR 171. All approaches to are two-lane roadways with no additional turn lanes. There are several entrances near the intersection for residential properties.

CSAH 43 / CSAH 2/CR 180 Intersection

The CSAH 43 / CSAH 2/CR 180 intersection is a skewed four-legged intersection. CSAH 43 is a north-south route with stop control on CSAH 43. CSAH 2/CR 180 is an east-west route. All approaches to are two-lane roadways with no additional turn lanes. There is a residential entrance in the northeast quadrant of the intersection and a skewed railroad crossing on the south leg of the intersection.

CSAH 43 / 18th Street Intersection

The CSAH 43 / 18th Street intersection is a three-legged intersection. CSAH 43 is a north-south route. The side street, 18th Street is an east-west route with stop control on 18th Street. All approaches to are two-lane roadways with no additional turn lanes. There are several entrances near the intersection for residential properties and a skewed railroad crossing on the north leg of the intersection.

All three intersections and the railroad crossing are closely spaced.

Proposed Configurations

Four alternative layouts for this intersection are being proposed and analyzed in this report.

Alternative 1:

Alternative 1 consists of a 5-leg roundabout connecting CSAH 43, CSAH 2/CR 180 and CR 171. Alternative 1 includes rerouting SE 18th Street to the south to remove the skew of the intersection (see Figure 2). For a full-size print of the alternative, see Appendix H.

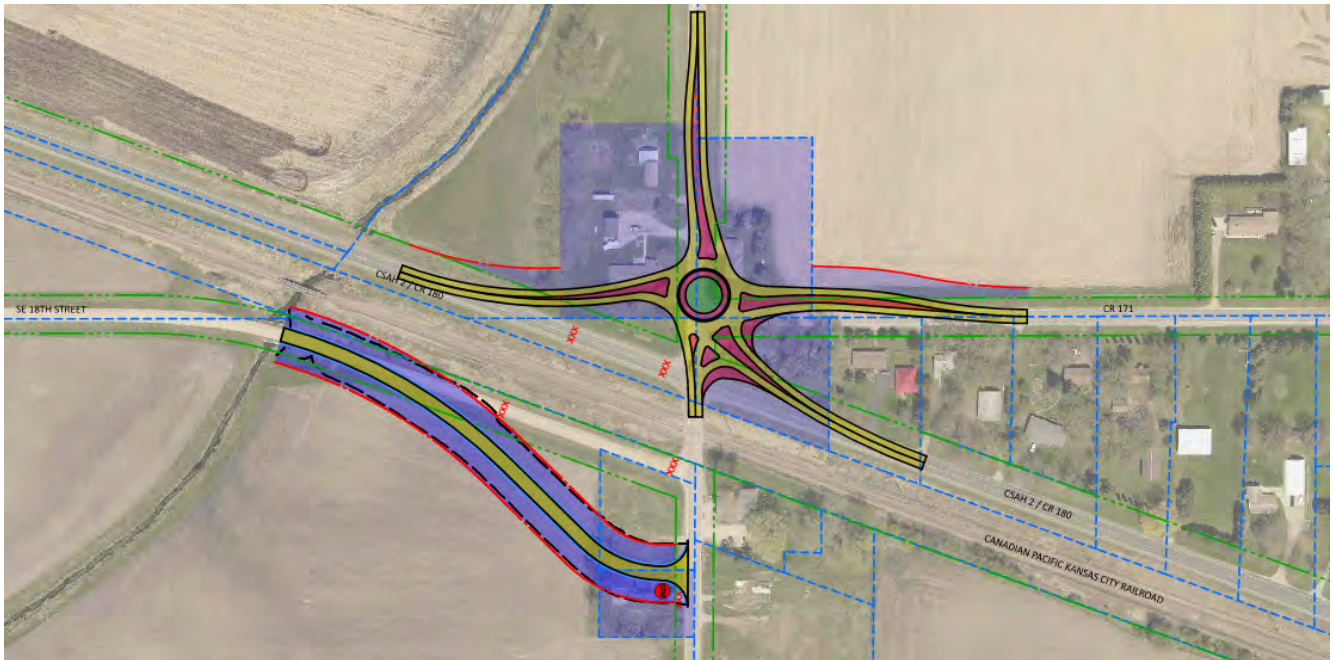


Figure 2 – Alternative 1

Alternative 2:

Alternative 2 consists of a new realigned intersection of CSAH 43, CSAH 2/CR 180 and CR 171 with the stop control switched from CSAH 43 to CSAH 2/CR 180 and CR 171. Alternative 2 includes rerouting SE 18th Street to the south to remove the skew of the intersection (see Figure 3). For a full-size print of the alternative, see Appendix H.

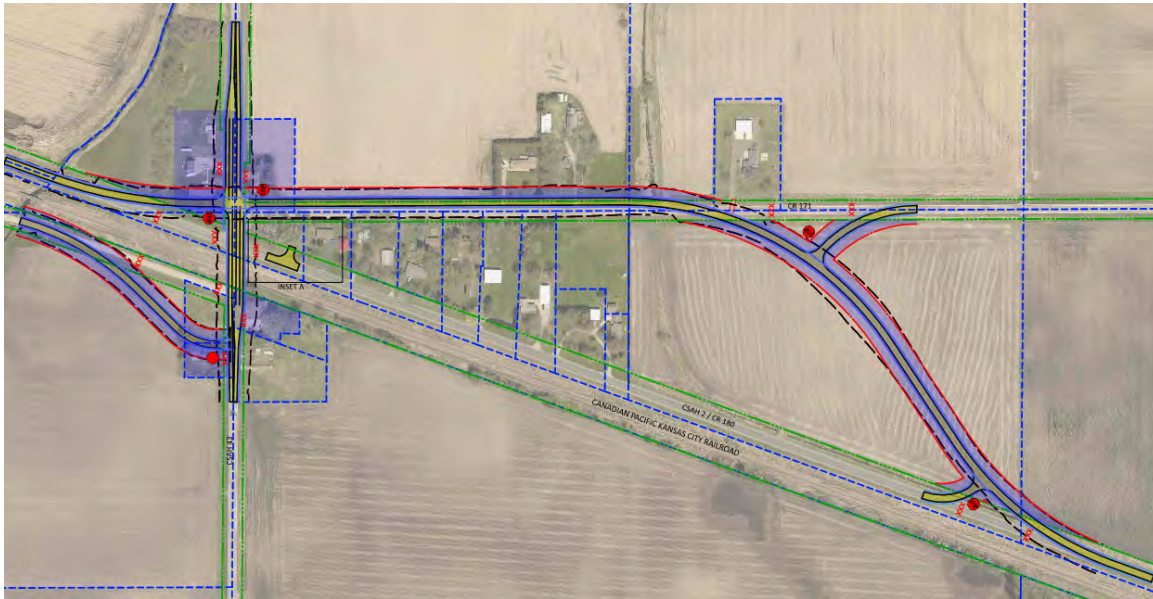


Figure 3 – Alternative 2

Alternative 3:

Alternative 3 consists of a new realigned intersection of CSAH 43, CSAH 2/CR 180 and CR 171 with the stop control switched from CSAH 43 to CSAH 2/CR 180 and CR 171. Alternative 3 includes rerouting SE 18th Street to the south to remove the skew of the intersection (see Figure 4). For a full-size print of the alternative, see Appendix H.

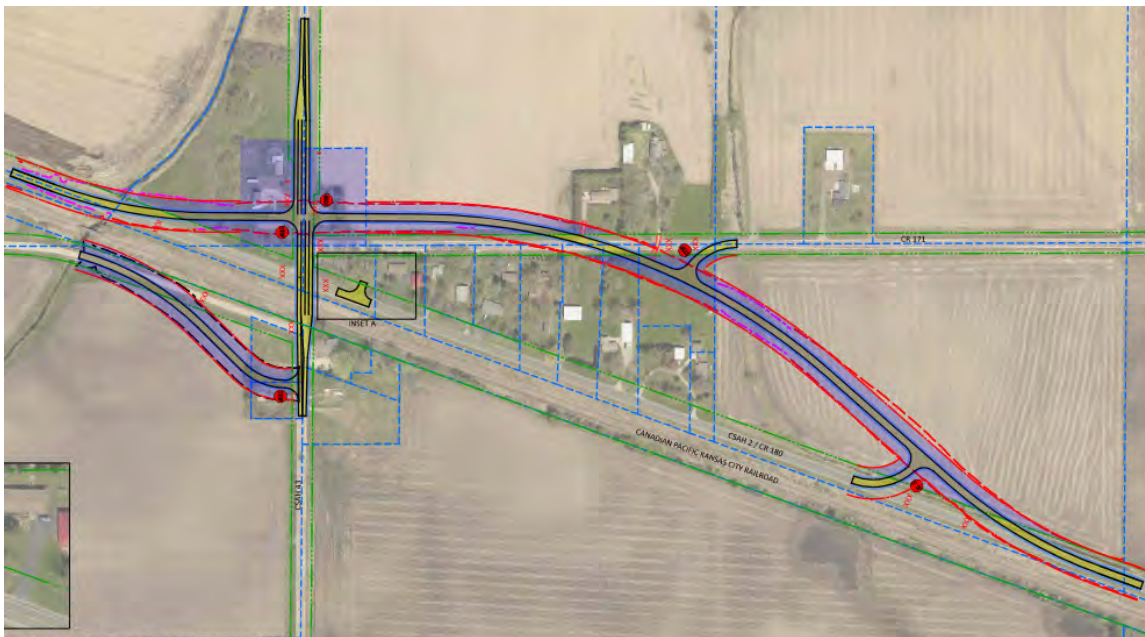


Figure 4 – Alternative 3

Alternative 4:

Alternative 4 consists of a new realigned intersection of CSAH 43, CSAH 2/CR 180 and CR 171 with the stop control switched from CSAH 43 to CSAH 2/CR 180 and CR 171. Alternative 4 includes rerouting SE 18th Street to the south to remove the skew of the intersection (see Figure 5). For a full-size print of the alternative, see Appendix H.

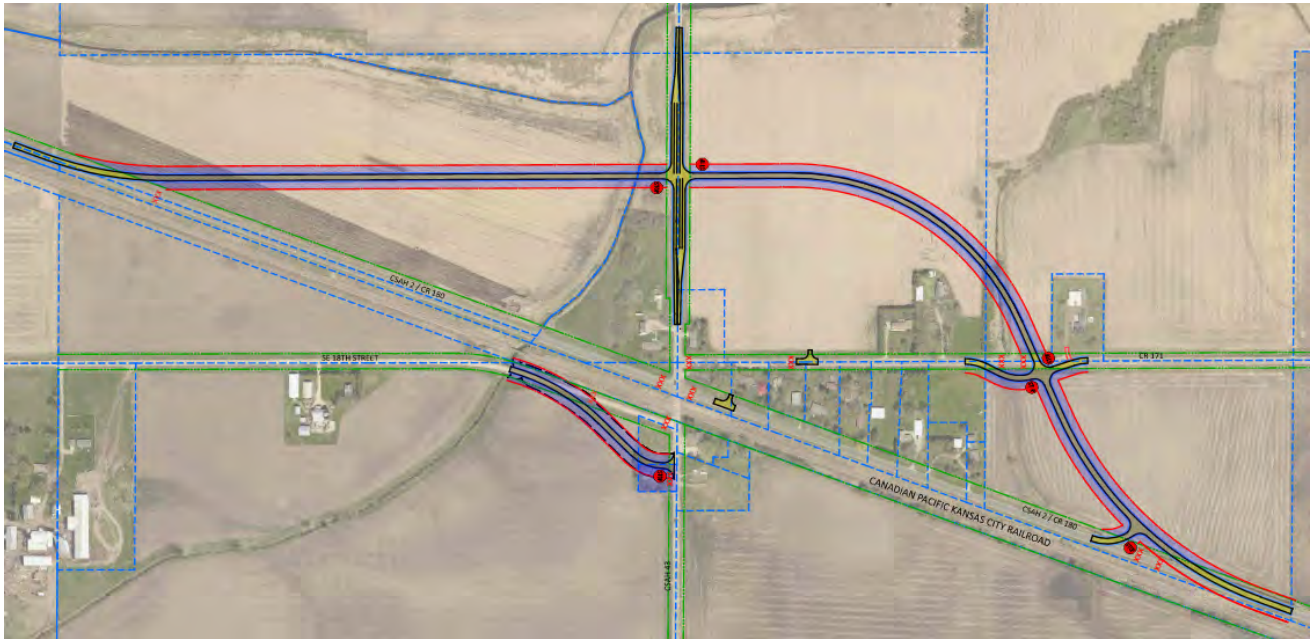
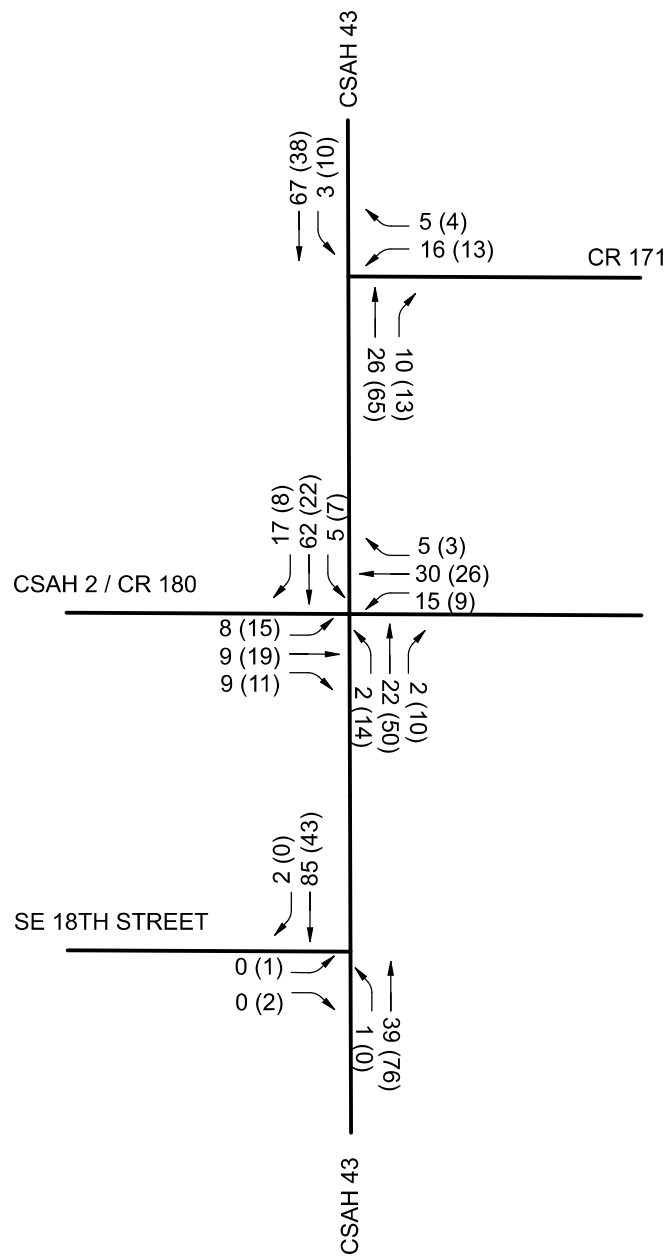


Figure 5 – Alternative 4

Traffic Volumes

Existing Traffic

Directional intersection traffic volumes were obtained from intersection traffic counts performed on Tuesday, May 21, 2024 (see Appendix A for the traffic count data). Traffic counts were performed from 6:00 AM to 7:00 PM. See Figure 6 for the peak hour traffic volumes.



NOT TO SCALE

LEGEND

MOVEMENT DESIGNATION

22 (45) AM (PM) PEAK HOUR TRAFFIC VOLUME

CSAH 2/CR 180, CSAH 43, and CR 171

EXISTING
PEAK HOUR TRAFFIC

STEELE COUNTY, MN

FIGURE 6

whks
engineers + planners + land surveyors

Traffic Changes Due to Planned Roadway Improvements

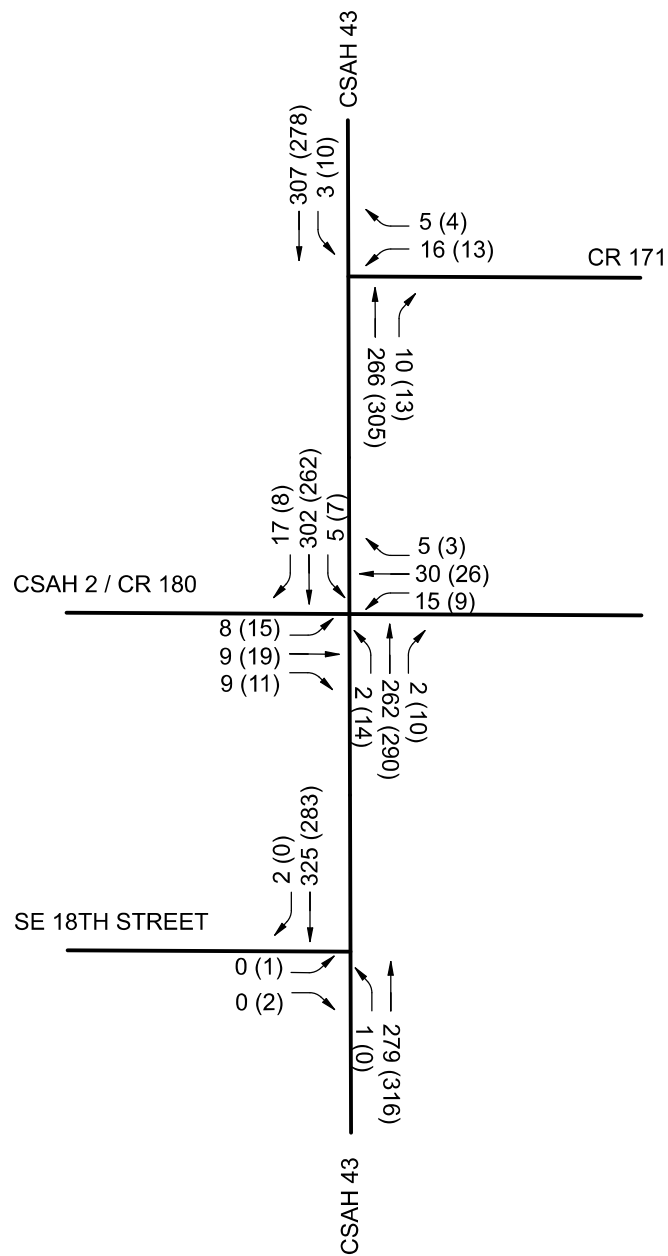
Previous corridor studies have indicated there will be an increase of traffic on CSAH 43 due to planned residential growth on the east side of the City of Owatonna.

The County is anticipating making improvements to CR 180 at a railroad underpass to the west. Currently the underpass is restricted to a 12-foot vertical clearance. The project will update the road to meet current clearance standards of at least 14' 6" or more. That change would encourage more truck traffic to utilize CR 180/CSAH 2.

It is estimated that in 2030, the average daily traffic (ADT) on CSAH 43 will be 5,500. Based on the traffic counts taken as part of this study, the current ADT on CSAH 43 is 1,500. Using a 1% compound growth factor, the ADT volumes were factored up to obtain design year (2044) volumes. The estimated 2044 ADT for CSAH 43 is approximately 6,300. The additional traffic was converted from ADT to hourly traffic using a K factor of 0.10. The future traffic volumes are shown in Figure 7.

Traffic Redistribution Based on Proposed Alternatives

Based on the proposed alternatives, the traffic was redistributed to analyze each alternative. Alternatives 2 through 4 have the same redistribution (see Figure 8 for the redistributed traffic).



NOT TO SCALE

LEGEND

MOVEMENT DESIGNATION

22 (45) AM (PM) PEAK HOUR TRAFFIC VOLUME

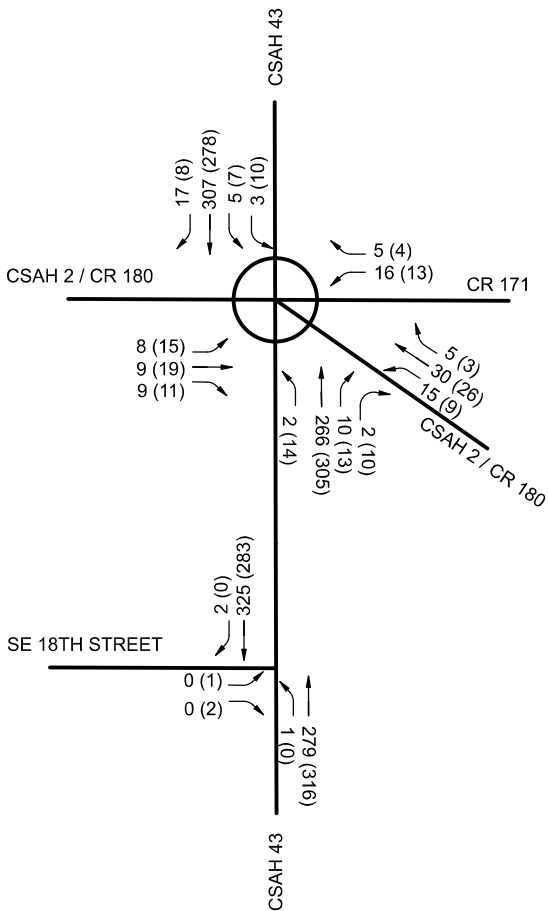
CSAH 2/CR 180, CSAH 43, and CR 171

2044
PEAK HOUR TRAFFIC

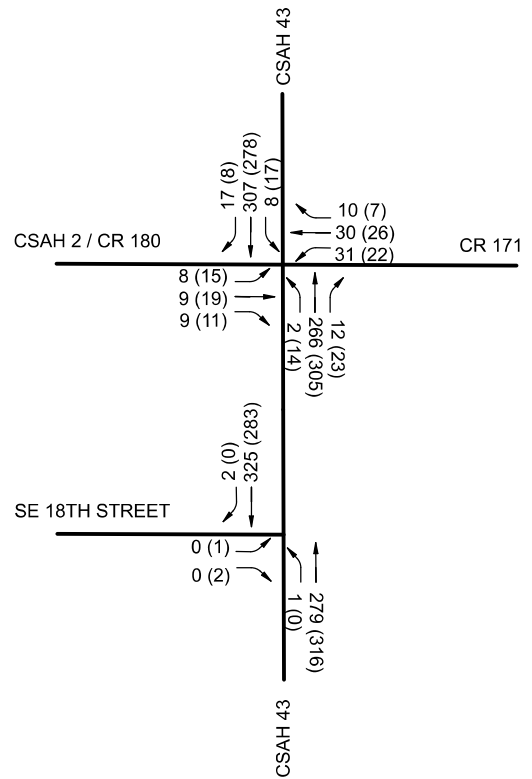
STEELE COUNTY, MN

FIGURE 7

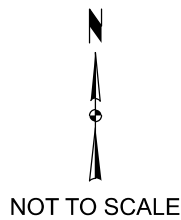
whks
engineers + planners + land surveyors



ALTERNATIVE 1



ALTERNATIVES 2-4



LEGEND

➔ MOVEMENT DESIGNATION

← 22 (45) AM (PM) PEAK HOUR TRAFFIC VOLUME

CSAH 2/CR 180, CSAH 43, and CR 171

REDISTRIBUTED 2044
PEAK HOUR TRAFFIC

STEELE COUNTY, MN

FIGURE 8



Intersection Analyses

The capacity of the intersections was analyzed using the procedures outlined in the *Highway Capacity Manual, 7th Edition (HCM)*, the intersections were modeled using Synchro Studio 11 with SimTraffic 11 and Sidra Intersection 9.1.

Level of Service (LOS) at intersections is primarily a function of peak hour turning movement volumes, intersection lane configuration, and traffic control. For intersection analysis, the *HCM* defines LOS in terms of the average control delay at the intersection in seconds per vehicle. Level of service is broken down into letter grades, with LOS A representing good operations and LOS F representing poor operations. LOS E is considered to be at capacity. Table 1 shows the level of service correlations to seconds of delay for signalized intersections and stop control (unsignalized) intersections. Currently in the United States, roundabout control is also categorized as unsignalized.

LOS	Signalized Intersection Control Delay (seconds/vehicle)	Unsignalized Intersection Control Delay (seconds/vehicle)
A	≤ 10 sec.	≤ 10 sec.
B	10 - 20 sec.	10 - 15 sec.
C	20 - 35 sec.	15 - 25 sec.
D	35 - 55 sec.	25 - 35 sec.
E	55 - 80 sec.	35 - 50 sec.
F	> 80 sec.	> 50 sec.

Table 1 – Intersection LOS Criteria

Capacity Analysis

The proposed alternatives were analyzed using the Synchro/SimTraffic and Sidra Intersection software programs, which uses the *Highway Capacity Manual (HCM)* methodology. The intersections were analyzed using the 2044 traffic volumes. Alternatives 2 through 4 have the same redistribution and will result in the same capacity.

Alternative 1

For Alternative 1, roundabout control and side-street stop control were analyzed. Based on the analysis, it has been determined that roundabout control connecting CSAH 43, CSAH 2/CR 180, and CR 171 in addition of a side-street stop control for 18th Street/CSAH 43, is acceptable. A summary of the detailed LOS results is shown in Appendix B.

Alternative 1 Level of Service					
		CSAH 2/CR 180, CR 171/CSAH 43, CSAH 43		18th Street/CSAH 43	
		AM	PM	AM	PM
APPROACH	NB	A	A	A	A
	SB	A	A	A	A
	EB	A	B	A	B
	WB	A	A	-	-
	NWB	A	A	-	-
Intersection LOS		A	A	A	A

Table 2 – Alternative 1 LOS Summary

Alternatives 2-4: Side-Street Stop Control

For Alternatives 2-4, side-street stop control was analyzed. Based on the analysis, it has been determined that side-street stop control at the intersection connecting CSAH 43, CSAH 2/CR 180, and CR 171 in addition of a side-street stop control for 18th Street/CSAH 43, is acceptable. A summary of the detailed LOS results is shown in Appendix C.

Alternatives 2-4 Level of Service					
		CSAH 2/CR 180, CR 171/CSAH 43, CSAH 43		18th Street/CSAH 43	
		AM	PM	AM	PM
APPROACH	NB	A	A	A	A
	SB	A	A	A	A
	EB	B	C	A	B
	WB	C	C	-	-
Intersection LOS		-	-	A	A

Table 3 – Alternatives 2-4 LOS Summary

Alternatives 2-4: Multi-Way Stop Control

For Alternatives 2-4, multi-way stop control at the intersection connecting CSAH 43, CSAH 2/CR 180, and CR 171 in addition of a side-street stop control for 18th Street/CSAH 43, is acceptable. A summary of the detailed LOS results is shown in Appendix D.

Alternatives 2-4 Level of Service			
		CSAH 2/CR 180, CR 171/CSAH 43, CSAH 43	
		AM	PM
APPROACH	NB	B	B
	SB	B	B
	EB	A	A
	WB	B	B
Intersection LOS		B	B

Table 4 – Alternatives 2-4 LOS Summary

Alternatives 2-4: Traffic Signal Control

For Alternatives 2-4, traffic signal control at the intersection connecting CSAH 43, CSAH 2/CR 180, and CR 171 in addition of a side-street stop control for 18th Street/CSAH 43, is acceptable. A summary of the detailed LOS results is shown in Appendix E.

Alternatives 2-4 Level of Service			
		CSAH 2/CR 180, CR 171/CSAH 43, CSAH 43	
		AM	PM
APPROACH	NB	B	B
	SB	B	B
	EB	A	A
	WB	A	A
Intersection LOS		B	B

Table 5 – Alternatives 2-4 LOS Summary

Safety Analysis

Crash data was obtained from the Minnesota Department of Transportation (MnDOT) showing fifteen recorded crashes at the three intersections between 2014 and 2024. The majority of crashes were angle (47%), other (27%), and single vehicle run off road (13%). There were four minor injury crashes, four possible injury crashes, and seven property damage crashes. Four crashes were at the CR 171 intersection. Nine crashes were at the CSAH 2/CR 180 intersection. Two crashes were at the 18th Street intersection. See Appendix F for the detailed crash data.

MnDOT provides an online calculator⁽⁴⁾ to determine the intersection crash rate per million vehicles entering the intersection. MnDOT has a crash rate goal of 1.0 crash per million entering vehicles (MEV) for all intersections.

The 2040 Transportation Plan identified the intersection as the top ranked crash location in the County based on 2016-2020 crash data. The current traffic counts and crash data were entered into the MnDOT crash calculator with the following results:

Intersection Crash Rate = per million entering vehicles

Based on the crash data provided at this location, there is a need to address safety issues. Angle crashes are severe crash types at high speeds.

Alternative 1

The proposed 5-leg roundabout combines two closely spaced skewed intersections and reduces the number of conflict points.

Studies show that roundabout control improves safety in the following ways:

1. Slower vehicle speeds
2. Decreased number of conflict points
3. Reduction of accident severity

Installing a roundabout is an accepted traffic calming technique which is achieved by controlling geometrics. Speed reduction can be realized at all times of the day and during various traffic volumes. Roundabout control is a flexible type of control that handles varying traffic volumes efficiently.

Installing a roundabout may reduce crashes by 44% (p. 30, DRCRF⁽¹⁾) and may reduce property damage only crashes by 42% and injuries by 82% (p. 31, DRCRF⁽¹⁾). Actual crash reductions vary due to site-specific factors.

The rerouting of SE 18th Street to the south to remove the skew of the intersection may also reduce crashes by 9% (p. 33, DRCRF⁽¹⁾).

Alternatives 2-4

The new realigned intersection of CSAH 43, CSAH 2/CR 180, and CR 171 will remove the skew and increase the separation from the railroad crossing. The new realigned intersection combines two closely spaced intersections, reducing the overall number of conflict points. Turn lanes will also be added on CSAH 43 to remove turning traffic from the through movement.

The rerouting of SE 18th Street to the south to remove the skew of the intersection may also reduce crashes by 9% (p. 33, DRCRF⁽¹⁾).



Warrant Analysis

A warrant analysis was performed in accordance with the *Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD)* utilizing Highway Capacity Software (HCS). There are no warrants for the installation of roundabouts. However, MnDOT's current policy states that roundabouts are considered warranted if traffic volumes meet the criteria for either multi-way stop or traffic signal control warrants. The peak hour traffic was also analyzed using the NCHRP report 825 Exhibit 17⁽³⁾.

Multi-way stop control warrants:

1. Crash Experience
2. Sight Distance
3. Transition to Signal or Roundabout
4. 8-Hour Volume
5. Other

Signal control warrants:

1. 8-Hour Volume
2. 4-Hour Volume
3. Peak Hour
4. Pedestrian Volume
5. School Crossing
6. Coordinated Signal System
7. Crash Experience
8. Roadway Network
9. Intersection Near a Grade Crossing

Multi-way stop warrants 1 through 5 are not met.

Signal control warrants 1 through 8 are not met. There are currently 5 trains a day at the grade crossing. Signal warrant 9 will be met if the future traffic is observed and the existing intersection configuration is not improved. The existing queue distance is approximately 65 feet and meets the requirements for existing traffic. To meet the needs of the future traffic, 130 feet of queue distance will be required. All proposed alternatives will meet the queue requirement.

NCHRP report 825 Exhibit 17 suggests that two-way stop control is appropriate for all proposed alternatives.

A summary of the warrant analysis is shown in Appendix G

Site Review

Right of Way

All four Alternatives will require additional right-of-way (ROW) to be constructed.

Alternative 1 will require the acquisition of approximately 17 acres of property and result in the relocation of four single-family residential houses.

Alternative 2 will require the acquisition of approximately 22 acres of ROW and result in the relocation of three single-family residential houses and one multi-family apartment unit.

Alternative 3 will require the acquisition of approximately 21 acres of ROW and result in the relocation of three single-family residential houses.

Alternative 4 will require the acquisition of approximately 14 acres of ROW and the relocation of one single-family residential house.

Cost Analysis

The estimated construction cost for Alternative 1 is estimated to be \$3,440,000.

The estimated construction cost for Alternative 2 is estimated to be \$4,710,000.

The estimated construction cost for Alternative 3 is estimated to be \$4,500,000.

The estimated construction cost for Alternative 4 is estimated to be \$5,620,000.

Findings and Recommendations

Capacity Analysis

Alternative 1

It has been determined that roundabout control for CSAH 2/CR 180 / CR 171 / CSAH 43, and side-street stop control for 18th Street/CSAH 43 is acceptable.

Alternatives 2-4

It has been determined that side-street stop, multi-way stop, and traffic signal control for CSAH 2/CR 180 / CR 171, and CSAH 43 is acceptable. Side-street stop control for 18th Street/CSAH 43 is acceptable.

Safety Analysis

Based on the crash data provided at this location, there is a need to address safety issues. Angle crashes are severe crash types at high speeds. Using the MNDOT crash calculator, an Intersection Crash Rate of 1.81 was calculated. MnDOT has a crash rate goal of 1.0 crash per million entering vehicles (MEV) for all intersections.

Alternative 1

Roundabouts offer significant safety benefits including an overall reduction in vehicle speed, elimination of dangerous intersection conditions such as stop sign running, and removes serious conflict points including angle, left-turn, and head-on crashes.⁽²⁾

Alternatives 2-4

The new realigned intersection of CSAH 43, CSAH 2/CR 180, and CR 171 will remove the skew and increase the separation from the railroad crossing. The new realigned intersection combines two closely spaced intersections, reducing the overall number of conflict points. Turn lanes will also be added on CSAH 43 to remove turning traffic from the through movement.

Warrant Analysis

Multi-way stop warrants are not met. It is not recommended that multi-way stop be implemented if unwarranted. Multi-way stop control is suitable only at intersections with moderate and relatively balanced volume levels on the intersection approaches. Under other conditions, the use of Multi-way stop control may create unnecessary delays and aggressive driver behavior. Not every two-way stop-controlled intersection should be considered as a candidate for multi-way stop control. This strategy should be used selectively, recognizing patterns and volumes of traffic and potentially adverse reaction by the driving population to being stopped for no apparent reason. If drivers encounter substantial delays, they may become impatient and act irrationally, which can lead to crash patterns of the type that the strategy is intended to correct.⁽⁵⁾

Signal control warrants 1 through 8 are not met. There are currently 5 trains a day at the grade crossing. Signal warrant 9 will be met if the future traffic is observed and the existing intersection configuration is not improved. The existing queue distance between the railroad crossing and the highway is approximately 65 feet and meets the requirements for existing traffic. To meet the needs of the future traffic, 130 feet of queue distance will be required. All proposed alternatives will meet the queue requirement. Based on the signal warrants not being met, it is not recommended that a signal be installed. Unwarranted signals can increase crash rate by 24%⁽¹⁾.

NCHRP report 825 Exhibit 17 suggests that two-way stop control is appropriate for all proposed alternatives.

Summary of Findings

All alternatives presented and types of intersection control will provide an acceptable Level of Service for future traffic. Warrants related to crashes, sight distance, and traffic volumes are not met for multi-way stop or signal control and roundabout control based on signal and multi-way stop findings. Signal warrant 9 related to the railroad crossing will be met if the future traffic is observed and the existing intersection configuration is not improved. The existing queue distance between the railroad crossing and the highway is approximately 65 feet and meets the requirements for existing traffic. To meet the needs of the future traffic, 130 feet of queue distance will be required. All proposed alternatives will meet the queue requirement for existing and future traffic. Based on the signal warrants not being met, it is not recommended that a signal be installed. Unwarranted signals can increase crash rate by 24%⁽¹⁾.

Based on the crash data provided, there are specific safety issues that need to be addressed in the proposed improvements. Roundabout control is an accepted traffic calming technique. Reduced vehicle speed is achieved by controlling geometrics and therefore, speed reduction can be realized at all times of the day and under varying traffic volumes. The redesigned intersections in Alternatives 2-4 that eliminates the skew and tight spaced intersections will also improve safety.

While not recommended as a permanent solution to the intersection based on the analysis performed in this report, multi-way stop could be implemented as a temporary traffic control. It would help reduce the number of right angle crashes at the intersection caused by poor sight distances and skewed geometry, and could be implemented immediately until the improved intersection is reconstructed. Multi-way stop would also provide an opportunity to prepare drivers for the switch in stop control from CSAH 43 to CSAH 2/CR 180 as recommended in this report. Additional pavement markings and advanced warning signs should also be updated at all approaches of the intersection to improve driver awareness to the interim control change. Dynamic changeable message signs should also be used in the short term to draw more attention to the changes.

Alternative 4 was found to require the least amount of additional ROW acquisition and require the least amount of housing relocations. Alternatives 1,2 and 3 all required higher amounts of acquisition and additional housing relocations.

Alternative 1 was found to be the cheapest alternative at \$3,440,000. The remaining alternatives were similar in cost, with Alternative 3 at \$4,500,000, then Alternative 2 at \$4,710,000, and Alternative 4 being the most expensive at \$5,620,000.

Based on these factors and the analyses performed in this study, Alternative 4 is the recommended Alternative. While all four alternatives had adequate safety and capacity requirements, Alternative 4 provides the most separation from the railroad tracks and other intersections for future upgrades to the intersection of CSAH 2/ CR 180 and CSAH 43 for a similar cost compared to the other alternatives. This was the only alternative that also provides enough space for construction of a future railroad overpass. Alternative 4 also requires the least amount of ROW acquisition and relocation of properties to construct. The two-way stop control in Alternatives 4 could be upgraded to multi-way stop or traffic signal in the future if the traffic demand requires it.

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- (2) Christopher W. Jenks et. al, ROUNDABOUTS: An Informational Guide. Second Edition, Report No. 672 (Washington, D.C.: US Department of Transportation Federal Highway Administration, 2010), p.3-33.
- (3) Richard Dowling et. al, Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual Report No. 825 (Washington, D.C.: US Department of Transportation Federal Highway Administration, 2016), p.31.
- (4) MNDOT, Traffic Engineering https://www.dot.state.mn.us/trafficeng/safety/crash_complex.html
- (5) TIMOTHY R. NEUMAN et. al, Guidance for Implementation of the AASHTO Strategic Highway Safety Plan Volume 5: A Guide for Addressing Unsignalized Intersection Collisions Report No. 500 (Washington, D.C.: US Department of Transportation Federal Highway Administration, 2003), p.V-90.