Environmental Assessment Worksheet

Owatonna East Side/29th Ave Corridor

SP 074-070-009

Steele County
November 2025

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F. DNR Correspondence
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H. MnDOT Cultural Resource Unit and State Historic Preservation Office Correspondence
I. Correspondence to Office of State Archaeologist and Minnesota Indian Affairs Council
J. Visual Impacts Analysis (VIA)
K. Traffic Study

List of Acronyms

Acronym	Definition
ADA	Americans with Disabilities Act
AES	Area of Environmental Sensitivity
AMM	Avoidance and Minimization Measures
APE	Area of Potential Effect
BGEPA	Bald and Golden Eagle Protection Act
BMP(s)	Best Management Practices
COE	Corps of Engineers
CPR	Canadian Pacific Railway
CR	County Road
CRU	Cultural Resources Unit
CSAH	County State Aid Highway
CY	Cubic Yards
DNR	Department of Natural Resources
DWSMA	Drinking Water Supply Management Area
EAW	Environmental Assessment Worksheet
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EQB	Environmental Quality Board
F	Fahrenheit
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
GHG	Greenhouse Gas
ISD	Independent School District
MBTA	Migratory Bird Treaty Act
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MICE	Minnesota Infrastructure Carbon Estimator
MnDOT	Minnesota Department of Transportation
MOVES	Motor Vehicle Emission Simulator
MPARS	Minnesota Department of Natural Resources Permitting and Reporting System

Acronym	Definition
MPCA	Minnesota Pollution Control Agency
MPH	Miles per hour
MSAT	Mobile Source Air Toxics
MWI	Minnesota Well Index
NAAQS	National Ambient Air Quality Standards
NAVD88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NHIS	Natural Heritage Information System
NOAA	National Oceanic Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
OES	Office of Environmental Stewardship
PBO	Programmatic Biological Opinion
PM	Particulate Matter
Project	29th Ave/East Side Corridor
RGU	Responsible Government Unit
ROW	Right of Way
SHPO	State Historic Preservation Office
SWPPP	Stormwater Pollution Prevention Plan
UA	Urbanized Area
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Society
WCA	Wetland Conservation Act
WHPA	Wellhead Protection Area

Environmental Assessment Worksheet

This most recent Environmental Assessment Worksheet (EAW) form and guidance documents are available at the Environmental Quality Board's website at**:** https://www.eqb.state.mn.us**/** The EAW form provides information about a project that may have the potential for significant environmental effects. Guidance documents provide additional detail and links to resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item or can beaddressed collectively under EAW Item 21.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for anEIS.

1. Project title: Owatonna East Side Corridor (29th Ave Corridor)

2. Proposer: Steele County
Contact person: Ronald Gaines, PE
Title: Public Works Director, Steele County
Address: PO Box 890, 3000 Hoffman Dr NW
City, State, ZIP: Owatonna, MN, 55060
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Email: Ronald.gaines@steelecountymn.gov

4. Reason for EAW Preparation:

Required:	**Discretionary:**
☐ EIS Scoping	☐ Citizen Petition
X Mandatory EAW	☐ RGU discretion
	☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

4410.4300, Subpart 22. A (Highway Projects): "For construction of a road on a new location over one mile in length that will function as a collector roadway, the DOT or local governmental unit is the RGU."

5. Project Location:

- **County**: Steele
- **City/Township**: City of Owatonna and Clinton Falls and Owatonna Townships
- **PLS Location (¼, ¼, Section, Township, Range):** See **Table 1**.
- **Watershed (81 major watershed scale):** Cannon River Watershed
- **GPS Coordinates**: 44.088230, -93.180463 (approximate Project center)
- **Tax Parcel Number**: NA

Table 1 – Project Location

Range	Township	Section	Quarter-Quarter Section
20W	107N	14	SW ¼ SE ¼
20W	107N	14	SE ¼ SE ¼
20W	107N	13	NW ¼ SW ¼
20W	107N	13	NE ¼ SW ¼
20W	107N	13	NW ¼ SW ¼
20W	107N	13	SE ¼ NW ¼
20W	107N	13	SW ¼ NW ¼
20W	107N	13	NE ¼ NW ¼
20W	107N	13	NW ¼ NW ¼
20W	107N	12	SE ¼ SW ¼
20W	107N	12	SW ¼ SW ¼
20W	107N	12	NW ¼ SW ¼
20W	107N	12	SW ¼ NW ¼
20W	107N	12	NW ¼ NW ¼
20W	107N	01	SW ¼ SW ¼
20W	107N	01	SE ¼ SW ¼
20W	107N	01	NE ¼ SW ¼
20W	107N	01	SE ¼ NW ¼
20 W	107 N	01	NE ¼ NW ¼
20W	108N	35	SE ¼ SE ¼
20W	108N	36	SW ¼
20W	108N	36	NE ¼ SW ¼
20W	108N	36	SW ¼ NE ¼

At a minimum attach each of the following to the EAW:

- County map showing the general location of the Project, **Attachment A:**
  - **Figure 1 – Project Area Map**

- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries, **Attachment A**:
  - **Figure 2 – USGS Project Area Map**

- Site plans showing all significant Project and natural features. Pre-construction site plan, **Attachment A**:
  - **Figure 3 – Project Map**
  - **Figure 4 – Aerial Project Map**
  - **Figure 5 – Project Layout**
  - **Figure 6 – Right of Way Impacts**

- List of data sources, models, and other resources (from the Item-by-Item Guidance: Climate Adaptation and Resilience or other) used for information about current Minnesota climate trends and how climate change is anticipated to affect the general location of the Project during the life of the Project (as detailed below in item 7. Climate Adaptation and Resilience).

6. Project Description:

a. **Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50words).**
Construct a new north-south, two-lane county highway between SE 18th St in Owatonna Township to Kenyon Road in Clinton Falls Township with a bridge over Maple Creek. The Project will realign Claremont Road to the north to create more space between the new 29th Avenue/Claremont Road intersection and the Canadian Pacific railroad crossing. The Project includes American with Disabilities Act (ADA) elements, intersection control, and stormwater treatment. Trails for pedestrians and bicyclists will be constructed along the new highway between SE 18th St and 26th St NE and portions of SE 18th St and 26th Street NE, along with a connection to a trail on Rose St. Portions 26th St NE, Claremont Road, and SE 18th St will be reconstructed.

b. **Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipmentor industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.**

The proposed Project is in Steele County in southeastern Minnesota (**Attachment A, Figure 1**). This area is located near the eastern edge of the developed part of Owatonna and in Owatonna and Clinton Falls Townships (**Attachment A, Figures 2-4).** More details on the Project are provided in the following paragraphs and shown in the Project layout, included in **Attachment A, Figure 5**. The right-of-way (ROW) for the new roadway would be approximately 100 - 150 feet wide. This is shown in **Attachment A, Figure 6**.

The proposed Project would include these key elements:

1. **Construct 29th Avenue/East Side Corridor.** Construct a new north-south county highway from SE 18th St to County State Aid Highway (CSAH) 8/Kenyon Road – an approximately 3.4-mile-long roadway that would tie into existing CSAH 8/Kenyon Rd. The new highway would have two travel lanes for vehicles - one in each direction. A new bridge, approximately 350 feet long, would be constructed over Maple Creek and its associated floodway.

The roadway would include a combination of rural, urban and hybrid (urban west side, rural east side) sections. Rural sections have ditches to move stormwater runoff, and urban sections use curb and gutter and a piped drainage system to collect and move stormwater runoff. The hybrid section uses a combination of rural and urban drainage elements. The hybrid section would be from SE 18th St to School St; the rural section would be from 26th St NE to the connection on Kenyon Road; and the urban section would go from School St to 26th St NE.

All the sections would include 12-foot driving lanes and 6-foot paved shoulders. The urban sections would have boulevards. A 10-foot-wide multiuse trail would be constructed along the west side of the new highway between SE 18th St and 26th St NE with a connection constructed to a trail along Rose St.

2. **Remove Portion of CSAH 8/Kenyon Rd**. Remove a piece of CSAH 8/Kenyon Rd northeast of 26th Street NE, making the new north-south roadway the primary travel direction. The piece of the roadway to be removed serves one farmstead. A new connection to this property would be provided via 26th St NE. The old section of Kenyon Road would be terminated with a cul de sac.

3. **Reconstruct CSAH 34/26th St NE.** Construct CSAH 34/26th St NE from CSAH 8/Kenyon Rd to the east, where it would connect to the realigned Kenyon Road that would become a part of the new 29th Ave (East Side Corridor). Reconstruct 26th St NE between the new connection and the west to Kenyon Rd/NE 24th Ave. This roadway would primarily be reconstructed as a three-lane roadway (one travel lane in each direction with a center turn lane) with a segment from Deer Trail Ln to 24th Ave as a two-lane urban roadway. There would be a 10-foot-wide multi-use trail on the south side of the road.

4. **Realign and Reconstruct County Road (CR) 180/Claremont Rd.** Claremont Rd is parallel to the Canadian Pacific/Kansas City Railroad (CPKC). Claremont Rd would be realigned approximately 650 feet north to provide appropriate spacing between the 29th Avenue/Claremont Road intersection and the new railroad crossing location.

5. **Remove CR 171/Havana Rd SE.** Remove a portion of CR 171/Havana Rd SE between the proposed new 29th Ave/East Side Corridor and CR 180/Claremont Rd. Removing this segment of roadway also eliminates an existing at-grade crossing with the CPKC. The segment of roadway removed is approximately 0.29-mile long.

6. **Reconstruct SE 18th St.** Reconstruct SE 18th St from 700 feet east of CSAH 48 (Bixby St) to the new 29th Ave/East Side Corridor connection. The road would be converted from a gravel roadway to a paved roadway. The road would have two travel lanes, one in each direction. The travel lanes would be 12 feet wide, and the roadway would have paved shoulders and a boulevard. A 10-foot-wide multiuse trail would be built along the north side of the roadway.

7. **Construct Multiuse Trails**. The Project would build several 10-foot-wide multiuse trails. As noted previously, a trail would be constructed along the west side of the new 29th Ave/East Side Corridor for its entire length. Additional 10-foot-wide trails would be built on the reconstructed pieces of CSAH 34/26th St NE and SE 18th St.

8. **Intersection Treatments.** Intersection control (stop signs, roundabouts, left- and right-turn lanes) would be considered at east-west roadways that would intersect with the new roadway (29th Ave/East Side Corridor), including SE 18th St, CR 180 /Claremont Rd, CSAH 19/Rose St, CSAH 35/Dane Rd, and NE 26th St. It is anticipated the Project would include roundabouts at:

    - 29th Ave/East Side Corridor and Rose St
    - 29th Ave/East Side Corridor and CSAH 35/Dane Rd
    - 29th Ave/East Side Corridor and extension of 26th St NE
    - 26th St NE and CSAH 8/Kenyon Rd

    Side-street stops with dedicated left- and right-turn lanes where needed on the new 29th Ave/East Side Corridor and/or connecting roadways. Turn lanes throughout the Project area are shown on **Figure 5**.

9. **Drainage Culverts**. In addition to the bridge over Maple Creek, the Project would likely require the extension of an existing drainage culvert at SE 18th St. The proposed 29th Ave/East Side Corridor and connecting roadways (SE 18th St, CR 180/Claremont Rd, and CSAH 34/26th St NE) cross relatively small local drainage ditches and swales, mostly unnamed and without a judicial status. The preliminary drainage analysis identified the need for the Project to construct nine culverts ranging in size from 15 to 42 inches. Steele County will continue to refine its drainage modeling in final design - final sizes and locations of potential culverts may be slightly modified during this process. A floodplain risk assessment, which is required when culverts are 48 inches in size or larger, would not be needed for the culverts.

10. **Drainage Ponds and Ditches**. The Project would incorporate ponding and ditches for roadway drainage. Ponds would be located as shown on **Figure 5**. Ditches would be constructed along both sides of the new roadway between CSAH 34/26th St NE to the connection with CSAH8/Kenyon Road and on the east side of the new roadway from SE 18th St to School St.

Construction methods for the Project would consist of excavation and major grading for the construction/reconstruction of the roadway, bridge, trail, and associated drainage. The Project would not include significant demolition, removal, or remodeling of existing structures.

Construction activities are anticipated to start in fall 2026 and continue through 2028.

c. **Project Magnitude:**

Table 2 – Project Magnitude

Description	29th Ave / East Side Corridor	CSAH 34 / 26th St NE*	CR 180 / Claremont Rd	Rose St	Dane Rd	SE 18th St	Total
Total Project Acreage	49.8	13.2	16.7	2.1	1.1	6.6	89.5
Linear project length	3.45 miles	0.97 mile	0.72 mile	0.33 mile	0.19 mile	0.56 mile	6.22 miles
Number and type of residential units	NA	NA	NA	NA	NA	NA	NA
Residential building area (in square feet)	NA	NA	NA	NA	NA	NA	NA
Commercial building area (in square feet)	NA	NA	NA	NA	NA	NA	NA
Industrial building area (in square feet)	NA	NA	NA	NA	NA	NA	NA
Institutional building area (in square feet)	NA	NA	NA	NA	NA	NA	NA
Other uses – specify (in square feet)	NA	NA	NA	NA	NA	NA	NA
Structure height(s)	30-foot lighting	30-foot lighting	30-foot lighting	30-foot lighting	30-footing	30-foot lighting	NA

* Includes Kenyon Road, 24th Avenue and connection to Majestic Lane

The proposed Project would also remove portions of three roadways, Kenyon Rd, Claremont Rd and Havana Rd. The removal includes 1.07 miles and 4.5 acres.

d. **Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.**

PROJECT PURPOSE

The purpose of the Project is to improve the connectivity of Steele County's transportation network and meet existing and future travel needs on the east side of the city of Owatonna and adjacent townships for motorized and nonmotorized users.

The Project is anticipated to provide relief to existing roadways and prevent future congestion on collector and arterial routes through downtown Owatonna and provide a better collector route for through traffic currently using residential streets.

PROJECT NEEDS

Transportation needs have been documented for the Project. Primary needs are the main transportation problems to be solved – or the reason the Project was initiated. Secondary needs are other transportation problems or opportunities for improvements that could be addressed, if feasible, at the same times as the primary needs are addressed. The 29th Ave/East Side Corridor has one primary and one secondary need. They are discussed in the following subsections.

Primary Need: Vehicle Mobility – Poor Connectivity

Steele County has identified poor network connectivity – both the lack of connections between roadway systems and lack of connectivity between current and anticipated origins and destinations – as a transportation issue. The poor connectivity requires travelers through the eastern portion of Owatonna to use indirect routes to make trips. As an example, trips between residential areas on the northeast side of Owatonna and the Owatonna High School in the southeast corner of the city are generally north/south. The shortest travel time for these trips on the existing network follows Mineral Springs Road, Bixby Road, and other connecting streets in the center of the city.

This traffic contributes to traffic congestion in downtown Owatonna as traffic travelling north-south, not destined for downtown, uses downtown roads for trips. Segments on Mineral Springs Road have been identified as likely to become congested in the future, partly because of these circuitous trips. This unintended use of the roadway network limits the ability to serve existing development and future growth areas.

Considerable through traffic also uses the local street network, including Crestview Lane, Greenhaven Lane, Shady Avenue, Oakview Drive, Partridge Ave, and, with anticipated connections, Countryview Ave. Although these routes provide a connection that is more direct than Mineral Springs Road for some trips, they are local streets intended to provide access to residential areas and not to provide mobility for through traffic.

The city of Owatonna and this portion of Steele County do not have a north-south network of collector or arterial roadways constructed at regular intervals to support existing traffic or traffic generated by new development. This has resulted in a general lack of routes that facilitate north-south travel. **Figure 7** in **Attachment A** shows the roadway network and functional classification.

Interstate 35 (I-35), located in the western half of Owatonna, is the city's primary north-south principal arterial roadway. Approximately one mile east of I-35, a series of city and county roadways—CSAH 1 (N Cedar Ave), N/S Cedar Ave, and CSAH 45 (S Cedar Ave)—form a continuous north-south route that serves the downtown. This series of roadways is 2.4 miles from the easternmost boundary of Owatonna, and consists of minor arterial, major collector, and minor collector segments. The next north-south minor arterial or collector roadway that travels the full length of the city north-south borders is CSAH 43, which is 1.6 miles to the east of the easternmost boundary of Owatonna, in Havana and Merton Townships. There is a four-mile space between the north-south route formed by CSAH 1, Cedar Ave, and CSAH 45 through downtown Owatonna and CSAH 43 where there is no roadway to serve north-south, cross-town traffic (**Figure 8**).

The existing east-west collector roadways on the east side of Owatonna, include CSAH 8/Kenyon Rd, CSAH 35/Dane Rd, CSAH 19Rose St, and CR 180 (E School St/E Main St/Claremont Rd). These roadways are not connected by a contiguous north-south roadway to distribute traffic. **Table 3** lists all eight existing roadways that would intersect with the proposed Project. This includes four collectors and four local roadways. Six of these roadways are owned by Steele County, including all four collectors. Two local roads are owned by Owatonna Township. However, a portion of SE 18th St, connecting CSAH 48 to the East Side Corridor, is proposed to be transferred from Owatonna Township to the county. This transfer includes plans to rebuild the road and reclassify it as either a collector or arterial route.

Table 3 – Intersecting Roadways

Roadway Name	Functional Class	Owner	Daily Traffic Volumes*
CSAH 8 (Kenyon Rd)	Major Collector	Steele County	1,760 (2024)
CSAH 34 (NE 26th St) east of CSAH 8	Local	Steele County	189 (2024)
CSAH 35 (Dane Rd)	Minor Collector	Steele County	1,085 (2024)
CSAH 19 (Rose St)	Major Collector	Steele County	1,832 (2024)
School St	Local	Owatonna Township	Not available
CR 180	Minor Collector	Steele County	1,801 (2021)
CR 171 (Havana Rd)	Local	Steele County	265 (2020)
SE 18th St	Local	Owatonna Township	86 (2021)

*Source: MnDOT Traffic Mapping Application

Downtown Congestion Impacts

Traffic travelling between the northeast part of Owatonna and US Highway 14, or other destinations in the southern portions of the city, require indirect travel through downtown Owatonna. This additional through traffic contributes to congestion on several downtown roadways and adds through traffic onto local residential streets.

A planning-level analysis of current and anticipated congestion on roadways in and near Owatonna was included in Steele County's 2040 Transportation Plan (2021). A volume to capacity (V/C) ratio was calculated for segments in the roadway network based on existing traffic volumes and typical planning-level capacity thresholds for different roadway types in the plan. The year 2046 is being used as the future year for the 29th Ave/East Side Corridor traffic analysis. This analysis assumes traffic volumes and operations in 2046 would be similar to those identified for 2040 in the Steele County 2040 Transportation Plan.

A roadway with a V/C ratio between 0.85 and 1.00 is approaching capacity, and a V/C ratio over 1.00 exceeds capacity. This means that the roadway is likely to be congested. **Table 4** and **Attachment A**, **Figure 8** show two roadways approaching congestion (highlighted in orange in the table) as denoted in the 2040 Transportation Plan. Roads include Mineral Springs Rd from Cherry St to St. Paul Rd and North St E between CR 45 and Cedar Ave N. Since the completion of the 2040 Transportation Plan, which used traffic volumes from 2019, traffic volumes on these routes have decreased.

Table 4 - Roadways Approaching Capacity/Congestion (Existing)

Roadway	Road Owner	From	To	Vehicles Per Day	Roadway Capacity (Vehicles Per Day)	V/C Ratio
North St E	City of Owatonna	CR 45	Cedar Ave N	8,900	10,000	**0.89**
Mineral Springs Rd	City of Owatonna	Cherry St	St. Paul Rd	9,300	10,000	**0.93**

Source: Steele County 2040 Transportation Plan

Future (2046) V/C ratios were also calculated for roadway segments in Steele County using 2040 daily traffic volume forecasts developed for the Steele County 2040 Transportation Plan (**Table 5** and **Figure 8**). In 2040, the segment of Mineral Springs Rd from Cherry St to St. Paul Rd is anticipated to be over capacity (highlighted in red in **Table 5**), and a second contiguous segment to the south would be approaching capacity (highlighted in yellow in **Table 5**). The 2040 Transportation Plan notes that congestion in this area, which is partially attributable to school traffic, may be mitigated by future projects.

Table 5 – Roadways Approaching and Exceeding Capacity (2046)

Roadway	Road Owner	From	To	Vehicles Per Day	Roadway Capacity (Vehicles Per Day)	V/C Ratio
Bridge St W	City of Owatonna	Park Dr NW	Selby Ave SW	20,500	22,000	**0.93**
18th St SW	City of Owatonna	CR 45	Hartle Ave SE	9,500	10,000	**0.95**
North St W	City of Owatonna	CR 45	Cedar Ave N	11,300	10,000	**1.13**
Cedar Ave N	City of Owatonna	North St W	16th St NE	9,200	10,000	**0.92**
Mineral Springs Rd	City of Owatonna	Fremont St E	Cherry St NE	9,300	10,000	**0.93**
Mineral Springs Rd	City of Owatonna	Cherry St NE	St. Paul Rd NE	10,100	10,000	**1.01**

Source: Steele County 2040 Transportation Plan

Land Use and Anticipated Growth Areas

Poor roadway connectivity impacts the ability of the roadway network to serve existing and planned land uses. Existing land uses within the study area are primarily agricultural, rural residential, and low-density residential. According to the City of Owatonna's Development Plan and ongoing discussions with city staff, additional low-density residential development is anticipated on the east side of Owatonna along with some mixed uses, potentially a new school, and limited commercial development. The Project area includes one of the city's primary growth areas. The existing roadway network is not equipped to manage and distribute traffic generated by new developments. Planned land uses are shown in **Attachment A, Figure 9**.

Owatonna High School, part of Independent School District (ISD) 761, opened in fall 2023 at 1455 SE 18th Street. The high school, which was relocated from central Owatonna to southwest Owatonna, has increased traffic using CSAH 45, CSAH 48, and city routes. The traffic study (**Attachment B – High School Traffic Study**) completed for the new school, indicates it generates 3,248 trips a day. Approximately 35 percent of trips are expected to access the school via CSAH 48/Bixby Rd, likely originating in the residential areas around downtown and in the northeast part of Owatonna. The trend of residential development on the east side of Owatonna, in combination with the new high school, will continue to generate additional trips between the northeast and southern portions of the city.

Secondary Need: Walkability/Bikeability

Nonmotorized users experience connectivity challenges due to a lack dedicated bicycle or pedestrian facilities within the Project area. Bicyclists or pedestrians may use roadway shoulders where available or travel lanes on low volume roadways to travel east-west along cross streets. These travel paths present bicyclists and pedestrians with conditions of low comfort and high stress.

Figure 10 in **Attachment A** shows existing and planned nonmotorized facilities (trails) on the east side of Owatonna. There is an existing trail along the south side of CSAH 34/ 26th St NE west of CSAH 8/Kenyon Rd, as well as several sidewalk segments in the development to the north. The City of Owatonna's Parks and Trails System Master Plan identifies several future trail segments within the Project area, including future east-west trail segments along Dane Rd and Rose St connected by a north-south trail segment between these two roadways along the city limits. There are also planned trails along portions of CSAH 48 and SE 18th St.

The existing transportation network provides connections that are indirect, uncomfortable, and stressful for many potential non-motorized trips. Origins and destinations of these trips include nearby residential areas and the Owatonna High School, the Owatonna Soccer Complex, Lincoln Elementary School, Hammann Park, Daikin Soccer Complex, Nass Woods Park, and Mineral Springs Park.

PROJECT BENEFICIARIES

The beneficiaries of the proposed Project would include local and regional motor vehicle travelers using the new 29th Ave/East Side Corridor as well as pedestrians and bicyclists that need or wish to travel along and/or across the corridor to go between residential areas and other locations within the city.

e. **Are future stages of this development including development on any other property planned orlikely to happen?** ☐ Yes **X** No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

f. **Is this project a subsequent stage of an earlier project?** ☐ Yes **X No**
If yes, briefly describe the past development, timeline and any past environmental review.

7. Climate Adaptation and Resilience:

a. **Describe the climate trends in the general location of the project (see guidance: *Climate Adaptation and Resilience*) and how climate change is anticipated to affect that location duringthe life of the project.**

Current and projected future changes in Minnesota's climate include greater intensity rainfall events, more localized flooding, more frequent (repeated) freeze/thaw cycles, lack of snow cover, extreme heat, drought, and other factors that may damage infrastructure and create safety risks. For transportation infrastructure, the two primary concerns are the projected changes in temperature and precipitation.

Climate scientists use mathematical models to understand the likely range of future climate conditions. It is important to note that climatological scale (patterns over the next 30 years) is different than meteorological scale (hours, days, weeks, months) and meteorological events. The global climate models combine the complex processes and relationships of our integrated ocean/earth/atmosphere system with different scenarios for future greenhouse gas concentrations, along with other human and natural activity on the planet. This allows scientists to estimate possible future conditions. The climate is complex, and no single model can represent all possible inputs. Because of this, different scientific teams maintain their own models and compare the results to better understand climate projections.

Climate models are designed to help us understand the general trajectories of climatic changes expected, based on greenhouse gas (GHG) concentrations and other influences, but they are not designed to predict specific climatic conditions for a specific place and time; nor are they designed to predict individual weather events that contribute to flooding. Virtually all models agree that Minnesota will continue getting warmer in the future, but no model can tell us with any certainty what exact temperature can be expected.[1]

TEMPERATURE CHANGES

The graphs in **Figure 11**, **Attachment A** display nine different temperature projections per time period for the Cannon River Watershed[2] using the *Minnesota Climate Explorer tool*. These include one "Model Mean," representing the average of eight models, plus the outputs from each of the individual models. For each time period and model, the graph shows the average and range of values. Each time period includes 20 years of data per model. The Model Mean, displayed in blue on the left side of each time period, is the most important single plot to examine for any future scenario because it integrates data from all other models.

Based on the Minnesota Climate Explorer tool, the Modeled Present (1980-1999) mean temperature for the Cannon River Watershed is 44.94°F, and the Late-Century (2080-2099, RCP 8.5) mean temperature is 54.52°F[3]. Representative Concentration Pathway (RCP) 4.5 and RCP 8.5 refer to two different greenhouse gas (GHG) emissions scenarios. RCP 4.5 represents a moderate scenario where emissions peak around 2040, and RCP 8.5 assumes continuously rising emissions through the 21st century. The difference in average temperature between the Modeled Present and the RCP 8.5 scenarios is 9.58°F. This projected increase in temperature is not expected to affect the structural stability of the Project; however, more extreme heat days are anticipated, which could increase the risk of pavement buckling[4].

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[1] Information in this section is adapted from the *Minnesota Climate Explorer Frequently Asked Questions*, available at: https://www.dnr.state.mn.us/climate/climate-explorer-faq.html

[2] The Project is located within the Cannon River Watershed, which was selected as the analysis area for the Minnesota Climate Explorer. More information about Minnesota's watersheds is available at: https://www.dnr.state.mn.us/watersheds/map.html

[3] Minnesota Department of Natural Resources, *Minnesota Climate Explorer tool*. Accessed 01/30/2025. Minnesota Climate Explorer (state.mn.us)

[4] Buckling is primarily a concrete pavement problem. Visit the following website for more information: http://www.dot.state.mn.us/pavementbuckle/

PRECIPITATION

Annual Precipitation

The historical average annual precipitation within the Cannon River Watershed is 30.34 inches, based on the *Minnesota Climate Explorer* metadata using precipitation data from the National Oceanic Atmospheric Administration (NOAA). Between 2010 and 2024, the annual average precipitation rose to 35.55 inches. The average annual precipitation is projected to continue to rise in the foreseeable future based on the climate models discussed above. In 2040-2059, average annual precipitation under RCP 4.5 is projected to decrease slightly to 32.33 inches, while for 2080-2099, the measurement is projected to be 32.87 inches under RCP 4.5 and 35.15 inches under RCP 8.5.

Extreme Rainfall Events – Depth, Intensity, Duration

Precipitation factors relating to the projected changes in Minnesota climate include increased precipitation depths, rainfall intensities, and storm duration. While these factors are largely independent, they could be interrelated in their effects on hydrologic and hydraulic systems. In Minnesota, the number of storms greater than 3-inches in 24-hours increased significantly between 2010 and 2023. Additionally, precipitation in the Project area also supports that there is an increasing frequency of higher intensity rainfall events, based on rainfall gauge data collected by the DNR State Climatology Office.

There is not an agreed upon standard of practice for how best to incorporate projected precipitation increases into projects. A resiliency check storm was analyzed to identify and reduce climate vulnerability risks to this Project. The proposed bridge over Maple Creek would be designed to span the full width of the floodway. This would maintain the primary conveyance area and cross section of the creek and not cause a constriction due to the new bridge opening.

Drainage Infrastructure and Stormwater Management Design

Increased precipitation depth, rainfall intensity and storm duration are expected to impact drainage infrastructure in cases where existing storm sewer and stormwater management areas have been designed to standards of less extreme events. Temporary ponding and overtopping on roadways and exceeding storage capacity of stormwater management areas may occur due to any (or combination) of the factors discussed above.

Drainage from the corridor ultimately flows to one of three major waterbodies, with elevations measured using the North American Vertical Datum of 1988 (NAVD88), ensuring uniform elevation standards:

- Maple Creek at the northern end of the proposed 29th Ave/East Side Corridor - Base Flood Elevation (BFE) 1187.2 from FEMA's Flood Insurance Study (FIS) 27147CV000A, effective December 2, 2011.
- Judicial Ditch 1W along 29th Avenue/East Side Corridor just south of existing CR 180/Claremont Road. Unknown flood elevation
- Izaak Walton Creek approximately 0.1 mile west of the far southern end of the Project area along SE 18th Street – estimated floodplain elevation 1205.7, based on FEMA Zone A floodplain. A LOMR revised the mapping for this segment of Izaak Walton Creek in November 2014. Note the floodplain elevation is an estimate based

on the available data as this is Zone A floodplain and a detailed model has not been completed.

Increases in depth, intensity and duration of rainfall could impact floodplain elevations for these waterbodies, reduce the amount of freeboard, or result in short duration ponding on the roadway. Additionally, increases in floodplain elevations of these waterbodies could impact the performance of the stormwater management system along the corridor due to higher tailwater.

b. **For each Resource Category in the table below: Describe how the project's proposed activitiesand how the project's design will interact with those climate trends. Describe proposed adaptations to address the project effects identified.**

Please refer to **Table 6.**

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Table 6 – Climate Considerations

Resource Category	Climate Considerations	Project Information	Adaptations
Project Design	Risks and vulnerabilities associated with warming temperatures and increased frequency of high-heat days and freeze-thaw events include increased pavement cracking and road buckling. Additionally, extreme heat events and cracked or icy pavements can create hazards and challenges for pedestrian accessibility.	The Project would involve constructing a new transportation route and reconstructing portions of Project area roadways. According to MnDOT more frequent (repeated) freeze/thaw cycles associated with climate change would result in detrimental impacts on pavement. o Elevated road surface temperatures, especially where braking happens and along high-volume corridors, may accelerate the deterioration of road surfaces, causing rutting, structural damage, and reduced pavement life.	MnDOT is studying the effects of increased freeze/thaw cycles on pavement; as design standards are updated to address negative effects, they would be implemented on projects at a statewide level.
Land Use	No critical facilities (i.e., facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are located within the Project area.	Not applicable.	Not applicable.
Water Resources	Existing risks and vulnerability with the increased frequency and intensity of precipitation events include transportation infrastructure damage, closures due to roadway flooding, washouts, slope failures, and others.	Temporary increased ponding on roadways and overtopping of roadway may occur due to conveyance capacity of drainage systems and storage capacity of stormwater management areas and adjacent wetlands being exceeded. The Project would be anticipated to increase impervious surface by 20 acres. Prolonged increases in precipitation could also increase flood risk associated with Maple Creek, Judicial Ditch 1W, and Izaak Walton Creek.	Best Management Practices (BMPs) would be constructed in compliance with the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater permit[5]. Defined overflow routes would be incorporated into the design along with the appropriate erosion protection. Existing drainage patterns would be maintained. The flood risk associated with the creeks and county ditch is reduced by consideration of roadway profile elevations to balance providing freeboard to the road and allowing overtopping of the road for larger storm events to not pose freeboard risks to upstream properties. Stormwater BMPs would be located in close proximity to the creeks to facilitate multi-purpose use as water quality, rate control and redundant flood storage for the creeks.
Contamination/ Hazardous Materials/Wastes	Increased frequency and intensity of precipitation events has the potential to increase the risk of hazardous materials entering waterways within the Project area.	Project activities would generate wastes and debris typical of road construction operations, such as asphalt, paints, gasoline, diesel fuel, and other petroleum-based products.	In compliance with the NPDES Construction Stormwater permit, products that have the potential to leach pollutants would be stored under cover, hazardous materials would be stored in sealed containers and would have secondary containment to prevent spills, solid wastes would be collected and disposed of properly, and vehicle and equipment washing would not be allowed on site. Appropriate measures would be taken during construction to avoid spills that could contaminate groundwater or surface water in the Project area.

[5] When stormwater drains off a construction site, it carries sediment and other pollutants that can harm lakes, streams, and wetlands. The Minnesota Pollution Control Agency issues coverage to construction site owners and their operators under the Construction Stormwater general permit to prevent stormwater pollution during and after construction, and to protect Minnesota's water resources. To learn more about this permit and efforts to protect water resources during construction, please visit: Construction Stormwater Permit overview (state.mn.us) and Construction stormwater | Minnesota Pollution Control Agency (state.mn.us).

Resource Category	Climate Considerations	Project Information	Adaptations
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Current Minnesota climate trends and anticipated climate change in the general location of the Project may influence the local species and suitable habitat. Suitable habitat for species may become unsuitable due to land use changes, increased temperature, and increased runoff.	The Project does not represent a new barrier to wildlife passage nor prevent movement of species migrating due to shifts in suitable habitat range. The Project is in an area identified as a site of moderate Biodiversity Significance – however the native plants contributing to the site rating are not located in the Project area. The Project is not expected to impact these resources.	Any alignment changes near the site of Moderate Biodiversity Significance would result in additional correspondence with the Minnesota DNR and additional surveys would be conducted to ensure no impacts to native species would occur.

8. Cover types:

Estimate the acreage of the site with each of the following cover types before and afterdevelopment:

Table 7 – Cover Types

Cover Types	Before (acres)	After (acres)
Wetlands and shallow lakes (<2 meters deep)	5.3	2.3
Deep lakes (>2 meters deep)	0	0
Wooded/forest	1.2	0
Rivers/streams	0.2	0.2
Brush/Grassland	0	4.5
Cropland	64.2	4.9
Livestock rangeland/pastureland	0	0
Lawn/landscaping	0.5	33.7
Green infrastructure TOTAL (see Table 8)	0	0
Impervious surface	17.7	37.7*
Stormwater Pond (wet sedimentation basin)	0	6.2
Other (Wet Ditch)	0.4	0
TOTAL	**89.5**	**89.5**
Individual acreages may not sum to total due to rounding * Net new impervious is 20 acres		

Figure 12 in **Attachment A** shows the National Land Cover Database Land Cover Class for areas along the Project area. Green infrastructure and impacts on trees are summarized in **Tables 8** and **9**, respectively.

Table 8 – Green Infrastructure

Green Infrastructure	Before (acres)	After (acres)
Constructed infiltration systems (infiltration basins / infiltration trenches / rainwater gardens / bioretention areas without underdrains / swales with impermeable check dams)	0	0
Constructed tree trenches and tree boxes	0	0
Constructed wetlands	0	0
Constructed green roofs	0	0
Constructed permeable pavements	0	0
Other (describe)	0	0
TOTAL	**0**	**0.0**

Table 9 – Tree Impacts

Trees	Acres	Number
Percent tree canopy removed **or** number of mature trees removed during development	4.5	NA
Number of new trees planted	0	0

9. Permits and approvals required:
List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. All of these final decisions are prohibiteduntil all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

The Project would require the permits/approvals listed in **Tables 10 – 13.**

Table 10 – Permits and Approvals Required (Federal)

Unit of Government	Type of Application	Status
Minnesota Department of Transportation (MnDOT) Office of Environmental Stewardship on behalf of the FHWA	Endangered Species Act Section 7 Determination	Complete
MnDOT Cultural Resources Unit on behalf of FHWA	Section 106 (Historic/Archaeological) Determination	Complete
US Army Corps of Engineers	Section 404 Permit	To be requested

Table 11 – Permits and Approvals Required (State)

Unit of Government	Type of Application	Status
Minnesota DNR	Dewatering Permit	To be requested
Minnesota Department of Transportation (MnDOT) – State Aid	Final Construction Plan Review	To be requested
MnDOT Bridge Office – State Aid	Preliminary and Final Bridge Review	In progress
Minnesota Indian Affairs Council	Archaeological Review	In Progress
Office of the State Archaeologist (OSA)	Archaeological Review	In Progress
Minnesota Pollution Control Agency (MPCA)	National Pollutant Discharge Elimination Permit Construction Stormwater Permit	To be requested
MPCA	Section 401 Certification	To be requested

Table 12 – Permits and Approval Required (Local/Regional)

Unit of Government	Type of Application	Status
Steele County	Environmental Assessment Worksheet	Draft complete
Steele County	Issue Record of Decision on Need for Environmental Impact Statement	To be requested
Steele County Soil and Water Conservation District	Wetland Conservation Act Public Road Project Notification and Replacement Plan	To be requested
City of Owatonna	Municipal Consent	To be requested
City of Owatonna	MS4 Permit	To be requested

Table 13 – Permits and Approval Required (Private)

Private	Type of Application	Status
Canadian Pacific/Kansas City Railroad (CPKC)	Railroad Temporary Occupancy - Work in Right of Way	In progress
CPKC	New Railroad Crossing Agreement – Including Preliminary Engineering and Memorandum of Understanding	In progress

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos.10-20, or the RGU can address all cumulative potential effects in response to EAW Item No.22. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 21.

10. Land use:

a. **Describe:**

i. **Existing land use of the site as well as areas adjacent to and near the site, including parksand open space, cemeteries, trails, prime or unique farmlands.**

EXISTING LAND USES

Attachment A, Figures 13 and **14** shows existing land uses near the Project Area in the city of Owatonna and the two townships. Land uses are primarily agricultural/undeveloped and low-density residential. Low density residential uses are concentrated in the northwest portion of the proposed Project along CSAH 34/26th St NE, CSAH 8/Kenyon Rd, and near the center of the project along the west side of the proposed 29th Ave/East Side Corridor. Most of the remaining Project area is agricultural or undeveloped.

The Owatonna High School is located on SE 18th St, just southwest of the south end of the Project limits at the intersection of SE 18th St and CSAH 48/Bixby Rd. The high school opened in 2023 and replaced the previous high school located in downtown Owatonna.

PARKS AND TRAILS

There are no existing parks (**Figure 15**) immediately adjacent to the proposed Project that

would be impacted. There are some nearby (within a half mile) parks. They include:

- **Falkland Meadow and Kriesel's Wood:** are located along Maple Creek and behind residential neighborhoods near Deer Trail Lane NE and Dane Rd, approximately 0.5-mile west of the proposed Project.
- **Countryview Park:** is located along Countryview Ave NE and is approximately 0.25 mile west of the proposed Project.
- **Hammann Park:** is located between Woodland Dr and Shady Ave and is approximately 0.5-mile from the proposed Project.

There are multiple existing trail connections within a half mile of the proposed Project. They include:

- **CSAH 34/26th St NE:** A trail is located just west of the northwestern end of the proposed Project. It is It is along CSAH 34/26th St NE west of the CSAH 77/NE 24th Ave/Kenyon Dr NE intersection. The trail is located on the south side of CSAH 34/26th St NE. The proposed Project would tie into this location, but would not impact the existing trail.
- **Rose St E:** A trail is located along Rose Street E. It stops at the intersection of Rose St and Countryview Ave, approximately 0.21 mile west of the proposed Project.
- **SE 18th St:** A trail/large sidewalk connection is provided on SE 18th St that connects to the Owatonna High School. It is approximately 0.31 mile from the proposed Project.

Figure 10 in **Attachment A** shows existing and proposed trails. The proposed multiuse trails for the Project would establish a future trail loop, connecting and filling gaps within Owatonna's existing trail network.

PRIME OR UNIQUE FARMLANDS

Within the townships, the land is primarily agricultural. There are several classifications of prime and unique farmland, including prime farmland, farmland of statewide importance, and prime farmland if drained or irrigated. Areas of prime farmland are shown in **Figure 16** in **Attachment A**.

ii. **Plans. Describe planned land use as identified in comprehensive plan (if available) and anyother applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.**

Future/planned land uses (**Attachment A, Figure 9**) from the city of Owatonna's *Imagine Owatonna: 2050 Comprehensive Plan*, 2024, identifies future land uses for the area around the proposed Project, including the new 29th Ave/East Side Corridor. Presently most of the land adjacent to the north-south portion of the proposed roadway is within Owatonna Township as are the east-west connections in the southern two-thirds of the Project. The city and Owatonna Township have an orderly annexation agreement in place to document areas identified for orderly growth. This agreement identities agreed upon areas adjacent to the city's limits that are defined for future growth along with circumstances that must be met for

that growth to occur. The intent of this agreement is to efficiently use the city's infrastructure and to help protect farmland. This agreement has been in place for several decades and is revised on an annual basis by both agencies.

The city's future land use map shows that much of the land near the proposed Project would develop over time, with much of the land use being low- or medium-density residential with some spots of mixed use and public/institutional.

iii. **Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.**

The zoning for the city of Owatonna is consistent with existing land uses. **Figure 17** in **Attachment A** shows the existing zoning map. Within the Project area in the city of Owatonna, the zoning is primarily single family residential, with a limited number of locations identified as single and two family residential. The city has a Floodplain Management Ordinance as part of its city code. It is discussed in Chapter 154[6]. The ordinance describes the lands to which it applies (floodway, flood fringe or general floodplain districts).

Zoning for Steele County is consistent with existing land uses in the area (agricultural and interim agricultural). The county has a Floodplain Management Ordinance which was adopted in 2011. The ordinance describes the lands to which it applies (floodway, flood fringe, or general floodplain districts) and incorporates the county's Official Zoning Map. For more detailed information on the county's Floodplain Ordinance, please visit the county website. [7]

Floodplain areas and maps are described in more detail in **Section 12**.

iv. **If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding,describe the risk potential considering changing precipitation and event intensity.**

No new buildings would be constructed as part of the proposed Project.

b. **Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.**

LAND USES AND ZONING

The Project aligns with current zoning regulations and future land use plans for the city of Owatonna and Steele County, which both anticipate continued development around the Project. This includes the transition of vacant and agricultural land into commercial, mixed use and residential areas.

[6] City of Owatonna City Code – Floodplain Management: § 154.025 DISTRICTS.

[7] Steele County Floodplain Ordinance: Floodplain Ordinance.pdf

The Project would require acquisition of property. Most of the right of way (property to be acquired) needed would be in areas for the new roadway and ponding. **Figure 6** in **Attachment A** shows property that would need to be acquired to construct the Project. Right of way acquisition would follow state and federal requirements. **Figure 6** shows the area of property to be acquired as well as temporary easements. Temporary easements are only needed for use during construction but are not required after construction. The property remains under the ownership of the property owner.

- Permanent right of way acquisition is anticipated to be approximately 67.5 acres
- Temporary easement acquisition is anticipated to be approximately 15.4 acres

City of Owatonna Development Plan (2006) and the 2050 Comprehensive Plan – *Imagine Owatonna* (2024) [8]

Both plans include development of the 29th Ave/East Side Corridor and surrounding land uses in an orderly fashion. The alignment of the 29th Ave/East Side Corridor has been consistently identified for decades and included in numerous city plans and future land use planning efforts. The proposed Project would support the planned land uses and economic growth identified by the city as well as future schools, parks, and trails incorporated throughout their planning efforts.

The city of Owatonna Development Plan, completed in November 2006, describes the City's efforts to work with Steele County on the development of a beltline roadway around the city to accommodate new development and reduce pressure on the existing transportation network. The city's plan depicts two proposed north-south collector roadways in the vicinity of the East Side Corridor study area as well as existing CSAH 43 which was identified to be the beltline in 2011.

Steele County Transportation Plan[9]

Steele County's 2040 Transportation Plan depicts a new roadway on the east side of Owatonna and includes the roadway in a listing of planned transportation projects[10]. According to the Plan, there is a need to balance the ability to serve existing development while also supporting future growth areas. The corridor is intended to provide an immediate benefit for travelers by eliminating the need to drive through downtown Owatonna to reach US 14 and destinations in the south and southwest portion of the city for trips originating in the northeast.

The City of Owatonna's 2040 Transportation Plan was developed concurrently and in collaboration with Steele County's 2040 Transportation Plan to ensure consistency with the county's transportation plan. The City's plan also includes a corridor on the east side of Owatonna in a listing of planned transportation projects.

Other City and County Actions

A transportation corridor on the east side of Owatonna was officially mapped in 2000. In March 2004, Steele County and the city of Owatonna entered into a Joint Powers Agreement indicating that

[8] City of Owatonna: Imagine Owatonna: 2050 Comprehensive Plan | Owatonna, MN

[9] Steele County references to historic county transportation plans and beltline study/updates: Welcome to Steele County, MN

[10] See Table 22. Long-Term Projects in *Steele County 2040 Transportation* Plan - 2021.

the officially mapped corridor should continue to be maintained as an “East Side Corridor" and preserved for a future roadway.

PARKS AND TRAILS

The Project is consistent with parks and trails. The Project would not impact any existing parks and trails, and it would provide connections to them in some locations as noted in the Project description in **Section 6b**. Please refer to **Figures 5** and **10** for the Project improvements and existing and proposed trail connections.

PRIME OR UNIQUE FARMLANDS

The Project would impact over 10 acres of land in agricultural production. **Table 14** lists the parcels and acres of farmland that would be directly or indirectly impacted by the Project. **Figure 16** in **Attachment A** shows the farmland impacts by parcel. Overall, the Project would impact approximately **64.2** acres of prime or unique farmland.

Table 14 – Farmland Impacts

Parcel ID	Indirect Impacts (acres)	Direct Impacts (acres)	Total Impacts (acres)
08-014-5000	0	0	0
08-014-2402	0.085	0	0.085
08-014-2301	0.016	0	0.016
08-023-1100	0.429	0	0.429
08-014-2200	0.393	0	0.393
08-024-3400	0.522	0	0.522
08-013-3300	0.129	0	0.129
08-013-3100	0.198	7.375	7.573
08-013-4300	0.042	0.719	0.761
08-013-4302	0	7.016	7.016
08-013-4301	0.037	4.207	4.244
08-013-4400	0.058	2.261	2.319
08-013-4100	0.504	4.559	5.063
08-012-3300	0	2.346	2.346
08-012-3200	0	0.616	0.616
08-012-3400	0.006	3.026	3.032
08-012-3100	0.051	0.672	0.723
17-573-0001	0	1.422	1.422
17-582-0001	0	1.544	1.544
08-012-4100	0.1	0.444	0.544
17-594-0001	0	1.325	1.325
08-001-3300	0.52	2.73	3.25
08-001-3100	0.262	4.829	5.091
08-001-4203	0.026	0.119	0.145
08-001-4200	0.52	5.54	6.06
08-100-0101	0.129	1.427	1.556

Parcel ID	Indirect Impacts (acres)	Direct Impacts (acres)	Total Impacts (acres)
08-100-0103	0.003	0	0.003
12-036-3000	0.822	6.985	7.807
17-578-0402	0.004	0	0.004
17-578-0403	0.015	0	0.015
17-578-0404	0.046	0.048	0.094
17-578-0405	0.003	0.022	0.025
17-578-0408	0.004	0	0.004
17-578-0409	0.008	0	0.008
17-578-0410	0.012	0	0.012
17-578-0411	0.01	0	0.01
17-578-0412	0.007	0	0.007
17-578-0413	0.003	0	0.003
17-578-0414	0.003	0	0.003
Total	**4.97**	**59.23**	**64.2**

As noted, the future land use map for the city of Owatonna shows the Project area as part of the city. Land uses identified in the map include low- and medium-density residential, some mixed use, and a potential future school. The city and Owatonna Township have an orderly annexation agreement, see **Attachment C**, that covers the Project area and supports the transition of land within the township to the city. Both parties understand the land is currently in agricultural production but is anticipated to be developed to support the economy of the region over the next 25 years. **Attachment C** also includes a resolution from Owatonna Township indicating support of the Project because it protects the long-term agricultural interests of the township and focuses development in areas agreed to through the orderly annexation agreement.

The State Agricultural Land Preservation and Conservation Policy (Minnesota Statute 17.80 to 17.84) enacted in 1982 sets forth state policy on agricultural land preservation and conservation. Minnesota Statutes, Section 17.82 requires the Minnesota Department of Agriculture (MDA) to review a project if 10 acres or more of agricultural land is to be acquired. If the proposed action is being reviewed under the rules of the Minnesota Environmental Quality Board (MEQB) Chapter 116D, or if a political subdivision (city or county) is required by law to review and approve the action, the law does not require a separate review by the MDA Commissioner. The Project is subject to MDA review as part of the preparation and distribution of this document, the EAW.

c. **Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 10b above and any risk potential.**

LAND USES AND ZONING

No potential incompatibilities in terms of land use and zoning were identified.

The county would follow right of way acquisition processes as required. Property owners would be compensated for acquisition of permanent right of way and temporary easements. No one would be relocated as part of the proposed Project.

The preliminary floodplain assessment is included in **Attachment D**. Based on the floodplain assessment no significant floodplain impacts would be expected.

PARKS AND TRAILS

No potential incompatibilities. The Project would enable trail connections to occur on 29th Ave/East Side Corridor, reconstructed 26th St NE, and reconstructed SE 18th St, thus providing an enhancement.

PRIME OR UNIQUE FARMLANDS

While the Project would impact approximately 64.2 acres of prime or unique farmland, the Project would be consistent with plans to annex a portion of Owatonna Township and continue to develop the city of Owatonna.

11. Geology, soils and topography/land forms:

a. **Geology - Describe the geology underlying the project area and identify and map any susceptiblegeologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.**

The Steele County Geographic Atlas (Atlas C-53) was used for information in this section. The reference maps are plates 1 (data-base map), 2 (bedrock geology), 3 (surficial geology), 4 (quarterly stratigraphy), 5 (supplemental quaternary stratigraphy and sand-distribution model), and 6 (bedrock topography and depth to bedrock). The reference maps for Steele County can be found on the University of Minnesota Website[11] and in **Attachment E**.

BEDROCK GEOLOGY

According to Atlas C-53, the bedrock geology beneath the Project area consists of Shakopee Formation. The thickness of the Shakopee Formation is about 175 feet with dolostone and sandy dolostone with thin quartzose sandstone and minor shale beds.

SURFICIAL GEOLOGY

Atlas C-53 shows the surficial geology consists of unsorted sediment composed primarily of loam diamicton with intervals of portly consolidated and gravel in places, in addition to minor amounts of disturbed and mixed glaciolacustrine sand and silt.

AQUIFERS

Based on the MNDNR's groundwater provinces 2021, the Project is within Minnesota's groundwater province 2 (South-central) where sedimentary bedrock aquifers that are commonly used. These aquifers are underlain by sandstone, siltstone and limestone and dolostone of sedimentary origin.

[11] University of Minnesota – University Digital Conservancy – C-53 Geologic Atlas of Steele County, Minnesota: C-53, Geologic Atlas of Steele County, Minnesota

GEOLOGIC HAZARDS

There are no known geologic hazards sinkholes, or other conditions that would require mitigation. No karst features are in the vicinity of the Project; the nearest karst feature is 18 miles northeast of the Project area near West Concord.

b. **Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 12.b.ii.**

EXISTING CONDITIONS

Topographic mapping indicates that elevation within the Project area ranges between 1,190 feet above mean sea level in the northern portion of the area to 1,260 feet above mean sea level in the southern portion of the area. The lower elevations area is associated with the wetlands and Maple Creek within the Project area. The USDA Soil Survey of Steele County, Minnesota identified the soil types listed in **Table 15** within the Project area. Soil units are mapped in **Attachment A, Figure 18**.

Table 15 – Soil Types

Map Symbol	Soil Unit Name	Erodibility	Slope (percent)
Af	Alluvial Land, frequently flooded	Slight	0 – 2
Cf	Canisteo clay loam, depressional	Slight	0 – 1
ClB	Clarion loam	Moderate	2 – 6
DaA	Dakota sandy loam	Slight	0 – 2
DaB	Dakota sandy loam	Slight	2 – 6
Du	Dundas silt loam	Slight	0 – 2
EaD	Estherville sandy loam	Severe	12 – 18
Gc	Glencoe clay loam	Slight	0 – 1
HnB2	Hayden sandy loam	Moderate	2 – 6
L78A	Canisteo clay loam	Slight	0 – 2
L113B	Reedslake-Le Sueur complex	Moderate	1 - 6
L1207B	Le Sueur-Reedslake-Cordova complex	Slight	0 – 5
LlC2	Lester loam	Moderate	6 – 10
LuA	Le Sueur loam	Slight	1 - 3
LuB	Le Sueur clay loam	Moderate	2 – 4
Ma	Madelia silty clay loam	Moderate	0 – 2
My	Klossner muck	Slight	0 - 1
NcA	Nicollet clay loam	Slight	1 - 3
NcB	Nicollet clay loam	Moderate	2 – 4
SkC	Sparta-Dickinson complex	Moderate	6 – 12

Map Symbol	Soil Unit Name	Erodibility	Slope (percent)
Te	Spillville, occasionally flooded	Slight	0 – 2
WaC2	Wadena loam	Moderate	6 – 12
Wt	Webster clay loam	Slight	0 – 2

SOIL EXCAVATION AND GRADING

Constructing the Project – both the new roadway, realigning existing roadways, and making intersection improvements would require major grading to accommodate the new roadway, bridge, turn lanes, multiuse trails, traffic control changes, and stormwater facilities. Construction of improvements would involve more than one acre of soil disturbance. Construction activities would disturb existing ground cover, and some of this work would take place in wetlands, floodplain, and floodway. All necessary permits would be acquired, including coverage under the Minnesota Pollution Control Agency's (MPCA) NPDES General Permit for Construction Stormwater (MNR100001).

As required by the NPDES permit, a Stormwater Pollution Prevention Plan (SWPPP) would be developed. The SWPPP requires temporary and permanent erosion and sediment control Best Management Practices (BMPs) to be implemented by the contractor during all phase of construction. Erosion and sediment control measures recommended by the DNR, NPDES, and other applicable jurisdictions would be used. Ditches, dikes, siltation fences, bale checks, sedimentation basins, and temporary seed could be utilized as temporary erosion control measures. BMPs contained in MnDOT's Standard Specifications, details, and special provisions would be used. Erosion control measures are discussed in greater detail under **Section 12**. The SWPPP would also identify sensitive resources within the Project area, as applicable, to minimize disturbance.

Erosion control measures, including requiring erosion control plans and designating a site inspector and enforcer, would be in place and maintained throughout the entire construction process. Removal of erosion control measures would occur only after all disturbed areas have been stabilized.

Because the Project would disturb over 50 acres and Maple Creek is impaired, the NPDES permit would need to be submitted to the MPCA for review and approval 30 days in advance of construction.

- **NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 12 must be consistent with thegeology, soils and topography/land forms and potential effects described in EAW Item 11.**

12. Water resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. **Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches.Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive speciesand the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.**

Figure 19 in **Attachment A** shows surface water resources within the Project area. The Project is located within the Minnesota Cannon River watershed (Major Watershed No. 39). The Project area had a Level 1 delineation in 2023 with a partial Level 2 delineation on parcels where right of entry was granted. Delineation methods followed the U.S Army Corps of Engineers (COE) 1987 Manual. Various water resources were identified within the Project area and are further described below.

DNR PUBLIC WATERS

There is one public water - Maple Creek (PWI No. M-048-026-006) within the Project area.

Unnamed Stream/Izaak Walton Creek (PWI No. M-048-026-006-001) is approximately 0.1 mile west of the far southern portion of the Project along SE 18th St.

WETLANDS

The Project area contains wetlands. Wetlands were identified using a Level 1 method within the Project area. Parcels within the Project area where right of entry was granted had a Level 2 wetland delineation conducted to verify Level 1 wetland boundaries. The delineations documented approximately 5.3 acres of wetland within the Project area. Additional Level 2 wetland delineation would be conducted as design progresses and right of entry is obtained. Coordination with the Steele County SWCD and COE would occur to confirm boundaries and COE jurisdictional status.

IMPAIRED WATERS

Maple Creek is listed as an impaired water for aquatic recreational activities within the Project area. Maple Creek is impacted by fecal coliform. A Total Maximum Daily Load (TMDL) plan for fecal coliform was approved in 2006.

COUNTY DITCHES

County Ditch 1 West (CD1w) is in the Project area, flowing east to west north of Havana Road. The 29th Ave/East Side Corridor would cross one of the two short upstream branches CD1w.

FLOODPLAIN AND FLOODWAY

Figure 20, **Attachment A** shows existing floodplain and floodway. These areas are concentrated near Maple Creek, which is within the Project area, and near Unnamed Stream/Izaak Walton Creek, situated approximately 0.1 mile west of the southernmost portion of the Project area. The proposed 29th Ave/East Side Corridor would cross Maple Creek, a regional stream that is a tributary of the Straight River. The extents of the floodplain (over 700 feet) and floodway (325 feet) are defined in the Federal Emergency Management Agency's (FEMA) Flood Insurance

Study (FIS) 27147CV000A, the Flood Insurance Rate Map (FIRM) panel 27147C0156C (both effective December 2, 2011). The floodplain is classified as Special Flood Hazard Area Zone AE, an area with a 0.01 annual chance of flooding, and with a defined Base Flood Elevation (BFE).

The reconstruction of SE 18th St as it approaches near the intersection of CSAH 48/Bixby Road (currently under construction – converting the intersection to a roundabout) could involve minimal encroachment into the floodplain of Unnamed Stream/Izaak Walton Creek. The FIRM panel 27147C0154C (effective December 2, 2011) shows that the regulatory floodplain of Izaak Walton Creek is classified as Special Flooding Hazard Area Zone A. Typically, a Zone A has no determined BFE and no defined floodway. The estimated floodplain elevation for Izaak Walton Creek, based on available data from the DNR, is 1205.7. A LOMR was completed for this segment of the creek in 2014.

ii. **Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.**

SPRINGS

No springs or seeps were identified in the Project area during the field wetland delineation conducted in 2024. According to the Minnesota DNR's Karst Feature Inventory web map, no springs are present in the Project area.

DEPTH TO GROUNDWATER

According to MN atlas web map viewer, the depth to groundwater within the Project ranges from 0 to 10 feet.

MINNESOTA DEPARTMENT OF HEALTH WELLHEAD PROTECTION AREA

There is a Minnesota Department of Health (MDH) Wellhead Protection Area (WHPA) and Drinking Water Supply Management Area (DWSMA) within portions of the Project area. These areas are shown in **Figure 21** in **Attachment A**. DWSMA is categorized as having a low vulnerability for outside contamination by the MDH. Vulnerability refers to the likelihood that activities at the land surface may degrade drinking water quality at a public water supply well.

WELLS

According to the Minnesota Department of Health's Well Index, there are nine wells within or near the Project.[12] **Figure 22** in **Attachment A** shows the location of verified wells located within approximately 100 feet of the Project. **Table 16** lists the wells.

All wells within the proposed county right of way would be capped. If a well is impacted but the balance of the site (and its associated uses) remains intact, the well would be mitigated by replacement in a new location. Known active wells near construction limits would be labeled on plan sheets as sensitive resources to prevent impacts due to potential changes during construction. Well abandonment would follow state and local guidelines.

[12] Minnesota Department of Health Well Index Map: Minnesota Well Index

Table 16 – Wells Within 100 Feet of the Project

Well ID	Location	Use	Status	Static Water Level (feet)	Depth to Bedrock (feet)
107576	609 Harriet	Domestic	Active	1,196	62
500517	2634 Walker Drive	Domestic	Active	1,193	70
509545	2621 Walker Drive	Domestic	Active	1,191	80
137277	RR 3	Domestic	Active	1,187	88
107595	RR 3	Domestic	Active	1,198	90
500546	2153 Hill Drive	Domestic	Active	1,194	85
137260	RR 4	Domestic	Active	1,198	70
717091	2944 Rose Street E	Domestic	Active	1,183	177
784825	2380 CR 180	Domestic	Active	1,185	100

If unidentified wells are encountered, the MPCA and MDH would be contacted to determine an appropriate course of action, which may include sealing, relocating, or preserving by a licensed well contractor according to Minnesota Rules Chapter 4725.

b. **Describe effects from project activities on water resources and measures to minimize or mitigatethe effects in Item b.i. through Item b.iv. below.**

i. **Wastewater - For each of the following, describe the sources, quantities and composition ofall sanitary, municipal/domestic and industrial wastewater produced or treated at the site.**

1) **If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water andwaste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.**

Wastewater would not be produced or treated by this Project.

2) **If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for sucha system. If septic systems are part of the project, describe the availability of septage disposal options within the region to handle the ongoing amounts generated as a result of the project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion.**

Wastewater would not be produced or treated by this Project.

3) **If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigateimpacts. Discuss any effects to surface or groundwater from wastewater discharges,taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may**

influence the effects.

Wastewater would not be produced or treated by this Project.

ii. **Stormwater - Describe changes in surface hydrology resulting from change of land cover. Describe the routes and receiving water bodies for runoff from the project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post construction including how the project will affect runoff volume, discharge rate and change in pollutants.Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction Stormwater permit coverage, state the total number of acres that will be disturbed by the project and describe the stormwater pollution prevention plan (SWPPP), including specific best management practices to address soil erosion and sedimentation during and after project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater management practices. Identify any receiving waters that have construction-related water impairments orare classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.**

The county reviewed climate trends, and though precipitation is projected to increase in rainfall intensity and volume, the Project would be designed using current standards. There is not yet an agreed upon standard of practice for how best to incorporate projected precipitation increases into projects. However, as discussed in **Section 7**, a resiliency check storm would be analyzed as the Project continues to identify and reduce climate vulnerability risks on the Project. The resiliency check storm is currently defined as a 15 percent increase in the 100-year design event, which is a statewide temporary placeholder until more robust precipitation frequency estimates based on nonstationary climate are published and assessed. As Project design advances, additional analysis would be completed, and improvements may be identified to address resiliency issues.

The Project would result in approximately 20 acres of net new impervious surface and 9.1 acres of reconstructed impervious. The Project would involve more than one acre of soil disturbance. Construction activities would disturb the existing ground cover, and some of this work would take place in the vicinity of wetlands. All necessary permits would be acquired, including an NPDES permit. As part of the NPDES permit, a Stormwater Pollution Prevention Plan (SWPPP) would be developed for the Project. The SWPPP would require temporary and permanent erosion control Best Management Practices (BMPs) to be implemented by the contractor during all phases of construction. Erosion control measures used by the DNR, NPDES, and other applicable jurisdictions would be used on this Project.

Erosion and sedimentation of all exposed soils within the Project area would be minimized by implementing BMPs during construction. Implementation of BMPs greatly reduces the amount of construction-related sedimentation and helps to control erosion and runoff. Ditches, dikes,

siltation fences, bale checks, sedimentation basins, and temporary seed could be utilized as temporary erosion control measures. BMPs contained in MnDOT's Standard Specifications, details, and special provisions would be used. As described under Reference 3 in the Standard Specifications, DNR recommends using 'bio-netting' or 'natural netting' types of erosion control products (category 3N or 4N) and excluding the use of plastic mesh netting.

Temporary and permanent erosion control plans would be identified in the final site grading and construction plans as required by NPDES permitting for construction sites, in accordance with the MPCA. A SWPPP that includes erosion control and sediment management practices would be submitted with the application for coverage under the NPDES general permit as part of design and implementation of proposed improvements. The SWPPP would identify sensitive resources within the Project area, as applicable, to minimize disturbance.

Erosion and sediment control measures, including requiring erosion and sediment control plans and designating a site inspector and enforcer, would be in place and maintained throughout the entire construction process. Removal of temporary erosion and sediment control measures would occur only after all disturbed areas have been stabilized.

Because Maple Creek is an impaired water for aquatic recreation due to fecal coliform and because the Project would disturb over 50 acres, the NPDES permit would need to be submitted for review and approval at least 30 days in advance of construction.

The city of Owatonna is part of the MS4 program (Municipal Separate Storm Sewer System). The Project would be required to meet the MS4 permit requirements for water quality volume. The required water quality volume for areas of the Project within the city boundary is the greater of one (1) inch of runoff from the new impervious surface or one-half (0.5) inch of runoff from the sum of the new fully reconstructed impervious surfaces created by the Project.

As a new roadway facility, the net new impervious water quality volume controls. The MS4 permit stipulates that volume reduction practices (e.g. infiltration or other) to retain the water quality volume on-site must be considered first when designing the permanent stormwater treatment system. The Project would make all reasonable attempts to reduce the runoff volume in accordance with the MS4 permit. Given the nature of the soils in the Project area (which have a low infiltration rate), alternative methods such as filtration and detention ponds were incorporated.

Permanent stormwater BMPs would include using a combination of the proposed ditches with ditch checks where the roadways would be rural sections, filtration basins and wet ponds. It would not be feasible to construct infiltration basins due to the high groundwater and poorly draining soils in the Project area. **Figure 5, Attachment A** shows ponding and filtration basins.

A storm sewer system would be designed along the urban (proposed curb and gutter areas) portions of the Project that would convey the 10-year peak flow rates.

The Project would possibly extend an existing culvert at SE 18th St near the western Project

limits. In addition, the roadway realignment and reconstruction of CR 180/Claremont, SE 18th St, and 26th St NE along with the construction of 29th Ave/East Side Corridor would cross over relatively small local drainage ditches and swales. A preliminary analysis indicated nine culverts ranging in size from 15 to 42 inches would be needed.

iii. **Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe anywell abandonment. If connecting to an existing municipal water supply, identify the wells tobe used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should theappropriation volume increase beyond infrastructure capacity or water supply for the project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.**

Water appropriation (includes dewatering) may be required to complete culvert and bridge work near wetlands, waterways, and areas with shallow water tables, including the floodplain and floodway. Dewatering BMPs would be identified in the SWPP, and a Project dewatering plan would be included with the construction documents. Any locations that are determined to require dewatering by the contractor would follow the dewatering plan. If temporary dewatering during construction exceeds 10,000 gallons per day or one-million gallons per year, a DNR water appropriation permit would be obtained by the contractor for these temporary activities. Dewatering discharge would be treated to be free of suspended sediment before entering surface waters using methods consistent with the permit. Discharge rates would be controlled to prevent scour/erosion at the point of discharge. No water appropriation is expected during operation of the roadway.

Information on wells in the Project area is provided in Section 12a.

iv. **Surface Waters**

a) **Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigationfor unavoidable wetland impacts will occur in the same minor**

or major watershed and identify those probable locations.

Wetland impacts that are unavoidable have been minimized to the extent practicable without compromising safety. The Project would impact approximately 2.99 acres of wetland and 0.4 acres of wet ditch through placement of fill to support roadway improvements. A Level 1 wetland delineation (desktop) identifying the wetlands and other aquatic resource boundaries was completed for the Project, along with a Level 2 wetland delineation (field investigation) where property access was granted. These resources were used to identify/confirm wetlands within the Project area and to estimate wetland impacts. **Figure 23, Attachment A** shows locations of existing wetlands, wet ditches, and associated impacts. **Tables 17** and **18** show wetland and wet ditch impacts, respectively.

Table 17 – Wetland Resources and Impacts

ID	Wetland Type/Existing Plant Community Types	Permitting Jurisdiction (COE, WCA)[1]	Permanent Impact (acres or sq feet)
1	Type 6/Shrub Carr	COE, WCA	0.05ac
2	Type 1/Seasonally Flooded Basin	COE, WCA	0.86 ac
3	Type 1/Seasonally Flooded Basin	COE, WCA	0.22 sq feet
4	Type 2/Wet Meadow	COE, WCA	0.38ac
5	Type 1/Seasonally Flooded Basin	COE, WCA	0.38 ac
6	Type 1/Seasonally Flooded Basin	COE, WCA	0.28 ac
7	Type 1/Seasonally Flooded Basin	COE, WCA	0.15 ac
8	Type 1/Seasonally Flooded Basin	COE, WCA	0.12 ac
9	Type 1/Seasonally Flooded Basin	COE, WCA	0.01 ac
10	Type 1/Seasonally Flooded Basin	COE, WCA	0.04 ac
11	Type 1/Seasonally Flooded Basin	COE, WCA	0.04 ac
12	Type 1/Seasonally Flooded Basin	COE, WCA	0.03ac
13	Type 1/Seasonally Flooded Basin	COE, WCA	0.25 ac
14	Type 1/Seasonally Flooded Basin	COE, WCA	0.15ac
15	Type 2/Wet Meadow	COE, WCA	0.03 ac

(1) COE is US Army Corps of Engineers and WCA is Wetland Conservation Act

Total Permanent Wetland Impacts = 2.99 acres

Table 18 – Wet Ditch Resources and Impacts

ID	Wetland Type / Existing Plant Community Types	Permitting Jurisdiction (COE, WCA) [1]	Size of Permanent Impact of the Project (Acres or Square Feet)
Wet Ditch 1	Type 3/Shallow Marsh	COE	0.40 ac

(1) COE is US Army Corps of Engineers and WCA is Wetland Conservation Act

Total Permanent Wet Ditch Impacts = 0.40 acres

Several measures were employed during Project development and alternatives evaluation to reduce and minimize impacts to wetlands and other resources. This included steepened (1:4 or steeper) inslopes outside the clear zone in wetland areas; minor shifts in the alignment of the new 29th Ave/East Side Corridor; and using urban and suburban design where practicable vs rural, which would have more impact. Additional measures would be considered in final design and in the permitting process.

As wetland impacts are expected, Steele County proposes to provide wetland replacement under the Wetland Conservation Act (WCA) at a ratio of 2:1. Impacted wetlands would be replaced near the watershed if possible, to help retain wetland services in the area consistent with WCA guidance; however, a bank has not been identified at this time.

Because the Project is currently expected to impact 2.99 acres of wetlands, a COE Section 404 Permit may be required. Steele County will coordinate an Approved Jurisdictional Determination with the COE to determine the wetlands which the COE will regulate. If a Section 404 permit is required, it is anticipated the project would require either a Section 404 Transportation Regional General Permit or Individual Permit. If a Section 404 Permit is needed, an MPCA Section 401 Certification is also required. If a USACE Section 404 Individual Permit is needed, the MPCA would need to review the Project for Section 401 Certification independently from the COE permit review process.

If the MPCA reviews the Section 401 Certification independently from the COE permit review process, a pre-filing meeting would need to occur to discuss impacts and potential mitigation. The submittal can occur 30 days or more after the pre-filing request. Submittals required to the MPCA include the joint application form, supplement info form, environmental review documents (preferred signed), and anti-degradation form. The MPCA would review for completeness and conduct an internal technical meeting. The MPCA would then determine a pathway forward based on their review: They may deny, certify with conditions (with 14-day public notice), or waive (certify without public notice) the application. The decision made by the MPCA would be sent to the COE.

b) **Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicialditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering thewater features. Discuss how**

the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

As previously noted, there is FEMA Zone A and AE floodplain designated within the Project area. The proposed 29th Ave/East Side Corridor would cross Maple Creek. At the crossing, Maple Creek has a wide regulatory floodplain (over 700 feet) and a wide (325 feet) floodway. The proposed roadway crossing coincides with the cross-section "AY" on the FEMA data, whose 1 percent annual chance flood water surface elevation (WSE) is given as 1187.2, NAVD88.

As noted previously, the Project parallels the floodplain associated with Unnamed Stream/Izaak Walton Creek. The FIRM panel 27147C0154C (effective December 2, 2011) shows that the regulatory floodplain of Izaak Walton Creek at this location is classified as Special Flooding Hazard Area Zone A. Zone A has no determined Base Flood Elevation (BFE) and no defined floodway. A WSE rise of no more than 0.5 feet is permissible within Zone A.

FEMA and Minnesota Rule 6115.0231, Subp.2.B.(1) state that for new crossings, no approach fill can encroach upon the regulatory floodway. Therefore, the proposed bridge over Maple Creek would span over the entire width of the defined floodway. The low chord of the bridge must be designed above the 100-year WSE of 1187.2 to meet MnDOT requirements. The proposed bridge design would also seek to achieve no (zero) rise in the WSE of 1187.2 under proposed conditions and also no drop in the WSE. Excavation within the floodplain would be needed. No grading would take place within the channel (i.e., below the bankfull elevation) of Maple Creek. Based on preliminary discussions with DNR it was determined that if no rise can be demonstrated, under final design and during construction phase alike, no Conditional Letter of Map Revision (CLOMR) would be required. Furthermore, if the proposed design can also demonstrate no drop in the WSE, a Letter of Map Revision (LOMR) would also not be required.

In addition to the proposed 29th Ave/East Side Corridor, the Project would include reconstruction of other local roads. The planned reconstruction of SE 18th St could involve minimal encroachment into the floodplain of Izaak Walton Creek. The preliminary floodplain assessment is included as **Attachment D**. There are no significant anticipated floodplain impacts.

13. Contamination/Hazardous Materials/Wastes:

a. **Pre-project site conditions - Describe existing contamination or potential environmental hazardson or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.**

The presence of potentially contaminated properties (defined as properties where soil and/or groundwater is impacted with pollutants, contaminants, or hazardous wastes) is a concern due to the potential liabilities associated with ownership of such properties, potential cleanup costs, and safety concerns associated with construction personnel encountering unsuspected wastes or contaminated soil or groundwater. Contaminated materials encountered must be properly handled and treated in accordance with state and federal regulations. Improper handling of contaminated materials can worsen their impact on the environment. Contaminated materials also cause adverse impacts to highway projects by increasing construction costs and causing construction delays, which also can increase Project costs.

The Steele County Project team reviewed MPCA and MDA databases to check for known or suspected contaminated sites in the Project area. The databases searched included: feedlots, stormwater areas, and a closed old agricultural chemical incident (pesticide spill/fire in a dairy barn). Although no areas of concern were noted in either database near the railway, there are some risks regarding contamination from freight and materials traveling through the Project area via this mode**. Figure 24 in Attachment A** shows the locations of items included in the MPCA and MDA databases. The sites identified in the databases have low-risk for contamination.

b. **Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solidwaste including source reduction and recycling.**

Excess materials generated because of construction (e.g., concrete, granular, bituminous, and topsoil) may be exported from the Project. It is anticipated that the existing pavement would be disposed of offsite. Storm sewer removals would be disposed. All earthwork would stay onsite within the county right of way.

Project activities would generate wastes and debris typical of construction operations. All waste and unused materials would be properly contained and disposed of off-site and not allowed to be carried by runoff to receiving waters.

The disposal of solid waste generated by clearing the construction area is a common occurrence associated with road construction projects. During Project construction, excavation of soil would need to occur within the Project limits. Preliminary design would consider selection of grade-lines and locations to minimize excess materials, and consideration would be given to using excess materials on the proposed Project or other nearby projects. Any excess soil material that is not suitable for use on the Project site or other nearby projects would be disposed of in accordance with state and federal requirements.

All solid waste generated by construction of the proposed Project would be disposed of properly in a permitted, licensed solid waste facility. Project demolition of concrete, asphalt, gravel, and other potentially recyclable construction materials would be directed to the appropriate storage, crushing, or renovation facility for recycling.

Excess materials and debris from this Project would be disposed of in accordance with MnDOT Standard Specifications for Construction, 2104.3C, Minnesota Rule 7035.2825.

Following construction, the Project would not generate solid waste.

c. **Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverseeffects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.**

CONSTRUCTION

Products, materials, or wastes typical of construction sites would be present during the construction of this Project (e.g., gasoline, diesel fuel, oil, hydraulic fluid, portable toilets, etc.). In compliance with the NPDES Construction Stormwater permit, products that have the potential to leach pollutants would be stored under cover, hazardous materials would be stored in sealed containers and would have secondary containment to prevent spills. Solid wastes would be collected and disposed of properly, and vehicle and equipment washing would not be allowed on site.

Temporary storage tanks for petroleum products may be in the Project limits for refueling construction equipment during roadway construction. The potential for substantial fuel or other chemical spills during and after road construction activities is considered low. A spill kit would be kept near any storage tanks. Appropriate measures would be taken during construction to avoid spills that could contaminate groundwater or surface water in the Project area. If a leak or spill occurs during construction, appropriate action to remedy the situation would be taken immediately in accordance with MPCA guidelines and regulations.

Any contaminated spills or leaks that occur during construction would be the responsibility of the contractor, who would notify the Duty Officer and work with the MPCA to contain and remediate contaminated soil/materials.

OPERATION

Once the Project is constructed there would be no above or below ground petroleum storage tanks within the site.

d. **Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, anddisposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.**

Normal construction wastes are anticipated. Toxic or hazardous materials such as fuel for construction equipment and materials used in the construction of roads (e.g., paint, contaminated

rags, acids, bases, herbicides, and pesticides) would likely be used during site preparation and road construction. Although spills of these materials are not common, any spills of reportable quantities that occur would be reported to the Minnesota Duty Officer and the contractor would clean up spilled material according to state requirements.

Measures to avoid adverse effects from storage of hazardous waste include the following:

- Products would be kept in their original containers unless they cannot be resealed. Original labels and Safety Data Sheets would be retained on site and would be accessible at all times as they contain important product and safety information. If surplus product must be disposed of, manufacturers' or local and state recommended methods for proper disposal would be followed. An effort would be made to store only enough products required to do the job.
- All materials stored onsite would be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure with secondary containment.
- Substances would not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all a product would be used up before disposing of the container.
- Manufacturers' recommendations for proper use and disposal would be followed.
- The contractor's site superintendent would inspect daily to ensure proper use and disposal of materials.

14. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

a. **Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.**

The Project is located within and immediately adjacent to the city of Owatonna. Land uses, as noted previously are primarily low-density residential, rural residential and agriculture. The Project area also includes a railroad. West of the Project area at the northern and southern Project endpoints are more urbanized development, including residential areas and the Owatonna High School which opened in 2023. As such, the surrounding vegetation comprises a mix of naturally occurring native and non-native trees and shrubs. Additionally, there are planted trees, mainly on nearby private properties Herbaceous vegetation is primarily composed of non-native grasses and other herbaceous plants.

Within the Project area, there are multiple surface water features, such as Maple Creek, wet ditches, and wetlands (as detailed in **Section 12**). Unnamed Stream/Izaak Walton Creek, while not within the Project area, is located approximately 0.1-mile west of the southernmost portion of the Project limits. Both creeks are DNR public waters. There are no public waters wetlands within the Project area. Areas near Maple Creek are wooded. Fewer trees are surrounding Izaak Walton Creek. **Figure 19** in **Attachment A** shows the public waters and wetlands.

The Minnesota DNR identified a site of *Moderate Biodiversity Significance* in the vicinity of the Project. Sites of Biodiversity Significance have varying levels of native biodiversity and are ranked

based on the relative significance of this biodiversity at a statewide level. The site has examples of Wet Prairie (southern – WPs54b) and Mesic Prairie (southern – UPs23a), both ranked as imperiled. The current Project alignment would avoid these native plant communities but would impact the *Moderate Biodiversity Significant* site (not the plant communities within the broader site). The site is shown in **Figure 25** in **Attachment A**.

Multiple rare state plants and species have been documented near the Project area as well as federal species and a plant. These items are described in detail in Section 14b. Correspondence with the DNR can be found in **Attachment F** and correspondence with MnDOT's Office of Environmental Stewardship (OES) can be found in **Attachment G**.

b. **Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-) and/or correspondence number (MCE) from which the data were obtained and attach the Natural Heritage Review letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.**

PUBLIC WATERS AND THREATENED AND ENDANGERED SPECIES, SPECIES OF SPECIAL CONCERN - STATE

One DNR Public Water is located in the Project area:

- Maple Creek Public Water (PWI No. M-048-026-006)

Maple Creek is listed as impaired for aquatic recreation due to fecal coliform.

The Minnesota Natural Heritage Information System (NHIS) was queried by the DNR to determine if any rare plant or animal species, native plant communities, or other significant natural features are known to occur within an approximate one-mile radius of the Project area (**MCE-2023-00220-02**). See **Attachment F** for correspondence with the DNR.

As noted in Section 14a, the DNR identified a MBS in the vicinity of the proposed Project, including Wet Prairie and Mesic Prairie. More than 99 percent of the prairie that was present in the state before settlement has been destroyed, and more than one-third of Minnesota's endangered, threatened, and special concern species are now dependent on the remaining small fragments of Minnesota's prairie ecosystem. Therefore, all prairie remnants merit protection.

Multiple rare native plants have been documented near the Project area. Three state threatened species and two state species of concern were identified. All these species are found in mesic or wet native prairie. Threatened species include:

- Tuberous Indian plantain (*Arnoglossum plantagineum)*
- Sullivant's milkweed (*Asclepias sullivantii)*
- Edible valerian (*Valerian edulis var. ciliata)*

The species of concern include:

- Small white lady's-slipper (*Cypripedium candidum)*
- Rattlesnake master (*Eryngium yuccifolium)*

The current route of the Project avoids these native plant communities; however, these impacts would change if the route is altered. The Project would impact the MBS Site, and Project alternatives to minimize disturbance to the identified ecologically significant area are included in Section 14d. Given the nature and location of the proposed Project and the utilization of avoidance and mitigation measures, the DNR does not believe the Project would negatively impact any known occurrences of rare features. Commitments for the rare native species identified within the vicinity of the proposed Project are listed in Section 14d.

THREATENED AND ENDANGERED SPECIES - FEDERAL

Section 7 of Endangered Species Act of 1973, as amended, requires each federal agency to review any action that funds, authorizes, or carries out to determine whether it may affect threatened, endangered, or proposed species or listed critical habitat. Federal agencies (or their designated representatives) must consult with the United States Fish and Wildlife Service (USFWS) if any such effects may occur as a result of their actions. Consultation with USFWS is not necessary if the proposed action would not directly or indirectly affect listed species or critical habitat. If a federal agency finds that an action would have no effect on listed species or critical habitat, it should maintain a written record of that finding that includes the supporting rationale.

MnDOT Office of Environmental Stewardship (OES), on behalf of USFWS, reviewed the proposed Project and provided a list of federally threatened, endangered, proposed and candidate species, and designated and proposed critical habitats that overlap with the Project area. The Project is within the range of four species listed as federally threatened, proposed, or candidate species. These include:

- Whooping crane (*Grus americana*) – non-essential experimental population
- Monarch butterfly (*Danaus Plexippus*) – proposed threatened
- Western regal fritillary (*Argynnis idalia accidentalis*) – proposed threatened
- Minnesota dwarf trout lily (*Erythronium propullans*) – threatened

Determinations for each are provided below and correspondence with MnDOT OES and USFWS is included in **Attachment G**.

Minnesota dwarf trout lily (*Erythronium propullans*) – No Effect Determination

No in-water work would be proposed for this Project and no direct or indirect impacts to suitable habitat are anticipated.

This Project review relies on the USFWS-issued Minnesota-Wisconsin Federal Endangered Species Determination Key within the Information for Planning and Consultation (IPaC) system to satisfy requirements under Section 7(a)(2). The Service developed this system in accordance with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.). As reviewed, this Project has met USFWS consultation requirements, and no further consultation is required for this species.

Monarch butterfly (*Danaus plexippus*) – No Jeopardy Determination

The proposed Project *may affect* monarch butterflies and/or suitable monarch habitat. Ground and vegetation disturbing activities are not expected to appreciably diminish the quality or extent of available suitable habitat within the Project's Action Area. *Therefore, MnDOT on behalf of the FHWA, does not anticipate the proposed action will jeopardize the continued existence of this species*.

Western regal fritillary (*Argynnis idalia occidentalis*) – No Jeopardy Determination

The proposed Project *may affect* regal fritillary butterflies and/or suitable habitat. Ground and vegetation disturbing activities are not expected to appreciably diminish the quality or extent of available suitable habitat within the Project's Action Area. In addition, violets (*Viola* spp.) – the host plant for regal fritillary butterflies – are typically absent or sparse in typical roadside habitats. *Therefore, MnDOT on behalf of the FHWA, does not anticipate the proposed action will jeopardize the continued existence of this species.* Required Avoidance and Minimization Measures (AMMs) would be incorporated as part of the Project. See MnDOT boiler plate special provisions (e.g., *Protection of Fish and Wildlife Resources*).

Whooping Crane (*Grus americana*) – No Jeopardy Determination

The proposed Project area is within the range of a known non-essential experimental population for Whooping crane. No documented occurrences or critical habitat for this species exist within the Project Action Area. All Project activities are proposed to be completed on land outside of a National Wildlife Refuge or National Park. Based on the proposed scope of work, Project activities are not expected to appreciably diminish the quality or extent of available suitable habitat within the Project's Action Area. *Therefore, MnDOT on behalf of the FHWA, does not anticipate the proposed action will jeopardize the continued existence of this species.*

Federal Migratory Bird Treaty Act (MBTA)

The proposed Project was reviewed for potential impacts to birds protected under the MBTA. Based on the proposed scope of work and/or the timing of proposed work, impacts are not anticipated to birds protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712). No further coordination is required.

Bald and Golden Eagle Protection Act (BGEPA)

The proposed Project was reviewed for potential impacts to eagles protected under the BGEPA. Based on the best available information, the proposed action is not anticipated to disturb, harm or destroy a bald eagle or a bald eagle nest protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d).

c. **Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.**

No Project work is anticipated to occur within a public water; therefore, a public water's work permit would not be needed. If bridge design changes and work would be needed within Maple

Creek, a Public Waters Work permit would have to be obtained for the Project.

No northern long-eared bat hibernacula and/or roost trees are documented within the Project Action Area; however, the Project would require removing approximately 3.3 acres of trees for construction of the new 29th Ave/East Side Corridor and other corridor realignments. Tree removals would occur during the winter season November 1 to April 14, inclusive. Other required avoidance and minimization measures are outlined in Section 14.d to support bat health.

The Project would impact the site of *Moderate Biodiversity Significance*, and Project alternatives to minimize disturbance to the identified ecologically significant area are included in Section 14d. Given the location of the proposed Project and the utilization of avoidance and mitigation measures, the DNR does not believe the Project would negatively impact any known occurrences of rare features. Commitments for the rare native species identified within the vicinity of the proposed Project are listed in Section 14d. MnDOT's CRU and USFWS indicated that the proposed Project would have a "no effect" determination on the Minnesota trout dwarf lily and a "no jeopardy" determination for the monarch butterfly, the western regal fritillary, and the whooping crane. They also indicated the Project would not affect birds protected under the Migratory Bird Treaty Act nor impact bald or golden eagle or their nests.

It is possible that soil disturbance and vegetation clearance associated with the Project could create conditions that enable the spread of invasive species. No noxious weeds have been previously mapped within the limits of the Project. The Project would follow all state requirements for the control and spread of state listed noxious weeds and/or invasive weeds if encountered during construction. Disturbed areas would be reestablished using appropriate native and stabilization seed mixes, contributing to improved climate change resilience and ecosystem health.

Climate change impacts on natural resources are expected to vary between species, populations, and ecosystems. Both positive and negative impacts are anticipated and would depend on the specific species, populations, and ecosystems examined. Current and projected future changes in Minnesota's climate include greater intensity rainfall events, more localized flooding, more frequent (repeated) freeze/thaw cycles, lack of snow cover, extreme heat, and drought. In response to changing climate, more mobile wildlife and plant species may shift their ranges to track the conditions in which they are best adapted to survive. Less mobile species may not be able to migrate, and other interventions may be needed (e.g., assisted migration). The protection of movement corridors and population refugia, and efforts to increase landscape permeability, are expected to be of key importance in a changing climate (Mawdsley et al. 2017).

Steele County seeks to maintain and enhance ecological connectivity on its projects through both programmatic approaches such as the use of wildlife passage benches under bridges spanning public waters and through project-specific designs components when applicable. Maintaining and enhancing ecological connectivity reduces barrier effects roads have on individual animals, populations, and ecosystems, which in turn improves natural resource resiliency.

d. **Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish,wildlife, plant communities, ecosystems, and sensitive ecological resources.**

PUBLIC WATERS

- Appropriate erosion control and sediment prevention measures would be taken in areas that drain to public waters.
- Contractors would be reminded that a separate DNR water use permit is required if the Project would require the use of more than 10,000 gallons of water per day or 1 million gallons per year from any surface water or ground water. Construction dewatering is considered as an appropriation requiring a DNR permit.
- Construction and demolition methods would be submitted for review and approval later in the design process. Construction contractors would be made aware of this condition as they may be held responsible for compliance.
- All DNR Public Waters would be identified as an area of environmental sensitivity (AES) on plans. This designation assures special protection during construction though the Standard Specifications for Construction #1717 (Air, Land, and Water Pollution), 2573.3 (A.3 stage the work to minimize sediment entering these AES areas) and use native vegetation per vegetation establishment recommendations, as well as approved standards for temporary erosion control due to potential for impacts to small animals and concern for plastics to enter DNR public waters.

THREATENED AND ENDANGERED SPECIES, SPECIES OF SPECIAL CONCERN – STATE

Site of Moderate Biodiversity Significance (MBS)

- Minimize vehicular disturbance in the MBS Site (allow only vehicles/equipment necessary for construction activities).
- Do not park equipment or stockpile supplies in the MBS Site.
- Do not place spoil within MBS Site or other sensitive areas.
- If possible, conduct the work under frozen ground conditions.
- Use effective erosion prevention and sediment control measures.
- Inspect and clean all equipment prior to bringing it to the Site to prevent the introduction and spread of invasive species.
- As much as possible, operate within already-disturbed areas.
- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible.
- Use only weed-free mulches, topsoil, and seed mixes. Of particular concern are birdsfoot trefoil (Lotus corniculatus) and crown vetch (Coronilla varia), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas.

Indian plantain, Sullivant's milkweed, Edible valerian, Small white lady's-slipper, and Rattlesnake master

- Indian plantain, Sullivant's milkweed, and edible valerian are all state-listed threatened species. The small white lady's slipper and the rattlesnake master are state-listed species of special concern. All these resources are found in mesic and/or wet native prairie. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of endangered or threatened plants or animals, including their parts

or seeds, without a permit.

- If this Project would impact any native prairie habitat, then to demonstrate avoidance, a qualified surveyor would need to conduct a botanical survey in these areas. (Project not anticipated to impact native prairie habitat)
- Surveys must be conducted by a qualified surveyor and would follow the standards contained in the Rare Species Survey Process and Rare Plant Guidance.
- Survey proposals must be submitted to Reports.NHIS@state.mn.us prior to initiating survey work.
- Project planning should consider that any botanical survey needs to be conducted during the appropriate time of the year. Consult Review.NHIS@state.mn.us if you have any questions.
- Visit the Natural Heritage Review page for a list of certified surveyors and more information on this process.

Minnesota's bats and the northern long-eared bat

- Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and pups cannot fly yet.

  - The DNR provides a recommendation regarding tree clearing activities; however, this recommendation is less restrictive than federal guidance applicable to the Project. Please refer to the next section on federal species for appropriate tree clearing measures.

THREATENED AND ENDANGERED SPECIES, SPECIES OF SPECIAL CONCERN - FEDERAL

Conservation measured outlined by MnDOT OES are listed below.

Required Avoidance and Minimization Measures (AMMs). See MnDOT boiler plate special provisions (e.g., Protection of Fish and Wildlife Resources).

- Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs. *Notify contractor(s) during the pre-construction meeting. Bat sightings (include sick, injured, and/or dead bats) on the Project must be reported to OES Wildlife ecologist (612-741-7678) within 24 hours of discovery*.
- Direct temporary lighting, if used, away from wooded areas during the bat active season (April1 to Nov. 14, inclusive). If installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable. *Please contact Susan Zarling (MnDOT Lighting Engineer) at 651-234-7052 with questions about approved products*.

Additional Required USFWS Conservation Measures:

- Contractor must inspect Bridges and Culverts, including expansion joints to determine if bats

or bat signs are present before beginning Work during the bat active season (April 1 to Nov. 14, inclusive). If bats or bat signs are detected, stop work, and notify the MnDOT wildlife ecologist immediately.

- Avoid tree clearing April 15 to Oct. 30, inclusive, to avoid the bat active season and bird nesting season.
- Restrict all activities to avoid the application of insecticides and fungicides.
- Minimize herbicide use – If used, must be spot treatments. Avoid broadcast applications of herbicides without further consultation to MnDOT Office of Environmental Stewardship.
- Project must establish native vegetation in areas that are not proposed to be mowed more than once per year, as shown in the MnDOT Seeding Manual.

Additional Recommended USFWS Conservation Measures:
Steele County agrees and is committed to implementing these additional recommended measures:

- Any erosion control blanket must be free of plastic netting and on the MnDOT Approved Products list for Rolled Erosion Prevention products.
- Any hydraulic mulch used up-slope of Public Waters must be free of plastic fiber additives.

BGEPA
If an eagle nest is found ahead of, or during construction, all work within 0.06 miles (300 feet) of the nest would be stopped and the MnDOT protected species team must be contacted. Email: protectedspecies.dot@state.mn.us or phone: 612-741-7678.

15. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or inclose proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

MnDOT's Cultural Resource Unit (CRU) initiated Section 106 review of the Project for the presence of historically significant archaeological and/or architectural resources based on the Project's Area of Potential Effect (APE)[13]. The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE accounts for any physical, auditory, visual, or other relevant potential impacts to historic properties.

Based on their existing programmatic agreements with various tribal groups, CRU sent a consultation letter to tribes with potential interest in the Project. CRU did not receive any responses within the allotted time (30 or 45 days, depending on individual tribal agreements with FHWA). CRU also consulted with the Minnesota Indian Affairs Council (MIAC) and the Office of the State Archaeologist (OSA)

[13] Of the National Historic Preservation Act of 1966. Section 106 review is required for the Project, as it will receive federal funding.

regarding the presence of any archaeological or burial sites not contained within the State Historic Preservation Office (SHPO) database. Neither agency identified additional sites.

MnDOT's CRU commissioned cultural resources surveys (archaeology and architecture-history). The archaeological field survey was completed on parcels where survey access was granted. No archaeological resources were identified. Based on the lack of findings and the fact that the pending parcels are of similar landforms and further away from waterbodies (lessens probability of findings), it was the archaeologist's professional opinion that the remaining areas have low potential for archaeology and the review is complete.

There were two railroads identified as culturally significant. There was also a culvert, which contributes to the railroad, but on its own, is not significant. Based on the archaeological and cultural reviews conducted by CRU and consultation with the tribes and SHPO, CRU issued a findings letter dated April 1, 2025, concluding that there would be **no adverse effect** by the Project.

SHPO responded to MnDOT's additional letter, requesting some additional investigations. MnDOT worked with a consultant team to review the additional sites and provide documentation on their review. The additional information from the investigations was provided to SHPO along with an updated findings letter dated July 3, 2025. The conclusion was the same – **no adverse effect** from the Project. SHPO reviewed MnDOT's updated findings letter and provided a response letter (July 29, 2025) indicating it agrees with MnDOT's conclusion. See **Attachment H** for correspondence with MnDOT's CRU and SHPO.

Information from MnDOT's CRU has been shared with the Office of the State Archaeologist (OSA) and the Minnesota Indian Affairs Council (MIAC) for review and comment regarding state rules. However, comments have not been received from either of these agencies. An update on any correspondence or additional Project direction will be provided when the Findings of Fact and Conclusion document is published. **Attachment I** has correspondence to OSA and MIAC requesting review and comment.

MITIGATION AND COMMITMENTS

If cultural materials are encountered during construction, unanticipated discoveries protocols would be followed. If archaeological artifacts, features, or human remains are uncovered during construction, demolition, or earthmoving activities, ground disturbance at the location would cease and the state archaeologist would be contacted.

16. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects fromthe project. Identify any measures to avoid, minimize, or mitigate visual effects.

The Project area is not designated a scenic byway, area, or easement. The Project would not produce vapor plumes or glare from intense lights. There would be lighting associated with the Project at intersections but would be consistent with MnDOT illumination guidelines.

Much of the surrounding land is in agricultural use where the new roadway is proposed, with a nearby neighborhood and more scattered farmsteads or rural residential homes. There are no substantial vistas, as the area is mostly flat with some rolling topography and trees, especially closer to Maple Creek. Where the Project would reconstruct existing roadways, there is suburban development or agricultural uses, which do not provide scenic views or vistas that would be substantially altered.

To minimize visual effects where there is a new roadway, the proposed Project would be built in alignment with existing topography, that is, the roadway would not be elevated. The county is considering incorporating landscaping, berming and/or fencing. Areas for these potential treatments will be determined following public input. The county has developed sketches and visualizations of potential mitigation activities for public consideration.

Recognizing that at least part of the Project would be a new addition to the overall landscape. Steele County has prepared a visual impact assessment (VIA) for the proposed Project based on guidance provided on MnDOT's Transportation Project Development Process (TPDP) and in consultation with MnDOT staff. Per the TPDP, the VIA used the Federal Highway Administration (FHWA) *Guidelines for the Visual Impact Assessment of Highway Projects* (2015). The VIA has four steps, they include:

- Establishment: Defines the area of visual effect (AVE) and determines if the community has potential defined visual preferences
- Inventory: Identifies and compares the relationship of the components of the affected environment and the composition of the affected population
- Analysis: Evaluates the types of impacts the Project has on visual resources; adverse, beneficial, or neutral
- Mitigation: Establishes mitigation measures (the final phase of the VIA process is commonly completed after a preferred alternative is selected)

Based upon compatibility with local comprehensive plans, annexation agreements, and proposed future land uses, an abbreviated VIA was completed. The VIA for the 29th Ave/East Side Corridor Project includes a description of the proposed Project as the starting point for establishing the area of visual effect (AVE) and the type of document/evaluation required. The AVE are locations in which views of the Project would be visible as influenced by the presence or absence of intervening topography, vegetation, and structures. For the 29th Ave/East Side Corridor, a buffer ranging between a quarter and a half mile was established around the Project due to the terrain, which allows for views of the roadway from nearby properties and users of the Project.

The inventory included descriptions of existing and proposed land uses, existing highways and local roadway connections, and freight travel via the railroads. The inventory acknowledged natural features within the Project area that contribute to its visual quality such as Maple Creek and its associated floodplain and wetlands. Since there are no archaeological sites or historic structures – only the culturally sensitive railroad, for which there would be no adverse effect associated with the Project, as the railroad would remain on its existing alignment.

The analysis indicated areas where populations are currently located near the proposed Project as well as vegetation around those areas, highlighting key locations where vegetation does and does not provide screening for properties/groups of properties. The analysis identified there would be both short- and long-term visual impacts associated with the Project, with short-term impacts occurring during construction when equipment would be present and there could be temporary dust impacting air quality. Short-term effects would go away following construction. Long-term impacts are the permanent alteration of transportation through the Project area and the loss of agricultural land use.

Mitigation for visual impacts was identified as limited, as there are limited adverse effects to the viewshed for drivers and for most surrounding land uses. Currently under consideration for mitigation are fencing, landscaping, and berming, or some combination of those options. Input from the public will be solicited as part of the official public comment period for this EAW and a public open house meeting that will be held during the official public comment period. An update on mitigation will be provided in the Findings of Fact and Conclusions Document which follows the public comment period.

Attachment J includes the visual impact analysis and associated imagery.

17. Air:

a. **Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effectsfrom stationary source emissions.**

The Project would not include any stationary sources of air emissions.

b. **Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimizeor mitigate vehicle-related emissions.**

NATIONAL AMBIENT AIR QUALITY STANDARDS

The Project would conform to the state implementation plan. This Project does not require an air quality analysis because the state of Minnesota is in full attainment as of September 24, 2022, and no longer has any maintenance areas for purposes of air quality conformity. Therefore, no air quality analysis related to the NAAQS has been performed.

Introduction to the Transportation Air Quality Analysis

Motorized vehicles affect air quality by emitting airborne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality as the number of vehicles and the congestion

levels in an area change. The EPA regulates a category of pollutants known as air toxics, which are generated by emissions from mobile sources. The FHWA provides guidance for the assessment of Mobile Source Air Toxic (MSAT) effects for transportation projects in the National Environmental Policy Act (NEPA) process. The following sections describe the likely Project impacts on MSATs for the no-build vs. build alternatives.

Mobile Source Air Toxics

Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of EPA's Integrated Risk Information System (IRIS).[14]

In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from the 2011 National Air Toxics Assessment (NATA).[15] These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

Motor Vehicle Emissions Simulator (MOVES)

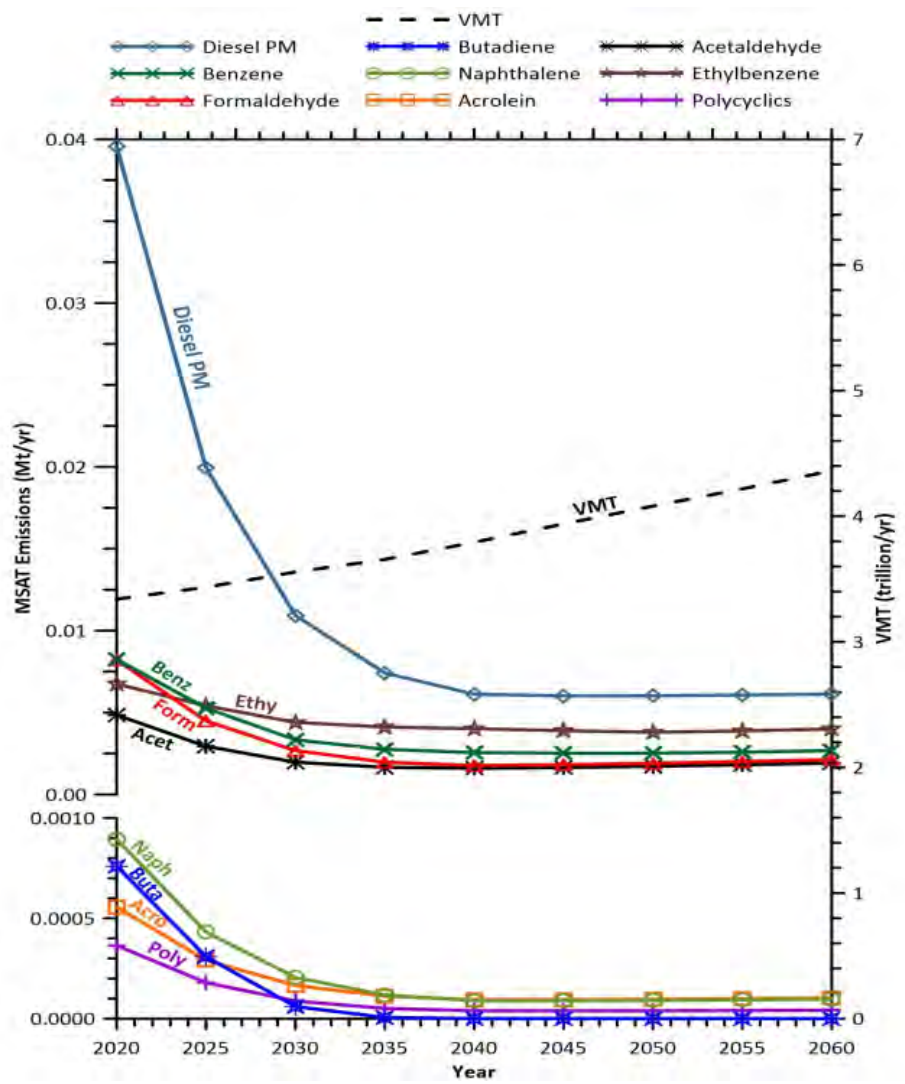
According to the EPA, MOVES3 is a major revision to MOVES2014 and improves upon it in many respects. MOVES3 includes new data, new emissions standards, and new functional improvements and features. It incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2014. These new emissions data are for light- and heavy-duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES3 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data. In November 2020, EPA issued MOVES3 Mobile Source Emissions Model Questions and Answers 4 EPA states that for on-road emissions, MOVES3 updated heavy-duty (HD) diesel and compressed natural gas (CNG) emission running rates and updated HD gasoline emission rates. They updated light-duty (LD) emission rates for hydrocarbon (HC), carbon monoxide (CO) and nitrogen oxide (NOx) and updated light-duty (LD) particulate matter rates, incorporating new data on Gasoline Direct Injection (GDI) vehicles.

Using EPA's MOVES3 model (**Exhibit 1**), FHWA estimates that even if VMT increases by 31 percent from 2020 to 2060 as forecast, a combined reduction of 76 percent in the total annual emissions for the priority MSAT is projected for the same time period.

[14] Integrated Risk Information System: https://www.epa.gov/iris

[15] 2011 National Air Toxics Assessment Results: https://www.epa.gov/national-air-toxics-assessment/2011-nata-assessment-results

Exhibit 1 – FHWA Projected National MSAT Emission Trends 2020-2060 for Vehicles Operating on Roadways Using EPA's MOVES3 Model



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors
Source: EPA MOVES3 model runs conducted by FHWA, March 2021.

Diesel PM is the dominant component of MSAT emissions, making up 36 to 56 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES3 will notice some differences in emissions compared with MOVES2014. MOVES3 is based on updated data on some emissions and pollutant processes compared to MOVES2014, and also reflects the latest federal emissions standards in place at the time of its release. In addition, MOVES3 emissions forecasts are based on slightly higher VMT projections than MOVES2014, consistent with nationwide VMT trends.

MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and

techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to arise during the NEPA process. Even as the science emerges, the public and other agencies expect FHWA to address MSAT impacts in its environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

NEPA Context

NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the federal government be interpreted and administered in accordance with its environmental protection goals, and that Federal agencies use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment (42 U.S.C. 4332). In addition to evaluating the potential environmental effects, FHWA must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall public interest (23 U.S.C. 109(h)). The FHWA policies and procedures for implementing NEPA are contained in 23 USC 139 and 23 CFR Part 771.

Mobile Source Air Toxics Analysis

The purpose of this Project would be to improve Steele County's transportation network by addressing poor north-south connectivity, reducing congestion in downtown Owatonna, and supporting non-motorized travel. By redirecting traffic from residential streets and downtown, the Project would alleviate congestion and provide a more direct route for local and regional traffic. The Project is anticipated to generate minimal air quality impacts for Clean Air Act criteria pollutants and does not present specific MSAT concerns. Future traffic volumes would be redistributed, easing pressure on currently congested routes like Mineral Springs Road, while supporting growth and development in adopted local and regional plans. EPA vehicle regulations would ensure substantial reductions in MSAT emissions over time, further minimizing environmental impact.

Moreover, EPA regulations for vehicle engines and fuels would cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES3 model forecasts a combined reduction of over 76 percent in the total annual emissions rate for the priority MSAT from 2020 to 2060 while vehicle-miles of travel are projected to increase by 31 percent (updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, January 18, 2023). This would both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this Project.

The Project would involve the use of construction equipment and construction crew vehicles. Traffic generated during construction would be at levels typical of this type of highway reconstruction effort. Construction vehicles would be fitted with factory-supplied mufflers and would be shut off when not in use.

c. **Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.**

DUST

There would be noise, dust, and air emissions associated with construction activities. No unique concerns have been identified. Standard noise, dust, and air quality specifications would be followed, in addition to adherence to applicable local ordinances. Erosion and sedimentation would be controlled in accordance with an erosion control plan and MnDOT standard specifications.

Construction contractors would be required to control dust and other airborne particles in accordance with MnDOT specifications. This could include measures such as applying water to exposed soils and limiting the extent and duration of exposed soil conditions as previously noted. Contractors would be required to conform to all applicable federal, state, and local requirements.

The following dust control measures would be considered, as necessary:

- Minimize the duration and extent of soils being exposed or regraded at any one time.
- Spray construction areas and haul roads with water at a controlled rate, especially during periods of high wind or high levels of construction activity. Monitor to ensure run off does not lead to off-site sedimentation.
- Minimize the use of vehicles on unpaved surfaces when feasible.
- Tarp trucks hauling soil, sand, and other loose materials or require trucks to maintain at least two feet of freeboard.
- Pave, apply water as needed, or apply (non-toxic) soil stabilizers on unpaved access roads, parking areas and staging areas at construction sites.
- Use water sweepers to sweep paved access roads, parking areas and staging areas at construction sites.
- Use water sweepers to sweep streets if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose, cover, water or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Utilize appropriate erosion control measures to reduce silt runoff to public roadways.
- Replant vegetation as quickly as possible to minimize erosion in disturbed areas.
- Use alternative fuels for construction equipment when feasible.
- Minimize equipment idling time.
- Maintain properly tuned equipment.

ODORS

Odors could be generated by exhaust from diesel engines engaged in construction, materials used in Project construction (e.g., asphalt, oil, etc.), and fuel storage areas but will end with construction. All machinery would be properly equipped and maintained to control emissions.

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

a. **GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to cometo that conclusion and any GHG emission sources not included in the total calculation.**

This section summarizes the GHG emissions associated with construction of the Project and vehicle traffic associated with the Project after it is constructed. It does not include an assessment of the potential climate effects of those emissions. In the case of GHGs and climate change, climate is driven by global cumulative changes of GHG concentrations in the atmosphere; the changes in emissions from one individual project are simply too small to justify calculation of resulting changes in temperature, sea level, precipitation, and other significant cumulative climate effects. However, estimation of emissions is still useful to the public and decision makers so they can understand whether projects are contributing to progress in mitigating climate change.

Steele County evaluates GHG emissions from projects due to concerns about current and future impacts of climate change in Minnesota. GHGs from transportation (e.g., carbon dioxide, methane, and nitrous oxide) contribute to warming of the atmosphere, which leads to effects in Minnesota that include increases in heavy precipitation, increased flooding, and more episodes of extreme heat. See Section 7 (Climate Resiliency) of this EAW for more information.

An analysis of operational and construction emissions (measured in carbon dioxide equivalents or "CO2e") was conducted for the No Build and preferred alternative using the Minnesota Infrastructure Carbon Estimator (MICE) tool. The results are shown in **Table 19**.

Table 19 – GHG Analysis Results

Operational Emissions (Base Year and Design Year)	**CO2e, Metric Tons Per year)**
Base Year (2024)	436
No Action Alternative (2046)	821
Build Alternative (2046)	2,405
Difference Build vs. No-Build	1,584
Cumulative Difference over project (22 years)	**CO2e Metric Tons (total)**
	17,429
Construction CO2e Emissions (Total over Construction Period)	***CO2e, Metric Tons (total)***
Build Alternative (2026)	4,228
No Build (2046) (maintenance of existing system)	491

The proposed Project would build a new roadway – a two-lane, rural highway with multiuse trails and intersection traffic control improvements (including ADA elements). The Project would improve travel time for motorists currently using other routes through downtown

Owatonna, and would reduce vehicle idling in those areas. It would also have the potential to reduce trip lengths, decreasing vehicle miles of travel (VMT). However, because the Project would construct a new roadway GHG emissions compared to the No Build are higher.

Construction GHG emissions would result from production and transportation of construction materials and from fuel used in construction equipment. The Project's total (cumulative) construction GHG emissions are shown in **Table 19**. For the Build Alternative (2026), total construction GHG emissions over the entire construction period and are estimated at 4,228 CO2e (total metric tons). The No Build Alternative (2046), which considers the maintenance of the existing roadway system, is estimated at 491 CO2e (total metric tons).

b. **GHG Assessment**

i. **Describe any mitigation considered to reduce the project's GHG emissions.**

Plans for the proposed Project were approximately 20 percent complete at the writing of this document. No additional Project-specific mitigation measures have been identified at this time other than constructing the trail for non-motorized users. Reuse of roadway materials or other measures may be considered to reduce emissions associated with construction.

Assessing GHG emissions from transportation projects is one of several strategies that MnDOT and other agencies are pursuing to address the issue of climate change. Other strategies that MnDOT is pursuing include intermodal transportation, electric vehicle incentives and infrastructure, clean vehicle standards, and alternative fuels. MnDOT is also developing a process for evaluating flood risk to the agency's bridges, large culverts, and pipes. Studying the performance of infrastructure under predicted extreme events will help MnDOT gain knowledge and better assess the impacts of climate changes to plan, design, build, and maintain assets for resilience. MnDOT shares its research and information with local road authorities through its State Aid Offices, so that knowledge, techniques, and practices can be used effectively across the state and by all jurisdictions as appropriate. More information regarding MnDOT's efforts to address climate change can be found at Sustainability at mndot.gov/sustainability.

ii. **Describe and quantify reductions from selected mitigation, if proposed to reduce theproject's GHG emissions. Explain why the selected mitigation was preferred.**

While not calculated, the proposed Project would use roundabout traffic control at key intersections along the corridor rather than traffic signal or side-street stop conditions. The roundabouts not only provide safety benefits for both motorized and non-motorized (those walking, biking, and rolling) but provide mobility benefits by reducing idling time and providing more even traffic flow.

At this level of design, information is not known about potential mitigations that may be identified in final design that could mitigate for construction impacts.

iii. **Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next**

Generation Energy Act goals and/or other more stringent state or local GHG reduction goals.

The Project's predicted GHG emissions are estimated (**Table 19**) at 2,405 CO2e (metric tons per year). The Next Generation Energy Act requires the state to reduce GHG emissions in the state by 80 percent between 2005 and 2050, while supporting clean energy, energy efficiency, and supplementing other renewable energy standards in Minnesota. The MICE tool shows that the cumulative difference between the Build and No-Build scenarios over the proposed Project's lifetime (22 years) is 17,429. Higher emissions for the Project would be expected as this is a new roadway.

It should be noted the No Build condition does not consider longer trips that would be required as growth continues to occur without additional transportation infrastructure.

19. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigatethe effects of noise.

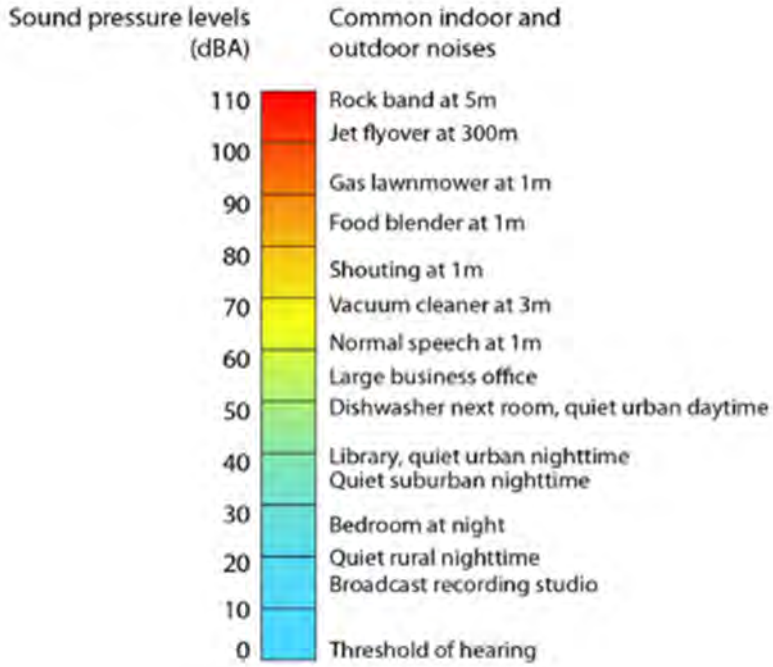
BACKGROUND

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. For highway traffic noise and construction equipment, an adjustment, or weighting, of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). A sound increase of three dBA is barely perceptible to the human ear, a five dBA increase is clearly noticeable, and a 10 dBA increase is heard as twice as loud. **Exhibit 2** shows the dBA levels of some common noise sources. [16]

Along with the volume of traffic and other factors (e.g., topography of the area and vehicle speed) that contribute to the loudness of traffic noise, the distance of a receptor from a sound's source is also an important factor. Sound level decreases as distance from a source increases. A general rule regarding sound level decrease due to increasing distance from a line source (roadway) that is commonly used is: beyond approximately 50 feet from the sound source, each doubling of distance from the line source over hard ground (such as pavement or water) will reduce the sound level by 3 dBA, whereas each doubling of distance over soft ground (such as vegetated or grassy ground) results in a sound level decrease of 4.5 dBA.

[16] Source: "A Guide to Noise Control in Minnesota," (August 2017) Minnesota Pollution Control Agency, http://www.pca.state.mn.us

Exhibit 2 – Decibel Levels of Common Noise Sources



The Minnesota state noise standards are in Minnesota Rules Chapter 7030. The MPCA is the state agency responsible for enforcing state noise rules. For roads and highways, the Minnesota Department of Transportation (MnDOT) handles complaints about noise on highways and other roads it manages. Most cities and counties are exempt from Minnesota's state noise rules, as documented in Minnesota Statutes 116.07.2a[17] Exemptions from standards – No standards adopted by any state agency for limiting levels of noise in terms of sound pressure which may occur in the outdoor atmosphere shall apply to: (3) except for the cities of Minneapolis and St. Paul, an existing or newly constructed segment of a road, street, or highway under the jurisdiction of a road authority of a town, statutory or home rule charter city, or county, except for roadways which full control of access has been acquired.

The proposed Project would be owned by Steele County and would not include full control of access. Therefore, the Project would be exempt from state noise requirements.

Local governments are required to take reasonable measures to prevent the approval of land use activities that would violate the state noise standard immediately upon establishment of the land use. Agencies should consider the state noise standard when reviewing and approving new projects in their jurisdiction. Steele County and Owatonna have considered state noise standards for this Project (see **TRAFFIC NOISE** subsection).

CONSTRUCTION NOISE

Activities associated with construction of the proposed Project would result in increased noise levels relative to existing conditions for the duration of the construction period. These impacts would primarily

[17] Sec. 116.07 MN Statutes

be associated with construction equipment. Anticipated construction activities include earthwork, concrete and bituminous paving, pile driving, storm sewer, concrete curb and gutter, signing, striping, lighting, and turf establishment.

Table 20 shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading/site preparation, which is generally the roadway construction phase with the greatest noise levels.

Table 20 – Typical Construction Equipment Noise Levels at 50 Feet

Equipment Type	Manufacturers Sampled	Total Number of Models in Sample	Range of Peak Noise Level (dBA)[1]	Average Peak Noise Level (dBA)[1]
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	NA	NA	95-105	101

Source: United States Environmental Protection Agency and Federal Highway Administration

[1] dBA: Unit of measurement for sound loudness based on the intensity of the sound and how the human ear responds. dBA is also referred to as A-weighted decibels. dBA measures are used when describing sound level recommendations for healthy listening.

Elevated noise levels are, to a degree, unavoidable for this type of Project. Steele County would require that construction equipment be properly muffled and in proper working order. It is common practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. Advanced notice would be provided to affected communities of any planned, abnormally loud construction activities.

It is anticipated that all major work on the Project would happen during the day, and construction would be limited to daytime hours as much as possible. At this time, it is not anticipated that night construction would occur. If it is needed, Steele County would coordinate with local officials. This Project is expected to be under construction for two to three construction seasons.

Any noise associated with high-impact equipment, such as pile driving, pavement sawing, or jack hammering, would be unavoidable with construction of the proposed Project. Pile driving noise is associated with any bridge construction and sheet piling necessary for retaining wall construction. While pile driving equipment results in the highest peak noise level, as shown in **Table 20,** it is limited in duration to the activities noted above (e.g., bridge construction). The use of pile drivers, jack hammers, and pavement sawing equipment would be prohibited during nighttime hours.

Construction Noise Mitigation and Commitments

Construction activities would be temporary in duration. Steele County would require that construction equipment be properly muffled and in proper working order. Advanced notice would be provided to affected communities of any planned, abnormally loud construction activities. Steele County would

communicate with local governments and property owners when night work close to residential areas is unavoidable. Steele County anticipates all major work on the Project to happen during the day, and construction would be limited to daytime hours as much as possible. The use of pile drivers, jackhammers, and pavement sawing equipment would be prohibited during nighttime hours. Steele County would coordinate with the city of Owatonna and Clinton Falls and Owatonna Townships as the construction staging/maintenance of traffic plans for the Project are developed.

TRAFFIC NOISE

The proposed Project would construct a roadway on a new alignment along with reconstructing existing roadways. As such, there are locations in the Project that currently do not experience roadway noise and other locations that do. Existing sound levels vary within the Project, with some areas having limited traffic noise, to other areas having regularly occurring traffic noise. Existing sound levels within the Project vary between 26.3 and 64.2 dBA.

Sensitive receptors in the area include residential developments, farmsteads, and rural homes. Much of the land along the new roadway portion of the Project is largely undeveloped or in agricultural production or has a limited number of nearby farmsteads or small residential clusters. There is a portion of the new roadway alignment that goes near a larger existing residential development between Rose St and Briarwood Pl NE, as shown on **Figures 13** and **14** in **Attachment A**. There is also a smaller neighborhood adjacent to the existing eastern limits of 26th St NE that is near an existing roadway, but it is currently not a county highway.

As noted above in the background section, the Project would be exempt from state noise standards. Steele County and the city of Owatonna, however, have identified potential measures that would be considered to mitigate effects of noise as part of the Project. The agencies have considered three options for use in the Project area. They include:

- Berming with trees – similar to what is currently in place along the south side of 26th St NE just east of Deer Trail Ln NE. Berms and trees would be in the public right of way.
- Landscaping with boulevard trees – provide a section of landscaping, including trees and shrubs to be located in the boulevard behind any trails. Landscaping would be in the public right of way.
- Fencing – provide a fence at the right of way boundary. The fence would be six feet tall, consistent with the city of Owatonna's height limits on residential fences. Fencing would be on the right of way line and would be the responsibility of the property owner.

The county will be collecting input on the three options as part of the public input on this EAW and will also be considering costs, impacts on utilities and drainage. A final decision on mitigation would be made prior to the publication of the record of decision.

20. Transportation

a. **Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternativetransportation modes.**

EXISTING AND PROPOSED ADDITIONAL PARKING SPACES

The proposed Project is a highway project and would not generate additional parking spaces.

ESTIMATED TOTAL AVERAGE DAILY TRAFFIC GENERATED

The proposed Project would not generate new trips in the same way as a new development because the roadway improvements proposed are not a destination or end point like a business or residential neighborhood. However, the Project introduces a new roadway to the area and provides connections to existing east-west routes, which will bring new travel and traffic to the Project area.

Steele County conducted a traffic study to identify the amount of traffic that would use the new 29th Ave/East Side Corridor and key connecting routes. **Attachment K** includes a travel forecast memo describing how near-term and 20-year projections were determined. As stated in the memo, near-term (2026) and future traffic volumes (2046) on the new 29th Ave/East Side Corridor and key connecting roadways were developed. **Table 21** shows the anticipated volumes on these routes.

Table 21 – Existing and Future Traffic Volumes

Roadway	Location	Existing Volumes*	2026 Volumes	2046 Volumes
SE 18th St	Bixby Rd to new 29th Ave/East Side Corridor	100	2,000	3,000
CR 171/Havana Rd	West of new 29th Ave/East Side Corridor	265	300	1,000
CR 180/Claremont Rd	Connection to new 29th Ave/East Side Corridor	930	1,100	1,600
Rose St	Connection to new 29th Ave/East Side Corridor	2,400	2,700	3,700
Dane Rd	Connection to new 29th Ave/East Side Corridor	980	1,400	2,100
26th St NE	Connection to new 29th Ave/East Side Corridor	180	1,300	1,600
CSAH 8/Kenyon Rd	Existing route to new 29th Ave/East Side Corridor	1,100	1,700	2,700
29th Ave/East Side Corridor	CSAH 8/Kenyon Rd to 26th St NE	1,100	1,700	2,700
29th Ave/East Side Corridor	26th St NE to Dane Rd	0	1,300	2,500
29th Ave/East Side Corridor	Dane Rd to Rose St	0	1,700	3,100 to 3,300
29th Ave/East Side Corridor	Rose St to CR 180/Claremont Rd	0	1,700	3,500
29th Ave/East Side Corridor	CR 180/Claremont Rd to Havana Rd	0	1,900	3,300
29th Ave/East Side Corridor	Havana Rd to SE 18th St	0	1,900	3,100

*Volumes were existing at the time the traffic memo was completed.

ESTIMATED MAXIMUM PEAK HOUR TRAFFIC GENERATED AND TIME OF OCCURRENCE

As noted above, the proposed Project would not generate/create new trips. It is anticipated that approximately 10 percent of the trips would occur during the morning and afternoon peak periods. Based on intersection counts at CSAH 48/Bixby Rd and SE 18th St, just west of the proposed Project, the morning peak period is from 7:15 to 8:15 am and the afternoon peak period is from 4:15 to 5:15 pm.

INDICATE SOURCE OF TRIP GENERATION RATES USED IN THE ESTIMATES

As stated in the Traffic Forecast memo dated April 3, 2024, included in **Attachment J**, near-term traffic volumes were estimated based on existing traffic shifting from existing routes onto the new roadway. The forecast volumes for the future include trips generated by anticipated future development in the area surrounding 29th Ave/East Side Corridor in addition to a general increase in traffic from the near term.

A background growth rate of 1 percent per year was assumed for existing roadway segments. Development traffic was estimated using the map provided in the 2024 Owatonna Township Orderly annexation agreement. Future residential areas were assumed to develop by 2046 at a density similar to existing developments along the east side of the city. The Owatonna School District is also planning for a future elementary school near the intersection of 29th Ave/East Side Corridor and Rose St. A trip generation rate from the Institute of Transportation Engineers Trip Generation Manual 11th Edition was used to estimate the additional traffic this future development would generate.

AVAILABILITY OF TRANSIT AND/OR OTHER ALTERNATIVE TRANSPORTATION MODES

Currently no fixed transit routes are provided in the Project area. Stele County is part of Southern Minnesota Area Rural Transit (SMART) which operates three dial-a-ride buses within the county. Buses are 18-passenger mini-buses and are fully accessible.

There are currently no multiuse trail facilities in much of the Project area. Just outside the Project area are some trail connections as noted in **Figure 10** in **Attachment A**. The proposed Project would provide multimodal connections in the Project area that are currently lacking.

b. **Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system.*If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance.**

EXISTING VOLUMES AND CONGESTION

As previously noted, there is no traffic on the proposed 29th Ave/East side corridor. Existing volumes on cross streets are noted in **20.a** above – **Table 21**. All existing volumes on streets that would intersect with the proposed 29th Ave/East Side Corridor are currently between 100 and 2,400 vehicles a day. These volumes are substantially below the capacity of the existing routes. SE 18th St, which is currently a township gravel roadway, and has less capacity than a paved roadway but would

be reconstructed as a paved roadway with shoulders as part of the Project.

The purpose and need for the Project (Section 6.d) indicates there are routes in downtown Owatonna (North St and Mineral Springs Rd) approaching congestion is existing congestion in downtown Owatonna that could benefit from the Project as previously shown in **Tables 4** and **5** and **Figure 8** (**Attachment A**).

FUTURE VOLUMES AND CONGESTION

Future traffic volumes are listed in **Table 21** in 20.a above. Future traffic volumes on the new 29th Ave/East Side Corridor would range from 2,500 to 3,500 vehicles a day. Traffic volumes on connecting roadways would range from 1,600 to 3,700 vehicles a day. All the roadways would be below the planning-level thresholds for congestion (volume to capacity [V/C] ratio of 1.0 or greater) or approaching congestion (V/C ratio of 0.85 to 1.00) in the future. No future congestion would be anticipated on the roadway segments.

The purpose and need for the Project (Section 6.d) indicates that the routes in downtown Owatonna (North St and Mineral Springs Rd) that were identified as approaching congestion would be congested in the future, along with other routes as identified in **Table 5** and shown on **Figure 8**.

PROPOSED TRAFFIC IMPROVEMENTS

Constructing 29th Ave/East Side Corridor would be expected to provide better travel connectivity between developing areas of Owatonna, downtown Owatonna, and the regional highway network, including US 14. It is also anticipated to help alleviate traffic congestion in downtown Owatonna today and in the future, as noted in the alternatives analysis and traffic forecasting memo. Travel for non-motorized users would also be improved with the construction of the trail along the west side of 29th Ave/East Side Corridor and along 26th St NE and SE 18th St.

The Project would include new intersection control along 29th Ave/East Side Corridor with dedicated left- and right-turn lanes where warranted to promote safety and traffic mobility. Roundabouts at key intersections would promote traffic movement through the intersection and provide pedestrians and bicyclists with a safe crossing.

ACCESS CHANGES

Presently there is no access on 29th Ave/East Side Corridor, as it does not exist. Access on intersecting roadways would incorporate limited changes. These would include:

- 26th St NE: the existing CSAH 8/Kenyon Rd public street would be converted to a dead-end public street, as the public road would connect into the new 29th Ave/East Side Corridor.
- Removal of Havana Road between the CPCK railway and the new 29th Ave/East Side Corridor.
- All connecting roadways would have a new intersection with 29th Ave/East Side Corridor.

Proposed access on 29th Ave/East Side Corridor is generally consistent with Steele County access guidelines for collector roadways. A few of the public streets do not quite provide a quarter of a mile spacing from one another. The spacing between Havana Rd, CR 180/Claremont, and School St is less than a quarter of a mile. The spacing between Rose St and Fox Hollow Ln is also less than a quarter of

a mile. To mitigate for some of the spacing, Fox Hollow Ln and Havana Rd would be limited to right-in/out intersections.

c. **Identify measures that will be taken to minimize or mitigate project related transportation effects.**

The purpose of the Project is to improve transportation connectivity between established areas in Owatonna and planned growth expected to occur over the next 20 years. It is also intended to provide congestion relief to existing transportation facilities connecting to downtown Owatonna today and in the future. A secondary reason for the Project is to support non-motorized connections in the developing areas of Owatonna.

The proposed Project would provide sufficient capacity to accommodate the planned growth in the area without overbuilding transportation facilities. Access management, the proposed traffic control at key intersections, and multimodal facilities would enhance safety and mobility for travelers in the area.

The Project would provide new infrastructure that would not need replacement or substantial repairs in the short- or mid-term by removing any poor soils to stabilize the new roadway and connecting roadway improvements to minimize reoccurring maintenance. This would limit construction interruptions for highway users over the long-term and improve infrastructure resiliency.

The Project would provide non-motorized users with more options and improve walkability and bikeability of construction of the proposed trails on 29th Ave/East Side Corridor and on connecting roadways as noted in the Project description and shown in **Figure 5** in **Attachment A**.

Steele County would coordinate with the city of Owatonna and Owatonna and Clinton Falls Townships and area businesses and property owners to maintain direct access to parcels during construction. Detours would be minimized to the extent practicable. Additional information would be provided to the public as staging plans become available. Steele County would coordinate with emergency responders to ensure access is provided to properties during construction should responders be called to one of the sites. As design plans progress and construction staging plans are developed, Steele County would meet with property owners/residents/businesses within and near to Project area to identify their needs and concerns with construction activities.

21. Cumulative potential effects:

a. **Describe the geographic scales and timeframes of the project related environmental effects thatcould combine with other environmental effects resulting in cumulative potential effects.**

Cumulative effects are “the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be

expected to affect the same environmental resources, including future projects planned or for which a basis of expectation has been laid, regardless of who undertakes the projects or what jurisdictions have authority over the projects."
There are two general geographic scales relevant to the Project. Some effects are limited to the area disturbed by the proposed Project. Areas outside the Project (such as undeveloped areas along the proposed corridor – 29th Ave/East Side Corridor and connecting roadways) could also be influenced by the Project depending on the nature of the resource or effect (e.g., water quality, traffic). There are also two general timeframes in which Project-related environmental effects could occur: effects that are related to construction activities but could last beyond the construction period, and effects that are related to long-term operation of the Project. Project-related environmental effects that could combine with other environmental effects are summarized in **Table 22**, along with the relevant geographic extent.

b. **Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographicscales and timeframes identified above.**

The existing and future land use maps in the comprehensive plan for the city of Owatonna outlines plans for the development of presently vacant and agricultural areas (refer to Section 10) into low-density residential zones, mixed-use, commercial, and a potential future school. Currently, the timing for projects contributing to these land-use conversions is uncertain. Review and approval of any development activities would be provided through municipal planning processes and regulatory programs.

Steele County does not have any programmed transportation improvements within the Project area in the next five years. Other projects could be needed to county highways in the future depending upon development timing and intensity of development that is constructed.

c. **Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmentaleffects due to these cumulative effects.**

The pace and extent of future residential, mixed use, and commercial development along and near 29th Avenue/East Side corridor and other connecting roadways within the Project area is unknown and depends on several factors. Nonetheless, such development would be anticipated to result in the cumulative environmental effects outlined above, including conversion of farmland, ground disturbance, water quality (increase in impervious surface), potential wetland impacts, vegetation removal, and increased traffic. These effects could combine with effects associated with construction of the proposed projects.

As discussed in **Table 22**, cumulative transportation impacts were accounted for to the extent feasible in modeling activities completed for the Project.

Table 22 – Project-Related Environmental Effects (Cumulative Potential Effects)

Reference (EAW Item)	Topic	Project-Related Environmental Effects	Geographic Extent and Future Potential Impacts
Item 10	Land Use	Farmland Conversion	Throughout Project area. Additional growth and development along 29th Ave/East Side Corridor and connecting roadways would result in converting existing farmland to other uses. The timing of these potential effects is unknown.
Item 11	Geology, Soils, and Topography	Ground/soil disturbance	Throughout Project area. Additional soil disturbance outside the Project footprint is possible because of future growth and development along 29th Ave/East Side Corridor and connecting roadways. The timing of these potential effects is unknown.
Item 12	Water Resources	• Wetland fill • Increase in impervious surface area • Water appropriation during construction • FEMA Floodplain impacts	Wetland fill at locations discussed in Item 12. Increase in impervious surface throughout the Project area. Water appropriation may be required to complete culvert work near wetlands and bridge work. As discussed in the "Land Use" topic above, there is potential for future development along 29th Ave/East Side Corridor and connecting roadways outside the Project footprint. The conversion of farmland and/or natural areas adjacent to the corridor to more intensive land uses would result in new areas of impervious surface, potential wetland impacts, and a potential need for water appropriation. The timing of these potential effects is unknown. FEMA floodplain impacts at Maple Creek and Izaak Walton Creek.
Item 13	Contamination / Hazardous Materials	Low risk for disturbance of potentially contaminated soils	Risk of contamination is low within the Project area, as there were only feedlots and one minor agricultural spill. As discussed in Land Use above, there is potential for future development along 29th Ave/East Side Corridor and connecting roadways. Other sites in the area could have contaminants that are unknown at this time.
Item 14	Fish and Wildlife	Tree removal (potential impacts to Northern Long Eared Bat habitat)	Tree removal at select locations within the Project. Planned future development (see Item 10) adjacent to 29th Ave/East Side Corridor and connecting roadways could result in additional tree removal outside the Project footprint. As noted in the "Water Resources" topic above, these developments could also create new areas of impervious surface outside the Project footprint. Additional impervious surface could impact the quality and volume of water entering wetlands. The timing of these potential effects is unknown. Prairie Lands near Project area - Native prairie remnants near the Project area are unlikely to be affected due to their location within and adjacent to the railroad ROW, which restricts development and construction. These areas are protected by the ROW management practices of the railroad company, which does not allow construction activities within their boundaries. Cumulative impacts to prairie lands or associated species are unlikely due to these protections.
Item 19	Noise	The project will generate noise	Planned future development outside the Project footprint but adjacent to 29th Ave/East Side Corridor and connecting roadways has the potential to generate additional traffic and associated traffic noise on 29th Ave/East Side Corridor, connecting routes, and nearby highways. Future developments were considered in analyzing future traffic within the Project area. If future highway expansion projects receiving federal funds are proposed in the area, noise impacts would have to be evaluated as part of these projects. Steele County and/or MnDOT would evaluate noise impacts as part of future projects on county highways and US Highway 14.
Item 20	Transportation	Disruptions to traffic flow during construction	Temporary construction impacts would occur at and around roadways and intersections that are being reconstructed and/or realigned. Because 29th Ave/East Side Corridor is a new route, traffic disruptions would be negligible on that part of the Project. Traffic operations in downtown Owatonna would be improved with the removal of through trips that would now be using 29th Ave/East Side Corridor and overall community connectivity would be enhanced with a more robust local roadway network. Walkability and bikeability for residents located along and near the new 29th Ave/East Side Corridor would be improved with the Project, providing better connections to nearby neighborhoods, existing and future schools, and existing parks and trails.

22. Other potential environmental effects:

If the Project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environmentwill be affected, and identify measures that will be taken to minimize and mitigate these effects.

This Project is not believed to cause any anticipated adverse environmental impacts that have not been addressed by this EAW.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature _____ Date **11/5/2025**

Title Public Works Director/ County Engineer

Attachments:

A. Figures
B. Owatonna High School Traffic Study
C. City of Owatonna – Town of Owatonna 2025 Annexation Agreement and Town of Owatonna Resolution
D. Floodplain Assessment
E. Geology Documentation
F. DNR Correspondence
G. MnDOT Office of Environmental Stewardship and US Fish and Wildlife Correspondence (Section 7)
H. MnDOT Cultural Resource Unit and State Historic Preservation Office Correspondence
I. Correspondence with the Office of the State Archaeologist and the Minnesota Indian Affairs Council
J. Visual Impacts Analysis (VIA)
K. Traffic Study

Attachment A – Figures

Figure 1 – Project Area Map

Figure 2 – USGS Project Area Map

Figure 3 – Project Map

Figure 4 – Aerial Project Map

Figure 5 – Project Layout

Figure 6 – Right of Way Impacts

Figure 7 – Roadway Network, Functional Classification, and Spacing

Figure 8 – Roadway Capacity / Congestion

Figure 9 – Planned Land Use

Figure 10 – Existing and Planned Nonmotorized Facilities

Figure 11 – Recent and Projected Future Average Temperature for Canon River

Figure 12 – Land Cover

Figure 13 – Existing Land Use (City of Owatonna)

Figure 14 – Existing Land Use (Townships)

Figure 15 – Parks and Trails

Figure 16 – Prime Farmland

Figure 17 – Existing Zoning (City of Owatonna)

Figure 18 – Soils

Figure 19 – Surface Waters

Figure 20 – FEMA Floodplain & Floodway

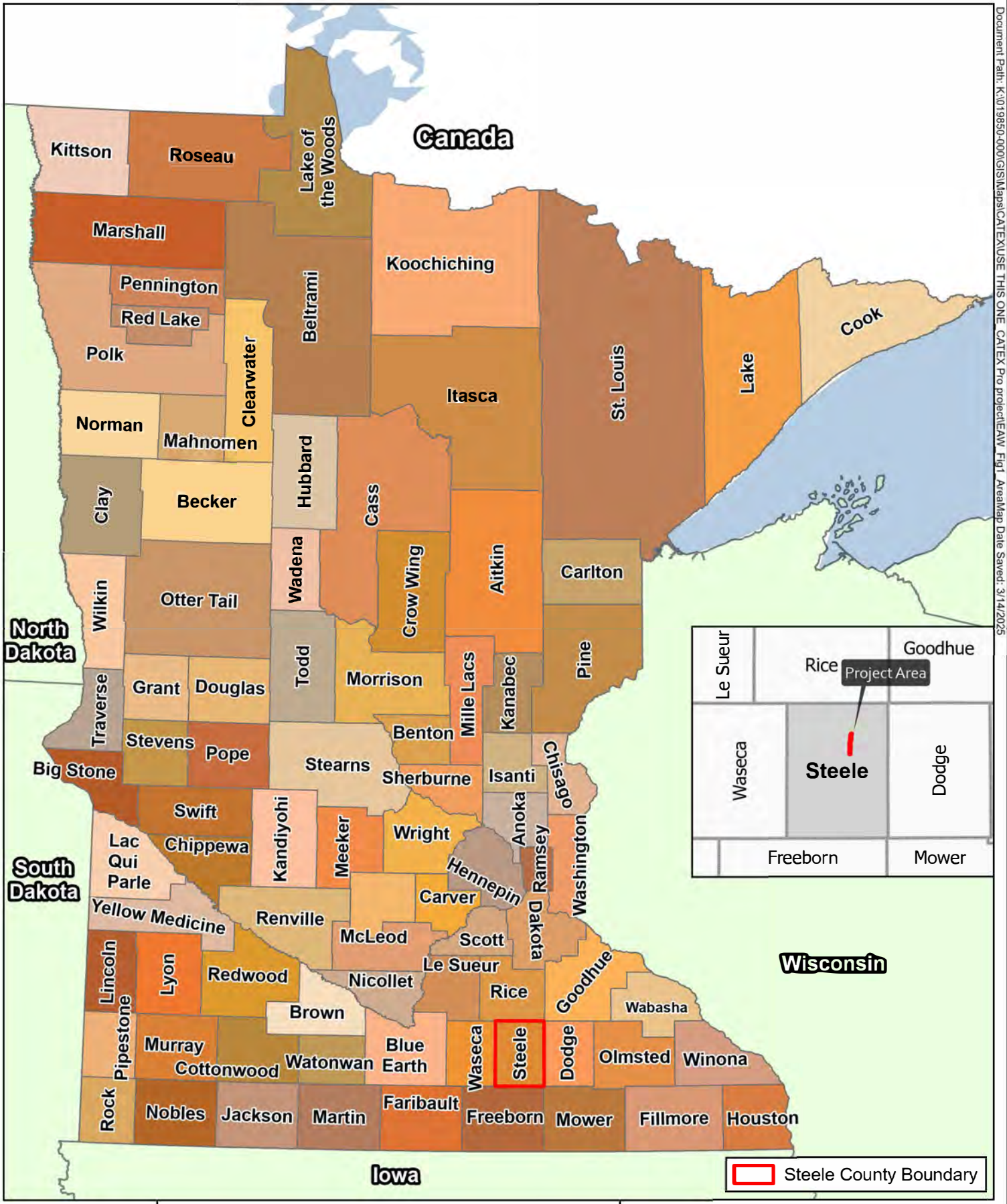
Figure 21 – WHPAs and DWSMAs

Figure 22 – Wells

Figure 23 – Wetland Impacts

Figure 24 – Potentially Contaminated Sites

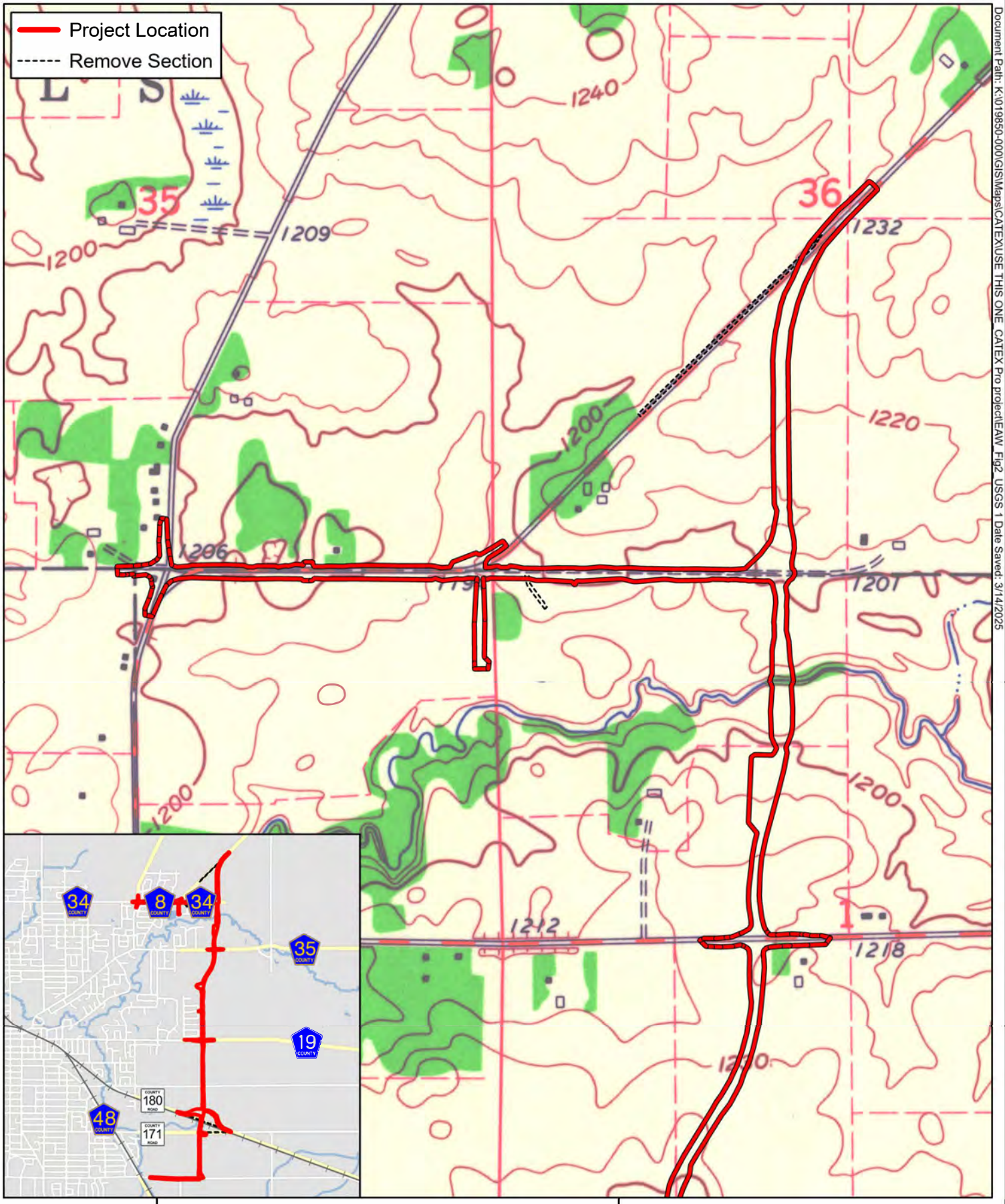
Figure 25 – Sites of Moderate Biodiversity



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Figure 1 - Project Area Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota



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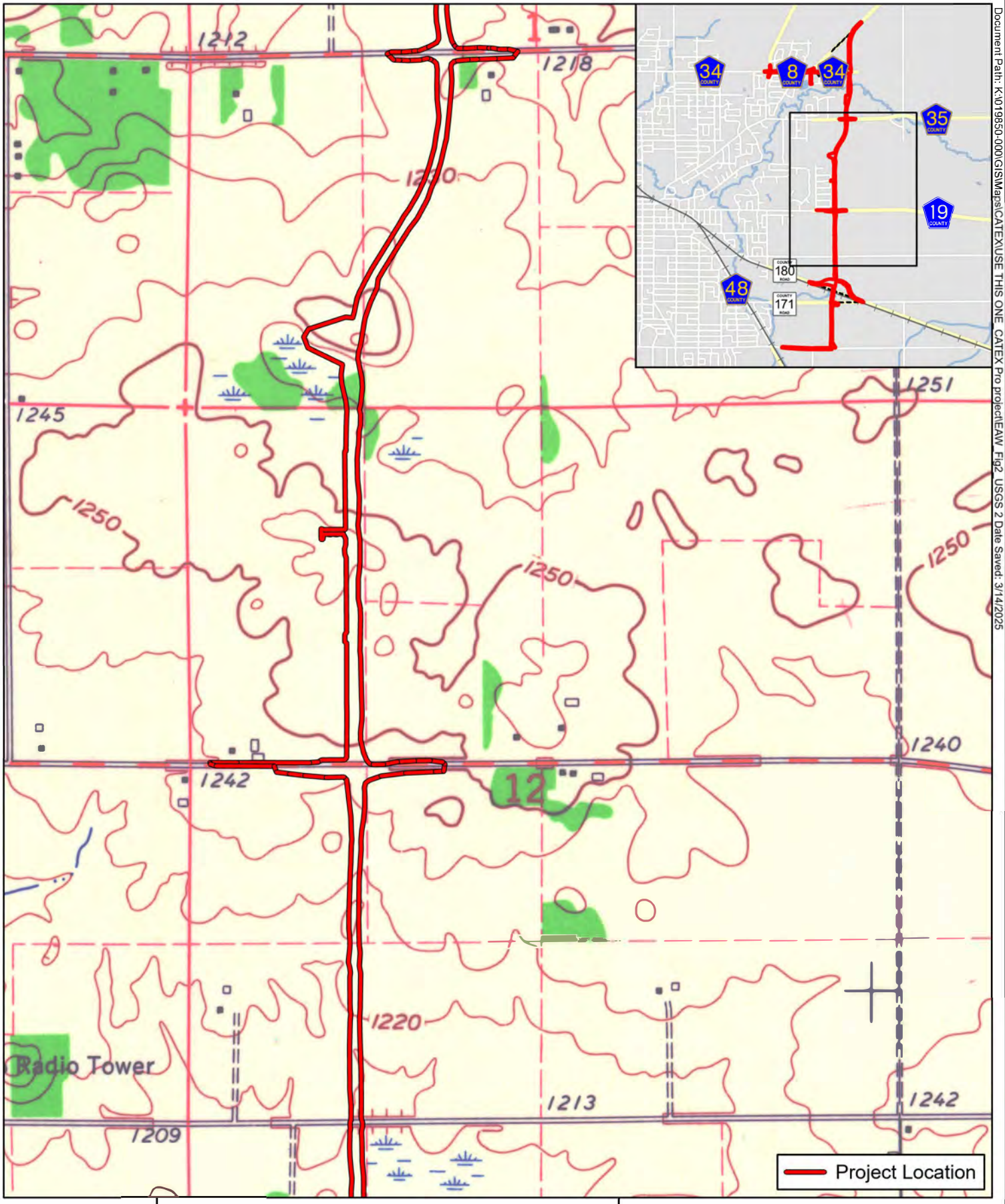
Figure 2A - USGS Project Area Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft



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Steele County

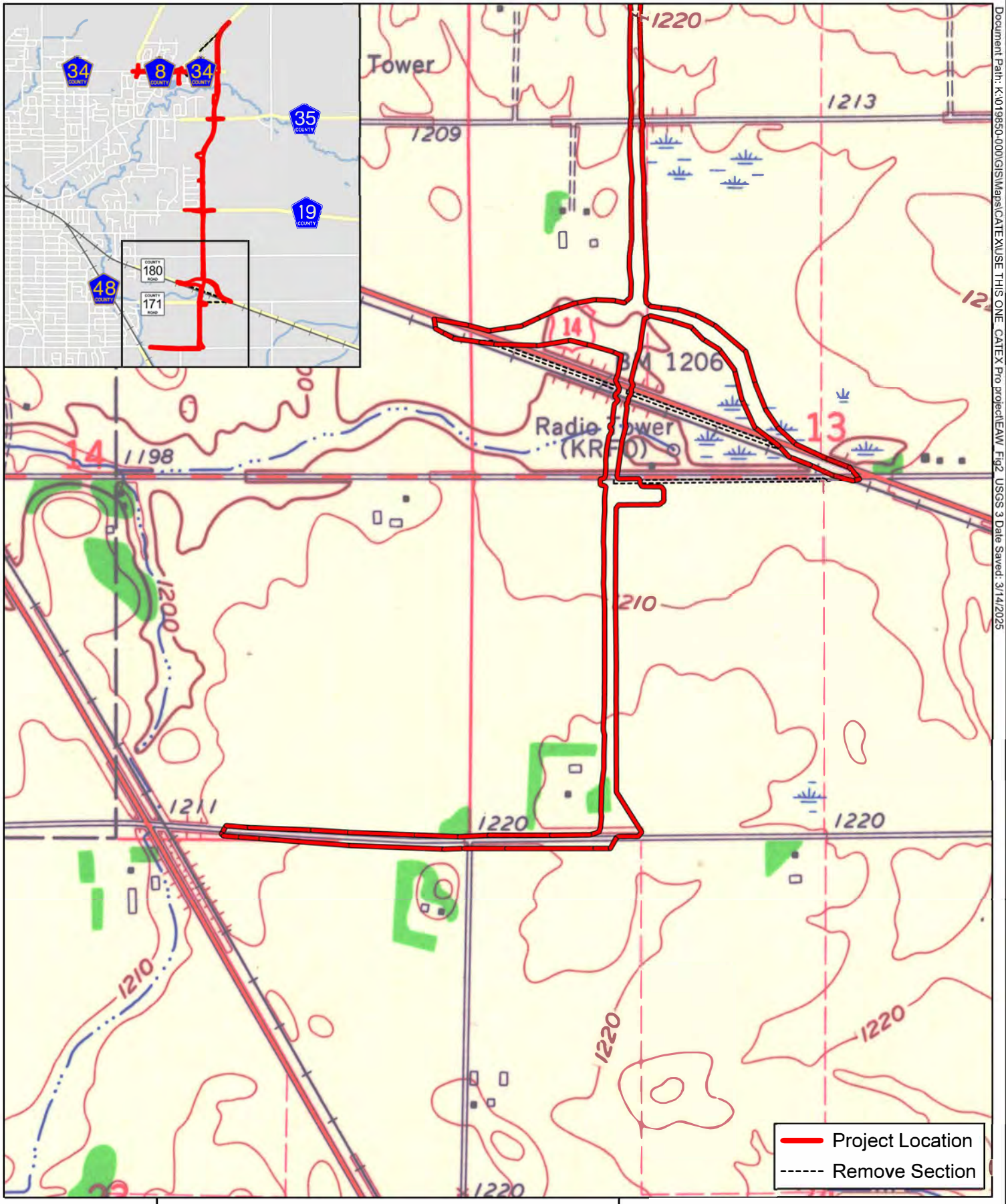
Figure 2B- USGS Project Area Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft



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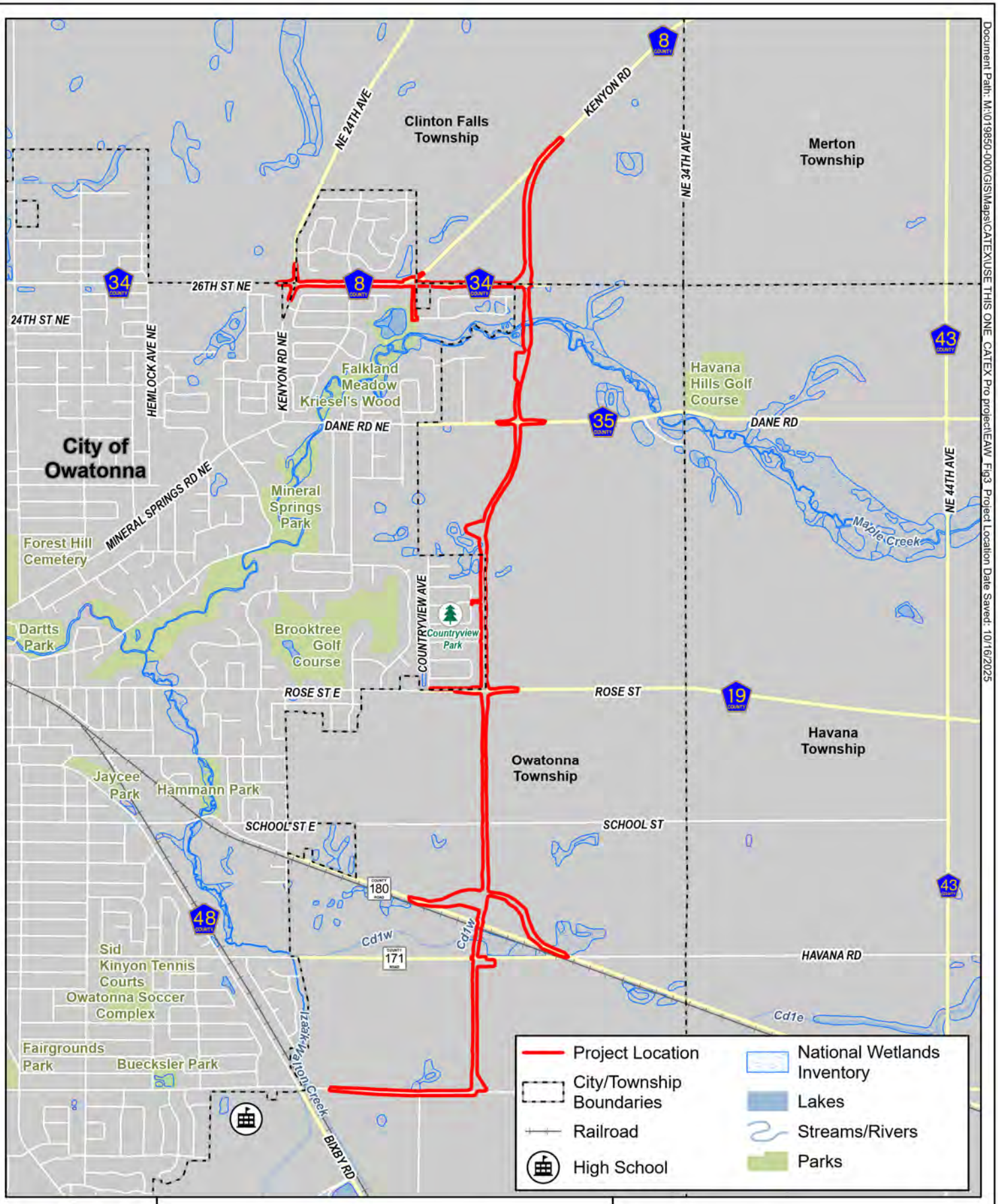
Figure 2C - USGS Project Area Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft



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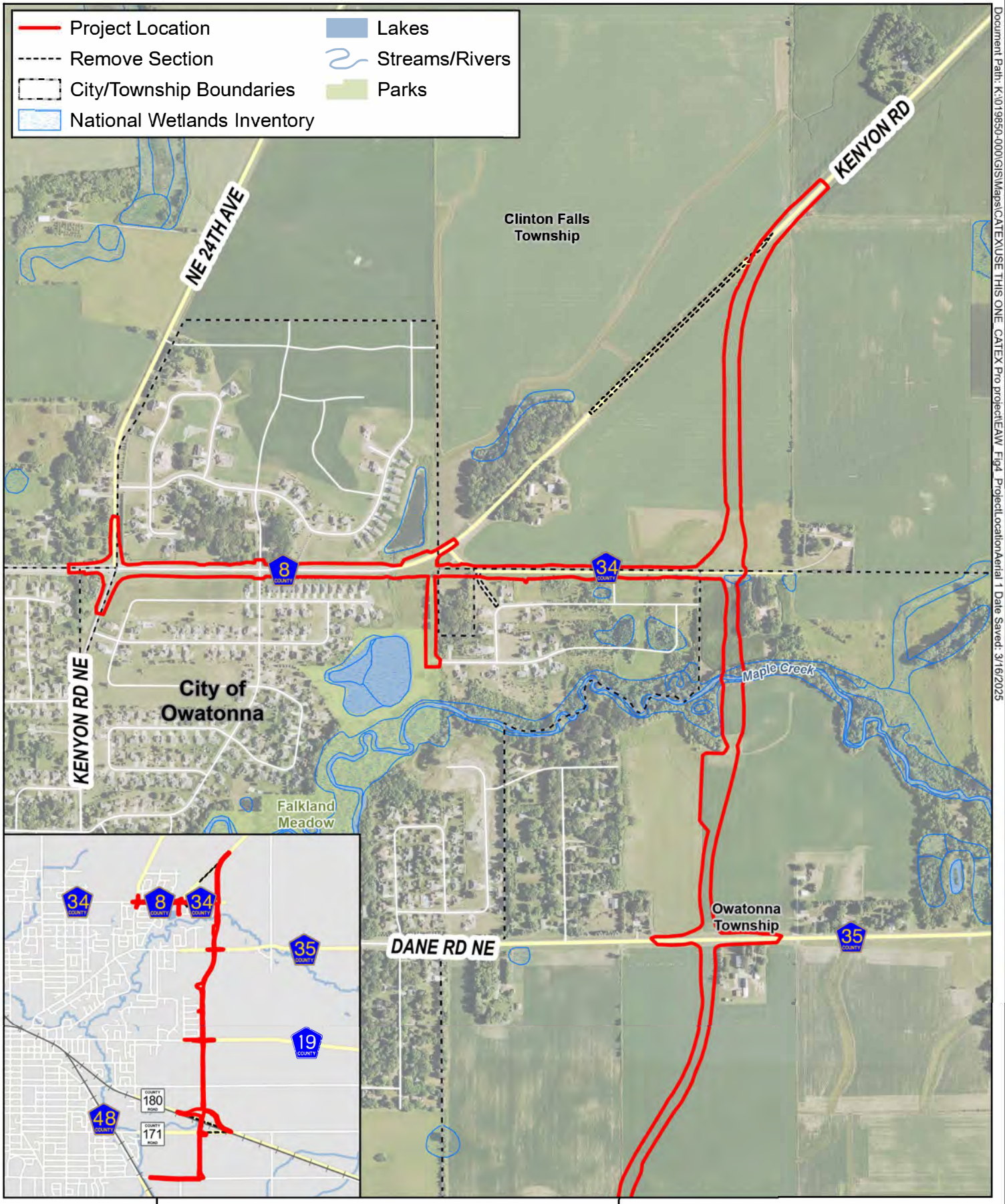
Figure 3 - Project Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 2,500 Feet

1 inch = 2,500 Ft



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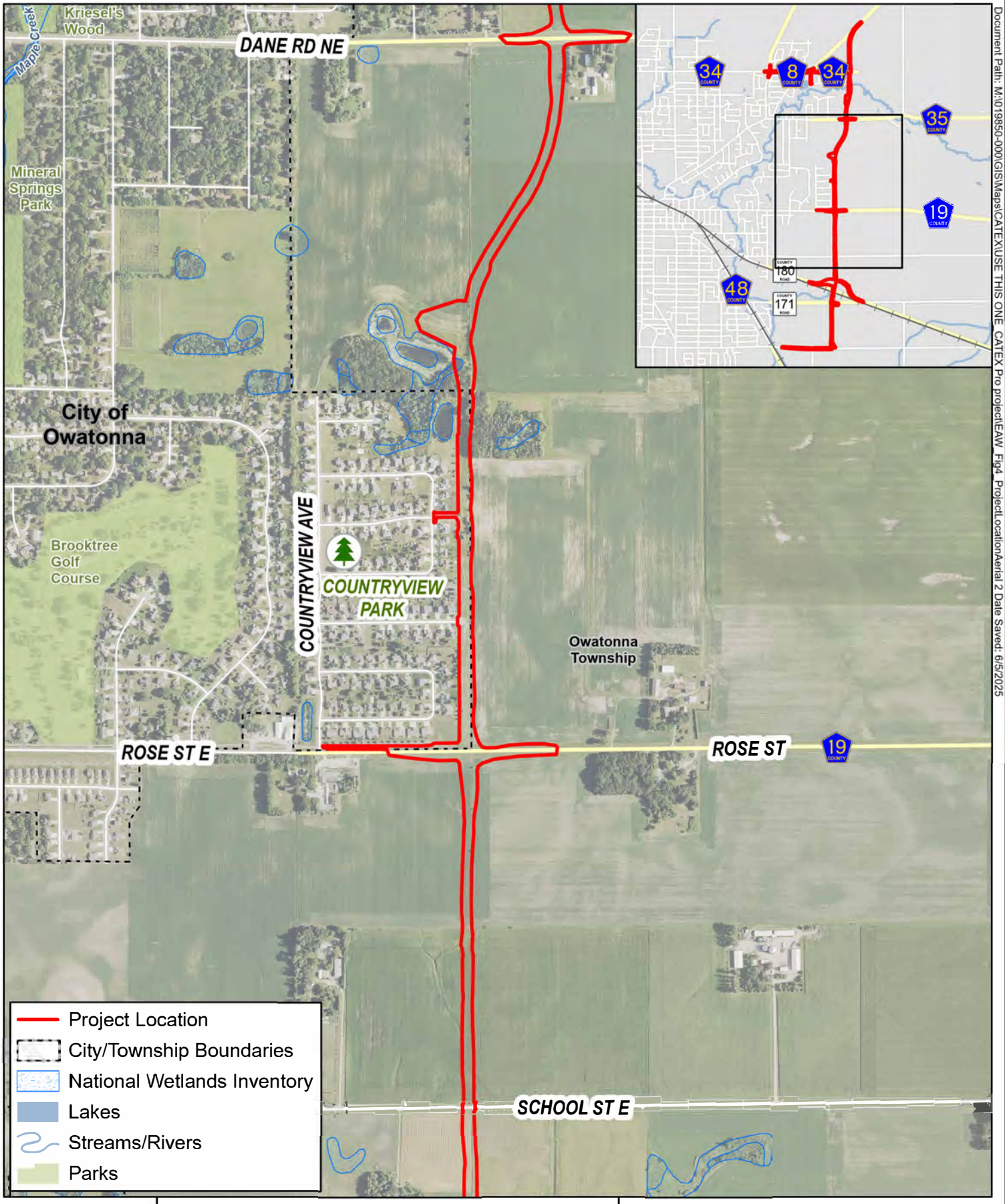
Figure 4A - Aerial Project Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft



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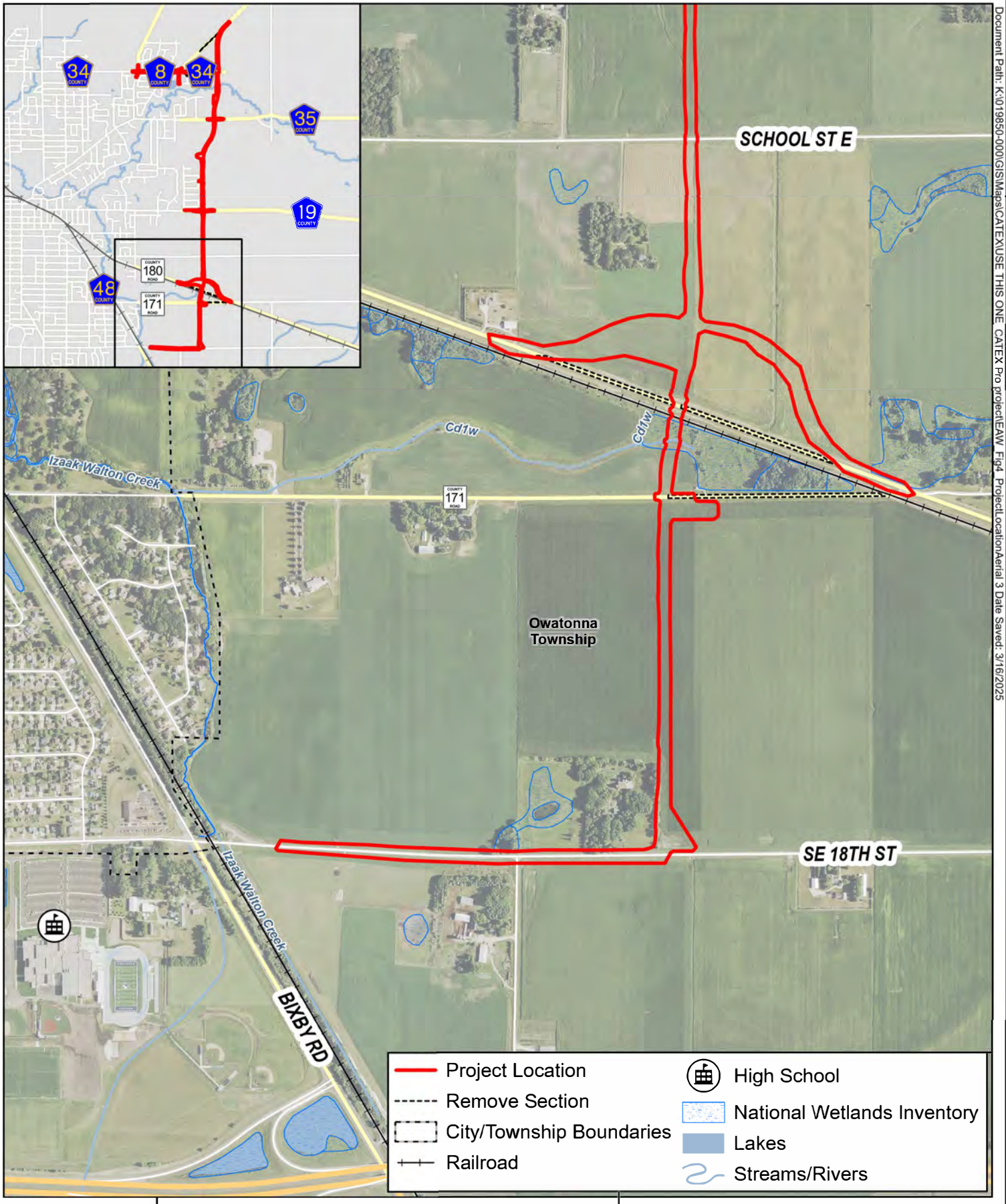
Figure 4B- Aerial Project Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft



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Figure 4C - Aerial Project Map

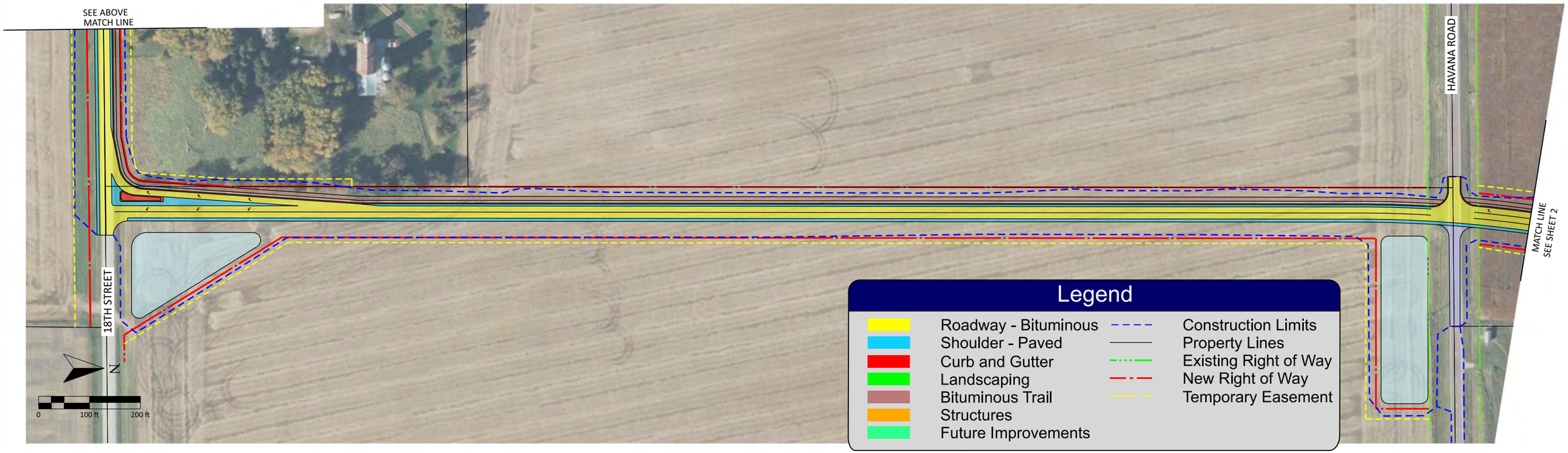
29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft





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29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 5a - Project Layout

SP 074-040-009

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SEE SHEET 3
MATCH LINE

N

0 100 ft 200 ft

CLAREMONT ROAD

MATCH LINE
SEE SHEET 1

Legend

Roadway - Bituminous	Construction Limits
Shoulder - Paved	Property Lines
Curb and Gutter	Existing Right of Way
Landscaping	New Right of Way
Bituminous Trail	Temporary Easement
Structures	
Future Improvements	

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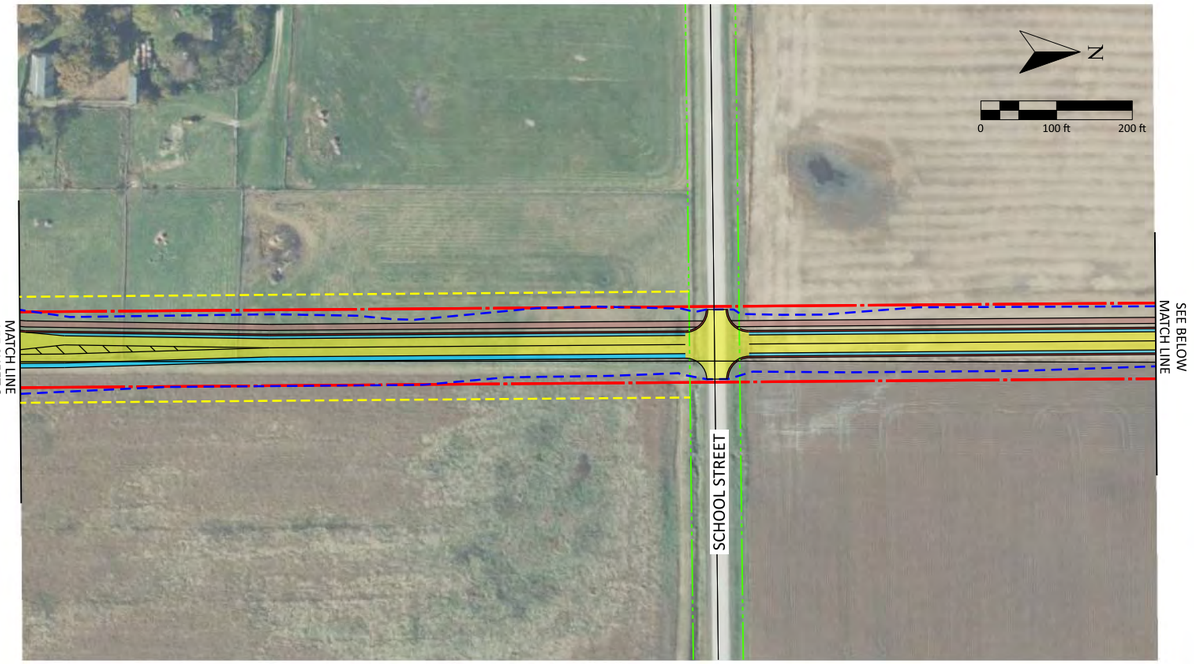
29th Avenue/East Side Corridor

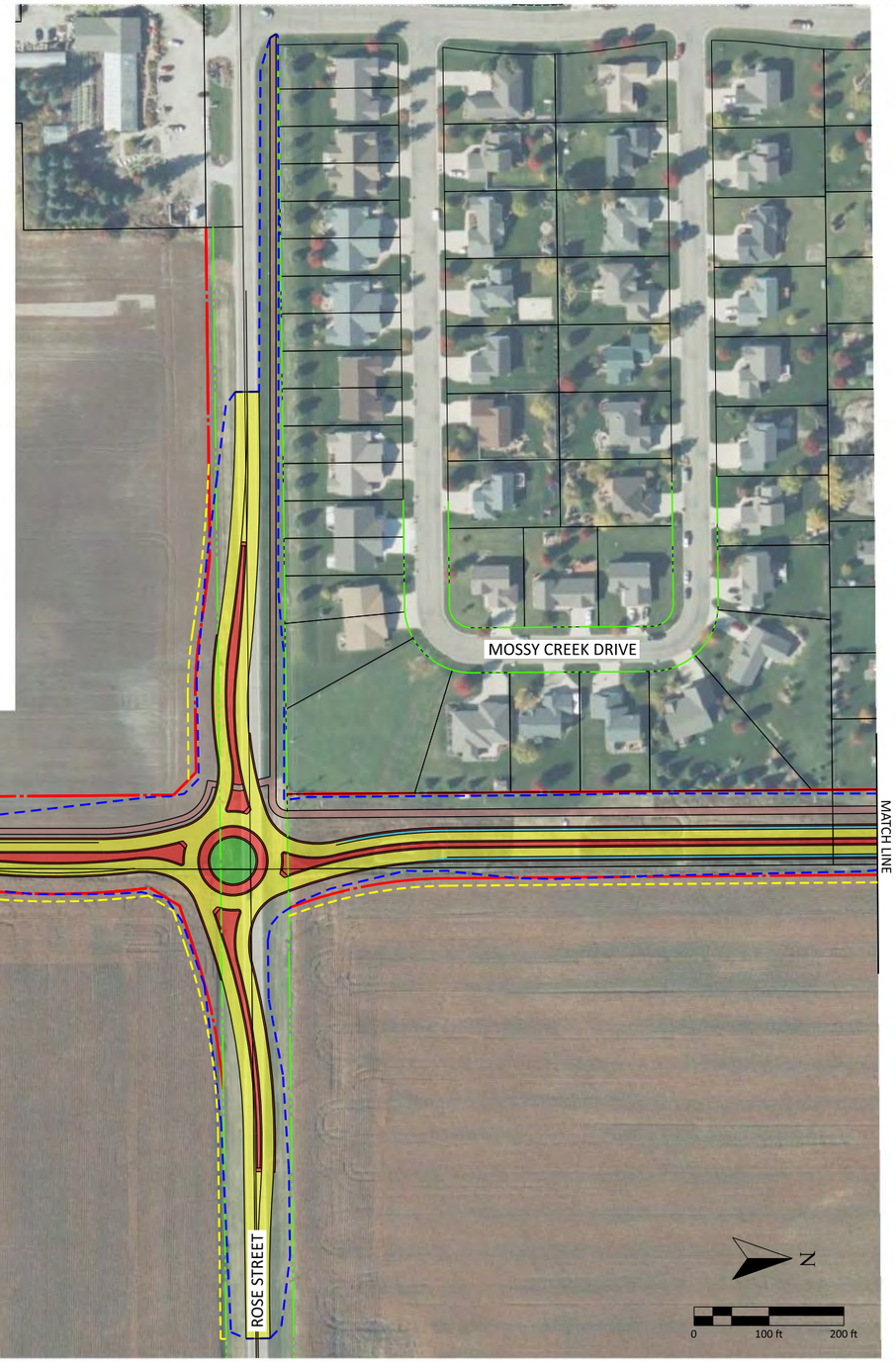
Steele County, Minnesota

Figure 5b - Project Layout

SP 074-040-009

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Legend

- Roadway - Bituminous
- Shoulder - Paved
- Curb and Gutter
- Landscaping
- Bituminous Trail
- Structures
- Future Improvements
- Construction Limits
- Property Lines
- Existing Right of Way
- New Right of Way
- Temporary Easement

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29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 5c - Project Layout
SP 074-040-009

SHEET 3 OF 6

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FOX HOLLOW LANE

STONY CREEK DRIVE

TIMBERWOOD LANE

SEE SHEET 3
MATCH LINE

MATCH LINE
SEE BELOW

N

0 100 ft 200 ft

DANE ROAD

SEE ABOVE
MATCH LINE

MATCH LINE
SEE SHEET 5

Legend

- Roadway - Bituminous
- Shoulder - Paved
- Curb and Gutter
- Landscaping
- Bituminous Trail
- Structures
- Future Improvements
- Construction Limits
- Property Lines
- Existing Right of Way
- New Right of Way
- Temporary Easement

N

0 100 ft 200 ft

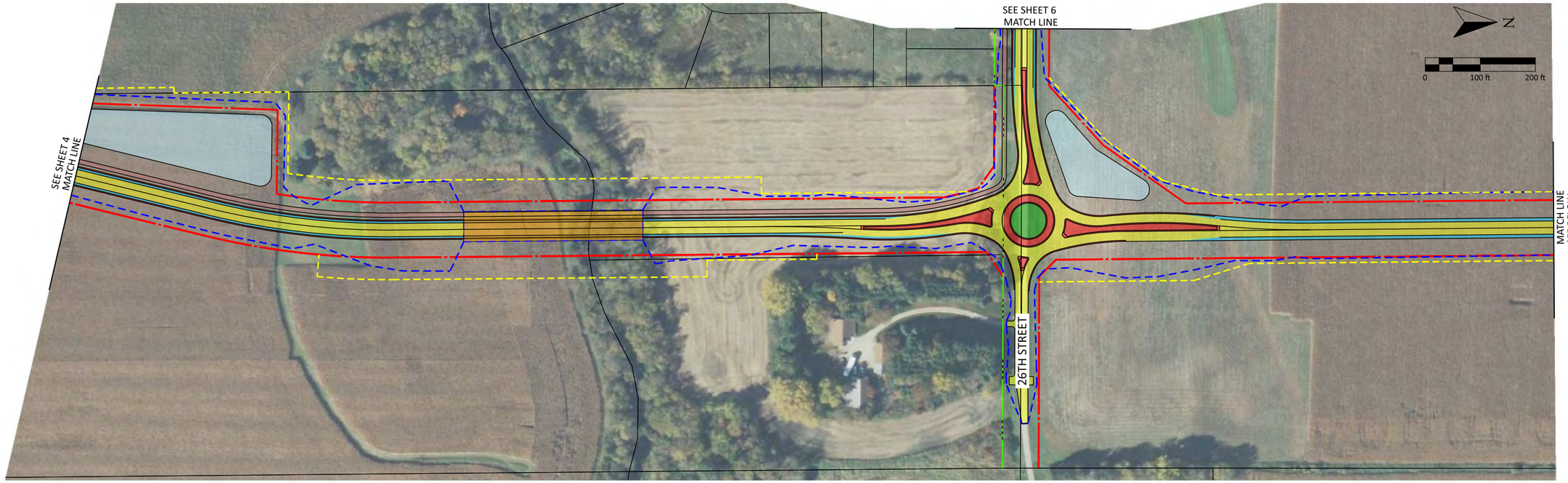
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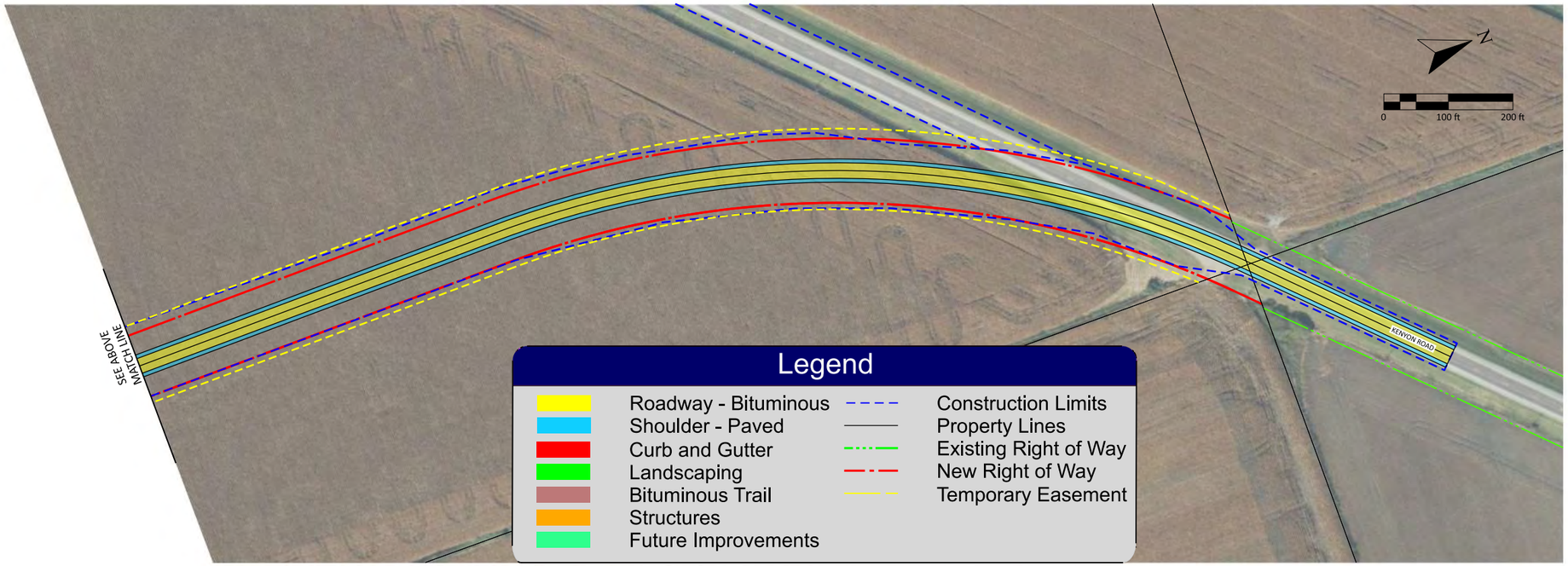
29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 5d - Project Layout
SP 074-040-009

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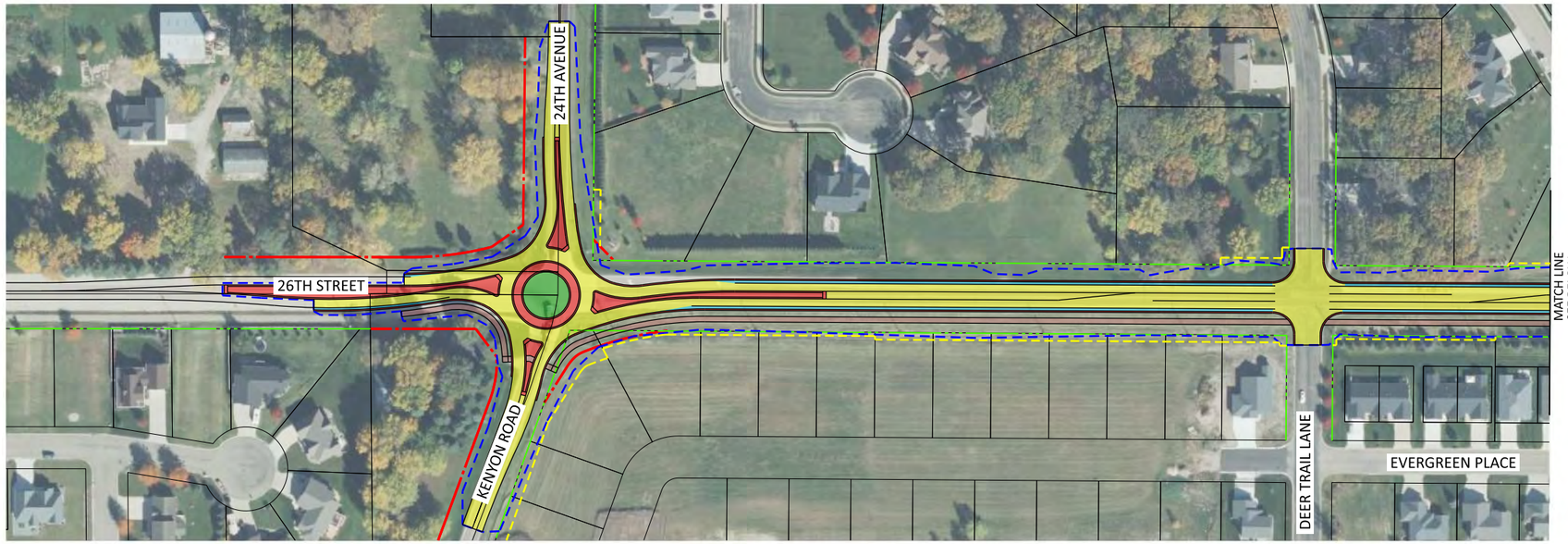
29th Avenue/East Side Corridor
Steele County, Minnesota

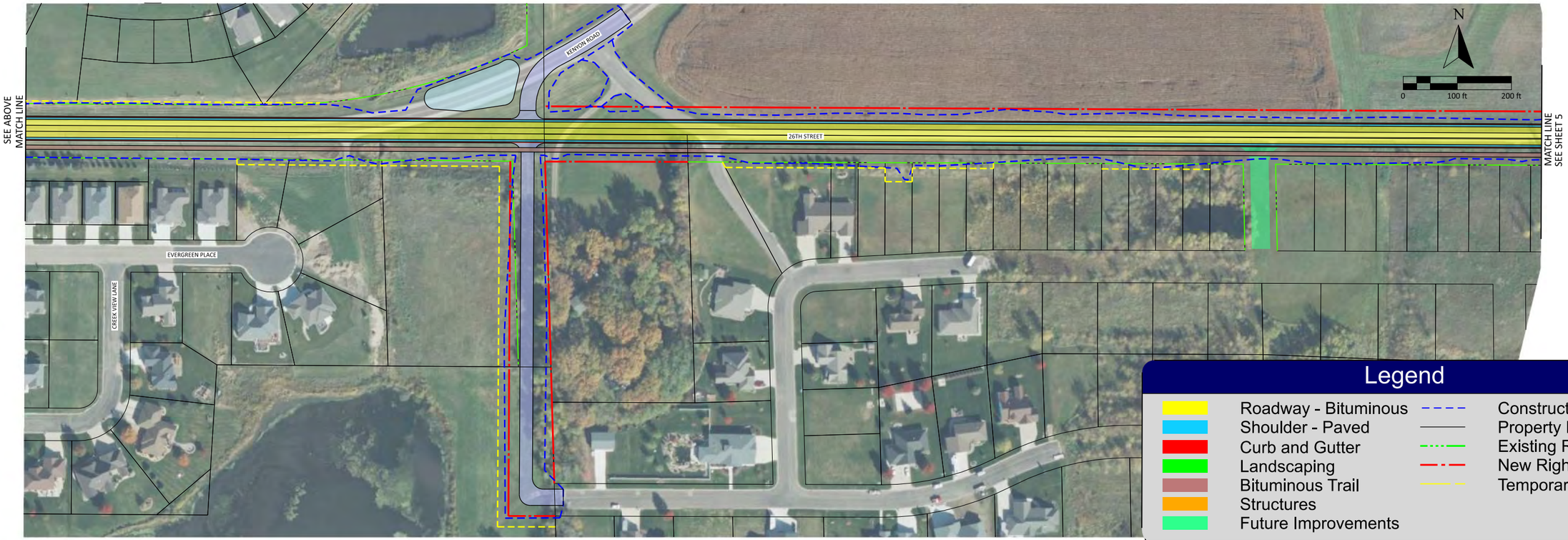
Figure 5e - Project Layout

SP 074-040-009

SHEET 5 OF 6

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Legend

Roadway - Bituminous	Construction Limits
Shoulder - Paved	Property Lines
Curb and Gutter	Existing Right of Way
Landscaping	New Right of Way
Bituminous Trail	Temporary Easement
Structures	
Future Improvements	

29th Avenue/East Side Corridor
Steele County, Minnesota

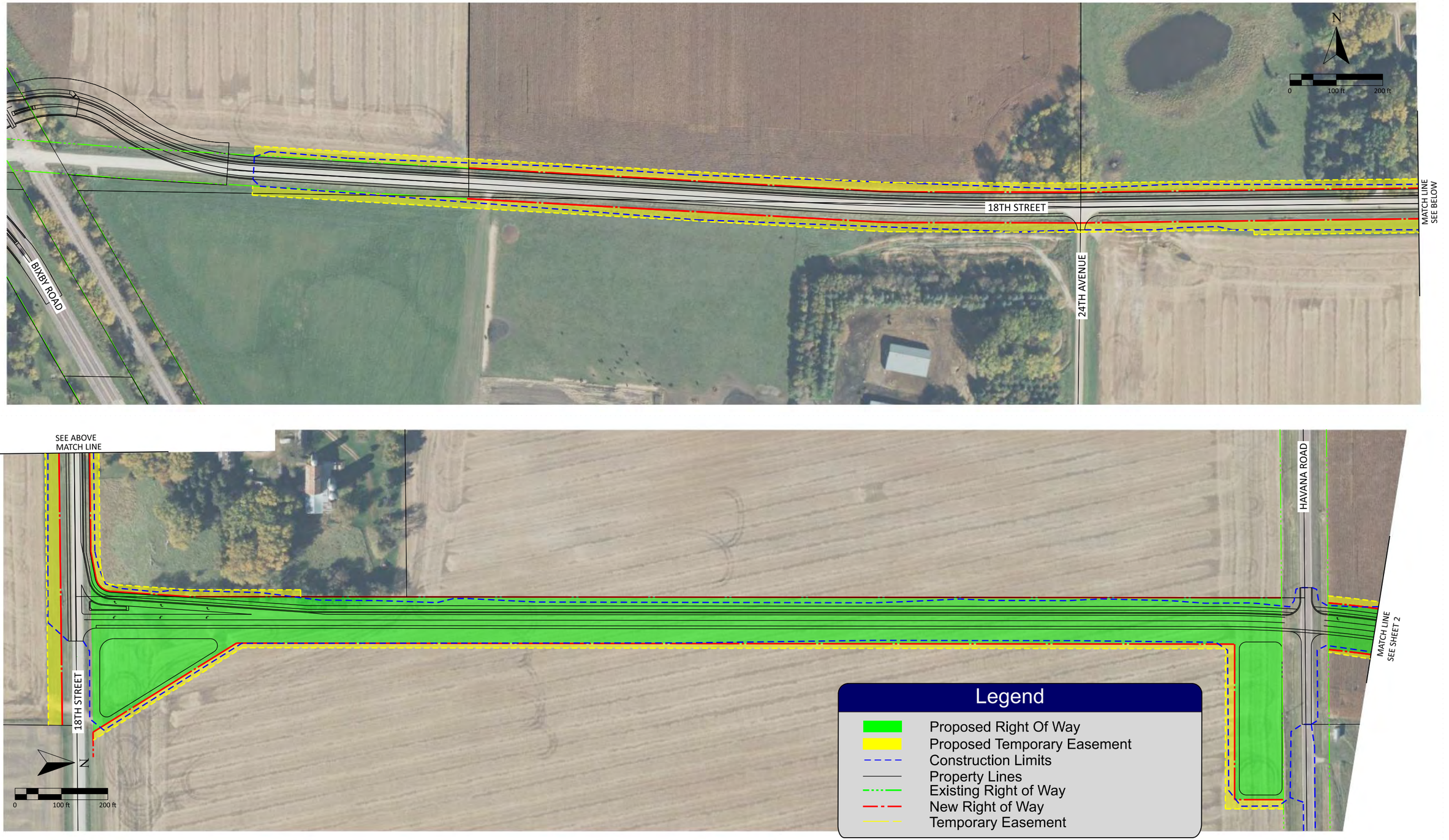
Figure 5f - Project Layout

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SHEET 6 OF 6

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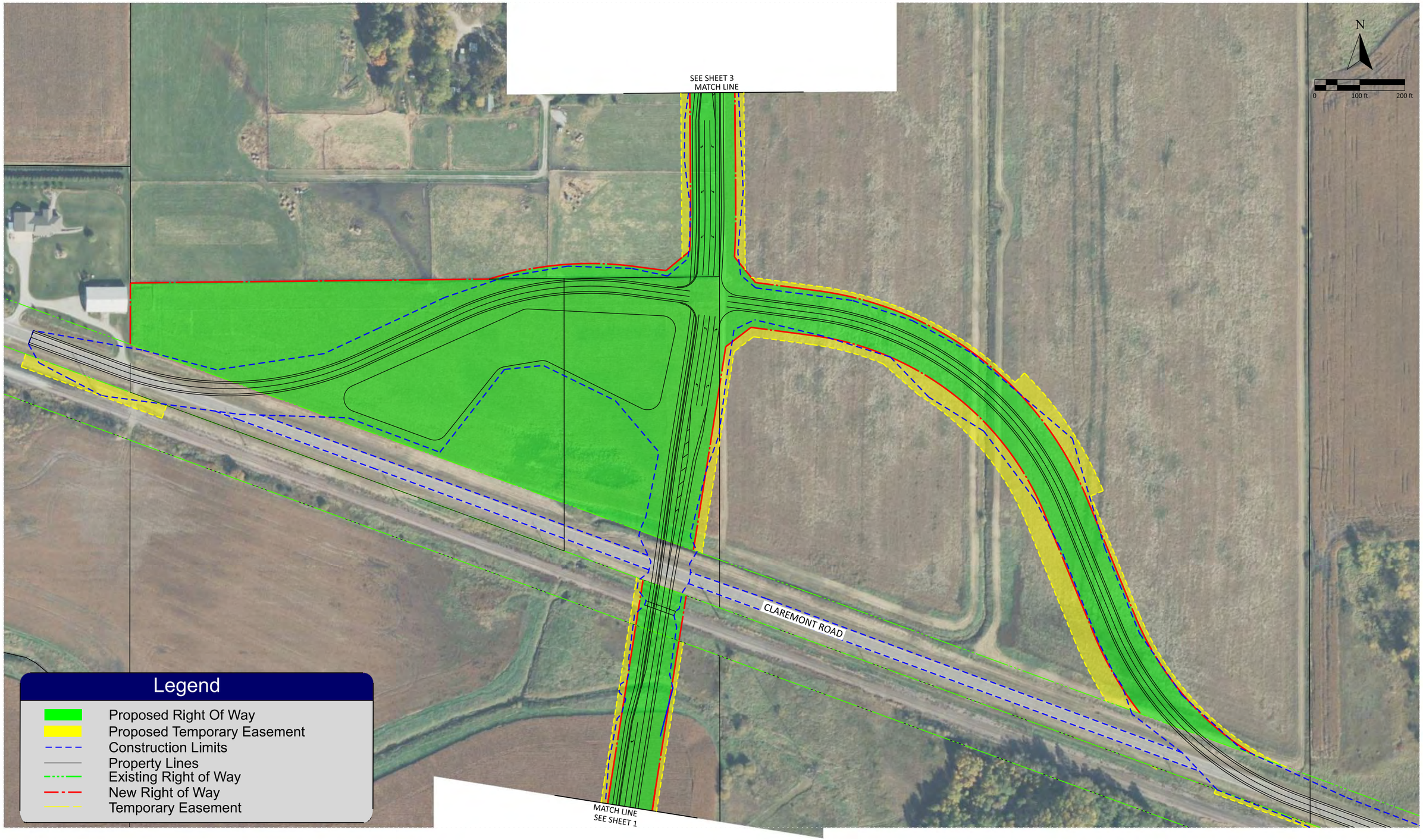
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29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 6a - Right of Way Impacts

SP 074-040-009

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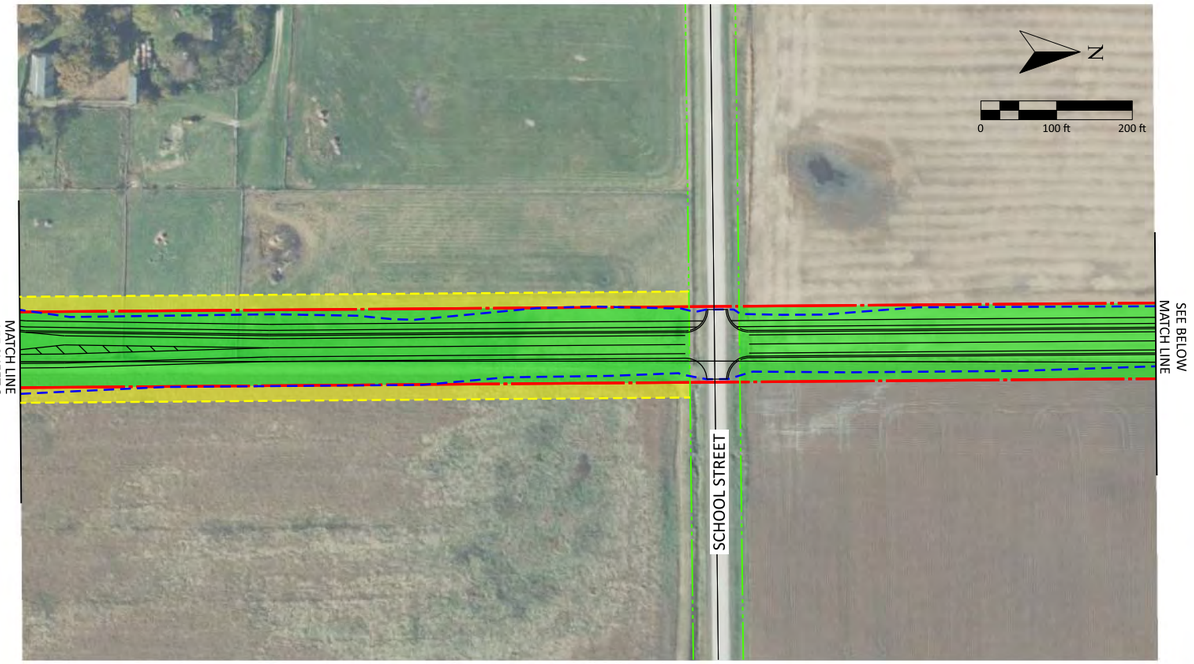
29th Avenue/East Side Corridor
Steele County, Minnesota

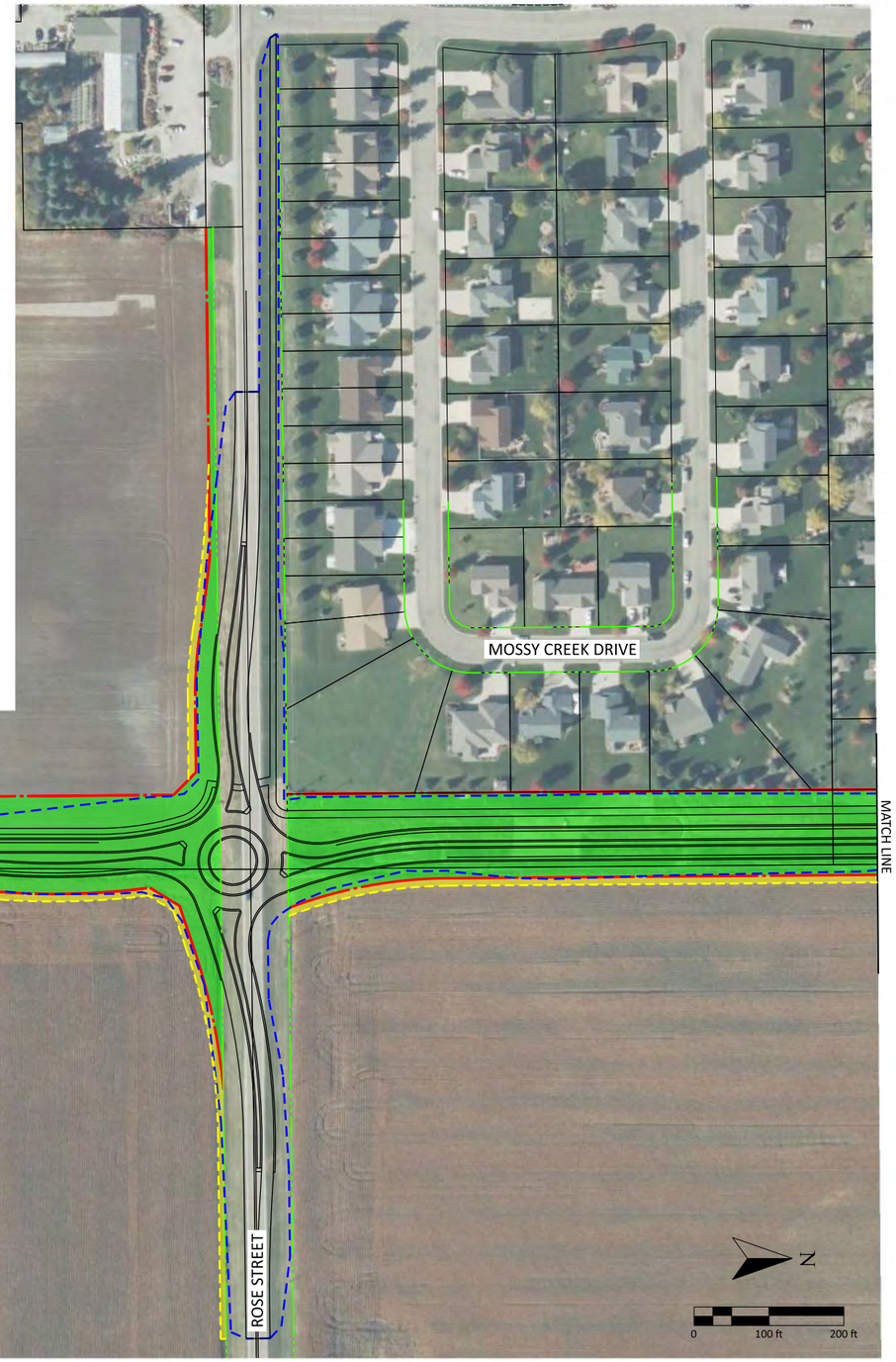
Figure 6b - Right of Way Impacts

SP 074-040-009

SHEET 2 OF 6

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Legend

- Proposed Right Of Way
- Proposed Temporary Easement
- Construction Limits
- Property Lines
- Existing Right of Way
- New Right of Way
- Temporary Easement

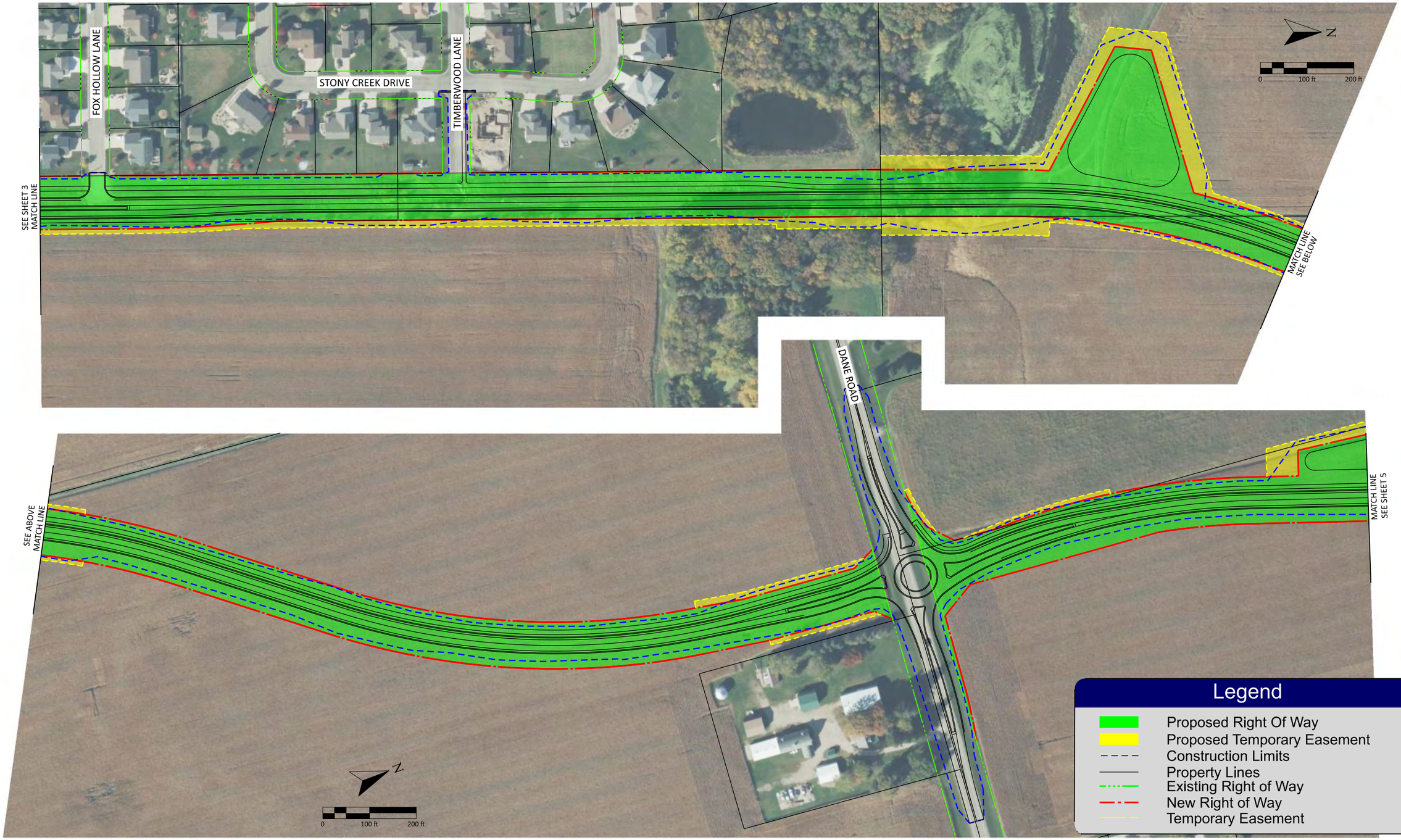
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29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 6c - Right of Way Impacts

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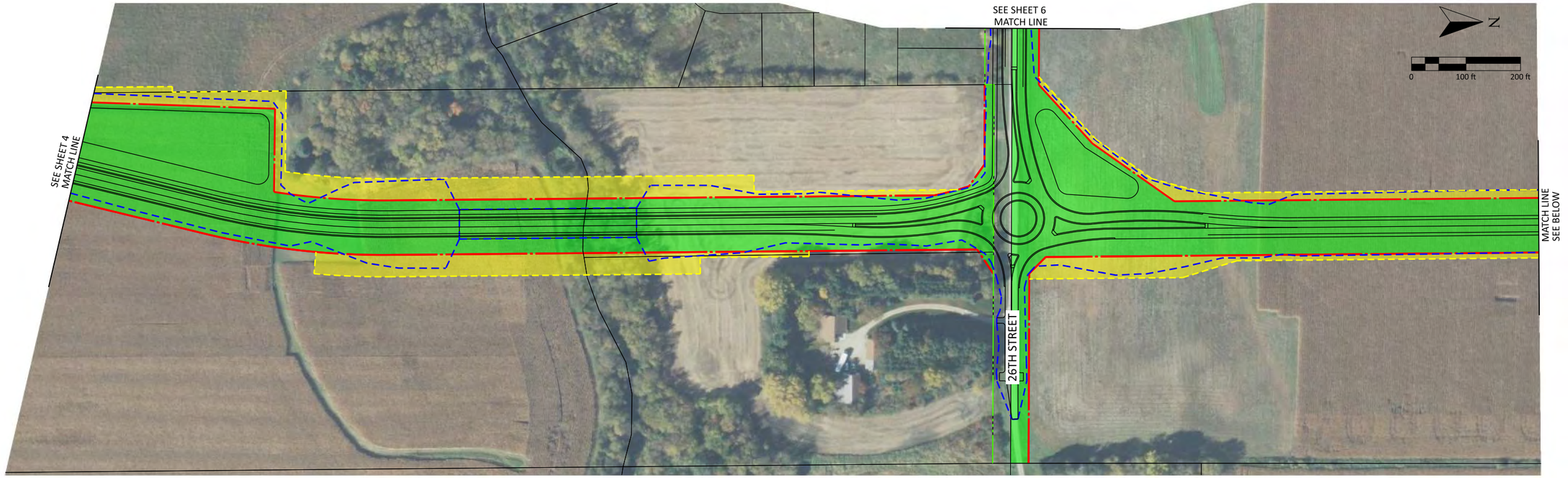
29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 6d - Right of Way Impacts

SP 074-040-009

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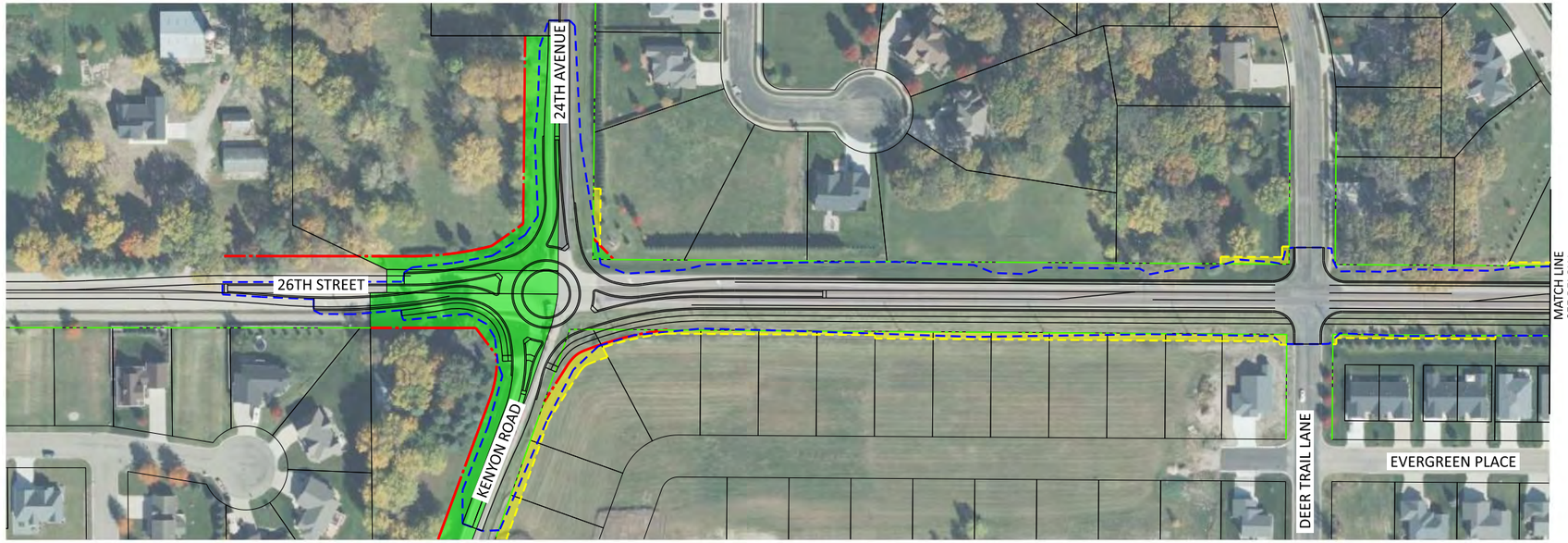


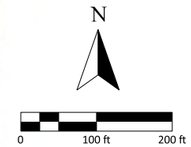
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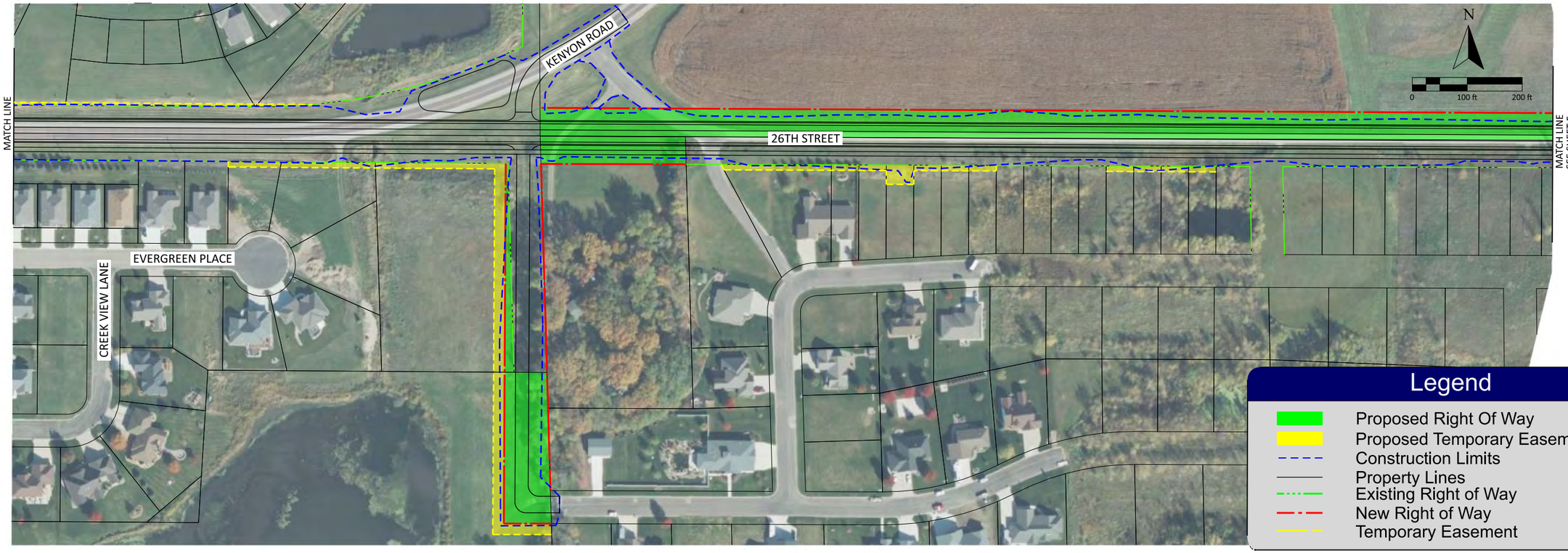
29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 6e - Right of Way Impacts
SP 074-040-009

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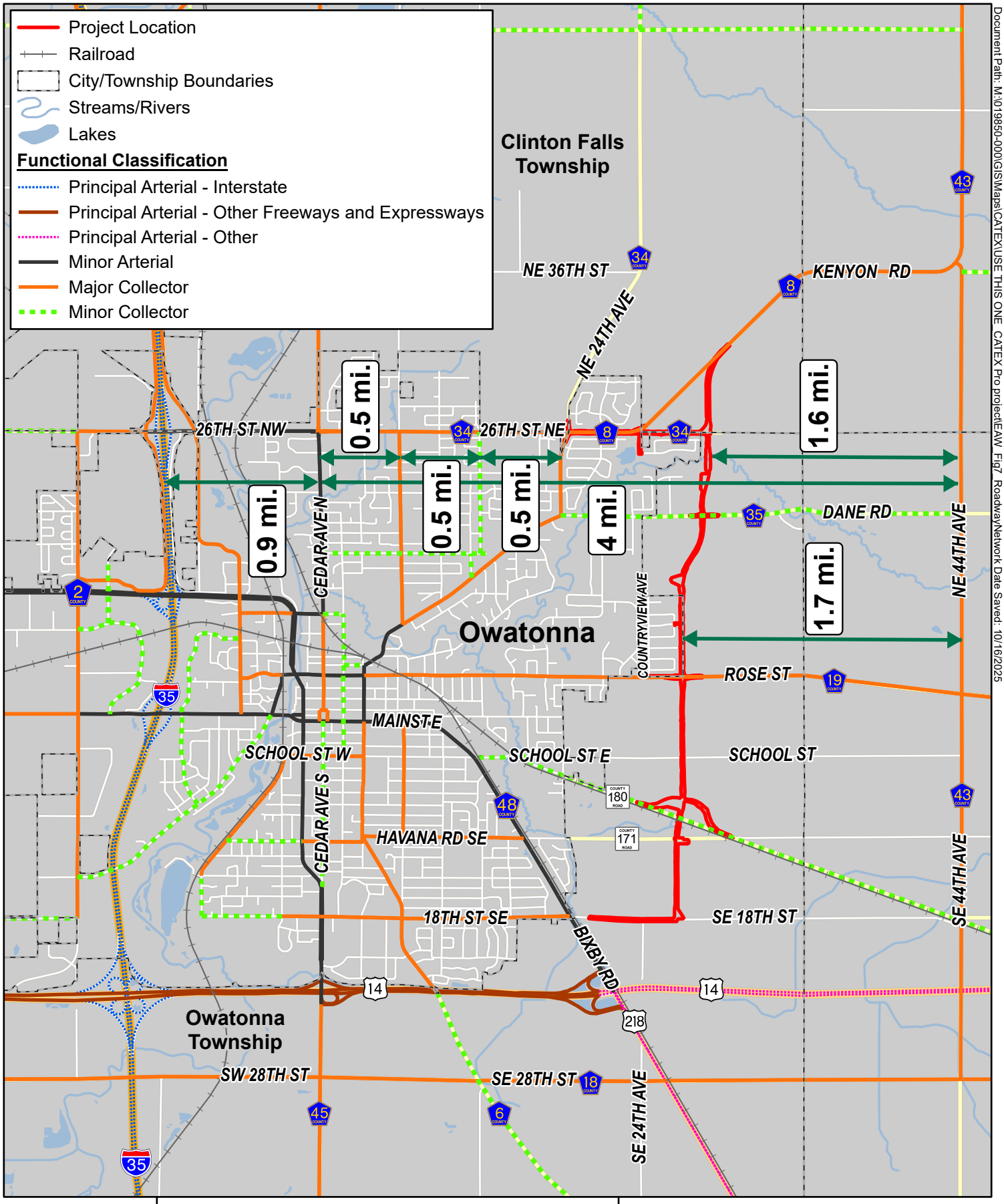
29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 6f - Right of Way Impacts

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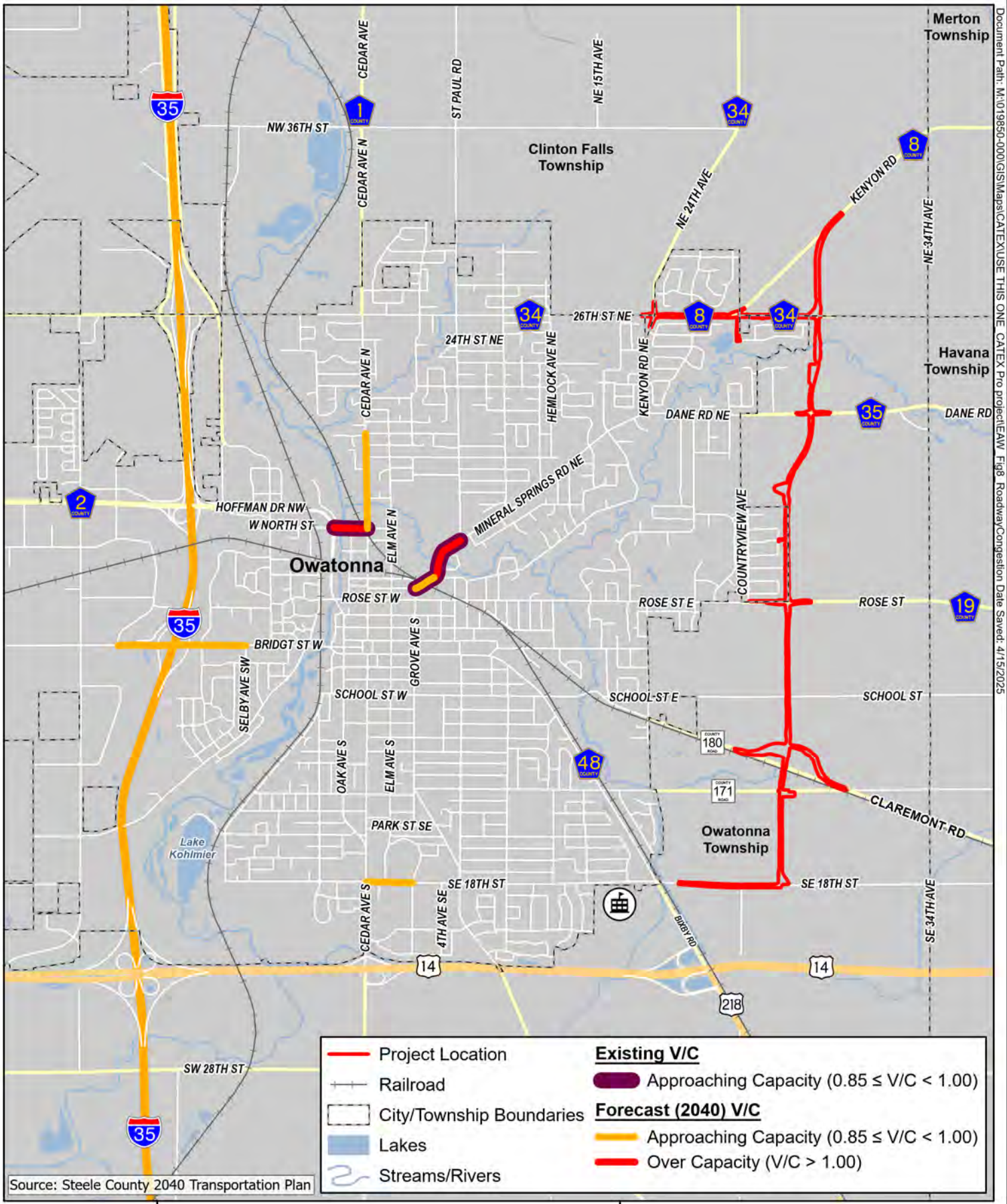
Figure 7 - Roadway Network, Functional Classification, and Spacing

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 4,200 Feet

1 inch = 4,200 Ft



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Figure 8 - Roadway Congestion

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

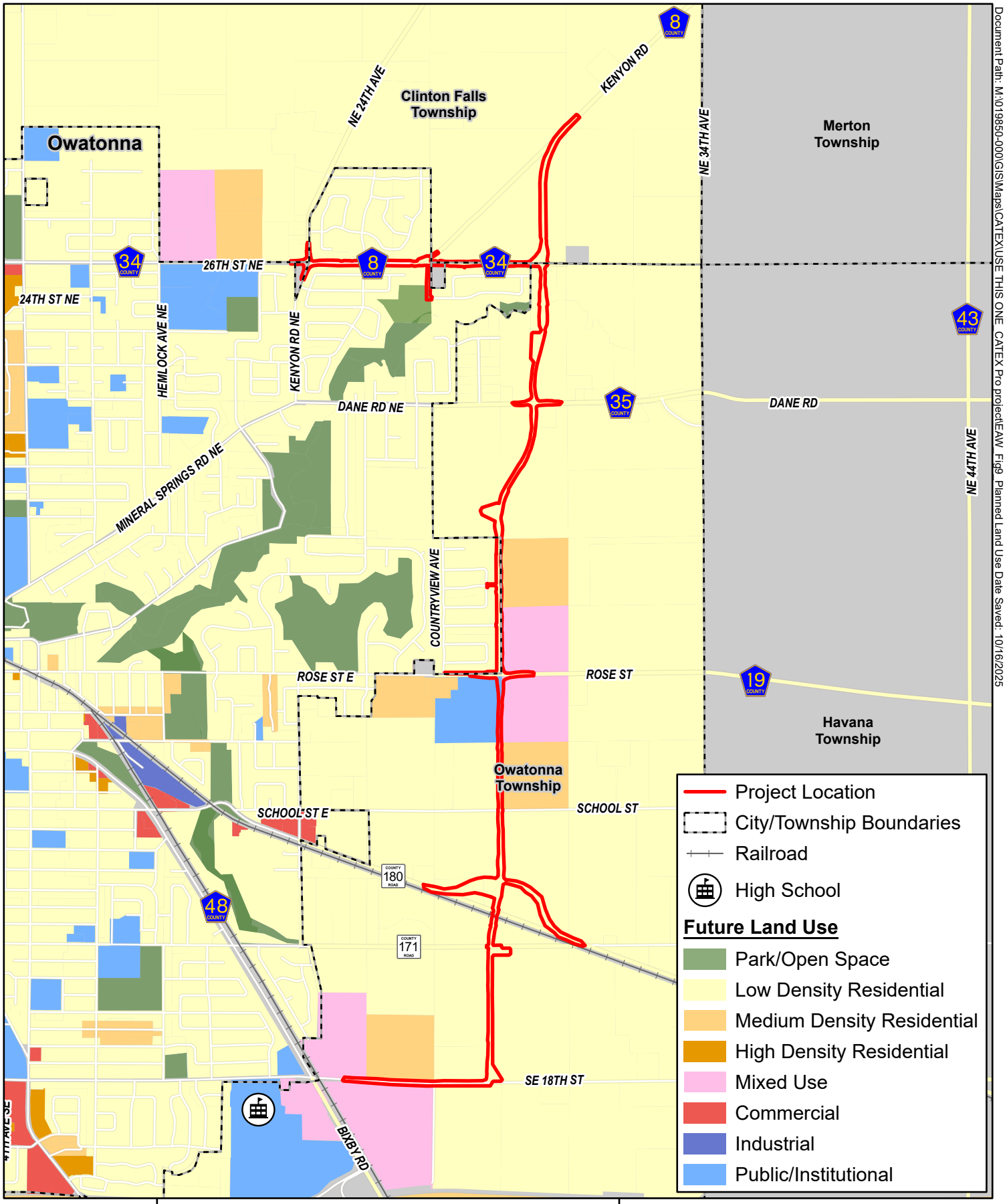


Figure 9 - Planned Land Use

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 2,500 Feet

1 inch = 2,500 Ft

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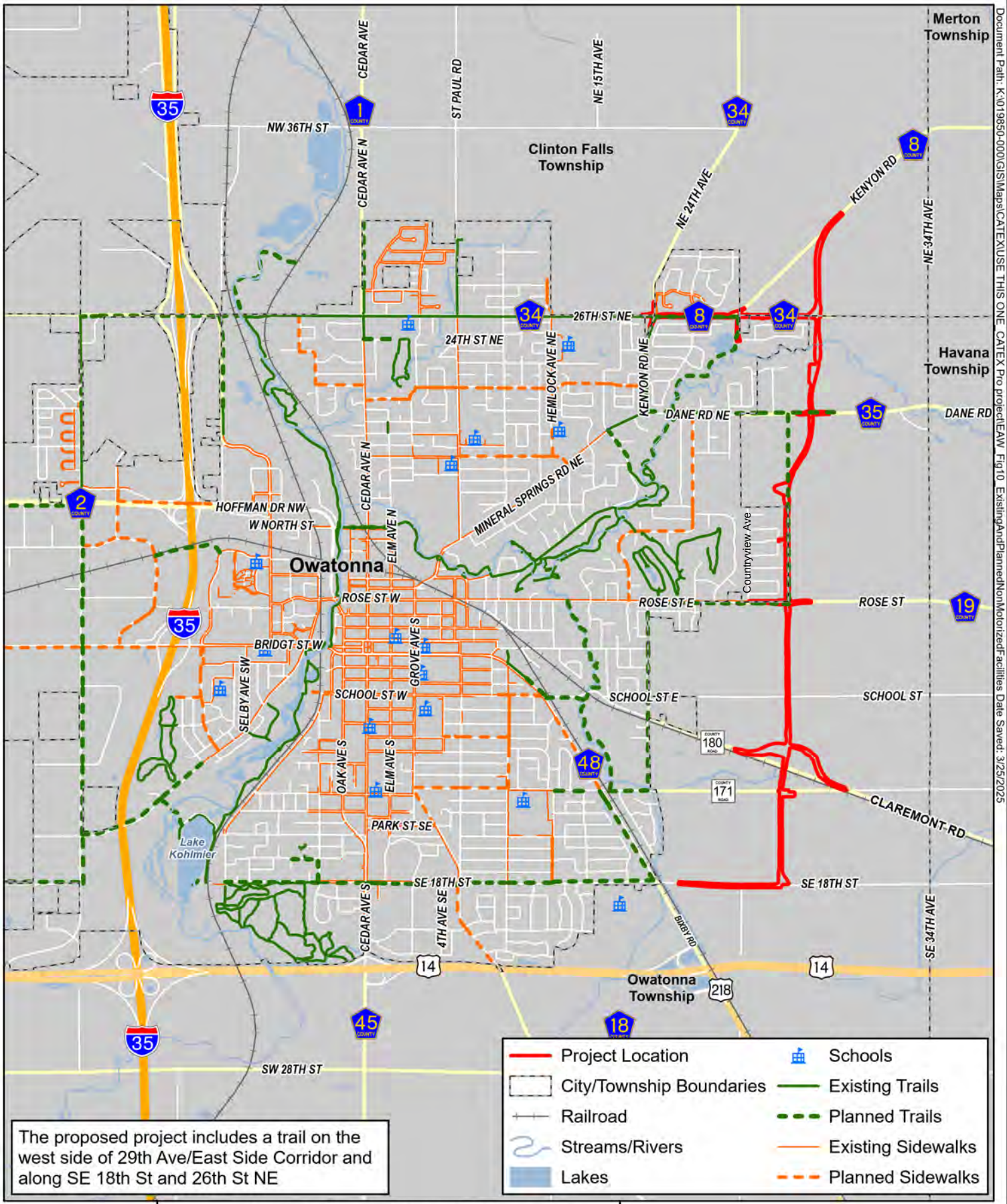


Figure 10 - Existing and Planned Nonmotorized Facilities

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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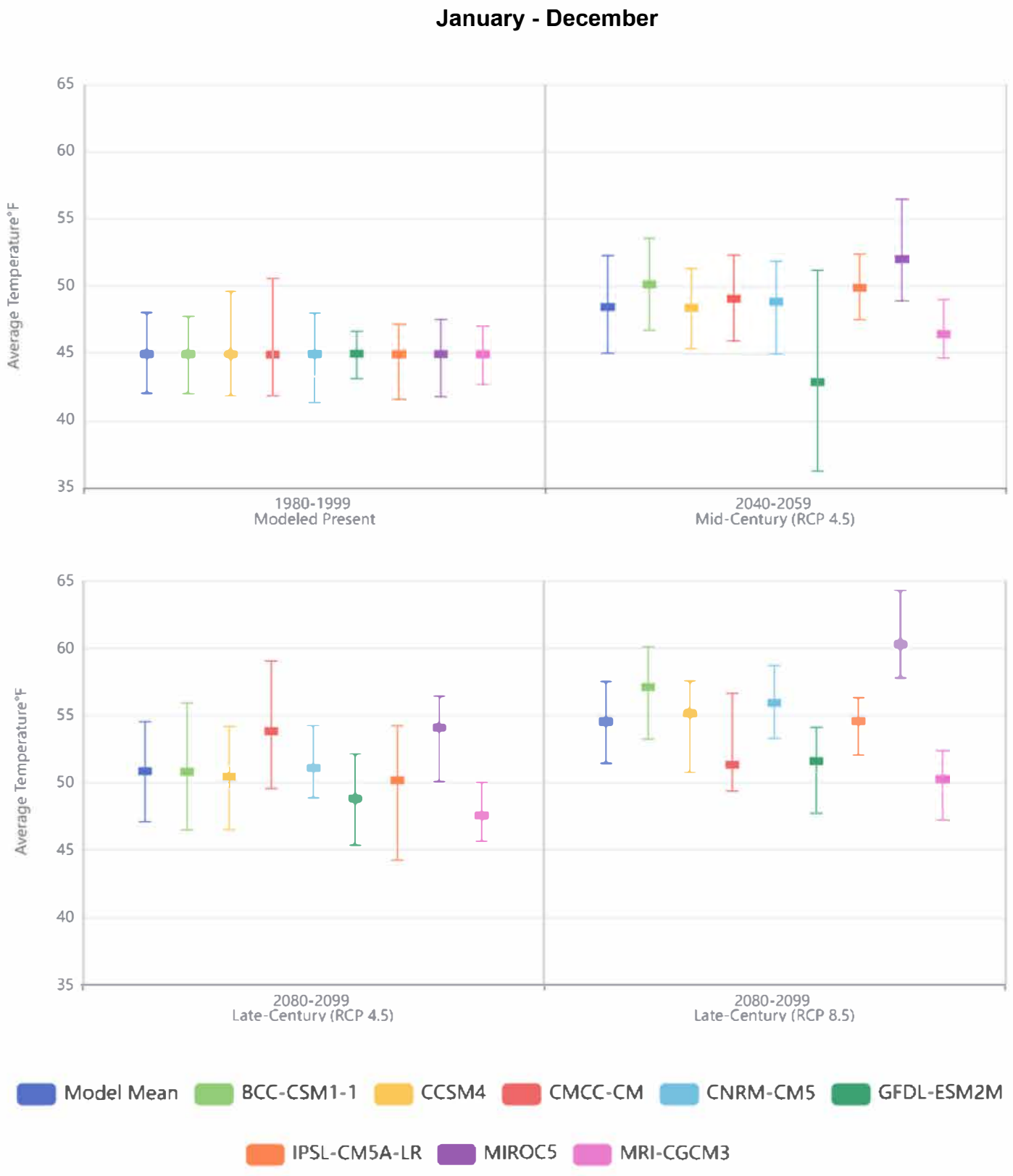


Figure 11 - Recent and Projected Future Average Temperature for Canon River

Owatonna East Side/29th Ave Corridor
SP 074-070-009
Steele County, Minnesota

Graph generated by Minnesota Department of Natural Resources using data from University of Minnesota climate modeling. These values may differ from those published in national and global climate assessments.



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Figure 12 - Land Cover
29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

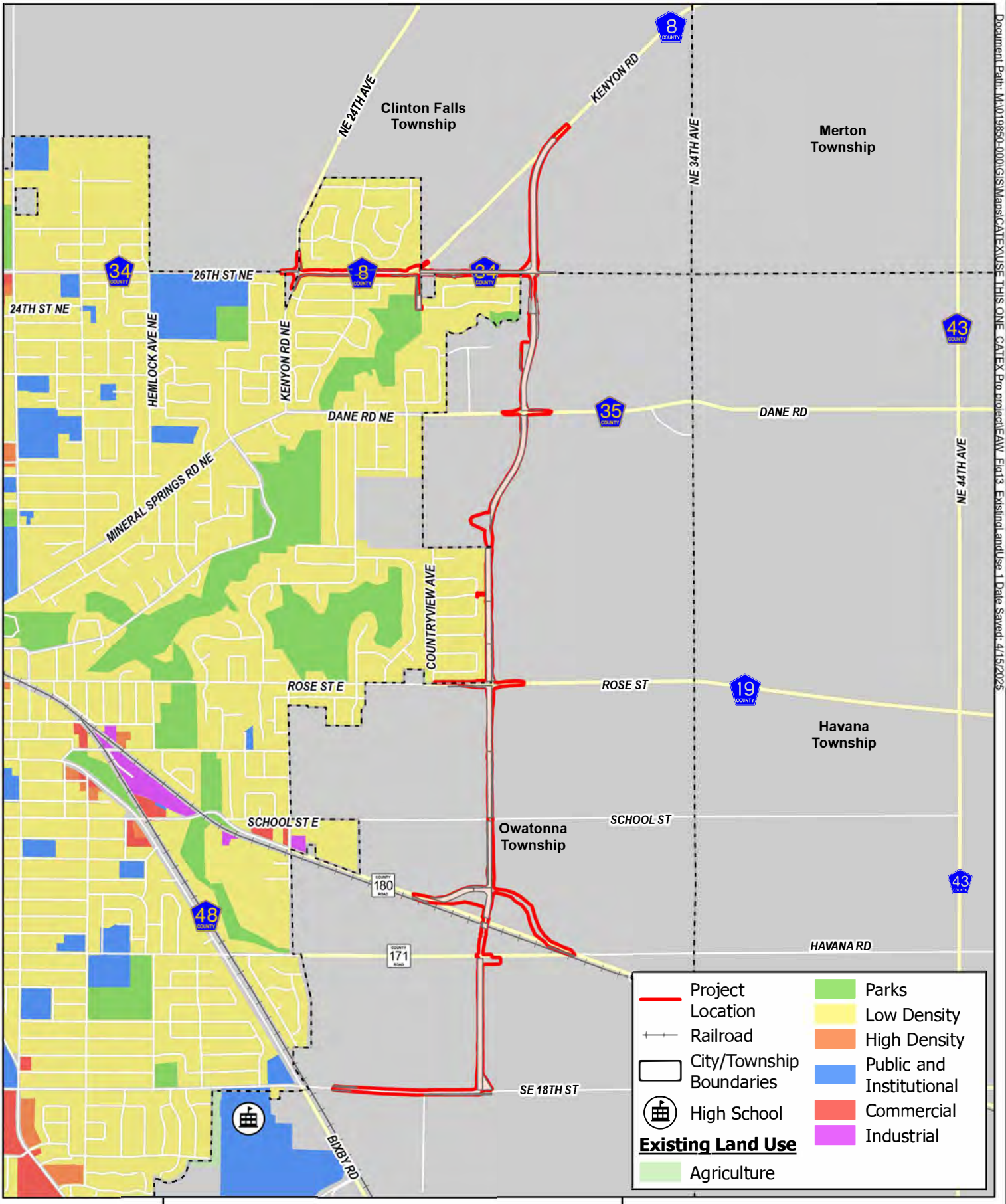


Figure 13 - Existing Land Use (City of Owatonna)

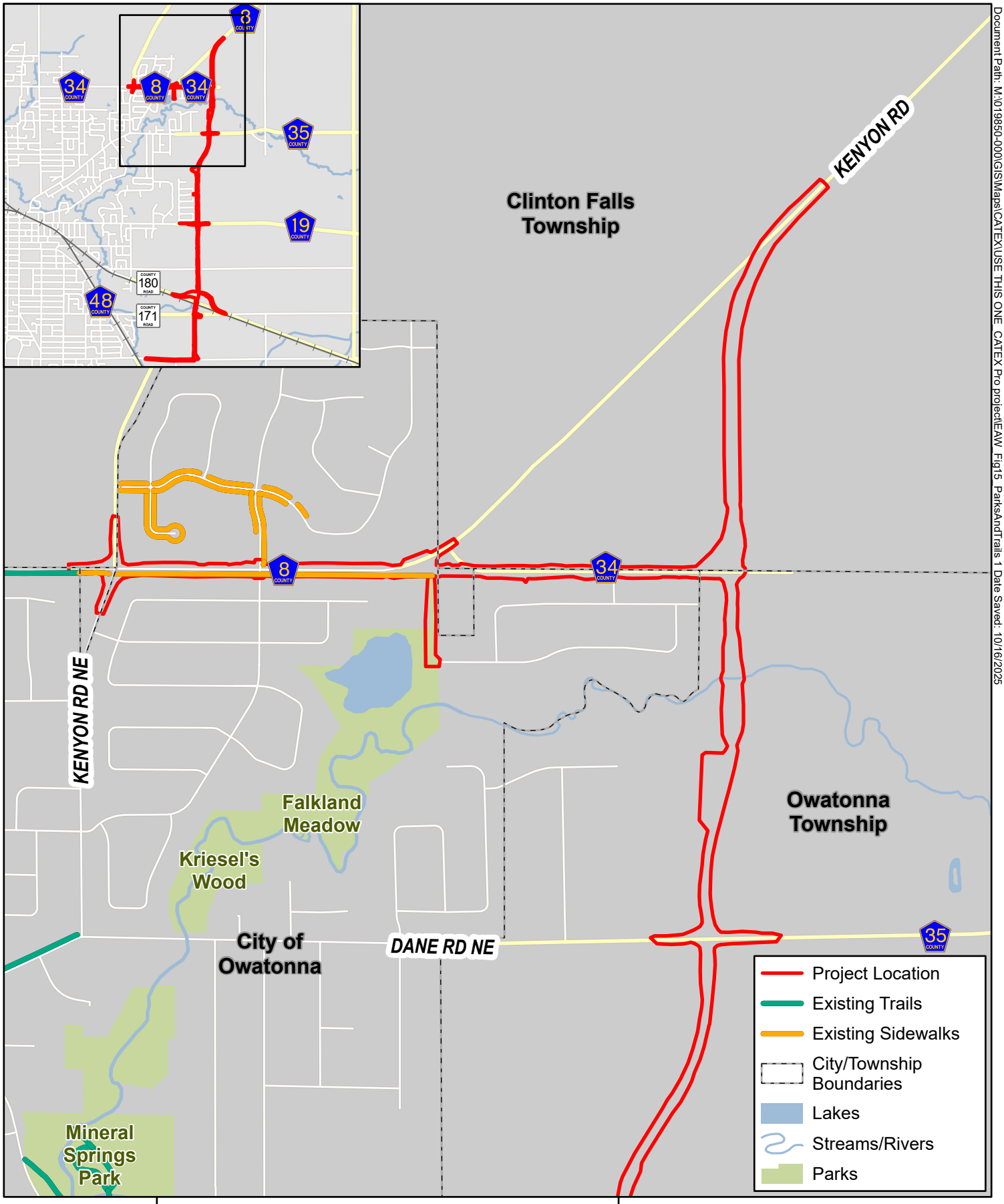
29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota



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Figure 14 - Existing Land Use (Townships)

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota



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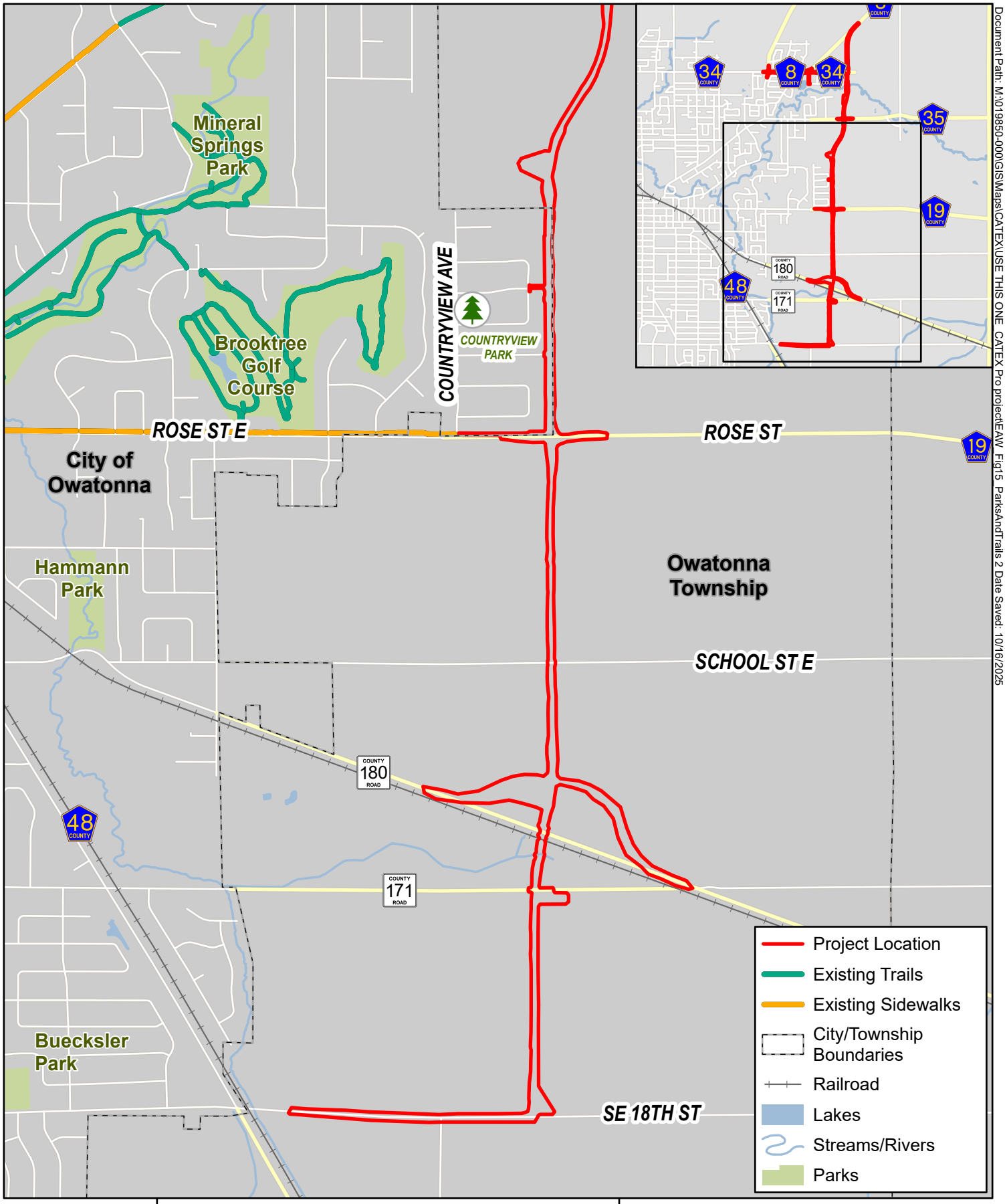
Figure 15A - Parks and Trails

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft



Document Path: M:\019850-000\GIS\Maps\CATEX\USE THIS ONE CATEX Pro project\EAW Fig15 ParksAndTrails 2 Date Saved: 10/16/2025

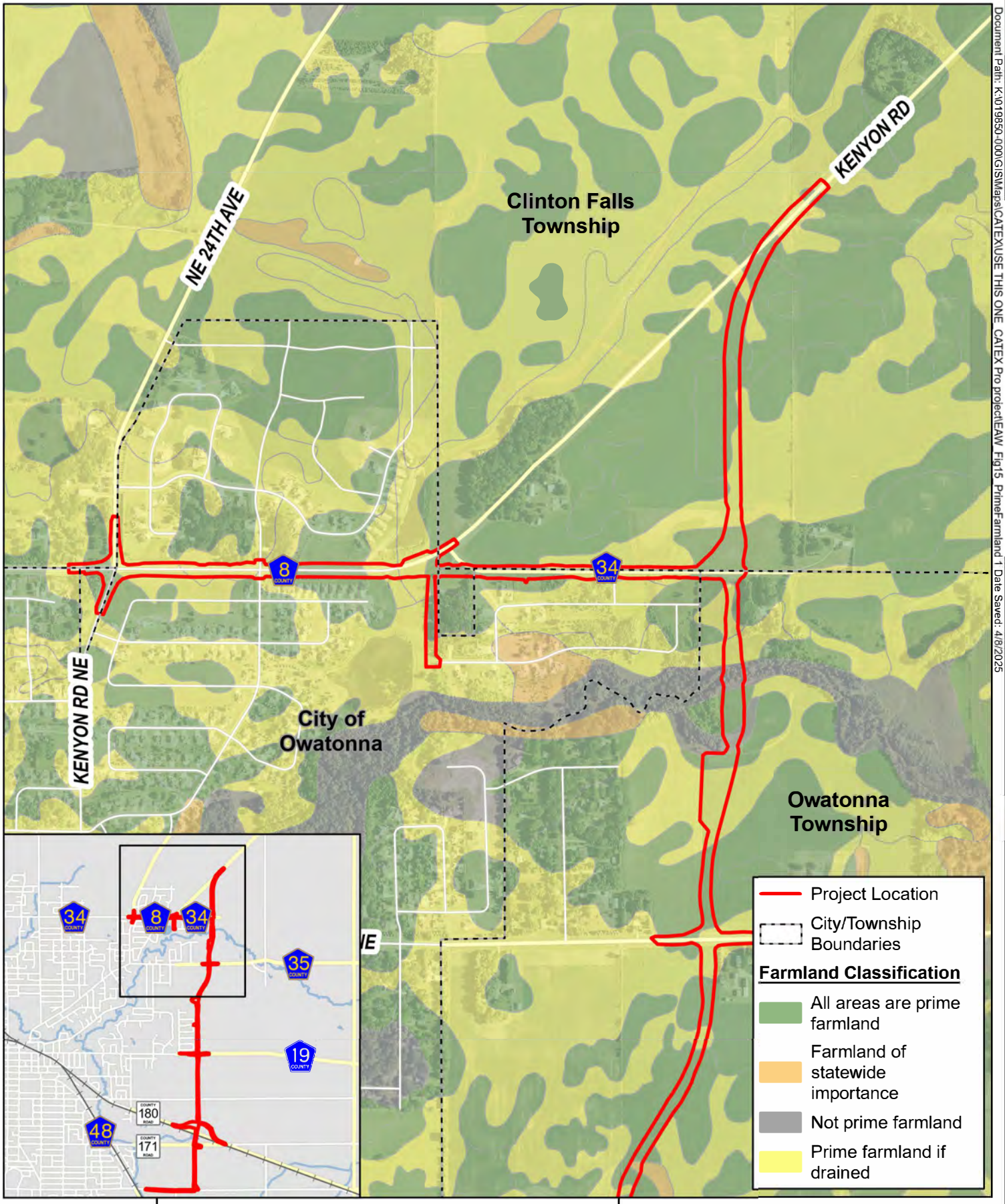
Figure 15B - Parks and Trails

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 1,500 Feet

1 inch = 1,500 Ft



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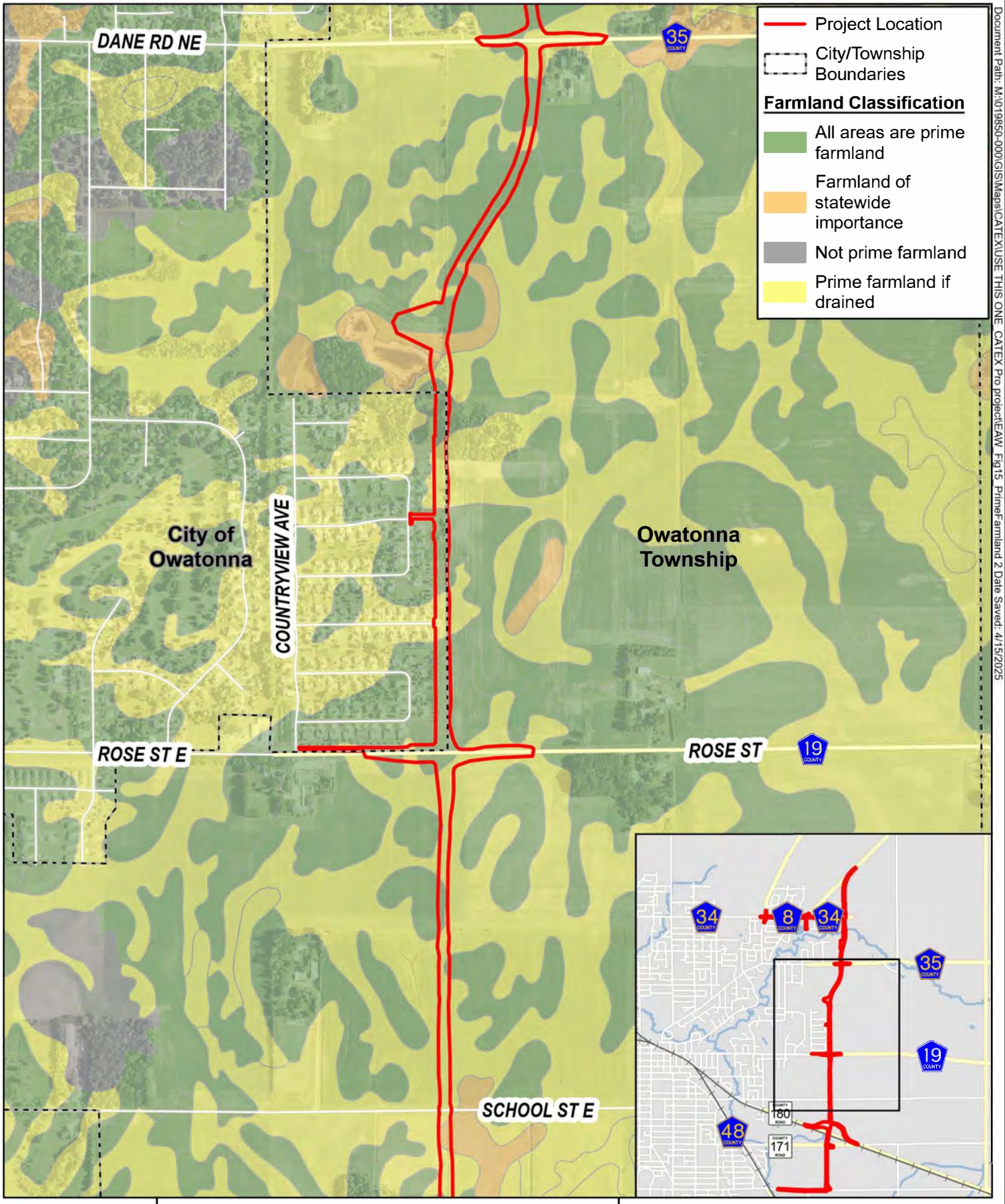
Figure 16A - Prime Farmland

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft



Document Path: M:\019850-000\GIS\Maps\CATEX\USE THIS ONE_CATEX Pro project\EAW_Fig15_PrimeFarmland 2 Date Saved: 4/15/2025

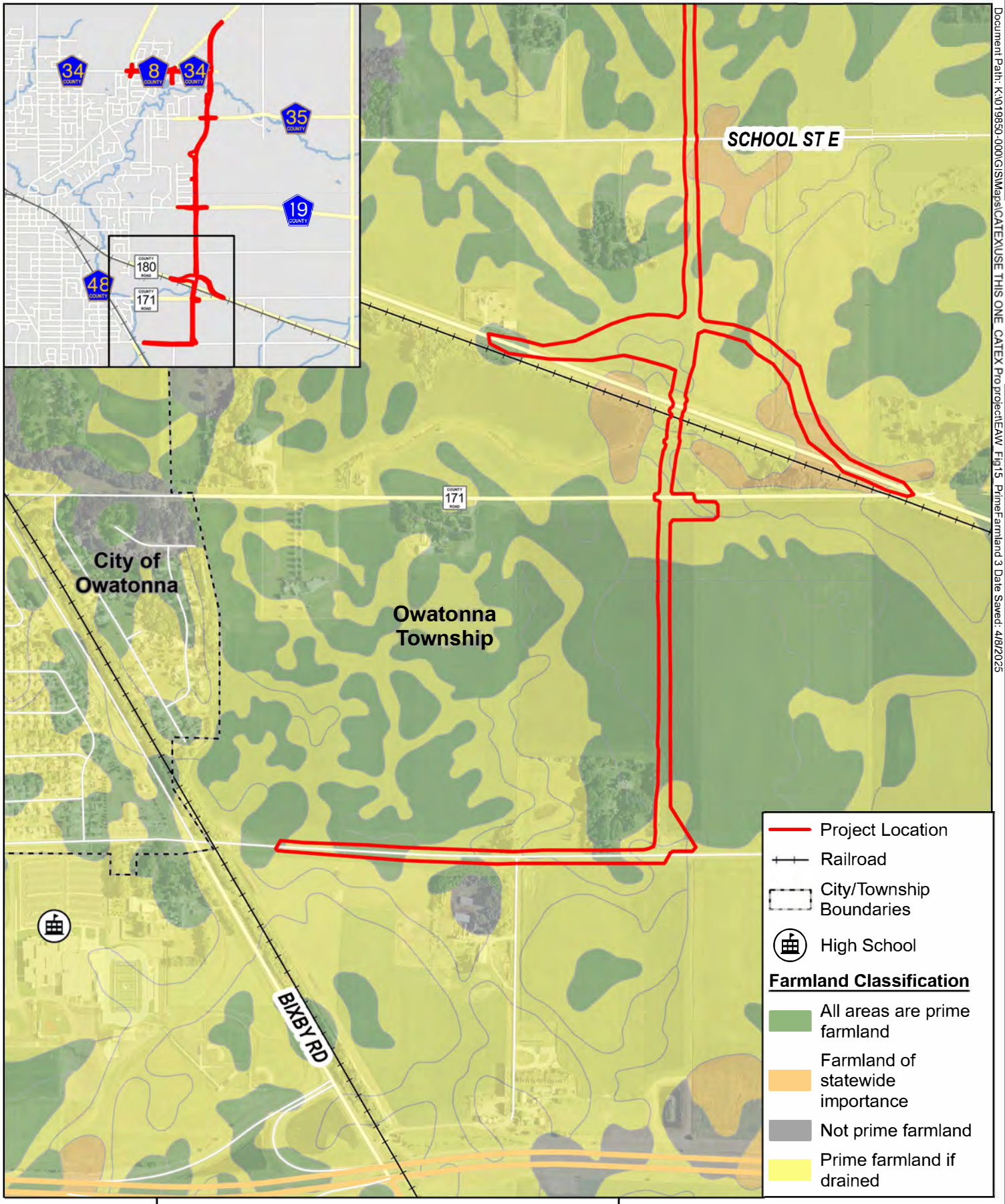
Figure 16B - Prime Farmland

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft



Document Path: K:\019850-000\GIS\Maps\CATEX\USE THIS ONE_CATEX Pro project\EAW_Fig15_PrimeFarmland 3 Date Saved: 4/8/2025

Figure 16C - Prime Farmland

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft

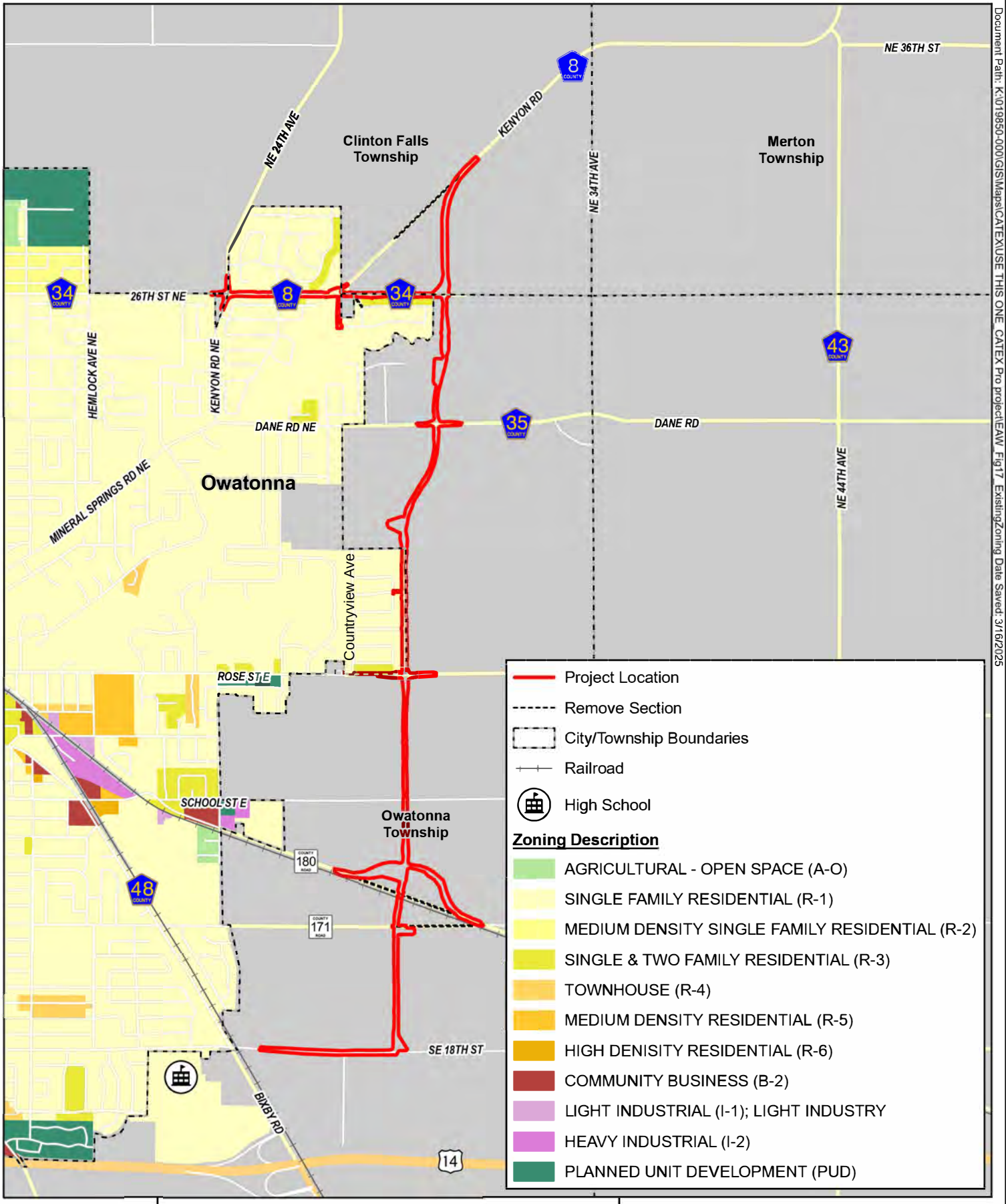


Figure 17 - Existing Zoning (City of Owatonna)

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 2,500 Feet

1 inch = 2,700 Ft

Document Path: K:\019850-000\GIS\Maps\CATEX\USE THIS ONE_CATEX Pro project\EAW_Fig17_ExistingZoning Date Saved: 3/16/2025

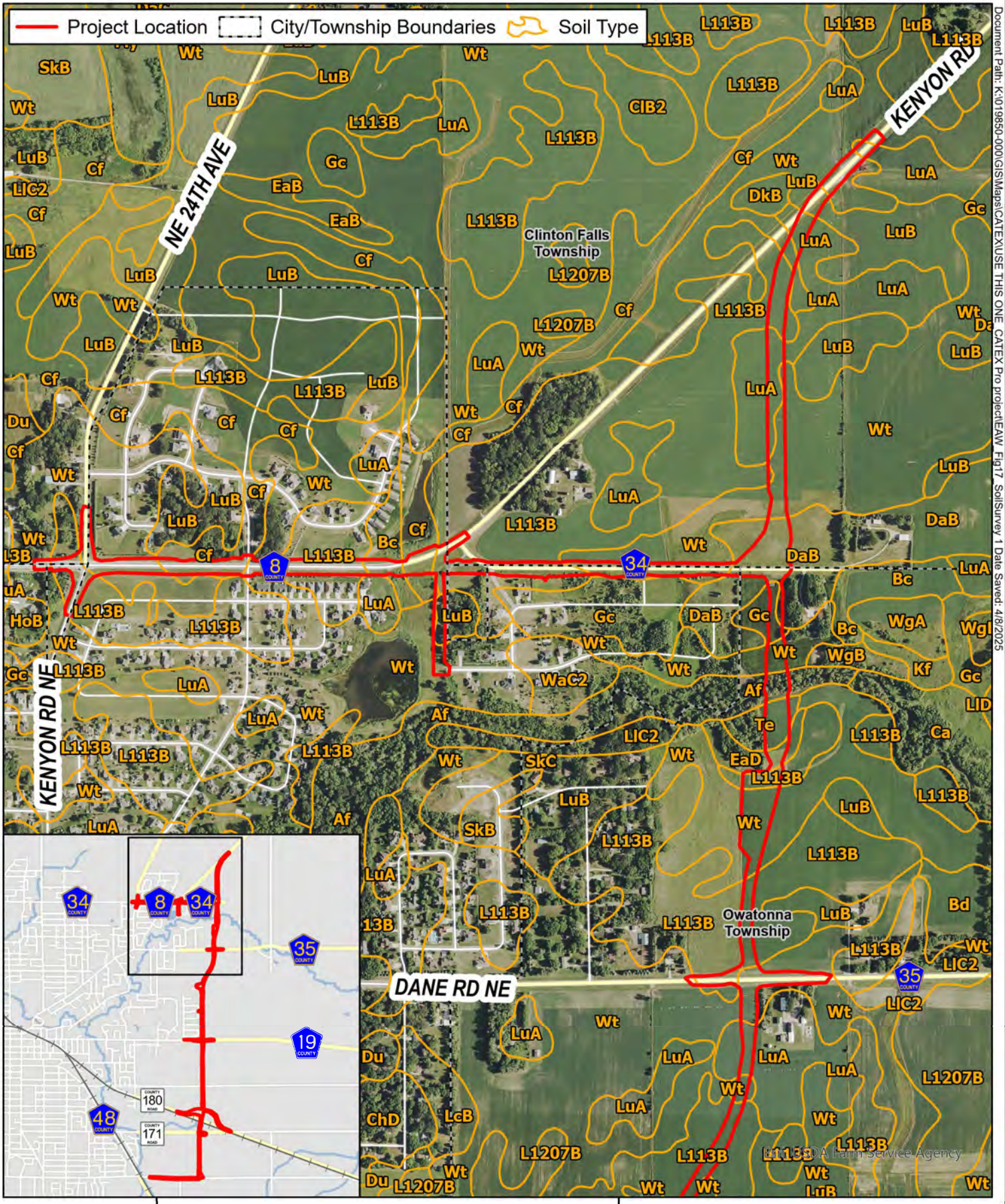


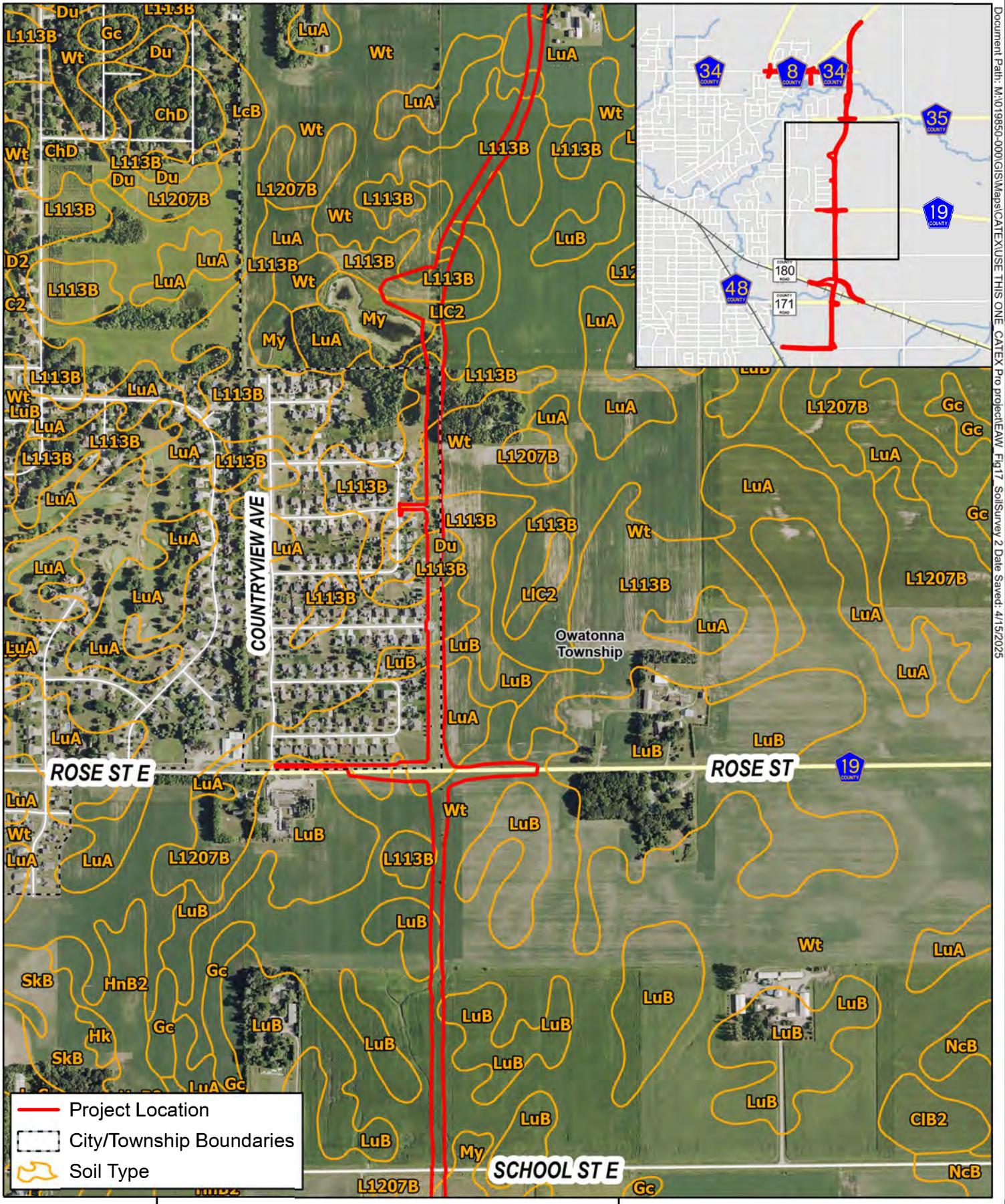
Figure 18A - Soils

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 850 Feet

1 inch = 850 Ft



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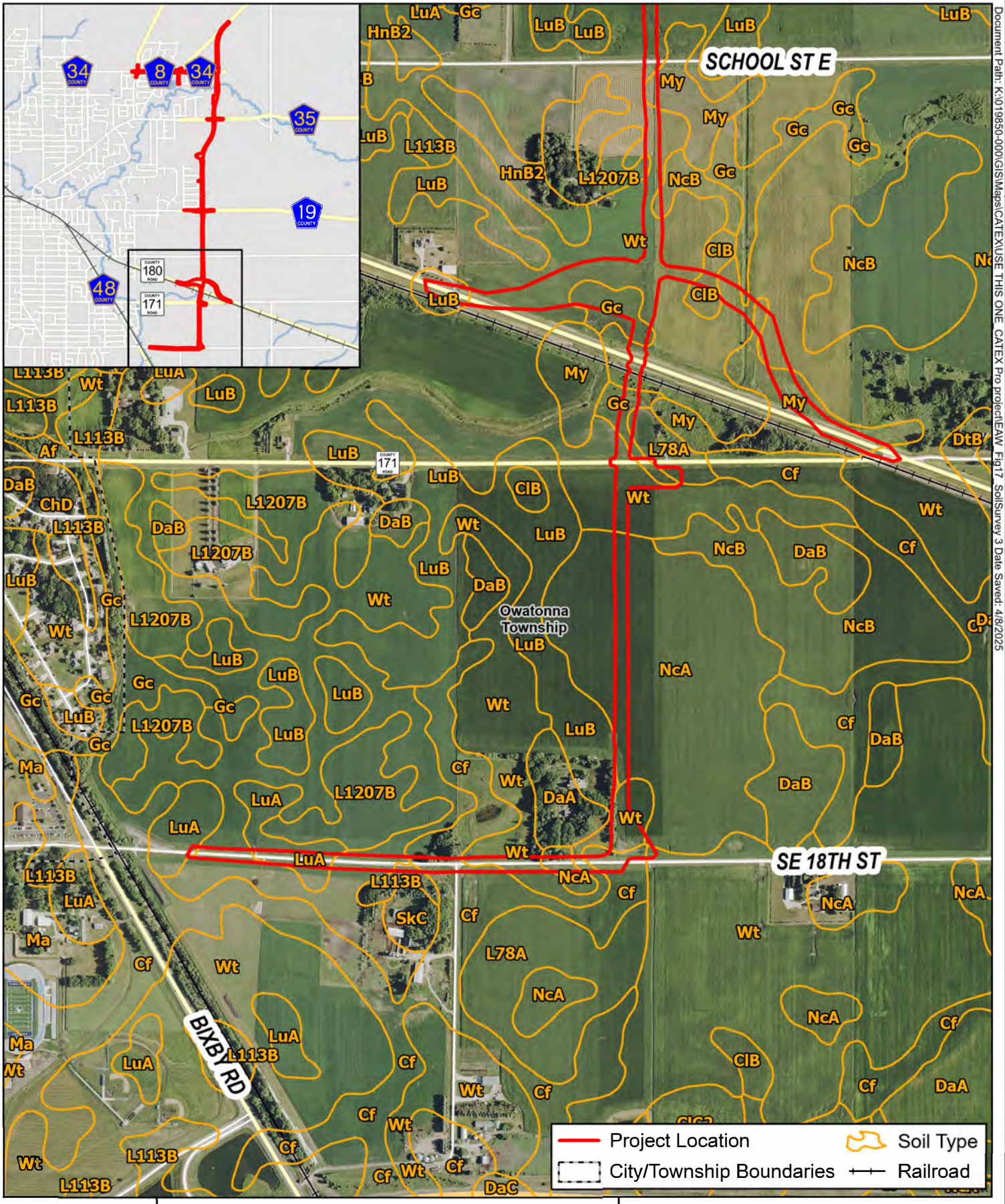
Figure 18B - Soils

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 850 Feet

1 inch = 850 Ft



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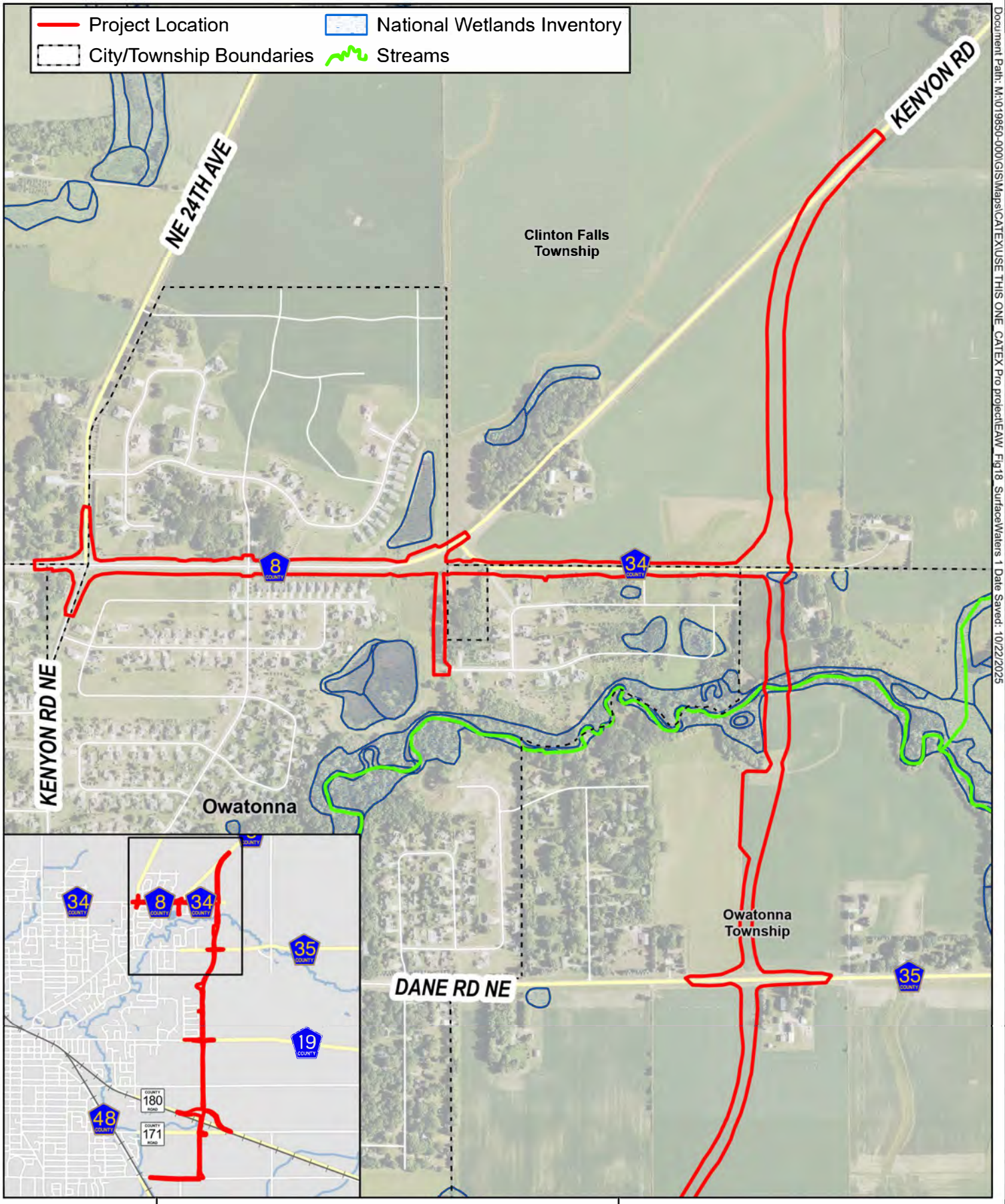
Figure 18C - Soils

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 850 Feet

1 inch = 850 Ft



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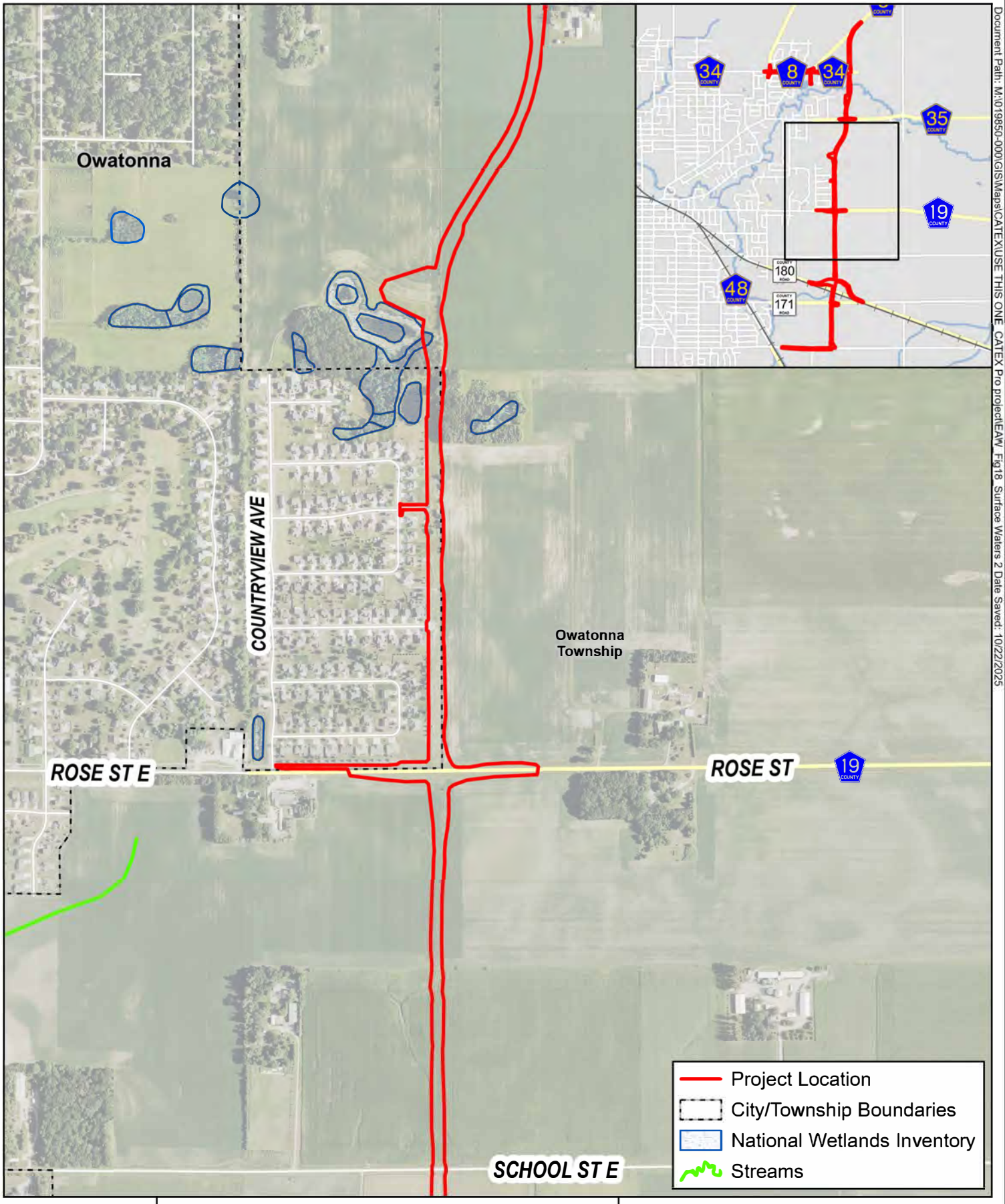
Figure 19A - Surface Waters

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 850 Feet

1 inch = 850 Ft



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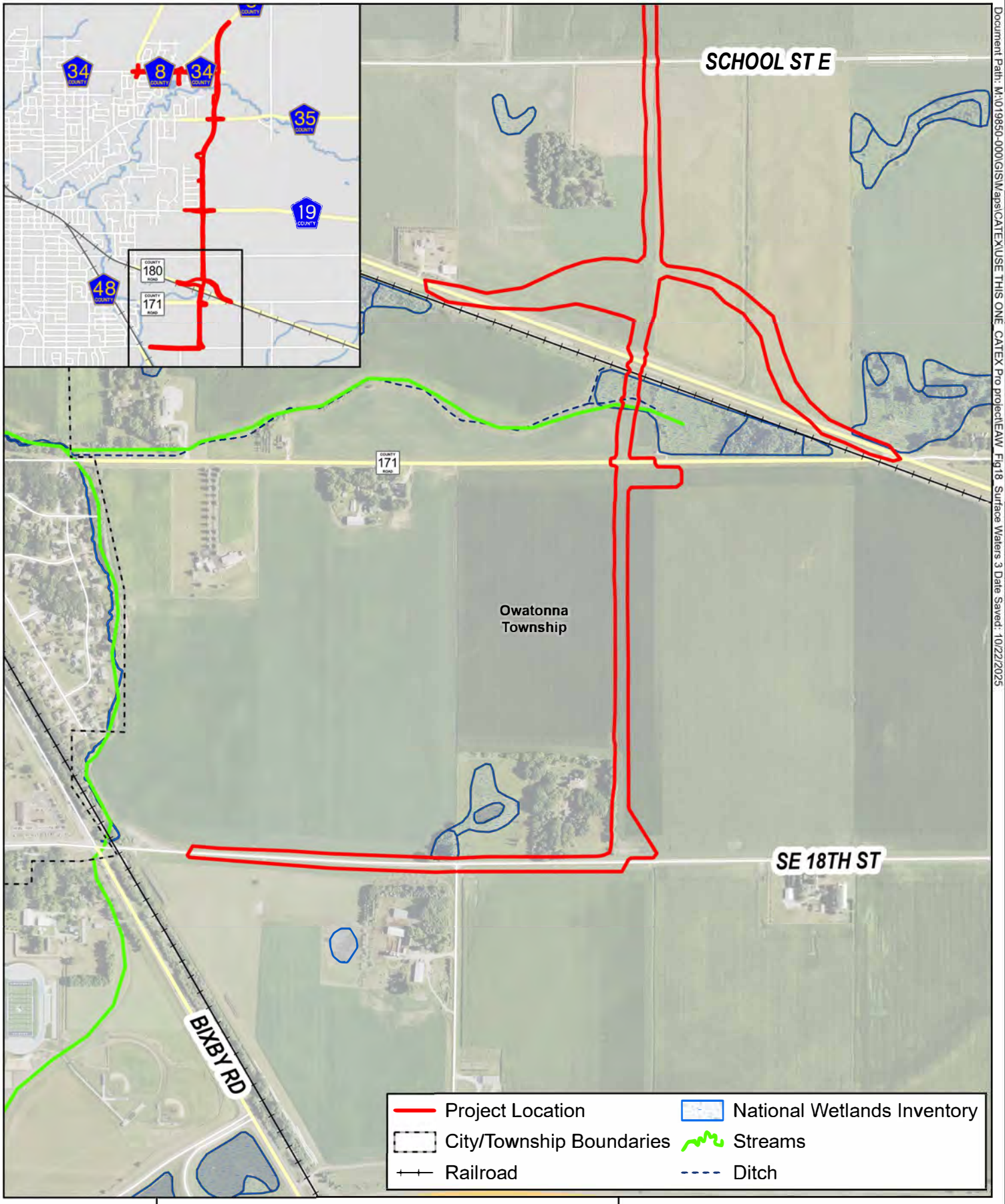
Figure 19B - Surface Waters

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 850 Feet

1 inch = 850 Ft



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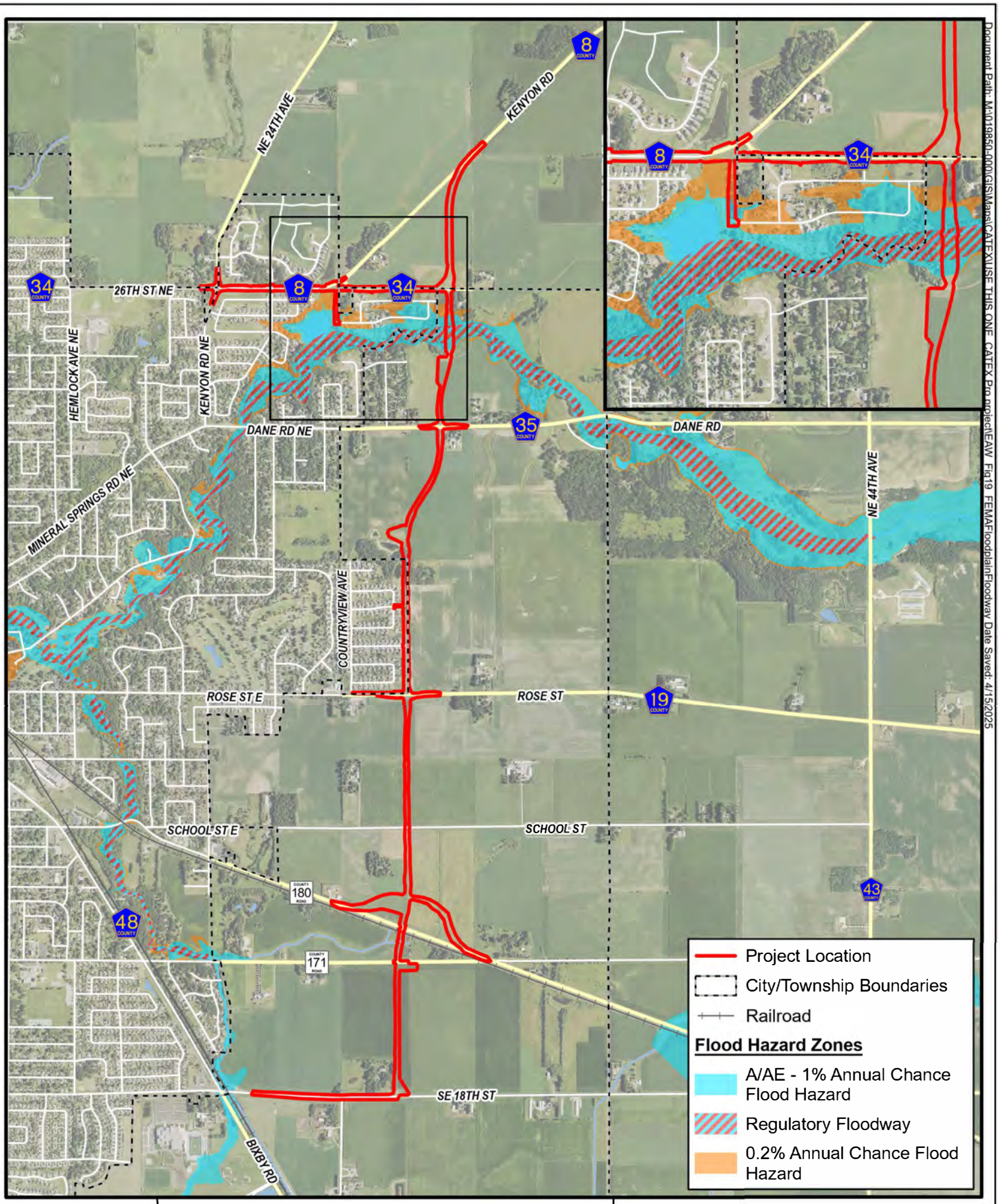
Figure 19C - Surface Waters

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 850 Feet

1 inch = 850 Ft



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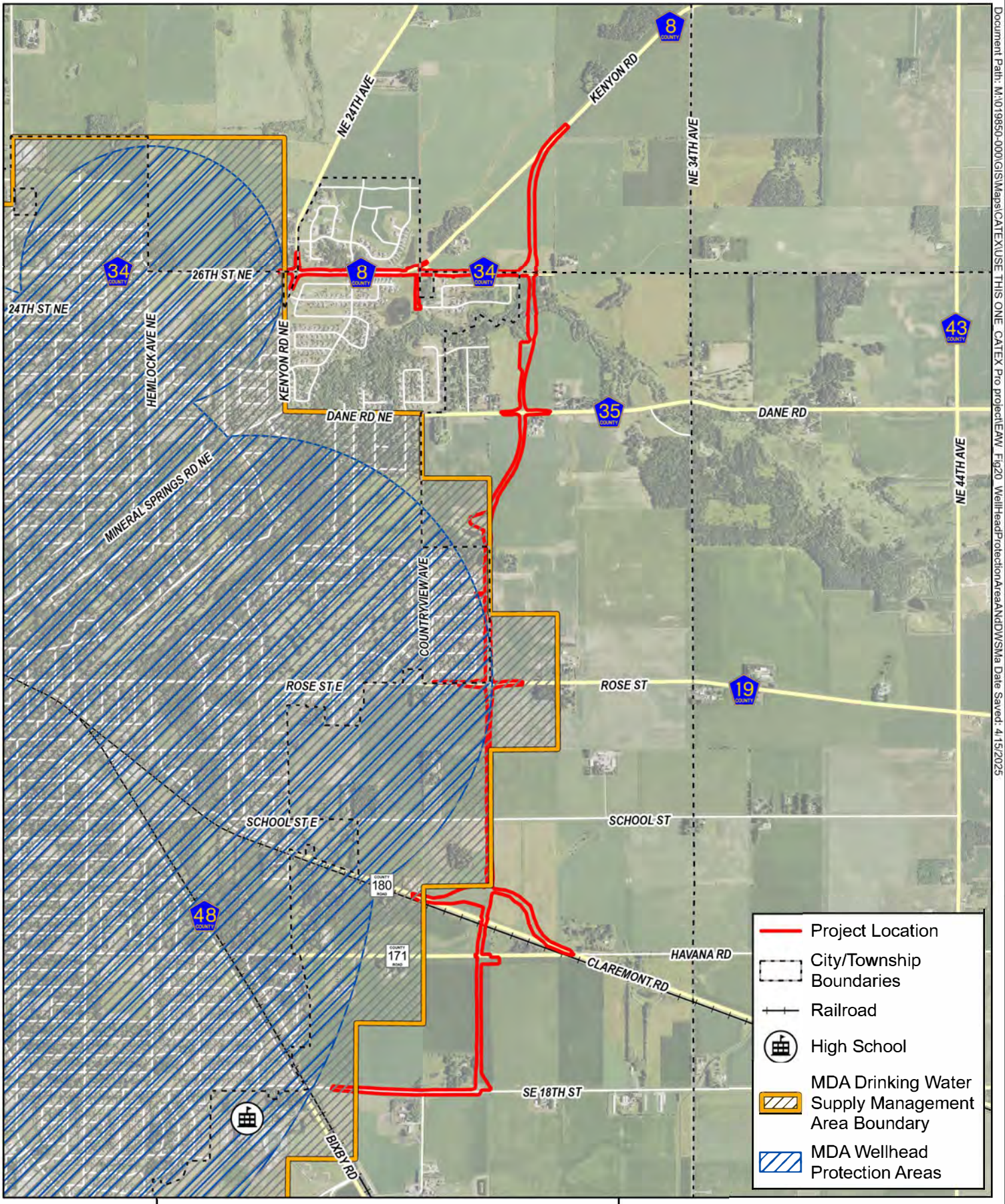
Figure 20 - FEMA Floodplain & Floodway

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 2,500 Feet

1 inch = 2,500 Ft



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Figure 21 - WHPAs and DWSMAs
29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N
0 2,500 Feet
1 inch = 2,500 Ft



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Figure 22 - Wells

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 2,500 Feet

1 inch = 2,500 Ft

WETLAND 1
IMPACT AREA: 2,288 SQ FT

18TH STREET

BIXBY ROAD

24TH AVENUE

MATCH LINE
SEE BELOW

N

0 100 ft 200 ft

SEE ABOVE
MATCH LINE

HAVANA ROAD

MATCH LINE
SEE SHEET 2

18TH STREET

WETLAND 2
IMPACT AREA: 37,496 SQ FT

N

0 100 ft 200 ft

Legend

- Wetland Impact Area
- Wetland
- Construction Limits
- Property Lines
- Existing Right of Way
- New Right of Way
- Permanent Easement
- Temporary Easement

Date Printed: $DATE$
WSB Filename: $FILE$

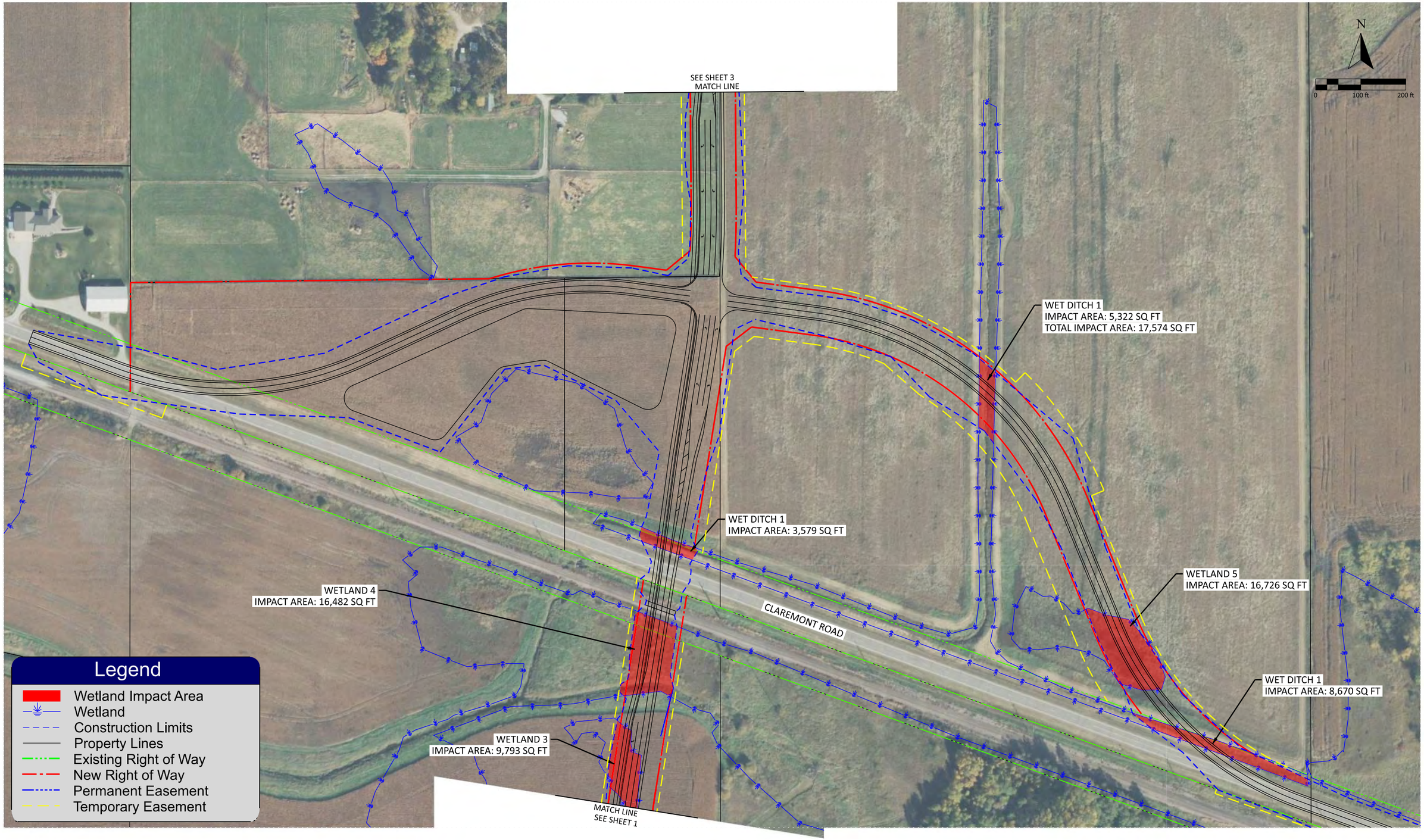
29th Avenue/East Side Corridor

Steele County, Minnesota

Figure 23a - Wetland Impacts

SP 074-040-009

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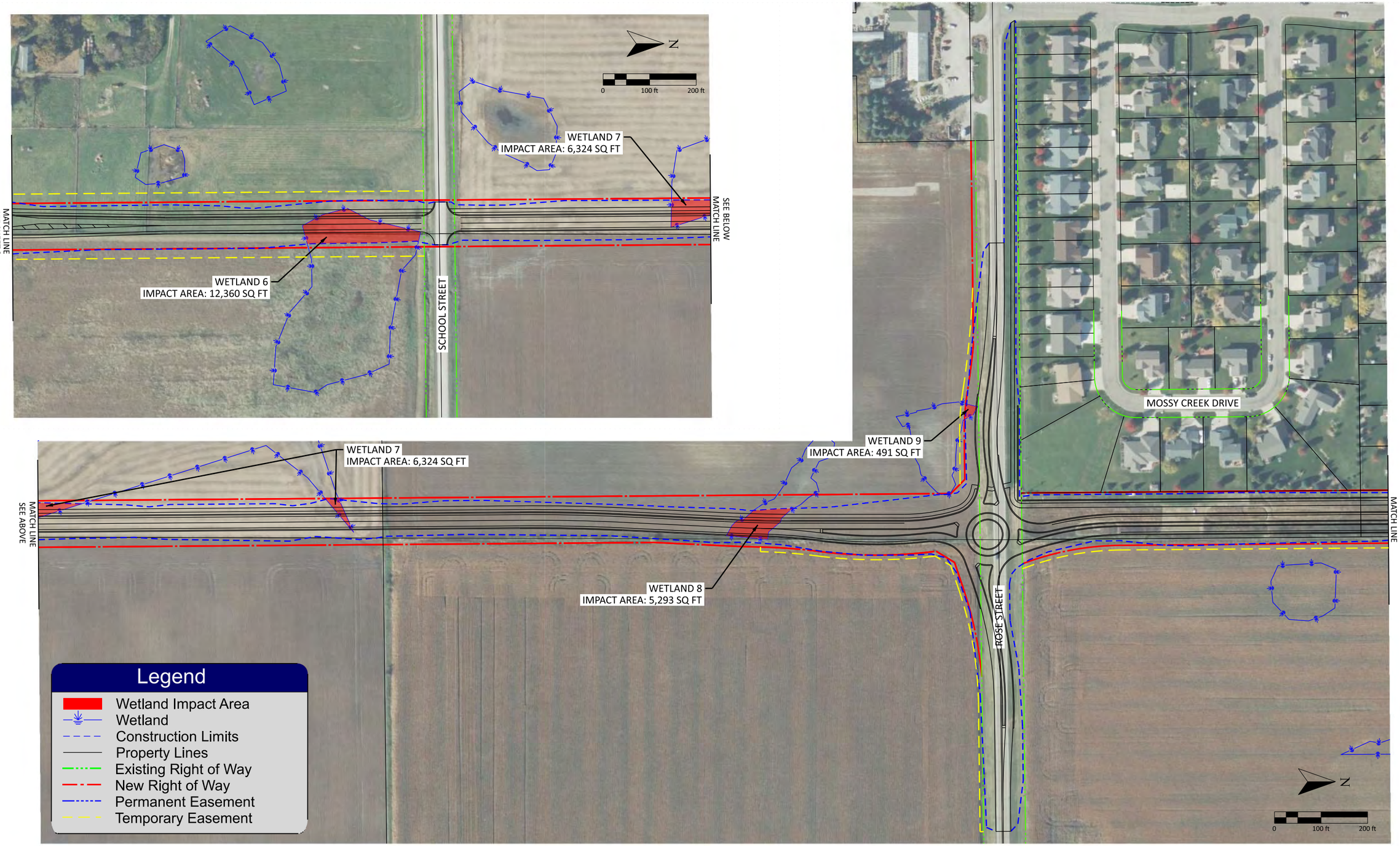
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29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 23b - Wetland Impacts

SP 074-040-009

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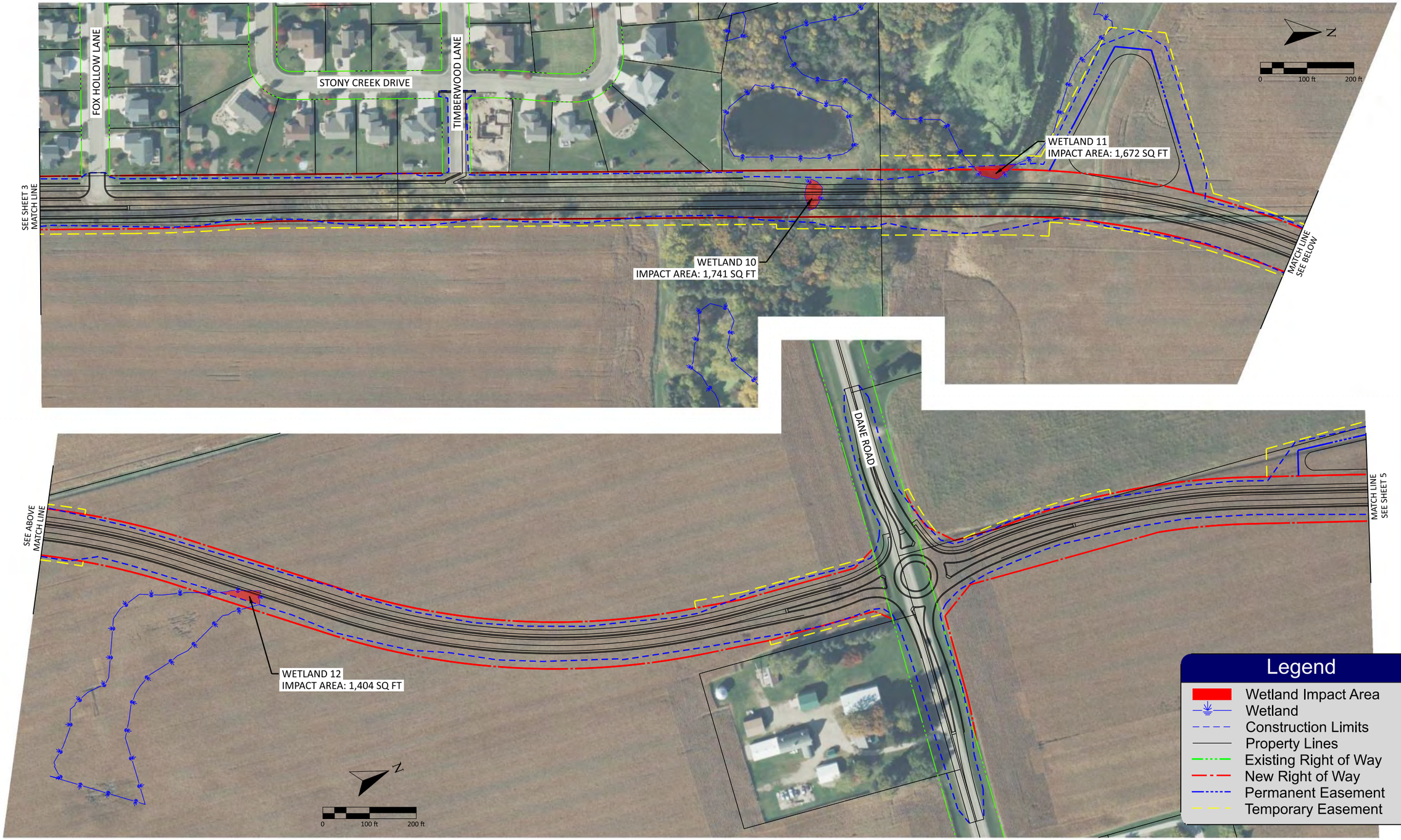
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29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 23c - Wetland Impacts

SP 074-040-009

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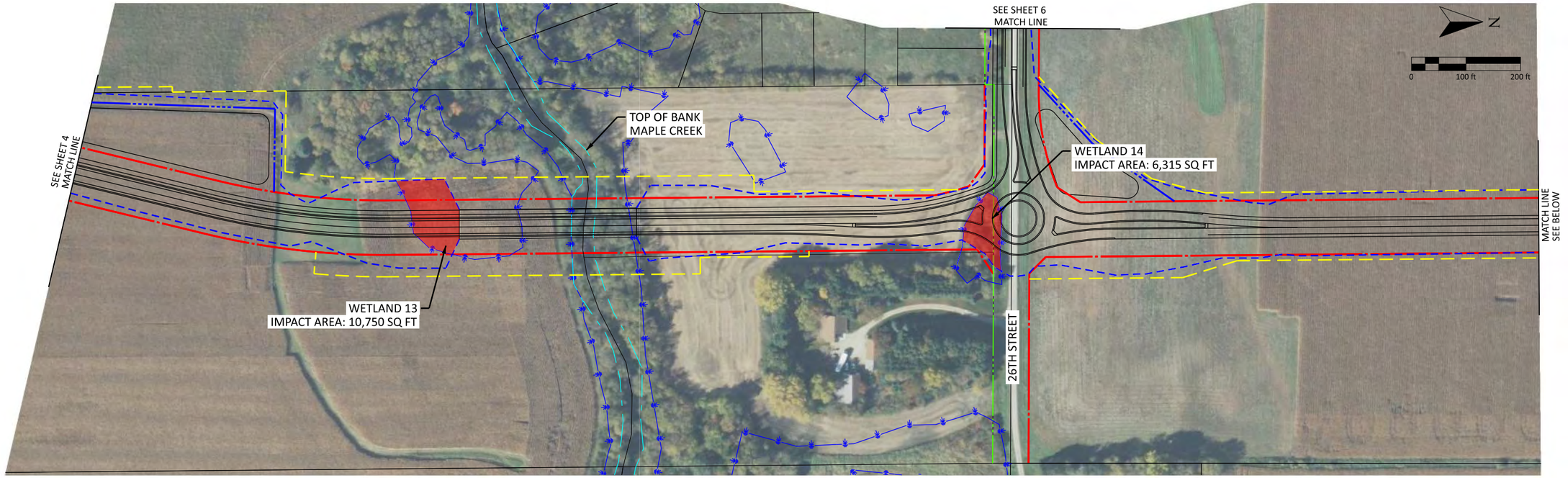
29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 23d - Wetland Impacts

SP 074-040-009

SHEET 4 OF 6

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Legend

- Wetland Impact Area
- Wetland
- Construction Limits
- Property Lines
- Existing Right of Way
- New Right of Way
- Permanent Easement
- Temporary Easement

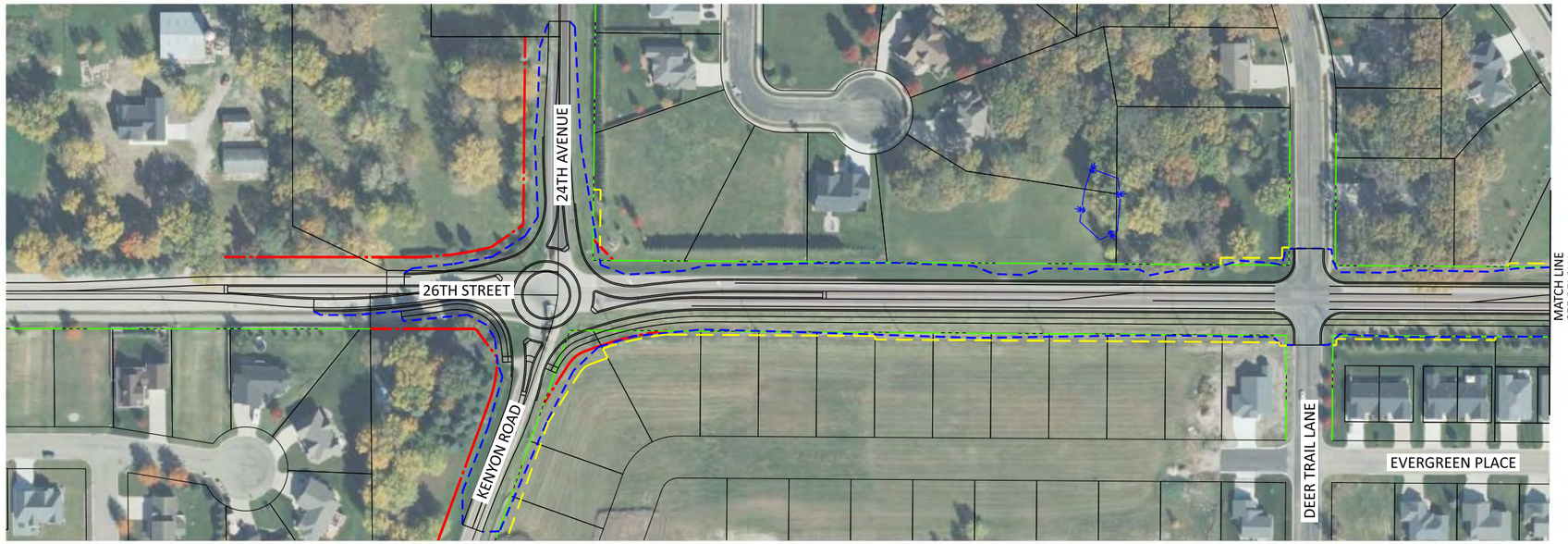
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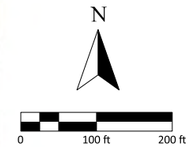
29th Avenue/East Side Corridor
Steele County, Minnesota

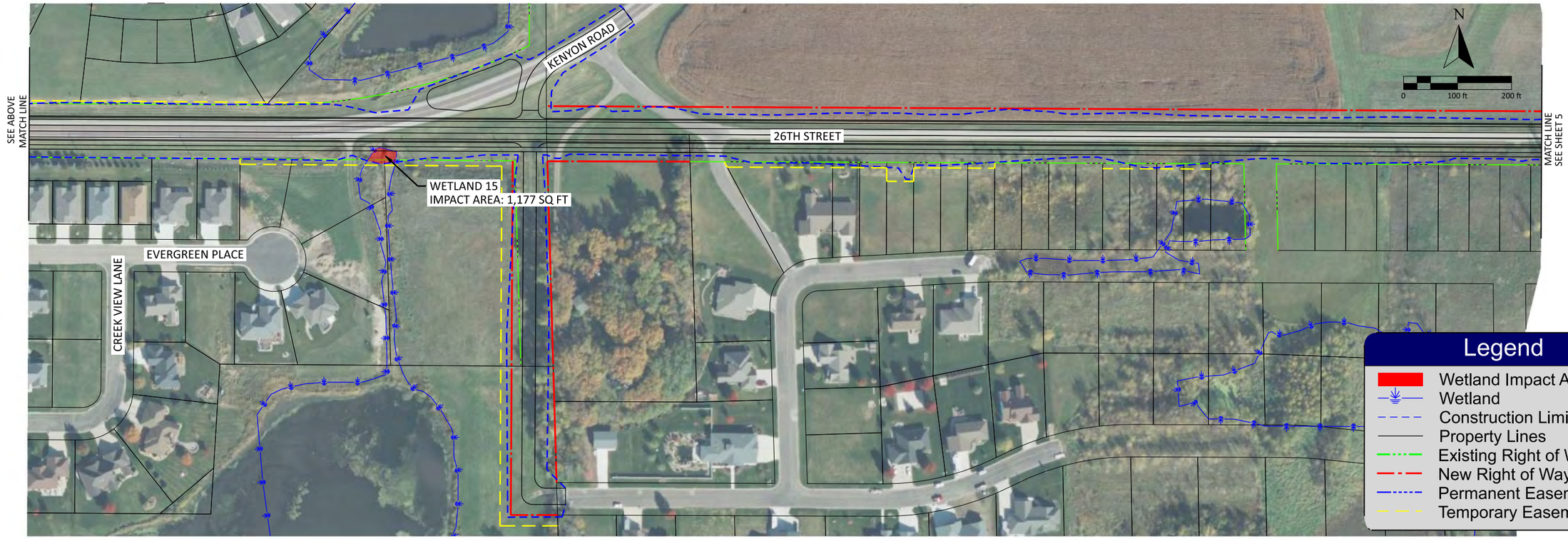
Figure 23e - Wetland Impacts

SP 074-040-009

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29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 23f - Wetland Impacts
SP 074-040-009

SHEET 6 OF 6

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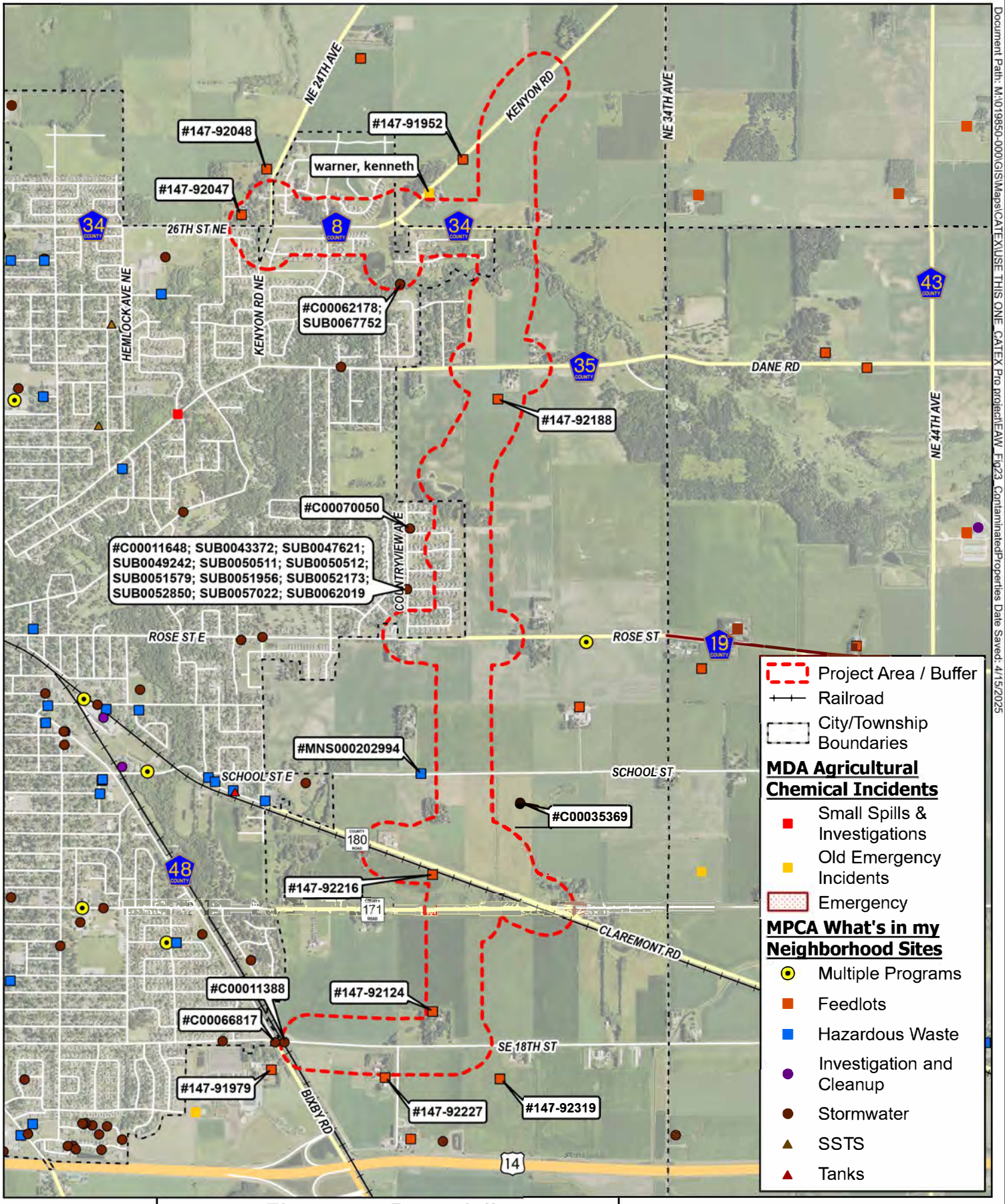


Figure 24 - Potentially Contaminated Sites

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 2,500 Feet

1 inch = 2,500 Ft

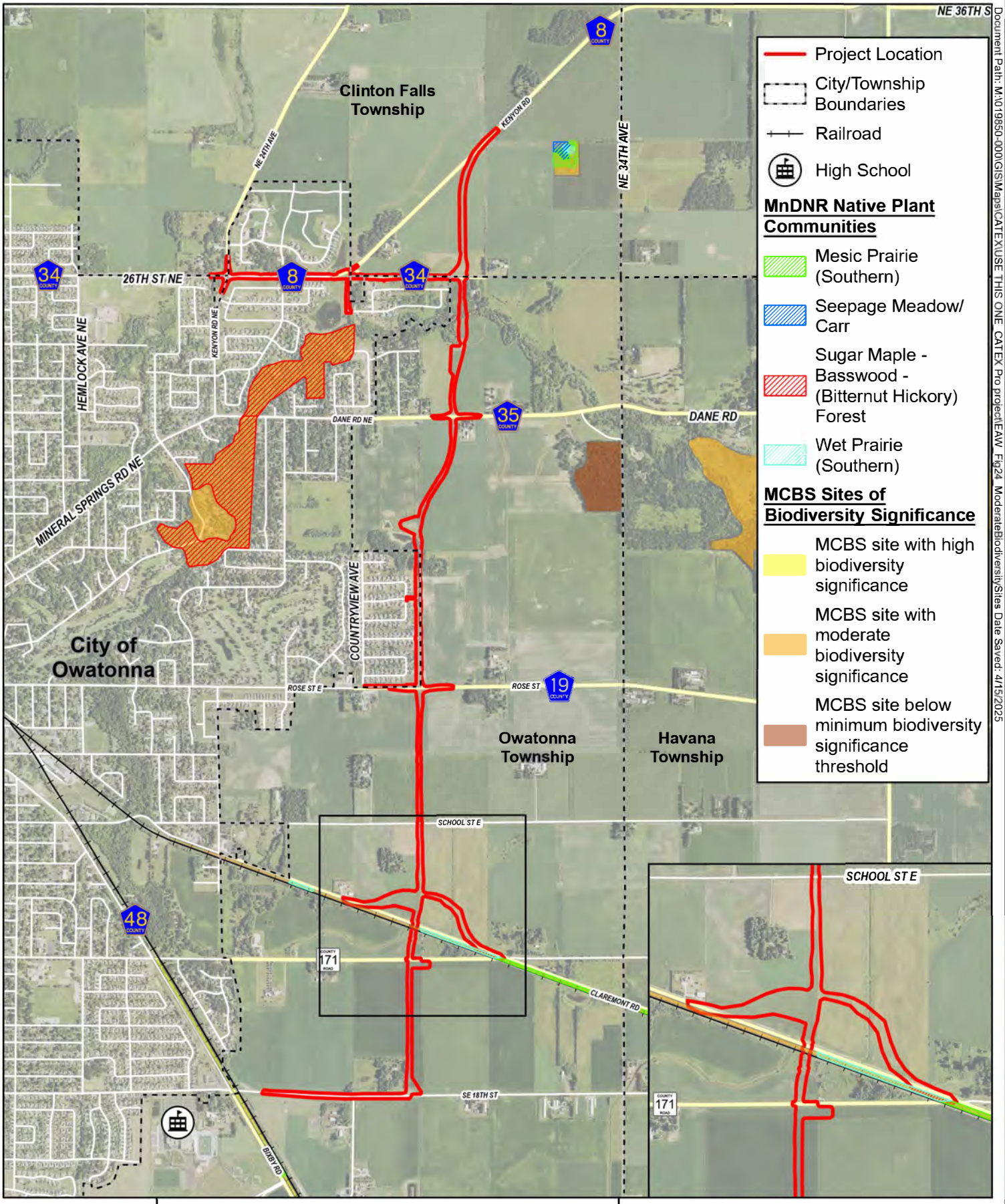


Figure 25 - Sites of Moderate Biodiversity

29th Ave/East Side Corridor SP 074-070-009
Steele County, Minnesota

N

0 2,500 Feet

1 inch = 2,500 Ft

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Attachment B – Owatonna High School Traffic Study

Memorandum

SRF No. 13417.01

To: Kyle Skov, Public Works Director
City of Owatonna

From: Matt Pacyna, PE, Principal
Brent Clark, PE, Senior Engineer

Date: July 17, 2020

Subject: Owatonna High School Traffic Impact Study

Introduction

SRF has completed a traffic impact study for the proposed Owatonna High School located in the southwest quadrant of the 18th Street and CSAH 48 (Bixby Road) intersection in Owatonna, MN (see Figure 1: Project Location). The main objectives of this study are to review existing operations within the study area, evaluate transportation impacts to the adjacent roadway network due to the proposed development, including access, circulation, and pedestrian access, and recommend any necessary improvements to ensure safe and efficient operations for all modes of transportation. The following information provides the assumptions, analysis, and recommendations offered for consideration.

Existing Conditions

Existing conditions were reviewed to establish a baseline in order to identify future impacts associated with the proposed development. Evaluation of the existing conditions includes a review of traffic volumes, roadway characteristics, pedestrian/bicycle facilities, and an intersection capacity analysis, which are summarized in the following sections.

Traffic Volumes

Turning movement and pedestrian/bicyclist counts were collected by SRF during the week of May 4, 2020 at the following study intersections:

- 18th Street/CSAH 45 (Cedar Avenue)
- 18th Street/Austin Road
- 18th Street/Truman Avenue
- 18th Street/Cornerstone Lane
- 18th Street/CSAH 48 (Bixby Road)
- CSAH 48 (Bixby Road)/US 14 North Ramp
- CSAH 48 (Bixby Road)/US 14 South Ramp
- Austin Road/22nd Street
- Austin Road/El Dorado Street

Historical and existing average daily traffic (ADT) volumes were provided by the Minnesota Department of Transportation (MnDOT) for the study area, which were primarily collected in 2019.



H:\Projects\13000\13417\TraffStudy\Figures\Fig01_Project Location.cdr

SRF Consulting Group, Inc.

Project Location

Owatonna High School Traffic Impact Study
City of Owatonna, MN

202013417
June 2020

Figure 1

Note that data collection efforts were conducted during the COVID-19 pandemic and traffic volumes were estimated to be approximately 10 to 25 percent lower than normal conditions for the study area. Therefore, the newly collected turning movements were adjusted using a combination of recently (2019) collected ADT volumes in the study area and hourly volume profiles collected as part of the *CSAH 45 Concrete Rehabilitation Transportation Study* completed by SRF in July 2018.

Roadway Characteristics

A field assessment was completed to identify various roadway characteristics within the transportation system study area, such as functional classification, general configuration, and posted speed limit. A summary of these roadway characteristics is shown in Table 1. Note that these are general characteristics and that there are some deviations within the area or segments of the roadways. For example, CSAH 48 (Bixby Road) transitions from a 2-lane divided roadway into a 2-lane undivided roadway north of US 14.

Table 1. Existing Roadway Characteristics

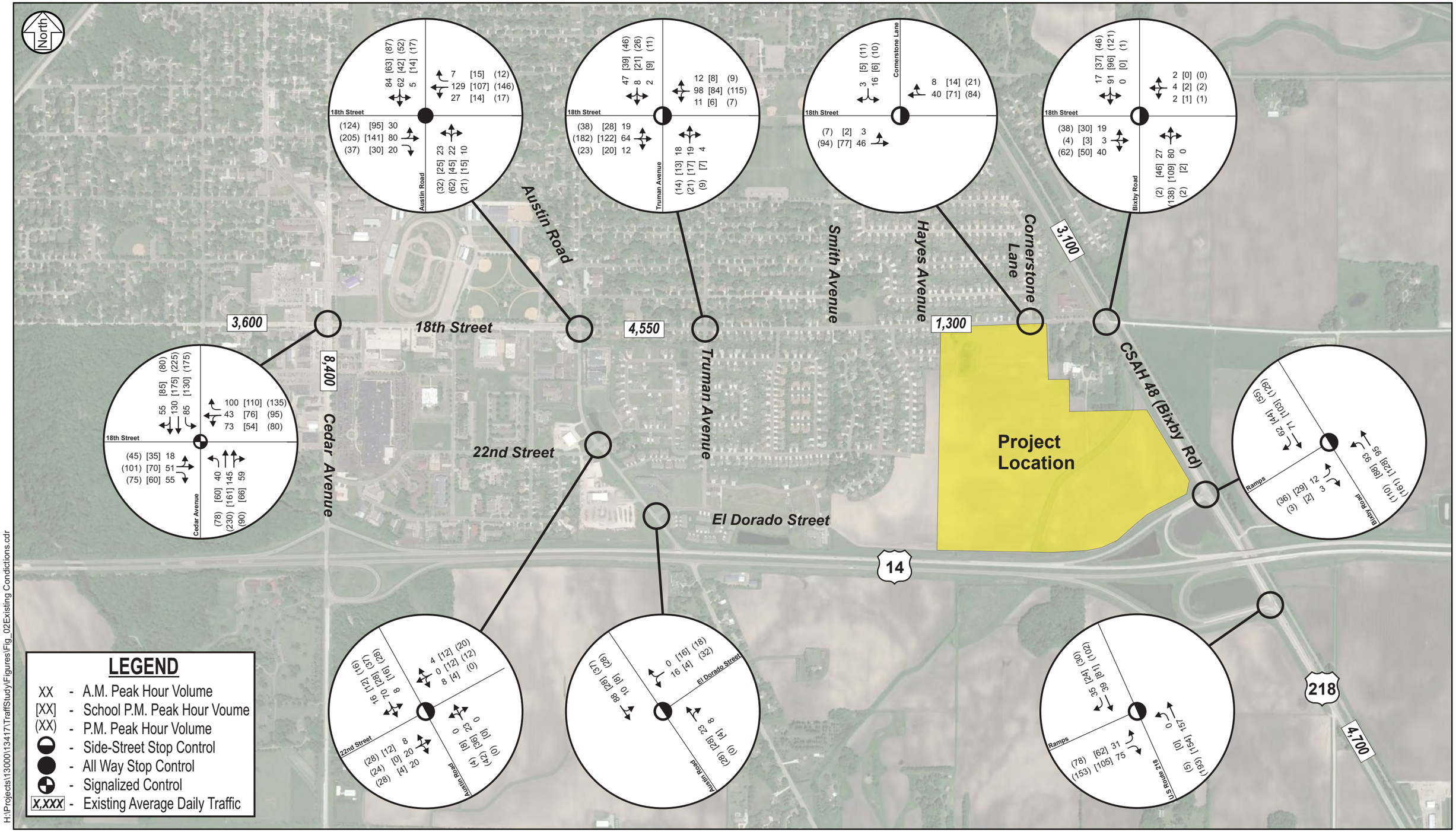
Roadway	Functional Classification	General Configuration	Posted Speed Limit (mph)
18th Street	Major Collector	2-lane undivided	30
CSAH 48 (Bixby Road)	Minor Arterial	2-lane divided/2-lane undivided	55
CSAH 45 (Cedar Avenue)	Minor Arterial	4-lane divided	30
Austin Road	Major Collector	2-lane undivided	30/40 (1)
Truman Avenue	Local Road	2-lane undivided	Unposted
Cornerstone Lane	Local Road	2-land undivided	Unposted

(1) Speed limit change occurs at the 18th Street intersection, with a posted speed limit of 40 mph south and 30 mph north of 18th Street.

From a traffic control perspective, the 18th Street/CSAH 45 (Cedar Avenue) intersection is signalized and the 18th Street/Austin Road intersection is all-way stop controlled. All other study intersections are side-street stop controlled. Existing geometrics, traffic controls, and traffic volumes in the study area are shown in Figure 2.

Pedestrian/Bicycle Facilities

Data obtained from the City of Owatonna was used to identify current pedestrian and bicycle facilities in the study area, which is illustrated in Figure 3. Note that there is significant sidewalk gap near the proposed high school. The closest pedestrian facility is a sidewalk located on Truman Avenue, north of 18th Street, which is over 1/2-mile from the proposed development. It is important to address this gap in the pedestrian/bicycle network within the study area, especially due to the amount of residential neighborhoods within close proximity (1/4-mile to 1/2-mile) of the proposed high school and the likelihood of increased pedestrian/bicycle activity associated with the new school.



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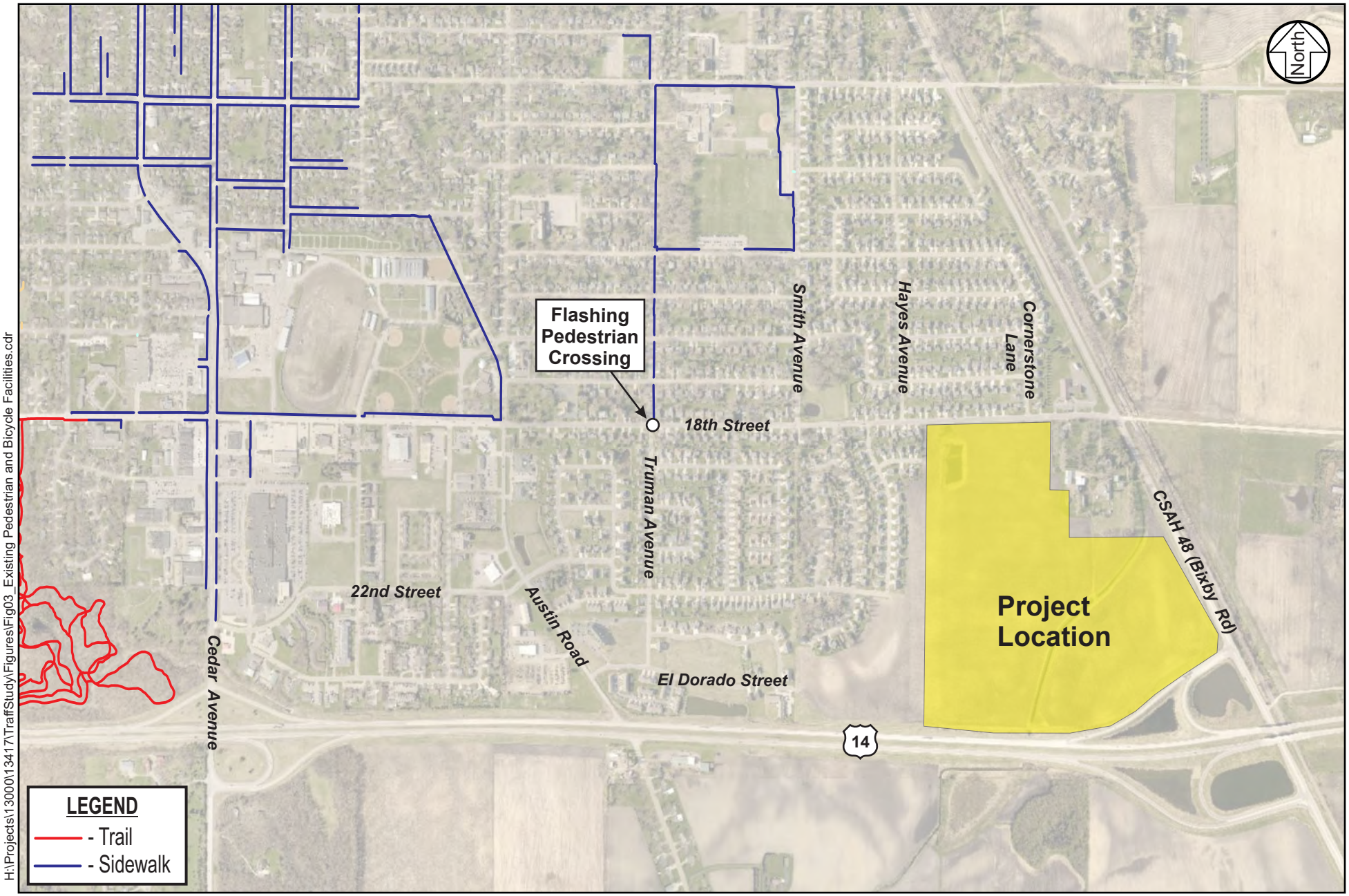
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Existing Conditions

Owatonna High School Traffic Impact Study
City of Owatonna, MN

202013417
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Figure 2



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Existing Pedestrian and Bicycle Facilities

Owatonna High School Traffic Impact Study
City of Owatonna, MN

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Figure 3

Intersection Capacity Analysis

An intersection capacity analysis was completed to establish baseline conditions to which future traffic operations can be compared. The capacity analysis was completed for the school a.m. and p.m. peak periods, along with the p.m. peak hour of the adjacent roadways. All intersections were analyzed using Synchro/SimTraffic software.

Capacity analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are graded from LOS A through LOS F. The LOS results are based on average delay per vehicle results from SimTraffic, which correspond to the delay threshold values shown in Table 2. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. Overall intersection LOS A through D is generally considered acceptable by drivers in the Owatonna Area.

Table 2. Level of Service Criteria for Signalized and Unsignalized Intersections

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

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

Schools generally have higher peaking characteristics as compared to typical roadway network during the a.m. and p.m. peak hours (i.e. traffic on/near school grounds tend to be busy for a short period of time close to school start and end times). Therefore, traffic operations were reviewed over two different time intervals to better understand peak conditions. First, the entire peak hour (i.e. 60-minute interval) was analyzed, which is the traffic industry standard. Second, the peak 15-minute interval was reviewed to give a better understanding of operational issues expected in the immediate school area during the periods before and after school start and end times. Note the peak 15-minute analysis is only included in future operations analysis when the school is operational.

Results of the existing intersection capacity analysis (60-minute interval), shown in Table 3, indicates that all study intersections currently operate at an acceptable overall LOS B or better during the a.m., school p.m., and p.m. peak hours.

Table 3. Existing Intersection Capacity Analysis (60-Minute Interval)

Intersection	A.M. Peak Hour (1)		School P.M. Peak Hour (1)		P.M. Peak Hour	
	LOS	Delay	LOS	Delay	LOS	Delay
18th Street / CSAH 45 (Cedar Avenue)	B	11 sec.	B	12 sec.	B	15 sec.
18th Street / Austin Road (3)	A	6 sec.	A	7 sec.	A	8 sec.
18th Street / Truman Avenue (2)	A/A	6 sec.	A/A	5 sec.	A/A	6 sec.
18th Street / Cornerstone Lane (2)	A/A	4 sec.	A/A	4 sec.	A/A	4 sec.
18th Street / CSAH 48 (Bixby Road) (2)	A/A	5 sec.	A/A	8 sec.	A/A	9 sec.
CSAH 48 (Bixby Road) / US 14 North Ramp (2)	A/A	4 sec.	A/A	6 sec.	A/A	6 sec.
CSAH 48 (Bixby Road) / US 14 South Ramp (2)	A/A	2 sec.	A/A	3 sec.	A/A	3 sec.
Austin Road / 22nd Street (2)	A/A	5 sec.	A/A	4 sec.	A/A	5 sec.
Austin Road / El Dorado Street (2)	A/A	5 sec.	A/A	3 sec.	A/A	4 sec.

(1) The school a.m. and p.m. peak hours are defined as 7:15 – 8:15 a.m. and 2:15 – 3:15 p.m. respectively. The school a.m. peak hour coincides with the a.m. peak hour of the adjacent roadway network.

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

(3) Indicates an all-way stop controlled intersection.

The following information summarizes the operational observations identified as part of the existing capacity analysis:

- 18th Street at CSAH 45 (Cedar Avenue) and Austin Road:
  - The eastbound/westbound approaches have lane widths of 20 feet or greater. These approaches are signed as "Right Lane Must Turn Right", however, there are no existing pavement markings, and these movements can be tight if eastbound/westbound vehicles in the shared thru-/left-turn lane are not over far enough to allow a vehicle to pass.
- 18th Street/CSAH 48 (Bixby Road)
  - The intersection does not currently have a crash issue, but given the high-speeds along CSAH 48, skewed roadway geometrics, and adjacent railroad crossing, any increase in traffic volume could pose a potential safety risk.
  - Eastbound vehicles were observed not to utilize the available roadway width to perform an eastbound right-turn movement when a thru- or left-turning vehicle was present. This is likely due to a sight distance issues caused by the roadway skew and obstruction of the other vehicle.

Proposed Development

The proposed new Owatonna High School is located in the southwest quadrant of the 18th Street/ CSAH 48 (Bixby Road) intersection in the City of Owatonna. The new high school would replace the existing high school located in the southeast quadrant of the School Street/Grove Avenue intersection near the center of the City. The current development proposal, shown in Figure 4, is expected to have an initial maximum capacity of 1,600 students, with the ability to expand if necessary. Note that current enrollment at the high school is approximately 1,500 students.

In addition, the proposed development will provide approximately 675 parking spaces, a 3,000-seat stadium, and an 800-seat auditorium. Construction is expected to begin in 2021 with an anticipated opening for the fall of 2023. Access to the high school is proposed at the two following locations along 18th Street:

- East Access: across from Cornerstone Lane approximately 800 feet west of CSAH 48 (Bixby Road); this access would be the primary access for staff/visitor parking and also serve as the primary parent pick-up/drop-off area.
- West Access: located approximately 550 feet east and west of Hayes Avenue and the proposed East Access, respectively; this access would be the primary access for students and buses.

Further discussion regarding access is documented later in this study.

Year 2025 Conditions

To identify impacts associated with the proposed development, traffic forecasts for year 2025 conditions were developed. The year 2025 conditions take into account general background growth and traffic generated by the proposed new high school. The following sections provide detail on general background growth, trip generation, an intersection capacity analysis, and improvements.

General Background Growth

To account for general background growth in the area, a growth rate of one-half (0.5) percent was applied to the existing peak hour traffic volumes to develop year 2025 background traffic forecasts. This growth rate is consistent with historical growth in the study area based on MnDOT AADT volumes. Although this growth rate is slightly below typical Steele County growth, the addition of the proposed high school is expected to result in growth beyond the typical Steele County growth rate.

Trip Generation

To account for traffic impacts associated with the new high school, trip generation estimates for the a.m., school p.m., and p.m. peak hours, as well as a daily basis were developed. The trip generation estimates, shown in Table 4, were developed using the *ITE Trip Generation Manual, 10th Edition*. Note that the trip generation was developed based on the maximum 1,600-student capacity to provide a conservative estimate for year 2025 traffic forecasts.



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Site Plan

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Figure 4

Table 4. Trip Generation Estimate

Land Use Type *(ITE Code)*	Size	A.M. Peak Hour Trips (1)		School P.M. Peak Hour Trips (1)		P.M. Peak Hour Trips		Daily Trips
		In	Out	In	Out	In	Out	
High School *(530)*	1,600 Students	557	275	169	359	108	116	3,248

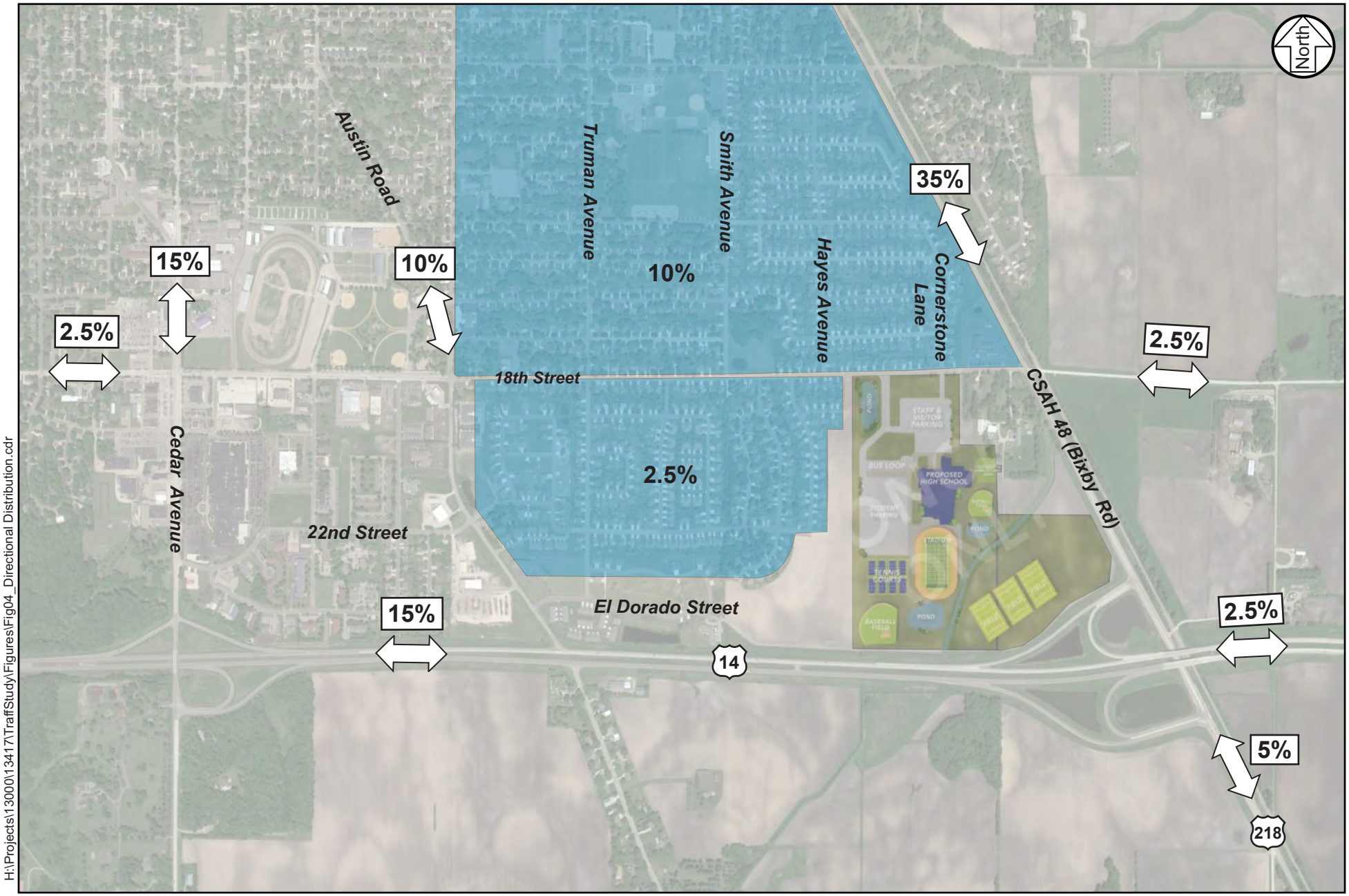
(1) The school a.m. and p.m. peak hours are defined as 7:15 – 8:15 a.m. and 2:15 – 3:15 p.m. respectively. The school a.m. peak hour coincides with the a.m. peak hour of the adjacent roadway network.

Results of the trip generation estimate indicate that the proposed high school is expected to generate approximately 832 a.m., 528 school p.m., 224 p.m. peak hour, and 3,248 daily site trips. Trips generated were distributed throughout the area based on the directional distribution shown in Figure 5, which was developed based on enrollment information provided by the school district, existing travel patterns, and engineering judgment. The resultant year 2025 traffic forecasts, which include general background growth and trips generated by the proposed high school, are shown in Figure 6.

Intersection Capacity Analysis

To understand how the existing roadway network is expected to operate under year 2025 build conditions, a detailed intersection capacity analysis was completed using Synchro/SimTraffic software. The study intersections were again reviewed under 60-minute and 15-minute peak intervals.

Results of the year 2025 intersection capacity analysis (60-minute interval) shown in Table 5 indicates that all study intersections are expected to operate with acceptable levels of service during the peak hours. While the school is expected to have minimal impact on most study intersections during the a.m. and school p.m. peak hours, operational and queueing issues were observed at the study intersections immediately adjacent to the proposed high school. Therefore, these intersections were reviewed further during the peak 15-minute arrival/departure period, which are shown in Table 6.



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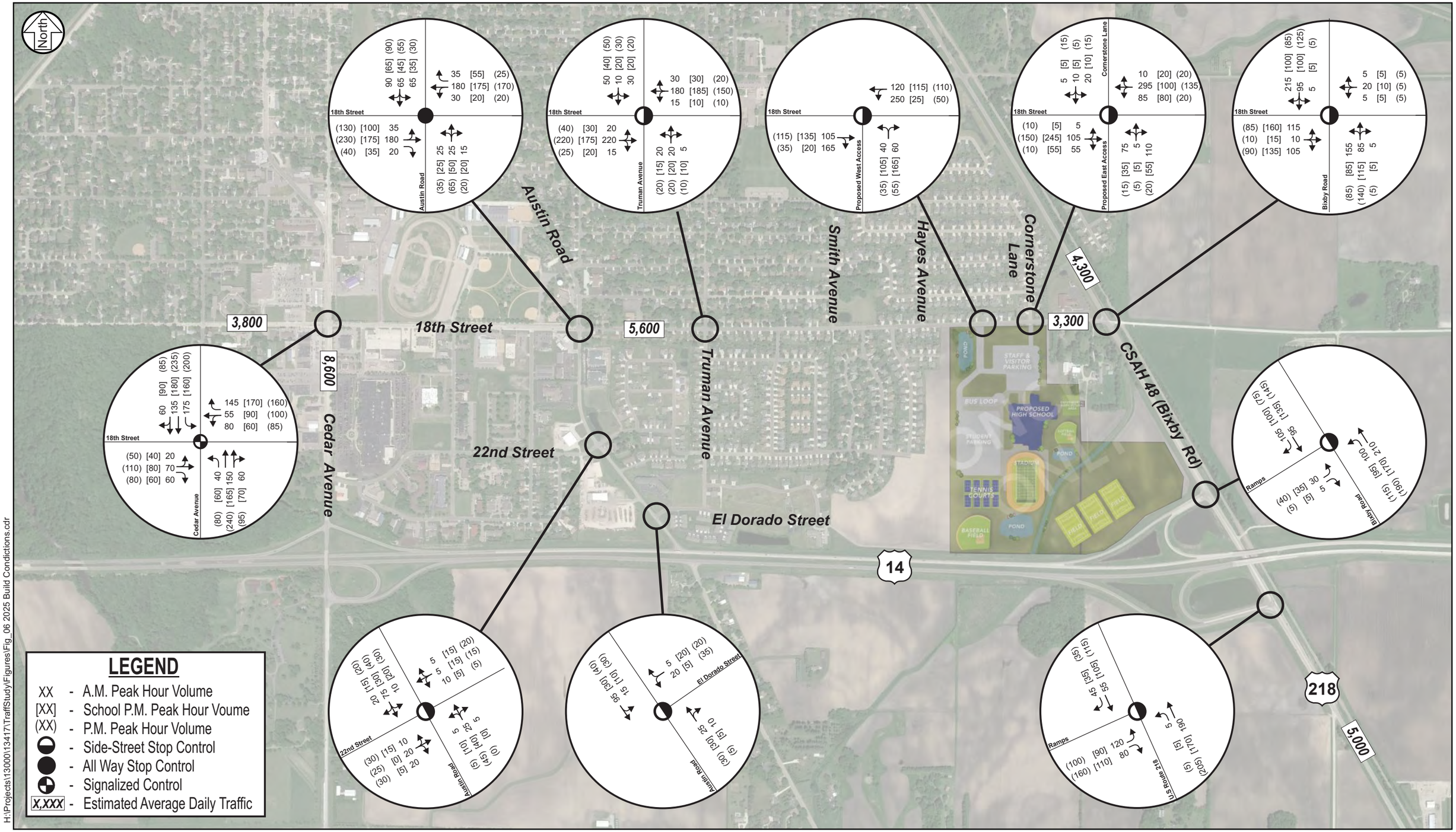
Directional Distribution

Owatonna High School Traffic Impact Study

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Figure 5



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2025 Build Conditions

Owatonna High School Traffic Impact Study
City of Owatonna, MN

Figure 6

Table 5. 2025 Build Intersection Capacity Analysis (60-Minute Analysis)

Intersection	A.M. Peak Hour (1)		School P.M. Peak Hour (1)		P.M. Peak Hour	
	LOS	Delay	LOS	Delay	LOS	Delay
18th Street / CSAH 45 (Cedar Avenue)	B	12 sec.	B	13 sec.	B	16 sec.
18th Street / Austin Road (3)	A	7 sec.	A	8 sec.	A	9 sec.
18th Street / Truman Avenue (2)	A/A	8 sec.	A/A	6 sec.	A/A	6 sec.
18th Street / Proposed West Access (2)	A/B	17 sec.	A/C	15 sec.	A/A	7 sec.
18th Street / Cornerstone Lane/East Access (2)	A/B	12 sec.	A/C	22 sec.	A/A	7 sec.
18th Street / CSAH 48 (Bixby Road) (2)	B/D	34 sec.	B/E	43 sec.	A/A	8 sec.
CSAH 48 (Bixby Road) / US 14 North Ramp (2)	A/A	5 sec.	A/A	6 sec.	A/A	7 sec.
CSAH 48 (Bixby Road) / US 14 South Ramp (2)	A/A	3 sec.	A/A	3 sec.	A/A	3 sec.
Austin Road / 22nd Street (2)	A/A	5 sec.	A/A	4 sec.	A/A	5 sec.
Austin Road / El Dorado Street (2)	A/A	5 sec.	A/A	3 sec.	A/A	4 sec.

(1) The school a.m. and p.m. peak hours are defined as 7:15 – 8:15 a.m. and 2:15 – 3:15 p.m. respectively. The school a.m. peak hour coincides with the a.m. peak hour of the adjacent roadway network.

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

(3) Indicates an all-way stop controlled intersection.

Table 6. 2025 Build Intersection Capacity Analysis (Peak 15-Minute Analysis)

Intersection	A.M. Peak Hour (1)		School P.M. Peak Hour (1)	
	LOS	Delay	LOS	Delay
18th Street/Proposed West Access (2) (3)	A/D	28 sec.	A/C	19 sec.
18th Street/Cornerstone Lane/East Access (2) (3)	A/C	18 sec.	A/D	28 sec.
18th Street/CSAH 48 (Bixby Road) (2)	C/F	65 sec.	D/F	62 sec.

(1) The school a.m. and p.m. peak hours are defined as 7:15 – 8:15 a.m. and 2:15 – 3:15 p.m. respectively. The school a.m. peak hour coincides with the a.m. peak hour of the adjacent roadway network.

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

(3) Northbound approach assumes no turn lanes.

The following information summarizes the operational and/or queuing issues identified as part of the 2025 build intersection capacity analysis:

- 18th Street School Access Locations:
  - A lack of a westbound left-turn lane results in approximately 150 feet (i.e. approximately 7 to 8 vehicles) of queues along 18th Street during the a.m. peak hour.
  - Northbound queues are expected to be approximately 150 feet and 250 feet during the a.m. and school p.m. peak 15-minute periods, respectively (assuming a single lane exiting).
  - **Recommendation:** Convert 18th Street to a 3-lane facility from CSAH 48 (Bixby Road) to Hayes Avenue and provide approximately 150-foot right-turn lanes exiting the school driveways at 18th Street.
- 18th Street/CSAH 48 (Bixby Road)
  - The eastbound approach (i.e. 18th Street) operates at LOS F and is expected to have queues of 300 feet or greater (i.e. 12 to 15 vehicles) during the peak 15-minute periods before the school start and after the school end times.
  - Approximately 150 vehicles or more are expected to make a northbound left-turn or southbound right-turn movement along CSAH 48 (Bixby Road) at 18th Street during the a.m. peak hour; there are currently no turn lanes at this location, which creates additional conflicts and a potential safety concern.
  - With the increased volumes, the peaking characteristics associated with schools, and the existing high-speed skewed intersection, the potential safety issues identified under existing conditions are expected to continue or worsen. In addition, when intersection capacity is approaching capacity, drivers may accept smaller gaps and make more aggressive movements, which could also increase the risk of a potential crash.
  - **Recommendation:** Geometric and/or traffic control improvements should be constructed. The recommended traffic control and geometric configurations are discussed further in the following section.

Recommended Improvements

18th Street/CSAH 48 (Bixby Road) Traffic Control Alternatives

To illustrate how various potential traffic control alternatives would be expected to operate under year 2025 build conditions, an additional intersection capacity analysis was conducted. It should be noted that due to safety concerns, northbound left- and southbound left- and right-turn lanes were assumed under the side-street stop and signal alternatives. Other assumed intersection geometrics are provided in the footnotes. Note that this assessment focuses on the traffic control alternatives, however realignment of 18th Street or CSAH 48 (Bixby Road) should also be considered to minimize/eliminate the intersection skew.

Results of the alternative analysis, shown in Table 7, indicates that all traffic control alternatives are expected to operate at an overall LOS D or better during the peak school a.m. and p.m. 15-minutes. Although the side-street stop control alternative would provide acceptable overall operations, the eastbound approach (i.e. 18th Street) is expected to continue to operate in the LOS E/F range during the peak 15-minutes. The signal and roundabout alternatives provide better operations and are expected to provide more long-term capacity for the area.

Table 7. 18th Street/CSAH 48 Alternative Analysis (Peak 15-Minute Analysis)

Traffic Control Alternative	A.M. Peak Hour		School P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Side-Street Stop (2)	C/E	45 sec.	D/F	56 sec.
All-Way Stop (1)	C	16 sec.	C	22 sec.
Roundabout (3)	A	7 sec.	A	7 sec.
Traffic Signal (2)	B	11 sec.	B	12 sec.

(1) Assumes existing geometric layout. All-way stop control was analyzed using HCS 7.
(2) Assumes the addition of a northbound left- and southbound left- and right-turn lanes along CSAH 48 (Bixby Road).
(3) Roundabout was analyzed as a single-lane approach, single-lane roundabout using HCS 7.

While operations are important, safety is the primary concern at the intersection. Roundabouts provide the safest intersection control, as they significantly reduce fatal and injury crashes as compared to other traffic controls. In addition, land use south of the intersection is rural, and a roundabout would provide a speed transition opportunity to alert drivers coming from the south that they are entering a more suburban area where vehicular and pedestrian activity could be higher. Therefore, a roundabout control at the 18th Street/CSAH 48 (Bixby Road) intersection is recommended. This traffic control improvement should be operational before the proposed high school opens.

18th Street and School Access Locations

The segment along 18th Street from CSAH 48 (Bixby Road) to Hayes Avenue was recommended to be converted to a 3-lane facility to reduce westbound queueing impacts along 18th Street, which would provide safety and operational benefits during peak hours. The three-lane facility would also provide the ability to construct a two-stage pedestrian crossing, which is discussed later in this document. While parking impacts are expected with the three-lane alternative (assuming no widening), eliminating parking on the south side of 18th Street would help reduce any potential sight distance issues exiting the high school. It is also important to note that there is not a significant amount of on-street parking the occurs today, although the parking is occasionally used.

In addition to the three-lane facility, turn lanes exiting the school driveways were recommended. A summary of the 2025 build conditions with and without turn lanes at the school access locations is shown in Table 8, to illustrate the operational benefits. Note that a three-lane facility was assumed in both turn lane scenarios.

Results of the analysis indicate that additional lanes will provide both operational and queuing benefits at both access locations. The proposed West Access is expected to have the most benefit from a turn lane addition, with the school p.m. peak hour queue being reduced from 250 feet to 100 feet. While there are safety and operational benefits associated with these turn lane additions, the operations without the turn lanes are acceptable and drivers would expect longer delays and queues before and after school start and end times.

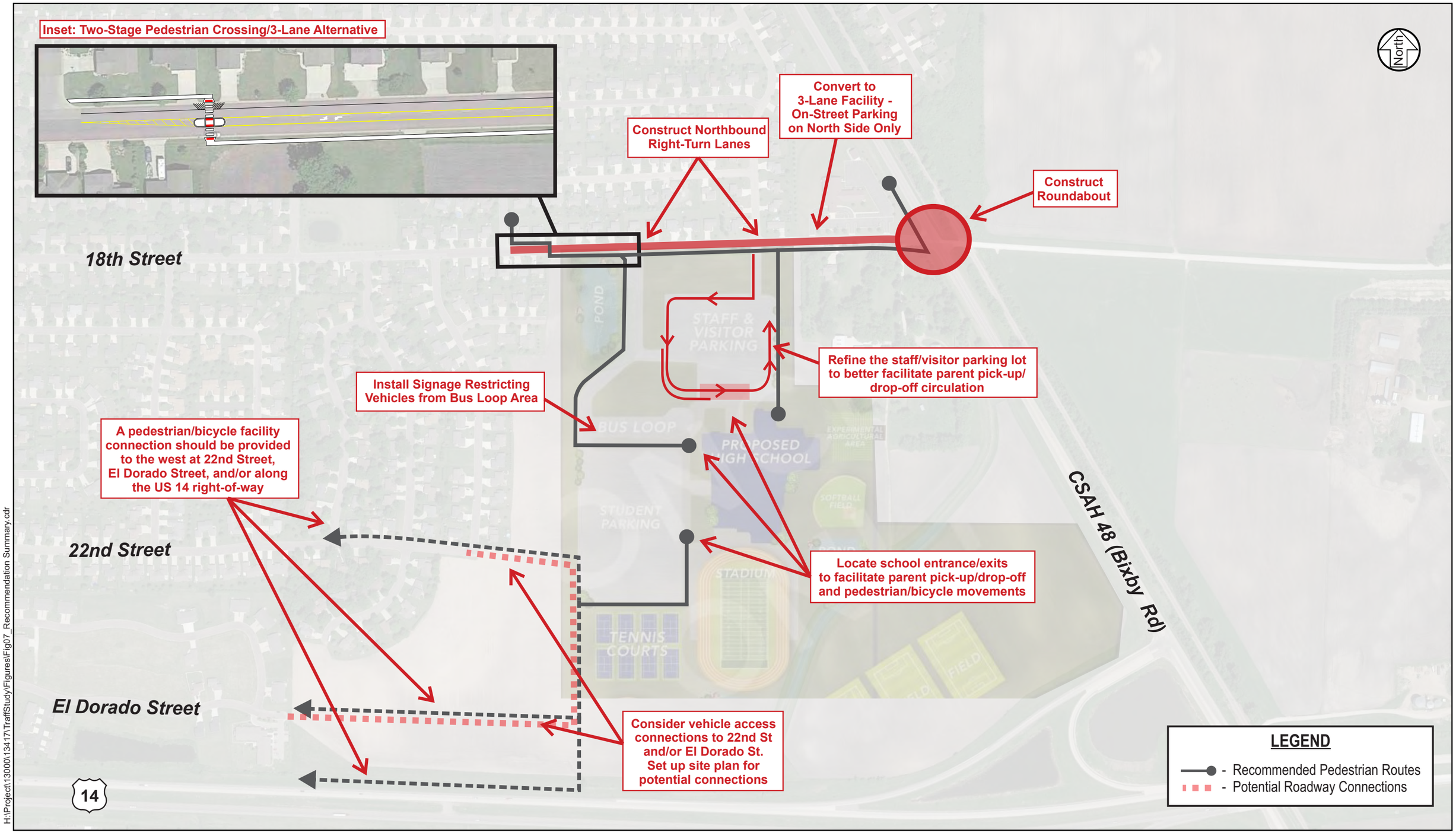
Table 8. 2025 Build Northbound Turn Lane Comparison (Peak 15-Minute Analysis)

18th Street Access	LOS (Delay)			
	A.M. Peak Hour		School P.M. Peak Hour	
	Single-Lane Exit	Turn Lane	Single-Lane Exit	Turn Lane
West Access	A/C (24 sec)	A/A (9 sec)	A/C (17 sec)	A/A (10 sec)
East Access (Cornerstone Land)	A/B (13 sec)	A/B (11 sec)	A/C (20 sec)	A/C (16 sec)
	Northbound 95th Percentile Queue (ft)			
West Access	135	75	250	100
East Access (Cornerstone Lane)	150	90	115	75

Site Plan/Access Review

A review of the proposed site plan was completed to identify any issues and recommend potential improvements with regard to access, drop-off/pick-up zones, pedestrian accommodations, and special event traffic. Based on this review, the following considerations were identified that should be discussed further. A summary of all recommended improvements and considerations near the school site are shown in Figure 7.

1) Vehicle access connections to 22nd Street and/or El Dorado Street to the west should be considered, as they would balance traffic impacts by reducing the amount of vehicles along 18th Street. However, this reduction in vehicles would likely result in marginal improvement in intersection operations, but would provide a safety benefit, particularly with respect to pedestrian safety. At a minimum, this site plan should be set up as to not preclude a future roadway connection to the west to minimize future site plan changes.



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SRF Consulting Group, Inc.

Recommendation Summary

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Figure 7

2) An enhanced pedestrian/bicycle crossing should be provided along 18th Street, between the West School Access and Hayes Avenue. With the three-lane alternative along 18th Street, a two-stage pedestrian crossing could be implemented west of the school access locations, which would provide some separation from vehicles entering/exiting the school. Two-stage crossings allow students to only cross one lane of travel at a time, thus creating a safer crossing. Depending on the pedestrian volumes expected, a rectangular rapid flashing beacon (RRFB) could be implemented at this location. Specific location of the crossing should be coordinated with project staff.
3) A pedestrian/bicycle facility connection should be provided to the west at 22nd Street, El Dorado Street, and/or along the US 14 right-of-way. This connection would provide a more direct connection to the existing residential areas immediately west of the school site, as well as provide an alternative route for students that live further to the northwest.
4) Pedestrian/bicycle facilities should be planned to connect to CSAH 48 (Bixby Road), which is envisioned to have a future pedestrian/bicycle facility.
5) Install signage prohibiting general purpose vehicle traffic within the bus drop-off/pick-up zones and review turning movements to ensure that buses have adequate accommodations to negotiate internal roadways and the bus loop area.
6) Refine the staff/visitor parking lot to better facilitate parent pick-up/drop-off circulation and to limit impacts with parking vehicles, where possible. This could include appropriate signage, striping, and geometric changes.
7) Locate school entrance/exits to help maximize internal vehicle storage for parent pick-up/drop-off operations, as well as to facilitate efficient pedestrian/bicycle movements.

Other Considerations

In addition to the identified recommendations and considerations, it is important to note that other key factors were considered/evaluated as part of this study, including a potential future school roadway/access directly to CSAH 48 (Bixby Road). However, given the current vehicle speeds along CSAH 48 (Bixby Road) and access spacing guidance, providing another access to CSAH 48 (Bixby Road) may be challenging and pose a safety risk, depending on the level of use. In addition, this type of access would not be expected to change the need for improvements to the 18th Street/CSAH 48 (Bixby Road) intersection.

Another factor that should be monitored is event traffic. In general, traffic operations before and after sporting/special events (depending on attendance levels) should be monitored to determine if special management strategies should be implemented to reduce potential conflicts and ensure safe and efficient operations. Potential strategies could involve traffic control officers to manage traffic before and after large events or restricting certain parking spaces to facility pedestrian movements.

Conclusions and Recommendations

The following information provides a summary of the key conclusions and recommendations offered as part of the study:

- All study intersections currently operate at an overall LOS B or better during the a.m., school p.m., and p.m. peak hours and no significant queues or side-street delays were identified.
- The 18th Street/CSAH 48 (Bixby Road) intersection does not currently have a crash issue, but given the high-speeds along CSAH 48, skewed roadway geometrics, and adjacent railroad crossing, any increase in traffic volume could pose a potential safety risk.
- There is a gap in existing pedestrian/bicycle facilities near the proposed high school location.
- The proposed new Owatonna High School is in the southwest quadrant of the 18th Street/ CSAH 48 (Bixby Road) intersection and includes a maximum capacity of 1,600 students; the school is expected to be open for the fall of 2023.
- At capacity, the proposed high school is expected to generate approximately 832 a.m. peak hour, 528 school p.m. peak hour, 224 p.m. peak hour, and 3,248 daily site trips.
- Based on the year 2025 build condition intersection capacity analysis, operational and queuing issues are expected to occur during the peak 15-minutes before and after school at study intersections immediately adjacent to the proposed high school.
- To address the future vehicular capacity and safety issues identified, the following improvements are recommended.
    - Construct a roundabout at the 18th Street/CSAH 48 (Bixby Road) intersection to reduce existing safety risks at the intersection and provide long-term capacity at the intersection.
    - Convert 18th Street to a 3-lane facility from CSAH 48 (Bixby Road) to approximately Hayes Avenue to provide vehicular and pedestrian safety benefits.
    - Provide approximately 150-foot right-turn lanes exiting the school driveways at 18th Street to improve operations and reduce queuing before and after school.
- Provide pedestrian/bicycle facilities to improve connectivity and safety within the area, including:
    - A dedicated pedestrian/bicycle facility along 18th Street between Hayes Avenue and CSAH 48 (Bixby Road).
    - An enhanced crossing along 18th Street between the West School Access and Hayes Avenue.
    - A connection to the west of the school site to 22nd Street, Eldorado Street, and/or the US 14 right-of-way.
    - Enhanced connectivity from the school entrances/exits to adjacent pedestrian/bicycle facilities.

- Although the site plan is preliminary, the following improvements should be considered:
  - Set up the site plan as to not preclude a future roadway connection to the west to minimize future site plan changes.
  - Install signage prohibiting general purpose vehicle traffic within the bus drop-off/pick-up zones and review turning movements to ensure that buses have adequate accommodations to negotiate internal roadways and the bus loop area.
  - Refine the staff/visitor parking lot to better facilitate parent pick-up/drop-off circulation and to limit impacts with parking vehicles, where possible. This could include appropriate signage, striping, and geometric changes.

Attachment C – City of Owatonna – Town of Owatonna 2025 Annexation Agreement and Town of Owatonna Resolution

CITY –TOWNSHIP ANNEXATION AGREEMENT

Effective January 1, 2025

The City of Owatonna and the Town of Owatonna do hereby enter into this Annexation Agreement.

PURPOSE

The purpose of this Annexation Agreement shall be to provide land areas for the growth of the City of Owatonna and further, to provide for the protection of agricultural and other lands within the Town of Owatonna from urban and suburban development and to promote an organized framework for systematic annexation, provided that the described areas are determined to be ready for annexation.

AREA A

This area has relatively immediate development potential. The City will support annexations within this area in as much as extension of services can be done in an orderly and cost effective way. The Township will not object to annexation requests within these areas, provided the City will install water and sewer within two years after annexation. Furthermore, Township will prohibit non-farm uses of the property in these areas. In instances where individual property owners can substantiate that within the previous five years from when city sanitary sewer becomes available, at least $900 has been spent to refurbish or reconstruct the on-site sewage treatment system and that such system is functioning properly and conforming to applicable codes, the property owner may defer hooking up to the city's sewer system for a period of five years. During that period interest on assessments resulting from construction of the city sewer system shall not accumulate or accrue. After five years, such residences shall be connected to city sewer and water lines, existing on-site systems shall be abandoned in compliance with city, county and state regulations and outstanding assessments shall be paid in conformance with prevailing assessment policy and the original interest rate.

AREA B

1. The City views this area as having potential for industrial and possibly some limited commercial expansion. The City views the area as being available for continued commercial/industrial expansion and will support annexation as long as such proposals will provide for the orderly extension of streets and utility services. While this area is under Township jurisdiction only farm uses shall be permitted.

AREA C

1. These areas have a largely residential development potential. The City will accept requests for annexation based on the ability to extend city services to the property, the costs of such extensions, and how such costs shall be born. Total annexations in this area shall not exceed 65 acres in any year that the agreement is in effect. A specific petition for annexation shall not exceed 60 acres and the City may require that such request be reduced in area in a manner

specified by the City. The Township shall not object to annexations within this area that are in compliance with the terms of this agreement.

2. These areas have residential development potential. The City will not support annexation within these areas until such time that the number of available single family lots in the City with utility services in place falls below 350. In addition, such parcels proposed for annexation must border City Limits by no less than 20% of the property's perimeter. While the area is under Township jurisdiction, the only new uses permitted shall farm uses.

GENERAL PROVISIONS

1. Requests for annexations shall be presented to the Owatonna Town Board for review unless both the City and Township waive this provision.

2. The Annexation Agreement shall be in effect for one year. Each year the agreement may be reviewed and upon majority vote of the governing bodies, a one year extension of the agreement with any approved revisions shall be made.

3. Relative to references to commercial and industrial development, proposed development shall mean imminent construction of buildings and structures or the platting of property into lots for future sale if the total property to be annexed is not larger than 160 acres and available property zoned for industrial uses within City Limits and west of I-35 drops below 150 acres with not less than two parcels of 40 acres (no side of which is over 1600 feet in length).

4. The terms of this agreement may be altered by joint resolution of the Township and City.

5. The City shall reimburse the Township for lost property taxes for annexed property. The petitioner will be responsible for paying the 10 years of the township share of property taxes as a portion of the application fee to the City. The City will send a check to Owatonna Township within 90 days of the annexation being approved by the Administrative Law Judge.

6. Within the designated annexation areas the Township will give the City written notice prior to all zone change requests, requests for subdivision, variances, conditional uses and non-farm building permits.

7. The term "farm uses" as used in this agreement, shall mean such uses commonly associated with the growing of produce on farms; including field crop farming, pasture for hay, fruit growing, tree, plant, shrub or flower nursery, truck gardening and the raising of livestock but not including commercial feedlots; and accessory operations that are clearly secondary, incidental and directly related to the farming operation.

8. If the City, by way of operation of this agreement or petition by a property owner desires to annex property, the City shall notify the Township of the proposed annexation which should include the following:

A. Description and map of the parcel to be considered.
B. The proposed use and development of said property.
C. The proposed services to be provided including water, sewer, police, fire, refuse and roads. Said list is not exclusive and can include additional municipal services.

D. The staging or time period in which the annexation is to occur and the period that the services will be developed.
E. Any change that is required in the Comprehensive Plan and/or zoning and subdivision ordinance of the City.

9. At the time of purchase, the City shall reimburse the Township for lost property taxes on property in the Township that is purchased by the City, such amount to be equivalent of ten years tax revenue collected by the Township for the property purchased.

IN WITNESS WHEREOF both parties have caused this agreement to be executed on the date opposite their signatures below.

TOWNSHIP OF OWATONNA BY

Dan DeWitte
Chairman

Township Clerk

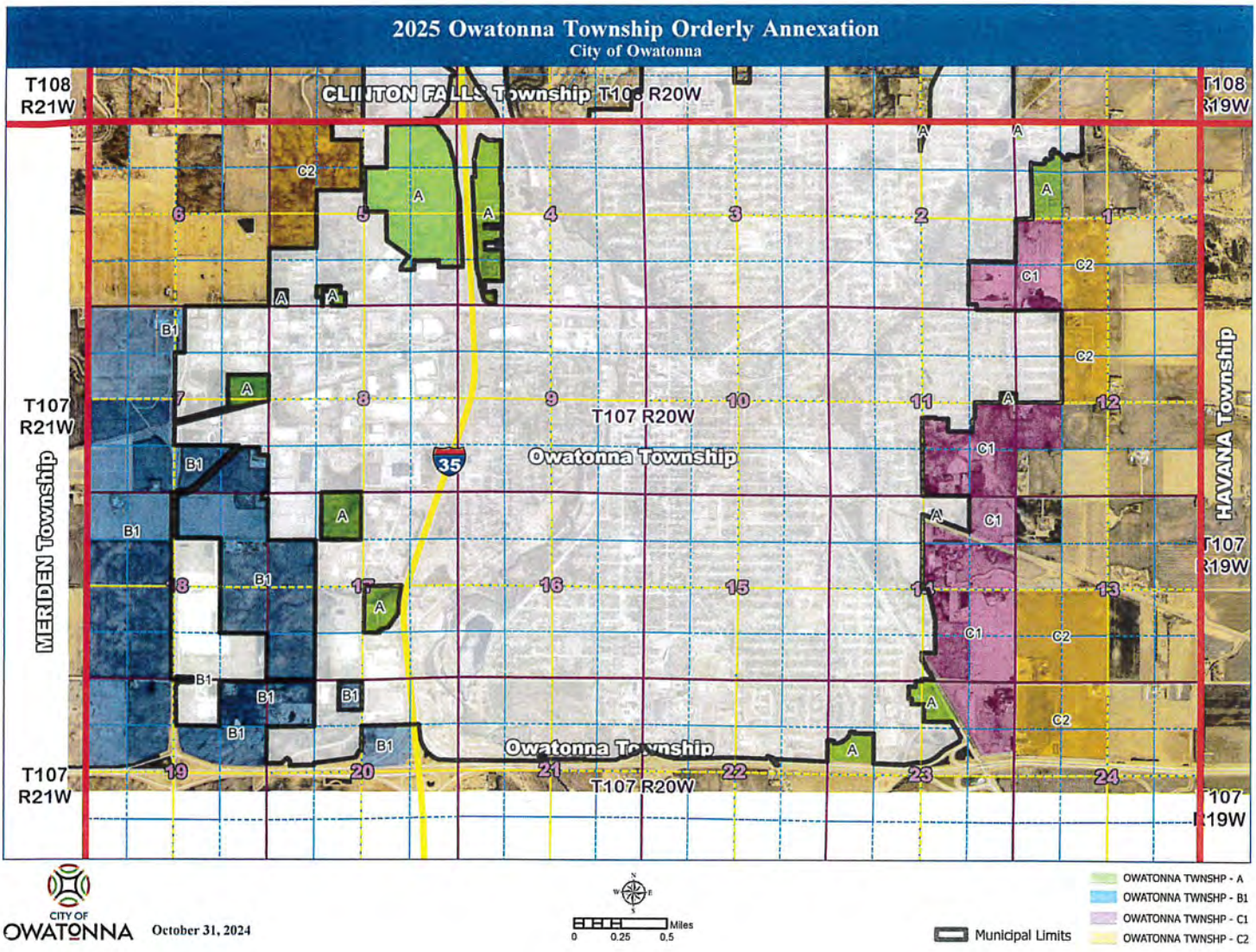
DATE 11/19/24

CITY OF OWATONNA

Mayor Thomas A Kuntz
Thomas A. Kuntz

Attest Kris M Busse
Kris M. Busse, City Administrator

DATE 11-19-24


2025 Owatonna Township Orderly Annexation
City of Owatonna
T108 R21W
CLINTON FALLS Township T108 R20W
T108 R19W
T107 R21W
T107 R20W
Owatonna Township
MERIDEN Township
HAVANA Township
T107 R19W
35
Owatonna Township
T107 R21W
T107 R20W
T107 R19W
CITY OF OWATONNA
October 31, 2024
Miles
0 0.25 0.5
Municipal Limits
OWATONNA TWNSHP - A
OWATONNA TWNSHP - B1
OWATONNA TWNSHP - C1
OWATONNA TWNSHP - C2

RESOLUTION

TOWN BOARD OF OWATONNA TOWNSHIP

WHEREAS, the Town and the City have annually adopted an orderly Annexation Agreement to provide land areas for the growth of the City and further, to provide for the protection of agricultural and other lands within the Township from urban and suburban development and to promote an organized framework for systematic annexation, and part of that agreement, the Township does not support non-farm use of the properties in the growth area, and

WHEREAS, the Preferred Alternative is largely in the defined growth areas and has less farmland impacts than the alternatives further east, and

WHEREAS, the Preferred Alternative keeps development from leapfrogging into non developed area and keeps development near existing city limits, and

WHEREAS, the Preferred Alignment best supports existing and near-term City development while preserving farmland further east, and

WHEREAS, the city dedicated land on the east side of the North County Additions 1, 2, and 3 plats preserving land for the route, and that land is already out of farmland production, further protecting additional farmland from being removed from production through other alternative routes, and

WHEREAS, Alternatives 4 and 5 presented in the environmental documents have greater farmland impacts, and would encourage development outside of the annexation agreement development areas.

NOW, THEREFORE, BE IT RESOLVED, the township does not support any other alternatives that impact farmland outside of orderly annexation agreement areas, or that do not use already-dedicated lands for the route.

BE IT FURTHER RESOLVED the Township requests that the County and City follow their previous significant planning efforts and agreements to preserve farmland and promote the orderly growth of the City.

BE IT FURTHER RESOLVED the Township supports the selection of the preferred alternative, identified as Alternative 3 as shown in the federal and state environmental documents, and commonly referred to as the 29th Avenue alignment.

ADOPTED 5-13-25 **, 2025.**

OWATONNA TOWNSHIP BOARD
Steele County, Minnesota

By: _____
Chairman

ATTEST:

By: _____
Township Clerk

CERTIFICATION

I hereby certify that the above *is* a true and correct copy of a Resolution duly passed, adopted, and approved by the Owatonna Township Board on the 13th day of May, 2025.

_____
Township Clerk

Attachment D – Floodplain Assessment

FLOODPLAIN ASSESSMENT

FLOODPLAIN ENCROACHMENT		
Floodplain	**Type of Encroachment**	**Length, ft**
Maple Creek: 100-year	Transverse Location AY - FIS 27147CV000A FIRM 27147C0156C New Bridge between Dane Rd and Kenyon Rd/26th St	Approx. 400 ft

**See figure for location*

Context: The project involves a new roadway and bridge over Maple Creek between Dane Rd. and Kenyon Rd./26th St NE of Owatonna in Steele County. While the bridge abutments would encroach into the floodplain, the bridge will span over 325 feet and will NOT encroach into the regulatory floodway. The low member of the bridge will be designed above the 500-year WSE.

TRANSVERSE or LONGITUDINAL ENCROACHMENT

1. There is no interruption of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route. This is a new roadway (29th Ave, also referred to as East Side Corridor) that will necessitate a new bridge structure at Maple Creek. Construction of the new roadway will not involve closure of adjacent roads.

   a. Is the roadway grade above the 100 year flood elevation? **YES**

Location of Crossing	Roadway Elevation	100 year flood elevation
29th Ave New Bridge (bridge ID TBD)	Approx. 1192	1187.2

   Note: Frequency of overtopping **Greater than 500-Year**
   Reason(s) why roadway grade will not be raised: **N/A (new roadway)**
   Are there reasonable alternative routes available that are above the 100 year flood elevations? **YES**

   b. If the 100 year flood elevation is not known, does roadway have a history of overtopping? **N/A (new roadway)**

   c. Describe how emergency services will be maintained during construction: **During the construction of the new roadway and bridge Emergency vehicles will continue to have access via the existing roadways**

2. There is no significant impact on natural and beneficial floodplain values.

   a. Impacts:

	Beneficial Impacts	Adverse Impacts
Fisheries	N	**N**
Wetlands	N	**N**
Plants	N	**N**
Open Space/Aesthetics	N	**N**
Public Access (boat/canoe)	N	**N**
Channel Changes	N	**N**
Boat Passage	N	**N**
Threatened/Endangered Species	N	**N**
Water Quality	N	**N**
Other	N	**N**

   b. Minimization/Mitigation Measures: The active channel of Maple Creek and parts of the floodplain are identified as freshwater wetlands. The wetlands, however, are mostly present within the floodway where no approach fill will be placed (i.e., no encroachment in the floodway). No work will be performed with the channel banks and the project will attempt to minimize any impact to the wetlands. Special erosion control measures and perimeter control will be implemented during the construction of the roadway and bridge.

Project will be in compliance with all permit requirements, including NPDES, SWPPP, Minnesota DNR, and US Army Corps of Engineers.

3. There is no significant increased risk of flooding.

   a. Does the project result in any headwater or tailwater elevations that would endanger life or property? **NO**
   Stage Increase **No Stage Increase (no rise)**

   b. Are there any special hydraulic features? What is their purpose? **N/A**

4. The project will not support and/or result in incompatible floodplain development.

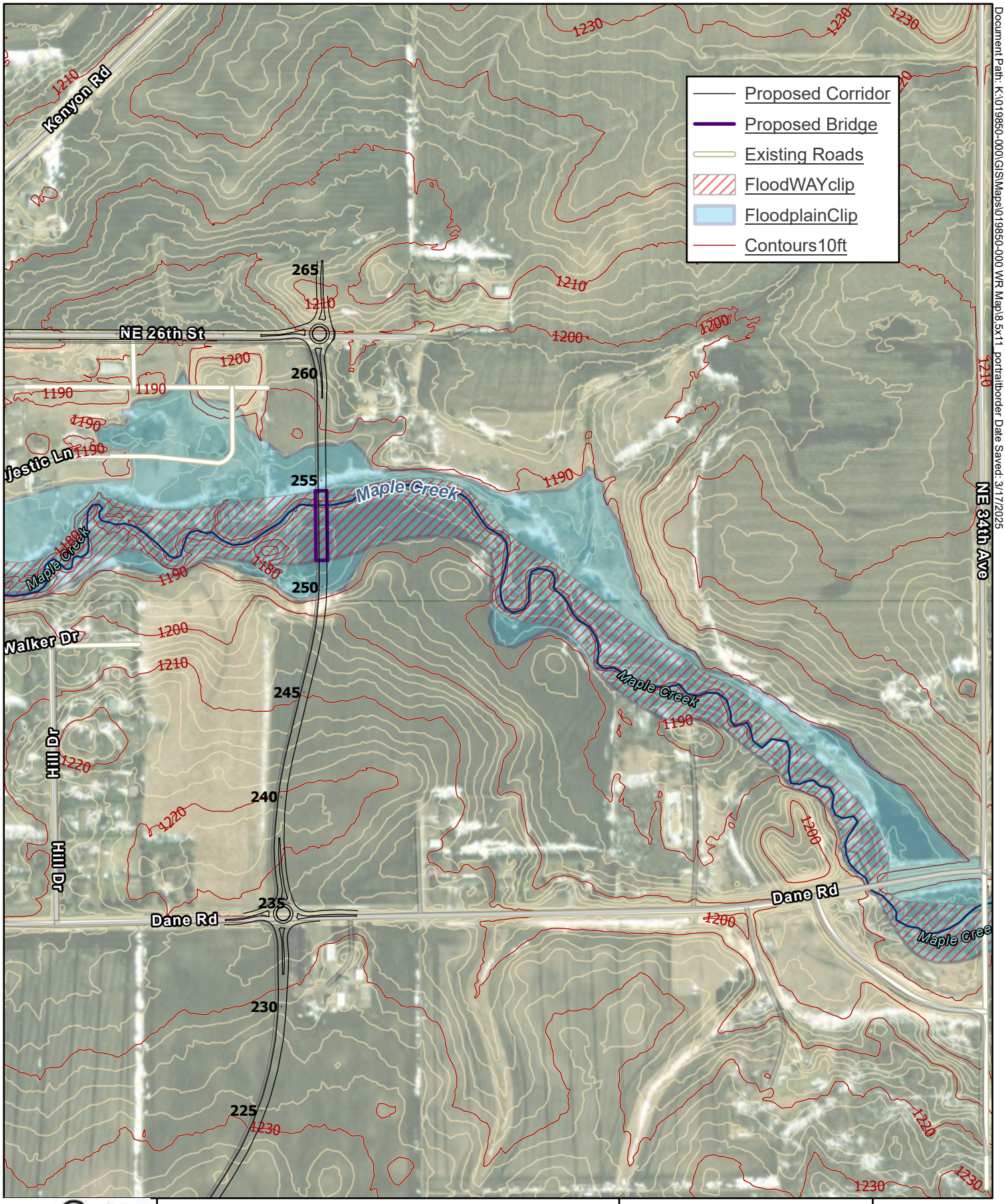
   Reason(s) why project will not cause incompatible floodplain development:

   The bridge will span the entire width of the floodway (i.e., over 325-ft), resulting in no-rise and not increased risk of flooding. The proposed large bridge opening, impacts the flow minimally only at high stages, protecting the riparian habitat.

COORDINATION
Multiple permits will be required for the project, below is a list of the anticipated permits necessary:

- Minnesota Pollution Control Agency Phase II NPDES CSW permit
- Minnesota Pollution Control Agency Section 401 Certification
- Minnesota Department of Natural Resources License to Cross
- Minnesota Department of Natural Resources Construction Dewatering (if necessary)
- US Army Corps of Engineers Section 404 Permit (Letter of Permission)
- Wetland Conservation Act Replacement Plan

CONCLUDING STATEMENT
Based on the above assessment, no floodplain impacts are expected.



Document Path: K:\019850-000\GIS\Maps\019850-000 WR Map\8.5x11_portrait\border Date Saved: 3/17/2025

FLOODPLAIN ASSESSMENT - MAP
Proposed 29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

0 600 Feet
1 inch = 600 feet

N

Bridge Number TBD (new road, new bridge) Date 1/31/2025

*	Stream name	Maple Creek
	Drainage area	28 sq-mi
	Flood of record	Unknown
	Maximum observed highwater elevation	Unknown
*	Design flood (50- year frequency)	2500 cfs
	Road sag point elevation	1192
	Design stage	1186.4
	Total stage increase	0.0 ft
*	Headwater elevation	1186.5
	Stage increase of the inplace condition	0.0 ft
	Min. waterway opening below elevation	1182 sq-t
	Low member at or above elevation	1188.5
	Mean velocity through structure	2.1 ft/s
	Main channel velocity	2.6 ft/s
	Overtopping flood or Greatest flood (500 -year frequency)	4800 cfs (500-year)
	Road sag point elevation	
	Stage	1182.2
	Total stage increase	0.0 ft
*	Headwater elevation	1188.3
	Stage increase of the inplace condition	0.0 ft
	Mean velocity through structure	3.7 ft/s
*	Basic flood (100-year frequency)	3300 cfs
	Stage	
	Total stage increase	0.0 ft
*	Headwater elevation	1187.3
	Stage increase of the inplace condition	0.0 ft
	Min. overflow area above sag point elev.	N/A
	Mean overflow velocity	N/A
	Mean velocity through structure	2.3 ft/s
	Approximate flowline elevation	1187.3 (in) to 1187.2 (out)
	Estimated pier scour elevation	1165 **
	Year frequency scour was calculated for	100-yr
	Skew	0
	Scour Code	M **

*Items to be shown on Grading Plan

** Initial scour estimate at 13-ft below channel thalweg.

A new north-south road, 29th Ave, also referred to as East Side Corridor, is being proposed in Steele County, Minnesota, NE of the City of Owatonna. The new road crosses Maple Creek, an important local stream and public water, between Kenyon Rd and Dane Rd.

The crossing requires a new bridge. No existing road or bridge is currently in place. The proposed crossing is located in a Special Flooding Hazard Area Zone AE, i.e., a regulatory floodplain with a determined floodway and 100-yr WSE elevation is place.

Based on discussion with MnDNR, the no approach fill will be placed in the floodway and the design will aim for no-rise in WSE (relative to the existing, no-bridge conditions). Because the floodway is 325 feet wide, the proposed bridge span will be relatively long (approximately 350 feet). The low chord will be designed above the 500-year flood elevation. Thus, the proposed bridge will cause little to no flow obstruction, resulting in no-rise compared to the existing conditions.

Because the flow cross-section area will be large, the velocities are expected to be relatively low (i.e., 3 to 4 ft/s range) with little risk of scour. The bridge design will ensure adequate abutment and pier scour protection will be provided and the footings of the piers will be constructed below the estimated 100-year scour depth.

The proposed structure should provide an adequate waterway to pass the design flood. There are no apparent structures within the upstream or downstream floodplain extents that would present any flood damage potential. The nearest structure upstream of the proposed bridge is approximately 8 feet above the 500-year WSE and approximately 4.5 feet above the proposed roadway.

I hereby certify that this 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.

_____

Dan Cazanacli, PE

Date: January 31, 2025 License No.: 42687

Appendix A Risk Assessment for Encroachment Design

This risk assessment form has been developed by MnDOT to document the consideration given to flood risk including backwater damage potential, traffic related losses, and roadway and/or structure repair costs for bridges and culverts. This form should be applied to the following cases to evaluate whether the proposed design results in acceptable flood risk:

- All waterway bridges
- Box culverts with span larger than 48”
- Round culverts with diameter larger than 48”
- Non-circular (e.g., arch, elliptical) culverts with equivalent diameter larger than 48”
- Culvert crossings consisting of multiple pipes with a combined area exceeding the area of a 48-inch round pipe is also considered a major culvert.

The form should be completed during the design process and signed by the engineer making the hydraulic recommendation. When this form is used initially at a preliminary design stage, it should be reviewed and revised as needed during final design stage to reflect the final design configuration. The information provided by the engineer in this form should be based on the proposed condition. Although not specifically addressed in this form, temporary impacts, such as those associated with construction, should also be considered by the engineer to identify necessary flood risk mitigation measures. This form is not intended to be a replacement for, and should be used in addition to, other forms or reports required for project permitting.

To complete this form, provide all information included in the Data Requirements section, then proceed to the Risk Assessment questions. Start with the first question in the Risk Assessment section and proceed to the subsequent questions based on your responses. Additional instructions are provided throughout this form. When completing this form, some responses indicate that a redesign should be considered to reduce flood risk. After redesigning to reduce flood risk, complete the Risk Assessment questions to confirm the proposed design results in acceptable flood risk, or provide justification for the design. Additional guidance for completing the “traffic related losses” section of the risk assessment is included at the end of this form as pages A-8 through A-12. Where space to provide responses is limited in this form, attach additional pages as needed.

DATA REQUIREMENTS

It may be helpful to compile the following information prior to completing the risk assessment: bridge/culvert design showing location and elevation of structure (bridge/culvert) and roadway overtopping profile, hydrologic and hydraulic modeling results, elevations of nearby properties at risk of flooding, roadway ADT, detour route, construction cost estimate for bridge/culvert and directly related work, and flood history.

Project Name and/or Number: 29th Ave / East Side Corridor SP 074-070-009
Date Risk Assessment Completed: 1/31/2025

1. Location of Crossing:
   MnDOT District: 6 County: Steele
   Vicinity of: NE of City of Owatonna, between Kenyon Rd and Dane Rd, approx. 0.5 miles west of 34th Ave NE
   Roadway/Route ID: TBD (new road) Control Section (TH Only): TBD (new road)
   Project Stationing: TBD (new road) Reference Post (TH Only): TBD (new road)
   Section: 1
   Township: 107 N Range: 20 W
   Latitude/Longitude: 44.088230 / -93.180463

2. Name of Stream: Maple Creek
   MnDNR Public Water (yes/no): yes (i.d. M-048-026-006)
   Existing Asset ID (Bridge # or TAMS #): N/A (new bridge)
   New Asset ID (Bridge # or TAMS #): TBD (new bridge)

3. Current AADT: N/A (new roadway) Year:
   Projected AADT: 2,500 Year: 2046

4. If the roadway is closed due to flooding at the bridge/culvert or approach roadway, what is the anticipated detour length? 0.75 Miles

   Coordination with transportation engineer or other professional may be needed to answer this question. Briefly describe assumptions for detour route:
   Southbound Traffic: West on 26th St NE / South on Kenyon Rd / East on Dane Rd
   Northbound Traffic: West on Dane Rd / North on Kenyon Rd / East on 26th St NE

5. Design Stage: ☒ Preliminary ☐ Final ☐ Other: _____

6. Type of Proposed Structure: ☒ Bridge ☐ Culvert(s)

7. Description of Proposed Structure (bridge type, number of bridge spans, bridge span length(s), box culvert dimensions, round culvert diameter, number of culvert barrels, etc.):
   Approx. 350-feet long span

8. Proposed bridge low member elevation (if applicable): 1188.5
   Proposed culvert soffit (inside top of pipe) elevation (if applicable): N/A

9. Minimum roadway overflow elevation: 1192
(may be located at structure or away from structure)

10. Hydraulic Data (Fill in as appropriate)
Elevation Datum: NAVD88
If different than NAVD88, provide conversion to NAVD88: _____
Elevation Source (HEC-RAS model, HY-8 model, etc.): HEC-RAS model
Discharge Source (FEMA FIS, Streamstats, Hydrologic Study, etc.): _____

Q_2 =	304 cfs	HW_2 Elevation =	1182.7 ft	TW_2 Elevation =	1182.6 ft
Q_5 =	639 cfs	HW_5 Elevation =	1183.9 ft	TW_5 Elevation =	1183.8 ft
Q_{10} =	1450 cfs	HW_{10} Elevation =	1185.3 ft	TW_{10} Elevation =	1185.2 ft
Q_{25} =	2000 cfs	HW_{25} Elevation =	1186.0 ft	TW_{25} Elevation =	1185.9 ft
Q_{50} =	2500 cfs	HW_{50} Elevation =	1186.5 ft	TW_{50} Elevation =	1186.4 ft
Q_{100} =	3300 cfs	HW_{100} Elevation =	1187.2 ft	TW_{100} Elevation =	1187.1 ft
Q_{500} =	4800 cfs	HW_{500} Elevation =	1188.3 ft	TW_{500} Elevation =	1188.2 ft

Approximate thalweg elevation (lowest elevation of the channel):
At inlet/upstream end of culvert/bridge: 1178.1 ft
At outlet/downstream end of culvert/bridge: 1178.1 ft

Design Event: ☒ 100-yr ☐ 50-yr ☐ 25-yr ☐ 10-yr Other: _____
Reasons for selecting Design Frequency:
To demonstrate no-rise associated with floods of 0.01 annual chance (compliant with FEMA/MnDNR rules)

11. Discharge at which roadway overtopping occurs if less than 500-yr flood (cfs): N/A

12. Discharge and Frequency of the "Greatest Flood", defined as the smaller of either the roadway/structure overtopping flood or 500-year flood: _____

13. Horizontal location of roadway overflow:
☐ At Structure
☐ Not At Structure (Describe Location of Overflow)
_____

14. Elevation of properties with flood damage potential influenced by the hydraulic asset being designed (attach additional sheets if needed):
Property Description: N/A Lowest structure 8-ft above HW500 Damage Elevation: _____
Property Description: _____ Damage Elevation: _____
Property Description: _____ Damage Elevation: _____
Property Description: _____ Damage Elevation: _____
Property Description: _____ Damage Elevation: _____

RISK ASSESSMENT

1. BACKWATER DAMAGE - Flood damage potential in this context may include, but is not limited to, damage to emergency response facilities, schools, shopping centers, hospitals, nursing homes, chemical plants, power plants, housing developments, storage facilities, roadways, etc. Data must be reviewed to determine whether facilities with flood damage potential exist in the area influenced by the hydraulic asset being designed. This data may come from, but is not limited to, the following potential sources:

- Minnesota Geospatial Information Office
- State and County Hazard Mitigation Plans
- Other datasets indicating the location of critical infrastructure

For this section of the Risk Assessment, the overtopping flood is defined as the point when flow occurs over the roadway, over the watershed divide, or through structure(s) provided for emergency relief. Once the overtopping flood stage is reached, hydraulic relief is provided and backwater damage potential is likely to remain constant or increase minimally with increased flows.

1a. Is the overtopping flood greater than the 100-year flood?
☒ Yes (Go to 1b) ☐ No (Go to 1e)

1b. Is the overtopping flood greater than the 500-year flood?
☒ Yes (Go to 1d) ☐ No (Go to 1c)

1c. Is there flood damage potential for the overtopping flood?
☐ Yes, **CONSIDER REDESIGN** (Go to 1e) ☐ No (Go to 1e)

1d. Is there flood damage potential for the 500-year flood?
☐ Yes, **CONSIDER REDESIGN** (Go to 1e) ☒ No (Go to 1e)

1e. Will there be flood damage potential to residence(s) or other buildings during a 100-year flood?
☐ Yes (Go to 1f) ☒ No (Go to 2)

1f. Would this flood damage potential exist even if the roadway crossing wasn't there?
☐ Yes (Go to 1g) ☐ No (Go to 1h)

1g. Could this flood damage potential be significantly increased by the backwater caused by the proposed crossing?
☐ Yes (Go to 1h) ☐ No (Go to 2)

1h. Could the stream crossing be designed to minimize this flood damage potential?
☐ Yes (Go to 1i) ☐ No (Go to 2)

1i. Does the current value of the building(s) and/or its contents have sufficient value to justify further evaluation of risk and potential flood damage?

☐ Yes, **CONSIDER REDESIGN** Go to 2) ☐ No (Go to 2)

Designer's justification for backwater damage responses:

---

2. TRAFFIC-RELATED LOSSES - For this section of the risk assessment, the overtopping flood is defined as point when flow occurs over the roadway, causing a traffic impact.

2a. Is the overtopping flood greater than the 500-yr flood?

☒ Yes (Go to 3) ☐ No (Go to 2b)

2b. Does the ADT exceed 50 vehicles per day?

☐ Yes (Go to 2c) ☐ No (Go to 3)

2c. Would the duration of road closure (in days) multiplied by the incremental detour length (length of detour minus the length of normal route, in miles) exceed 20? Use sound engineering judgement to estimate the duration of road closure and detour length. The duration of road closure should reflect an average flood duration and additional time needed to repair and/or clear debris from roadway.

☐ Yes (Go to 2d) ☐ No (Go to 3)

2d. Does the annual traffic risk cost (Eqn. A.5) exceed 10% of the annual capital costs (Eqn. A.1)? (See Equations at end of Risk Assessment for Instructions and Example)

☐ Yes, **CONSIDER REDESIGN** (Go to 3) ☐ No (Go to 3)

Designer's justification for traffic-related losses responses:

---

3. ROADWAY AND/OR STRUCTURE REPAIR COSTS - This section of the Risk Assessment focuses on the potential for roadway or structure damage due to overtopping conditions during a flood event. To answer the questions below, consider alternatives which include roadway embankment or structure protection to reduce damage potential vs. increasing hydraulic capacity to reduce overtopping likelihood.

For this section of the Risk Assessment, the overtopping flood is defined as point when flow occurs over the roadway or structure.

3a. Is the overtopping flood less than a 100-year flood?

☐ Yes (Go to 3b) ☒ No (Go to 3d)

3b. Is the downstream shoulder and embankment constructed of erosion resistant vegetative cover or other protective materials such as pavement, riprap or precast articulated concrete (as needed)?

☐ Yes (Go to 3d) ☐ No (Go to 3c)

3c. If it is anticipated that the roadway and/or embankment would be susceptible to severe damage caused by overtopping, will the cost of protecting the roadway and/or embankment from severe damage caused by overtopping exceed the cost of providing additional culvert or bridge capacity?

☐ Yes, **CONSIDER REDESIGN** (Go to 3d) ☐ No (Go to 3d)

Protect embankment from overtopping damage

3d. Is there damage potential to the structure caused by scour, ice, debris, structure overtopping or other means during the lesser of the overtopping flood or the 100-year flood?

☐ Yes (Go to 3e) ☒ No (Go to 4)

3e. Will the cost of protecting the structure from damage exceed the cost of providing additional culvert or bridge hydraulic capacity (such as by increasing bridge low member elevation, lengthening bridge, increasing culvert size, etc.)?

☐ Yes, **CONSIDER REDESIGN** (Go to 4) ☐ No (Go to 4)

Protect structure from scour damage

Designer's justification for roadway and/or structure repair costs responses:

---

4. Has the project been designed with flood risk mitigation measures to reduce potential damage associated with increasing risk of extreme storms/floods that exceed design event frequency (e.g., provide armoring to protect structure and/or roadway, provide additional flow capacity, incorporate features that can be modified for future adaptation)?

☒ Yes (Go to 5; Describe below) ☐ No, **CONSIDER REDESIGN** (Go to 5)

Summary of how project has been designed with flood risk mitigation measures:

Proposed bridge span of ~350-ft and lower chord above the 500-yr WSE provides ample opening which translates in no flow restrictions or rise. The risk of significant blockage due to debris and ice is negligible. Proper armoring will be provided at abutments and piers.

---

5. In your opinion, are there any other factors that suggest a redesign should be considered?

☐ Yes, **CONSIDER REDESIGN** (Go to 6) ☒ No (Go to 6)

Indicate:

---

6. If none of the boxes next to "**CONSIDER REDESIGN**" are checked, proceed with the design, selecting an acceptable grade line and waterway opening consistent with the constraints imposed on the project including, but not limited to, aquatic organism passage improvements, flood risk reduction goals, etc. The risk assessment has demonstrated that when considering the potential for flood damage costs, traffic related costs, roadway and/or structure repair costs, the design results in an acceptable level of flood risk.

If one or more boxes next to "**CONSIDER REDESIGN**" are checked, further analysis in the checked category may be required to support a revised design or alternative flood mitigation measures. Alternatively, justify (below) why a revised design or alternative flood mitigation measures are not required.

Designer's justification for one or more checks indicating that a redesign should be considered to minimize risk:

I hereby certify that this 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:

Name: Dan Cazanacli

Signature: _____

License Number: 42687 Date: 1/31/2025

RISK ASSESSMENT FOR ENCROACHMENT DESIGN – ADDITIONAL INFORMATION

The following equations are used to answer question 2d in the "Traffic Related Losses" section of the risk assessment. Examples showing how to apply each equation are also provided herein.

ANNUAL CAPITAL COST

The annual capital cost of the bridge/culvert can be calculated using Equation A.1 below. In cases where the bridge/culvert is only part of a larger construction project, only the costs directly related to the bridge/culvert construction should be included in the capital cost of construction in Equation A.1. Directly related costs may include the bridge/culvert structure, temporary flow bypassing, related excavation, bedding, backfill, pavement and other restoration, end treatments, permanent and temporary erosion control, etc.

$$A = P\left[\frac{i(1+i)^n}{(1+i)^n - 1}\right]$$ **Equation A.1**

Where:

A = annual capital cost for n periods at interest rate i
P = present value of the capital cost of construction (estimated by project team)
i= interest rate (nominal Treasury rate, for example)
n = number of years (design service life)

The design service life for culverts is defined in Chapter 2 of the 2024 MnDOT Drainage Manual. The design service life for bridges is defined in MnDOT Memo to Designers #2022-01: MnDOT Service Life Design Guide for Bridges, which is included in Appendix A of the MnDOT LRFD Bridge Design Manual.

ANNUAL TRAFFIC RISK COST

The daily user cost of a roadway closure can be calculated using Equation A.2 below.

$$Daily\ User\ Cost = [V_c(\Delta hrs)(a_{hc}) + V_c(\Delta miles)(a_{mc})] + [V_t(\Delta hrs)(a_{ht}) + V_t(\Delta miles)(a_{mt})] \quad \textbf{Equation A.2}$$

Where:

Daily User Cost = Incremental daily costs associated with a detour due to flooding or other road closure
V_c = Annual average daily volume of passenger cars (current value)
V_t = Annual average daily volume of heavy commercial trucks (current value)
a_{hc} = Hourly value of travel time for passenger car users (drivers and passengers)
a_{ht} = Hourly value of travel time for heavy commercial trucks
a_{mc} = Per-mile variable cost for passenger cars
a_{mt} = Per-mile variable cost for heavy commercial trucks
Δhrs = Incremental travel time (in hours) associated with a detour route relative to regular routing (estimated by project team)
Δmiles = Incremental mileage associated with a detour route relative to regular routing (estimated by project team)

Where traffic congestion is not an issue, time can be estimated from the basic relationship between speed and distance. Most detours will require additional travel time per user which amounts to a fraction of an hour and thus can be entered directly into the equation above.

Travel time on the regular and detour routes can be estimated based on posted speed limits on each route using equation A.3 below.

$$Time(hr) = \left(\frac{Segment\ Length}{PSL}\right) \quad \textbf{Equation A.3}$$

Where:

PSL = the posted speed limit on each route expressed in miles per hour.

If the route contains multiple segments with varying speed limits, a composite or weighted speed can be calculated using segment lengths or volumes as the weighting metric.

Other methods may also be used to estimate travel time, such as direction applications from various online search engines (e.g., Google).

Standard values for the parameters used in user cost estimates are available from Appendix A of MnDOT's guidance on Cost-Effectiveness and Benefit-Cost Analysis for Transportation Projects (see link here). It is also necessary to have an estimate of vehicle occupancy in order to generate estimates of time-related costs. The per-hour values for users are estimates of per-person costs, and so vehicle volumes for passenger cars must be multiplied by an average occupancy factor in order to assess per-person time costs. Standard values for Minnesota from large, representative travel behavior surveys such as the 2017 National Household Travel Survey have been reported as 1.67 for all passenger car trips. No adjustment is needed for heavy commercial truck traffic, as occupancy levels are assumed to be one.

Estimates of traffic volumes for heavy trucks and for all vehicles can be found on MnDOT's Traffic Mapping Application, available at this site. The Heavy Commercial Annual Average Daily Traffic (HCAADT) is part of the Annual Average Daily Traffic (AADT) provided on MnDOT's Traffic Mapping Application, so the HCAADT must be subtracted from the AADT to obtain the annual average daily volume of passenger cars used in Equation A.2. Equation A.4 shows how the annual average daily volume of passenger cars (V_c) can be calculated.

$$V_c = AADT - HCAADT \qquad \textbf{Equation A.4}$$

When applying Equation A.2 and A.4 to answer question 2d in the Risk Assessment form, the present values of the AADT and HCAADT should be used to conform to the present value cost computation; projected future values should not be used.

The estimates of variable costs for passenger cars and heavy commercial trucks are inclusive of external pollution-related costs for carbon dioxide emissions as well as emissions of EPA criteria pollutants. These external costs are added to the private variable costs of vehicle operation.

From Equation A.2, the daily user cost associated with a roadway closure is obtained. The annual traffic risk cost is then calculated using Equation A.5 below.

$$Annual\ Traffic\ Risk\ Cost = Daily\ User\ Cost \times Flood\ Duration \times Annual\ Probability\ of\ Overtopping\ Flood \qquad \textbf{Equation A.5}$$

Where:

Daily User Cost is obtained from Equation A.2
Flood Duration (in days) is estimated by designer and refers to the mean or median duration of a flood event at the project location.
Annual Probability of Overtopping Flood = 1 ÷ Overtopping Flood Frequency

The final step in answering question 2d in the "Traffic Related Losses" section of the risk assessment is to compare the annual traffic risk cost (Equation A.5) to the annual capital cost (Equation A.1). This comparison is conducted using Equation A.6:

$$Cost\ Comparison(\%) = \left(\frac{Annual\ Traffic\ Risk\ Cost}{Annual\ Capital\ Cost} \right) \times 100$$ **Equation A.6**

EXAMPLE CALCULATION FOR QUESTION 2d UNDER "TRAFFIC RELATED LOSSES"

Example calculation for:

i = 5%
P = $1,250,000
n = 75 years
AADT = 10,000
V_t = HCAADT = 1,100
a_{hc} = $23.90
a_{ht} = $37.60
a_{mc} = $0.35
a_{mt} = $1.02
Δ_{hrs} = 0.25 hours
Δ_{miles} = 12 miles
Flood Duration = 3 days
Overtopping Flood = 100-yr flood

First calculate the annual capital cost using Equation A.1:

$$A = \$1{,}250{,}000 \left[\frac{0.05(1+0.05)^{75}}{(1+0.05)^{75}-1} \right] = \$64{,}152$$

Next calculate the annual average daily volume of passenger cars using Equation A.4:

$$V_c = 10{,}000 - 1{,}100 = 8{,}900$$

Next calculate the daily user cost using Equation A.2 with an assumed passenger car occupancy rate of 1.67:

$$Daily\ User\ Cost = [8{,}900(0.25)(\$23.90)(1.67) + 8{,}900(12)(\$0.35)] + [1{,}100(0.25)(\$37.60)(1.67) + 1{,}100(12)(\$1.02)] = \$149{,}990$$

Next calculate the annual traffic risk cost using Equation A.5:

$$Annual\ Traffic\ Risk\ Cost = \$149{,}990 \times 3 \times (1 \div 100) = \$4{,}499.71$$

To answer question 2d in the “Traffic Related Losses” section of the risk assessment, compare the annual capital cost to the annual traffic risk cost using Equation A.6:

$$Cost\ Comparison(\%) = \left(\frac{\$4{,}499.71}{\$64{,}152}\right) \times 100 = 7.0\%$$

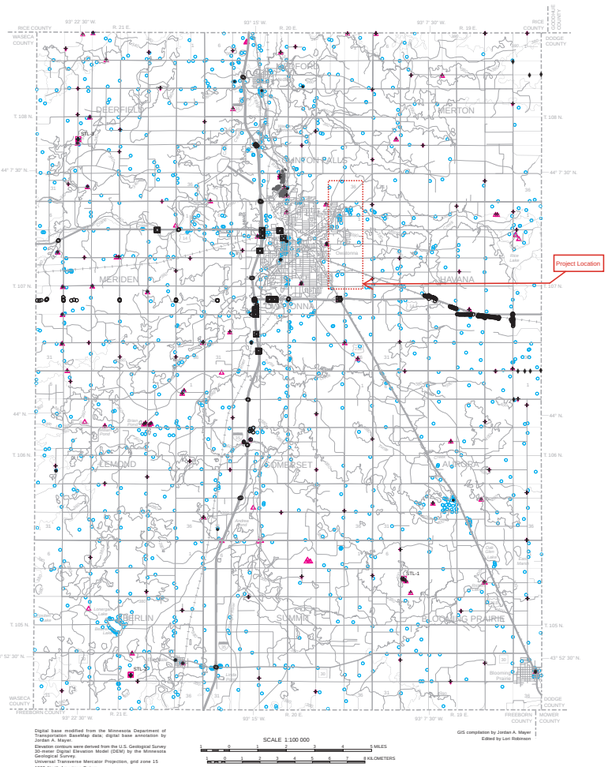
Since the annual traffic risk cost is less than 10% of the annual capital cost, a √ should not be placed in the “Consider Redesign” column for question 2d under “Traffic Related Impacts”.

Attachment E – Geology Documentation

UNIVERSITY OF MINNESOTA
MINNESOTA GEOLOGICAL SURVEY
Harvey Thorleifson, Director

Prepared and Published with the Support of
THE STEELE COUNTY BOARD OF COMMISSIONERS AND
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AS RECOMMENDED BY THE LEGISLATIVE-CITIZEN COMMISSION ON MINNESOTA RESOURCES

COUNTY ATLAS SERIES
ATLAS C-53, PART A
Steele County
Plate 1—Database Map



Digital base modified from the Minnesota Department of Transportation Baselibrary data; digital base annotation by Jordan A. Mayer.
Elevation contours were derived from the U.S. Geological Survey 30-meter Digital Elevation Model (DEM) by the Minnesota Geological Survey.
Universal Transverse Mercator Projection, grid zone 15
1983 North American Datum

SCALE 1:100 000
MILES
KILOMETERS
CONTOUR INTERVAL 20 METERS

GIS compilation by Jordan A. Mayer
Edited by Lori Robinson


LOCATION DIAGRAM

MAP SYMBOLS

- Record of water-well construction (well driller's log)
- Rotary-sonic core sample
- Diamond drill core sample
- Soil boring
- Cutting sample
- Borehole geophysical log
- Giddings probe hole
- Field site
- Textural analysis
- Passive seismic sounding
- Bedrock outcrop

Note: More than one symbol can occur at the same location.



INDEX TO 7.5-MINUTE QUADRANGLES

DATABASE MAP

By

Jordan A. Mayer and Margeurite C. Bradley

2022

INTRODUCTION

The public health and economic development of Steele County are directly dependent on the wise use and management of its land and water resources. Geologic and hydrologic information are essential before decisions are made that affect natural resources. Although the amount of geologic information required for making specific decisions can vary, the information will not be used if it is unavailable when needed, or if it is available only in a highly technical form, or scattered in many different maps and reports. The databases described here address this need.

County Geologic Atlases, prepared jointly by the Minnesota Geological Survey and the Minnesota Department of Natural Resources, present detailed geologic and hydrologic information in an interpretive as well as descriptive form. Maps and texts summarize basic geologic and hydrologic conditions at a county scale, and interpret these conditions in terms of the impacts of possible land- and water-use decisions.

Several sources commonly provide information about an area or an individual property, but they may use different classification schemes to describe the same geologic materials. As a result, discrepancies in data interpretation may arise or the different sources may appear to contradict each other. For example, water-well drillers may describe glacial till as "clay," but engineering records will describe it as "clayey sand." Both descriptions are acceptable for their original purpose of describing the physical attributes of the material. "Clay," the term used by well drillers, defines the general inability of the till to yield groundwater to a well. "Clayey sand," the term from the engineering record, defines the physical composition of the till relative to particle size and engineering properties. The geologist must take the analysis one step further and define the material in terms of how it formed rather than how it is to be used. In this example, till consists of an unsorted mixture of rock fragments ranging in size from clay to cobbles and boulders, and it is interpreted by the geologist to have been deposited directly by glacial ice. Understanding the process by which the material formed allows geologists to make predictions about what lies between and beyond data points.

All the types of data described on this plate were interpreted by geologists or hydrogeologists to make them meaningful for mapping purposes. The 1:100,000 scale of the maps in this atlas was chosen because it shows the geologic and topical studies of the county while keeping the physical size of each plate to a manageable level. As a result, some detailed information that was gained by data interpretation and mapping cannot be shown on these maps or discussed in the texts. Some of this information is available in digital files that accompany the atlas.

Whether to use the atlas alone, or in combination with the databases, depends on the amount of detail needed. Generally, database information must be used to evaluate site-specific conditions.

THE DATABASE MAP

The types, locations, and density of information used to prepare the Steele County atlas are shown on this map. The data are described here to aid the user in assessing what types may be useful for a particular information need. The Database Map serves as a guide to the precision of the other maps in the atlas. It shows where data are sparse or lacking and interpretation and extrapolation were required to prepare the maps.

DRILL-HOLE INFORMATION

A **record of water-well construction (well driller's log)** is a water-well contractor's description of the geologic materials penetrated during drilling and the construction materials used to complete the well. Hydrologic data, such as the static water level and test-pumping results, are commonly included. Before any driller's log can be used, the location of the well must be verified, and a geologist must interpret the log. Driller's logs are the primary source of subsurface geologic and hydrologic data for Steele County; about 1,300 logs were used for this atlas.

Diamond drill and rotary-sonic core samples were collected at various sites throughout Steele County as a means to establish the nature of the subsurface material. Bedrock core is most commonly collected using a diamond bit rotating at the end of a drill rod. A column of rock moves up the drill pipe and is recovered at the surface for study. Diamond drill core exists for 25 sites in Steele County. This method was used by the Minnesota Department of Transportation when they upgraded and expanded Steele County's highways and bridges. Rotary-sonic cores were collected by the Minnesota Geological Survey for this project from three sites in the county (labeled STL-1 through STL-3) to aid the interpretation of the Quaternary deposits and to determine bedrock depth and nature. The coring technique enables recovery of a continuous core, 3.5 inches (8.9 centimeters) in diameter, from glacial deposits and bedrock (where intersected). It provides excellent subsurface samples for detailed study and comparison with cuttings, geophysical logs, and driller's logs from surrounding sites. Detailed geologic's logs for the rotary-sonic cores are shown on Plate 4, *Quaternary Stratigraphy*. These detailed logs were entered into the County Well Index (CWI) and are available in Minnesota Geological Survey file data. The core is available for inspection at the Minnesota Department of Natural Resources Drill Core Library in Hibbing (the state repository for bedrock and earthen material core samples collected during exploration, engineering, and geoscience research programs across Minnesota).

Soil borings are test holes drilled to obtain information about the physical properties of subsurface materials for engineering, mapping, or exploration purposes. They are logged by an engineer or a geologist using a variety of classification schemes based on particle sizes, penetration rate, moisture content, and color. Soil-boring data were collected by the Minnesota Department of Transportation and are concentrated along major roadways including Interstate 35 and U.S. Highway 14. Descriptions of the geologic materials penetrated are interpreted by Minnesota Geological Survey geologists for mapping purposes. These descriptions and interpretations can be found in the data package associated with this atlas. Soil-boring data can be found at the Minnesota Department of Transportation's online portal for soil borings (https://www.dot.state.mn.us/materials/foundations.html).

Cutting-samples collected during drilling provide physical evidence of subsurface geologic materials. Cuttings are the samples generated as the drill bit cuts through the subsurface material and are used to interpret and verify driller's logs. They are logged and stored at the Minnesota Geological Survey; descriptions are available upon request.

Borehole geophysical logs are collected by Minnesota Geological Survey staff, other government agencies, or private entities by lowering instruments down a well or drill hole and measuring the physical and chemical properties of the geologic materials through which the hole passes. Different logging techniques measure naturally occurring gamma radiation, spontaneous potential, and resistivity. Gamma logs characterize in graphic form the geologic formations penetrated. Spontaneous potential and resistivity are mainly used to locate water levels in wells and the depth of the well casing. An interpretive log is prepared by a geologist from the geophysical log and correlated with drilling samples from the same hole; information obtained from nearby outcrops, or a geophysical log from a nearby drill hole. Geophysical logs can provide high-quality subsurface geologic and hydrologic information for wells that have little or no other information available. Information and interpretations from the geophysical logs are entered into the County Well Index. Logs can be viewed at the Minnesota Geological Survey or accessed online (http://a.mnn.edu/borehole_gov).

Giddings probe holes are borings of glacial materials, 2 inches (5.1 centimeters) in diameter, collected by Minnesota Geological Survey staff using a truck mounted hydraulic auger. A description was generated at every site and samples were taken for textural analyses at most locations. Samples were generally taken about every 5 feet (1.5 meters), at unit contacts, or where the geologist believed it was important. The information from these holes can be found within the digital file data provided with this atlas.

OTHER INFORMATION

Field sites are natural and artificial exposures of unconsolidated Quaternary deposits that were described by Minnesota Geological Survey staff in detail; samples from many sites were texturally analyzed. Field sites include stream and river cuts, gravel pits, excavations, and road cuts. Information and descriptions of these sites can be found within the digital file data provided with this atlas.

Textural analyses express the proportion of sand-, silt-, and clay sized particles that make up a sample. The samples analyzed were taken from natural and artificial exposures, Giddings holes, and the rotary-sonic cores. They are helpful in determining the origin, correlation, and hydrologic properties of unconsolidated sediments. Textural-analysis data can be found within the digital file data provided with this atlas.

Passive seismic soundings provide information based on measurement and analysis of ambient shear- and surface-wave energy in the ground that allow a calculation of the depth to bedrock (thickness of unconsolidated deposits) beneath that point. The measurements employ a recording seismograph system that is implanted into the ground surface and records ambient ground vibrations in three orthogonal directions (two horizontal and one vertical) during a 16-minute interval. The method is called passive because no energy is directly input into the ground at the time of measurement, such as is the case for conventional seismic sounding. Instead, the unit measures background vibrations from a variety of natural and artificial sources that include wind, machinery, and traffic. The averaged horizontal spectra of the seismic noise is divided by the corresponding vertical spectrum, and the resulting Horizontal to Vertical Spectral Ratio (HVSR) should display a prominent peak that closely approximates the resonant frequency (shear wave) of the unconsolidated sequence overlying the bedrock surface (Chandler and Lively, 2014). In general, depth to bedrock calculated by this method can have errors up to 25 percent of the depth; however, in areas with little to no other data, this is still useful information and many soundings can be inexpensively collected over a short period of time with one or two operators. Ten passive seismic stations were acquired in Steele County as part of this Geologic Atlas. These data can be found in the data package associated with this atlas.

Bedrock outcrops are exposures of solid rock at the land surface. Most are natural outcrops; however, some may be exposures created during construction or quarry operations. They serve as reference points for mapping and for checking the accuracy of subsurface data. Bedrock at or near the surface must be considered in land-use planning decisions such as pipeline routing, sewage-system design, and excavation. The few bedrock outcrops in Steele County are concentrated along the Straight River, just east of the Owatonna airport.

DATABASE MANAGEMENT

All of the data shown on the map were plotted on maps at 1:24,000 or finer resolution and assigned inventory numbers. Included with the Steele County Atlas are regularly updated databases containing digital GIS files, developed to provide easy access and rapid retrieval of these site-specific data.

Computer storage and retrieval systems are ideal for manipulating large amounts of data because automated geologic databases can be designed to interact with other computer files, such as land-use data. Such interaction permits more efficient assessment of cause-and-effect relationships concerning natural resources than is commonly possible with manual files.

DIGITAL DATABASES

Computerized files were developed for point-source data such as wells and borings in Steele County. They use Public Land Survey descriptions, Universal Transverse Mercator (UTM), and latitude-longitude coordinates as location criteria; thus, they are compatible with the natural-resource databases housed at the Minnesota Land Management Information Center (LMIC). The computerized database developed for Steele County by the Minnesota Geological Survey is the County Well Index (CWI).

County Well Index (CWI)—Information from water-well records and other subsurface drill-hole data, such as exploration holes, is entered into this statewide database. Each well log is assigned a six-digit unique number and each exploration drill hole is assigned either a five- or six-digit unique number. These reference numbers are also used by state agencies and the Water Resources Division of the U.S. Geological Survey. Elevations are expressed in feet above sea level and were determined from either topographic maps (see the index to 7.5-minute quadrangles) or Minnesota's lidar high-resolution elevation dataset. Elevations from the topographic maps are generally accurate to plus or minus 5 feet (1.5 meters) and the lidar elevations are generally accurate to within 3 feet (1 meter). The street address of each well is also included wherever possible to provide data users with a well-location system that is compatible with local regulatory programs. Software at the Minnesota Geological Survey is used to display and tabulate many of the data elements contained on the original well log. The program also denotes if there are additional data, such as borehole geophysical logs, cutting samples, or core, for an individual record.

The County Well Index is stored in a database that consists of 10 related tables. These tables contain information such as well depths, well construction, addresses, aquifers, dates drilled, static water levels, and pumping-test data. They also contain alternate well identifiers such as permit numbers or emergency-service numbers, and the well stratigraphy (the geologic materials encountered during drilling).

CWI application software developed by the Minnesota Department of Health provides two types of reports:

WELL LOG contains all the information about the well as it was reported by the contractor (Fig. 1). There may also be additional location information, land-surface elevation, aquifer designation, and remarks about the drill holes.

WELL STRATIGRAPHY contains the geologic log described by a well driller (Fig. 2). A geologist makes stratigraphic interpretations based on this description, and on her or his knowledge and understanding of the geology of Steele County. The interpretations are augmented in some cases by additional data sources, such as cuttings, borehole geophysical logs, or core. Only those drill holes with verified locations have stratigraphy assigned to them.

Other digital data—Details about other types of data shown on this plate are available in attribute tables for individual GIS shapefiles included in the atlas products. This includes information that is part of the Quaternary Data Index (QDI), an internal working database. The Quaternary Data Index contains information from field sites, rotary-sonic cores, soil borings, Giddings probe holes, soil auger holes, and textural analyses. Some detailed information associated with these data sources is not included in digital files that are part of this atlas. This includes descriptions of cutting samples and borehole geophysical logs. It is stored in various formats and can be obtained by request from the Minnesota Geological Survey.

Soil borings commonly contain detailed information that is not part of the files included in this atlas. The information can be accessed in other digital and paper files from the Minnesota Geological Survey. Additionally, soil-boring data can be obtained from the section of the Minnesota Department of Transportation Foundations Unit's web page (https://www.dot.state.mn.us/materials/foundations.html).

FUTURE DATA COLLECTION

Additional geologic information is generated continuously as new water wells are drilled, construction activities expose more bedrock, or additional wells are tested for water quality. To address this, the library of information prepared for Steele County is flexible so that old data can be reevaluated in light of new information, and new forms of data can be added if required. The need to manage groundwater and other natural resources wisely will never become outdated. Future demands on these resources will require current data to assess the impacts.

ACKNOWLEDGEMENTS

The staff from the Environmental Services and Geographic Information Systems Departments of Steele County contributed greatly to the development of the County Well Index database. We thank local water-well contractors and landowners for their valuable assistance.

REFERENCE

Chandler, V.W., and Lively, R.S., 2014, Evaluation of the horizontal-to-vertical spectral ratio (HVSR) passive seismic method for estimating the thickness of Quaternary deposits in Minnesota and adjacent parts of Wisconsin: Minnesota Geological Survey Open-File Report 14-01.

Unique Well Number: 818297
County: Steele
Quad: Sauc
Quad Id: 53D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 2016/07/13
Update Date 2021/09/25
Received Date 2016/09/13

Well Name: DNR OB 74004
Township: 107 N
Range: 20 W
Dir: —
Section: 29
Subsection: DCDCDA
Field Located Elevation: MNDNR 1071.80 ft.
Well Depth: 550.00 ft.
Depth Completed: 550.00 ft.
Date Well Completed: 2016/05/02

contact address: 21371 15 SH S
NEW ULM MN 56073
MN DNR

Drilling Method: Dual Rotary
Drilling Fluid: Water
Well Hydrofractured? No
Use: observation well

Casing: Type Steel (black or galvanized); Diameter 4 in.; Drive Shoe? No; Depth 4ft; from 0.00 to 10.00 ft.; to 135.00 ft. at 40.48 lbs/ft; from 10.00 to 4.00 ft.; to 440.00 ft. at 10.79 lbs/ft
Note Diameter (in.): 10.00 to 550.0

Screw: No
Open Hole(ft.): From 440.0 To 550.0
Make
Diameter
Slot
Length
Set
Type

Static Water Level: 181.00 ft. land surface; Date measured: 2016/05/02

Pumping Level (below land surface): 183.00 ft. after 1.00 hrs. pumping 10.00 G.P.M.

Wellhead Completion
Pitless adapter manufacturer
Model
Casing Protection: 12 in. above grade
At-grade (Environmental Wells and Borings ONLY)
Reconned offset
Grouting Information: Well grouted? Yes; Not Specified
Material: other; From ft.; To 440.0 ft.; 15.00 Cubic yards
Material: driven casing seal; From ft.; To 135.0 ft.; 3.00 Sacks

Nearest Known Source of Contamination
1000 feet; 90 Direction; BOW Type
Well disinfected upon completion? Yes; No

Pump: Not Installed; Date Installed
Manufacturer's Name
Model number; HP; Volts
Length of drop pipe; Material; Capacity; g.p.m.
Type

Abandoned Wells: Does property have any not in use and not sealed well(s)? Yes; No

Variance: Was a variance granted from the MDH for this well? Yes; No

Well Contractor Certication: Mark J Trad Wells, Inc. 1404

License Business Name: SEE REMARKS
Lic. or Reg No.

Remarks: GROUT MATERIAL: PORTLAND. DRILLERS: TONY TRAUT & NICK ANDERSON. INTERPRETATION BASED ON NEARBY GAMMA LOG.

First Bedrock: OGSV
Last Strat: QPDC
Aquifer: Prairie Du Chien Group
Depth to Bedrock: 10.00 ft.

Description	Color	Hardness	From	To (ft.)
CLAY	BROWN	SOFT	0	5
CLAY & GRAVEL	BROWN	SOFT	5	30
CLAY & GRAVEL	GRAY	SOFT	30	34
CLAY	GRAY	SOFT	34	42
SAND	GRAY	SOFT	42	52
COARSE SAND & ROCKS	GRAY	SOFT	52	55
COARSE SAND	YELLBRN	SOFT	55	57
COARSE SAND & GRAVEL	YELLOW	SOFT	57	65
CLAY & GRAVEL	WHTYEL	SOFT	65	70
COARSE SAND & GRAVEL	YELLOW	SOFT	70	76
LIMESTONE (broken & fractured)	TAN	HARD	76	107
LIMESTONE (broken & fractured)	TAN		107	135
LIMESTONE	TAN	HARD	135	155
LIMESTONE	TAN	HARD	155	185
SHALE	GREEN	SOFT	185	223
SHALE	GREEN	SOFT	223	280
LIMESTONE	GRYBRN	HARD	280	285
LIMESTONE	GRYBRN	HARD	285	298
LIMESTONE	GRYBRN	HARD	298	305
SANDSTONE	GRAY	MEDIUM	305	307
SANDSTONE	GRAY	MEDIUM	307	406
SANDSTONE	GRAY	MEDIUM	406	412
LIMESTONE	BROWN	HARD	412	415
LIMESTONE	BRNGRY	HARD	415	550

REPORT — Printed on 8/25/2021

Name of Driller
Date

Figure 1. Example of a WELL LOG record, showing all the information about the well as reported by the well driller.

Unique Well Number: 818297
County: Steele
Quad: Sauc
Quad Id: 53D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 2016/07/13
Update Date 2021/09/25
Received Date 2016/09/13

Well Name: DNR OB 74004
Township: 107
Range: 20
Dir: W
Section: 29
Subsection: DCDCDA
Depth Drilled: 550 ft.
Depth Completed: 550 ft.
Date Completed: 2016/05/02
Lic/Reg. No.: 1404
Driller Name: SEE REMARKS

Elevation: 1071.80 ft.
Method: Surveyed
Aquifer: Prairie Du Chien Group
Depth to Bedrock: 10 ft.
Open Hole: 440-550
SWL: 181

Field Located Property: Mn Department of Natural Resources
Mn Well Index Map Id:
Geologic Interpretation: Andrew Retzler
Location Method: Universal Transverse Mercator(UTM) - NAD83 - Zone 15 - Meters
Input Source: Minnesota Geological Survey
Input Date: 2016/10/05
Agency: MGS
UTM Easting (X): 479768
UTM Northing (Y): 4878044
Interpretation Method: Geologic study 1:24k to 1:100k

Geological Material	Color	Hardness	DEPTH From	DEPTH To	Thick	ELEVATION From	ELEVATION To	Stratigraphy	LITHOLOGY Primary	LITHOLOGY Secondary	LITHOLOGY Minor
CLAY	BROWN	SOFT	0	5	5	1071.8	1066.8	clay-brown	clay		
CLAY & GRAVEL	BROWN	SOFT	5	30	25	1066.8	1041.8	pebbly sand/clst/clay-brown	clay	gravel	
CLAY & GRAVEL	GRAY	SOFT	30	34	4	1041.8	1037.8	pebbly sand/clst/clay-gray	clay	gravel	
CLAY	GRAY	SOFT	34	42	8	1037.8	1029.8	clay-gray	clay		
SAND	GRAY	SOFT	42	52	10	1029.8	1019.8	sand-gray	sand		
COARSE SAND & ROCKS	GRAY	SOFT	52	55	3	1019.8	1016.8	sand -/larger-gray	sand	cobble	
COARSE SAND	YELBRN	SOFT	55	57	2	1016.8	1014.8	sand	sand		
COARSE SAND & GRAVEL	YELLOW	SOFT	57	65	8	1014.8	1006.8	sand -/larger-yellow	sand	gravel	
CLAY & GRAVEL	WHTYEL	SOFT	65	70	5	1006.8	1001.8	pebbly sand/clst/clay	clay	gravel	
COARSE SAND & GRAVEL	YELLOW	SOFT	70	76	6	1001.8	995.8	Galena/Stewartville Fm	dolomite	limestone	shale
LIMESTONE (BROKEN & FRACTURED)	TAN	HARD	76	107	31	995.8	964.8	Galena/Prosser Fm	dolomite	limestone	shale
LIMESTONE (BROKEN & FRACTURED)	TAN		107	135	28	964.8	936.8	Galena/Prosser Fm	limestone	dolomite	
LIMESTONE	TAN	HARD	135	155	20	936.8	916.8	Galena/Prosser Fm	limestone	dolomite	
LIMESTONE	TAN	HARD	155	185	30	916.8	886.8	Galena/Prosser Fm	limestone	dolomite	
SHALE	GREEN	SOFT	185	223	38	886.8	848.8	Galena/Prosser Fm	limestone	dolomite	
SHALE	GREEN	SOFT	223	280	57	848.8	791.8	Decorah Shale	shale		
LIMESTONE	GRYBRN	HARD	280	285	5	791.8	786.8	Decorah Shale	shale		
LIMESTONE	GRYBRN	HARD	285	298	13	786.8	773.8	Platteville Formation	limestone		
LIMESTONE	GRYBRN	HARD	298	305	9	773.8	764.8	Glenwood Formation	shale		
SANDSTONE	GRAY	MEDIUM	305	307	2	764.8	762.8	Glenwood Formation	shale		
SANDSTONE	GRAY	MEDIUM	307	406	99	762.8	663.8	St Peter Sandstone	sandstone		
SANDSTONE	GRAY	MEDIUM	406	412	6	663.8	657.8	Prairie Du Chien Group	dolomite		
LIMESTONE	BROWN	HARD	412	415	3	657.8	654.8	Prairie Du Chien Group	dolomite		
LIMESTONE	BRNGRY	HARD	415	550	135	654.8	521.8	Prairie Du Chien Group	dolomite		

Figure 2. Example of a WELL STRATIGRAPHY record, which contains a geologist's interpretation of the geologic materials listed by the driller in the WELL LOG record (Fig. 1). Additional downhole information for this well and nearby wells (in this case a nearby geophysical log) controls the geologist's interpretation, which may not match the driller's description of the geologic material penetrated.

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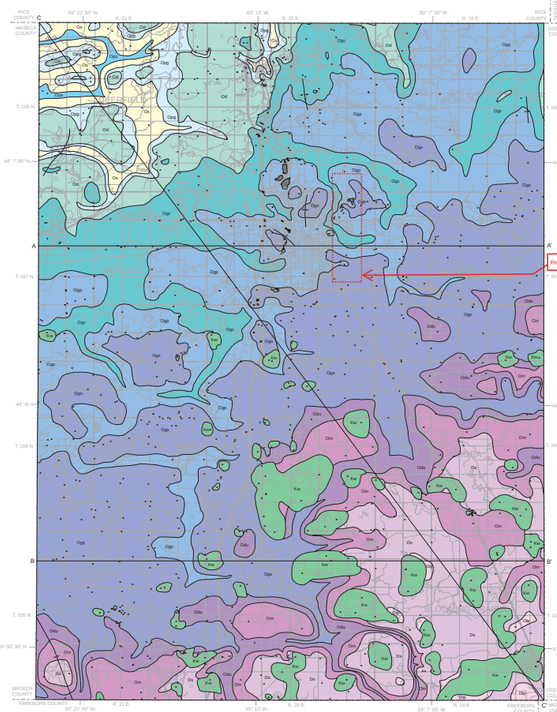
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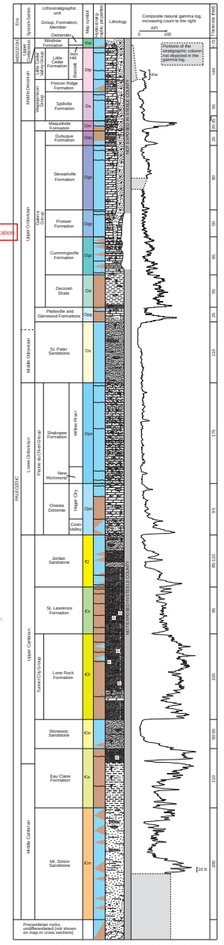
Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based; however, the Minnesota Geological Survey does not warrant or guarantee that there are no errors. Users may wish to verify critical information; sources include both the references listed here and information on file at the offices of the Minnesota Geological Survey in St. Paul. In addition, this publication is the result of the interpretation of data from various geologic and cartographic principles. No claim is made that the interpretation shown is rigorously correct; however, and it should not be used to guide engineering-scale decisions without site-specific verification.

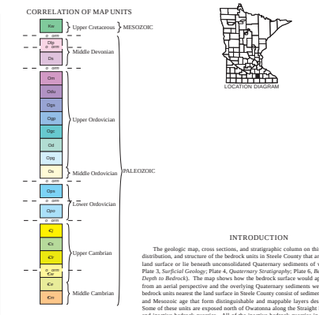
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COUNTY ATLAS SERIES
ATLAS C-53, PART A
Steele County
Plate 2—Bedrock Geology







BEDROCK GEOLOGY

By

Andrew J. Retzler

2022

INTRODUCTION

The geologic map, cross sections, and stratigraphic column on this plate depict the type, distribution, and structure of the bedrock units in Steele County that are either exposed at the land surface or lie beneath unconsolidated Quaternary sediments of variable thickness (see Plate 3, *Surficial Geology*; Plate 4, *Quaternary Stratigraphy*; Plate 6, *Bedrock Topography and Depth to Bedrock*). The map shows how the bedrock surface would appear if it were viewed from an aerial perspective and the overlying Quaternary sediments were stripped away. The bedrock units nearest the land surface in Steele County consist of sedimentary rocks of Paleozoic and Mesozoic age that form distinguishable and mappable layers designated as formations. Some of these units are exposed north of Owatonna along the Straight River, mainly in active and inactive bedrock quarries. All of the inactive bedrock quarries in this area are presently flooded. Several of the Paleozoic bedrock formations are major reservoirs for water supply in the country, while others closer to the surface provide aggregate and crushed stone materials.

Characteristics of each formation are given in the stratigraphic column (Fig. 1) and in the description of map units. The accompanying bedrock geologic cross sections add the dimension of depth and illustrate the stratigraphic, structural, and topographic relationships of the bedrock units, as well as the variable thickness of the overlying Quaternary sediments. Projected onto these cross sections are the locations and approximate depths drilled (shown as vertical lines) from available water-well data in the County Well Index (CWI) database within a 1,640-foot (0.5-kilometer) buffered area adjacent to each line of cross section. Surfaces representing the elevation of the tops of the mapped formations are also available as Digital Elevation Models (DEMs) for use in GIS programs. The geologic formations are thin in relation to their aerial extent, and would only be one-tenth as thick as shown on the cross sections if no vertical exaggeration were used. The exaggeration necessary to show the thin rock formations gives the appearance of steeper slopes on bedrock unit contacts, the land surface, and bedrock topography. Only two of the units shown as first bedrock on this plate are exposed at the land surface, the Prosser Formation and underlying Cummingsville Formation; elsewhere the bedrock is covered by as much as 295 feet (89.9 meters) of Quaternary unconsolidated sediment (see Plate 6).

Production of the map and associated products relied on several data sources, including outcrops, water-well and other drilling records from the County Well Index database, soil and engineering test borings from the Quaternary Data Index (QDI) database, rock core, drill cuttings samples, borehole geophysical logs, and previously published geologic maps of adjacent counties (Mossler, 1995, 1998; Runkel, 1998; Tipping and others, 2007; Retzler, 2019; Steenberg, 2020). Figure 2 highlights some of the bedrock outcrops and rock-core samples examined during this project. This map supersedes a combined 1:100,000-scale bedrock geology map of Steele, Dodge, Olmsted, and Winona Counties (Tipping and others, 2007). Significant improvements and modifications were made to the interpretations of the previous map based on additional water-well records, drill cuttings, rotary-sonic drill core, and borehole geophysical logs. These improvements include generating model-ready top and bottom bedrock-surface DEMs for all of the bedrock units in Steele County down to the Mt. Simon Sandstone, better definition of the thicknesses and extents of the Galena Group formations (particularly the Stewartville and Prosser Formations), better understanding of the lithologic and facies trends of the Dubuque and Maquoketa Formations, and improved delineation and characterization of the patchy Mesozoic (Upper Cretaceous) Windrow Formation. Bedrock structure was also mapped in greater detail, revealing a number of local folds superimposed on the regional dip of these strata. Collectively this provides significantly improved depiction of the subsurface geologic characteristics, including hydrogeologic units, which has implications for modeling groundwater flow and contaminant transport.

The various data sources and their irregular distribution and density can be seen on the map and Plate 1, *Database Map*. The spatial distribution and coverage of these data should be considered when assessing the reliability of the map at any particular location. Areas with a high density of bedrock control points (outcrops and boreholes) are more likely to have an accurate interpretation of the bedrock geology, whereas areas with widely spaced control points may be less reliable. The bedrock surface DEMs supplementing this map were interpolated using the Esri ArcMap Topo to Raster tool and similarly inherit these biases in the data. Furthermore, the accuracy of the DEMs is dependent upon the contour interval used when mapping the topographic surface of each unit and the errors inherited in the Topo to Raster interpolation method. For this map, the bedrock-surface DEMs on average are accurate to within ± 32.5 feet (± 3.81 meters). Significant efforts were made to ensure the accuracy of the bedrock surfaces; however, users should always refer to and consider the two-dimensional geologic map because it represents the most accurate and reliable representation of uppermost bedrock across the county.

During production of this map, 1,359 located water-well records and 358 located engineering test and geddings soil probe borings existed within Steele County in the County Well Index and the Quaternary Data Index databases, respectively. Of those, 1,027 reached Mesozoic and/or Paleozoic bedrock. Geologic interpretations of subsurface material were made by the author based on material descriptions by drillers or the analysis of other geologic data sources (such as drill cuttings, core samples, and geophysical data).

In Steele County, Paleozoic and Mesozoic bedrock lies on top of Mesoproterozoic rocks of the Keweenawan Supergroup associated with the Midcontinent rift (Jirsa and others, 2012). These rocks include sandstone, siltstone, and shale of the Hinckley Sandstone and Solor Church and Fond du Lac Formations (Jirsa and others, 2012). The distribution, depth, and thickness of these Mesoproterozoic rocks is poorly constrained in this region due to their deep burial and limited subsurface data. Bounding the Midcontinent rift on either side in Steele County are two deeply buried thrust faults inferred by aerial geophysical imagery that offset these rocks: the Belle Plain fault to the southwest and an unnamed fault in the northeast (Jirsa and others, 2012). Both faults strike north-northwest and were presumably inactive during deposition of the overlying Paleozoic and Mesozoic rocks in this area because no data indicate discernible areas of significant, discrete offset within these rocks across Steele County. No new mapping of the Mesoproterozoic units or their associated faults was done for this project.

The Paleozoic rocks of Steele County are characterized by relatively thin, widespread layers of sandstone, shale, and carbonate deposited in shallow seas during the Cambrian, Ordovician, and Devonian Periods of the Paleozoic Era, from about 500 to 375 million years ago. The older Cambrian formations are dominated by siliciclastic sedimentary rock, including sandstone and siltstone with minor shale (such as the Jordan Sandstone and Tunnel City Group). Carbonate rock occurs only as relatively thin layers within these units. Ordovician and Devonian formations, in contrast, are dominated by thicker units of carbonate rock (such as the Prairie du Chien and Galena Group), with the exception of the St. Peter Sandstone and Decorah Shale. Carbonate rock units of the upper Galena Group formations are used as aggregate or crushed stone in one active quarry in Owatonna, where bedrock is within 50 feet (15 meters) or less of the land surface (see Plate 6). Rock quarries are less abundant in Steele County than counties further east (such as Olmsted and Mower Counties) due to the overall widespread presence of thick Quaternary glacial sediments. The deepest bedrock unit penetrated by water wells in Steele County is the Cambrian Mt. Simon Sandstone in Owatonna. However, the majority of water wells in Steele County are much shallower.

The Paleozoic strata of Steele County lie just west of the axial trace of a broad, cratonic depression known as the Hollandale embayment. These stratigraphic layers are typically inclined (less than 1°) southeast as part of the regional structural trend of the embayment. As a result, progressively younger bedrock formations subcrop from northwestern to southeastern Steele County. This general trend is locally interrupted by deep valleys that incise older bedrock formations, and by broad, open fold structures. The stratigraphic top of the St. Peter Sandstone was contoured at 25-foot (7.6-meter) intervals to help constrain the location of structural folds in Steele County and to derive the bedrock-surface DEMs for all other units (above and below the St. Peter Sandstone) mapped in this atlas (Fig. 3). This unit was selected to portray these structures because its upper contact is distinct and easily recognized by water-well drillers. It also provides a fair amount of spatial coverage across Steele County from the water wells that penetrate it, with the exception of the southeastern corner (see Fig. 3). In general, folds were inferred where changes in the elevation of the top of the St. Peter Sandstone indicate a gradual change in slope greater than that of the regional 1° southeast structural trend. The axial trace of most folds in Steele County trend north-northwest, or roughly perpendicular to the regional structural dip of the Paleozoic strata. Faults crosscutting the Paleozoic strata were not identified in Steele County.

The Mesozoic rocks of Steele County are part of the Cretaceous Windrow Formation, which is dominated by variably thick, patchy, and poorly cemented siliciclastic sediments. The Windrow Formation lies unconformably atop the Ordovician and Devonian carbonate rock units of the Paleozoic Era. It was deposited on the exposed Paleozoic carbonate bedrock across a low, featureless plain within a terrestrial environment during the Cretaceous Period (Mossler, 2000). Some mapped Windrow Formation materials are likely in-place weathering products or residuum of underlying Paleozoic bedrock, but other parts of the formation are derived from sediments deposited in streams and on floodplains. The distribution and thickness of this unit are difficult to constrain without high-quality subsurface information, such as drill cuttings or core. It is commonly overlooked and misinterpreted to be unconsolidated Quaternary glacial sediment in water-well drilling records due to its abundance of poorly consolidated, sub-rounded to sub-angular sand and pebbly sand. For these reasons, the Windrow Formation may have a significantly greater extent than is depicted on the map and in the corresponding cross sections.

HYDROSTRATIGRAPHY

Some of the Paleozoic bedrock formations include aquifers that are a significant source of groundwater for Steele County. About 65 percent of wells in the county draw water from Paleozoic bedrock. This map and associated products, such as the bedrock-surface DEMs, provide a three-dimensional depiction of the rock properties that control flow in these water-bearing layers. Such rock properties are called hydrostratigraphic properties. The hydrostratigraphic classification, shown by brown and blue colors on the hydrostratigraphic properties column of Figure 1, distinguishes layers that are dominated by relatively high-permeability material (nearly transmitting water), versus layers dominated by lower-permeability material (relatively harder to transmit water). This generalized characterization for Steele County is based on hydrogeologic reports by Runkel (1996), Paillet and others (2000), Runkel and others (2003, 2004a, b, 2018), Tipping and others (2006), Luhmann and others (2011), Green and others (2012), and unpublished borehole and core data collected by the Minnesota Geological Survey. The high-permeability layers are potential aquifers, able to yield economic quantities of water in most places. The low-permeability layers are potential aquitards that retard vertical flow, hydraulically separating the aquifer layers from one another in many places, and protecting water resources in the underlying layers from surface contamination. Fractures parallel to bedding that have high permeability are likely to be present in most geologic formations in Steele County, but are placed on the column where the hydrogeologic reports cited above indicate they are most common in the region. Deeper in the subsurface, the hydrogeologic properties of much of the Upper to Middle Cambrian and Mesoproterozoic bedrock units are poorly understood, and these units do not supply water to Steele County, at least in part, because sufficient water resources are available at shallower depths within the unconsolidated Quaternary glacial sediment, St. Peter Sandstone, and fractured Ordovician and Devonian carbonate formations.

In Steele County, most aquifers are layers dominated by relatively coarse-grained sandstone or composed mostly of carbonate rock. The sandstone aquifers, primarily the St. Peter Sandstone, transmit water more easily in both horizontal and vertical directions through the pore spaces between sand grains, as well as through fractures. The carbonate rock aquifers, such as the Galena Group and Prairie du Chien Group, transmit water mostly through a relatively dense network of interconnected fractures and solution cavities. It should also be noted that layers designated as aquifers can locally contain low-permeability strata that serve as small, internal aquitards.

Most layers designated as aquitards in the county have a much lower permeability in the vertical direction than do aquifers. Examples in Steele County include the Decorah Shale and Glenwood Formation, whose rocks are composed mostly of shale with small, poorly connected pore spaces. Carbonate rock containing a relatively sparse network of fractures and/or interbedded with shale, such as the upper Dubuque Formation or the lower part of the Prairie du Chien Group (Oneota Dolomite), are also aquitards. However, layers designated as aquitards with very low permeability in the vertical direction may locally contain horizontal fractures that are conductive enough to yield large quantities of water.

Horizontal and vertical fractures are more common where bedrock layers are at or near the bedrock surface. As a result, aquitards in such conditions are likely to have higher permeability compared with more deeply buried portions of the same formations, and may have a diminished ability to retard water flow to underlying aquifers. There is no precise boundary between shallow and deep conditions of burial, but in most areas of southeastern Minnesota, about 50 feet (15.2 meters) of depth below the bedrock surface is a best approximation (Runkel and others, 2006a, 2018).

In addition to this hydrostratigraphic classification, the Minnesota Department of Natural Resources, as Part B of the Steele County Geologic Atlas, will conduct a thorough hydrogeologic study of the groundwater flow system, aquifer capacity, and aquifer sensitivity that may or may not result in modifications or additions to this classification. Furthermore, designations of aquifers versus aquitards made here may not correspond precisely with those made for regulatory purposes by the Minnesota Department of Health.

DESCRIPTION OF MAP UNITS

MESOZOIC

Kcw Windrow Formation (Upper Cretaceous)—The Windrow Formation unconformably overlies the Devonian and Ordovician carbonate units, from the Bassett Member of the Little Cedar Formation down to the Shakopee Formation/Oneota Dolomite of the Galena Group. It is divided into two members: the Ostrander Member and the underlying Iron Hill Member. The mapped extent of the Windrow Formation as shown on the map and cross sections is approximate and conservative because it is difficult to verify its occurrence without high-quality water-well records, drill cuttings, core samples, and/or borehole geophysical logs. Nineteen feet (5.8 meters) of the Windrow Formation were recovered in rotary-sonic core STL-1 (CWI unique number 341104). Total thickness of the Windrow Formation is variable, ranging from absent to as much as 75 feet (22.9 meters) in Steele County.

Ostrander Member—Yellowish-brown, orange-red, and grayish-white, very friable, fine- to coarse-grained, rounded to sub-angular quartzose sandstone and pebbly chert conglomerate with minor gray to black and orange, thinly-laminated to massive, waxy clay and silty clay (Figs. 2C, D). The sandstone is commonly micaceous and commonly contains thin beds or nodules of pyrite- or iron-cemented sand. Chert pebbles are commonly very well-rounded, and polished. Many contain silicified invertebrate fossil fragments of probable Devonian and Ordovician age. The Ostrander Member may also include paleosols, as indicated by rotary-sonic core STL-1 (CWI unique number 341104). This core contains light gray to white, kaolinitic clay with probable oxidized root traces and siderite nodules, known as sphaerosiderite (Fig. 2C). Sphaerosiderite has also been noted within paleosols of the Cretaceous Dakota Formation in Iowa (Ludvigson and others, 1998). The Ostrander Member commonly overlies the Iron Hill Member, but has also been identified as lying directly atop Paleozoic strata (Mossler, 1998). The thickness of the Ostrander Member is variable, ranging from absent to as much as about 75 feet (22.9 meters) in Steele County.

Iron Hill Member—Green, white, tan, red, orange, and black, pebbly clay and silty clay intermixed with chert fragments, silt, and/or sand that formed as part of a weathering residuum atop weathered Devonian or Ordovician carbonate bedrock. Deposits are commonly heavily cemented and cemented with iron oxides. The Iron Hill Member commonly forms irregular masses devoid of sedimentary structures and has been observed to occur on karst topography as fillings in enlarged joints and sinkholes (Sloan, 1964). The thickness of the Iron Hill Member is variable, ranging from absent to as much as about 10 feet (3.0 meters) in Steele County.

PALEOZOIC

Dlp Bassett Member of the Little Cedar Formation and the Pinicon Ridge Formation, undivided (Middle Devonian)—The Bassett Member of the Little Cedar Formation and the Pinicon Ridge Formation are combined into a single map unit with a full thickness of about 44 feet (13.4 meters) in Steele County. Description of this combined unit is based on a limited number of wells with drill cuttings and borehole geophysical logs.

Bassett Member of the Little Cedar Formation—Light to medium gray, thick-bedded dolostone. Total thickness of the Bassett Member varies between about 40 and 70 feet (12.2 to 21.3 meters; Mossler, 2008). Only about 14 feet (4.3 meters) or less of the Bassett Member are preserved in Steele County.

Pinicon Ridge Formation—Compound reddish-brown, yellowish-gray, silty or sandy dolostone with thin beds of dark gray and olive-gray shale and minor yellowish-gray to brownish-gray, fine- to coarse-grained, quartz sandstone and chert nodules and quarry calcite- and quartz-filled vugs. The upper and lower contacts are gradational and are placed where shale content is greatest. Total thickness of the Pinicon Ridge Formation is about 30 feet (9.1 meters).

Ds Spillville Formation (Middle Devonian)—Finely crystalline, light brown to grayish-orange dolostone with abundant fossil-moldic porosity and dog-tooth, quarry calcite-filled vugs (Fig. 2E). The basal few feet are sandy to silty and may contain minor amounts of shale (Mossler, 1998). Twenty feet (6.1 meters) of the Spillville Formation were recovered in rotary-sonic core STL-1 (CWI unique number 341104). Total thickness of the Spillville Formation is about 55 feet (16.8 meters).

Opm Maquoketa Formation (Upper Ordovician)—Dark gray-brown, silty and sandy dolostone with light olive-gray shale and light gray-white, dolomite-cemented, fine- to coarse-grained, quartzose sandstone with cross-stratification. Sand-sized phosphate grains and some chert grains are abundant throughout. One possible hardground surface with rip-up clasts within a dark gray-brown dolostone bed is present in core near southeastern Steele County drilled for the Dodge County Geologic Atlas (CWI unique number 340102; core DOR-2; Retzler, 2019). The lithology of the Maquoketa Formation in nearby Mower and Olmsted Counties (Mossler, 1998; Retzler, 2019; Steenberg, 2020), particularly in the presence of quartzose sandstone, is different from nearby Mower and Olmsted Counties where the overlying Spillville Formation is unconformable. The total thickness of the Maquoketa Formation can vary between about 20 and 35 feet (6.1 to 10.7 meters). A representative total thickness of 30 feet (9.1 meters) was used in deriving the corresponding DEMs and in representing the Maquoketa Formation in cross section. Additional high-quality drill cuttings, core samples, and natural gamma-ray logs are needed to better constrain and describe the Maquoketa Formation in this area.

Galena Group (Upper Ordovician)

Ogu/Ogl ***Dubuque Formation***—Brown to gray-brown and light gray to yellowish-gray, thin- to medium-bedded limestone and dolostone interbedded with light olive-gray to light gray, calcareous shale (Figs. 2F, G). Parts of the Dubuque Formation are fossiliferous with abundant crinoids and brachiopods and less common bryozoans, trilobites, and bivalves. The Dubuque Formation appears to be more dolomitic and less shaly throughout Steele and Dodge Counties than has been described in areas to the north and northeast (Mossler, 2008; Mossler, 1998; Retzler, 2019; Steenberg, 2020). Eleven feet (3.4 meters) of the Dubuque Formation were recovered in rotary-sonic core STL-2 (CWI unique number 341105). Total thickness of the Dubuque Formation is about 25 feet (7.6 meters).

Ogs ***Stewartville Formation***—Yellowish-gray and white-gray, vuggy dolostone and dolomitic limestone. Bedding is typically medium to thick near the base and thin and crinkly near the top. The Stewartville Formation typically displays a vuggy, coarse-grained crystalline texture compared to the fine-grained, micritic texture more characteristic of the underlying Prosser Limestone, and its beds are commonly highly burrow mottled. The Stewartville Formation is commonly fossiliferous in the lower and upper parts near its contact with the underlying Prosser Formation and overlying Dubuque Formation. Fossils include brachiopods, gastropods, horn corals, crinoids, cephalopods, and receptaculitids, and are commonly preserved as internal or external molds. Thirty-one feet (9.4 meters) of the Stewartville Formation were recovered in rotary-sonic core STL-2 (CWI unique number 341105; Fig. 2H). Total thickness of the Stewartville Formation is about 90 feet (27.4 meters).

Ogp ***Prosser Formation***—Fine-grained, fossiliferous, yellowish-gray to grayish-brown, interminutely silty and sandy limestone and dolomitic limestone. Bedding is typically thin to medium and flaggy, and fracture is not as conchoidal as in this coquina layers. Fossils include brachiopods, gastropods, bivalves, echinoderms, bryozoans, trilobites, horn corals, and cephalopods. The Prosser Formation contains chert nodules and is more micritic than the underlying Cummingsville Formation. The Prosser Formation is exposed in one outcrop along the bank of the Straight River (Fig. 2A) and in one active quarry north of Owatonna (Fig. 2B). In the recent past, it was presumably exposed in several other inactive quarries in this area that have since been flooded. Total thickness of the Prosser Formation is about 50 feet (15.2 meters).

Ogc ***Cummingsville Formation***—Fossiliferous, yellowish-gray to white-gray, silty and sandy limestone interbedded with green-gray, calcareous shale. The limestone is thin- to medium-bedded and commonly contains more silt and sand than the overlying Prosser Formation. Fossils in abundance include bryozoans, crinoids, and brachiopods. Less common are trilobites, horn corals, cephalopods, and gastropods. Chert nodules are locally abundant, particularly in the upper half. The Cummingsville Formation is exposed in one active quarry north of Owatonna (Fig. 2B). In the recent past, it was presumably exposed in several other inactive quarries in this area that have since been flooded. Total thickness of the Cummingsville Formation is about 65 feet (19.8 meters).

Od ***Decorah Shale***—Grayish-green shale containing thin beds of fossiliferous, blue-gray limestone. Fossils in abundance include bryozoans, crinoids, horn corals, and brachiopods. Less common are trilobites, cephalopods, gastropods, and bivalves. Ferruginous ooids of a brassy color are common in the upper half of the Decorah Shale, where they are cemented within thin limestone beds or disseminated throughout the shale. Total thickness of the Decorah Shale is about 55 feet (16.8 meters).

Opg Platteville Formation and Glenwood Formation (Upper Ordovician)—The carbonate rock of the Platteville Formation and underlying shale of the Glenwood Formation are combined as a single map unit with a full thickness of about 25 feet (7.6 meters).

Platteville Formation—Thin- to medium-bedded, tan to gray limestone and dolostone. It is commonly burrow mottled and fossiliferous. It contains fine- to coarse-grained quartz sand and phosphate grains in the lowermost 2 feet (0.6 meter). Two feet (0.6 meter) of the Platteville Formation were recovered in rotary-sonic core STL-2 (CWI unique number 341106). Total thickness of the Platteville Formation is about 15 to 20 feet (4.6 to 6.1 meters).

Glenwood Formation—Grayish-green to brownish-gray, calcareous, sandy, and phosphatic shale. The Glenwood Formation is about 5 to 10 feet (1.5 to 3.0 meters) thick.

Os St. Peter Sandstone (Middle to Upper Ordovician)—White to tan, fine- to medium-grained, friable quartzose sandstone. Bedding and structures are generally absent; however, subtle cross-stratification is rarely present. Iron staining and burrows are commonly present in the uppermost few feet. Total thickness of the St. Peter Sandstone is about 110 feet (33.5 meters).

Prairie du Chien Group (Lower Ordovician)—Dominated by dolostone interlayered with lesser amounts of quartzose sandstone. The Prairie du Chien Group is formally divided into two formations: the Shakopee Formation and underlying Oneota Dolomite. It is commonly difficult to discern the contact between the Shakopee Formation and Oneota Dolomite without high-quality drill cuttings and borehole geophysical logs. Total thickness of the Prairie du Chien Group is about 275 feet (83.8 meters).

Opa ***Shakopee Formation***—The Shakopee Formation is a heterolithic unit composed mostly of tan to gray, thin to medium-bedded dolostone, sandy dolostone, sandstone, and shale. It contains oolites, intraclasts, microbial mounds, chert nodules, quartzose sandstone, and green-gray shale partings. The Shakopee Formation is separated into two members: the Willow River and the underlying New Richmond. The Willow River Member is dominated by dolostone and sandy dolostone with thin quartzose sandstone and minor shale beds. The dolostone and sandy dolostone beds commonly contain oolites, nonolotic texture, and stromatolites. The New Richmond Member is composed of fine- to medium-grained quartzose sandstone, as well as oolitic sandy dolostone. The contact between these members was not confidently discernible using data from currently available water-well records and drill cuttings in Steele County. To the east in Olmsted County, recent mapping indicated that the Willow River Member is generally 120 to 150 feet (36 to 46 meters) thick, and the New Richmond Member reaches thicknesses of 25 feet (7 meters) or less (Steenberg, 2020). Total thickness of the Shakopee Formation is about 175 feet (53.3 meters). The Shakopee Formation is the oldest unit to subcrop in Steele County and is encountered as first bedrock within a buried bedrock valley in the northwest.

Opo ***Oneota Dolomite (shown only on cross sections)***—The Oneota Dolomite is separated into two members: the Hager City and the Coon Valley. The Hager City Member is predominantly a yellowish-gray to light brown, medium- to thick-bedded dolostone that generally lacks sedimentary features, such as oolites and quartz sand, characteristic of the overlying Shakopee Formation. Thickness of the Hager City Member varies from about 65 to 70 feet (19.8 to 21.3 meters). The basal Coon Valley Member is a heterolithic unit composed of thinly bedded dolostone, sandy dolostone, and beds of fine- to coarse-grained, poorly sorted quartzose sandstone. Glauconite and pyrite are also common. The thickness of the Coon Valley Member varies from about 25 to 30 feet (7.6 to 9.1 meters). Total thickness of the Oneota Dolomite is about 95 feet (29.0 meters).

Cj Jordan Sandstone (Upper Cambrian; shown only on cross sections)—Dominantly white to yellow, medium- to coarse-grained, friable quartzose sandstone characterized by coarsening-upward sequences consisting of two interlayered facies: medium- to coarse-grained, cross-stratified, generally friable, quartzose sandstone; and very fine-grained, commonly bioturbated, feldspathic sandstone and lenses of siltstone and shale (Runkel, 1994). The major part of the very fine-grained facies forms a regionally continuous interval that gradationally overlies the St. Lawrence Formation (unit **Cs**), although there are lithologically similar intervals intercalated with the medium- to coarse-grained facies at higher stratigraphic intervals. An unconformity, locally marked by thin beds of quartz pebble conglomerate and silcrete-cemented sandstone clasts (Runkel and others, 2007), separates the Jordan Sandstone from the overlying Oneota Dolomite of the Prairie du Chien Group. Thickness of the Jordan Sandstone ranges from about 85 to 110 feet (25.9 to 33.5 meters). A representative total thickness of 90 feet (27.4 meters) was used in developing the corresponding DEMs and in representing the Jordan Sandstone in cross section.

Cs St. Lawrence Formation (Upper Cambrian; shown only on cross sections)—Light gray to yellowish-gray and pale yellowish-green, dolomitic, feldspathic siltstone with interbedded, very fine-grained sandstone and shale. Lenses and layers of light gray, finely crystalline, sandy dolosiltone occur locally, especially in the lowermost few feet of the formation (Runkel and others, 2006a). Intraclastic beds are present near the top and base of the unit and glauconite is present throughout, but typically more concentrated in the lowermost 30 feet (9.1 meters). The upper contact with the Jordan Sandstone is conformable and gradational, making it difficult to select a precise contact between these formations even with well cuttings and/or borehole geophysical logs. Total thickness of the St. Lawrence Formation is about 85 feet (25.9 meters).

Tunnel City Group (Upper Cambrian; shown only on cross sections)

Ctc ***Lone Rock Formation***—Pale yellowish-green, very fine- to fine-grained glauconitic, feldspathic sandstone and siltstone, with thin, greenish-gray shale partings. Pink and red dolostone beds are present near the base of the formation. The upper contact with the St. Lawrence Formation is conformable and fairly sharp because beds in the Lone Rock Formation are generally coarser-grained and less well-cemented. Total thickness of the Lone Rock Formation is about 150 feet (45.7 meters).

Cw Wonewoc Sandstone (Upper Cambrian; shown only on cross sections)—Fine- to coarse-grained, moderately- to well-sorted, light-gray, cross-stratified, quartzose sandstone. White, brown, and black lingulitform brachiopod shells are locally abundant. The upper part is coarser-grained; the lower part is finer-grained, better sorted, and progressively finer-grained toward its base. The very fine-grained sandstone in the lower part is feldspathic. The Wonewoc Sandstone is conformable with overlying and underlying formations; however, there is a subtle unconformity marked by a pebbly sandstone layer within the formation (Runkel and others, 1998). The Wonewoc Sandstone was formerly referred to as the Ironton-Galesville Sandstone. Thickness of the Wonewoc Sandstone ranges from about 50 to 55 feet (15.2 to 16.8 meters). A representative total thickness of 55 feet (16.8 meters) was used in developing the corresponding DEMs and in representing the Wonewoc Sandstone in cross section.

Ce Eau Claire Formation (Middle to Upper Cambrian; shown only on cross sections)—Yellowish-gray to pale olive-gray, fine- to very fine-grained, feldspathic sandstone, siltstone, and shale. White and brown lingulaform brachiopod shells are common. The contact with the underlying Mt. Simon Sandstone is conformable and transitional, which is commonly apparent on natural gamma-ray logs. Total thickness of the Eau Claire Formation is about 110 feet (33.5 meters).

Cm Mt. Simon Sandstone (Middle Cambrian; shown only on cross sections)—Pale yellowish-brown to grayish-orange-pink to light gray, medium- to coarse-grained, quartzose sandstone. Interbeds of shale, siltstone, and very fine-grained, feldspathic sandstone are common. Fossils are rare in its upper half (Mossler, 1992). Lingulitform brachiopod shells are locally common in the upper one-third of the formation. Thin beds of quartz-pebble conglomerate occur at several stratigraphic positions, and are especially abundant near the base of the formation. The Mt. Simon Sandstone unconformably overlies Mesoproterozoic rocks. One water well partially penetrates the Mt. Simon Sandstone in Steele County, indicating a minimum thickness of 136 feet (41.5 meters). However, limited subsurface data in surrounding counties indicate a total thickness of about 200 feet (61.0 meters; Bloomgren, 1993; Mossler, 1995, 1998; Runkel, 1998; Steenberg, 2020), which was used in developing the corresponding DEMs and in representing the Mt. Simon Sandstone in cross section.

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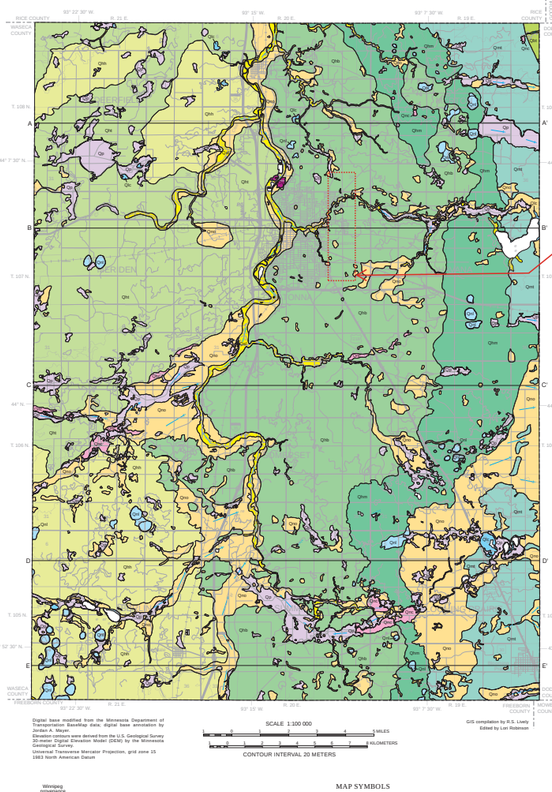
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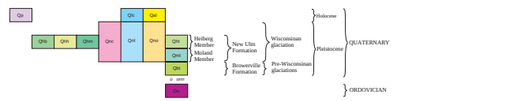
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COUNTY ATLAS SERIES
ATLAS C-53, PART A
Steele County
Plate 3—Surficial Geology





CORRELATION OF MAP UNITS



INTRODUCTION

This map portrays the surface distribution of Quaternary sediments expected to be at or within several meters of the land surface, but below the topsoil in Steele County, Minnesota. Glacial and post-glacial deposits can exceed 300 feet (91 meters) in thickness (see Plate 6, *Depth to Bedrock*). Quaternary sediments are absent in the north-central part of Steele County near Owatonna and Medford, where bedrock is exposed at the land surface in a quarry (unit Oo). The depiction of landform distribution was based on 3.5-foot (1-meter) resolution lidar elevation imagery (available from the Minnesota Geospatial Commons, 2016). This map was compiled from descriptions and samples collected from a variety of natural and artificial exposures including, but not limited to, road cuts, gravel pits, stream cuts, construction sites, and borrow pits. Samples were also collected from soil auger borings and rotary-sonic cores and were systematically characterized on the basis of texture, lithology, color, sorting, consolidation, and matrix carbonate content. In total, 62 soil auger borings were advanced to an average depth of 15 feet (4.6 meters), and three rotary-sonic drill cores were drilled to an average depth of 177 feet (54 meters; see Plate 4, *Quaternary Stratigraphy*). Data from previous mapping in and adjacent to Steele County (see the Index to Previous Mapping) were used to assist with interpretations and delineation of map units. All of the above were supplemented by the soil map of Steele County (Natural Resources Conservation Service, 2016), cuttings from water wells throughout the county, well logs included in the Minnesota County Well Index (CWI) database, and the Quaternary Data Index (QDI), an internal working database at the Minnesota Geological Survey that includes soil and engineering test borings from the Minnesota Department of Transportation (2015).

Surficial map units are distinguished from each other on the basis of texture, provenance, stratigraphic position, geographic location, and surface expression. Textural analysis of the samples collected was carried out at the Minnesota Geological Survey largely following the procedures outlined in ASTM D422, *Standard Test Method for Particle Size Analysis of Soils* (ASTM International, 2007; note: this standard has since been replaced by ASTM D7928 (ASTM International, 2017)). Provenance is determined from the lithologic composition of the very coarse-grained sand fraction (1-2 millimeters) in accordance with Hobbs (1998), where grains are counted by lithology using a binocular microscope. Formal units are assigned based on textural and lithologic properties defined in Johnson and others (2016), which have been recognized in accordance with the North American Stratigraphic Code guidelines.

GLACIAL HISTORY

The surficial geology of Steele County is composed largely of sediments deposited during the most recent glacial episode, the Wisconsinan glacial episode, which lasted from approximately 110,000 years ago to the start of the Holocene Epoch 11,700 years ago. During this glacial episode, ice sheets originating from the Laurentide ice center—the central-northwest Winnipeg provenance, the northwest Riding Mountain provenance, the central-northeast Rainy provenance, and the northeast Superior provenance (Fig. 1). While ice advanced from these source areas, it picked up and incorporated different clast assemblages that were subsequently transported and deposited down-ice, leaving behind unsorted glacial deposits called till. Till deposits are composed of clay to boulder-sized fragments that were derived primarily from pre-existing and previously deposited lithologic compositions reflective of the up-ice bedrock. These till compositional signatures are often readily interpretable, and can be used to determine the provenance, or origin, of the incursion of the Laurentide Ice Sheet into Minnesota and its eventual melting during the late Wisconsinan glacial episode.

Steele County is mostly covered by deposits of the Des Moines lobe, an ice stream that is an offshoot of the Laurentide Ice Sheet, which advanced across Minnesota and into Iowa during the late Wisconsinan glaciation (Marine Isotope Stage [MIS] 2; Patterson, 1997). The Des Moines lobe reached its maximum southern extent, forming the Bemis moraine in Iowa, at approximately 14,000 °C yr BP, a chronology that was established through radiocarbon dating organics found buried in till (Fig. 2; Kemmis and others, 1981; Clayton and Moran, 1982; Patterson, 1997; Dalton and others, 2020). Sediment deposited by Des Moines-lobe ice contains significant amounts of gray Cretaceous Pierre Shale, which was principally derived from up-ice source areas across Saskatchewan, Manitoba, and North Dakota. Evidence of earlier ice advances (pre-Wisconsinan) are only found at the surface in a small portion of the county (see unit Qot) because these deposits were largely eroded or buried by subsequent glaciations.

PRE-WISCONSINAN EPISODE

The oldest glacial material preserved at the land surface in Steele County is the Browerville Formation (see Plate 4, *Quaternary Stratigraphy*). This unit occurs at the surface in the northeast corner of Steele County beyond the maximum extent of the Des Moines lobe. Two samples had a loam texture with an average of 22 percent carbonate clast content and rare to absent shale (Fig. 3; Table 1). Sediment of this formation was deposited by Winnipeg-provenance ice and is found scattered throughout southern and southeastern Minnesota usually at depth, beneath younger Wisconsinan-aged sediments. The Browerville Formation till can be found extensively at the surface to the southeast in Mower County (Meyer and Knaeble, 1998), and to the east in Dodge County (Marshall and McDonald, 2019), where it forms a relatively flat-lying surface.

Several dating methods have been used to estimate the age of the Browerville Formation. Wood collected from Browerville Formation till at a gravel pit in Stearns County was older than about 45,000 °C yr BP (approximately 48,000 cal yr BP; Meyer and Knaeble, 1996; Johnson and others, 2016). Two other samples were collected from marl deposits in lacustrine sediment that overlay Browerville Formation till in a rotary-sonic core from central Minnesota. These samples had a uranium/thorium disequilibrium minimum date of 200,000 yr BP (Knaeble and Meyer, 2007). These dates imply that the Browerville Formation is at least pre-Wisconsinan and probably pre-Illinoian in age (MIS >8; the glaciation that was pre-the Wisconsinan that occurred between 190,000 and 130,000 yr BP [Martinson and others, 1987]).

WISCONSINAN EPISODE

Moland phase

The surficial geology of Steele County is dominated by glacial sediments deposited during the Wisconsinan glacial episode. This episode, which lasted from 110,000 years ago to the start of the Holocene Epoch 11,700 years ago, is characterized by repeated advances of the Des Moines lobe into Steele County. Strictly speaking, the Des Moines lobe is attributed to the ice advance during the last Bemis phase that reached Des Moines, Iowa. In practice, the Des Moines lobe term has been used broadly to include the Moland-phase ice advance as well, which followed a similar trajectory but did not reach as far south (Fig. 2; Johnson and others, 2016). The first ice advance to reach Steele County occurred as part of the Moland phase. During this phase, the Des Moines lobe advanced from the northwest Riding Mountain provenance and covered most of Steele County. As the Des Moines lobe eventually retreated, it deposited the Moland Member till, the lowest member in the New Ulm Formation (unit Qnw).

Moland Member till has a sandier matrix and contains significantly fewer gray shale fragments than the younger Des Moines-lobe till found in the county (Fig. 3; Table 1). The Moland Member mapped in Steele, Dodge, and Mower Counties is probably correlative to the Sheldon Creek Formation of north-central Iowa (Bemis and others, 1996; Bettis, 1997; Meyer, 2000). The Sheldon Creek Formation was inferred to have been deposited by two distinct ice advances during MIS 3, with soils or weathering horizons separating the two in places (Kerr and others, 2021). The Verdi Member in southwest Minnesota may also be time correlative with the Moland Member because similar tills were deposited prior to the formation of the Bemis moraine (Fig. 2; Gowan, 2020a, b).

During the Moland phase, the Des Moines lobe advanced into Steele County and terminated along the Steele and Dodge County border. At this position, the Des Moines-lobe ice constructed a subtle, discontinuous, northwest–southeast-trending moraine in northeast Steele County and western Dodge County. Additionally, meltwater flowed from the ice, carving river valleys and depositing outwash (unit Qtw) across Steele and Dodge Counties. In northern Dodge County, meltwater flowed eastward through valleys of the Middle Fork unnbro River and Milliken Creek. In southern Dodge County, meltwater flowed south, draining into the Cedar River valley (Marshall and McDonald, 2019).

Bemis phase

Following the Moland phase and a period of glacial retreat, the Des Moines lobe readvanced during MIS 2 at approximately 14,000 °C yr BP (17,250 cal yr BP; Bemis and others, 1996). During this advance, the Des Moines lobe formed the terminal Bemis moraine at its maximum extent, which runs from northeast South Dakota through southeast Minnesota, central Iowa, and southeast Minnesota (Fig. 2). The moraine was named by Leverett (1932) for the town of Bemis, South Dakota, and was originally cited in Steele County as the Eastern or Outer Moraine by Harrington (1884). In southeast Minnesota, the Bemis moraine stands conspicuously higher than much of the relatively flat-lying surrounding landscape (Fig. 4B), and its composition is an amalgamation of more than one advance of the Des Moines lobe into the region. These advances are more discernible in southwest Minnesota and Iowa (Bemis and others, 1996; Day, 2014; Gowan, 2020a, b). Here the Bemis-moraine complex appears as a broad swath of hummocky topography (Fig. 4A), which likely incorporated sediment deposited during both the Bemis phase and the ensuing Altamont phase (Fig. 2).

The Bemis-moraine complex forms an arcuate band roughly north–south across the county and is largely composed of Heiberg Member till (see units Qtw, Qww). During periods of Des Moines-lobe stagnation and subsequent down-wasting, large amounts of supraglacial sediment accumulated, covering and insulating the ice in places. When these areas of buried ice eventually melted, they left behind the irregular, collapsed, stagnation features found throughout the moraine complex, particularly along unit Qtw. Common stagnation landforms include depressions, minor moraines and ridges, ice-walled lake plains, circular flat-topped hills, and irregular ring-shaped hummocks. Many of these landforms have been muted by erosion and anthropogenic changes such as agriculture, but remain pronounced on lidar imagery. The prevalence of ice-marginal stagnation landforms has been noted throughout the extent of the Des Moines lobe, particularly down-ice in Iowa, where upwards of 90 percent of the landscape is blanketed by these features (Day, 2014).

The Bemis-moraine complex is composed of a high-relief mixture of glacial till, glacial lacustrine, and glacial fluvial sediments formed as ice melted and sediment was reworked and topographically inverted in places. Samples collected from the Bemis moraine complex (units Qtw, Qww) have, on average, a loam matrix texture and contain an average of 19 percent Cretaceous Pierre Shale (Fig. 3; Table 1). The moraine complex forms a drainage divide and meltwater flowed east from the margin of the moraine and formed outwash plains along the eastern side of the county and into Dodge County (Fig. 5). Outwash from the Bemis and Moland phases are mapped together as unit Qwo because they are similar in texture and difficult to distinguish from one another. As the Des Moines-lobe ice retreated, new drainageways formed and meltwater flowed into the current drainage of the Straight River.

A significant proportion of the Bemis-moraine complex is made up of sediment derived from the Heiberg Member. The Bemis moraine demarcates the eastern extent of the Heiberg Member, and the shale clast content varies greatly, but is typically 12 to 15 percent lower than the shale content found in samples of Heiberg Member till (unit Qtt) in the western portion of the county (Table 1). An increase in mixing of underlying basal sediments along the limit of the Bemis moraine contributed to the depletion in shale clast content from samples in this area. This was likely triggered in part by an increase in basal drag and subglacial deformation that accompanied widespread stagnation of the Des Moines lobe. Moreover, sandier and less shale-rich sediment derived from the coeval and stratigraphically equivalent Villard Member is likely present in many places. The Heiberg and Villard Members are theorized to have been deposited by primarily-independent ice streams within the Des Moines lobe that can be traced to distinct up-ice provenances based on textural and lithologic properties; the Heiberg Member deposits reflecting a northwest source (Riding Mountain provenance) and the Villard Member deposits reflecting a northern source (Winnipeg provenance; Patterson, 1997; Lusardi and others, 2011). The migratory and overlapping nature of these ice streams likely contributed to the mixing of Heiberg and Villard Member deposits, particularly along the broad shear zone separating the two streams (Fig. 5). This mixing has also been noted in auger holes and rotary-sonic core from areas directly up-ice from Steele County (Lusardi and others, 2011).

Altamont and Algona phases

A series of recessional end moraines found down-ice in Iowa document the oscillation of the Des Moines lobe between periods of advance, stagnation, and readvance to progressively lesser margins, which have been dated to between 14,000 °C yr BP and 12,300 °C yr BP (Ruhe, 1969; Kemmis and others, 1981; Clayton and Moran, 1982). Rather than forming a typical morainal ridge, each successive advance left a wide hummocky moraine inside of the footprint of the previous one (Fig. 2). Following the Bemis phase, the Des Moines lobe readvanced during the Altamont phase forming the Altamont moraine. This hummocky moraine extends into north-central Iowa from between southwest and southeast Minnesota. The Bemis and Altamont moraines are distinct and have been mapped separately in southwestern Minnesota and north-central Iowa. However, along the eastern margin of the Des Moines lobe, the Bemis and Altamont moraines are confluent and are difficult to distinguish from one another.

The last major advance of the Des Moines lobe into Steele County was during the Algona phase. At this time, the Des Moines lobe advanced from the northwest and formed the Algona moraine (Fig. 4A), a hummocky ground moraine in the southwest corner of Steele County that was originally referred to by Harrington (1884) as the Western or Inner Moraine. This advance was also characterized by extensive stagnation and down-wasting of ice, resulting in the formation of ice-walled lake plains, circular flat-topped hills, short-crested ridges, and other stagnation landforms (unit Qag).

Post Algona phase

While the Des Moines-lobe ice retreated to the west from the Algona margin, it formed multiple recessional ice margins (Lusardi, 1997; Lusardi and others, 2002). Meltwater flowed east from these margins into Steele County and incised channels into sediment deposited by the Algona advance. Beaver and Lonergan Lakes, northwest of Ellendale, currently occupy one of these channels, which also serves as a modern tributary of the Straight River (Fig. 6). Lacustrine silt and clay (unit Qlc) accumulated in lakes, kettles, depressions, and on till plains that were subsequently overlain by Holocene peat (unit Qpt) in some areas. There is little evidence for the development of significant proglacial lakes in the county, but the Bemis moraine coincides with a drainage divide and determines the course of several important drainageways across the county.

Lusardi (1997) speculated that an outlet of glacial Lake Minnesota, a large proglacial lake that formed south of Mankato to the west in Blue Earth County, may have also drained east through Waseca and Steele Counties and eventually north through the Straight River. This is based on a patchy band of exposed outwash likely linked to meltwater-carved channels that presumably flowed through existing lows and depressions in the stagnant ice. Distinct channel scarps have also been observed along the Little Le Sueur River and southwest of Owatonna, down-cutting below the original outwash surface in places.

HOLOCENE

The Holocene Epoch began around 11,700 yr BP ago when the last glacial period ended and marked the beginning of relatively warm conditions in Minnesota. During the Holocene Epoch, the landscape of Steele County was largely modified by water as modern streams deposited floodplain alluvium (unit Qal) in old channels and tributaries. The melting of buried stagnant ice may have continued into the early Holocene Epoch, during this time, organic-rich deposits also formed in low lying areas (unit Qo). From the mid-Holocene Epoch until present, the climate and geomorphic processes were much like today. More recently, anthropogenic changes such as the large-scale movement of sediment by industrial machinery, has greatly altered the surface composition, particularly in well-developed areas like Owatonna.

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DESCRIPTION OF MAP UNITS

HOLOCENE

Qaf Sand and gravel, sandy loam to silt loam—Predominantly unconsolidated sediment deposited by modern streams on floodplains and in channels. Generally, coarse-grained sediments (sand and gravel) are found in channels and fine-grained deposits (fine-grained sand and silt) are found on floodplains; commonly coarsens with depth. Areas of low elevation are typically filled with thick silty to clayey sediment. Contacts with other map units are commonly scarps. Organic sediments may be found disseminated within the unit or form distinct peat beds in places. *loodplain alla ia .*

Qlc Silt, clay, and loamy sand—Lacustrine sediments deposited in post-glacial lakes. Fine-grained sediment, typically organic-rich and overlain by peat in some areas. Coarser-grained along shorelines, typically where winnowing through wave-action has concentrated the sand-size fraction. Includes lakes that have been drained or have dried. *ake sedi ent.*

Qo Decomposed organic matter—Partially to fully decomposed organic matter. May include organic-rich silt, clay, and marl in places. Unit developed in a non-glacial environment as ice retreated. Distribution of this unit has been obtained from the Natural Resource Conservation Service (2016). *eat.*

PLEISTOCENE

Late Wisconsinan

Undifferentiated New Ulm Formation sediment associated with the northwest-source (Riding Mountain provenance) Des Moines lobe (Johnson and others, 2 1)—Undifferentiated due to similarities in texture and mixing of sediment deposited during different phases (such as mixing of Bemis- and Moland-phase outwash).

Qnf ***Interbedded to massive sand, silt, and clay***—Medium- to fine-grained sand, silt, and clay deposited in depressions, kettles, and ice-walled lakes on the stagnating glacial surface. Clayey lake sediment in places and at depth. This unit is commonly deposited in the form of circular, positive relief features with relatively flat surfaces that stand higher than the surrounding landscape. Margins of these features are commonly coarser-grained and diamicton debris flow sediment is present in places. *ce alled lake sedi ent.*

Qnw ***Fine- to coarse-grained sand and gravel***—Well- to poorly-sorted fluvial sediments. Primarily composed of sediment from the Des Moines lobe, particularly from meltwater during the Bemis and Moland phases. May also include sediment from older pre-Wisconsinan units like the Browerville Formation, which has been reworked and mixed to varying degrees. Differentiation of these units has been confounded by considerable surface leaching as well as the similarities in texture and lithology. Oxidation is pervasive in the coarse-grained sand and gravel-size fraction. *nd fferentiated out ash.*

Qnw ***Loam to gravelly sand***—A complex mix of ice-contact sediment that is predominantly sand, gravelly sand, and gravel. Intermittently capped by and/or includes interbeds of till. Boulders and deformation features are present in places. Generally mapped along ice margins where ice-contact sand, gravel, and till were deposited in close proximity. May be deposited by meltwater flow along ice margins or beneath ice (Jennings and others, 2011; see Map Symbols). Deposits commonly exhibit irregular, hummocky topography. *ce contact sedi ents.*

New Ulm Formation—Heiberg Member—The uppermost member of the New Ulm Formation, deposited by the Des Moines-lobe ice. It is found at the surface across much of southern Minnesota (Johnson and others, 2016). A relatively high percentage of gray shale fragments (Fig. 3; Table 1) distinguishes this unit from other New Ulm Formation units. Because textural and lithologic properties are relatively similar throughout the county, these units have been assigned primarily on the basis of depositional phase, topography, and surface expression. Typically light olive-brown (2.5Y 5/4) where oxidized to dark gray (2.5Y 4/1) where unoxidized.

Qtt ***Loam diamicton behind the Bemis moraine***—Chiefly unsorted, loam-textured sediment, interbedded in places with sand, silt, and gravel. Gray shale content varies widely, but is higher than underlying members of the New Ulm Formation (approximately 32 percent shale; Fig. 3; Table 1). Topography is generally subdued with less stagnation features, and is lower in elevation than the Bemis-moraine units (see units Qtw, Qww). A thin layer (typically less than 1 foot) of silt and/or clay is found at the surface in places, which may be the result of ponded, relocated, fine-grained sediments. *Glacial till*

Qtw ***Loam diamicton, hummocky***—Chiefly unsorted, loam-textured sediment, interbedded in places with sand, silt, and gravel. Texturally and compositionally analogous to unit Qtt with a similarly high shale clast content (approximately 29 percent; Fig. 3; Table 1). This unit is differentiated by its irregular, hummocky topography, the result of stagnation and subsequent melt-out of Des Moines-lobe ice. These stagnation features are typically 10 to 20 feet (3 to 6 meters) tall, although some larger examples can exceed 60 feet (18 meters) in height. This unit is found across the western half of the county and particularly the southwest corner, where it was largely deposited during the Algona phase (Fig. 4A). Circular, flat-topped hills are common and irregularly spaced, separated by low areas underlain by till. Ice-walled lake plains (see unit Qtt) are common and morphologically similar to the flat-topped hills seen extensively across this unit. *u ucky glacial till*

Qtw ***Loam diamicton of the Bemis moraine***—Chiefly unsorted sediment. Composed primarily of loam diamicton with intervals of poorly consolidated sand and gravel in places, in addition to minor amounts of disturbed and mixed glaciolacustrine units and till. It is a mixed unit that is largely composed of Heiberg Member till mixed with older sediment including the Villard Member (see unit Qww), Browerville Formation till (see unit Qwo) and the Moland Member (see unit Qwt . This unit and unit Qtm were deposited on the eastern edge of the Des Moines lobe (Figs. 2, 4A) and bifurcate the county from north to south, demarcating the margin of active ice during the Bemis phase. These units are higher in elevation than units Qtt and Qtm (see Fig. 4B). This unit is likely an amalgamation of more than one advance (Bemis and Altamont phases) of the Des Moines-lobe ice into the county. It contains less shale than unit Qtt (approximately 17 percent compared to 32 percent; Fig. 3; Table 1), but significantly more than the subjacent Moland-phase till (unit Qwt). *Be ix ovaine till*

Qwt ***Loam diamicton of the Bemis moraine, hummocky***—Chiefly unsorted sediment. This unit is analogous to and texturally similar to unit Qtw but is differentiated by its irregular, hummocky topography that is visible on lidar imagery and can rise 20 to 50 feet (6 to 15 meters) above the more subdued surface of unit Qtw. Mostly loam diamicton with intervals of poorly consolidated, fine- to coarse-grained sand and gravel intercalated with silt and sandy loam till. This unit forms an arcuate band of hummocky till that marks the eastern terminus of the Bemis-moraine complex (Fig. 4A) and is indicative of a stagnant ice environment and down-wasting of debris-laden ice. Hummocks and depressions are generally smaller than those found in unit Qtw, but include similar ice-walled lake plains and melt-out features such as circular flat-topped hills, ice-walled lake plains, and ring forms. *u ocky fie ts ovaine till*

New Ulm Formation—Moland Member—The oldest member of the New Ulm Formation found at the surface in Steele County. It may underlie most of the Heiberg Member sediment, but has likely been extensively eroded (Johnson and others, 2016). Its position beyond the Bemis moraine and its relatively low percentage of gray shale fragments (Fig. 3; Table 1) distinguishes this member from the Heiberg Member.

Qwt ***Sandy loam diamicton***—Chiefly unsorted sediment. Diamicton contains abundant pebbles and cobbles suspended in a sandy loam matrix. Poorly-consolidated coarse-grained sand and gravel beds along with sand and silt lenses and stringers are common. Contains significantly less Cretaceous Pierre Shale fragments than adjacent Heiberg Member till sediments (typically less than 10 percent; Fig. 3; Table 1). Commonly leached and oxidized. Olive-brown (2.5Y 4/3) when oxidized to dark gray (2.5Y 4/1) where unoxidized. *Glacial till.*

Pre-Wisconsinan

Browerville Formation—Sediment deposited by Winnipeg-provenance ice (Johnson and others, 2016). The Browerville Formation is a regionally extensive formation that has been recognized to the east in Dodge County (Marshall and McDonald, 2019), and southeast in Mower County (Meyer and Mossler, 1998).

Qbt ***Loam diamicton***—Chiefly unsorted sediment, pebbly and cobbly, loam diamicton. Generally light yellowish-brown where oxidized (10YR 6/4) and very dark gray (2.5Y 3/1) where unoxidized. Sand lenses and stringers are common in the upper 6 feet (2 meters). Only exposed at the surface in the northeast corner of the county, but it is a pervasive unit in the subsurface (see Plate 4) and at the surface to the east in Dodge County (Marshall and McDonald, 2019). *Glacial till*

ORDOVICIAN

Oo Bedrock—Upper Ordovician bedrock at or near the land surface; see Plate 2, *Bedrock Geology* for details. Exposed predominantly in a quarry on the north side of Owatonna and also along the banks of the Straight River adjacent to the quarry.

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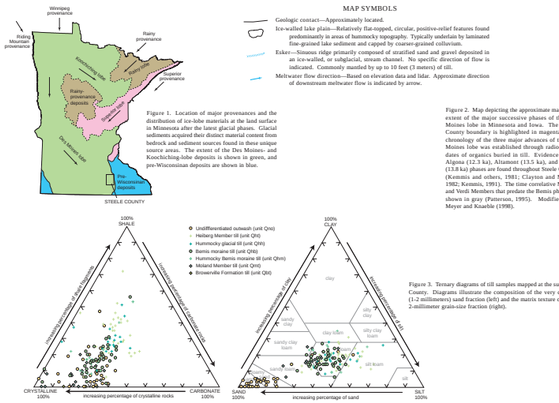
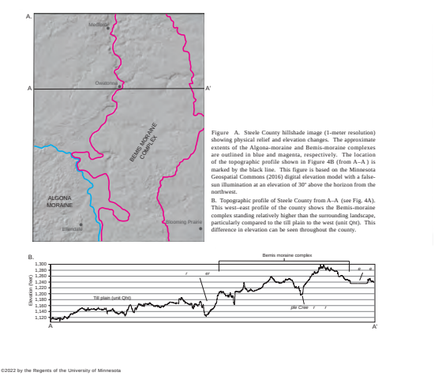


Figure 1. Location of major provenances and the distribution of ice-lobe materials at the land surface in Minnesota after the latest glacial phases. Glacial sediments acquired their distinctive mineral content from bedrock and sediment sources found in these unique source areas. The extent of the Des Moines- and Superior-lobe deposits is shown in green, and pre-Wisconsinan deposits are shown in blue.

Figure 3. Ternary diagrams of till samples mapped at the surface in Steele County. Diagrams illustrate the composition of the very coarse-grained (1-2 millimeters) sand fraction (left) and the matrix texture of the less than 2-millimeter grain-size fraction (right).


A
A'
B
B'
Owatonna
Medford
BEMIS MORAINE CREST
ALGONA MORAINE
Ellendale
Blooming

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COUNTY ATLAS SERIES
ATLAS C-53, PART A
Steele County
Plate — uaternary Stratigraphy

UATERNARY STRATIGRAPHY

Daniel Conrad and Maurice u en

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A'
STL-3
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COUNTY ATLAS SERIES
ATLAS C-53, PART A
Steele County
Plate 5—Sand-Distribution Model


LOCATION DIAGRAM

SAND-DISTRIBUTION MODEL

Maurice u en Daniel Conrad and S Livel

INTRODUCTION

e uaternar sand and ravel deposits o Minnesota are products o a loo and comple istor o multiple lacial events t at ma es subsur ace mappin o t ese potential water bearin units c allow in owever establis in t e location and c aracteristics o sand and ravel units is an essential step toward identi in a ui ers and ensurin t eir appropriate use and protection e Steele Count eolo ic Atlas includes t ree dimensional models t at s ow t e distribution o t e uaternar sand and ravel deposits w ic ma be a ui ers eolo ists interpreted t e t ree dimensional models and related sand and ravel deposits wit in t e counties t o t e lacial events t at ormed t em Alt ou t e models and interpretations are based on t e best available data t ey are unavoidably incomplete due to a lac o data in some areas see Plate *Database Map* and Plate *Quaternary Stratigraphy*

e distribution o sand at t e land sur ace was mapped b eolo ists rom e possures s allow drill oles soil maps and land orms Plate *Surficial Geology* In contrast interpretations o sand distribution in t e subsur ace relied primaril on well and soil boris records supported b scientic ic core and drill cuttin s collected b well drillers Eac well record or drill ho describes t e vertical se uence o eart materials at one location

e eolo ist predicts t e materials t at occur in t e areas between wells and at dept s not penetrated b t e wells at prediction is based on an assessment o available data and an understandin o t e ionse and processes t at created t e sediment e distribution o data reuli a ects t e resolution and accurac o t e mapped sand deposits Plate or e ample t e data points are widel spaced smaller sand deposits ma not be well constrained or ma be missed entirel

Unconsolidated uaternar sediments t at overlie bedroc in Steele Count var readi in c aracter distribution and t ic ness e deposits are lar el t e result o man distinct lacial ice advances durin t e Pleistocene Epoc Plate lacial a ui ers primaril consist o saturated sand and ravel ese are t picall deposited b meltwater streams t at lowed inront o or beneat laciers durin advances and retreats La ers o lower permeabilit a uitards con ine a ui ers and are enerall composed o unsorted sediment diamicton made o cla ey to boulder si ed particles is unsorted sediment is deposited b lacial ice and is termed till ill la ers tend to be more laterall persistent t an sand la ers because lacial ice usuall spreads across t e re ion w ereas meltwater c aneels t at deposited sand and ravel were con ined to draina es at lower elevations in an evolvin landscape In t is report t e depicted sand deposits ave been named a ter t e underl in till b convention e cept or use at t e land sur ace until Qw and t eir lacial ice and meltwater ront onl remtianed sediment unit s

and retreat o t e same c cle ice ma bur and erode its own sand as well as sediment deposited durin a previous advance A new la er o sand ravel or till could ill a void eroded into an underl in la er and completel ta e its place iven su icient erosion e var in de rees o deposition and erosion over s ort distances in a lacial settin create comple s stems o bot discontinuous till s eets as well as sand and ravel deposits e create an accurate eolo ic representation o t e subsur ace closel spaced mile ilometer cross section lines were enerated in a west east direction i ater wells soil boris s and scienti ic and en ineerin test oles wit in mile ilometer o eac side o t e cross section lines were pro ected onto t at line and used b a eolo ist to identi contacts between eolo ic units in t e subsur ace e results rom t e cross section anal ses were compiled di itall into rids or eac o t e eolo ic units rids were developed s ewin t e elevation o t e top and bottom o eac o t e units as well as t e deposit t ic ness inal interpretations alon ive o t e cross sections are s own on Plate

lacial till is commonl described as cla ey and ravel can occur wit in a till more e tensive deposits tend to occur at t e contact between two till la ers ere two till la ers related to di erent depositional events are not separated b a sand and ravel deposit t eir contact ma be reco ni ed b a c an e in t e driller s description o t e cla y to ture densit and or color In eneral lo s t at were more detailed were iven more wei t b t e eolo ist w en drawin unit boundaries Usin available data contact lines were drawn alon eac cross section and model ind uitil t e eolo ist was con ident in t e spatial and strati rap ic representation o eac eolo ic unit Eac line represents t e base o a till or sand and ravel unit Th so tware was used to e tract elevation values rom vertices alon eac uniti line e e tracted elevation values were converted into a ridded sur ace representin t e base o t e unit Illustration t e areal e tent and dept o t e eolo ic units across t e count were processed wit s ecial so tware and bedroc topo rap rids to create top bottom and t ic ness rids or eac eolo ic unit e sult is a t ree dimensional eolo ic model o tills and sand and ravel units or t e count All model outputs are available di itall as raster datasets in t e ries accompan in t is plate

e strati rap o t e sand and till units are illustrated in t ure e sand distribution model outputs are s own in t ures t rou t ure depicts areas in Steele Count t at are underlain b multiple sand deposits w ereas some areas ave no mapped sand units Due to t e comple it o t e uaternar deposits it was not possible to e trapolate all t e detail rom one cross section to t e ne t t wo t e more widespread units can appear more continuous t an t e ti el are

A number o actors determine w et er or not t e sand and ravel units depicted ere are suable a ui ers o be an a ui er t e units must be saturated and able to readil transmit water to a well eir capacities or water stora e and transmission depend on t eir e tent and t ic ness as well as actors suc as sediment coarseness de ree o sortin consolidation and connectivit between sand and ravel units In man places two or more sand and ravel units ma connect to eeth a sin le a ui er t e ter is no interveinin till la er ater uali also determines w et er an a ui er is suitable as a source o drin in water Maps and reports produced b t e Minnesota Department o atural esources as Part o t e Steele Count Atlas will describe a ui er c aracteristics includin c emistr pollution sensitivit and roundwater low direction

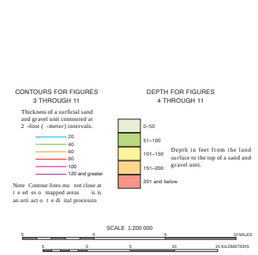
e eolo ic model s ould be considered a probabilit map or t e occurrence and appro imate t ic ness o sna or sand deposits e model does not uarantee sand and ravel will be ound at all places s own nor does it preclude t em rom bein ound in areas w ere t e are not s own ere clusters o wells e ist in t e cross sections contact lines represent enerali ed interpretations o t e r cluster o data instead o representin a e s own on Plate

In Steele Count man wells draw water rom Paleo oic bedroc meanin t e complete t ic ness o uaternar strati rap is penetrated t owever in areas w ere t e uar ernar is t e well was bedroc drillers lo s ma lac detailed descriptions o t e uaternar sediments and t e sand deposit t ic nesses ma be underrepresented As a result some o t e sand and ravel deposits s own on t e cross sections Plate and modeled ere ma be t ic er and more widespread t an portra ed At increasin dept s in t e strati rap ic section data availabilit diminis es and delineated sand and ravel deposits could be more or less continuous t an s own

In some areas o Steele Count water wells do not e tend t rou t e till t ic ness o t e uaternar deposits ere c aracteristics o deeper deposits cannot be identi ied or di erentiated units s i and p t are assi ned to t ose areas Despite t ese limitations t e eolo ic model provides a realistic interpretation o t e location and t pe o eolo ic units t at would be encountered in t e subsur ace o Steele Count owever iven t e limits o t e data as noted above t e model s ould be used as a side and s ould not preclude uer ore site speci ic investi ations or inspection o individual well lo s

REFERENCE

Ma er Mars all and McDonald M uaternar strati rap pl of Novembe pos ect muna er eolo ic atlas o Dod e Count Minnesota Minnesota eolo ical Surve Count Atlas C pt A scale pls



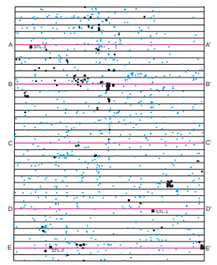


Figure 1. Map o Steele Count s owin cross section lines rotar somic core locations blac s uares wells endin in uaternar sediments blac dots and wells endin in bedroc blue dots Cross sections A A t rou E E are illustrated on Plate *Quaternary Stratigraphy*

Figure 2. Strati rap ic position o sand ravel and till deposits s own on t e sand distribution da rams ot Steele Count t s compared wit e uivalent units depicted in cross sections or ad acent Dod e Count to t e east Ma er and ot ers

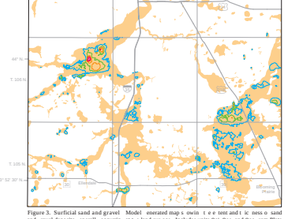


Figure 3. Surficial sand and gravel Model enerated map s owin t e e tent and t ic ness o sand and ravel deposits enerali ecounties ar i e land sur ace Includes units Qse Qsc and Qsw rom Plate *Surficial Geology* In places t e sur icial sand e tends below ine rained sediment sur icial units Qs Qse Qsc Sur icial sand and ravel var ies in t ic ness rom to eet to meters

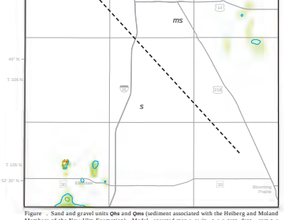


Figure . Sand and gravel units **Qns** and **Qens** (sediment associated with the Heiberg and Moland Members of the New Ulm Formation) Model enerated map s owin t e e tent dept rom t e sur ace and t ic ness o sand deposits t at lie strati rap ically above till units and Qte and Qete respectivel but ma overlie older units in places Sand and ravel units s and ms are ound on di erent sides o t e count w ic is denoted b t e das ed line Unit s occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters Unit s occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters

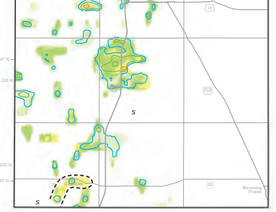


Figure 5. Sand and gravel units **Qws1** and **Qws2** (sediment associated with the Villard Member of the New Ulm Formation) Model enerated map s owin t e e tent dept rom t e sur ace and t ic ness o sand deposits t at lie strati rap ically above till units and respectivel but ma overlie older units in places Unit s is con ined to a small area in t e sout west part o t e count w ic is mar ed b t e das ed line Unit s ma also be ound wit in t e das ed area in places alt ou it is muc more e tensive t an unit s and can be found t rou out t e western al o t e count Unit s occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters Unit s occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters

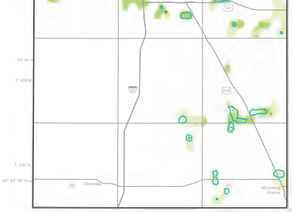


Figure . Sand and gravel unit **Qba** (sediment associated with the Browerville Formation) Model enerated map s owin t e e tent dept rom t e sur ace and t ic ness o sand deposits modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters



Figure . Sand and gravel units **Qrs** and **Qls** (sediment associated with the Rose Creek Formation and Meyer Lake Member of the Lake Henry Formation) Model enerated map s owin t e e tent dept rom t e sur ace and t ic ness o sand deposits t at lie strati rap ically above till units r and r respectivel but ma overlie older units in places Sand and ravel units rs and ls are ound on di erent sides o t e count w ic is denoted b t e das ed line Unit rs occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters Unit ls occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters

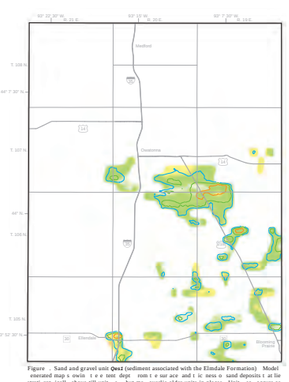


Figure . Sand and gravel unit **Qwx2** (sediment associated with the Elmdale Formation) Model enerated map s owin t e e tent dept rom t e sur ace and t ic ness o sand deposits t at lie strati rap ically above till unit e but ma overlie older units in places Unit es occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters

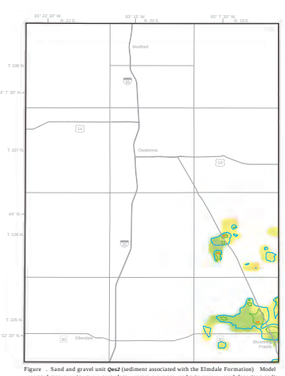


Figure . Sand and gravel unit **Qwx2** (sediment associated with the Elmdale Formation) Model enerated map s owin t e e tent dept rom t e sur ace and t ic ness o sand deposits t at lie strati rap ically above till unit e but ma overlie older units in places Unit es occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters

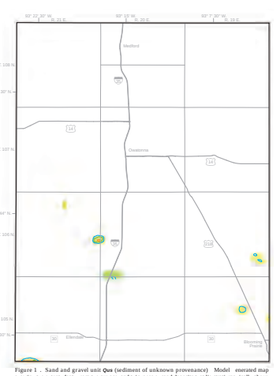


Figure 1 . Sand and gravel unit **Qus** (sediment of unknown provenance) Model enerated map s owin t e e tent dept rom t e sur ace and t ic ness o sand deposits t at lie strati rap ically above unit p or bedroc Deposited b meltwater rom pre iconminan ice o un nown provenance Unit s occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters

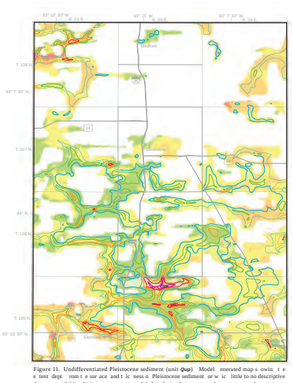


Figure 11. Undifferentiated Pleistocene sediment (unit **Qup**) Model enerated map s owin t e e tent dept rom t e sur ace and t ic ness o Pleistocene sediment ot w ic little to no descriptive data are available Unit p occurs as modeled at dept s between and eet and meters and varies in t ic ness rom to eet to meters

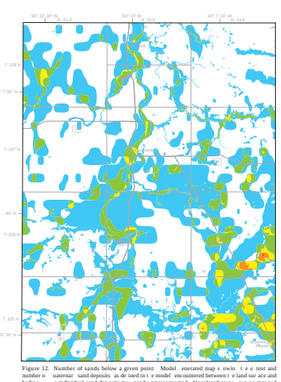


Figure 12. Number of sands below a given point Model enerated map s owin t e e tent and number o uaternar sanddeposits ea de ined in t e model encountered between t e land sur ace and bedroc e individual sand deposits ma not be interconnected Unconfined areas ave no mapped sand units

GIS compilation by R.S. Lively
Edited by Lori Robinson

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Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based; however, the Minnesota Geological Survey does not warrant or guarantee that there are no errors. Users may wish to verify critical information; sources include both the references listed here and information on file at the offices of the Minnesota Geological Survey in St. Paul. In addition, effort has been made to ensure that the interpretation conforms to sound geologic and cartographic principles. No claim is made that the interpretation shown is rigorously correct, however, and it should not be used to guide engineering-scale decisions without ade uate verification.

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UNIVERSITY OF MINNESOTA
MINNESOTA GEOLOGICAL SURVEY
Harvey Thorleifson, Director

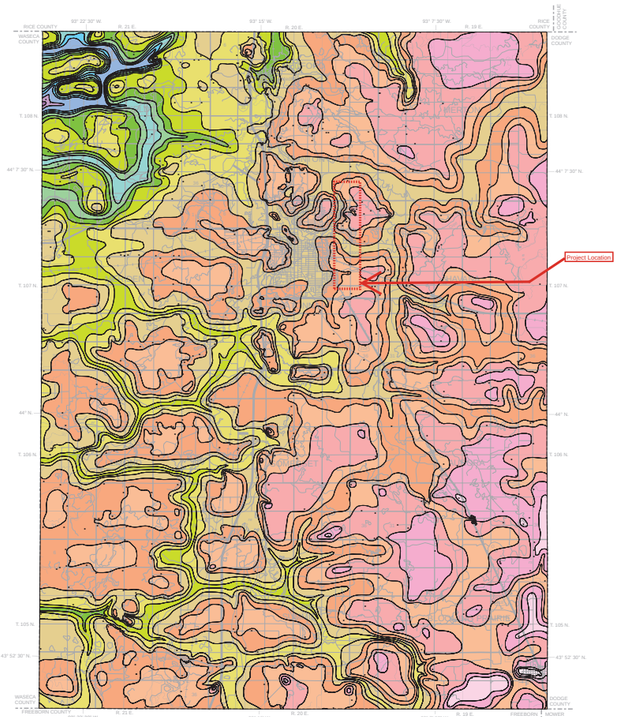
Prepared and Published with the Support of
THE STEELE COUNTY BOARD OF COMMISSIONERS
AND THE MINNESOTA ENVIRONMENT AND NATURAL RESOURCES TRUST FUND
AS RECOMMENDED BY THE LEGISLATIVE-CITIZEN COMMISSION ON MINNESOTA RESOURCES

COUNTY ATLAS SERIES
ATLAS C-53, PART A
Steele County
Plate —Bedrock Topography
and Depth to Bedrock



BEDROCK TOPOGRAPHY

Andrew et ler



E PLANATION

e bedroc elevation sur ace o Steele Count depicts t e composite topo rap o uppermost bedroc bot Meso oic and Paleo oic bedroc or base o t e overl in saternar lacial sediments It is represented b colors assi ned to ont meter contour intervals e ample to ret to meters above sea level on t e edroc opo rap map e position o contour intervals was determined rom water well and ot er drillin records rom t e Count ell Inde C t database unif and en inserin test borin s rom t e saternar Data Inde DI database rotar sonic drill core bedroc outcrop mappin and ecotnorp ic landf sur ace eatures c aracteristic o s allow bedroc e overall patt distribution o data can be seen on Plate *Database Map* and on t is map e database s ould alwa s be considered w en assessin t e reliabilit o t e map at site speci ic locations ose areas wit a l density o bedroc control points are li el to ave accurate interpretations o bedroc elevation w ereas t ose areas wit widel spaced control points ma be less reliable and inappropriate or site speci ic needs In eneral t ere is ood spatial covera e o water wells and borin s reac ic t e bedroc sur ace t rou out Steele Count

e bedroc elevation o Steele Count ran es rom more t an eet meters above sea level in t e sout east and near Isomin Prairie to less t an eet meters above sea level in t e nort west wit in Deer ield owns ip e most prominent bedroc topo rap eature in Steele Count is a buried bedroc valle wit in Deer ield owns ip in t e nort west t at deepens westward into aseca Count Oft en buried bedroc valle s is less prominence occur in nort ern Steele Count in and around Med ord t at deepen to t e nort into ice Count and in sout western Steele Count nort west o Ellendale t at deepens to t e west into aseca Count

Accompan in t is map is a bedroc elevation rid ot t e bedroc topo rap t at was interpolated rom t e mapped contours usin t e Esri ArcMap opo to aster tool e accurac o t is rid is dependent upon t e contour interval used w en mappin t e topo rap ic sur ace and t e errors in erit in t e opo to aster interpolation met od or t is map t e bedroc topo rap rid on avera e is accurate to wit in eet meters and is available online as a supplemental ile in t is atlas inal ad ustments were made to t e interpolated bedroc elevation rid to set its values e ual to t e land sur ace elevation wit in t e e tent o t e mapped bedroc outcrop pol ons and to ensure its values were less t an t e land sur ace elevation elsew ere Si ni icant e orts were made to ensure t e accurac o t e bedroc elevation rid in accordance wit t e mapped contours owever users s ould alwa s re er to and consider t e two dimensional edroc opo rap map because it represents t e most accurate and reliable representation o t e interpolated bedroc across t e count

1,201-1,225
1,176-1,200
1,151-1,175
1,126-1,150
1,101-1,125
1,076-1,100
1,051-1,075
1,026-1,050
1,001-1,025
976-1,000
951-975
926-950
901-925
876-900
851-875
826-850

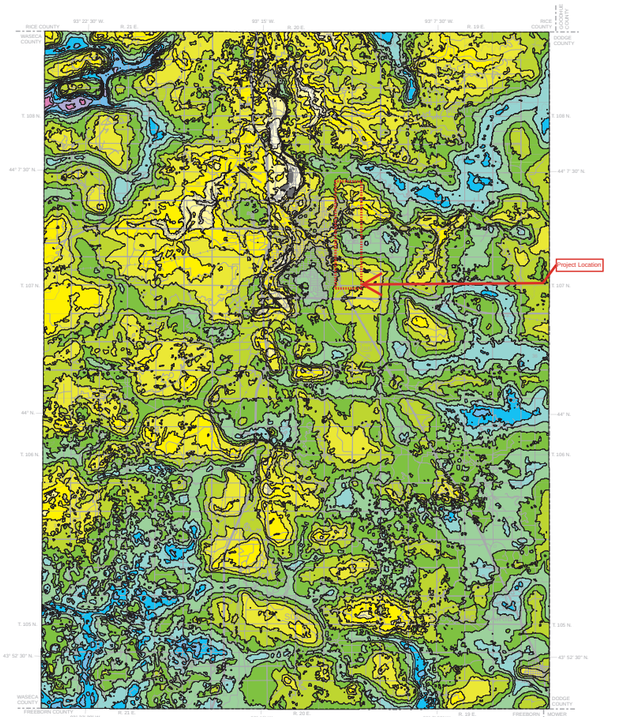
Elevation of the bedrock surface in feet above mean sea level

MAP SYMBOL

- **Drill hole that penetrated bedrock**

DEPTH TO BEDROCK

Andrew et ler



E PLANATION

e dept to bedroc is e ual to t e dept rom t e land sur ace to t e underl in bedroc sur ace and represents t e t ic ness o t e saternar lacial sediments o calculate t is t ic ness a rid o bedroc sur ace elevations derived rom t e edroc opo rap map was subtracted rom a corresponding rid o land sur ace elevations e land sur ace elevation rid was resampled rom a oot meter di ital elevation model derived rom lidar created b t e Minnesota Department o ariculal esources e bedroc sur ace elevation rid was made rom t e edroc opo rap map w ic was interpolated rom oot meter elevation contours based on outcrop mappin and interpretation o water well and ot er drillin records en inserin test borin s and ecotnorp ic eatures c aracteristic o bedroc near t e land sur ace e residual rid was t en classi ied at oot meter intervals to produce t e color coded Dept to edroc map e accurac o t e dept to bedroc rid is dependent upon t e accurac o t e land sur ace elevation rid and t e bedroc elevation rid or more in ormation re ardin t e interpolation met od and accurac o t e bedroc elevation rid used in t is process please re er to t e e planator te ton t e edroc opo rap map ic ness o t e saternar sediments varies reall over s ort distances and mappin at t is scale ma not properl resolve suc prominent variations or t is reason si ls best to consult site speci ic data vac as water well records and en inserin test borin s w erever available see Plate *Database Map* e detailed appearance o t e Dept to edroc map is related to sur icial land orms because t e land sur ace topo rap model is based on t e resolution data t an t e interpreted bedroc sur ace model e t ic est saternar lacial sediments in Steele Count are wit in a buried bedroc valle in t e nort west corner t at deepens to t e west into aseca Count In t is area t e dept to bedroc reac es as muc as eet meters Areas w ere bedroc is at or wit in eet meters o t e land sur ace enerall correspond to t e nort central portion o Steele Count near t e cities o Owatonna and Med ord w ere a number o bedroc outcrops are e posed at t e land sur ace wit in and around bedroc suraries

1–25
26–50
51–75
76–100
101–125
126–150
151–175
176–200
201–225
226–250
251–275
276-300

Depth in feet from the land surface to the bedrock surface

MAP SYMBOL

Outcrop edoc at or near t e land sur ace See Plate *Bedrock Geology* or detailed in ormation

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Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based; however, the Minnesota Geological Survey makes no warranty, expressed or implied, regarding its correctness. Users seek to verify critical information; sources include both the references listed here and information on file at the offices of the Minnesota Geological Survey in St. Paul. In addition, effort has been made to ensure that the interpretation conforms to sound geologic and cartographic principles. No claim is made that the interpretation shown is rigorously correct, however, and it should not be used to guide engineering-scale decisions without site-specific verification.

Attachment F – DNR Correspondence

DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

December 26, 2024

Kaylynn Sieverding
WSB & Associates, Inc.

Natural Heritage Review of proposed East Side Corridor (29th Ave Corridor) Project 2024: Clone Of 2023-00220, T107N R20W Sections 1-2, 12-14, 23-24, T108N R20W Section 36; Steele County

Dear Kaylynn Sieverding,

For all correspondence regarding the Natural Heritage Review of this project please include the project ID **MCE-2023-00220-02** in the email subject line.

As requested, the Minnesota Natural Heritage Information System has been reviewed to determine if the proposed project has the potential to impact any rare species or other significant natural features. Based on the project details provided with the request, the following rare features may be impacted by the proposed project:

Ecologically Significant Areas

- The Minnesota Biological Survey (MBS) has identified a Site of *Moderate* Biodiversity Significance in the vicinity of the proposed project. Sites of Biodiversity Significance have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. Sites ranked as *Moderate* contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. This Site has mapped examples of Wet Prairie (Southern) (WPs54b) and Mesic Prairie (Southern) (UPs23a), both state-ranked as Imperiled (S2). More than 99% of the prairie that was present in the state before settlement has been destroyed, and more than one-third of Minnesota's endangered, threatened, and special concern species are now dependent on the remaining small fragments of Minnesota's prairie ecosystem. Therefore, we feel that all prairie remnants merit protection. The current route of the project avoids these native plant communities but that could change if the route is altered. The project will impact the MBS Site and we encourage you to consider project alternatives that would minimize disturbance to this ecologically significant area while continuing to avoid the prairie native plant communities. Actions to minimize disturbance may include, but are not limited to, the following recommendations:
    - Minimize vehicular disturbance in the MBS Site (allow only vehicles/equipment necessary for construction activities).
    - Do not park equipment or stockpile supplies in the MBS Site.

- Do not place spoil within MBS Site or other sensitive areas.
- If possible, conduct the work under frozen ground conditions.
- Use effective erosion prevention and sediment control measures.
- Inspect and clean all equipment prior to bringing it to the Site to prevent the introduction and spread of invasive species.
- As much as possible, operate within already-disturbed areas.
- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible.
- Use only weed-free mulches, topsoils, and seed mixes. Of particular concern are birdsfoot trefoil (*Lotus corniculatus*) and crown vetch (*Coronilla varia*), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas.

MBS Sites of Biodiversity Significance and DNR Native Plant Communities can be viewed using the Minnesota Conservation Explorer or their GIS shapefiles can be downloaded from the MN Geospatial Commons. Please contact the NH Review Team if you need assistance accessing the data. Reference the MBS Site Biodiversity Significance and Native Plant Community websites for information on interpreting the data.

State-listed Species

- Several rare native plants have been documented near the proposed project area. These are tuberous Indian plantain (*Arnoglossum plantagineum*), Sullivant's milkweed (*Asclepias sullivantii*), and edible valerian (*Valerian edulis* var. *ciliata*), all state-listed as threatened, and small white lady's-slipper (*Cypripedium candidum*) and rattlesnake master (*Eryngium yuccifolium*), both state-listed as species of special concern. These species are all found in mesic or wet native prairie. Minnesota's Endangered Species Statute (*Minnesota Statutes*, section 84.0895) and associated Rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134) prohibit the take of endangered or threatened plants or animals, including their parts or seeds, without a permit. **If this project will be impacting any native prairie habitat then to demonstrate avoidance, a qualified surveyor will need to conduct a botanical survey in these areas.**

  Surveys must be conducted by a qualified surveyor and follow the standards contained in the Rare Species Survey Process and Rare Plant Guidance. Visit the Natural Heritage Review page for a list of certified surveyors and more information on this process. Survey proposals should be submitted to Reports.NHIS@state.mn.us prior to initiating survey work. Project planning should take into account that any botanical survey needs to be conducted during the appropriate time of the year, which may be limited. Please consult Review.NHIS@state.mn.us if you have any questions regarding this process.

- The Natural Heritage Information System (NHIS) tracks bat roost trees and hibernacula plus some acoustic data, but this information is not exhaustive. Even if there are no bat records listed nearby, all of Minnesota's bats, including the federally endangered northern long-eared bat (*Myotis septentrionalis*), can be found throughout Minnesota. During the active season (approximately April-November) bats roost underneath bark, in cavities, or in crevices of both live and dead trees. Tree removal can negatively

impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize these impacts, **the DNR recommends that tree removal be avoided from June 1 through August 15.**

- Please visit the DNR Rare Species Guide for more information on the habitat use of these species and recommended measures to avoid or minimize impacts.

Federally Protected Species

- To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online Information for Planning and Consultation (IPaC) tool.

Environmental Review and Permitting

- The Environmental Assessment Worksheet should address whether the proposed project has the potential to adversely affect the above rare features and, if so, it should identify specific measures that will be taken to avoid or minimize disturbance. Sufficient information should be provided so the DNR can determine whether a permit to take will be needed for any of the above protected species.

- Please include a copy of this letter and the MCE-generated Final Project Report in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's native plant communities, rare species, and other rare features. However, the NHIS is not an exhaustive inventory and does not contain the locations of all rare features in the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and project description provided with the request. **If project details change or the project has not occurred within one year, please resubmit the project for review within one year of initiating project activities.**

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential impacts to these rare features. Visit Natural Heritage Review for additional information regarding this process, survey guidance, and other related information. For information on the environmental review process or other natural resource concerns, please contact your DNR Regional Environmental Assessment Ecologist.

Thank you for consulting us on this matter and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

James Drake

Digitally signed by James Drake
Date: 2024.12.26 15:00:18 -06'00'

Natural Heritage Review Specialist
james.f.drake@state.mn.us

Cc: Haley Byron

Attachment G – MnDOT Office of Environmental Stewardship and US Fish and Wildlife Service Correspondence (Section 7)

DEPARTMENT OF TRANSPORTATION

January 3, 2025

Kathleen Mahoney
U.S. Fish and Wildlife Service
Minnesota-Wisconsin ES Field Office
3815 American Blvd. E.
Bloomington, MN 55425-1665

S.P. 074-070-009, New Roadway
Project Code: 2025-0018994
Owatonna, Steele County, Minnesota

No Effect Determination – Minnesota Dwarf Trout Lily Erythronium propullans)
No Jeopardy Determination – Monarch butterfly (*Danaus plexippus*)
No Jeopardy Determination – Western Regal Fritillary (*Argynnis idalia occidentalis*)
No Jeopardy Determination -- Whooping Crane (*Grus americana*)

Project Description:

The S.P. 074-070-009 project was originally reviewed and submitted to the USFWS on 11/22/23 for concurrence. Following this submission, the project team expanded the original project work area to include areas outside of the original action area. This revised review encompasses the revised project work limits and action area.

The S.P. 074-070-009 project will construct a new north-south roadway and adjacent paved trail from the eastern end of the SE 18th Street improvements to County State Aid Highway (CSAH) 8 (Kenyon Road), approximately 3.4 miles to the north. Additional project components include paving and constructing a trail along 18th Street between CSAH 48 (Bixby Rd) and the new E Side Corridor roadway, improvements to CSAH 34 between 24th Ave NE and the East Side Corridor and Kenyon Rd, and constructing new structures over Maple Creek, Izaak Walton Creek, and County Ditch 74 to accommodate the new roadway/paths. A section of County Road (CR) 180 (Claremont Road) would be realigned just north of the Canadian Pacific Railway to provide separation between the railroad crossing and the East Side Corridor intersection with CR 180. Surrounding land use consists of a mixture of cropland, scattered rural residences, and remnant woodland. Less than 20 acres of tree clearing is anticipated.



Action Area identified for the proposed project (blue line is boundary).

Conservation Measures:

Required Avoidance and Minimization Measures (AMMs). See MnDOT boiler plate special provisions (e.g., *Protection of Fish and Wildlife Resources*).

- Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs. *Notify contractor(s) during the pre-construction meeting. Bat sightings (including sick, injured, and/or dead bats) on the project must be reported to OES wildlife ecologist (612-741-7678) within 24 hours of discovery.*
- Direct temporary lighting, if used, away from wooded areas during the bat active season (April 1 to Nov. 14, inclusive). If installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable. *Please contact Susan Zarling (MnDOT Lighting Engineer) at 651-234-7052 with questions about approved products.*

Additional Required Conservation Measures:

- Contractor must inspect Bridges and Culverts, including expansion joints to determine if bats or bat signs are present before beginning Work during the bat active season (April 1 to Nov. 14, inclusive). If bats or bat signs are detected, stop work, and notify the MnDOT wildlife ecologist immediately.
- Avoid tree clearing April 15 to Oct. 30, inclusive, to avoid the bat active season and bird nesting season.
- Restrict all activities to avoid the application of insecticides and fungicides.
- Minimize herbicide use – If used, must be spot treatments. Avoid broadcast applications of herbicides without further consultation to MnDOT Office of Environmental Stewardship.
- Project must establish native vegetation in areas that are not proposed to be mowed more than once per year, as shown in the MnDOT Seeding Manual.

Additional Recommended Conservation Measures. *Incorporate into project documents, plans, and provisions only if the project chooses to include recommendations as project requirements.*

- Any erosion control blanket must be free of plastic netting and on the MnDOT Approved Products List for Rolled Erosion Prevention products.
- Any hydraulic mulch used up-slope of Public Waters must be free of plastic fiber additives.
- Span bridge(s) must be designed and constructed to include a Passage Bench. See the MnDOT Riprap Slope with Geotextile, Detail B. https://www.dot.state.mn.us/bridge/bridgedetails2.html
- Aggregate Surfacing must be placed on all riprapped areas and slopes above the Ordinary High Water Level (OHWL) to fill voids. Surface riprap with coarse filter aggregate in accordance with specification 3149.2H.

Species List for the Project Action Area

A list of federally threatened, endangered, proposed and candidate species, and designated and proposed critical habitat that overlaps with the action area, was requested via the Information for Planning and Consultation (IPaC) web application maintained by the U.S. Fish and Wildlife Service (requested January 2025). Based on this list, the project is within the range of the following:

Species	Status	Habitat
Whooping Crane *Grus americana*	Non-essential Experimental Population	Utilizes a variety of habitats, including coastal marshes and estuaries, inland marshes, lakes, open ponds, shallow bays, salt marsh and sand or tidal flats, upland swales, wet meadows and rivers, pastures, and agricultural fields.
Monarch Butterfly *Danaus plexippus*	Candidate	Grassland habitats where milkweed and flowers are present.
Western Regal Fritillary *Argynnis idalia occidentalis*	Proposed -- Threatened	Native prairies and other grassland habitats where violets and flowers are present.
Minnesota Dwarf Trout Lily Erythronium propullans	Threatened	North-facing slopes and floodplains in deciduous forests.

MnDOT consults the Minnesota Department of Natural Resources Natural Heritage Information System (Copyright January 2025 State of Minnesota, Department of Natural Resources), and other resources as available, to determine if proposed projects may affect listed species.

Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

The Migratory Bird Treaty Act of 1918 (MBTA) is a federal law regulating the taking, killing, and possession of migratory birds and is administered by the U. S. Fish and Wildlife Service (Service). Under the MBTA, it is unlawful for any person to take, kill, or possess regulated species of birds. Take that occurs incidental to otherwise lawful activities -- "incidental take" -- is also prohibited. Frequently encountered birds on transportation projects subject to regulation under the MBTA include, but are not limited to, cliff swallows, bank swallows, eastern phoebes, American robins, red-winged blackbirds, mourning doves, and killdeer.

The Bald and Golden Eagle Protection Act of 1940 (BGEPA) is a federal law regulating impacts to bald and golden eagles. The BGEPA is administered by the Service. Under the BGEPA, the term "take" means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. Unlike protections under MBTA, both occupied and unoccupied eagle nests are protected. Construction projects, including tree clearing, occurring adjacent to eagle nests and/or important roosting areas may require seasonal avoidance and/or permitting.

This project was reviewed for potential impacts to birds protected under the MBTA and eagles protected under the BGEPA. **The Service will not be reviewing or commenting on impacts to migratory birds or eagles unless MnDOT OES determines additional coordination with the Service is required.** Findings and avoidance measures, if required, are identified in Attachment 1.

Endangered Species Act – Section 7 Consultation

Section 7 of Endangered Species Act of 1973, as amended (Act), requires each Federal agency to review any action that it funds, authorizes or carries out to determine whether it may affect threatened, endangered, proposed species or listed critical habitat. Federal agencies (or their designated representatives) must consult with the U.S. Fish and Wildlife Service (Service) if any such effects may occur because of their actions. Consultation with the Service is not necessary if the proposed action will not directly or indirectly affect listed species or critical habitat. If a federal agency finds that an action will have no effect on listed species or critical habitat, it should maintain a written record of that finding that includes the supporting rationale.

No Effect and No Jeopardy Determinations

No Effect Determination – Minnesota dwarf trout lily (Erythronium propullans)

No in-water work is proposed for this project and no direct or indirect impacts to suitable habitat are anticipated.

This project review relies on the USFWS-issued Minnesota-Wisconsin Federal Endangered Species Determination Key within the Information for Planning and Consultation (IPaC) system to satisfy requirements under Section 7(a)(2). The Service developed this system in accordance with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.). As reviewed, this project has met USFWS consultation requirements, and no further consultation is required for this species. The U.S. Fish and Wildlife Service's consistency verification letter is attached (see Attachment 2).

No Jeopardy Determination – Monarch Butterfly (Danaus plexippus)

The proposed project *may affect* monarch butterflies and/or suitable monarch habitat. Ground and vegetation disturbing activities are not expected to appreciably diminish the quality or extent of available suitable habitat within the project's Action Area. ***Therefore, MnDOT on behalf of the FHWA, does not anticipate the proposed action will jeopardize the continued existence of this species.***

No Jeopardy Determination – Western Regal Fritillary (Argynnis idalia occidentalis)

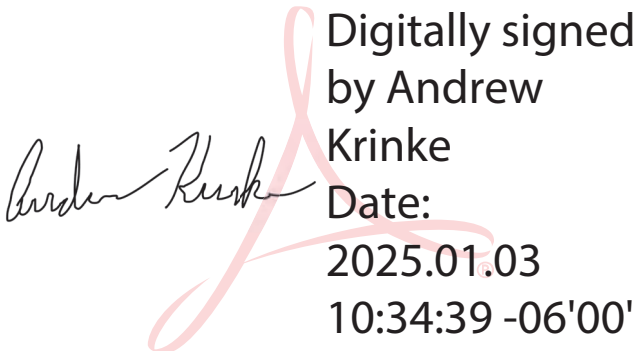
The proposed project *may affect* regal fritillary butterflies and/or suitable habitat. Ground and vegetation disturbing activities are not expected to appreciably diminish the quality or extent of available suitable habitat within the project's Action Area. In addition, violets (*Viola* spp.) – the host plant for regal fritillary butterflies – are typically absent or sparse in typical roadside habitats. ***Therefore, MnDOT on behalf of the FHWA, does not anticipate the proposed action will jeopardize the continued existence of this species.***

No Jeopardy Determination -- Whooping Crane (Grus americana)

The proposed project area is within the range of a known non-essential experimental population for Whooping crane. No documented occurrences or critical habitat for this species exist within the Action Area. All project activities are proposed to be completed in on lands outside of a National Wildlife Refuge or National Park. Based on the proposed scope of work, project activities are not expected to appreciably diminish the quality or extent of available suitable habitat within the project's Action Area. ***Therefore, MnDOT on behalf of the FHWA, does not anticipate the proposed action will jeopardize the continued existence of this species.***

Please contact me if there are questions or concerns.

Thank you,



Andrew Krinke
Natural Resource Program Specialist

MnDOT Office of Environmental Stewardship
395 John Ireland Blvd., MS620
St. Paul, MN 55155
Cell: (612)-590-6362
Andrew.krinke@state.mn.us

Attachment 1

Migratory Bird Treaty Act

Based on the proposed scope of work proposed and/or the timing of proposed work, impacts to birds protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712) are not anticipated. No further action is required, however, if the proposed scope of work or proposed timing of work changes, please contact the MnDOT protected species team at: protectedspecies.dot@state.mn.us

Learn more about the Migratory Bird Treaty Act at: https://www.fws.gov/law/migratory-bird-treaty-act-1918

Bald and Golden Eagle Protection Act

Based on the best available information, the proposed action is not anticipated to disturb, harm, or destroy a bald eagle or a bald eagle nest protected under the Bald ang Golden Eagle Protection Act (16 U.S.C. 668-668d). If a nest is found ahead of or during construction, **stop all work** within 300' of the nest and contact the MnDOT protected species team right away. E-mail: protectedspecies.dot@state.mn.us or Phone: 612-741-7678

Learn more about the Bald and Golden Eagle Protection Act at: https://www.fws.gov/law/bald-and-golden-eagle-protection-act

Attachment 2

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793

In Reply Refer To: 01/02/2025 21:14:12 UTC
Project code: 2024-0018994
Project Name: S.P. 074-070-009, New Roadway

Subject: Consistency letter for 'S.P. 074-070-009, New Roadway' for specified threatened and endangered species that may occur in your proposed project location consistent with the Minnesota-Wisconsin Endangered Species Determination Key (Minnesota-Wisconsin DKey).

Dear Andrew Krinke:

The U.S. Fish and Wildlife Service (Service) received on **January 02, 2025** your effect determination(s) for the 'S.P. 074-070-009, New Roadway' (Action) using the Minnesota-Wisconsin DKey within the Information for Planning and Consultation (IPaC) system. You have submitted this key to satisfy requirements under Section 7(a)(2). The Service developed this system in accordance of with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.).

Based on your answers and the assistance of the Service's Minnesota-Wisconsin DKey, you made the following effect determination(s) for the proposed Action:

Species	Listing Status	Determination
Minnesota Dwarf Trout Lily (*Erythronium propullans*)	Endangered	No effect
Monarch Butterfly (*Danaus plexippus*)	Proposed Threatened	No effect
Whooping Crane (*Grus americana*)	Experimental Population, Non-Essential	No effect

Determination Information

Thank you for informing the Service of your "No Effect" determination(s). Your agency has met consultation requirements and no further consultation is required for the species you determined will not be affected by the Action.

Additional Information

Sufficient project details: Please provide sufficient project details on your project homepage in IPaC (Define Project, Project Description) to support your conclusions. Failure to disclose important aspects of your project that would influence the outcome of your effects determinations may negate your determinations and invalidate this letter. If you have site-specific information that leads you to believe a different determination is more appropriate for your project than what the Dkey concludes, you can and should proceed based on the best available information.

Future project changes: The Service recommends that you contact the Minnesota-Wisconsin Ecological Services Field Office or re-evaluate the project in IPaC if: 1) the scope or location of the proposed Action is changed; 2) new information reveals that the action may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the Action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation with the Service should take place before project changes are final or resources committed.

Species-specific information

Listed Plants: You have indicated that your Action will have no effect (NE) on a threatened or endangered plant species. Although your Federal Endangered Species Act requirements are met, we recommend you contact the Minnesota or Wisconsin Department of Natural Resources regarding compliance with state law. **You may need a state permit if your Action will harm state-listed plants.**

Bald and Golden Eagles: Bald eagles, golden eagles, and their nests are protected under the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended, 16 U.S.C. 668a-d) (Eagle Act). The Eagle Act prohibits, except when authorized by an Eagle Act permit, the "taking" of bald and golden eagles and defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The Eagle Act's implementing regulations define disturb as "… to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

The following species and/or critical habitats may also occur in your project area and **are not** covered by this conclusion:

- Western Regal Fritillary *Argynnis idalia occidentalis* Proposed Threatened

Coordination with the Service is not complete if additional coordination is advised above for any species.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

S.P. 074-070-009, New Roadway

2. Description

The following description was provided for the project 'S.P. 074-070-009, New Roadway':

> The S.P. 074-070-009 project was originally reviewed and submitted to the USFWS on 11/22/23 for concurrence. Following this submission, the project team expanded the original project work area to include areas outside of the original action area. This revised review encompasses the revised project work limits and action area.
>
> The S.P. 074-070-009 project will construct a new north-south roadway and adjacent paved trail from the eastern end of the SE 18th Street improvements to County State Aid Highway (CSAH) 8 (Kenyon Road), approximately 3.4 miles to the north. Additional project components include paving and constructing a trail along 18th Street between CSAH 48 (Bixby Rd) and the new E Side Corridor roadway, improvements to CSAH 34 between 24th Ave NE and the East Side Corridor and Kenyon Rd, and constructing new structures over Maple Creek, Izaak Walton Creek, and County Ditch 74 to accommodate the new roadway/ paths. A section of County Road (CR) 180 (Claremont Road) would be realigned just north of the Canadian Pacific Railway to provide separation between the railroad crossing and the East Side Corridor intersection with CR 180. Surrounding land use consists of a mixture of cropland, scattered rural residences, and remnant woodland. Less than 20 acres of tree clearing is anticipated.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.092116250000004,-93.18180070408584,14z



QUALIFICATION INTERVIEW

1. This determination key is intended to assist the user in evaluating the effects of their actions on Federally listed species in Minnesota and Wisconsin. It does not cover other prohibited activities under the Endangered Species Act (e.g., for wildlife: import/export, Interstate or foreign commerce, possession of illegally taken wildlife, etc.; for plants: import/export, reduce to possession, malicious destruction on Federal lands, commercial sale, etc.) or other statutes. Additionally, this key DOES NOT cover wind development, purposeful take (e.g., for research or surveys), communication towers that have guy wires or are over 450 feet in height, aerial or other large-scale application of any chemical (such as insecticide or herbicide), and approval of long-term permits or plans (e.g., FERC licenses, HCP's).

   Click **YES** to acknowledge that you must consider other prohibitions of the ESA or other statutes outside of this determination key.

   Yes
2. Is the action being funded, authorized, or carried out by a Federal agency?

   Yes
3. Are you the Federal agency or designated non-federal representative?

   Yes
4. Does the action involve the installation or operation of wind turbines?

   No
5. Does the action involve purposeful take of a listed animal?

   No
6. Does the action involve a new communications tower?

   No
7. Does the activity involve aerial or other large-scale application of ANY chemical, including pesticides (insecticide, herbicide, fungicide, rodenticide, etc)?

   No
8. Will your action permanently affect local hydrology?

   No
9. Will your action temporarily affect local hydrology?

   Yes
10. Will your project have any direct impacts to a stream or river (e.g., Horizontal Directional Drilling (HDD), hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.)?

    Yes

11. Does your project have the potential to impact the riparian zone or indirectly impact a stream/river (e.g., cut and fill; horizontal directional drilling; construction; vegetation removal; pesticide or fertilizer application; discharge; runoff of sediment or pollutants; increase in erosion, etc.)?

    Note: Consider all potential effects of the action, including those that may happen later in time and outside and downstream of the immediate area involved in the action.

    Endangered Species Act regulation defines "effects of the action" to include all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (50 CFR 402.02).

    Yes

12. Will your action disturb the ground or existing vegetation?

    Note: This includes any off-road vehicle access, soil compaction (enough to collapse a rodent burrow), digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or prescribed fire), cultivation, development, etc.

    Yes

13. Will your action include spraying insecticides?

    No

14. Does your action area occur entirely within an already developed area?

    Note: Already developed areas are already paved, covered by existing structures, manicured lawns, industrial sites, or cultivated cropland, AND do not contain trees that could be roosting habitat. Be aware that listed species may occur in areas with natural, or semi-natural, vegetation immediately adjacent to existing utilities (e.g. roadways, railways) or within utility rights-of-way such as overhead transmission line corridors, and can utilize suitable trees, bridges, or culverts for roosting even in urban dominated landscapes (so these are not considered "already developed areas" for the purposes of this question). If unsure, select NO..

    No

15. Does Minnesota dwarf trout lily occur in the action area?

    No

16. Have you determined that the action will have no effect on individuals within the whooping crane nonessential experimental population (NEP)?

    Yes

17. [Hidden Semantic] Does the action area intersect the monarch butterfly species list area?

    Automatically answered

    Yes

18. Under the ESA, monarchs remain warranted but precluded by listing actions of higher priority. The monarch is a candidate for listing at this time. The Endangered Species Act does not establish protections or consultation requirements for candidate species. Some Federal and State agencies may have policy requirements to consider candidate species in planning. We encourage implementing measures that will remove or reduce threats to these species and possibly make listing unnecessary.

    If your project will have no effect on monarch butterflies (for example, if your project won't affect their habitat or individuals), then you can make a "no effect" determination for this project.

    Are you making a "no effect" determination for monarch?

    Yes

IPAC USER CONTACT INFORMATION

Agency: Minnesota Department of Transportation
Name: Andrew Krinke
Address: 395 John Ireland Boulevard
City: St. Paul
State: MN
Zip: 55155
Email andrew.krinke@state.mn.us
Phone: 6127046743

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration

Attachment H – MnDOT Cultural Resources Unit and State Historic Preservation Office Correspondence

Cultural Resources Unit, Environmental Stewardship
395 John Ireland Boulevard, Mail Stop 620
Saint Paul, MN 55155-1800

April 1, 2025

VIA E-MAIL

Nicole Foss, Environmental Review Transportation Liaison
Minnesota State Historic Preservation Office
Administration Building #203
50 Sherburne Avenue
Saint Paul, MN 55155

Re: S.P. 074-070-009, East Side Corridor Project
Sec. 1, 12, 13, 14, 23, 24 – T107N – R20W & Sec. 36 – T108N – R20W, Steele County
Federal Review

Dear Ms. Foss:

Minnesota Department of Transportation Cultural Resources Unit (MnDOT CRU) staff meeting the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739) in archaeology, history, and architectural history have reviewed the above-referenced project pursuant to our Federal Highway Administration (FHWA)-delegated responsibilities for compliance with Section 106 of the National Historic Preservation Act (54 USC 300108) and its implementing regulations, 36 CFR 800, and under the terms of the *Programmatic Agreement Among the Federal Highway Administration, the Minnesota State Historic Preservation Office, the Advisory Council on Historic Preservation; the Department of the Army, Corps of Engineers, St. Paul District; and the Minnesota Department of Transportation; Regarding Implementation of the Federal-Aid Highway Program in Minnesota* (Statewide PA). The project will receive funding from the FHWA and will require permits from the US Army Corps of Engineers.

We also reviewed the above-referenced project to determine whether MnDOT has responsibilities under Minnesota Statutes regarding cultural resources. Compliance with Minnesota Statute is the responsibility of the entity doing, funding, or licensing the work under the Minnesota Historic Sites Act (Minn. Stat. 2023 138.661-138.669); or the agency controlling any public lands that may be affected by proposed work (e.g., right-of-way or through temporary or permanent easements) for the Minnesota Field Archaeology Act (Minn. Stat. 2023 138.31-138.42). Steele County is responsible for compliance with the Minnesota Historic Sites Act for this project since it is funding or permitting the project. Steele County is responsible for compliance with the Minnesota Field Archaeology Act on this project since it controls the land on which the project will occur.

We are writing to consult with the Minnesota State Historic Preservation Office (MnSHPO) pursuant to MnDOT's duties and responsibilities under federal law and the Statewide PA. Although our review was limited to MnDOT's duties and responsibilities under the Statewide PA, this letter also will facilitate Steele County's ability to meet their responsibilities under Minnesota Statute.

Project Description

2024 Project Scope

The proposed project, as described in the Cultural, Noise, and Threatened & Endangered Review Request form dated March 15, 2023, includes improvements to approximately two-thirds of a mile of SE 18th Street, the construction of roughly 3.4 miles of new road corridor for County State Aid Highway 8 (CSAH 8), and the realignment of segments of County Road 180 (Claremont Road) and NE 26th Street in Owatonna and Clinton Falls Townships, Steele County. Please refer to the enclosed APE maps and plan documents (EastSide Corridor + Profile 2025_0318.pdf). The project will upgrade the existing SE 18th Street gravel township roadway to include two 12-foot paved travel lanes, 6-foot-wide paved shoulders, and an 8-foot paved trail along the north side. A 5-foot boulevard will be situated between the roadway and the trail. Additionally, the project will construct a new north-south road from the eastern end of the SE 18th Street improvements north to CSAH 8 (Kenyon Road), spanning approximately 3.4 miles. This new road will be designated as part of CSAH 8 and is expected to be classified as a major collector or minor arterial, featuring an approximate 150-feet-wide right of way (R/W). The new segment of CSAH 8 will contain two travel lanes with dedicated left- and right-turn lanes at selected intersections: SE 18th Street, County Road 180 (Claremont Road), CSAH 19 (Rose Street), CSAH 35 (Dane Road), and NE 26th Street. Six-foot paved shoulders will be constructed along the entire length of the corridor. An 8-foot-wide paved trail will also be added along the west side of the corridor, separated from the roadway by a 5-foot boulevard, except at the bridges over Maple Creek and the Canadian Pacific Railroad (XX-RRD-CSP017/018/022).

As part of the construction of CSAH 8 a portion of County Road 180 (CR 180) will be realigned to provide better separation of the new intersection at CSAH 8/CR 180 from the Canadian Pacific Railroad corridor. A segment of Havana Road will be removed as part of this realignment. A segment of the existing alignment of CSAH 8 (Kenyon Road) northeast of NE 26th Street will be removed to route traffic to the new segment of CSAH 8. Intersection improvements will occur along NE 26th Street to maintaining access to the farmstead along the existing alignment of CSAH 8 (2697 Kenyon Road).

Four bridges will be constructed as part of the project:

- A bridge/culvert over Izaak Walton Creek south of the Canadian Pacific Railway.
- A bridge over the Canadian Pacific Railway, to separate auto and train traffic.

- A bridge/culvert over County Ditch 74 between CSAH 19 (Rose Street) and CSAH 35 (Dane Road).
- A bridge over Maple Creek between CSAH 35 (Dane Road) and NE 26th Street.

In October 2024, Steele County proposed an alternate route ("Alternative Route 3B" See Attached APE Maps) for the East Side Corridor to be reviewed by the MnDOT CRU along with the original route. Alternative Route 3B is approximately 1.15 miles of the new north-south constructed CSAH 8 road between School Street and Dane Road, this segment of the road alignment is shifted approximately 700 feet to the east. See enclosed *S.P. 074-070-009 Project Layout 3B (June 4, 2024).* This findings letter will review both the original corridor and the "Alternative Route 3B" segment.

2025 Project Scope

In February 2025, Steele County added to the 2024 scope of the East Side Corridor Project, see enclosed APE Maps that define the 2024 and updated 2025 APE and review areas and plan documents (*EastSide Corridor + Profile 2025_0318.pdf*). These added elements include adding a noise wall between the new CSAH 8 and the neighborhood between Rose Street and Stone Creek Drive NE, and six pond locations. Other added elements include four roundabouts, extending area of road repaving on NE 26th Street and Dane Road, and minimizing construction on SE 18th Street and the connection to Kenyan Road. None of the added scope items will expand the width or depth of existing roadway disturbance. See below for list of roundabout locations.

Roundabout intersections:

- 26th Street NE and Kenyon Rd
- 26th Street and the new CSAH 8
- Dane Road and new CSAH 8
- Rose Street and new CSAH 8

Based on the information provided by the project proposer and pursuant to 36 CFR 800.3 and Stipulation 3.C of the Statewide PA, MnDOT CRU has determined that the proposed project constitutes a federal undertaking as defined in 36 CFR 800.16(y) for FHWA and the US Army Corps of Engineers and that it has the potential to cause effects to historic properties. Further, MnDOT CRU has also determined that the proposed project is an undertaking subject to Minnesota Statute. Steele County is responsible for compliance with the Minnesota Historic Sites Act for this project since it is funding or permitting the project. Steele County is responsible for compliance with the Minnesota Field Archaeology Act on this project since it controls the land on which the project will occur.

Area of Potential Effects (APE)

Based on the project's April 29, 2022, plans, information provided in the March 15, 2023, review request form, project's June 4, 2024, alternate route option plans, and pursuant to 36 CFR 800.4 and Stipulation 3.C of the Statewide PA, MnDOT CRU has established an Area of Potential Effects (APE) as shown in the attached map. The APE for the project is defined as 150 feet to either side of the centerline of existing roads where work will occur and 375 feet to either side of the centerline of the proposed alignment of CSAH 8 or 350 feet to either side of the CSAH 8R/W. The vertical APE for the undertaking is six feet below ground surface except where bridge work will occur. At bridge locations, the vertical APE is 20 feet to accommodate the need for bridge pilings. See attached APE Maps that define the 2024 and updated 2025 APE and review areas.

Consultation & Public Involvement

On March 24, 2023, MnDOT CRU reviewed the undertaking's proposed activities for exemptions in existing consultation protocol agreements between FHWA and certain tribes. After initial review of these agreements, MnDOT CRU notified the following Tribal Nations about the undertaking, pursuant to 36 CFR 800 and Minn. Stat. 10.65: Fort Peck Tribes, Lower Sioux Indian Community, Prairie Island Indian Community, Santee Sioux Nation, Shakopee Mdewakanton Sioux Community, and Upper Sioux Community. We specifically requested input into the process of identifying historic properties of religious or cultural significance and sought the Tribal Nation's interest in becoming a consulting party. Fort Peck responded to our request stating that the project would have no adverse effects to properties of historical or cultural significance to the Fort Peck Assiniboine and Sioux Tribes. No additional responses were received from other Tribal Nations we notified.

The project area is not represented by a local heritage preservation commission (HPC). The State Historic Site Network maintained by the Minnesota Historical Society (Minn. Stat. 2023 138.662) was reviewed and no state historic sites were identified within the APE; therefore, no coordination is needed with the Minnesota Historical Society.

Identification of Properties

Following the delineation of the APE, MnDOT CRU set review areas to guide identification efforts. The archaeological review area includes areas of potential ground disturbance, anticipated easements, and R/W acquisitions plus a 50 to 150-foot buffer. The architecture history review area included properties with parcels intersecting the APE. On March 22, 2023, and April 24, 2024, MnDOT CRU staff reviewed information on state-designated and listed properties, significant archaeological and historic sites, burials/cemeteries, and other previously inventoried properties in databases maintained by the MnSHPO, OSA, and the Minnesota Indian Affairs Council (MIAC), including the unrecorded historic cemeteries data layer available via the OSA Web Portal. No previously recorded archaeological sites, burials/cemeteries, or

state-designated or National Register-listed properties were identified within the archaeological review area or the architecture-history review area. In addition to the consultation with Tribal Nations described above, we also sent an Information Request to OSA and MIAC on March 22, 2023, asking if they were aware of any sites in the APE that were not identified in our searches. The OSA provided information regarding a 1991 communication found in their burial files concerning a proposed runway construction project at the Owatonna Airport in Sec. 36 – T108N – R20W. The MIAC identified no additional sites. The Owatonna Airport is located approximately 3.5 miles west of the north end of the proposed undertaking, largely in Sec. 32 – T108 – R20W. No physical evidence or additional reference to burials within Sec. 36 – T108N – R20W were identified during our review for the project.

Based on the identification efforts described above and pursuant to 36 CFR 800.4 and Stipulations 3.D and 3.E of the Statewide PA, MnDOT CRU has determined there are two (2) historic properties in the APE, as described below. Further, identification efforts indicate there are no properties subject to the above-referenced Minnesota Statutes in the project APE.

Archaeological Investigations

Westwood completed archaeological investigations in October 2023 of the original alignment and in November 2024 of the added alternative route; see enclosed *Phase I Archaeological Investigation MnDOT CSAH 8 Realignment Project (SP 074-070-009) Steele County, Minnesota*[1]*.* The archaeological investigations included a Phase Ia literature search and Phase I archaeological assessment of the ARA. The Phase I survey of the archaeological review area included a pedestrian survey and a total of 17 shovel tests. On one seven-acre parcel (County Pin 080123200), the consultant did not receive approval for access and therefore it was not able to be field reviewed; the location of this parcel is identified in the Exhibit 2 map in Westwood's archaeological report. This parcel consisted entirely of plowed fields in a low potential area for archaeological resources, and, therefore, MnDOT CRU determined that survey was not warranted. No archaeological sites were identified. **MnDOT agrees with and adopts the consultant's findings and recommendation that no further survey is warranted**.

Architecture History Investigations

MnDOT contracted with Westwood to undertake the Phase I/II architecture history survey of the Project APE. Survey was conducted in November 2023 of the original alignment and in September 2025 of the added alternative route; see enclosed *Phase I and II*

[1] Steeves, Ryan, Lindsay Schwartzkopf, and Rigden Glaab. 2025. *Phase I Archaeological Investigation MnDOT CSAH 8 Realignment Project (SP 074-070-009) Steele County, Minnesota.* Prepared for MnDOT by Westwood Professional Services.

Architecture/History Investigations for the Proposed MnDOT CSAH 8 Realignment Project (SP 074-070-009) Steele County, Minnesota[2]*.*

Identified Resources

Westwood identified and surveyed eleven (11) properties at the Phase I level and all were determined to be not eligible. The consultant conducted a Phase II evaluation of a stone culvert (XX-RRD-CNW034). The culvert (XX-RRD-CNW034) was determined not individually eligible but was determined to be a contributing resource within the CNW Railroad Corridor Historic District (XX-RRD-CNW027/028) (Table 1) (see attached consultant report; the Phase I inventory forms have been submitted to your office via MnSHIP). MnDOT agrees with and is adopting the consultant's recommendations for these properties.

Table 1: Newly Identified Architecture History Properties

Inventory No.	Property Name/Type	Address	Current Investigation
ST-CLI-00015	Farmstead	2697 Kenyon Rd	Not Eligible
ST-CLI-00026	Farmstead	2926 26th St NE	Not Eligible
ST-ONA-00039	Farmstead	2829 Dane Rd	Not Eligible
ST-ONA-00046	Farmstead	2548 18th St SE	Not Eligible
ST-ONA-00055	Farmstead	1818 24th Ave SE	Not Eligible
ST-ONA-00062	Farmstead	2567 School St	Not Eligible
ST-ONA-00069	House	2401 26th St NE	Not Eligible
ST-ONA-00070	House	1545 26th St NE	Not Eligible
ST-ONA-00071	House	2857 26th St NE	Not Eligible
ST-OWA-00429	House	2120 26th St NE	Not Eligible
ST-OWA-00430	House	2715 Deer Trail Ln NE	Not Eligible
XX-RRD-CNW034*	Stone culvert, Chicago and Northwestern (CNW)	Approximately 0.37 mile west of Havana Road	Contributing resource to the CNW Railroad Corridor Historic District.[3] Not individually eligible.

* Received a Phase II level evaluation

[2] Nelson, Sara J. 2025. *Phase I and II Architecture/History Investigations for the Proposed MnDOT CSAH 8 Realignment Project (SP 074-070-009) Steele County, Minnesota. Prepared for MnDOT by Westwood Professional Services.*

[3] CNW Railroad Corridor Historic District (XX-RRD-CNW027 and XX-RRD-CNW028)

Previously Inventoried Properties

Five (5) previously inventoried segments and lines of railroad corridor historic districts intersect with the APE (Table 2). Three (3) of the corridor historic districts have been previously determined eligible, the Chicago North Western (CNW) corridor districts were determined eligible by MnDOT and the Chicago, Milwaukee, St. Paul and Pacific (CSP) corridor district was recommended eligible by MnDNR. MnDOT agrees with and adopts MnDNR's recommendation.

Table 2. Previously Inventoried in the APE

Inventory No.	Current railroad	Historic Railroad Company	NRHP Eligibility
XX-RRD-CNW027	Chicago and Northwestern (CNW)	Winona & St. Peter RR Co./Chicago & North Western RY Co.: Main Line	Eligible (2024-1799[4])
XX-RRD-CNW028		Winona & St. Peter RR Co./Chicago & North Western RY Co.: Main Line, Winona to Mankato	Eligible (2024-1799[5])
XX-RRD-CSP017	Chicago, Milwaukee, St. Paul and Pacific (CSP)	Chicago Milwaukee St. Paul & Pacific RR Co., Owatonna to Austin	Not Eligible (2021-1948[6])
XX-RRD-CSP018		Minnesota Central RY Company/ Milwaukee & St. Paul RY Co./Chicago Milwaukee & St. Paul RY Co./Chicago Milwaukee St. Paul & Pacific RR Co.	Not Eligible (2021-1948[7])

[4] SHPO concurrence with eligible determination on August 7, 2024, "Re: Chicago and North Western Railway Company and Chicago Great Western Railway Company: Phase II Evaluations (SHPO No. 2024-1799)" from Amy Spong, SHPO, to Britta Anderson, MnDOT.
[5] See above
[6] MnSHPO concurrence with determinations of eligibility on June 8, 2021, "Chicago Milwaukee St. Paul and Pacific: Iowa and Minnesota Division Railroad Corridors Phase II Evaluations (SHPO No. 2021-1948), from Sarah Beimers, MnSHPO, to Miranda Van Vleet, MnDNR.
[7] See above

Inventory No.	Current railroad	Historic Railroad Company	NRHP Eligibility
XX-RRD-CSP022		Minnesota Central RY Co./Milwaukee & St. Paul RY Co./Chicago Milwaukee & St. Paul RY Co./Chicago Milwaukee St. Paul & Pacific RR Co., Owatonna to Austin	Eligible (2021-1948[8])

Summary

There are or three (3) architectural history historic properties in the APE.

- Winona & St. Peter Railroad Co./Chicago & North Western Railway Co.: Main Line (XX-RRD-CNW027) / Winona & St. Peter Railroad Co./Chicago & North Western Railway Co.: Main Line, Winona to Mankato (XX-RRD-CNW028)
    - Stone Culvert (XX-RRD-CNW034) – Contributing

- Minnesota Central Railway Co./Milwaukee & St. Paul Railway Co./Chicago Milwaukee & St. Paul Railway Co./Chicago Milwaukee St. Paul & Pacific Railroad Co., Owatonna to Austin

Assessment of Effects

MnDOT CRU contracted Westwood to complete an assessment of effects on the historic properties within the APE. Westwood reviewed project documentation, assessed effects for the historic property within the APE, and made the following effects assessment in the letter report, *Architecture/History Assessment of Effects for CSAH 8 (SP 074-070-009), Steele County, Minnesota*:

Table 3. Historic Properties Assessed for Adverse Effect

Inventory No.	Current railroad	Historic Railroad Company	Finding of Effect
XX-RRD-CNW027		Winona & St. Peter RR Co./Chicago & North Western RY Co.: Main Line	No Adverse Effect
XX-RRD-CNW028		Winona & St. Peter RR Co./Chicago & North	No Adverse Effect

[8] See above

Inventory No.	Current railroad	Historic Railroad Company	Finding of Effect
	Chicago and Northwestern (CNW)	Western RY Co.: Main Line, Winona to Mankato	
XX-RRD-CNW034		Stone culvert, CNW RY	No Adverse Effect (not individually eligible but contributing to historic property)
XX-RRD-CSP022	Chicago, Milwaukee, St. Paul and Pacific (CSP)	Minnesota Central RY Co./Milwaukee & St. Paul RY Co./Chicago Milwaukee & St. Paul RY Co./Chicago Milwaukee St. Paul & Pacific RR Co., Owatonna to Austin	No Adverse Effect

MnDOT agrees with and adopts the consultant's recommendations of No Adverse Effect to historic properties.

Conclusion & Request for Comments: No Adverse Effect

Pursuant to 36 CFR 800.5(b) and (d)(1) and Stipulation 3.G of the Statewide PA, MnDOT CRU finds that the federal undertaking, as currently proposed, will have **No Adverse Effect** on two (2) historic properties.

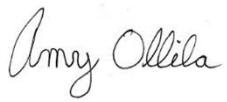
This letter also documents that MnDOT has no responsibilities under the Minnesota Historic Sites Act or the Minnesota Field Archaeology Act. Steele County is responsible for compliance with Minnesota Statute as the entity funding or permitting the project and since it controls the lands on which the project will occur.

It is the responsibility of Steele County to notify MnDOT CRU of any plan changes, including development of utility plans, so we can determine if an additional review under Section 106 is required. If your project requires a permit from the Army Corps of Engineers, please attach this findings letter to your permit as proof that the Section 106 process has been completed on their behalf through the terms of the Statewide PA.

Pursuant to Stipulation 3.G of the Statewide PA, we request any comments from your office within 30 days of receipt of this letter. Specifically, we are requesting comments from your office on the determinations of eligibility and findings of effect.

Please do not hesitate to contact me if you have any questions, require additional information on the historic properties or potential effects, or would like to schedule a meeting to discuss the project.

Sincerely,



Archaeologist
Cultural Resources Unit
Office of Environmental Stewardship, MnDOT
Amy.ollila@state.mn.us | 612-394-7080

Encl. Area of Potential Effects (APE) Maps –
SP074_070_009APE_FullMap.pdf
SP074_070_009APE_NorthMap.pdf
SP074_070_009APE_SouthMap.pdf

EastSide Corridor + Profile 2025_0318.pdf
S.P. 074-070-009 Project Layout 3B (June 4, 2024).pdf
Phase I Archaeological Investigation MnDOT CSAH 8 Realignment Project (SP 074-070-009) Steele County, Minnesota (Westwood Professional Services, January 2025
Phase I and II Architecture/History Investigations for the Proposed MnDOT CSAH 8 Realignment Project (SP 074-070-009) Steele County, Minnesota (Westwood Professional Services, January 2025)
Architecture/History Assessment of Effects for CSAH 8 (SP 074-070-009), Steele County, Minnesota (Westwood Professional Services, January 2025)

CC: CRIS (Administrative Record)
Jack Corkle, WSB
Ryan Grohnke, Westwood Professional Services

Cultural Resources Unit, Environmental Stewardship
395 John Ireland Boulevard, Mail Stop 620
Saint Paul, MN 55155-1800

July 3, 2025 VIA E-MAIL

Nicole Foss, Environmental Review Transportation Liaison
Minnesota State Historic Preservation Office
Administration Building #203
50 Sherburne Avenue
Saint Paul, MN 55155

Re: S.P. 074-070-009, East Side Corridor Project
Sec. 1, 12, 13, 14, 23, 24 – T107N – R20W & Sec. 36 – T108N – R20W, Steele County
Federal Review

Dear Ms. Foss:

Thank you for your April 29, 2025, (SHPO Number 2025-1020) letter regarding the completion of the review of our agency's submission of a No Adverse Effect findings for the referenced federal undertaking pursuant to our Federal Highway Administration (FHWA)-delegated responsibilities for compliance with Section 106 of the National Historic Preservation Act (54 USC 300108) and its implementing regulations, 36 CFR 800, and under the terms of the *Programmatic Agreement Among the Federal Highway Administration, the Minnesota State Historic Preservation Office, the Advisory Council on Historic Preservation; the Department of the Army, Corps of Engineers, St. Paul District; and the Minnesota Department of Transportation; Regarding Implementation of the Federal-Aid Highway Program in Minnesota* (Statewide PA).

This letter is to respond to the letter's request for more information and clarification to aid in your continued review of S.P. 074-070-009, East Side Corridor Project submitted to your office on April 1, 2025.

Your comment:

"We were not able to concur with the eligibility determinations for the following properties, as **information was missing in the MnSHIP submittals**. These forms have been returned to the form preparer via MnSHIP with the following information requested:

• ST-ONA-00070 House - Please address whether or not the property has significance under each of the four National Register Criteria (A through D).

• ST-OWA-00430 House - Please address whether or not the property has significance under each of the four National Register Criteria (A through D).

• XX-RRD-CNW034 railroad culvert – Please upload the PDF attachment and thumbnail. No attachments were included in this submittal."

Our response:

The three referenced inventory forms have been updated to apply the comments and resubmitted to MnSHIP on May 6, 2025.

Your comment:

"We **request clarification** on why the following six properties within the APE, which contain buildings or structures of survey age, were not inventoried for this project:

• 08-001-3300 Residential Agricultural 2475 Dane Rd

• 08-001-4202 Residential 2674 Dane Rd

• 08-013-1300 Residential Agricultural 3094 Havana Rd

• 08-013-4200 Communications 2668 Havana Rd

• 08-023-1300 Residential 1945 18th St SE

• 08-024-3400 Residential Agricultural 2183 24th Ave SE."

Our response:

Property	**Reason not inventoried**
08-001-3300 Residential Agricultural 2475 Dane Rd	Distance from project
08-001-4202 Residential 2674 Dane Rd	Distance from project
08-013-1300 Residential Agricultural 3094 Havana Rd	Distance from project
08-023-1300 Residential 1945 18th St SE	Distance from project
08-024-3400 Residential Agricultural 2183 24th Ave SE	Distance from project /visual screening

Property: ST-ONA-00061 08-013-4200 Communications Havana Rd

08-013-4200 Communications Havana Rd has been inventoried by MnDOT CRU and is enclosed with this submission for your review. Since MnSHIP already has a number associated with the property, MnDOT CRU was not able to upload the inventory on the website. Please add this inventory form to that associated number of ST-ONA-00061.

The property, KRFO Radio Communications Shed, has been found to be ineligible for the National Register for Historic Places.

Conclusion & Request for Comments: No Adverse Effect

Pursuant to 36 CFR 800.5(b) and (d)(1) and Stipulation 3.G of the Statewide PA, MnDOT CRU finds that the federal undertaking, as currently proposed, will have **No Adverse Effect** on two (2) historic properties.

The new inventory of property 08-013-4200 Communications 2668 Havana Rd has not changed the **No Adverse Effect** finding.

This letter also documents that MnDOT has no responsibilities under the Minnesota Historic Sites Act or the Minnesota Field Archaeology Act. Steele County is responsible for compliance with Minnesota Statute as the entity funding or permitting the project and since it controls the lands on which the project will occur.

It is the responsibility of Steele County to notify MnDOT CRU of any plan changes, including development of utility plans, so we can determine if an additional review under Section 106 is required. If your project requires a permit from the Army Corps of Engineers, please attach this findings letter to your permit as proof that the Section 106 process has been completed on their behalf through the terms of the Statewide PA.

Pursuant to Stipulation 3.G of the Statewide PA, we request any comments from your office within 30 days of receipt of this letter. Specifically, we are requesting comments from your office on the determinations of eligibility and findings of effect.

Please do not hesitate to contact me if you have any questions, require additional information on the historic properties or potential effects, or would like to schedule a meeting to discuss the project.

Sincerely,

Amy Ollila

Archaeologist
Cultural Resources Unit
Office of Environmental Stewardship, MnDOT
Amy.ollila@state.mn.us | 612-394-7080

Encl. 08-013-4200 Communications 2668 Havana Rd ST-ONA-00061 Inventory form

CC: CRIS (Administrative Record)
Jack Corkle, WSB
Ryan Grohnke, Westwood Professional Services

Minnesota Individual Property Inventory Form – Continuation Sheet

Historic Name: KRFO Radio Communication Shed

Inventory No.: ST-ONA-00061

Associated MN Multiple Property Form (Name and Inventory No:

Narrative Description

The KRFO Radio Communication Shed is at 2668 Havana Road, Owatonna, MN 55060. The shed is located 7.9 acre parcel shaped like a triangle located in Steele County, Minnesota. The shed is located at the far west corner of the parcel facing Havana Road. The shed is associated with KRFO Radio Channel, AM 1390/94.7 FM.

The KRFO Radio Communication Shed was built 1970 as communication tower shed according to Steele County Parcel Record[1]. However, based on historic data and aerials, the building appears to have been built in 1951. The building is approximately 240 square feet in space. The parcel is zoned as agricultural, but the building classified as a commercial.[2] The building is owned by Townsquare Media, Inc.

The shed is a rectangular shaped building with concrete foundation and side gable roof. The shed has is clad in light grey shingles with gray asphalt roof shingles. The front façade (south elevation) has a solid metal door with two wood steps at the entrance. The door is flanked on either side by former window opens that have been enclosed or covered with plywood. A third window opening located on the west elevation and has also been covered with plywood. The west elevation has a electrical power gauge and various covered cords extending down the west elevation of the building. A single air conditioning unit is located on the east elevation and has a roof vent in the end gable. A large radio antenna is located east and north of the shed. A wood power pole is located west of the shed and connects power from the pole to the building. A gravel L-shaped driveway is located east of the shed and curves along the south elevation of the shed. The driveway is accessed from Havana Road.

The property has no formal or informal landscaping; around the shed, the parcel is predominately agricultural.

Statement of Significance

The history of radio stations in Minnesota and the United States started in 1912 with establishment of the Radio Act. The Radio Act was controlled by the Secretary of Commerce, who was Herbert Hoover at the time. The Act authorized the Secretary to issue licenses to every applicant, and did not provide him with any regulatory powers.[3] The North American Regional Broadcasting Agreement established the protocol for call letters. Stations east of the Mississippi started with K, and those west started with W. Canadian stations started with C, and Mexican stations started with X. At first call letters had only three letters, but they were quickly exhausted in the 20's and a fourth was added.

[1] "Parcel Report for Parcel No. 08-013-4200 ," Steele County Assessor Website, https://steele.minnesotaassessors.com/parcel.php?parcel=08-013-4200.
[2] "Parcel Report for Parcel No. 08-013-4200 ," Steele County Assessor Website, https://steele.minnesotaassessors.com/parcel.php?parcel=08-013-4200.
[3] "Twin Cities Radio Timeline," St. Louis Park Historical Society, https://durenberger.com/wp-content/uploads/2019/10/MINNESOTA-RADIO-HISTORY.pdf.

By 1927, the Commerce Department was required to issue any applicants with a broadcasting license and lacked any regulatory authority. As such, Congress passed the Radio Act of 1927 (P.L 632, 69th Congress) to better control the new industry; there were concerns about First Amendment rights and the ways the new medium would be used.[4]

The first public radio station in Minnesota was started in 1912 at the University of Minnesota by Dr. Franklin Wesley (F.W.) Springer.[5] The intent of the radio station was to broadcast the University of Minnesota Football games thus becoming the first Minnesota radio station and first sports radio station, simultaneously.[6] In 1912, most of the population didn't have radios, but a few people had ham radios. Dr. F.W. Springer's radio station was experimental and people with hams could dial-in to listen to a game from the University of Minnesota.[7] The first University of Minnesota football games are broadcasted in Morse code in morse code.[8] The radio station continued until World War I, but soon an electrical engineering professor C.M. Jansky, Jr. was broadcasting again by 1920.[9] Minnesota's first authorized radio station was KUOM, going on the air on January 13, 1922 from the University campus.[10]

The first commercial radio station was WLAG in Minneapolis and started airing in 1922. Like Dr. F.W. Springer's radio, WLAG was operated through ham radios with the radio station broadcasting from the Minneapolis City Hall Courthouse.[11] By the 1920s, AM radio stations were being created everywhere in Minnesota and the United States. Looking at the number of stations and the unregulated nature of early radio stations, most stations were hobbyist or individuals running a radio stations. The first radio news department in Minnesota and across the nation was WAMD, the forerunner to KSTP. WAMD also aired the first play-by-play hockey game in 1925.[12]

[4] Jennifer Davis, "Anniversary of the Radio Act of 1927, The Beginning of Broadcast Regulation," Library of Congress Blogs, February 23, 2016, Anniversary of the Radio Act of 1927, The Beginning of Broadcast Regulation | In Custodia Legis.
[5] Steve Marsh, "A Brief History of Radio in MN," *Mpls.St.Paul Magazine,* September 30, 2021, https://mspmag.com/arts-and-culture/timeline-radio-mn/.
[6] Kathryn Milewsk, "History of Radio, Sports, Broadcaster, Broadcasting How Did Sports Radio Broadcasting Begin? (Live365 History of Radio)," *Live 365,* March 03, 2023, https://live365.com/blog/how-did-sports-radio-broadcasting-begin/.
[7] Kathryn Milewsk, "History of Radio, Sports, Broadcaster, Broadcasting How Did Sports Radio Broadcasting Begin? (Live365 History of Radio)," *Live 365,* March 03, 2023, https://live365.com/blog/how-did-sports-radio-broadcasting-begin/.
[8] "History," Radio K (KUOM), University of Minnesota Radio Station, https://radiok.org/History.
[9] "History," Radio K (KUOM), University of Minnesota Radio Station, https://radiok.org/History.
[10] "Twin Cities Radio Timeline," St. Louis Park Historical Society, https://durenberger.com/wp-content/uploads/2019/10/MINNESOTA-RADIO-HISTORY.pdf.
[11] Alex Cosper, "Minneapolis-St. Paul Radio History," Tangent Sunset, 2005, https://www.tangentsunset.com/radiominn.htm.
[12] "Twin Cities Radio Timeline," St. Louis Park Historical Society, https://durenberger.com/wp-content/uploads/2019/10/MINNESOTA-RADIO-HISTORY.pdf.

Throughout the 1920s, the popularity of the radio grew from just 5 radio stations to 606 stations by the end of 1920.[13] Between 1930 and 1950s, the number of AM radio stations grew from 618 to 2,144 stations. AM stations on air began exceptionally to grow to 3,151 AM stations.[14]

A 1959 aerial photograph of the shed's current location shows agricultural fields with a shed building located near the current location. (Figure 2). The 1964 topographic map in the location of the shed notes a "Radio Tower" KRFO. (Figure 3). No other historic aerials, county plat maps or topographic maps provide further identification of the radio shed or tower.

The communication shed is associated with the radio station of KOBK in Owatonna, Minnesota as an AM broadcasting station. The Owatonna Broadcasting Company applied for the first license on December 18, 1950, with the call name, KOBK.[15] The radio call sign was changed to KRFO on May 1, 1956, and could be listened to on dial 1390 AM. From 1950 to 1956, the radio license was transferred seven times. In 1956, the radio license was transferred to Gerald J. "Jerry" Boos, Duane "Pink" Allen and Bob Behling in purchasing Owatonna Broadcasting Co., the licensee of radio station KOBK, later to be known as KRFO and KRFO-FM. The trio ran the radio station for 33 years with Jerry Boos acting as the radio station's operation as chief engineer, sales manager and secretary treasurer of the corporation for more than 33 years.[16] The station was sold on Oct. 1, 1989 to Cumulus Licensing Corporation based out of Atlanta, Georgia thus ending the locally owned radio station. In 2013, the Cumulus Media, former Cumulus Licensing Corporation, sold the license for KRFO to Townsquare Media.

Recommendation

This property postdates the context Urban Centers (1870-1940) and therefore was not evaluated under that context.

The property historically served as a radio transmission shed/tower from 1951 to current. Research shows that the radio tower and communication shed are still performing its purpose. Although it is still active and in use, there are 11 radios stations broadcasting out of Owatonna as of 2025. The shed and tower are associated with the of KOBK, later KRFO, the radio tower has been changed since 1951. The communication shed appears to be the same building based on historic aerials views of the driveway and roof shape. There, is no information available to indicate that it played more of a significant role than other communication shed or radio tower antenna in Owatonna or Steele County. Additionally, research does not indicate that the radio communications

[13] Amie Tennant, "Radio and Music in the 1920s United States," Family Search Blog, June 20, 2020, https://www.familysearch.org/en/blog/1920s-radio-music-america.
[14] Federal Communication Commission, Current Broad Authorizations Annual Report, 1983, https://babel.hathitrust.org/cgi/pt?id=uiug.30112105054578&view=1up&seq=105
[15] "Owatonna Broadcasting Company FFC License," Federal Communications Commission, FCC History Cards, 1950-1980, https://cdbs.recnet.com/corres/?doc=44278 .
[16] "Gerald 'Jerry' J. Boos's Obituary," *Brainard Dispatc,* April 03, 2002, https://www.brainerddispatch.com/obituaries/gerald-jerry-j-boos

are original that are housed in the shed and unlikely to possess any special significance. Although this property is associated with the rise of radio stations around the State of Minnesota and United States, during the 1950s, no information was found to associate this property with any patterns or events with National Register of Historic Places (NRHP) significance on a local, statewide, or national scale, the property does not meet the significance requirements for NRHP Criterion A: Event.

The property has changed ownership throughout its history. The people with the longest period of ownership appears to be Gerald J. "Jerry" Boos, Duane "Pink" Allen and Bob Behling, who owned the Owatonna Broadcasting Company for 33 years before it was sold to a national media company. Although the group owned and operated the radio station, research does not indicate that Gerald J. Boos, Duane Allen or Bob Behling's time as proprietors were significant to the local area or that their accomplishments are best reflected through their time with this property. Therefore, the property does not meet the significance requirements for NRHP Criterion B for its association with Gerald J. Boos, Duane Allen or Bob Behling or Owatonna Broadcasting Company.

Although historic photographs of the communication shed are not available, the obvious alterations to the property, including infilling window units, new building siding and roof shingles, and solid metal door, as it diminishes the property's integrity of Workmanship, Design, and Association as a communication shed. Because the property does not demonstrate distinctive characteristics of a type, period, or method of construction, is not the work of a master, and does not possess high artistic value, it does not meet the significance requirements for NRHP Criterion C: Architecture/Engineering.

The property does not have potential to provide information important to history. Thus, it does not meet the significance requirements of Criterion D: Information Potential.

Because it does not have sufficient significance under Criteria A, B, C, or D, the KRFO Radio Communication Shed (ST-ONA-00061) is recommended **Not Eligible** for listing in the NRHP

References

Cosper, Alex. "Minneapolis-St. Paul Radio History." *Tangent Sunset*, 2005. Website accessed June 6, 2025, https://www.tangentsunset.com/radiominn.htm.

Davis, Jennifer. "Anniversary of the Radio Act of 1927, The Beginning of Broadcast Regulation." Library of Congress Blogs: February 23, 2016. Website accessed June 6, 2025, Anniversary of the Radio Act of 1927, The Beginning of Broadcast Regulation | In Custodia Legis.

Federal Communication Commission. Current Broad Authorizations Annual Report, 1983. Website accessed June 6, 2025, https://babel.hathitrust.org/cgi/pt?id=uiug.30112105054578&view=1up&seq=105

"Gerald 'Jerry' J. Boos's Obituary," *Brainard Dispatc,* April 03, 2002, Website accessed June 6, 2025, https://www.brainerddispatch.com/obituaries/gerald-jerry-j-boos.

"History." Radio K (KUOM). University of Minnesota Radio Station. Website accessed June 6, 2025, https://radiok.org/History.

Marsh, Steve. "A Brief History of Radio in MN." *Mpls.St.Paul Magazine:* September 30, 2021. Website accessed June 6, 2025, https://mspmag.com/arts-and-culture/timeline-radio-mn/.

Milewsk, Kathryn. "History of Radio, Sports, Broadcaster, Broadcasting How Did Sports Radio Broadcasting Begin? (Live365 History of Radio)." *Live 365:* March 03, 2023, Website accessed June 6, 2025, https://live365.com/blog/how-did-sports-radio-broadcasting-begin/.

"Owatonna Broadcasting Company FFC License." Federal Communications Commission. FCC History Cards, 1950-1980. Website accessed June 6, 2025, https://cdbs.recnet.com/corres/?doc=44278 .

Steele County Assessor Website. "Parcel Report for Parcel No. 08-013-4200." Steele County Assessor Website, Website accessed June 6, 2025, https://steele.minnesotaassessors.com/parcel.php?parcel=08-013-4200.

Tennant, Amie. "Radio and Music in the 1920s United States." Family Search Blog: June 20, 2020, Website accessed June 6, 2025, https://www.familysearch.org/en/blog/1920s-radio-music-america.

"Twin Cities Radio Timeline." St. Louis Park Historical Society. Website accessed June 6, 2025,

Maps



Figure 1. Map showing location of Radio Communication Shed. (Steele County GIS)

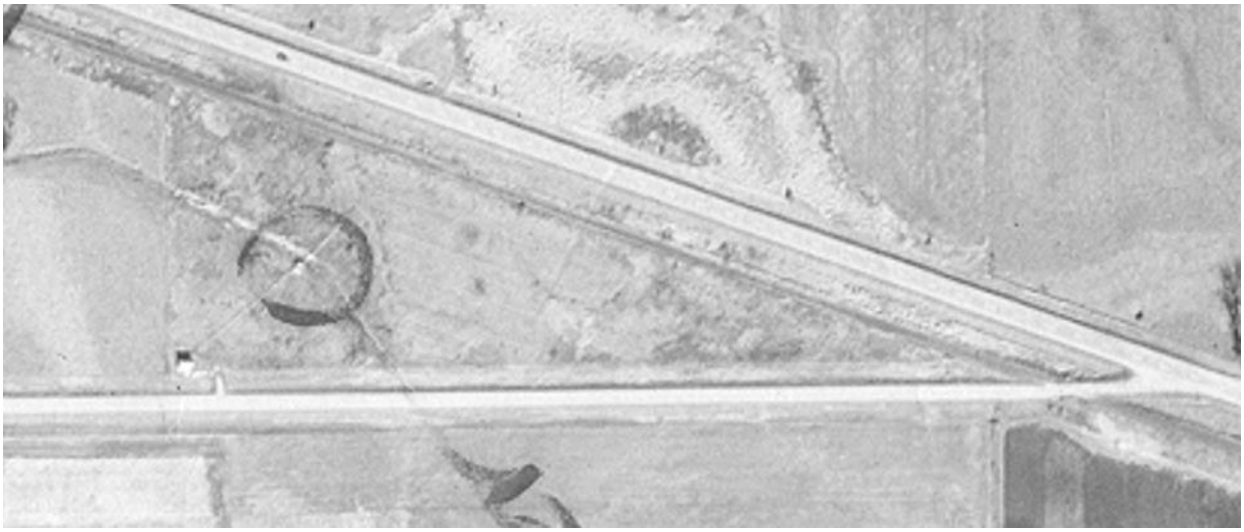


Figure 2. 1959 Historic aerial of location (Minnesota Historical Aerial Photographs Online)



Figure 3. 1962 7.5 Owatonna, MN Topographic Map (USGS Historical Topographic Map Viewer)

Photographs



Figure 4. Looking northwest toward KRFO Radio Communication Shed located along Havana Road



Figure 5. Looking northeast toward KRFO Radio Communication Shed located along Havana Road



Figure 6. An August 31, 1964 aerial photograph shows no development yet taking place where the Park (yellow box) would later be located. (MHAPO, Photograph BIP-EE-27)

July 29, 2025 **VIA EMAIL**

Amy Ollila
Cultural Resources Unit
MN Department of Transportation
395 John Ireland Blvd, MS 620
St. Paul, MN 55155-1899

RE: East Side Corridor Project, SP 074-070-009
Steele County (Federal Review)
SHPO Number: 2025-1020

Dear Ms. Ollila,

Thank you for continuing consultation with our office regarding the above-referenced project. Information received in our office via email on July 3, 2025 has been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108), its implementing federal regulations, "Protection of Historic Properties" (36 CFR Part 800), and per the terms of the 2015 Amended Programmatic Agreement (PA) executed among the Federal Highway Administration, the U.S. Army Corps of Engineers, the Advisory Council on Historic Preservation, and the Minnesota State Historic Preservation Office (SHPO).

We last wrote to your office on April 29, 2025 to provide concurrence on the definition the area of potential effect (APE) and nine determinations of eligibility, as well as to request additional information on three properties and clarification on why six properties within the APE were not inventoried.

We have now completed a review of your submittal which included the following documentation in support of your agency's No Adverse Effect finding for the proposed federal undertaking:

- Three Minnesota architecture-history inventory forms (Westwood, submitted via MnSHIP):
  - ST-ONA-00070 House
  - ST-OWA-00430 House
  - XX-RRD-CNW034 Railroad culvert
- One Minnesota architecture-history inventory form (MnDOT Cultural Resources Unit [CRU], submitted via email):
  - ST-ONA-00061 KRFO Radio Communication Shed.

Our comments are provided below.

Identification of Historic Properties

We appreciate the property-specific and contextual information provided for the radio communication shed (ST-ONA-00061), and **concur** that the following properties within the APE for the current undertaking are **not eligible** for listing in the National Register of Historic Places (NRHP):

- ST-ONA-00070 House
- ST-OWA-00430 House
- ST-ONA-00061 KRFO Radio Communication Shed
- XX-RRD-CSP017 Chicago Milwaukee St. Paul & Pacific RR Co., Owatonna to Austin (previous SHPO concurrence for SHPO Review No. 2021-1948, 6/8/2021).

- XX-RRD-CSP018 Minnesota Central RY Company/Milwaukee & St. Paul RY Co./Chicago Milwaukee & St. Paul RY Co./Chicago Milwaukee St. Paul & Pacific RR Co. (previous SHPO concurrence for SHPO Review No. 2021-1948, 6/8/2021).

We agree that the following **historic properties** are within the APE for the current undertaking:

- XX-RRD-CNW027 Winona & St. Peter RR Co./Chicago & North Western RY Co.: Main Line (NRHP-eligible);
- XX-RRD-CNW028 Winona & St. Peter RR Co./Chicago & North Western RY Co.: Main Line, Winona to Mankato (NRHP-eligible);
- XX-RRD-CNW034 culvert, which is part of the historic fabric of, and contributes to the significance of, XX-RRD-CNW027 and XX-RRD-CNW028, and
- XX-RRD-CSP022 Minnesota Central RY Co./Milwaukee & St. Paul RY Co./Chicago Milwaukee & St. Paul RY Co./Chicago Milwaukee St. Paul & Pacific RR Co., Owatonna to Austin (NRHP-eligible).

Assessment and Finding of Effect

If the undertaking will be carried out as described in your submittal, specifically the extent of the project activities and construction limits described in your letter and email, then we will concur with your agency's finding that the undertaking, as currently proposed, will have **no adverse effect** on historic properties.

Implementation of the undertaking in accordance with this finding, as documented, fulfills the federal agency's responsibilities under Section 106. If, subsequent to this review by our office, your agency receives an objection to Section 106 determinations and/or findings from a consulting party, or project is not constructed as proposed, including, but not limited to, a situation where design changes to the currently proposed project diverts substantially from what was presented at the time of this review, then your agency will need to reopen Section 106 consultation with our office pursuant to 36 CFR 800.5(d)(1) and pursuant to the intent of state statutes.

Please contact Nicole Foss at (651) 201-3248 or nicole.foss@state.mn.us if you have any questions regarding our review of this project.

Sincerely,



Amy Spong
Deputy State Historic Preservation Officer

Attachment I – Correspondence with the Office of the State Archaeologist and the Minnesota Indian Affairs Council

From: Daniil Solovev
To: OSA.Project.Reviews.adm@state.mn.us
Cc: Jack Corkle; Andrew Plowman
Subject: Second Follow-Up on Project Review Request – SP 074-070-009 29th Ave/East Side Corridor
Date: Monday, July 7, 2025 9:46:00 AM

Hello,

I'm following up on the Project Review Request submitted on April 7, 2025, for SP 074-070-009, the 29th Ave/East Side Corridor project located in Steele County. We previously followed up on May 27, 2025, but have not yet received a response. I wanted to check on the status of the review and see if any additional information is needed to assist in completing it. I'd be happy to provide any documents or clarification as needed.

Please let me know if there are any questions or if additional information is needed to complete your review. I'm happy to provide anything further to assist with the process.

Thank you again for your time and assistance.

From: Daniil Solovev
Sent: Tuesday, May 27, 2025 10:08 AM
To: OSA.Project.Reviews.adm@state.mn.us
Cc: Jack Corkle <JCorkle@wsbeng.com>; Andrew Plowman <APlowman@wsbeng.com>
Subject: Follow-Up on Project Review Request – SP 074-070-009 29th Ave/East Side Corridor

Hello,

I'm following up on the Project Review Request submitted for SP 074-070-009, the 29th Ave/East Side Corridor project located in Steele County.
Please let me know if there are any questions or if additional information is needed to complete your review. I'm available to assist with anything further.

Thank you again for your time and assistance.

From: Daniil Solovev
Sent: Monday, April 7, 2025 7:15 AM
To: OSA.Project.Reviews.adm@state.mn.us
Cc: Jack Corkle <JCorkle@wsbeng.com>; Andrew Plowman <APlowman@wsbeng.com>
Subject: OSA Project Review Request – 29th Ave/East Side Corridor SP 074-070-009

Hello,

I am submitting a Project Review Request for the SP 074-070-009 29th Ave/East Side Corridor located in Steele County.

In accordance with OSA's review process, I have attached the completed Project Review Form along with all relevant supporting documentation.

If additional information is required, please let me know. Thank you.

From:	Kaylynn Sieverding
To:	OSA.project.reviews.adm@state.mn.us
Subject:	Third Follow-Up on Project Review Request - SP 074-070-009 29th Ave/East Side Corridor
Date:	Wednesday, July 30, 2025 12:49:00 PM
Attachments:	2025-1020 East Side Corridor Steele Co SHPO Comment Letter 20250729.pdf

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Hello,

I'm following up on the Project Review Request submitted on April 7, 2025, for the 29th Ave/East Side Corridor project (SP 074-070-009) in Steele County. Daniil Solevev (WSB) previously followed up on May 27, 2025, and July 7, 2025, but has not yet received a response/finalized review. I wanted to check on the status of the review and see if any additional information is needed to assist in completing it.

I have attached the SHPO concurrence letter based on CRU's findings and determination to further assist OSA's review.

Thank you for your time and attention to this matter.

From: Daniil Solovev
To: MIAC.culturalresources@state.mn.us
Cc: Jack Corkle; Andrew Plowman
Subject: Second Follow-Up on Project Review Request – SP 074-070-009 (29th Ave/East Side Corridor, Steele County)
Date: Monday, July 7, 2025 9:44:00 AM

Hello,

I'm following up on the Project Review Request submitted on April 7, 2025, for the 29th Ave/East Side Corridor project (SP 074-070-009) in Steele County. We previously followed up on May 27, 2025, but have not yet received a response. I wanted to check on the status of the review and see if any additional information is needed to assist in completing it. I'd be happy to provide any documents or clarification as needed.

Please let me know if any additional information is needed to complete the review. I'd be happy to provide any further documentation or clarification as needed.

Thank you for your time and attention to this project.

From: Daniil Solovev
Sent: Tuesday, May 27, 2025 10:13 AM
To: MIAC.culturalresources@state.mn.us
Cc: Jack Corkle <JCorkle@wsbeng.com>; Andrew Plowman <APlowman@wsbeng.com>
Subject: Follow-Up on MIAC Project Review Request – SP 074-070-009

Hello,

I'm following up on the Project Review Request submitted on April 7, 2025, for the 29th Ave/East Side Corridor project (SP 074-070-009) in Steele County.

Please let me know if any additional information is needed to complete your review. I'm happy to provide further details if necessary.

Thank you for your time and consideration.

From: Daniil Solovev
Sent: Monday, April 7, 2025 7:15 AM
To: MIAC.culturalresources@state.mn.us
Cc: Jack Corkle <JCorkle@wsbeng.com>; Andrew Plowman <APlowman@wsbeng.com>
Subject: MIAC Project Review Request – 29th Ave/East Side Corridor SP 074-070-009

Hello,

I am submitting a Project Review Request for the SP 074-070-009 29th Ave/East Side Corridor located in Steele County.

In accordance with MIAC's review process, I have attached the completed Project Review Form along with all relevant supporting documentation.

If additional information is required, please let me know. Thank you.

From:	Kaylynn Sieverding
To:	MIAC Cultural Resources
Subject:	Third Follow-Up on Project Review Request - SP 074-070-009 (29th Ave/East Side Corridor, Steele County)
Date:	Wednesday, July 30, 2025 12:42:00 PM
Attachments:	2025-1020 East Side Corridor Steele Co SHPO Comment Letter 20250729.pdf

Hello,

I'm following up on the Project Review Request submitted on April 7, 2025, for the 29th Ave/East Side Corridor project (SP 074-070-009) in Steele County. Daniil Solevev (WSB) previously followed up on May 27, 2025, and July 7, 2025, but has not yet received a response/finalized review. I wanted to check on the status of the review and see if any additional information is needed to assist in completing it.

I have attached the SHPO concurrence letter based on CRU's findings and determination to further assist MIAC's review.

Thank you for your time and attention to this matter.

Attachment J – Visual Impacts Analysis (VIA)

Abbreviated Visual Impact Assessment

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Appendix B – Visual Impact Assessment (VIA) Questionnaire and Rationale

Appendix C – City of Owatonna Comprehensive Plan Excerpts

1.0 Introduction

The Federal Highway Administration (FHWA) published the Guidelines for the Visual Impact Assessment of Highway Projects in January 2015 as an update to the original 1980s Visual Impact Assessment (VIA) document. The new guidelines are more efficient and comprehensive and provide a roadmap for conducting the assessment. This memorandum incorporates these new guidelines into the visual analysis.

The VIA is written as an independent report and the results of the VIA are incorporated by reference and briefly summarized in the Project's Environmental Assessment Worksheet (EAW). There are four steps in the new VIA process:

- **Establishment:** Defines study area, viewsheds, and landscape constraints
- **Inventory:** Identifies the affected environment visual quality
- **Analysis:** Evaluates potential impacts of the project to visual resources and identifies the adverse, beneficial, or neutral effects of the project
- **Mitigation:** Identifies and establishes mitigation measures for adverse effects

2. 0 Project Description

The proposed Project is in Steele County in southeastern Minnesota (**Appendix A, Figure 1**). This area is located near the eastern edge of the developed part of Owatonna and in Owatonna and Clinton Falls Townships (**Appendix A, Figures 2-4**). More details on the Project are provided in the following paragraphs and shown in the project layout, included in **Appendix A, Figure 5**. The right of way (ROW) for the new roadway would be approximately 150 feet wide.

The proposed Project would include these key elements:

1. **Construct 29th Avenue/East Side Corridor.** Construct a new north-south county highway from SE 18th St to County State Aid Highway (CSAH) 8/Kenyon Road – an approximately 3.4-mile-long roadway that would tie into existing CSAH 8/Kenyon Rd. The new highway would have two travel lanes for vehicles - one in each direction. A new bridge, approximately 350 feet long, would be constructed over Maple Creek and its associated floodway.

   The roadway would include a combination of rural, urban and hybrid (urban west side, rural east side) sections. Rural sections have ditches to move stormwater runoff, and urban sections use curb and gutter and a piped drainage system to collect and move stormwater runoff. The hybrid section uses a combination of rural and urban drainage elements. The hybrid section would be from SE 18th St to School St; the rural section would be from 26th St NE to the connection on Kenyon Road; and the urban section would go from School St to 26th St NE.

   All the sections would include 12-foot driving lanes and 6-foot paved shoulders. In the urban and suburban sections, the west side of the roadway would have 5- to 15-foot-

wide boulevard and a 10-foot-wide multiuse trail extending along the new highway between SE 18th St and 26th St NE.

2. **Remove Portion of CSAH 8/Kenyon Rd**. Remove a piece of CSAH 8/Kenyon Rd northeast of 26th Street NE, making the new north-south roadway the primary travel direction. The piece of the roadway to be removed serves one farmstead. A new connection to this property would be provided via 26th St NE. The old section of Kenyon Road would be terminated in a cul-de-sac.

3. **Reconstruct CSAH 34/26th St NE.** Construct CSAH 34/26th St NE from CSAH 8/Kenyon Rd to the east, where it would connect to the realigned Kenyon Road that would become a part of the new 29th Ave (East Side Corridor). Reconstruct 26th St NE between the new connection and the west to Kenyon Rd/NE 24th Ave. This section of roadway would have a segment of a three-lane highway (one lane in each direction with a center turn lane) and a two-lane, urban roadway with shoulders between Deer Trail Lane and 24th Ave. There would be a 10-foot-wide multiuse trail and a 5- to 15-foot-wide boulevard on the south side of the road. The roadway would be paved.

4. **Realign and Reconstruct County Road (CR) 180/Claremont Rd.** Claremont Rd is parallel to the Canadian Pacific/Kansas City Railroad (CPKC). Claremont Rd would be realigned approximately 650 feet north to provide appropriate spacing between the 29th Avenue/Claremont Road intersection and the new railroad crossing location.

5. **Remove CR 171/Havana Rd SE.** Remove a portion of CR 171/Havana Rd SE between the proposed new 29th Ave/East Side Corridor and CR 180/Claremont Rd. Removing this segment of roadway also eliminates an existing at-grade crossing with the CPKC. The segment of roadway removed is approximately 0.29-mile long.

6. **Reconstruct SE 18th St.** Reconstruct SE 18th St from 700 feet east of CSAH 48 (Bixby St) to the new 29th Ave/East Side Corridor connection. The road would be converted from a gravel roadway to a paved roadway. The road would have two travel lanes, one in each direction. The travel lanes would be 12 feet wide, and the roadway would have paved shoulders. A 10-foot-wide multiuse trail and a 5- to 15-foot-wide boulevard would be built along the north side of the roadway.

7. **Construct Multiuse Trails**. The Project would build several 10-foot-wide multiuse trails. As noted previously, a trail would be constructed along the west side of the new 29th Ave/East Side Corridor for its entire length. Additional 10-foot-wide trails would be built on the reconstructed pieces of CSAH 34/26th St NE and SE 18th St.

8. **Intersection Treatments.** Intersection control (stop signs, roundabouts, left- and right-turn lanes) would be considered at east-west roadways that would intersect with the new roadway (29th Ave/East Side Corridor), including SE 18th St, CR 180 /Claremont Rd, CSAH 19/Rose St, CSAH 35/Dane Rd, and NE 26th St. It is anticipated the Project would include roundabouts at:

    - 29th Ave/East Side Corridor and Rose St
    - 29th Ave/East Side Corridor and CSAH 35/Dane Rd

- 29th Ave/East Side Corridor and extension of 26th St NE
- 26th St NE and CSAH 8/Kenyon Rd

Side-street stops with dedicated left- and right-turn lanes where needed on the new 29th Ave/East Side Corridor and/or connecting roadways. Turn lanes throughout the Project area are shown on **Figure 5**.

9. **Drainage Culverts**. In addition to the bridge over Maple Creek, the Project would likely require the extension of an existing drainage culvert at SE 18th St. The proposed 29th Ave/East Side Corridor and connecting roadways (SE 18th St, CR 180/Claremont Rd, and CSAH 34/26th St NE) cross relatively small local drainage ditches and swales, mostly unnamed and without a judicial status. The preliminary drainage analysis identified the need for the Project to construct nine culverts ranging in size from 15 to 42 inches. Steele County will continue to refine its drainage modeling in final design - final sizes and locations of potential culverts may be slightly modified during this process. A floodplain risk assessment, which is required when culverts are 48 inches in size or larger, would not be needed for the culverts.

10. **Drainage Ponds and Ditches**. The Project would incorporate ponding and ditches for roadway drainage. Ponds would be located as shown on **Figure 5**. Ditches would be constructed along both sides of the new roadway between CSAH 34/26th St NE to the connection with CSAH8/Kenyon Road and on the east side of the new roadway from SE 18th St to School St.

11. **Lighting**. The Project would include lighting at roundabout intersections and would be considered at other public streets.

12. **Berming, Fencing, and/or Landscaping.** The county is considering three options to incorporate into the project to mitigate visual impacts for areas of existing development adjacent to the new roadway. These options include:

    - **Berming with trees** – similar to what is currently in place along the south side of 26th St NE just east of Deer Trail Ln NE. Berms and trees would be in the public right of way.
    - **Fencing** – provide a fence at the right of way boundary. The fence would be six feet tall, consistent with the city of Owatonna's height limits on residential fences. Fencing would be on the right of way line and would be the responsibility of the property owner.
    - **Landscaping with boulevard trees** – provide a section of landscaping, including trees and shrubs to be located in the boulevard behind any trails. Landscaping would be in the public right of way.

3.0 Visual Impact Assessment Scoping

A scoping questionnaire helps practitioners identify which level of documentation is appropriate for the project. The project team has completed the VIA scoping questionnaire based on the

best available information and professional judgement to determine which level of documentation is best suited for the FEIS-ROD. Based on the scoring system on the questionnaire, an abbreviated VIA was recommended. This questionnaire and its responses are included as **Appendix B**.

While the proposed Project would add a new roadway, which is a change in the physical characteristic of the existing environment that would be considered a high level of permanent change, the abbreviated VIA is recommended because the permanent changes are compatible with the City of Owatonna's growth and development plans for expanding the urbanized area of the city to the east as well as annexation agreements with adjacent townships. **Appendix C** includes sections of the city's comprehensive plan that show existing land uses, identified growth areas, and future land uses. Please refer to figures 1.1, 1.21, and 1.3 from the comprehensive plan (**Appendix C**) for discussion that follows.

The city has been expanding residential development eastward as there are land use, natural resource, and other constraints associated with expanding additional residential areas in other portions of the community. For example, areas west of Interstate 35 (I-35) are primarily industrial and commercial uses, including the city's airport. This area is proposed to expand the industrial and commercial uses into the future, with a limited amount of medium-density residential uses where there is an existing manufactured home community. Areas east of I-35 are guided as future residential areas, along with institutional land uses and a few spot commercial and mixed use areas. Much of the area within the existing city limits east of I-35 is developed, and new development will be moving further east. Both the city's and Steele County's transportation plan recognize that development will be extending further eastward.

Additional consideration regarding use of the abbreviated VIA is that much of the proposed Project area is currently more agricultural in nature and currently has limited development immediately adjacent to the new alignment. The county is considering berming, fencing, and/or landscaping to mitigate visual impacts for existing areas of development. These options would provide a partial visual barrier of the highway and could be viewed as a positive element by the neighborhoods.

There are low to moderate concerns regarding the types of project features (bridges, excavation, etc.). Controversies associated with the project have been focused on the proximity of the roadway to the North Country neighborhood and concerns about noise and safety. The project would be built consistent with Steele County and MnDOT State Aid design requirements.

4.0 Area of Visual Effect (Establishment Step)

This section of the VIA provides regional and local context for the Project, broadly defines the area of visual effect (AVE), and provides a general description of the Project's visual character. The establishment phase answers three basic questions:

- What is the visual character of the Project?
- Are there any legal directives or constraints that dictate the visual quality of what can be constructed?

- To what extent is the Project visible?

4.1 Visual Character of the Project

As noted in Section 2 – the Project would construct a new county highway. Elements of the Project include:

- A new north-south roadway
- Upgrading two gravel roadways to paved roadways (portions of 18th and 26th)
- Realigning an existing roadway slightly at a railroad crossing
- Reconstructing existing roadways in developed/developing areas
- Constructing a bridge over Maple Creek
- Providing roundabouts at key intersections
- Constructing multiuse trails
- Removing some sections of existing roadways
- Potentially buffering residential areas

The new and reconstructed roadways would be two-lane facilities. Some segments of the roadway would be urban (curb and gutter), some would be rural (ditch), and some would be suburban (combination of ditch and curb and gutter). There would be lighting at the roundabouts and lighting will be considered at other public street intersections. There would be boulevards and the potential for landscaping in some areas based upon public input. It is anticipated the roadway would be bituminous pavement with the bridge being concrete.

The roadway would be anticipated to have 12-foot-wide driving lanes, shoulders, a boulevard and a trail (in most locations). Typical roadway sections are shown in **Images 1 – 11**. The roadways and bridges would follow existing topography, as the Project area is generally flat, with some areas of rolling topography. Existing and proposed sections are shown for existing routes; 29th Ave/East Side Corridor has proposed sections only.

The Project would be constructed over the course of two construction seasons. During construction, there would be large equipment in the Project area that would be visible during construction. Following construction, this equipment would be gone. As noted in the EAW, nighttime construction would be minimized to the extent practicable. §

29th Ave/East Side Corridor – Proposed Sections

Image 1 – 29th Ave Proposed Urban Section

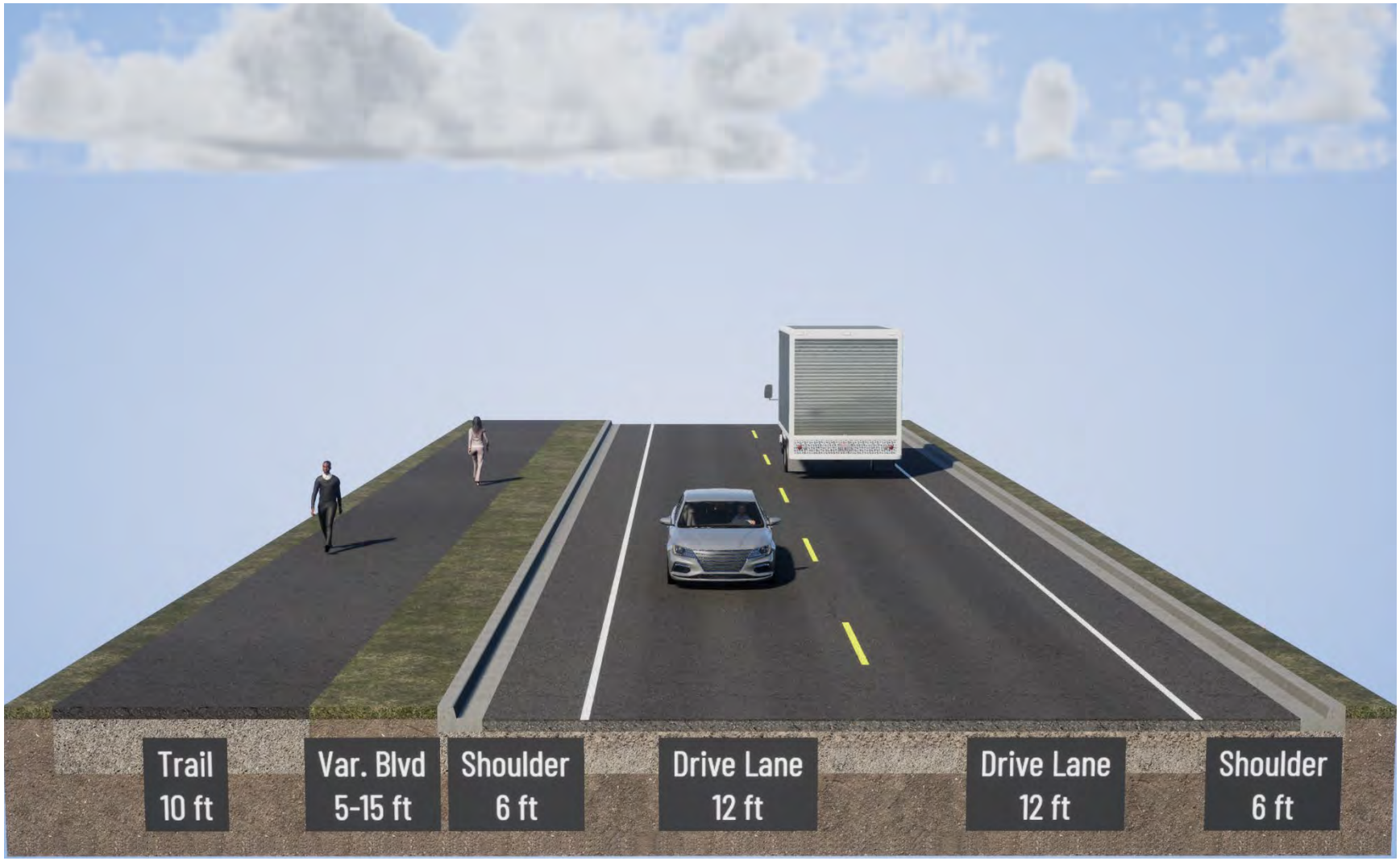


Image 2 – 29th Ave Proposed Suburban Section

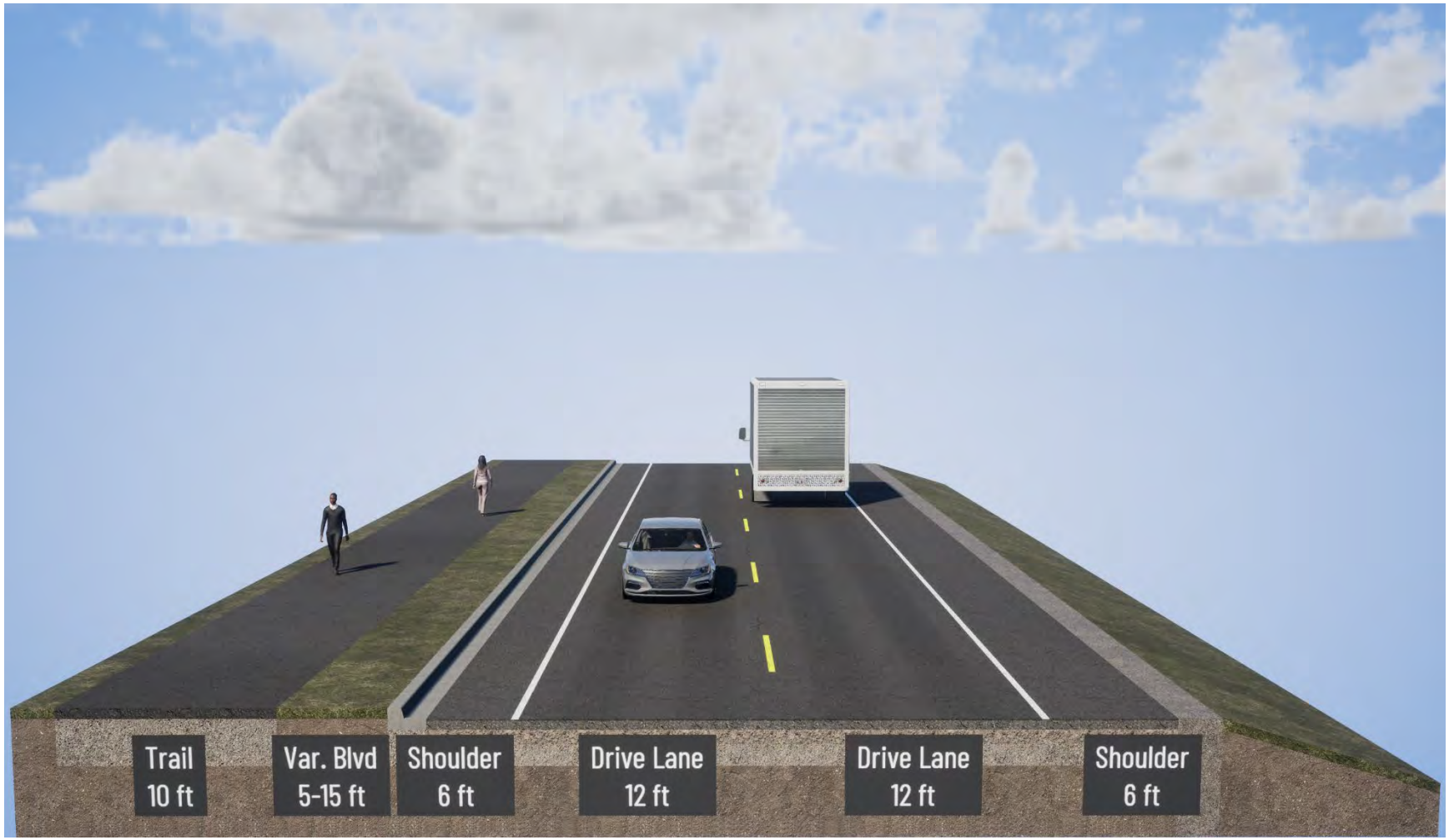


Image 3 – 29th Ave Proposed Rural Section

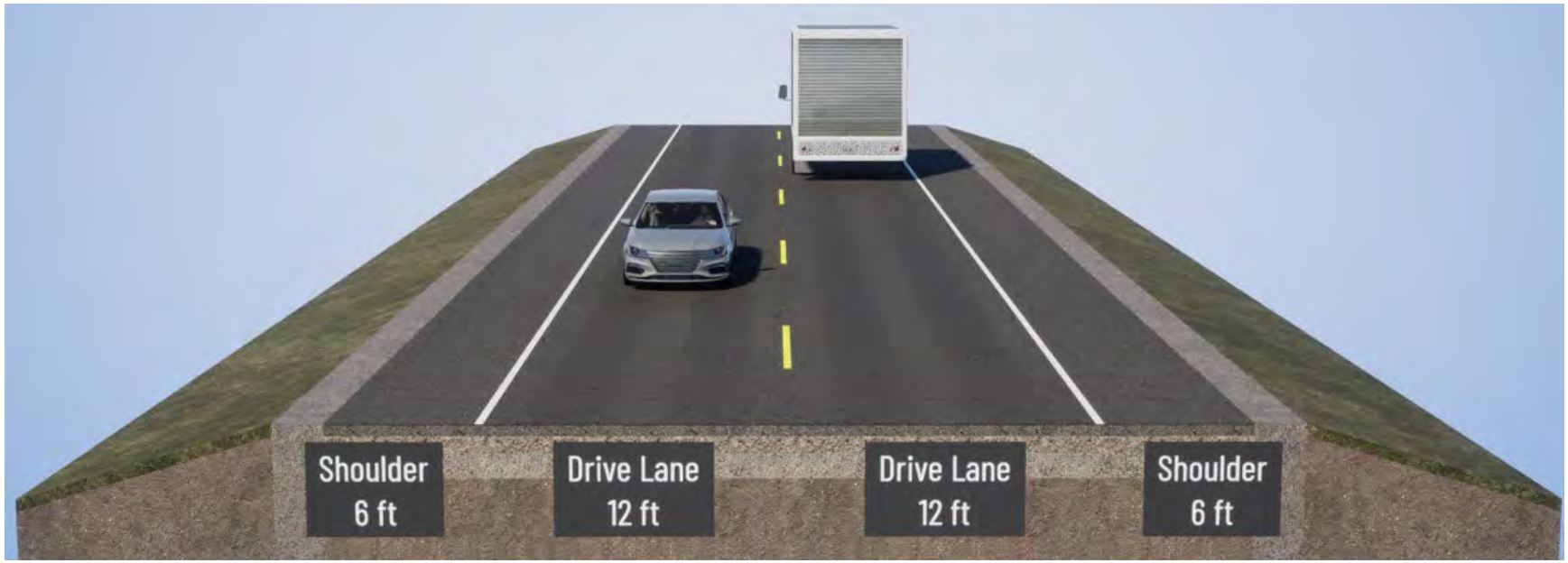
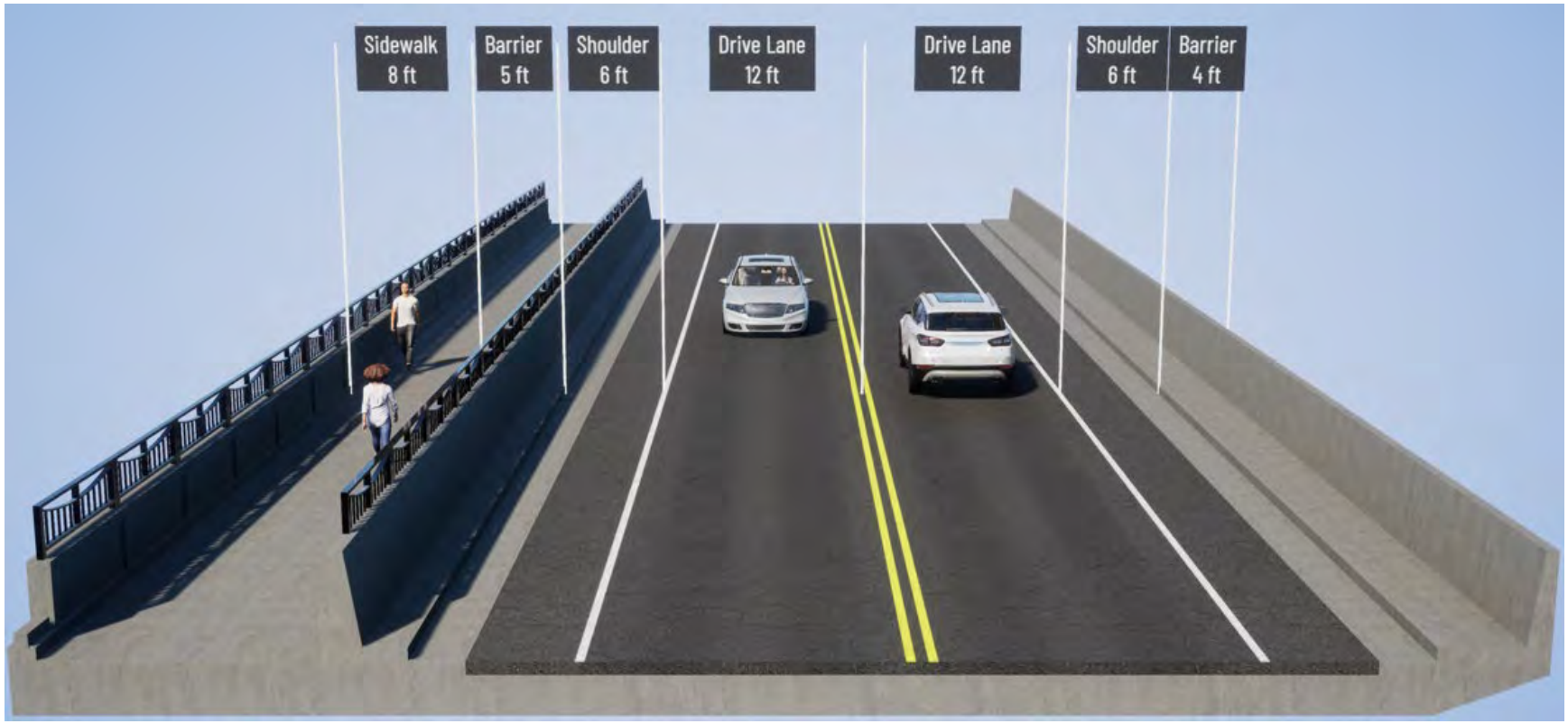


Image 4 – 29th Ave Proposed Bridge Section



SE 18th Street/County Road 180 – Existing and Proposed Sections

Image 5 – SE 18th Street – Existing Section (gravel roadway)



Image 6 – SE 18th Street – Proposed Section



Claremont Road – Existing and Proposed Sections

Image 7 – Claremont Road Existing Section

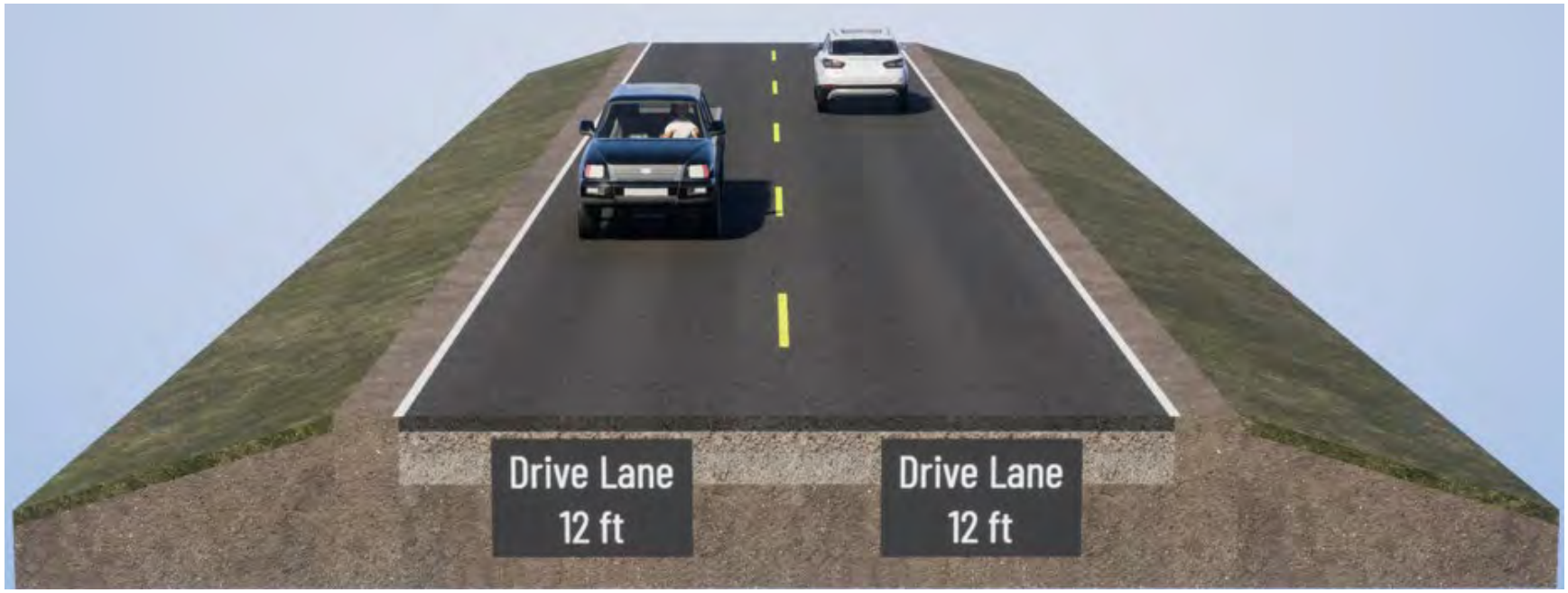


Image 8 – Claremont Road Proposed Section



26th Street NE – Existing and Proposed Sections

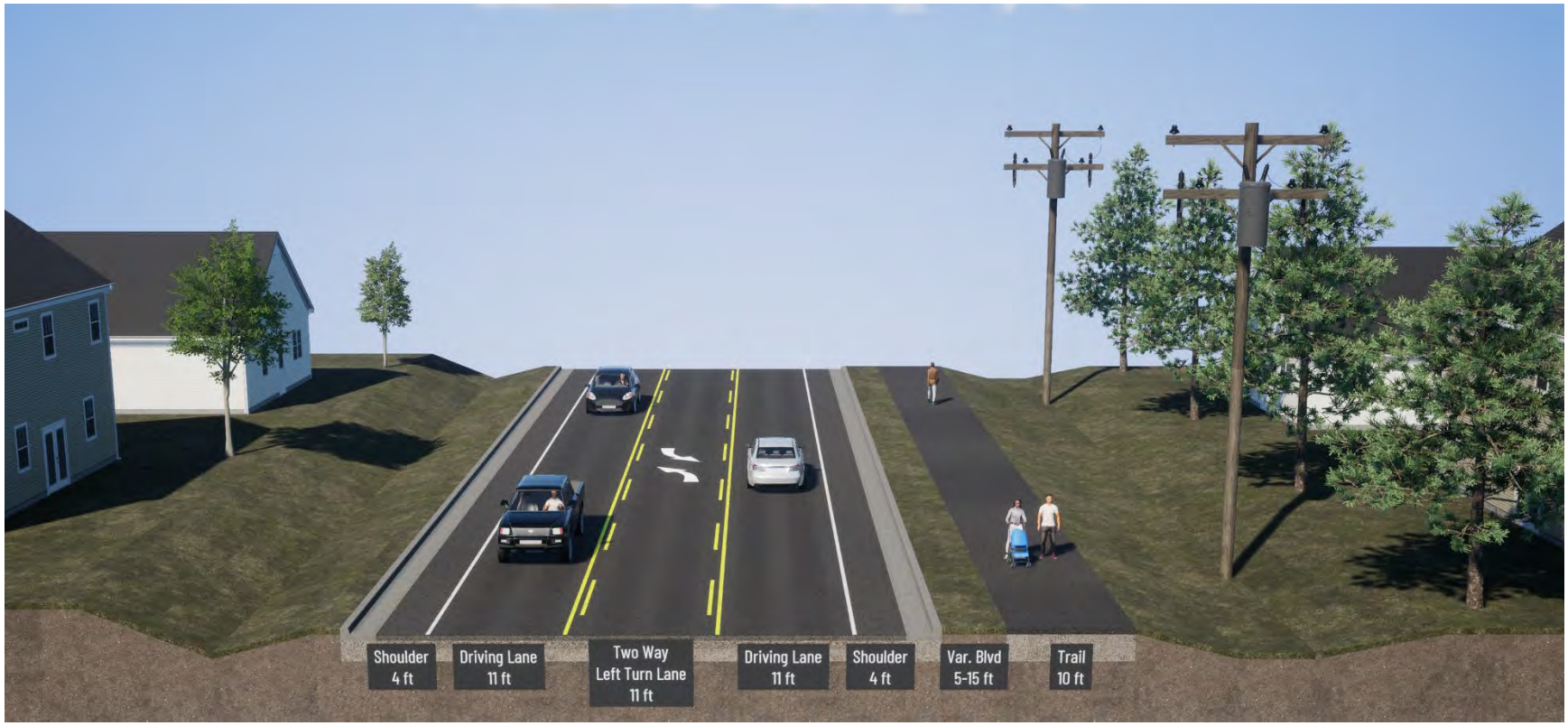
Image 9 – 26th Street NE Existing Section (west of Haddonstone Lane NE)



Image 10 – 26th Street NE Existing Section (east of Haddonstone Lane NE to 29th Ave/East Side Corridor – gravel roadway)



Image 11 – 26th Street NE Proposed Section



4.2 Legal Directives or Constraints

As there is no federal funding for the Project, National Environmental Policy Act (NEPA) requirements are not applicable. The Project is also not in an area designated as: scenic byway; coastal or shoreline area; scenic river; wildlife refuges or scientific and natural areas; federal lands; forests; nor other major landscape feature. A review of historic and cultural resources was conducted as documented in the EAW. It was concluded that there would be no adverse effect to these resources if the Project were constructed.

However, the Project is subject to Minnesota statues, including environmental review. As such, a state EAW was prepared for the Project. Question 16 of the EAW asks the preparer to describe any scenic views or vistas on or near the Project and to describe any project related visual effects such as vapor plumes or glare from intense lights. It also asks the preparer to discuss potential visual effects from the project and to identify measures to avoid, minimize or mitigate visual effects. Please refer to the EAW for responses specific to the proposed Project. In addition, guidance provided by MnDOT in its TPDP strongly recommends preparing a visual impact assessment for projects for which an EAW is prepared.

There are no local ordinances related to the visual quality of roadways.

4.3 Visibility

The area of visual effect (AVE) is the area in which views of the Project would be visible as influenced by the presence or absence of topography, vegetation and structures and the physiological limits of human sight. Location, proximity, and light help define the limits of what viewers can see.

The Project area is relatively flat, with some rolling hills. There are no mountains, plateaus, or higher hills in the Project area. **Figure 6** in **Appendix A** shows land elevation in the Project area. The contours indicate the project area is generally flat with some rolling topography.

There are two types of viewsheds – static and dynamic. Both are defined by what people can see in the environment. Static viewsheds are what neighbors of the road see from a stationary location. Dynamic viewsheds are what travelers on the road/trail see as they move through the Project. The AVE is the combination of the viewsheds of all travelers with views from the road and all neighbors with views of the road. Viewsheds can be restricted by land cover (trees, vegetation, buildings/structures, hills, and other features) and by atmospheric conditions such as smoke, dust and fog. Atmospheric conditions are not a factor/regular occurrence in the Project area and are not expected to influence the VIA.

In general, the area is a combination of suburban and rural landscapes. Existing roadways such as 26th St NE, Dane Rd, Rose St, and SE 18th St are developing and have homes, schools, and businesses in place. Other areas are more rural in nature – such as along Havana Rd, Claremont Rd, and School St. There are no mountains, plateaus, rocky outcroppings or substantial defining features other than suburban development and rural/agriculture. As noted previously, the

Project area is relatively flat, with some rolling topography and clusters of treed areas near farmsteads/rural homes and Maple Creek.

Existing roadway segments (most of 26th St NE) in the northern portion of the Project are expected to experience a low level of permanent change, as the roadway already exists, and will be reconstructed as a two-lane roadway (what it is today). A quarter mile (1,320 feet) buffer was used for viewsheds in this area, as the homes and development block viewsheds. The same is true for existing roadways that would intersect with the new north-south alignment except for SE 18th St and 26th St NE east of Haddonstone Lane NE, which would become paved roadways. These roadways would be a more moderate change, with most of the change being experienced by drivers/non-motorized users along the corridor as most farmsteads/buildings in this area are treed and block the view from these structures. A buffer of a half mile (2,640 feet) was used in this area.

Much of the new alignment portion of the Project is currently in agricultural production. There is one section of new alignment near an existing neighborhood, and a few rural residential properties. In these areas we are looking at a half mile (2,640 feet) buffer.

Figure 7, **Appendix A**, shows the Project alignment and buffer areas.

5.0 Inventory of Project Environments (Inventory Step)

The purpose of the inventory phase is to define the affected environment and populations (see 6.0 – Affected Population) and the existing or preferred condition of visual quality. Three basic questions are addressed in this phase:

- What is the existing visual character of the AVE?
- Whose views in the AVE would be affected by the Project?
- What do people like and dislike about the existing visual character of the AVE?

The existing visual character of the AVE is determined by its visual resources. Visual resources can be divided into three categories: natural, cultural, and project. Extremes of natural-cultural resources are easily recognized – national parks vs large cities. National parks are described by most as being “natural” and large cities are identified as “cultural”. It is more difficult to categorize rural landscapes as being strictly natural or cultural. A landscape without built elements (horizontal and vertical construction) is a natural environment. If the landscape is composed of built elements, or is otherwise highly manipulated, it is a cultural environment. There can be some built elements in a natural landscape and some cultural elements in a natural landscape. The project landscape is inside the right of way, regardless of it being a natural or cultural environment.

5.1 Visual Character of the Natural and Cultural Environments

The city of Owatonna is a growing community located in southern Minnesota. The current (2020) population of the community is 26,420. Outside city limits, the surrounding area is largely agricultural.

The city is served by three larger highways, Interstate 35 (I-35), which runs north-south through the community, US Highway (US 14) that runs east-west along the city's southern border, and US 218, which connects into US 14 at the city's southeastern border.

Industrial and big-box commercial land uses are generally located west of I-35 and a regional airport is in the northwestern portion of the city, also west of I-35. Most residential areas and downtown Owatonna are located east of I-35 and the Straight River. Much of the community is developed within its existing border, with annexation agreements in place for future development to the east. Existing residential areas within the Project area are primarily single-family residential units. Future growth areas are identified in the city's comprehensive plan (see **Appendix C**) for existing and future land use and growth areas. Growth in recent years has occurred to the northeast, where homes have been built along the ravine of Maple Creek as well as alongside Brooktree Golf Course, to the north, and to the southeast.

The Steele County Fairgrounds are located north of US 14, in the more densely developed portion of the community.

Natural/geographical elements within the city include Kaplan's Woods, a hardwood nature preserve on the southern border of the city near the interchange of I-35 and US 14. The Straight River flows north-south just east of I-35 and is surrounded by treed areas and a country club, and parks south of Bridge St. North of Bridge St, areas near the river are still tree-lined, but there are a few more adjacent developments and some residential units.

Two Creeks near or in the Project include Unnamed/Isaac Walton Creek and Maple Creek. Maple Creek is part of the Cannon River watershed and eventually feeds into the Mississippi River. The Creek's width varies seasonally and by location, but is generally narrow to moderately wide, typical of small tributary streams. It is currently impaired, as noted in Question 12 of the EAW. See **Figure 18** in **Attachment A** of the **EAW** for the locations of the creeks.

Outside the city of Owatonna, in the townships, the area is largely agricultural/farming. There are scattered farmsteads and barns and some rural residential lots. Many of the sites are surrounded by trees, especially near structures such as homes, sheds, barns, and other outbuildings. Multiple crops are planted and rotated within and near the Project area. Some are low-growing – soy beans, alfalfa and other hay and some specialty crops, including oats, barley, peas and potatoes. Others such as corn and sweet corn are taller. Corn is the primary crop in the county. Some of the farmsteads have animals, including cows.

In addition to agricultural uses, there is a radio tower between Havana and Claremont Roads.

5.2 Visual Character of the Project

As noted in Section 4.1, and shown in **Figure 5** in **Appendix A**, the proposed roadways would have 11- or 12-foot-wide driving lanes, shoulders, a boulevard and a trail (in most locations). The trail would be 10 feet wide. Some areas would be more urbanized to reduce the roadway footprint near areas that are developed, and other areas would remain rural, with ditches, and some areas would have a combination of urban and rural sections. Typical roadway sections were shown in **Images 1 – 11**. There would be

some ponds to collect stormwater runoff, there would be an at-grade crossing of the railroad, and a bridge over Maple Creek. The roadways and bridges would follow existing topography, with no substantial elevations or depressions. It is anticipated the roadways would primarily be paved with bituminous/asphalt materials, except for the roundabouts which would include some concrete elements. Traffic signs would provide information on speeds, advanced warning of traffic control and traffic control navigation at the roundabouts. Lighting would be provided at the roundabout and will be considered at other public street locations. No traffic signals are proposed for the project. Landscaping elements would be considered based upon public input and discussion between city and county officials.

Grading would be required for the Project, as portions of it include new roadway alignments and reconstructing existing alignments. No retaining or noise walls are anticipated to be included in the project.

6.0 Affected Population (Inventory Step)

The second task of the inventory step is to identify whose views in the AVE are affected by the project. There are two groups of viewers – neighbors and travelers. Neighbors are adjacent to the Project and have “views of the road”. Travelers are using the roadway/trail and have “views from the road”.

6.1 Neighbors

The term neighbor does not always mean the viewer is immediately adjacent to the roadway/proposed roadway; it includes those that may see it from their geographic location within the AVE. There are multiple types of neighbors to consider – residential, recreational, institutional, civic, retail, commercial, industrial, and agricultural. Within the Project area there are residential and agricultural.

Residential – This includes residents of single-family homes, condominiums, or apartment dwellers, and others who occupy permanent shelter. Their visual preferences tend toward a desire to maintain the existing landscape as it is – they are not interested in change, even change that purports to improve the quality of life. Residential neighbors are often interested in cultural order and natural harmony, with less emphasis on project coherence unless it impacts their ability to appreciate the other two aspects of visual quality. Residential neighbors are shown in **Figures 7 and 8** in **Appendix A**.

Agricultural – These neighbors are farmers of crops or herd animals. They often work in fields and pastures. Agricultural neighbors regard cultural order and natural harmony as critical components of the landscape; they are less interested in project coherence. Agricultural neighbors are shown in **Figures 7 and 8** in **Appendix A**.

It should also note that there are residential and agricultural neighbors that are considered as neighbors rather than travelers if they are using other roadways in the Project area, not necessarily an impacted roadway in the project, but using parallel or connecting roads.

Although Brooktree Golf Course, Owatonna High School, McKinley Elementary School, and Cornerstone Evangelical Free Church are in proximity to the Project, they do not have visual line of sight to it.

As noted previously, the city of Owatonna and Owatonna Township have identified the Project area and its surrounds for future development. Timing of development is over the next 25 years, with no specific plans currently in place for the near term. However, as development occurs, some rural and residential neighbors would experience other changes in their viewshed. In some instances, the future development would block views of the new roadway alignment portions of the Project.

6.2 Travelers

As previously explained, travelers have views from the roadway or are future users of the improved highway. The views seen by travelers have a great deal related to their responsibilities – that is – whether a traveler is the driver or a passenger. Drivers need to focus more on the road than passengers, who are free to view the adjacent roadside. Pedestrians and bicyclists using the trail or roadway are also considered to be travelers.

Beyond the differences in modes (motorized, pedestrian, and bicyclist) travelers can be further divided into three types – commuting, touring and shipping. Commuters are regular travelers of the same route. The frequency of the travel may vary, but there tend to be peaks – morning and evening. Most commuting is between home and work. Other types of commuting involve longer distances, travel through rural or other settings, and involve passengers as well as drives. Such trips include commuting to a favorite or frequent destination such as a campground, cabin, sports arena, or a friend/relative's home. These trips are commuting because they are repeated; the trips tend to become routine. Commuters are interested in project coherence. They are also interested in cultural order and natural harmony to the extent that it contributes to wayfinding.

Touring travelers are tourists – or those traveling on a highway, primarily for enjoyment, usually to a pre-determined destination. These types of trips tend to be more adventuresome over longer distances. Touring travelers frequently travel in groups – driver and passengers. These users are equally interested in project coherence, cultural order, and natural harmony.

Shipping travelers use the highway for their job – primarily to move goods/products. Most shipping travel is routine – with most trips only being drivers, no passengers. Shippers' primary interest is in project coherence, but they will use resources that create cultural order and natural harmony to help with wayfinding.

The Project area would be expected to primarily consist of commuting travelers.

Figures 9 in **Appendix A** show the viewsheds of representative residential and agricultural neighbors as well as travelers.

7.0 Visual Character Likes and Dislikes (Inventory Step)

The third task of the inventory step is to define visual quality – that is – to answer the question – what do people like and dislike about the visual character of the AVE? Visual quality serves as the baseline for determining the degree of visual impacts – that is, if visual impacts are adverse, beneficial, or neutral. It also helps to establish mitigation goals for any adverse impacts.

Different viewers will evaluate visual resources in different ways and come to varying conclusions about visual quality. Neighbors and travelers may have different opinions on what they like and dislike. A neighbor's self interest and visual preference relates to the use of their property. A travelers' interest and visual preference relates to their purpose for using the highway.

The neighbors and travelers within the Project area have a mix of preferences in terms of cultural order, natural harmony, and project coherence. Residential neighbors are more likely in favor of cultural order and agricultural neighbors are more likely to be equally interested in cultural order and natural harmony, with most travelers (commuters in the case of the Project) interested in project coherence.

In terms of coherence for the travelers, the Project would provide a consistent corridor – it would a be two-lane county highway, with shoulders, a trail, roundabout and side street stop intersections. The highway would be paved and have a boulevard that provides a buffer between the roadway and adjacent land uses. Landscaping would be considered by the county where there are residential neighbors (as natural harmony would need to be incorporated).

In terms of cultural order, the Project would be consistent with a suburbanizing community. As noted in its comprehensive plan, the city of Owatonna is expanding its residential land uses, as well as some mixed commercial and institutional uses to the east as the community continues to grow. Roadways and trails supporting this growth and connections within the community are a part of its cultural order. This does not mean that every individual resident will like a roadway or want a roadway near their home – but it is part of the overall community plan for the area and its continued evolution.

In terms of natural harmony, the Project would be constructed in line with the existing topography – not elevated or depressed. A creek crossing would be provided at Maple Creek above the floodplain, but consistent with the area topography. The flow of the creek would not be impacted. The Project would result in the loss of farmland vegetation and some treed areas near Maple Creek. Most other vegetation would remain consistent as it is today. The Project would not disturb grazing areas for cows or other animals. Boulevards would introduce turf/grasses. The county is considering using native seed mixes to assist with pollinator populations and to maintain a consistent vegetative cover within the Project area. Additionally, the county is considering potential berming, fencing, and/or landscaping in areas of existing development.

Images 12 - 14 show different key views on the corridor and denote existing natural and cultural elements within the Project area.

Image 12 – Maple Creek Area



Image 13 – Suburbanizing Areas and Farmland



Image 14 – Farmland and Identified Growth Areas (Includes Railroad South of Claremont Rd)



8.0 Effects Analysis (Analysis Step)

Transportation improvements associated with the Project could result in both short-term and long-term visual impacts. Short-term impacts include disruptions during construction while long-term impacts are the result of permanent alterations that change the way people travel in and around the area. Short-term impacts would include an increase in roadway congestion in and around the area in developed locations (not on the new alignment segments), the presence of large equipment, dust from construction, and general disruption to nearby neighborhoods and businesses. These short-term impacts would have a temporary visual effect to the community.

Long-term impacts would include property acquisition, a new north-south roadway connection, a paved roadway instead of a gravel roadway on SE 18th St and a portion of 26th St – which would increase traffic on these routes, and a bridge on the new north-south roadway alignment. The new north-south roadway would create a visual change, as land currently in agricultural production would become a roadway. This creates a visual change for drivers – that currently do not have a route in this area and a change for an existing neighborhood between Rose St and Stony Creek Dr NE (approximately 0.4 of a mile) on the west side of the roadway. In addition to the homes in the neighborhood, there are a few rural residential properties and/or farmsteads that are within 500 feet of the new roadway. Some of these properties are also extensively treed today, but others would be able to see the new roadway as demonstrated in **Figures 9**.

A new visual experience for drivers using SE 18th St would occur, as the segment of roadway between Bixby Rd and the new East Side Corridor would be paved. There are only two residences within 550 feet of this portion of the Project and the properties are currently heavily screened by trees.

The design of the new roadway alignment and reconstruction of existing roadway segments generally follows the existing grade of the ground – so it would fit in with the topography of the area and not rise above it visually.

For most areas within the Project area, the changes to visual character would not be substantial. In areas near existing neighborhoods along the north-south section of 29th Ave/East Side Corridor, the changes would be more substantive. Within the North Country neighborhood, the new 29th Ave alignment would abut the rear property lines for approximately 2,200 feet. A total of 15 homes back onto this section, with the distance from the closest corner of each home to the proposed trail ranging from a minimum of about 45 feet to more commonly 80 feet to more than 100 feet. The roadway would be located an additional 20 feet beyond the trail. However, proposed changes would be consistent with city plans that provide for continued growth of the community and its transportation network, including trails for pedestrians and bicyclists.

9.0 Mitigation (Mitigation Step)

Mitigation is the fourth phase of preparing a VIA. During this phase, recommendations/considerations are identified to avoid, minimize, or mitigate for adverse visual impacts and identify opportunities for enhancing visual quality.

Avoidance is making reasonable efforts to avoid adverse impacts on visual resources, viewers, or visual quality to the extent that avoidance is feasible. If an alternative or avoidance measure does not also avoid or lessen other social, economic, or environmental impacts, or fails to address project needs, it may not be selected.

Alternatives and measures which minimize or reduce an adverse visual impact are preferred over alternatives that more fully impact the visual resource. If it is not possible to avoid or minimize adverse impacts, mitigation should be considered.

The proposed Project would not avoid all visual impacts, as it would add a roadway where one does not exist at present. The county and its project team developed an alignment that is consistent with existing topography, minimized infrastructure footprint (using urban, suburban and rural designs) and designed with surrounding context to the extent practicable.

The county is considering incorporating some mitigation/enhancement measures based upon feedback and input from the community. The county is considering berming, fencing, and/or landscaping in areas where neighborhoods would have greater viewsheds of the new 29th Ave/East Side Corridor. The visual mitigation/enhancement options are shown in **Images 15 – 23.** The county has developed sketches and visualizations of potential mitigation activities for public consideration which will be shard at public meetings. Input from the public will be considered by the County Board and incorporated into the final Project plans.

View 1 – From Proposed 29th Ave/East Side Corridor, Looking Northerly North of Timberwood Lane

Image 15 – Berming Option (View 1)



Image 16 – Fencing Option (View 1)



Image 17 – Landscaping Option (View 1)



View 2 – From Fox Hollow Lane Looking Easterly

Image 18 – Berming Option (View 2)



Image 19 – Fencing Option (View 2)



Image 20 – Landscaping Option (View 2)



View 3 – From Timberwood Ln Looking Easterly

Image 21 – Berming Option (View 3)



Image 22 – Fencing Option (View 3)

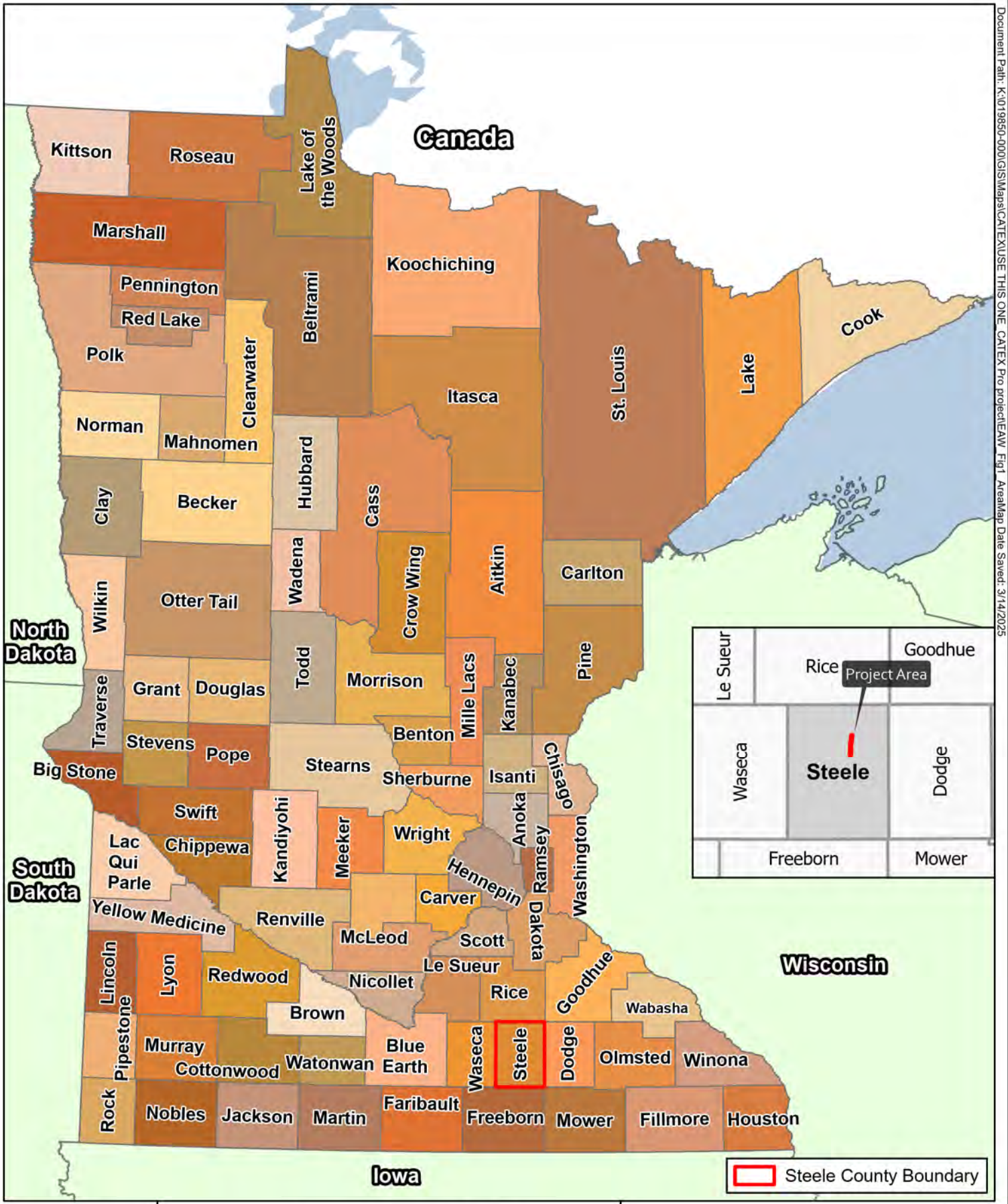


Image 23 – Landscaping Option (View 3)



Appendix A – Figures

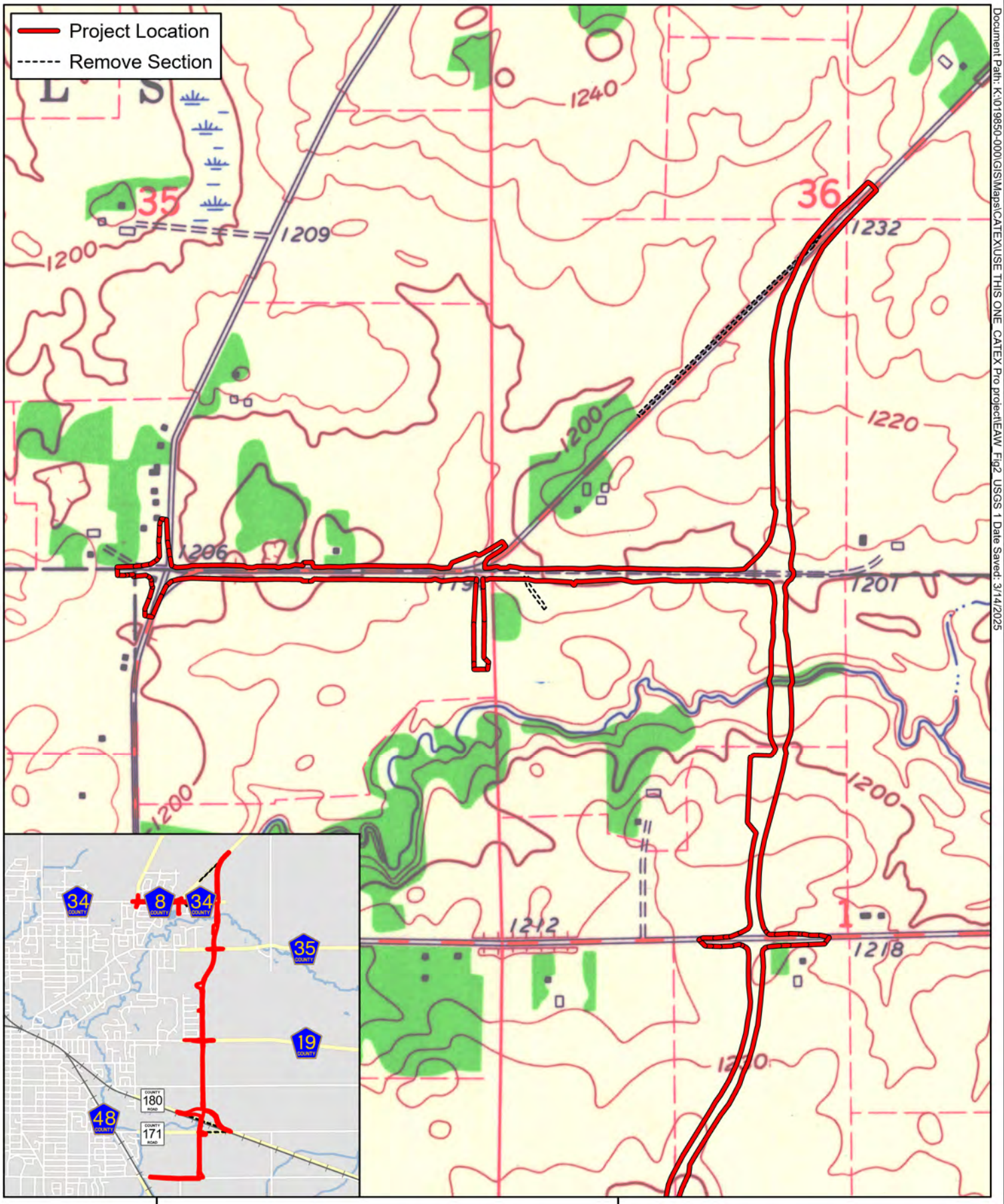
- Figure 1 – Area Map
- Figure 2 – USGS Map
- Figure 3 – Project Location
- Figure 4 – Project Location (Aerial)
- Figure 5 – Project Layout
- Figure 6 – Elevation Contours Map
- Figure 7 – Visual Analysis Area and Visual Receptor Inventory
- Figure 8 – Representative Viewer Inventory
- Figure 9 – Representative Viewer 1-29



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Figure 1 - Area Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota



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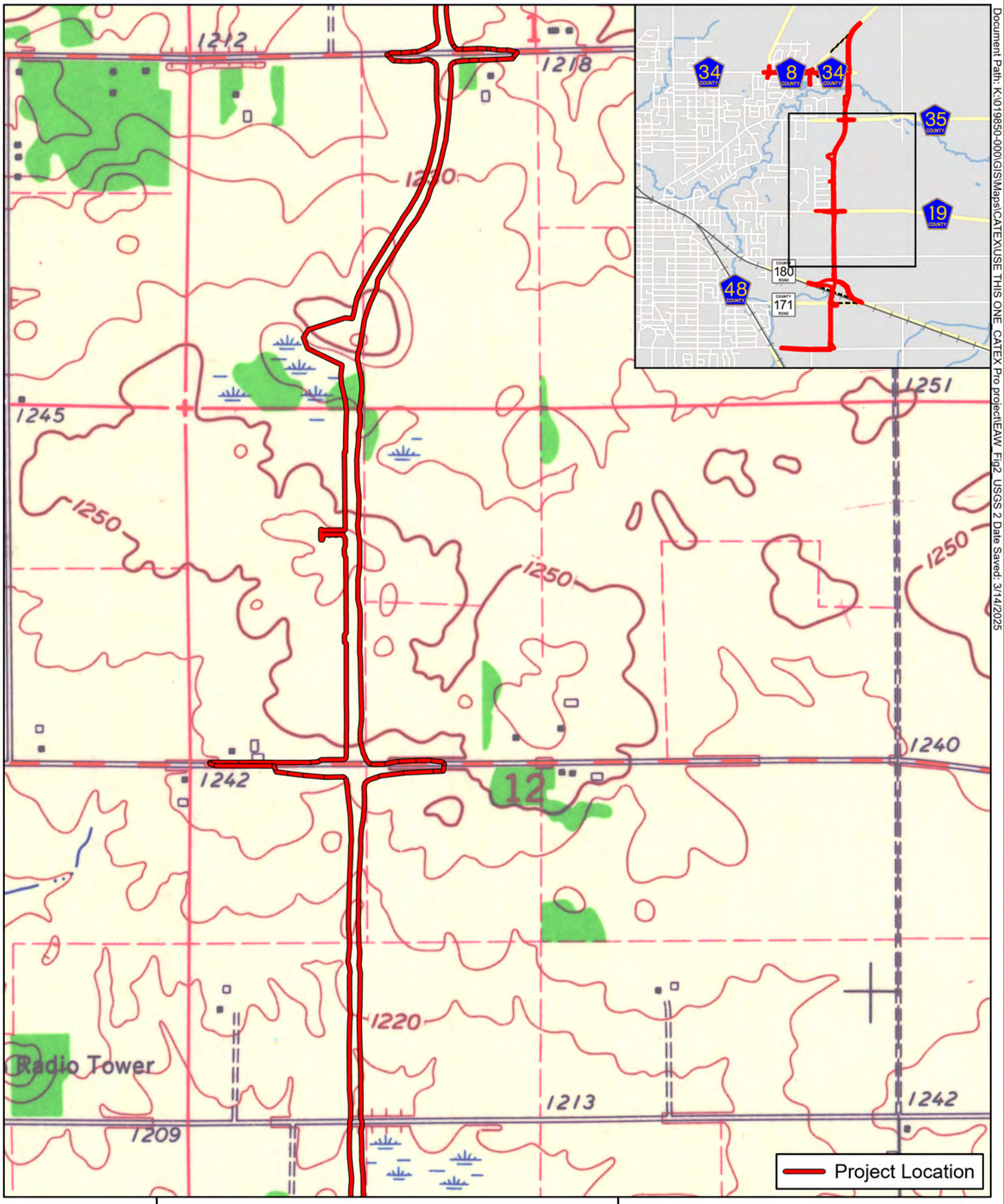
Figure 2A - USGS Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

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1 inch = 950 Ft



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Steele county

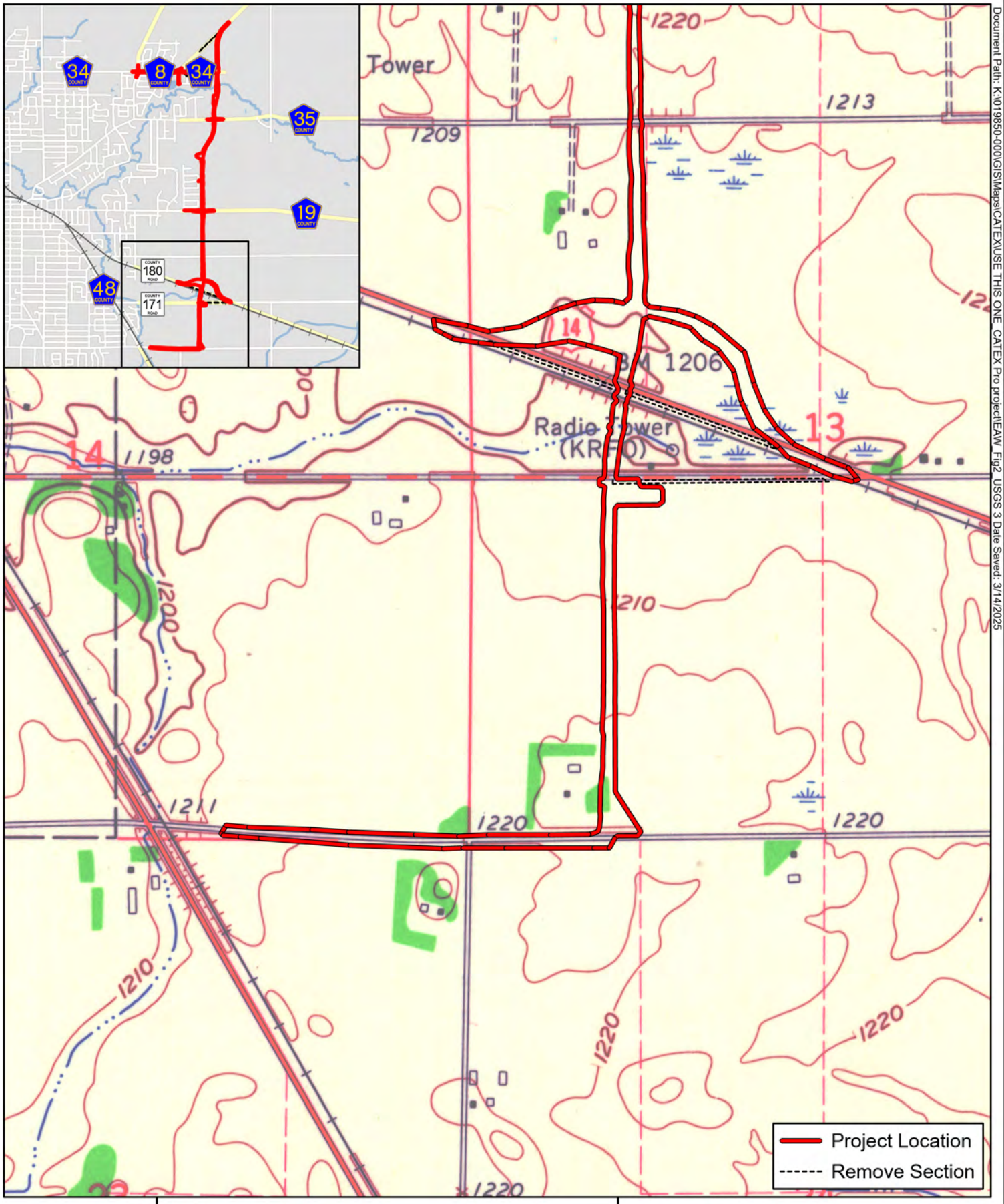
Figure 2B - USGS Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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1 inch = 950 Ft



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Steele county

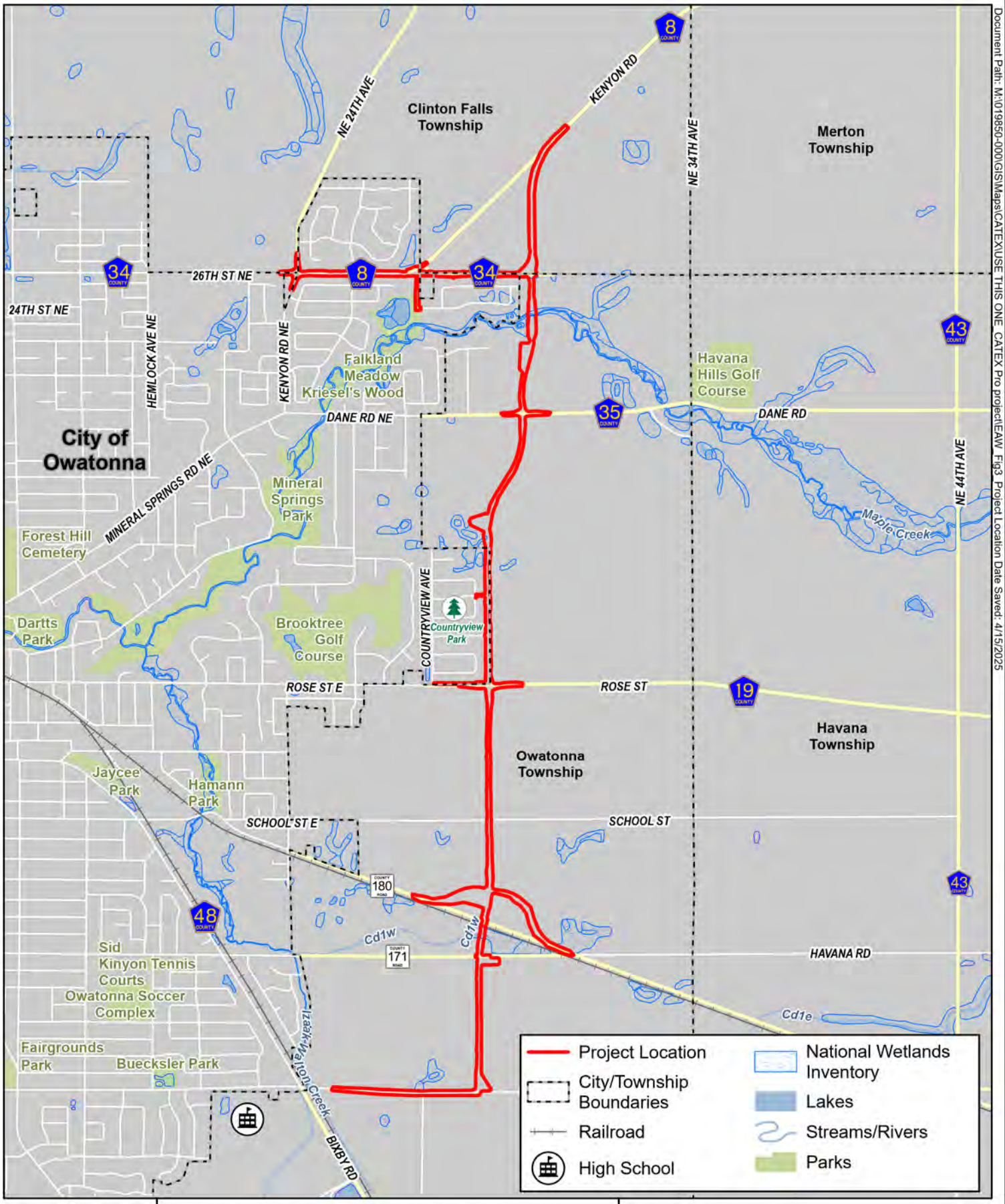
Figure 2C - USGS Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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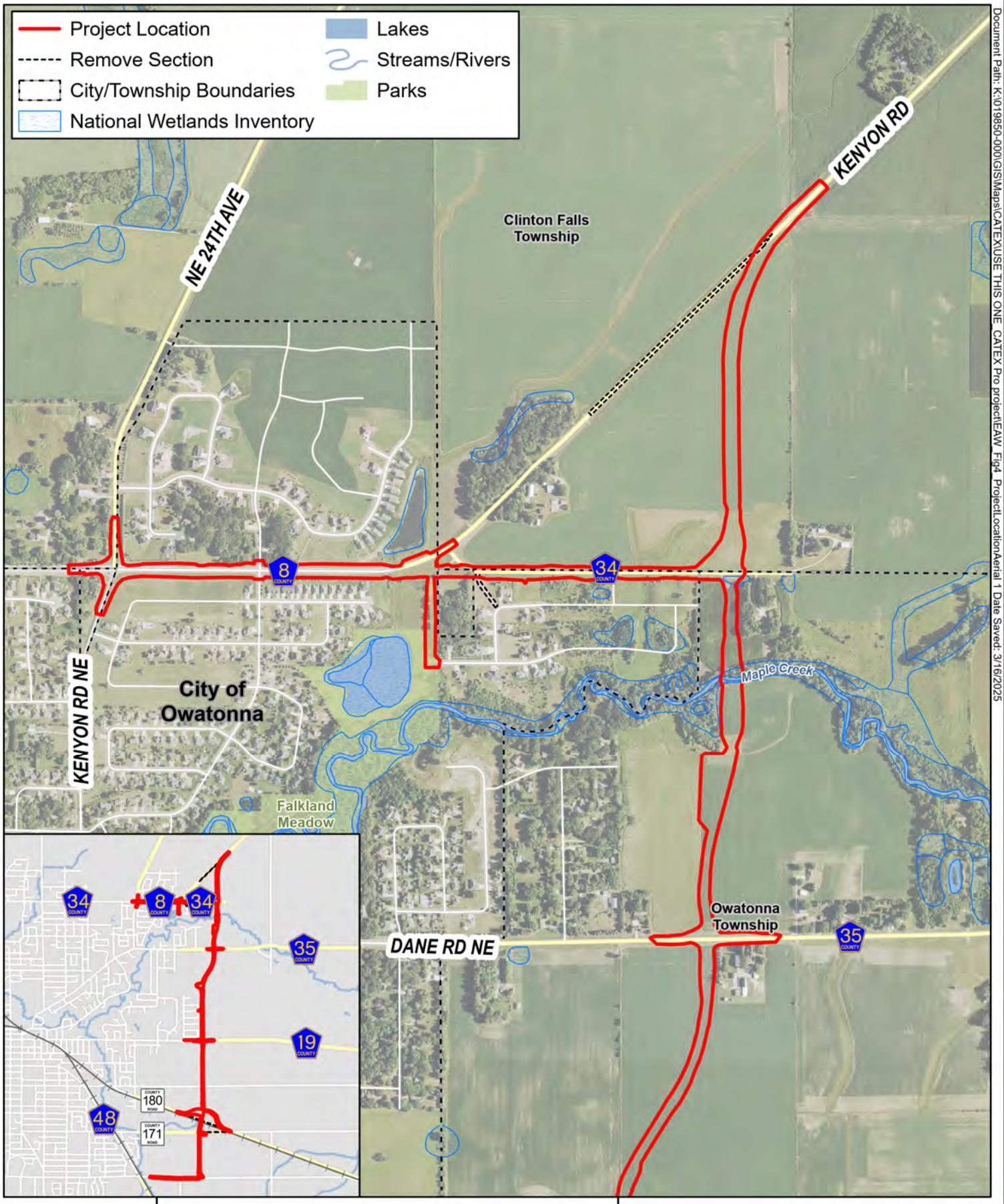
Figure 3 - Project Location

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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1 inch = 2,500 Ft



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Figure 4A - Project Location (Aerial)

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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1 inch = 950 Ft



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Steele county

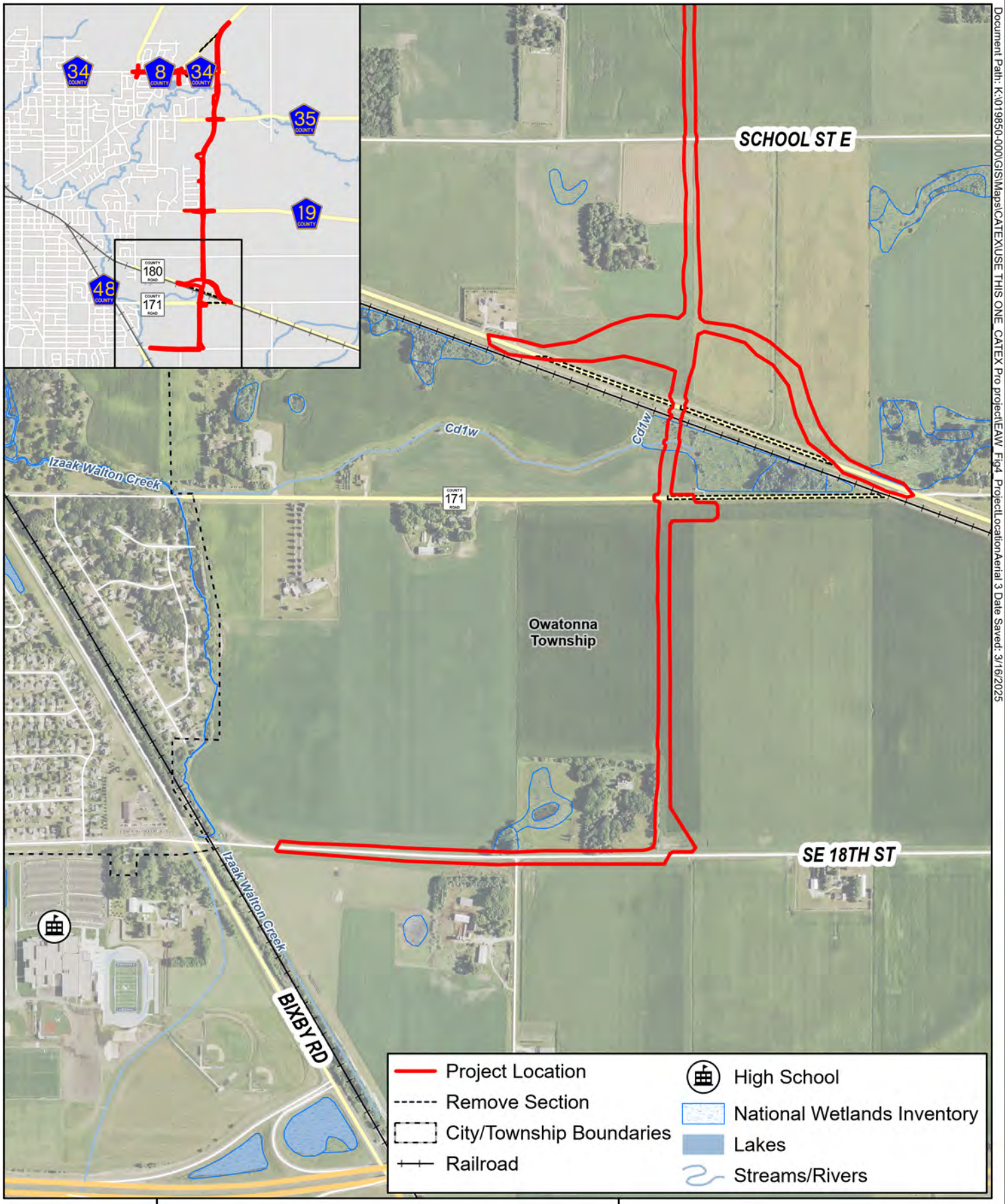
Figure 4B - Project Location (Aerial)

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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Figure 4C - Project Location (Aerial)

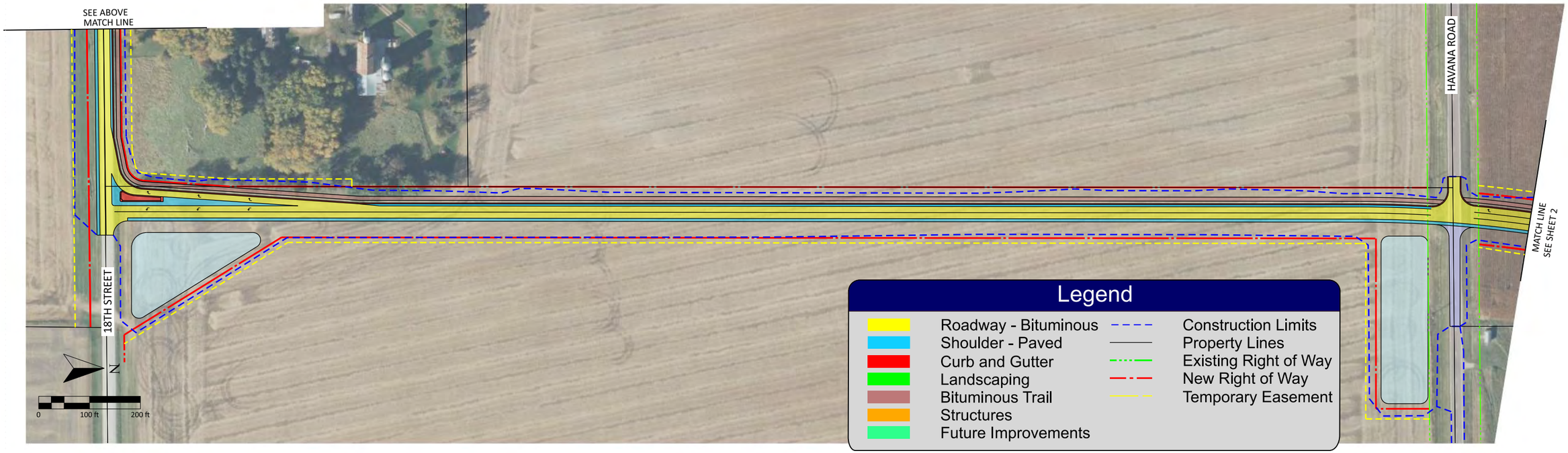
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Steele County, Minnesota

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1 inch = 950 Ft





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29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 5a - Project Layout

SP 074-040-009

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SEE SHEET 3
MATCH LINE

N

0 100 ft 200 ft

CLAREMONT ROAD

MATCH LINE
SEE SHEET 1

Legend

Roadway - Bituminous	Construction Limits
Shoulder - Paved	Property Lines
Curb and Gutter	Existing Right of Way
Landscaping	New Right of Way
Bituminous Trail	Temporary Easement
Structures	
Future Improvements	

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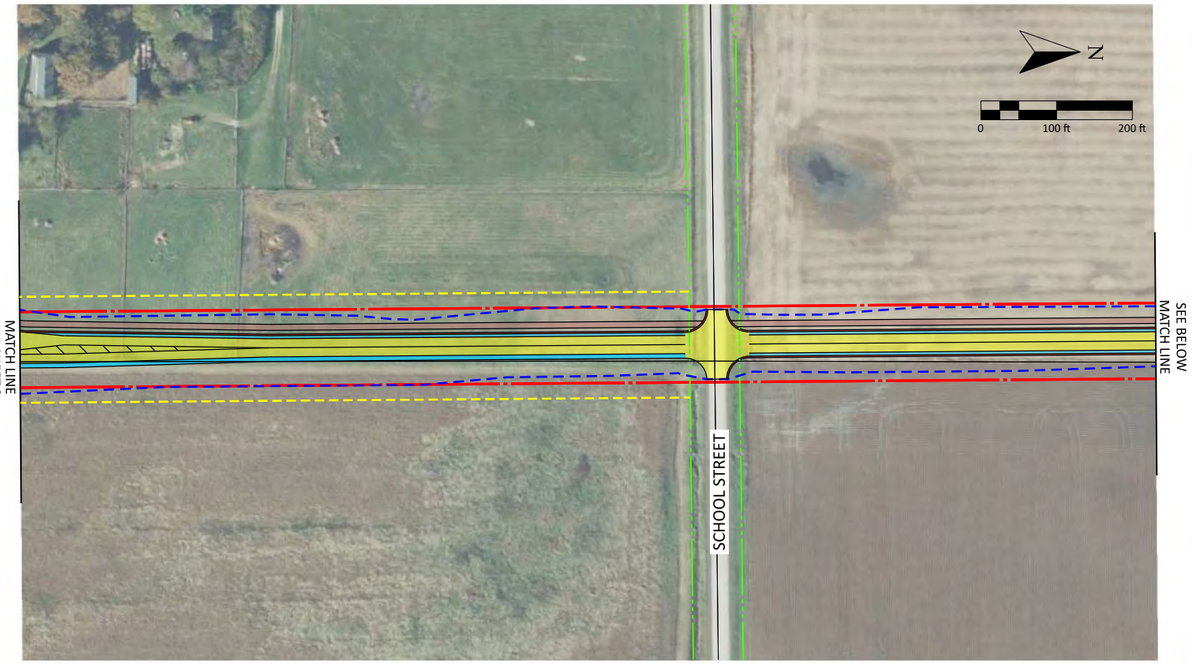
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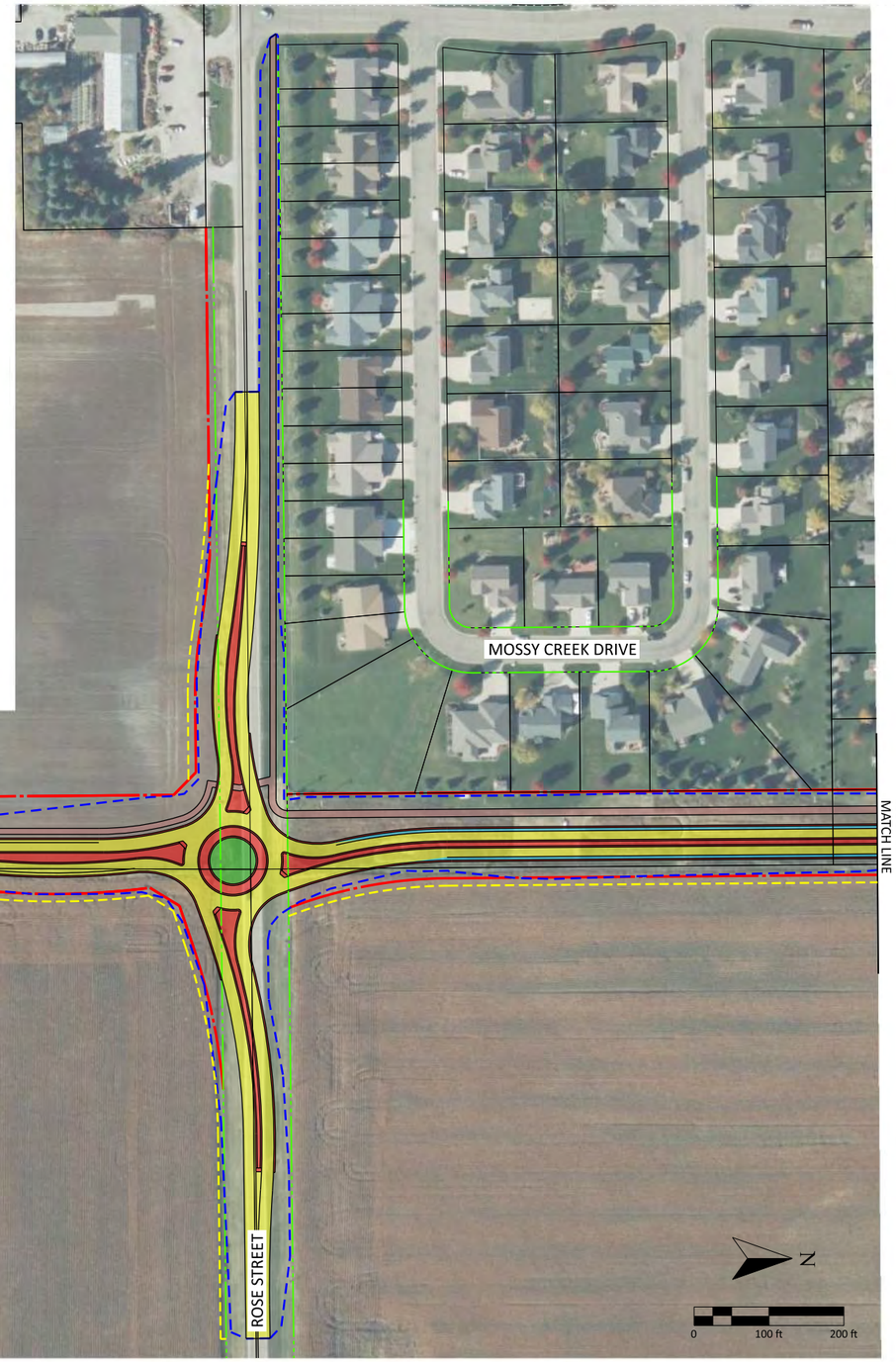
Steele County, Minnesota

Figure 5b - Project Layout

SP 074-040-009

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Legend

- Roadway - Bituminous
- Shoulder - Paved
- Curb and Gutter
- Landscaping
- Bituminous Trail
- Structures
- Future Improvements
- Construction Limits
- Property Lines
- Existing Right of Way
- New Right of Way
- Temporary Easement

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29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 5c - Project Layout
SP 074-040-009

SHEET 3 OF 6

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FOX HOLLOW LANE

STONY CREEK DRIVE

TIMBERWOOD LANE

SEE SHEET 3
MATCH LINE

MATCH LINE
SEE BELOW

N

0 100 ft 200 ft

DANE ROAD

SEE ABOVE
MATCH LINE

MATCH LINE
SEE SHEET 5

Legend

- Roadway - Bituminous
- Shoulder - Paved
- Curb and Gutter
- Landscaping
- Bituminous Trail
- Structures
- Future Improvements
- Construction Limits
- Property Lines
- Existing Right of Way
- New Right of Way
- Temporary Easement

N

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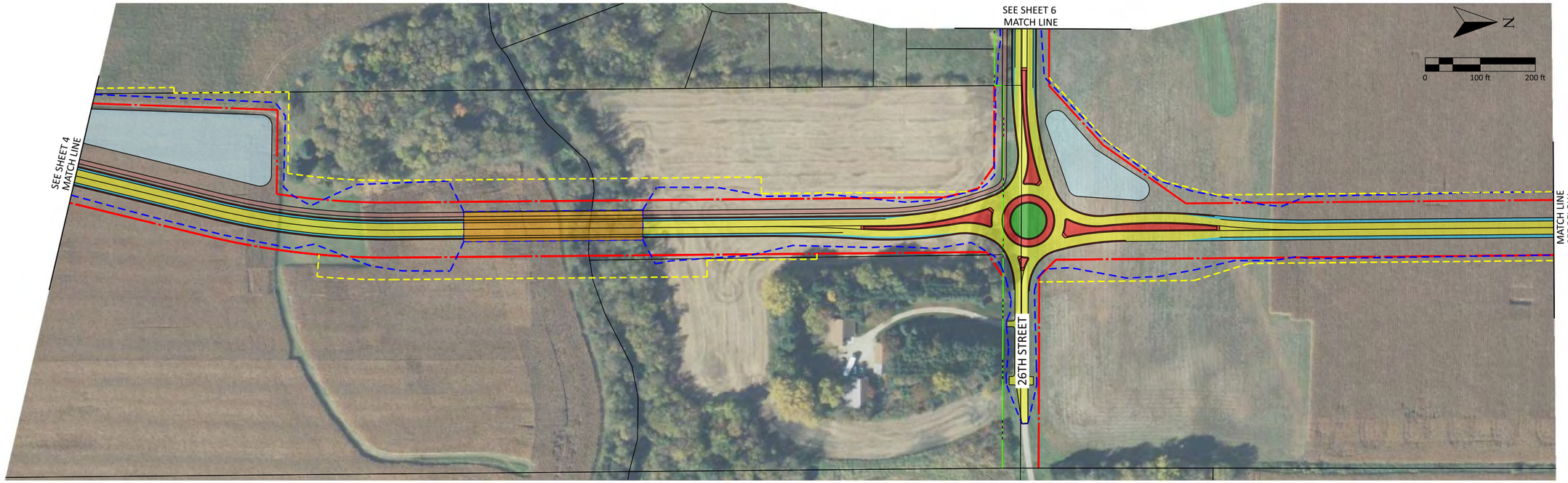
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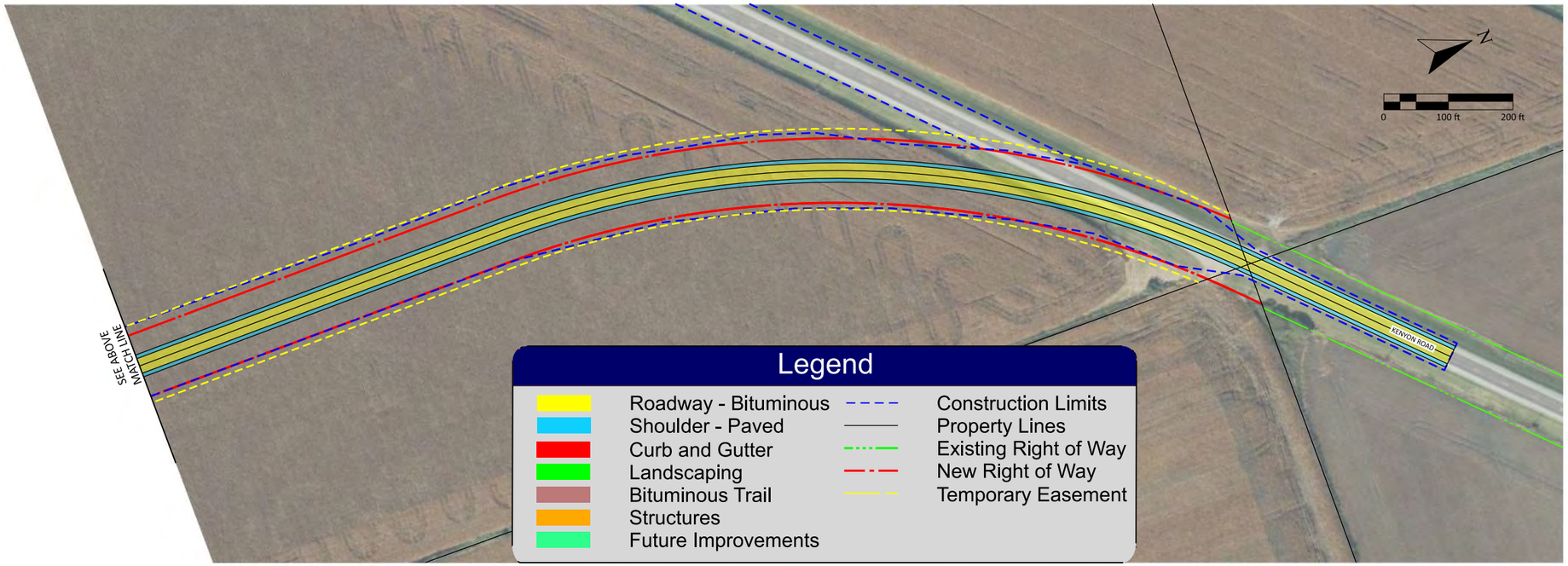
29th Avenue/East Side Corridor
Steele County, Minnesota

Figure 5d - Project Layout
SP 074-040-009

SHEET 4 OF 6

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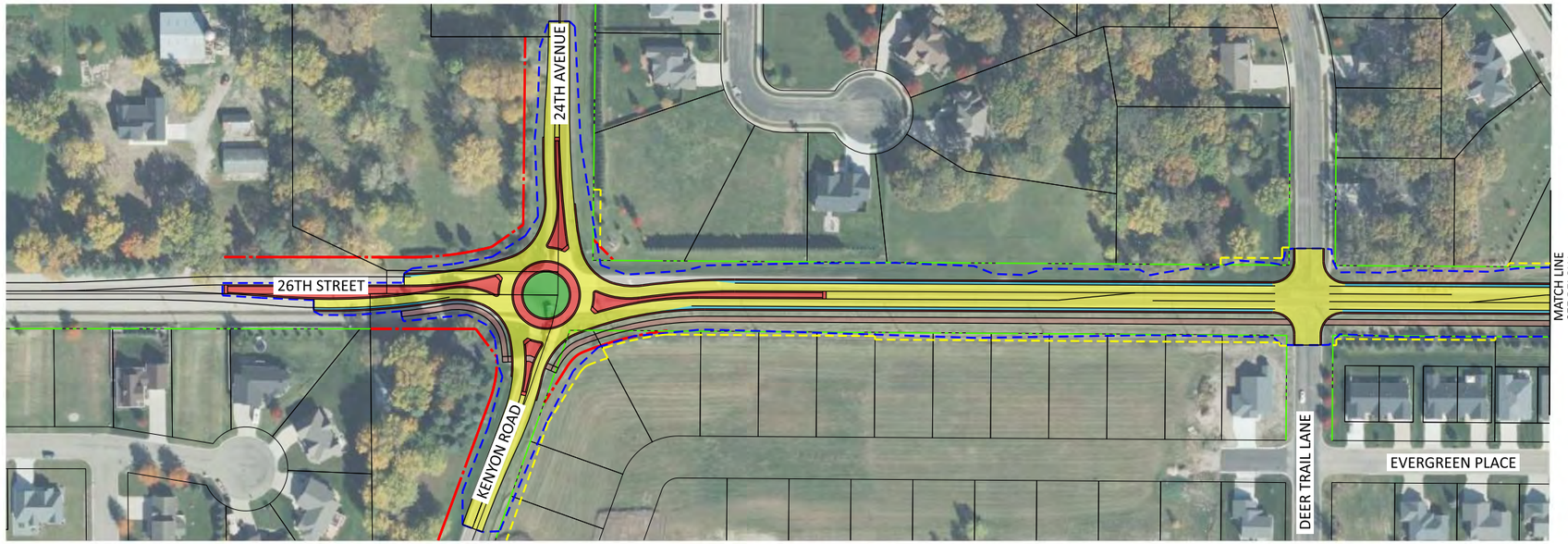
29th Avenue/East Side Corridor
Steele County, Minnesota

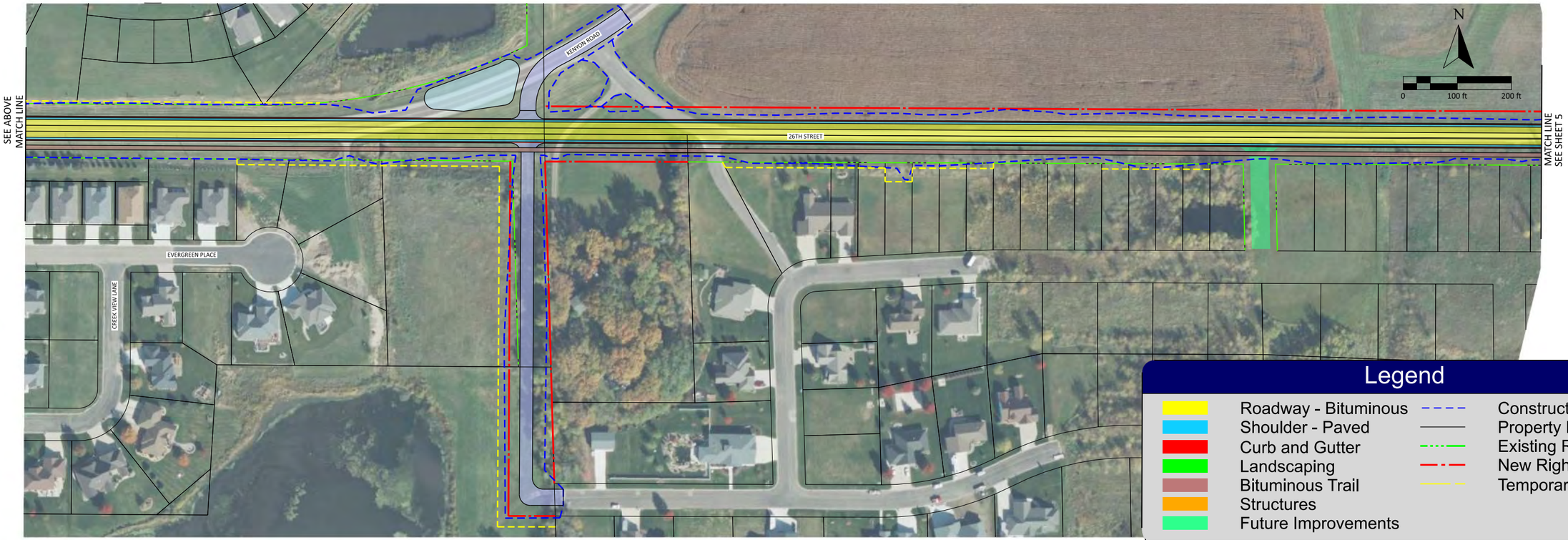
Figure 5e - Project Layout

SP 074-040-009

SHEET 5 OF 6

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Legend

Roadway - Bituminous	Construction Limits
Shoulder - Paved	Property Lines
Curb and Gutter	Existing Right of Way
Landscaping	New Right of Way
Bituminous Trail	Temporary Easement
Structures	
Future Improvements	

29th Avenue/East Side Corridor
Steele County, Minnesota

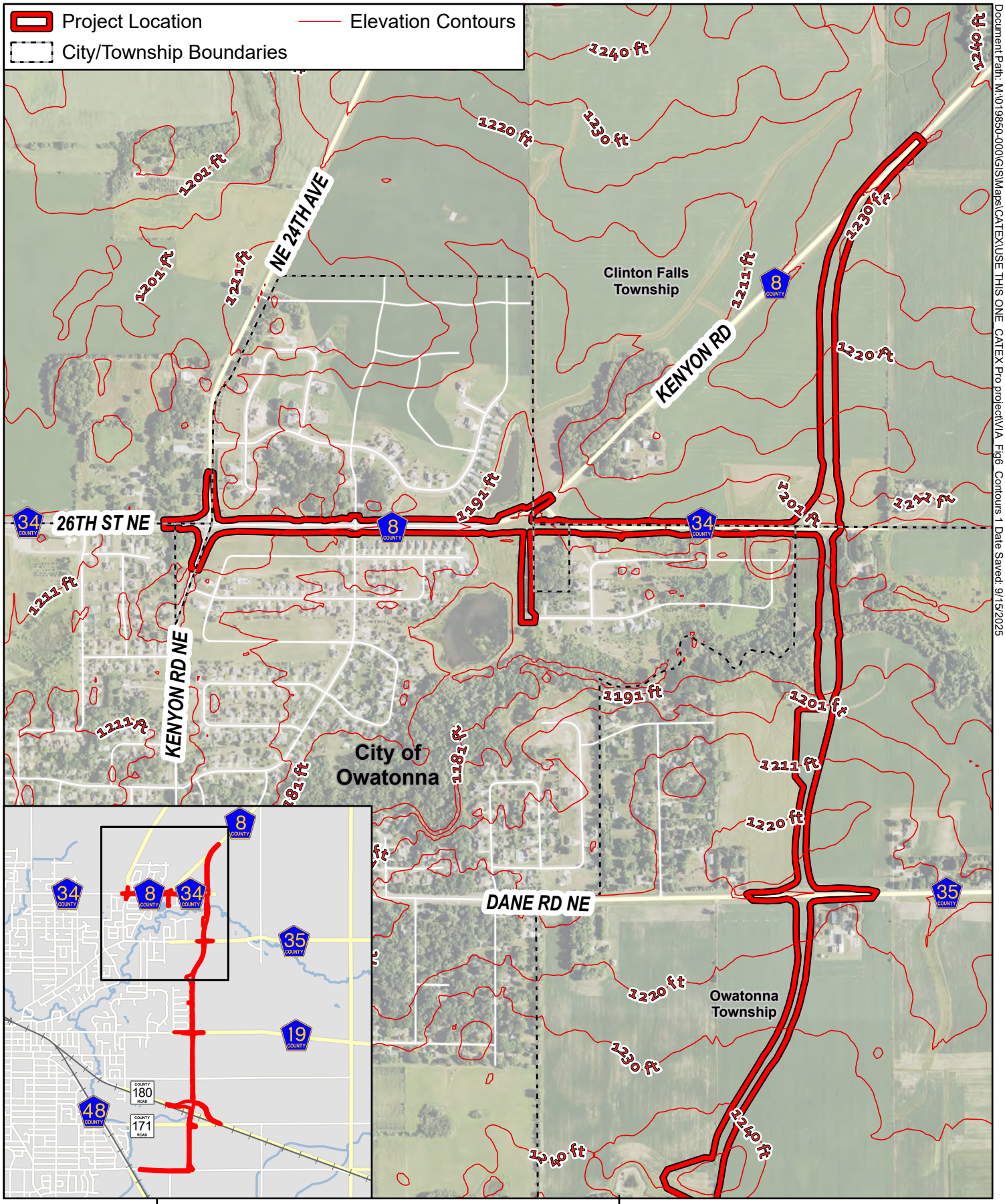
Figure 5f - Project Layout

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SHEET 6 OF 6

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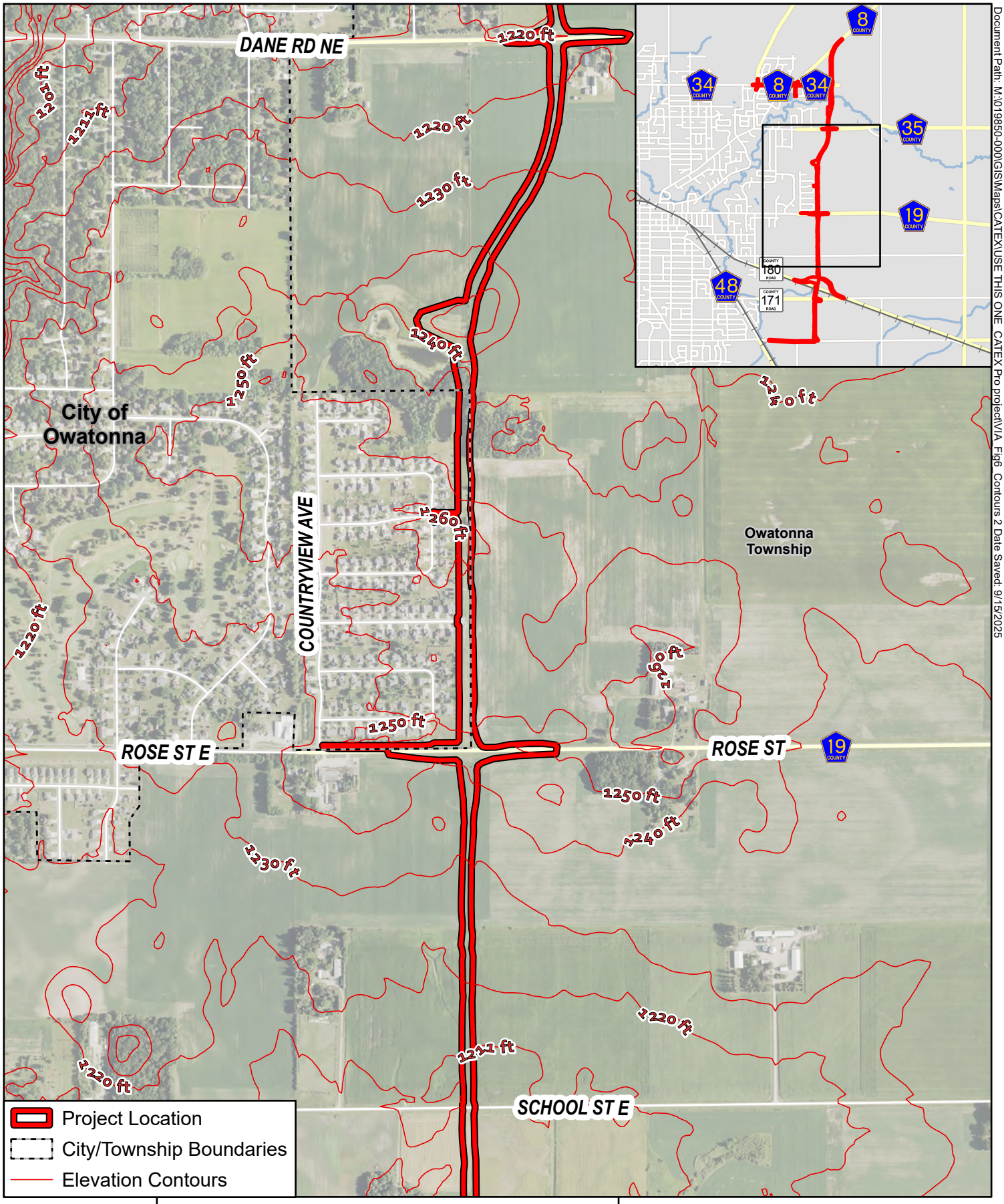
Figure 6A - Elevation Contours Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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0 950 Feet

1 inch = 950 Ft



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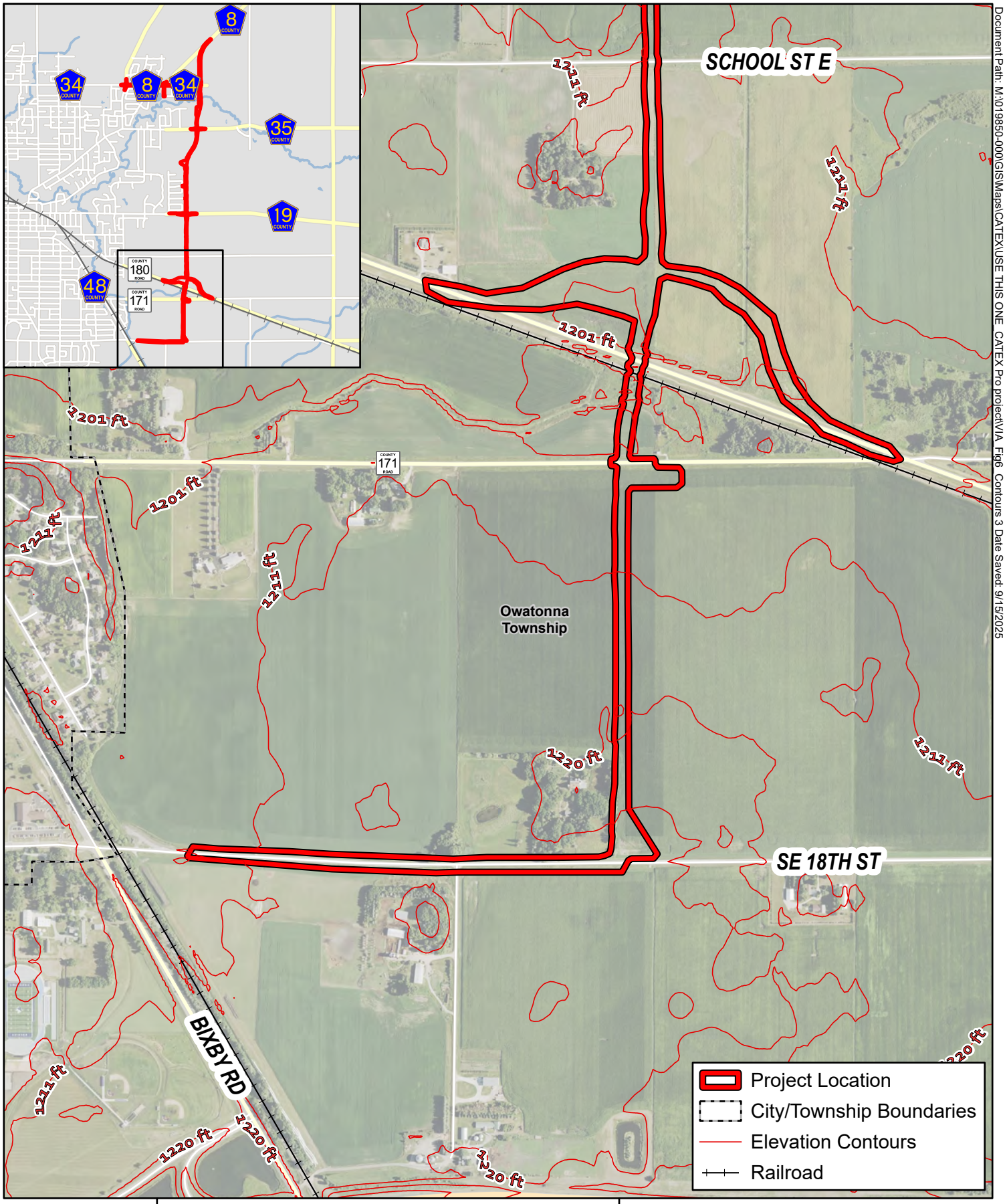
Figure 6B - Elevation Contours Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 950 Feet

1 inch = 950 Ft



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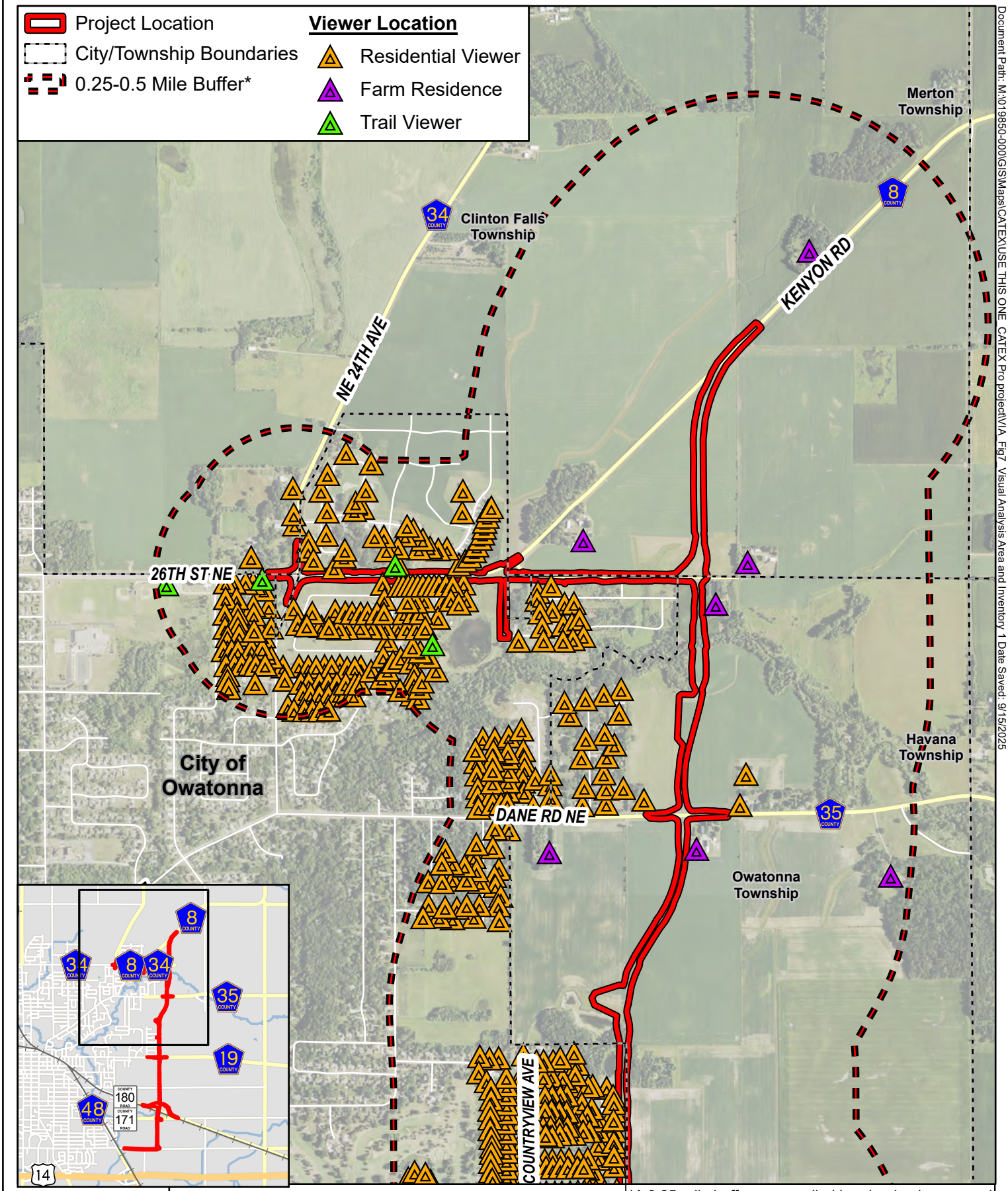
Figure 6C - Elevation Contours Map

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

N

0 850 Feet

1 inch = 850 Ft



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Figure 7A - Visual Analysis Area and Visual Receptor Inventory

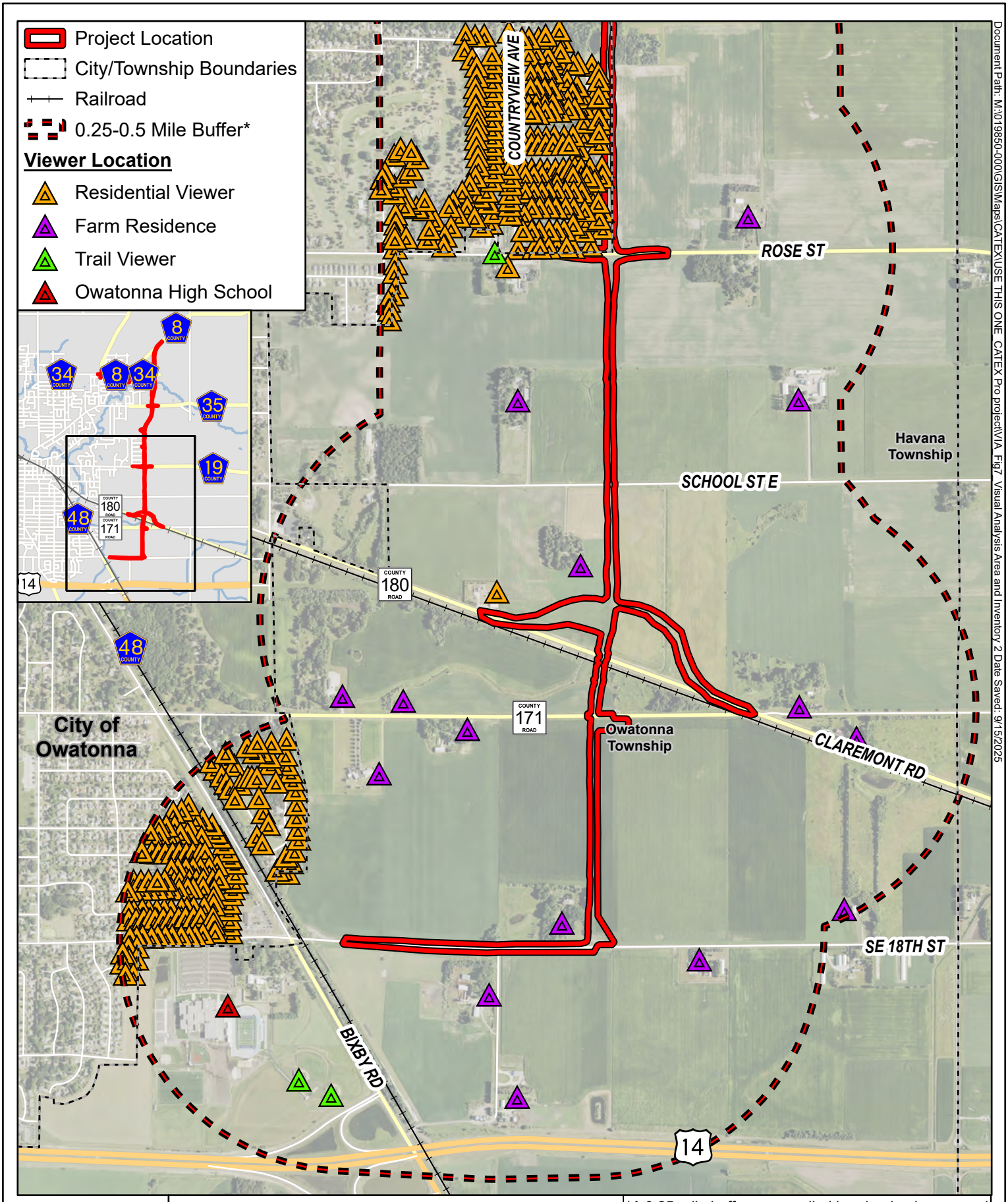
29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

*A 0.25-mile buffer was applied in urbanized areas and a 0.5-mile buffer in rural areas to reflect varying visual exposure and viewer density, consistent with VIA Guidelines for Highway Projects (Section 3.4).

N

0 1,450 Feet

1 inch = 1,450 Ft



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Figure 7B - Visual Analysis Area and Visual Receptor Inventory

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

*A 0.25-mile buffer was applied in urbanized areas and a 0.5-mile buffer in rural areas to reflect varying visual exposure and viewer density, consistent with VIA Guidelines for Highway Projects (Section 3.4).

N

0 1,450 Feet

1 inch = 1,450 Ft

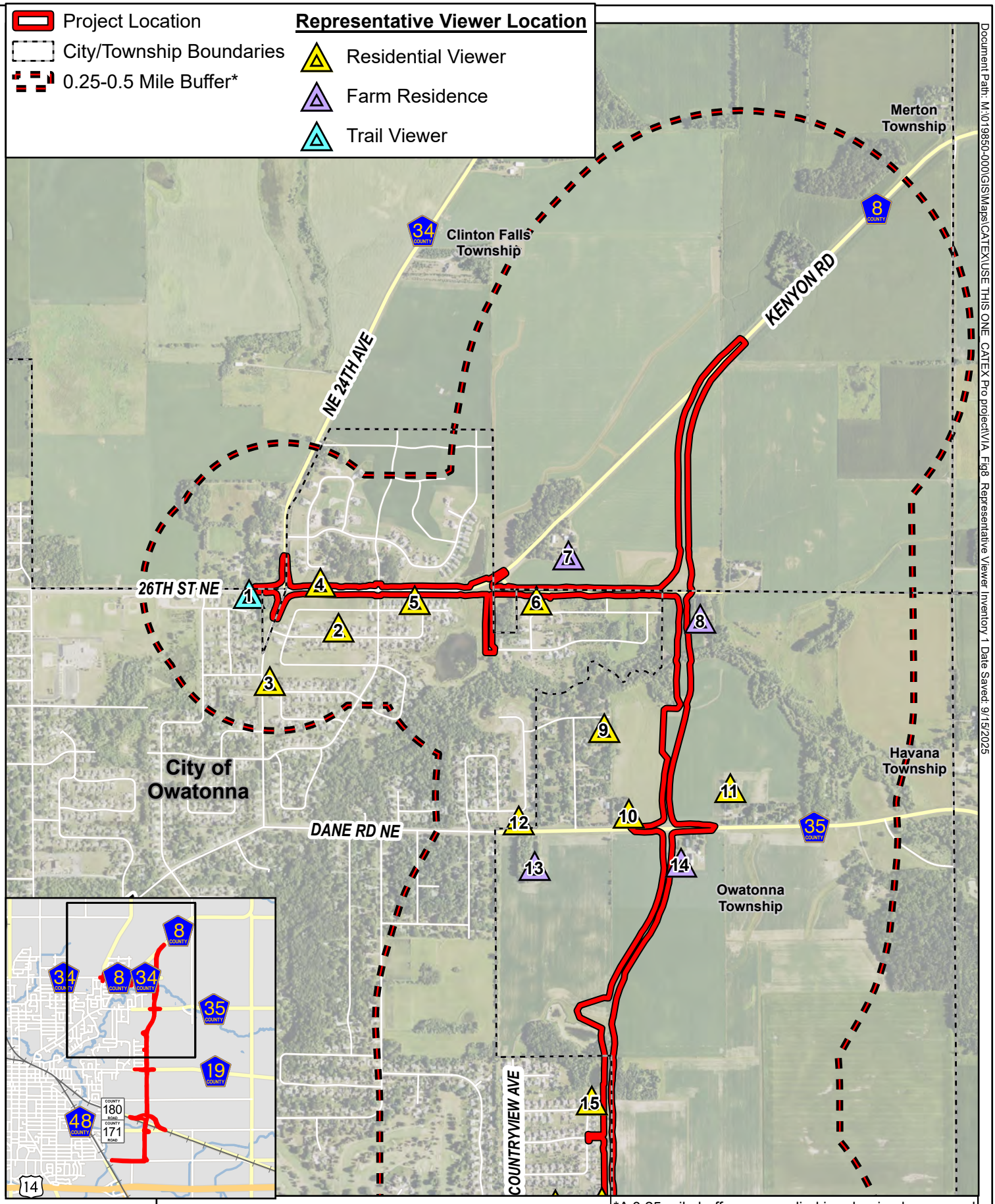


Figure 8A - Representative Viewer Inventory

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

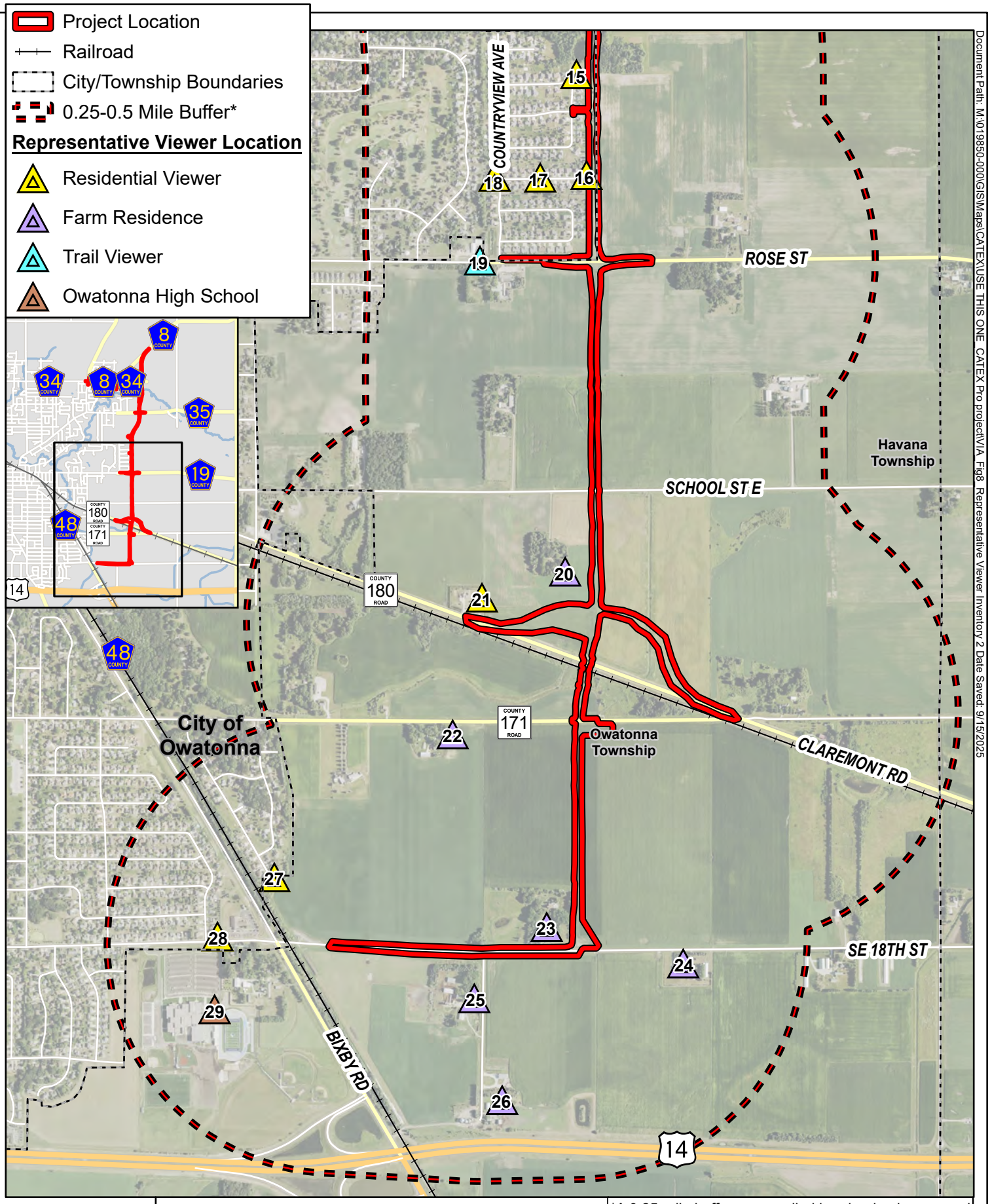
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N

0 1,450 Feet

1 inch = 1,450 Ft

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Figure 8B - Representative Viewer Inventory

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

*A 0.25-mile buffer was applied in urbanized areas and a 0.5-mile buffer in rural areas to reflect varying visual exposure and viewer density, consistent with VIA Guidelines for Highway Projects (Section 3.4).

N

0 1,450 Feet

1 inch = 1,450 Ft

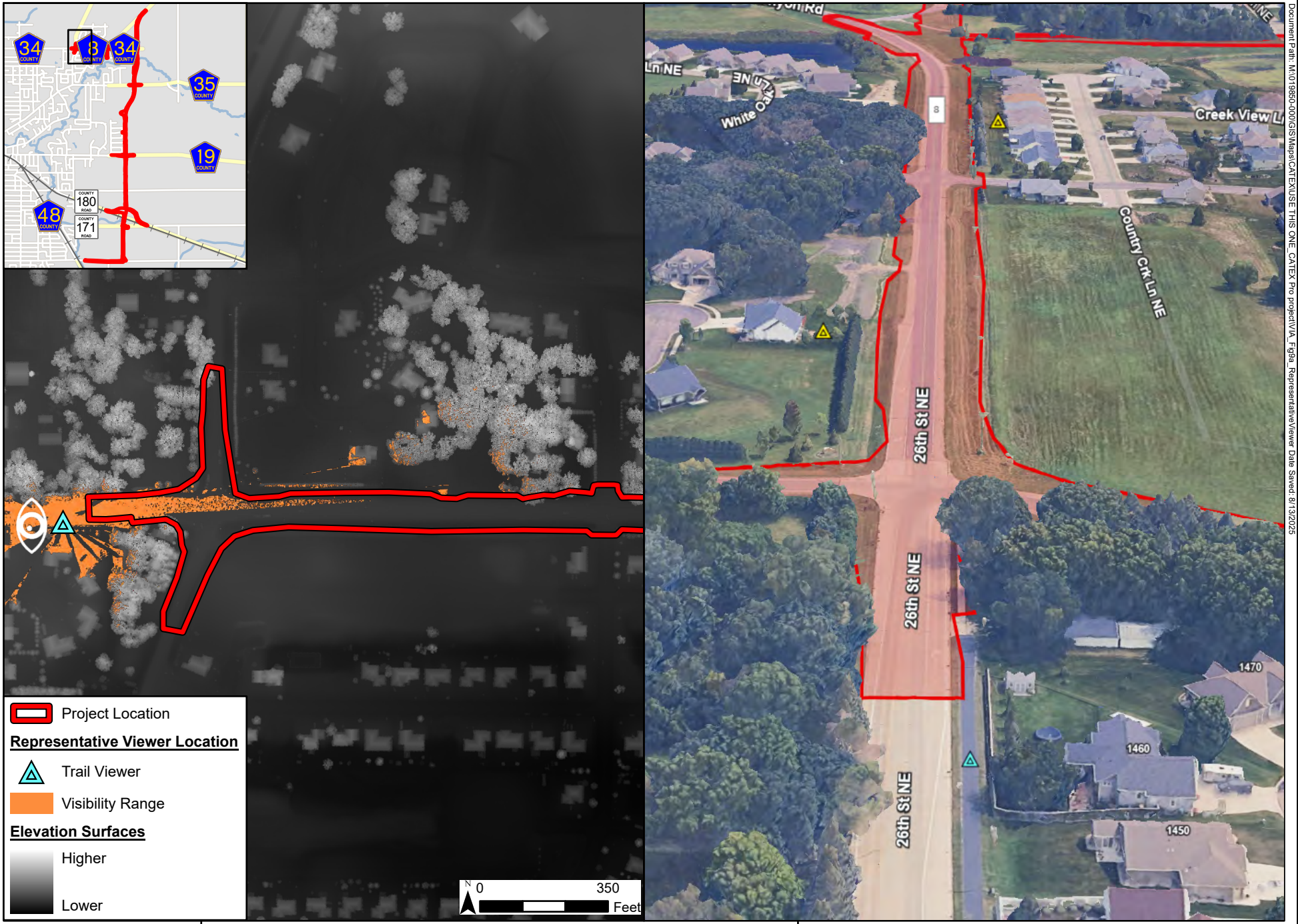


Figure 9a - Representative Viewer 1

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

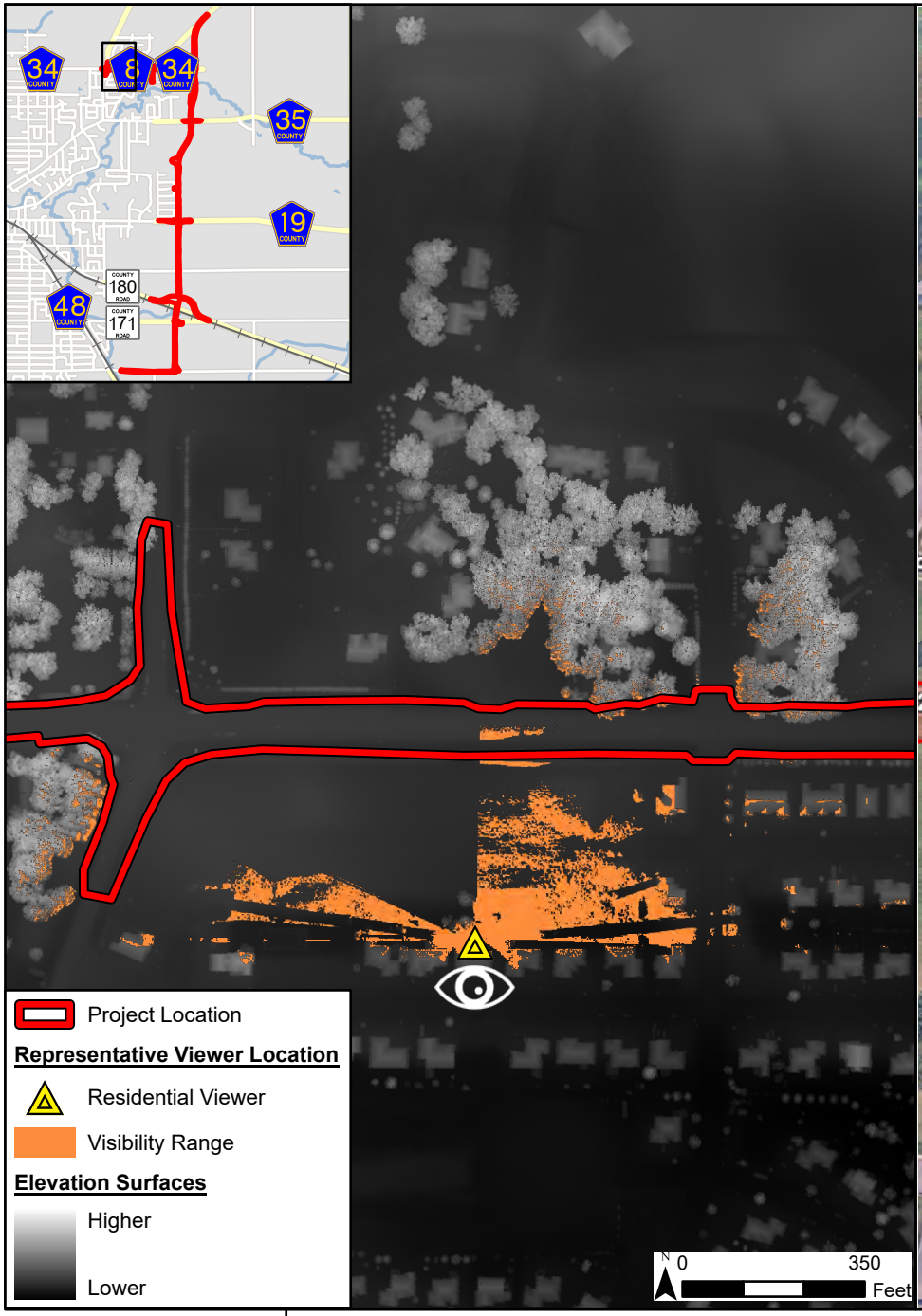




Figure 9b - Representative Viewer 2

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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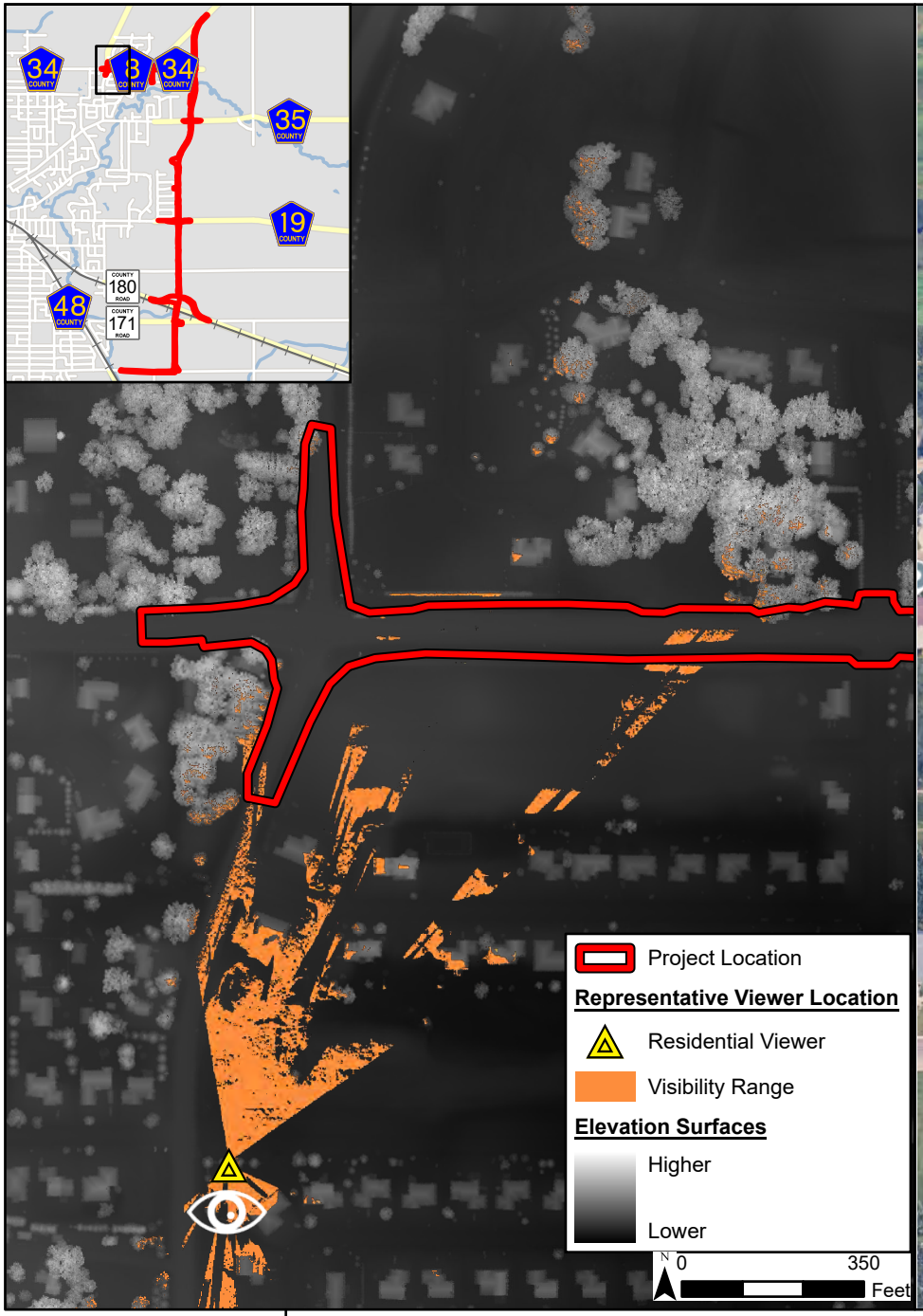




Figure 9c - Representative Viewer 3

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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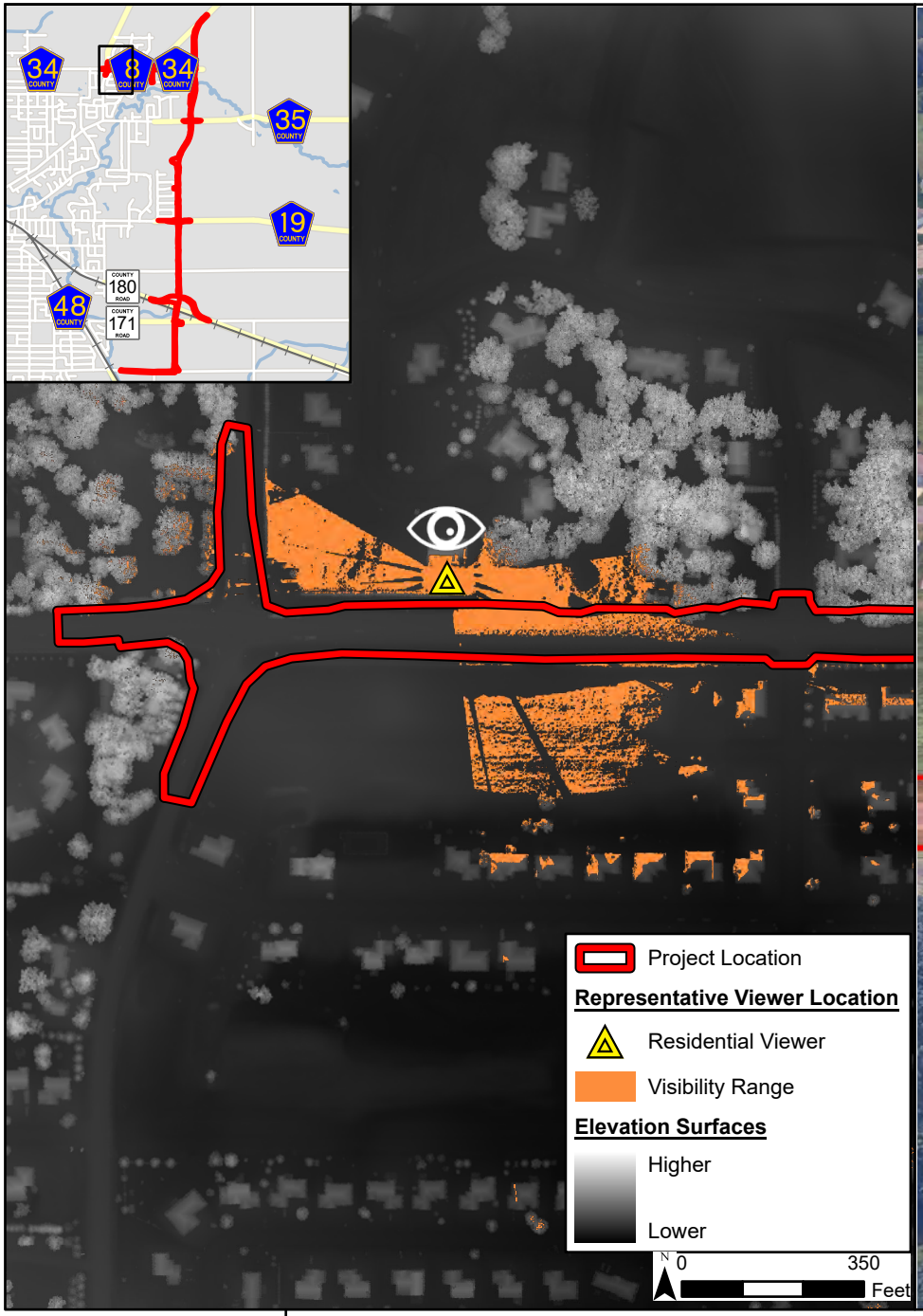
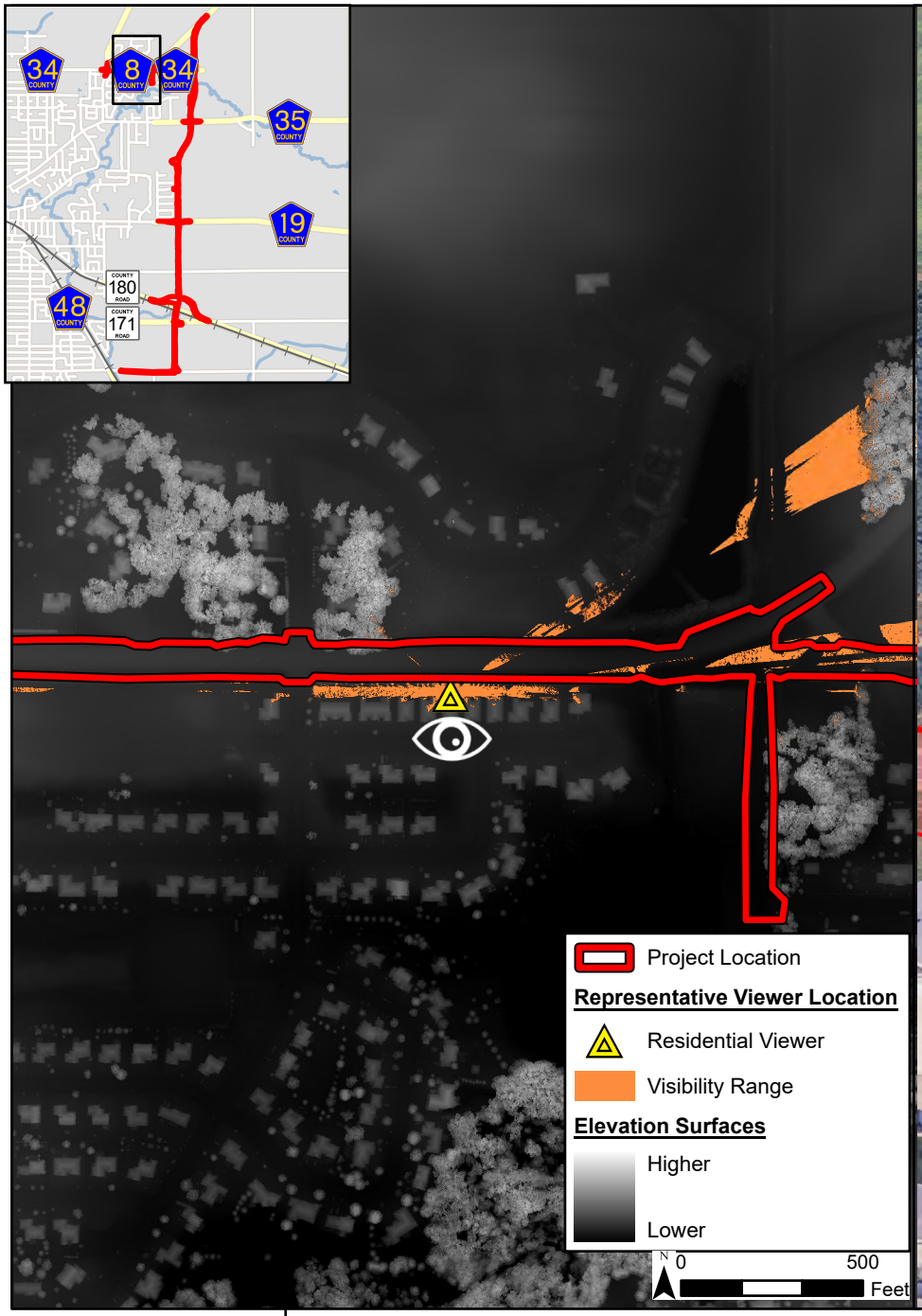




Figure 9d - Representative Viewer 4

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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Figure 9e - Representative Viewer 5

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

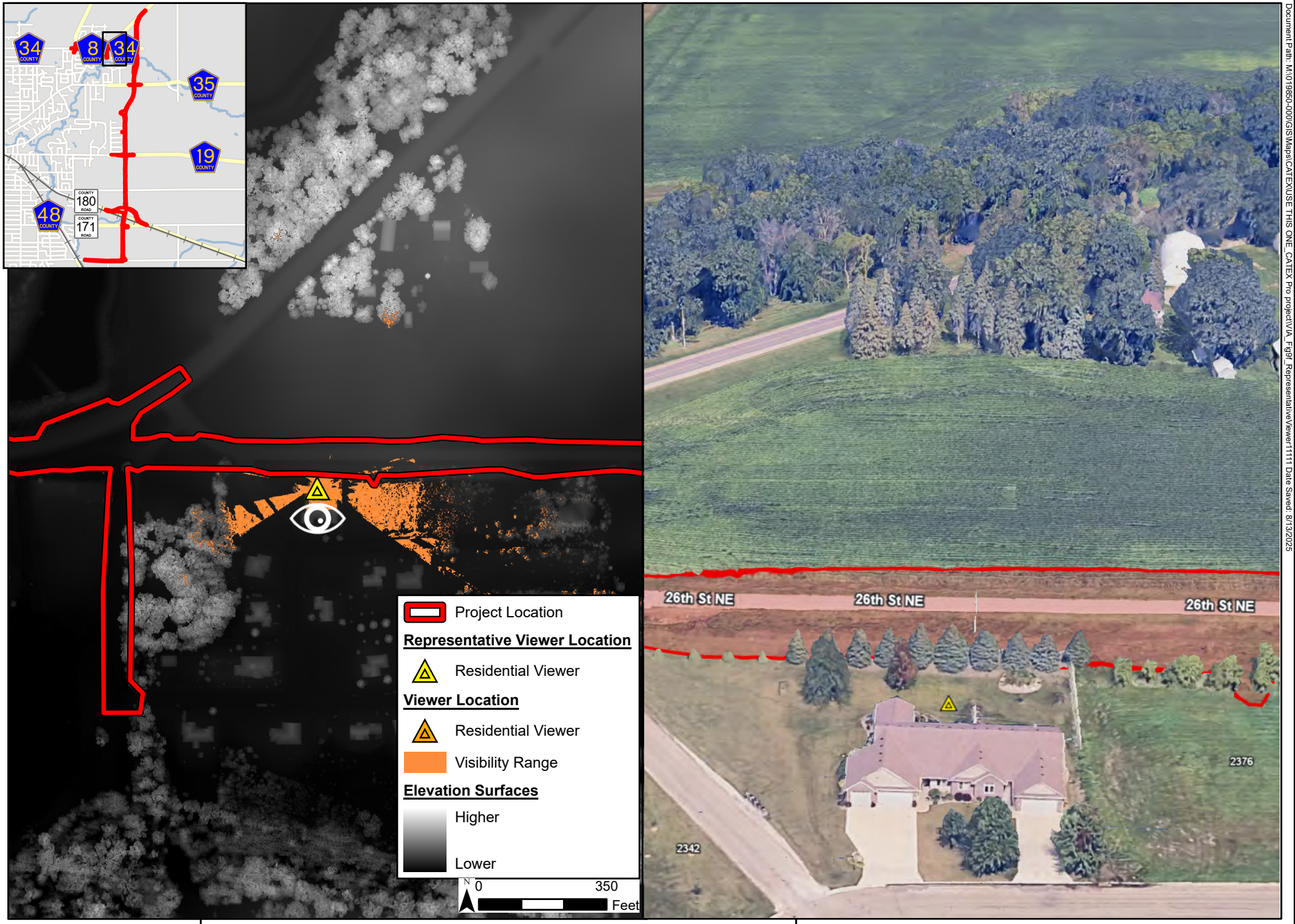


Figure 9f - Representative Viewer 6

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

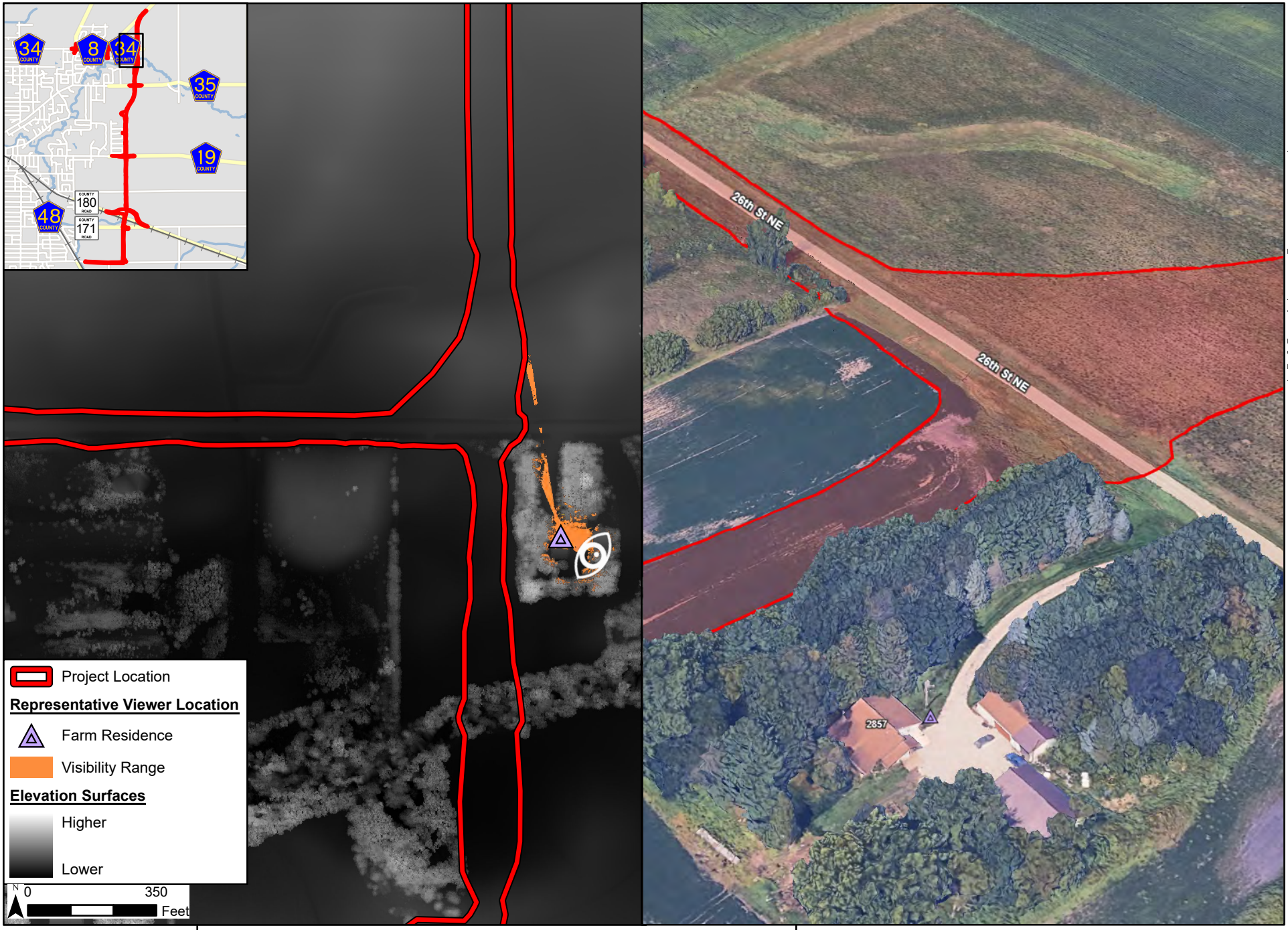
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Figure 9g - Representative Viewer 7

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota



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Figure 9h - Representative Viewer 8

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota



Figure 9i - Representative Viewer 9

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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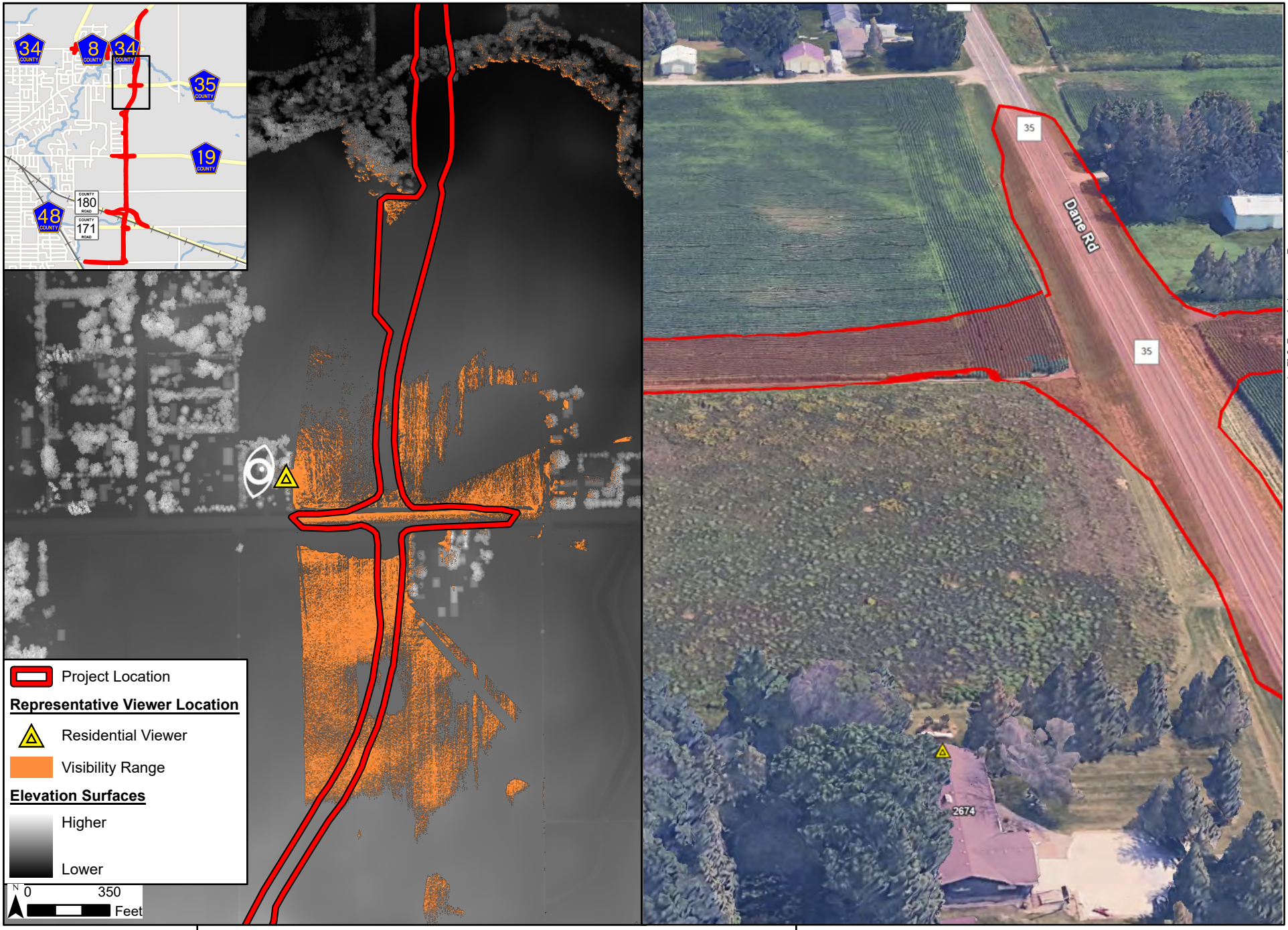


Figure 9j - Representative Viewer 10

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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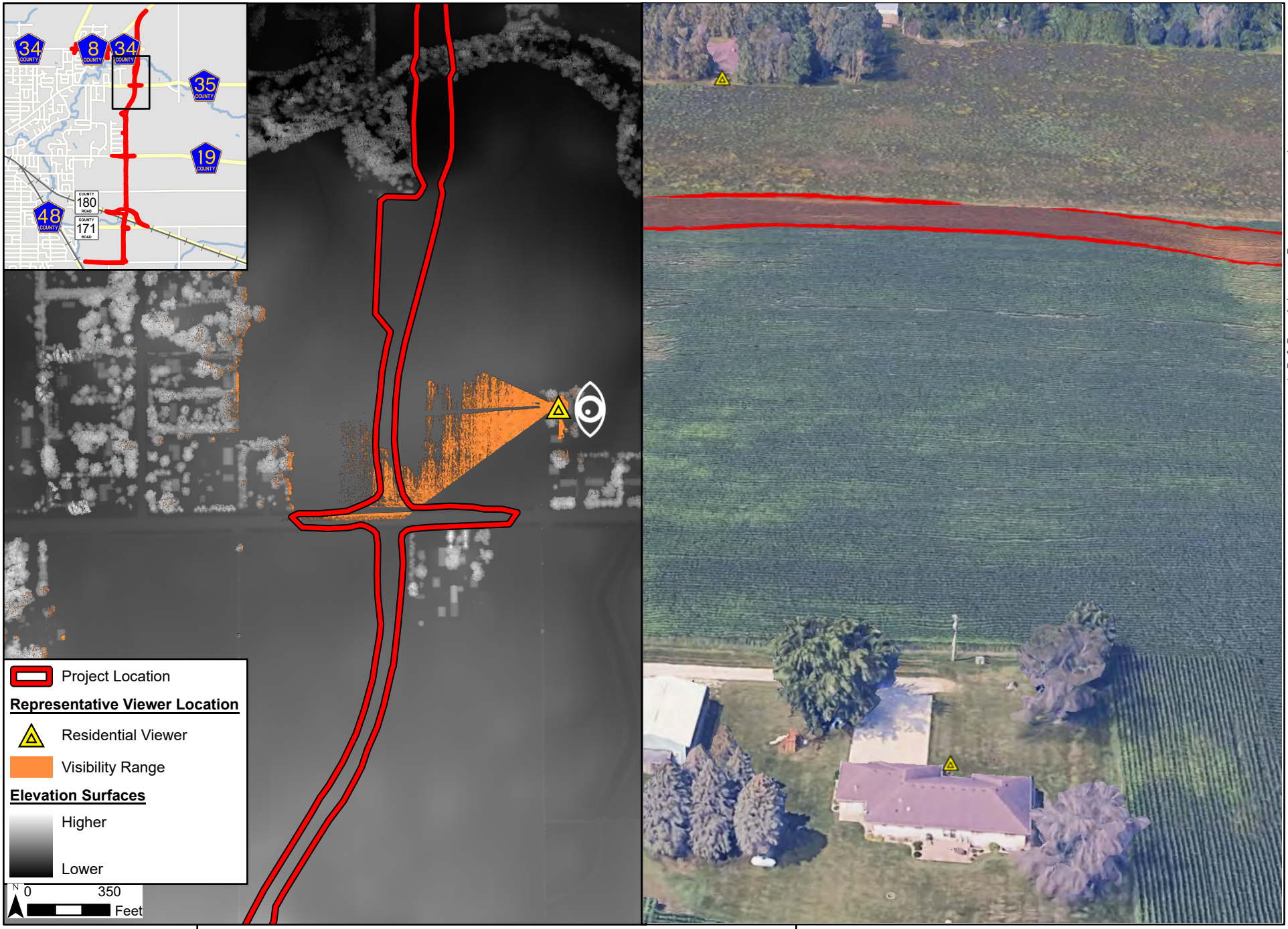


Figure 9k - Representative Viewer 11

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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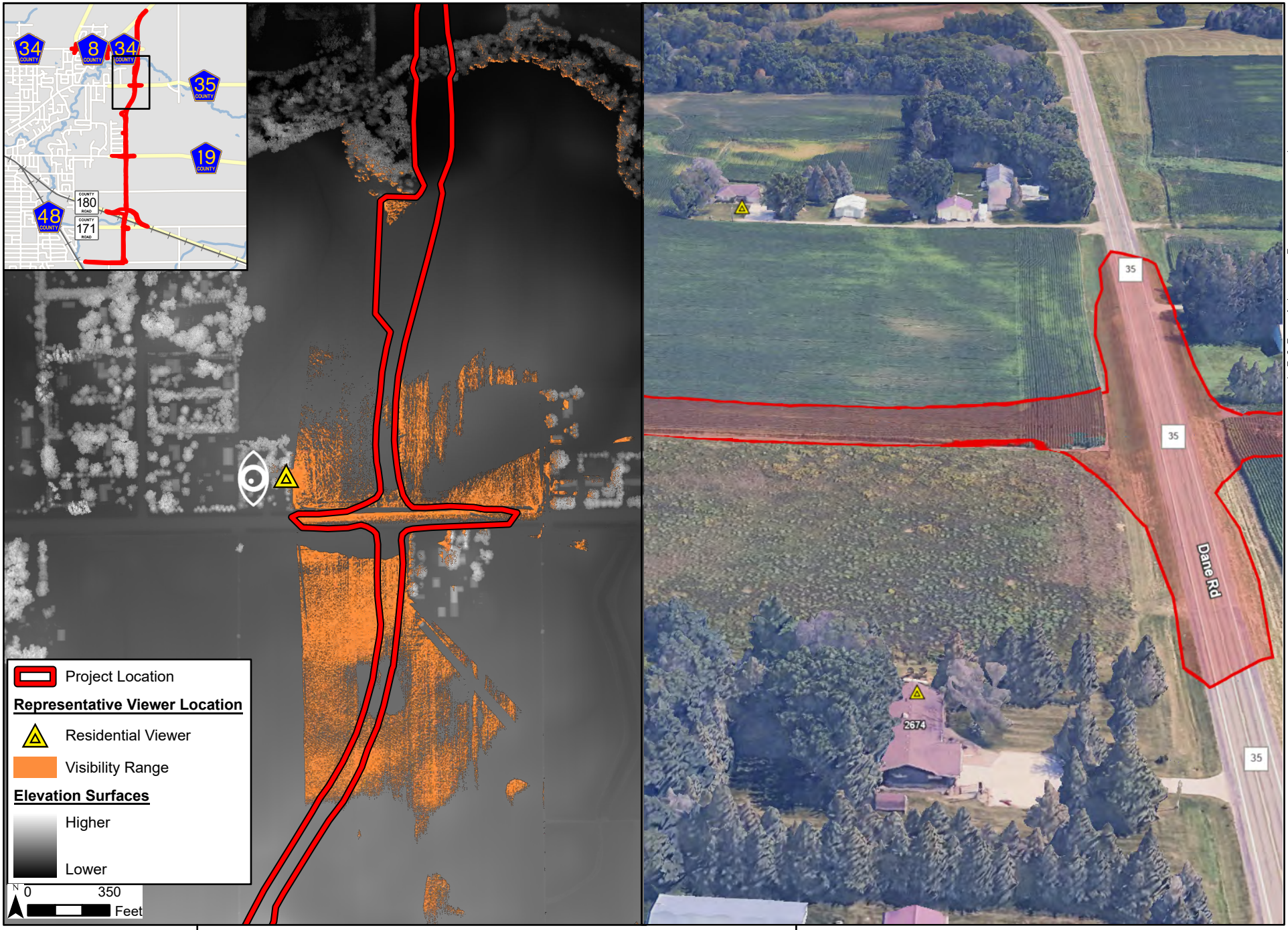
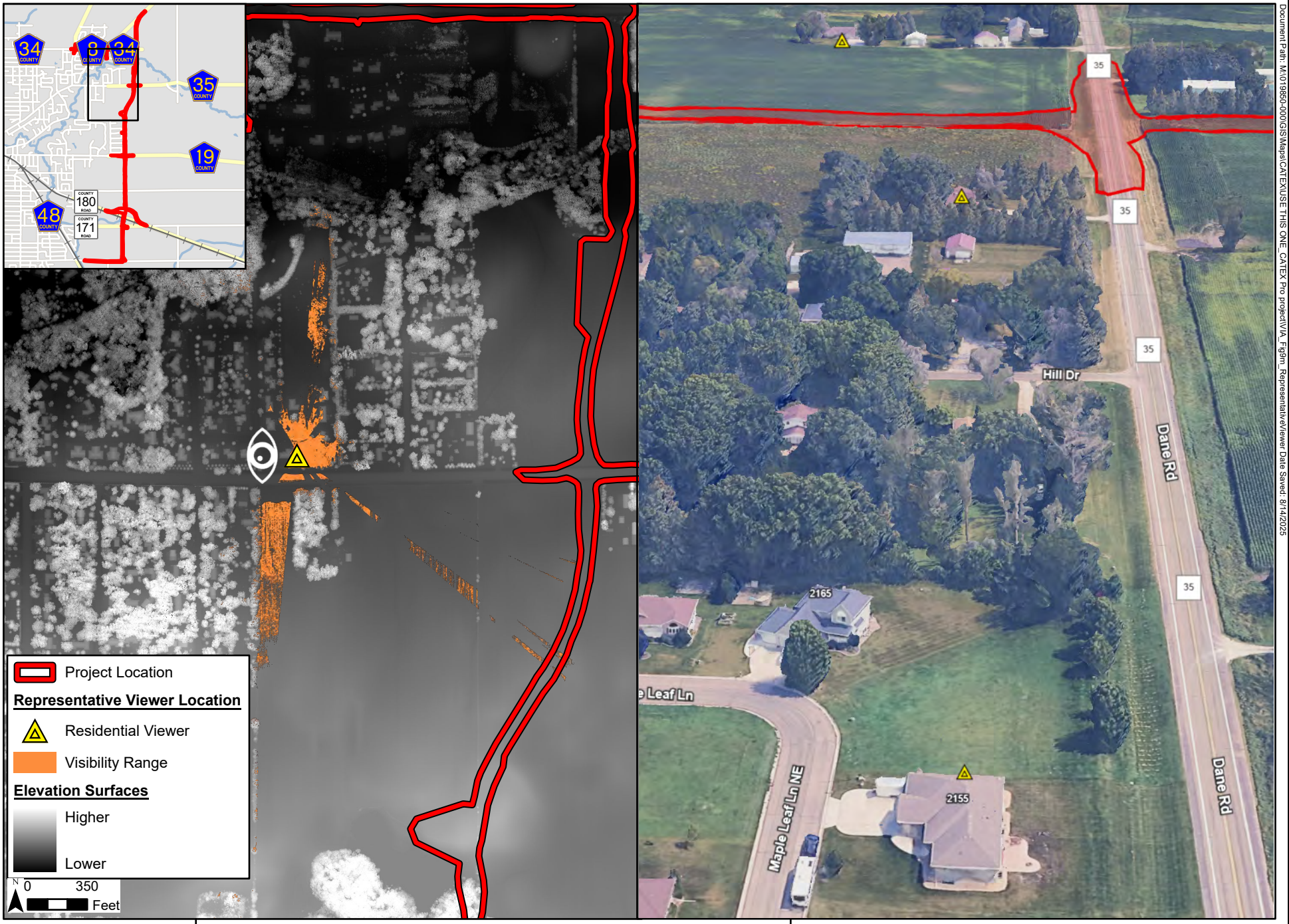


Figure 9I - Representative Viewer 12

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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Figure 9l - Representative Viewer 12

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota



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Figure 9m - Representative Viewer 13

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota



Figure 9n - Representative Viewer 14

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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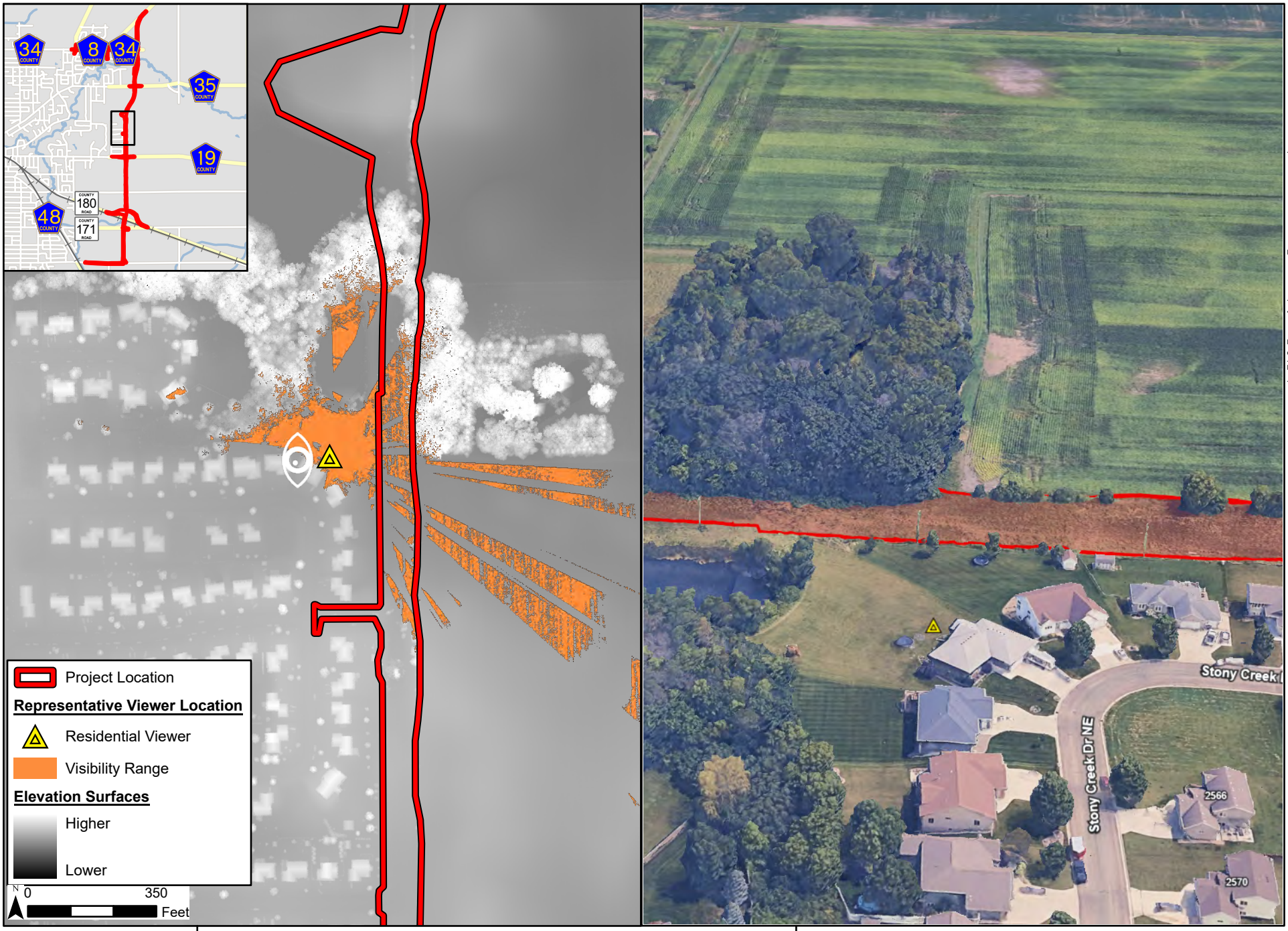


Figure 9o - Representative Viewer 15

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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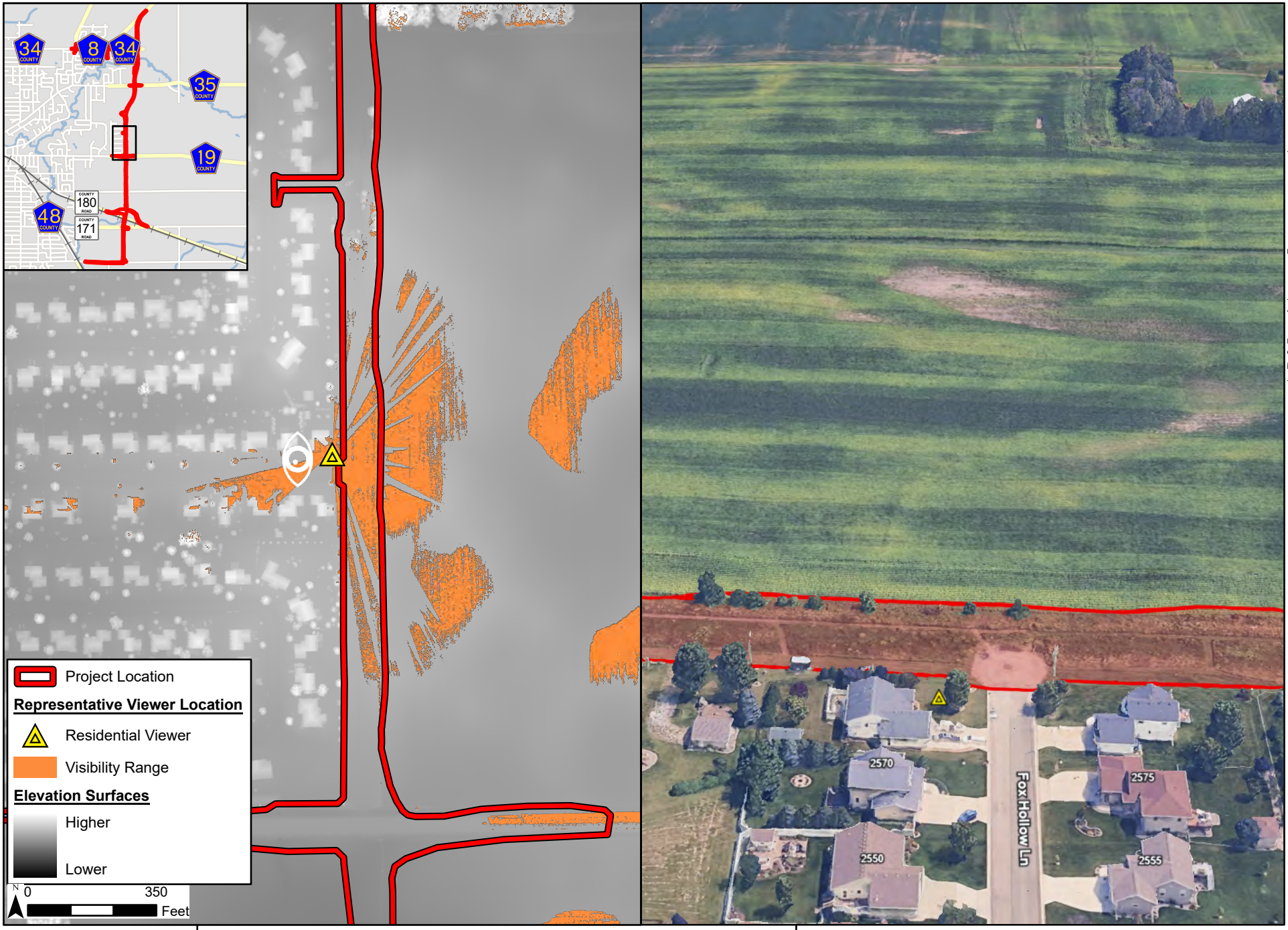
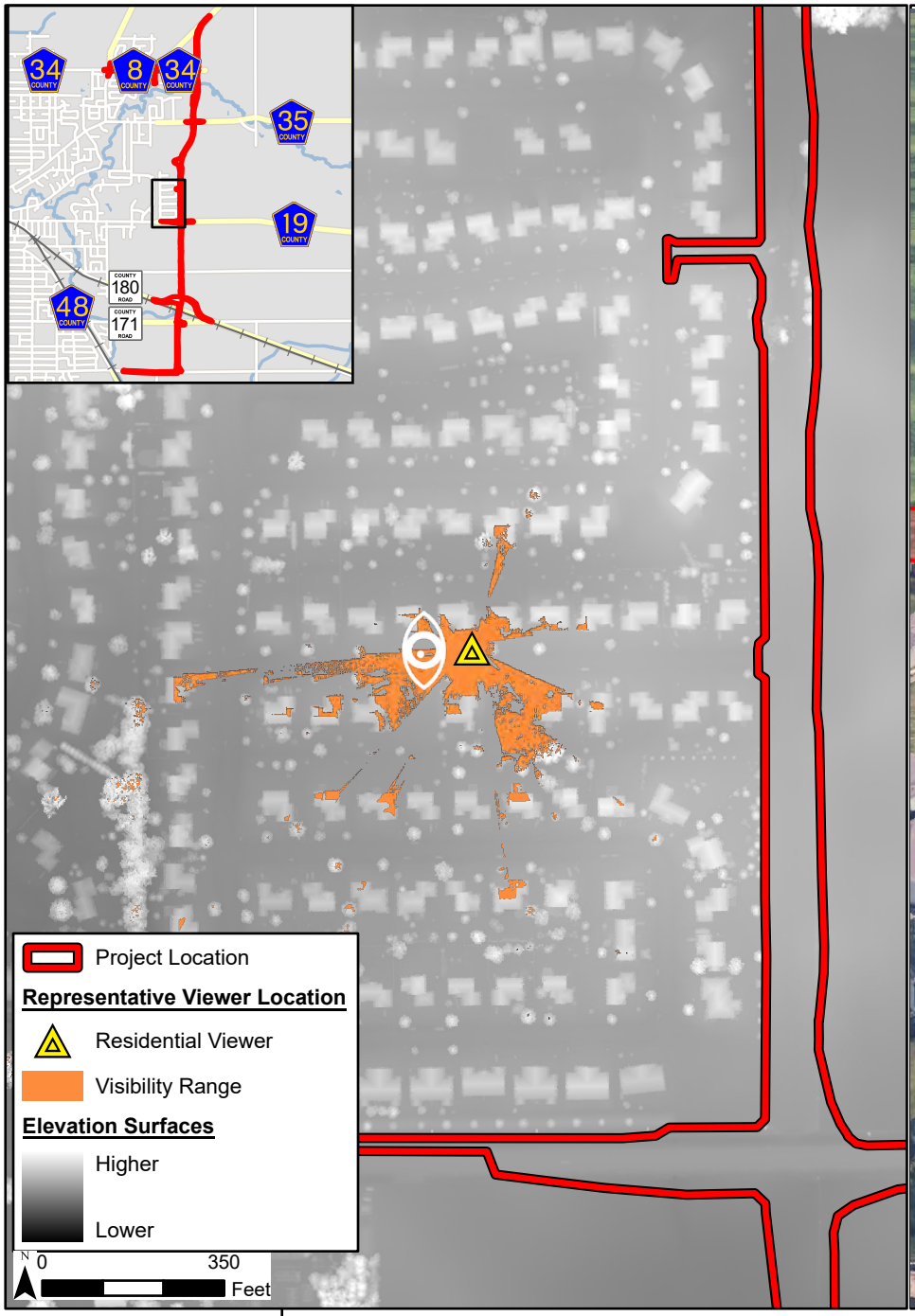


Figure 9p - Representative Viewer 16

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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Figure 9q - Representative Viewer 17

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

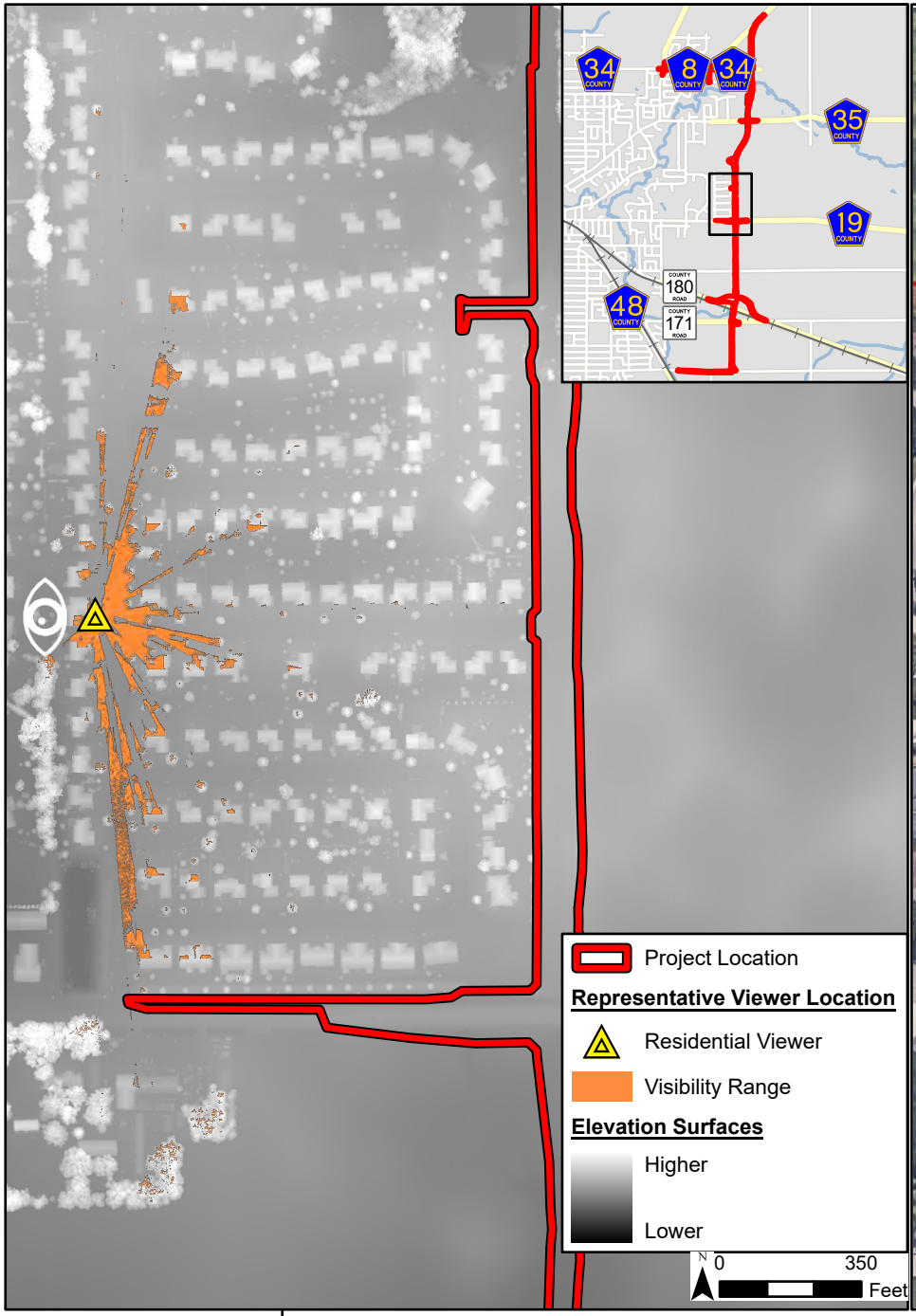
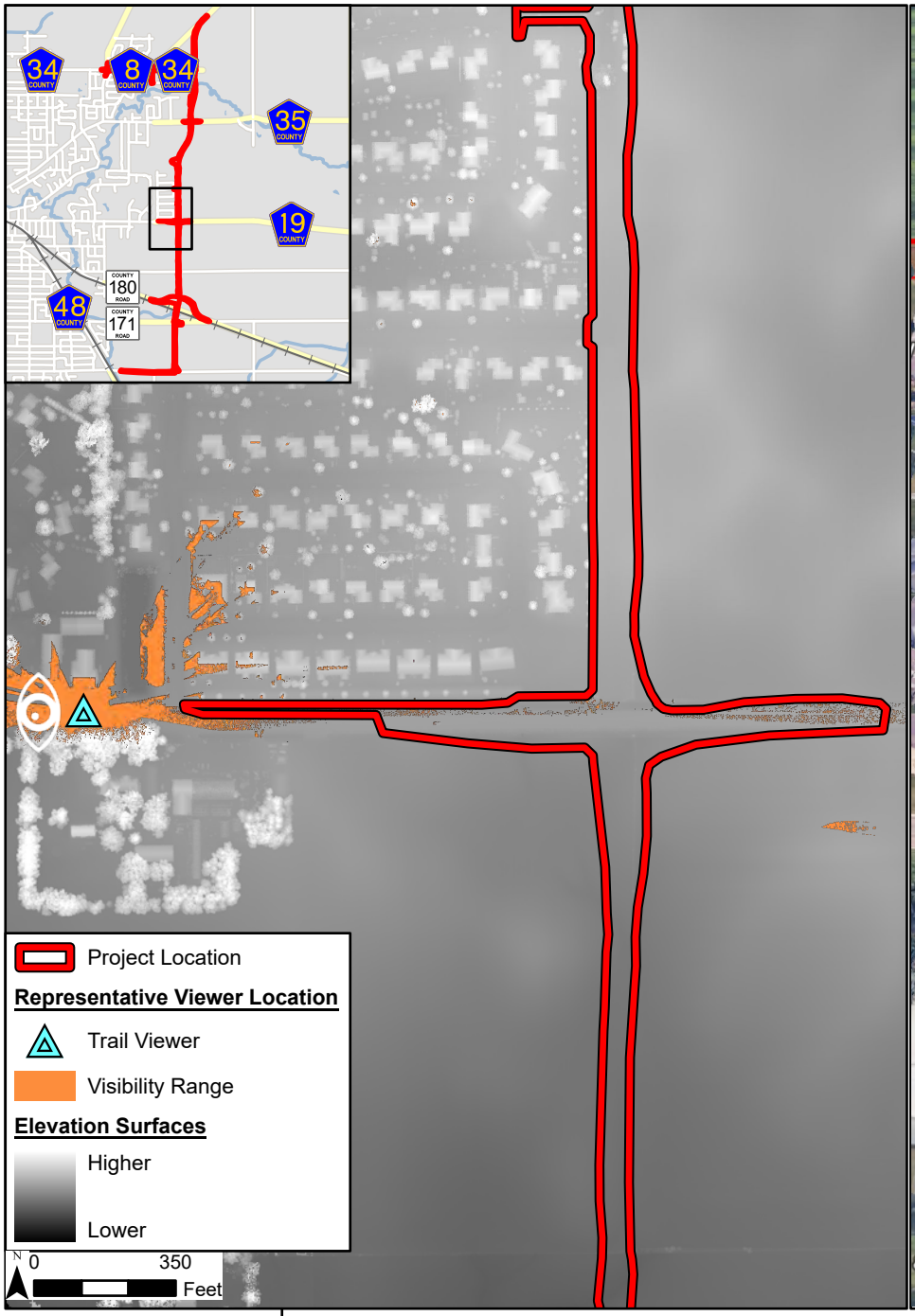




Figure 9r - Representative Viewer 18

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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Figure 9s - Representative Viewer 19

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

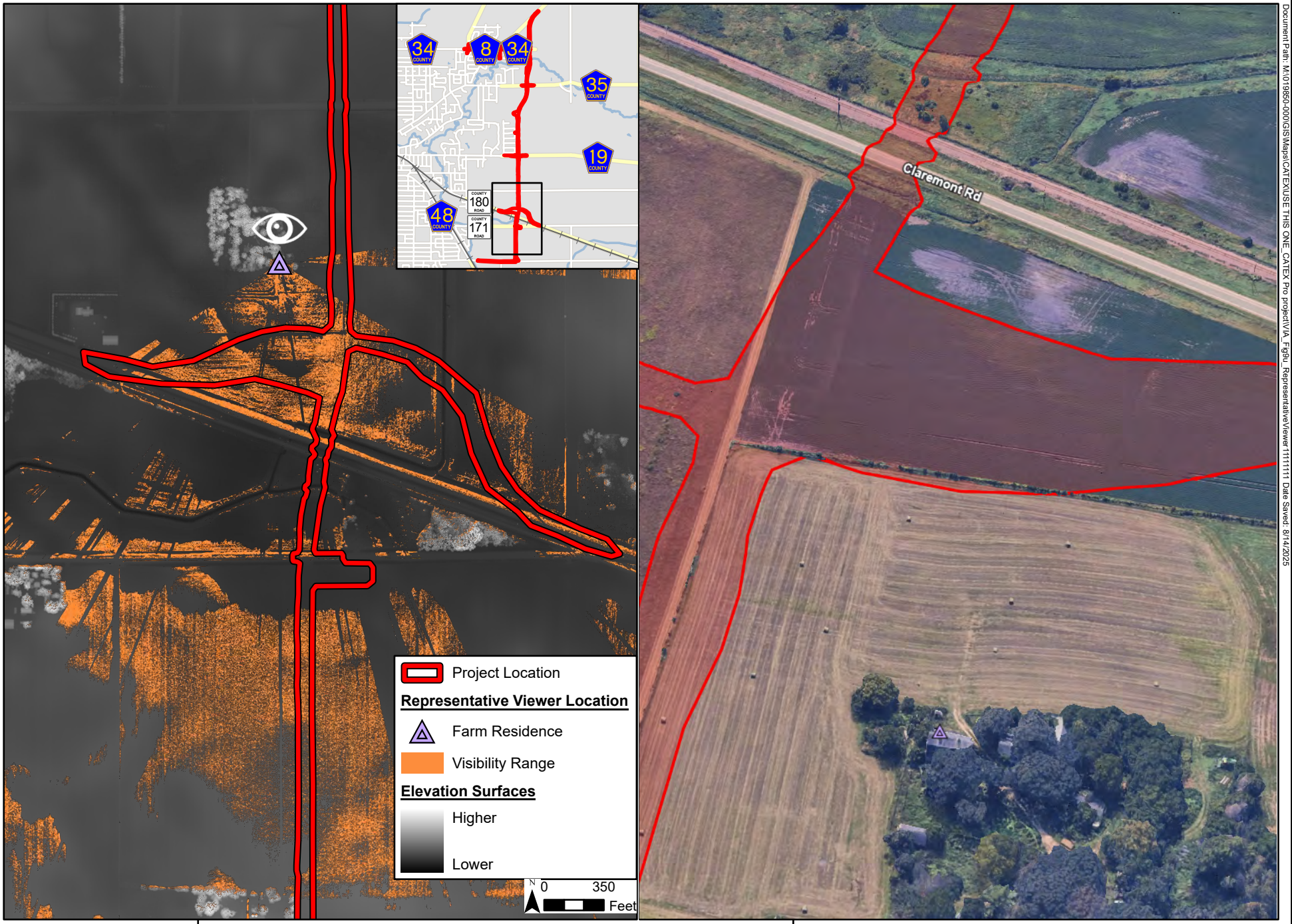


Figure 9t - Representative Viewer 20

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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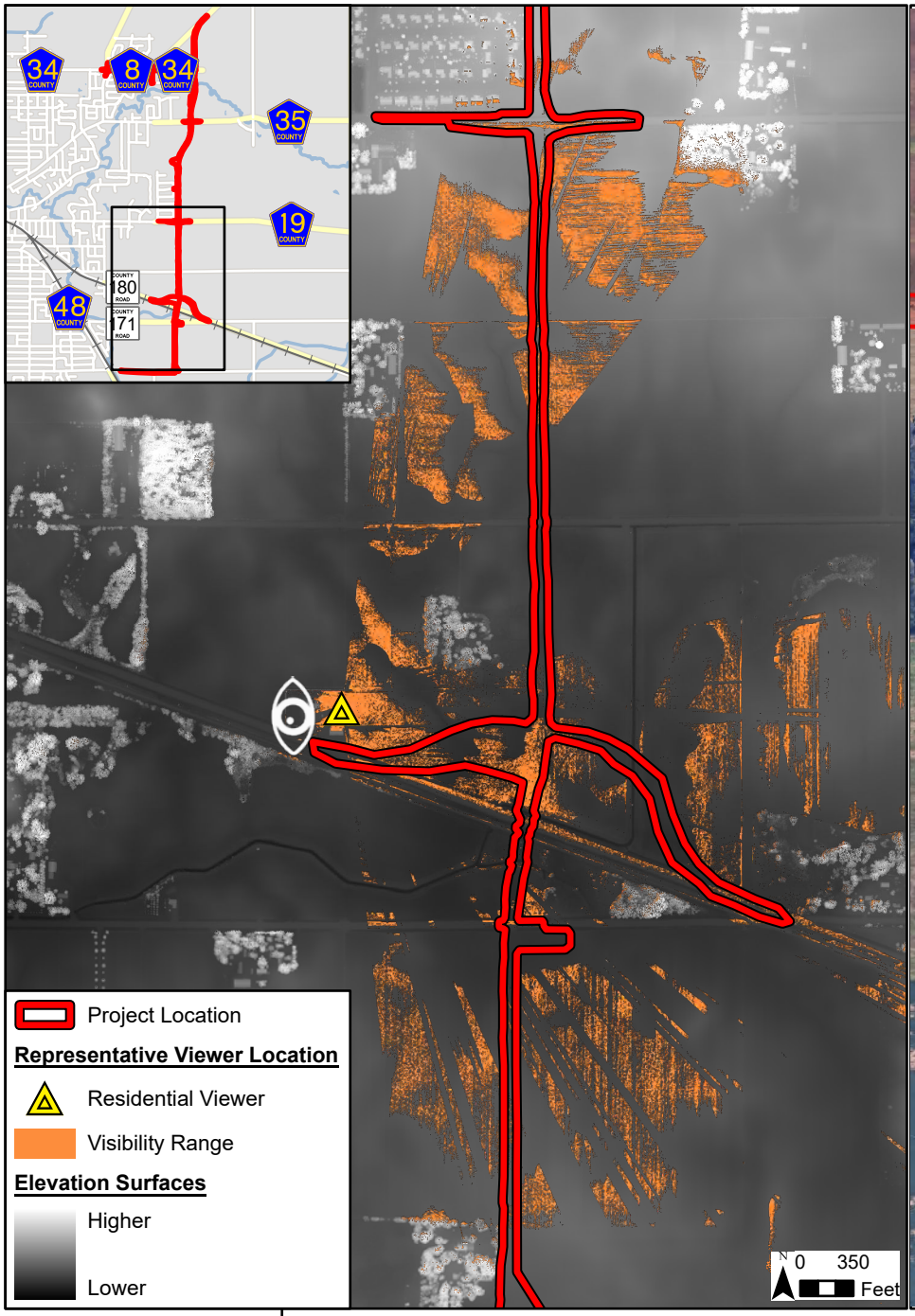




Figure 9u - Representative Viewer 21

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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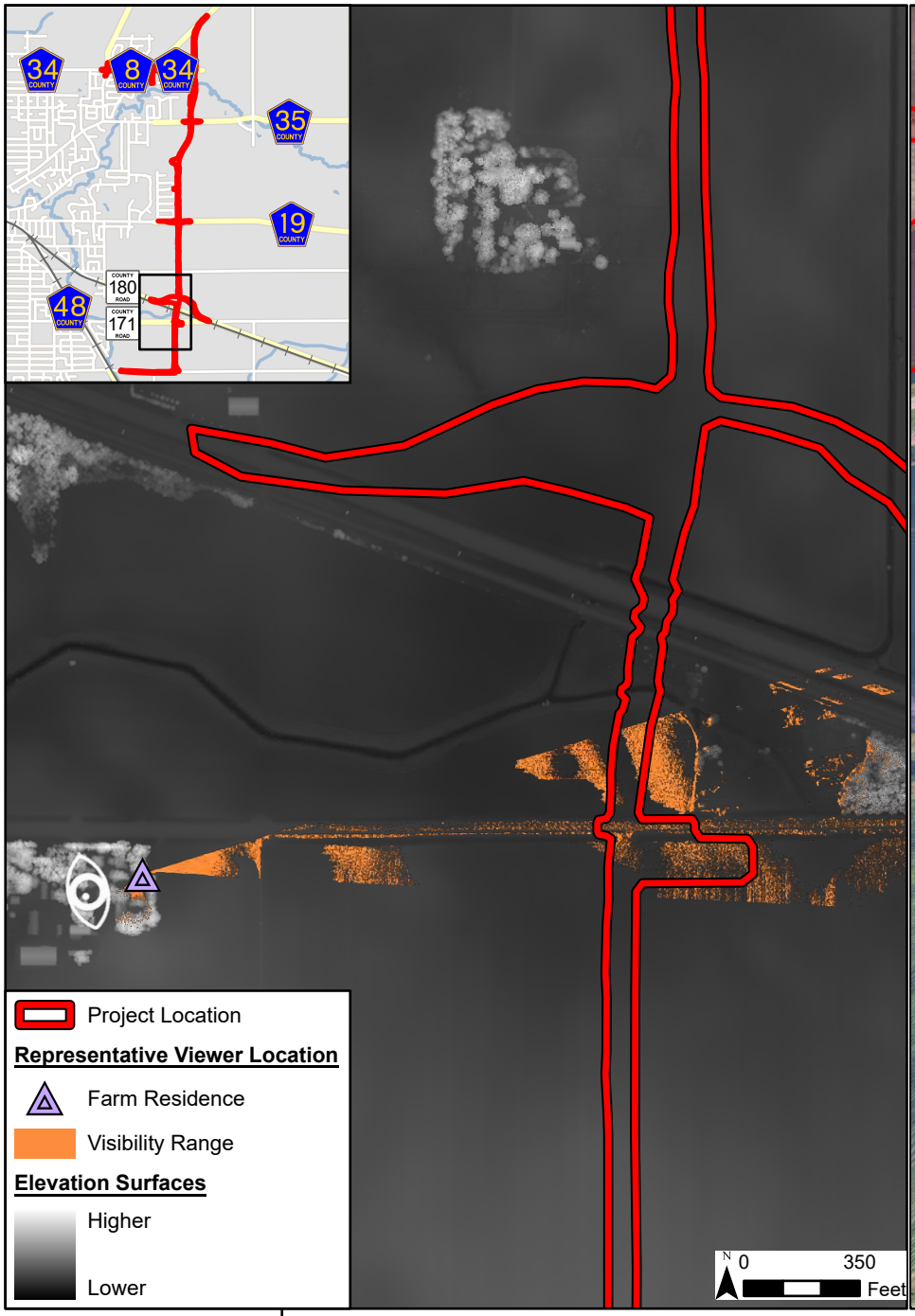




Figure 9v - Representative Viewer 22

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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Figure 9w - Representative Viewers 23, 24, 25, 26

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

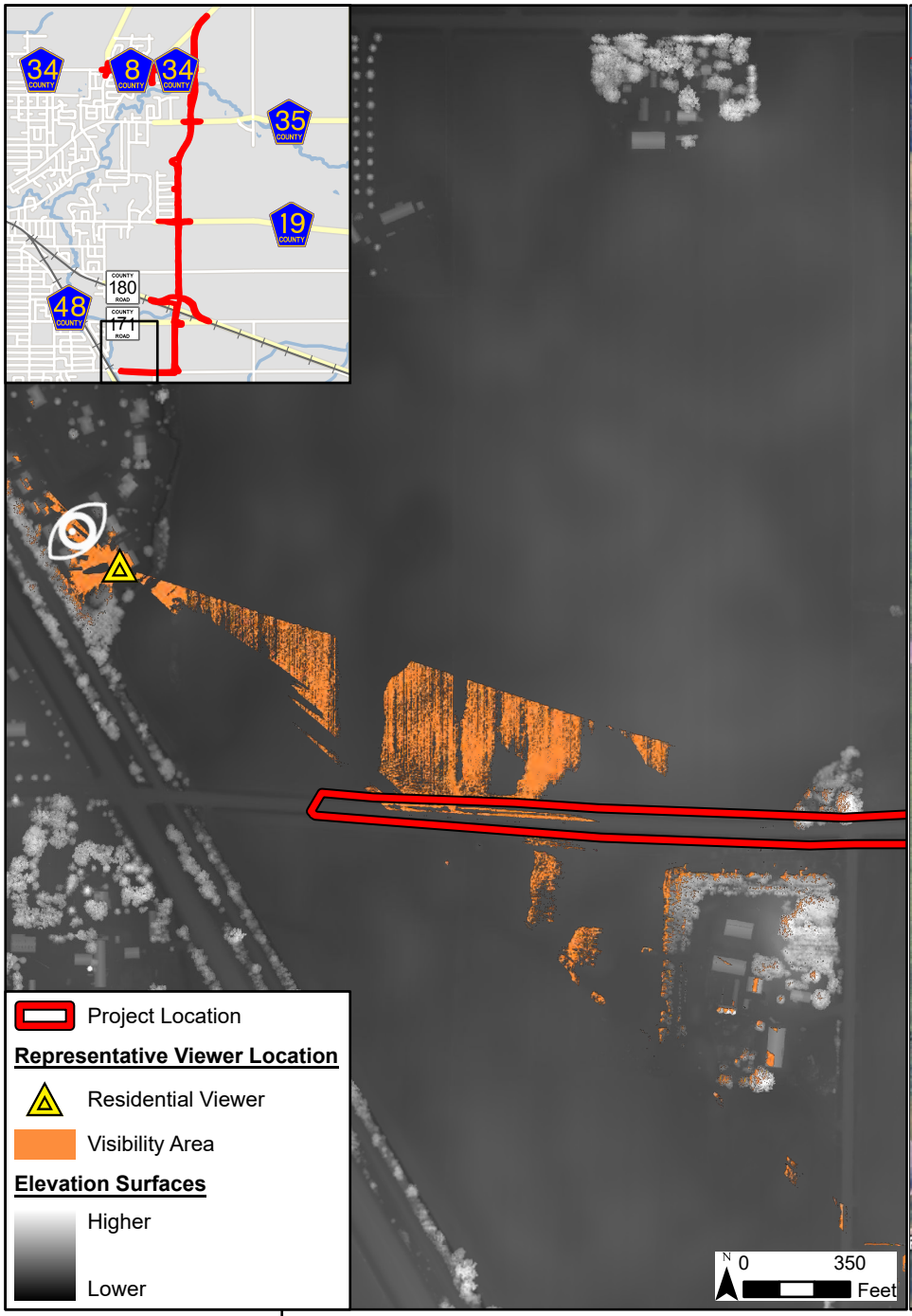




Figure 9x - Representative Viewer 27

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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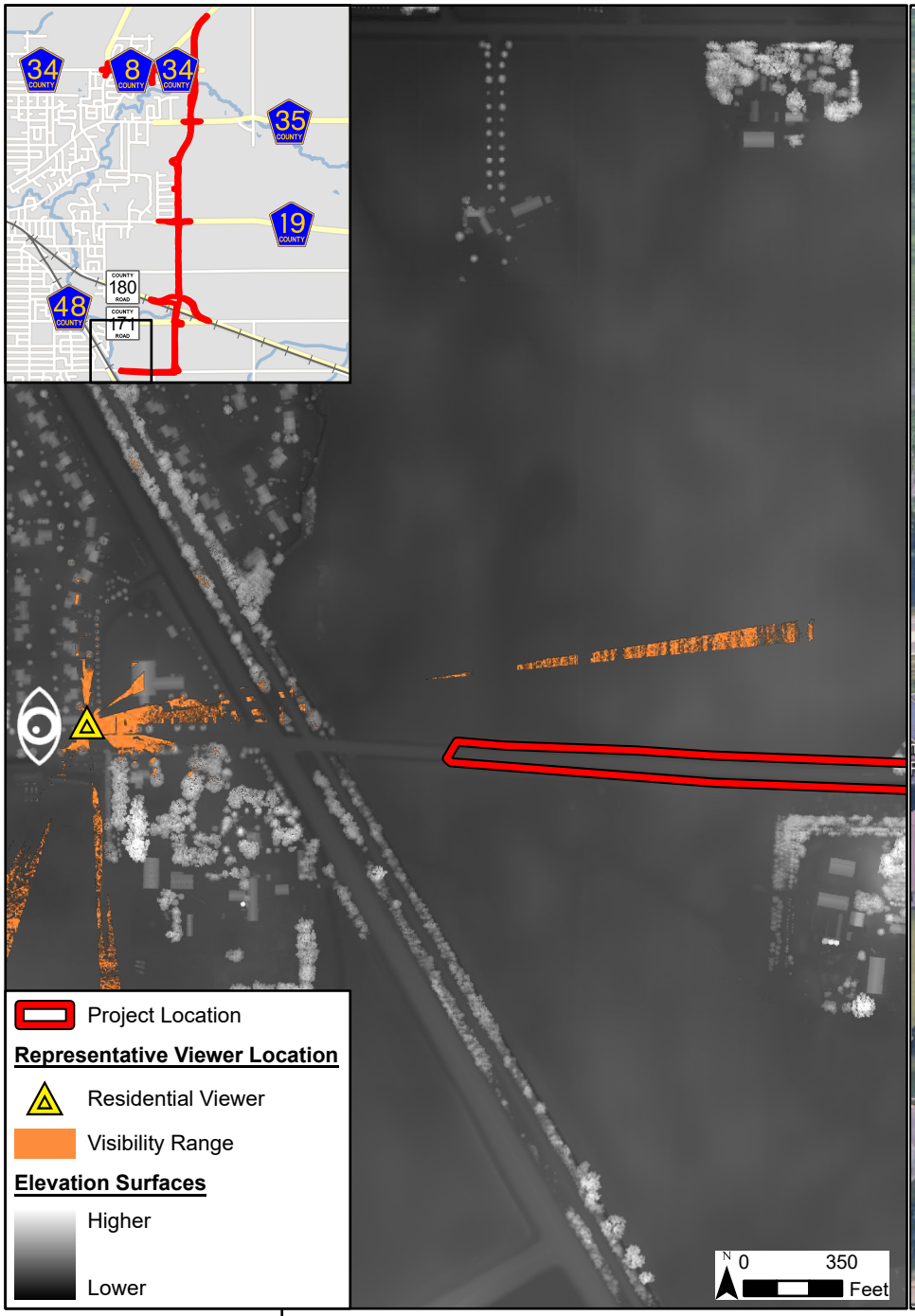




Figure 9y - Representative Viewer 28

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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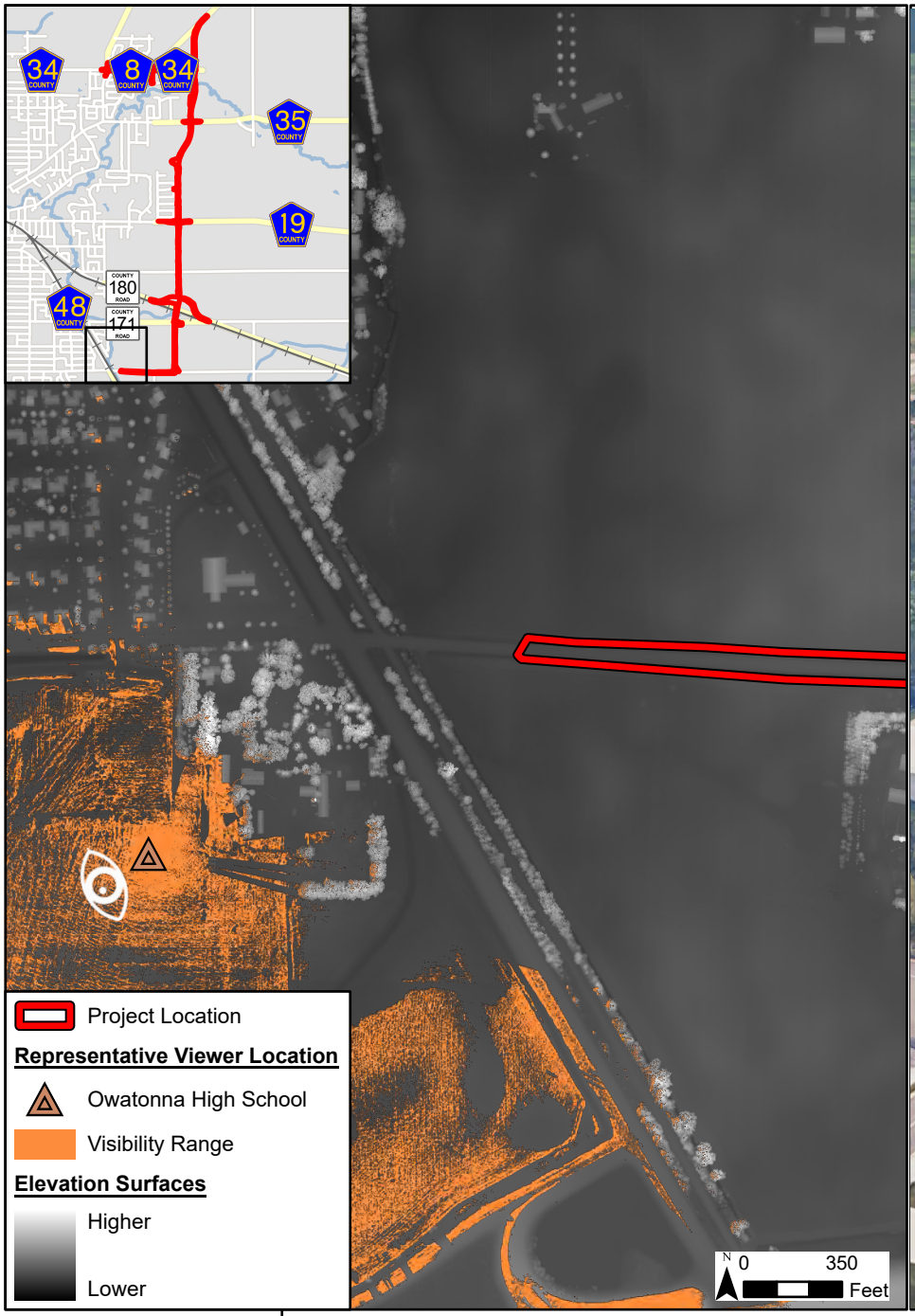




Figure 9z - Representative Viewer 29

29th Ave/East Side Corridor
SP 074-070-009
Steele County, Minnesota

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Appendix B – Visual Impact Assessment (VIA) Questionnaire and Rationale

Visual Impact Assessment (VIA) Scoping Questionnaire

The following ten questions can be used to determine the appropriate level of effort for assessing the impacts on visual quality that may result from a proposed highway project. The first set of five questions is concerned with environmental compatibility impacts on the visual resources of the affected environment. The second set of five questions deals with the sensitivity of the affected population of viewers to those impacts.

Consider each of the ten questions on the questionnaire and select the response that most closely applies to the project in question. Each response has a corresponding point value. After the questionnaire is completed, the total score will represent the type of VIA document suitable for the project.

It is important that this scoring system be used as a preliminary guide only. Although these questions provide some guidelines for determining if a VIA is necessary, it should not, by itself, be considered definitive. This checklist is meant to assist the writer of the VIA to understand the degree and breadth of the possible visual issues. The goal is to develop an analysis and document strategy that is appropriately thorough, efficient, and defensible.

Project Name: 29th Ave/East Side Corridor	Site Visit Date: NA
Location: Owatonna, MN	Time: NA
Special Conditions/Notes: NA	Conducted By: Jacqueline Corkle

Environmental Compatibility

1. Will the project result in a noticeable change in the physical characteristics of the existing environment?

(Consider all project components and construction impacts - both permanent and temporary, including landform changes, structures, noise barriers, vegetation removal, railing, signage, and contractor activities.)

- **X** High level of permanent change (3)
- ☐ Moderate level of permanent change (2)
- ☐ Low level of permanent or temporary change (1)
- ☐ No Noticeable Change (0)

Rationale: Portions of the Project are on existing roadway such as CSAH 8/Kenyon Rd, CSAH 34/26th St NE, 18th St, and CR 180/Claremont Rd. Changes on these routes would have no noticeable change or a low-level change in terms of physical characteristics or viewsheds. Roadways would remain as two-lane facilities, some would see new surfaces, as they are gravel

roads versus paved roads. The most substantial change, which would be a high-level of permanent change, is the construction of the new north-south segment of 29th Ave/East Side Corridor. This roadway does not exist today – so the roadway and its associated signage, lighting, and traffic control would be new. There would be a new bridge over Maple Creek, which would be slightly elevated to stay out of the floodplain.

2. Will the project complement or contrast with the visual character desired by the community?

(Evaluate the scale and extent of the project features compared to the surrounding scale of the community. Is the project likely to give an urban appearance to an existing rural or suburban community? Do you anticipate that the change will be viewed by the public as positive or negative? Research planning documents, or talk with local planners and community representatives to understand the type of visual environment local residents envision for their community.)

☐ Low Compatibility (3)

☐ Moderate Compatibility (2)

X High compatibility (1)

Rationale: The proposed Project is in the suburbanizing area of the city of Owatonna. Nearby land uses include developed areas within portions of the Project along existing roadways to rural/agricultural areas identified for future urban growth in other locations within the Project. The Project is within one of the primary areas identified for future growth in the city's comprehensive plan (Imagine Owatonna: 2050 Comprehensive Plan – adopted in 2024), including low- to medium density residential housing and mixed-use development. This area is also part of an orderly annexation area within Owatonna Township that has been agreed upon for future city expansion. A new roadway in this area and improvements to existing roadways in the Project area is consistent with both these plans, as well as the Steele County transportation plan. The Project area has also been identified as a location for trail development and connections by the city of Owatonna.

Generally, the Project will maintain the rural and suburban characteristics of the surrounding community. The Project complements the land uses and visual characteristics desired by the county, city and townships in their long-range plans, including officially mapping a future roadway in the Project location.

Owatonna High School is located near the south end of the Project limits at the intersection of 18th St SE and CSAH 48/Bixby Rd; the high school opened in 2023. The location of the new school is part of the reason for the Project.

Some residents have expressed strong dislike for the new north-south roadway portion of the Project due to its proximity to their residences or the acquisition of property, while others have indicated the roadway will provide connections to other parts of the community that do not exist today and would be beneficial, for both motorized and non-motorized users.

3. What level of local concern is there for the types of project features (e.g., bridge structures, large excavations, sound barriers, or median planting removal) and construction impacts that are proposed?
(Certain project improvements can be of special interest to local citizens, causing a heightened level of public concern, and requiring a more focused visual analysis.)

☐ High concern (3) **X** Moderate concern (2)

☐ Low concern (1) ☐ Negligible Project Features (0)

Rationale: There has not been widespread community concern regarding specific Project features. As noted in number 2 above, there are some residents that have expressed dislike for the Project due to its proximity to their residences. Support has been expressed for the trail, as it is perceived as a benefit/enhancement associated with the Project. There have been no comments received on the bridge or its features.

4. Is it anticipated that to mitigate visual impacts, it may be necessary to develop extensive or novel mitigation strategies to avoid, minimize, or compensate for adverse impacts or will using conventional mitigation strategies, such as landscape or architectural treatment adequately mitigate adverse visual impacts?

☐ Extensive Non-Conventional Mitigation Likely (3)

☐ Some non-conventional Mitigation Likely (2)

X Only Conventional Mitigation Likely (1)

☐ No Mitigation Likely (0)

Rationale: Only conventional mitigation strategies are likely to be included as part of the Project because much of it is in areas where improvements will be limited to paving a gravel roadway or reconstructing existing roadways (no substantial permanent visual changes).

Much of the new alignment would be in an agricultural area with limited development – some farmsteads or rural residential lots which generally have treed areas around residential structures. A segment of the new roadway alignment would be near an existing neighborhood where conventional mitigation (landscaping, berming, or fencing) would be likely. The county will consider native plantings for boulevards along the new north-south portion of the Project to help maintain rural/suburban aesthetics and landscaping.

5. Will this project, when seen collectively with other projects, result in an aggregate adverse change (cumulative impacts) in overall visual quality or

character?

(Identify any projects [both state and local] in the area that have been constructed in recent years and those currently planned for future construction. The window of time and the extent of area applicable to possible cumulative impacts should be based on a reasonable anticipation of the viewing public's perception.)

☐ Cumulative Impacts likely: 0-5 years (3)

X Cumulative Impacts likely: 6-10 years (2)

☐ Cumulative Impacts unlikely (1)

Rationale: There have been some public infrastructure projects near the Project area in recent years. As noted previously, west of the Project the new high school was constructed and intersection improvements were made near the school. Within the Project area itself, there have not been any recent projects, nor are there any future projects programmed for construction. While the City of Owatonna has identified the area east of the proposed 29th Ave/East Side Corridor as a growth area, there are not any housing/commercial projects currently in development. The exact timing of future development is not known currently but is considered consistent with local and regional plans which identify growth and development over the next 25 years. Since there are no plans currently in development, a 6 – 10-year timeframe was identified as most likely.

Additionally, future development in this area would be consistent with planned growth/suburbanization in both the city and township – so it would not be considered and adverse effect. Community plans, which included input from the public, identified development for the Project area.

Viewer Sensitivity

1. What is the potential that the project proposal may be controversial within the community, or opposed by any organized group?

(This can be researched initially by talking with the state DOT and local agency management and staff familiar with the affected community's sentiments as evidenced by past projects and/or current information.)

☐ High Potential (3) **X** Moderate Potential (2)

☐ Low Potential (1) ☐ No Potential (0)

Rationale: The identified alignment for 29th Avenue/East Side Corridor is controversial with some residents of a neighborhood on the west side of the new north-south roadway. Some residents in the neighborhood support the Project as it provides connections to the community that do not exist today, including for those that walk and bike.

As noted previously, in areas where roadways are being resurfaced/reconstructed there is little controversy and in areas where the roadway is in agricultural use, there are a limited number of farmsteads or rural lots affected.

The city, township, and county support the Project to advance community plans/comprehensive plans/annexation agreement that show the city of Owatonna growing to the east and having a multimodal transportation network supporting that development. These plans and agreements incorporated community input in their development.

The Township has provided a resolution of support for the Project and the alignment of the new north-south roadway, as it allows for planned development, but preserves areas further to the east for continued agricultural production, consistent with the township's and its resident's long-term plans.

2. How sensitive are potential viewer-groups likely to be regarding visible changes proposed by the project?

(Consider among other factors the number of viewers within the group, probable viewer expectations, activities, viewing duration, and orientation. The expected viewer sensitivity level may be scoped by applying professional judgment, and by soliciting information from other DOT staff, local agencies and community representatives familiar with the affected community's sentiments and demonstrated concerns.)

☐ High Sensitivity (3) **X** Moderate Sensitivity (2)

☐ Low Sensitivity (1)

Rationale: The Project would result in visible changes to some viewer groups. Much of the new north-south corridor is in areas that are undeveloped or are in agricultural use, with limited nearby viewers. However, there is a neighborhood where the roadway does not exist today, with adjacent residents that would view the roadway. Those residents, backing up to the new north-south roadway, would have a permanent view of the new roadway if no landscaping, berming, or fencing were provided. The county is considering all these options and will listen to feedback from the public on what aesthetic elements to incorporate into the Project.

In areas where roadways would be resurfaced/reconstructed, there would be fewer visible changes other than roadway surface for the existing gravel road. All roadways would be reconstructed as two-lane roadways (what they are today).

In many areas, there would be new access to multimodal (trail) facilities and activities that would provide users with a transportation option that does not presently exist and would improve connections to other portions of the community. This is viewed as an enhancement/benefit over existing conditions.

3. To what degree does the project's aesthetic approach appear to be consistent with applicable laws, ordinances, regulations, policies or standards?

☐ Low Compatibility (3) ☐ Moderate Compatibility (2)

X High compatibility (1)

Rationale: The Project would be designed and constructed in accordance with applicable laws, ordinances, regulations, policies, and/or standards for Steele County and MnDOT State Aid requirements.

4. Are permits going to be required by outside regulatory agencies (i.e., Federal, State, or local)?

(Permit requirements can have an unintended consequence on the visual environment. Anticipated permits, as well as specific permit requirements - which are defined by the permitter, may be determined by talking with the project environmental planner and project engineer. Note: coordinate with the state DOT representative responsible for obtaining the permit prior to communicating directly with any permitting agency. Permits that may benefit from additional analysis include permits that may result in visible built features, such as infiltration basins or devices under a storm water permit or a retaining wall for wetland avoidance or permits for work in sensitive areas such as coastal development permits or on Federal lands, such as impacts to Wild and Scenic Rivers.)

X Yes (3) ☐ Maybe (2)

☐ No (1)

Rationale: The Project area does not include federal lands, coastal areas or Wild and Scenic Rivers. Permits would be required for wetland impacts and for soil disturbance from outside regulatory agencies for various elements of the Project as documented in the Environmental Assessment Worksheet. Permits are primarily focused on water resources and soil disturbance.

5. Will the project sponsor or public benefit from a more detailed visual analysis in order to help reach consensus on a course of action to address potential visual impacts?

(Consider the proposed project features, possible visual impacts, and probable mitigation recommendations.)

☐ Yes (3) ☐ Maybe (2)

X No (1)

Rationale: It is not anticipated that a more detailed visual analysis would help reach consensus/consent on a course of action to address potential visual impacts. Materials (sketches and visualizations) have been shared with the public for input regarding conventional mitigation associated with landscaping, berming, and fencing. Input from the public on their preferences will be considered by the county and its partners as part of final design.

Summary of VIA Scores:

VIA Scoping Questionnaire Element	**Score**
Environmental Compatibility	
1. Level of change in the physical characteristics of the existing environment.	3
2. Complement or contract with visual character by community	1
3. Level of concern	2
4. Level of mitigation	1
5. Result in cumulative effect.	2
Viewer Sensitivity	
1. Potential for community or organized group controversy	2
2. Sensitivity of potential viewer groups	2
3. Consistency of project's aesthetic approaches with applicable laws, ordinances, regulations, policies, or standards	1
4. Permits required by outside agencies	3
5. Benefit from more detailed visual analysis to reach consensus on addressing potential visual impacts	1
TOTAL:	**18**

Determining the Level of Visual Impact Assessment

Total the scores of the answers to all ten questions on the Visual Impact Assessment Scoping Questionnaire. Use the total score from the questionnaire as an indicator of the appropriate level of VIA to perform for the project. Confirm that the level suggested by the checklist is consistent with the project teams' professional judgments. If there remains doubt about whether a VIA needs to be completed, it may be prudent to conduct an Abbreviated VIA. If there remains doubt about the level of the VIA, begin with the simpler VIA process. If visual impacts emerge as a more substantial concern than anticipated, the level of VIA documentation can always be increased.

The level of the VIA can initially be based on the following ranges of total scores:

☐ **Score 25-30**
An *Expanded VIA* is probably necessary. It is recommended that it should be proceeded by a formal visual scoping study prior to beginning the VIA to alert the project team to potential highly adverse impacts and to develop new project alternatives to avoid those impacts. These technical studies will likely receive state-wide, even national, public review. Extensive use of visual simulations and a comprehensive public involvement program would be typical.

☐ **Score 20-24**
A *Standard VIA* is recommended. This technical study will likely receive extensive local, perhaps state-wide, public review. It would typically include several visual simulations. It would also include a thorough examination of public planning and policy documents supplemented with a direct public engagement processes to determine visual preferences.

X Score 15-19
An *Abbreviated VIA* would briefly describe project features, impacts and mitigation requirements. Visual simulations would be optional. An Abbreviated VIA would receive little direct public interest beyond a summary of its findings in the project's environmental documents. Visual preferences would be based on observation and review of planning and policy documents by local jurisdictions.

☐ **Score 10-14**
A *VIA Memorandum* addressing minor visual issues that indicates the nature of the limited impacts and any necessary mitigation strategies that should be implemented would likely be sufficient along with an explanation of why no formal analysis is required.

☐ **Score 6-9**
No noticeable physical changes to the environment are proposed and no further analysis is required. Print out a copy of this completed questionnaire for your project file to document that there is no effect. A *VIA Memorandum* may be used to document that there is no effect and to explain the approach used for the determination.

Appendix C – City of Owatonna Comprehensive Plan Excerpts

IMAGINE OWATONNA

2050 COMPREHENSIVE PLAN

October 2024

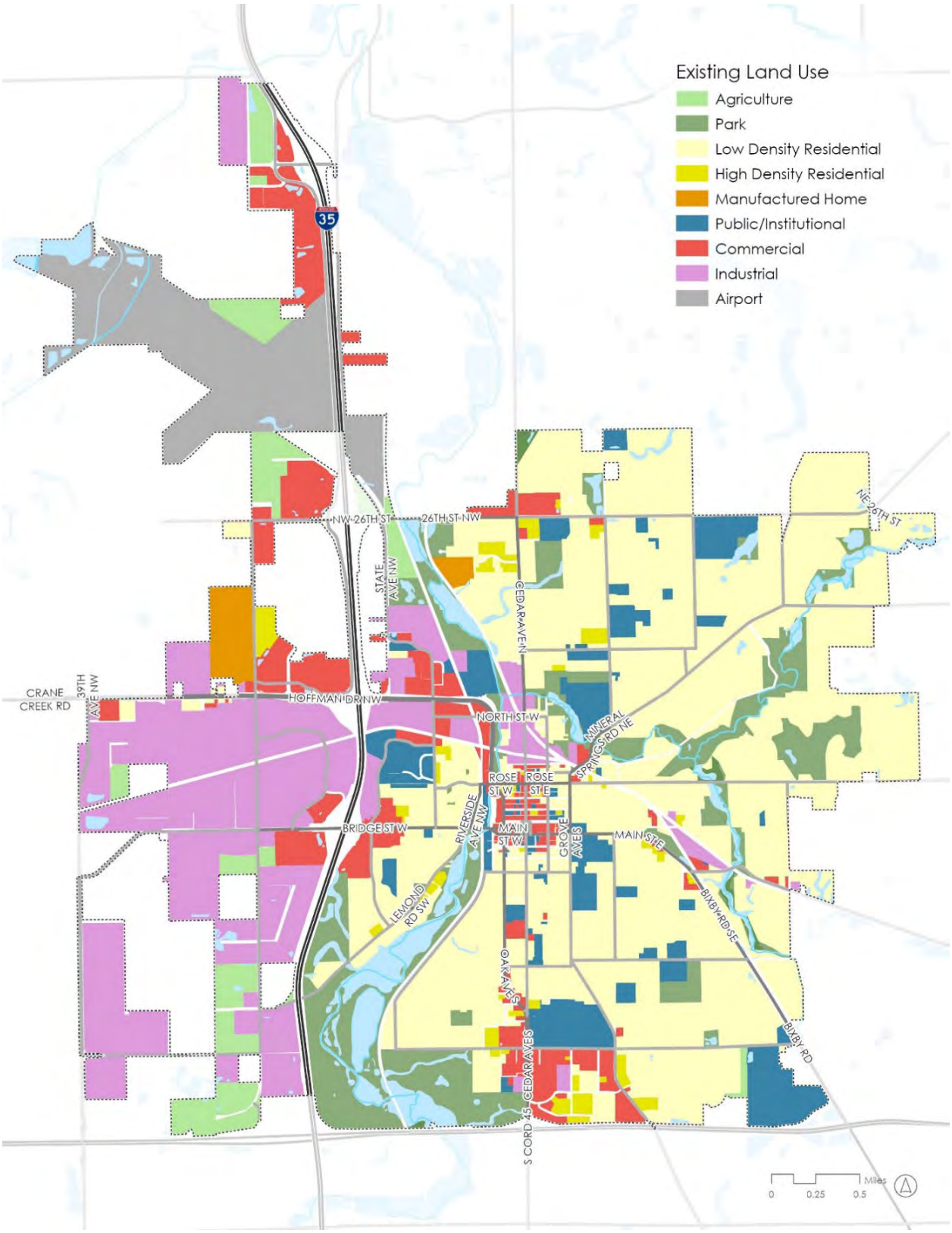


Figure 1.1 Existing Land Use
Source: City of Owatonna

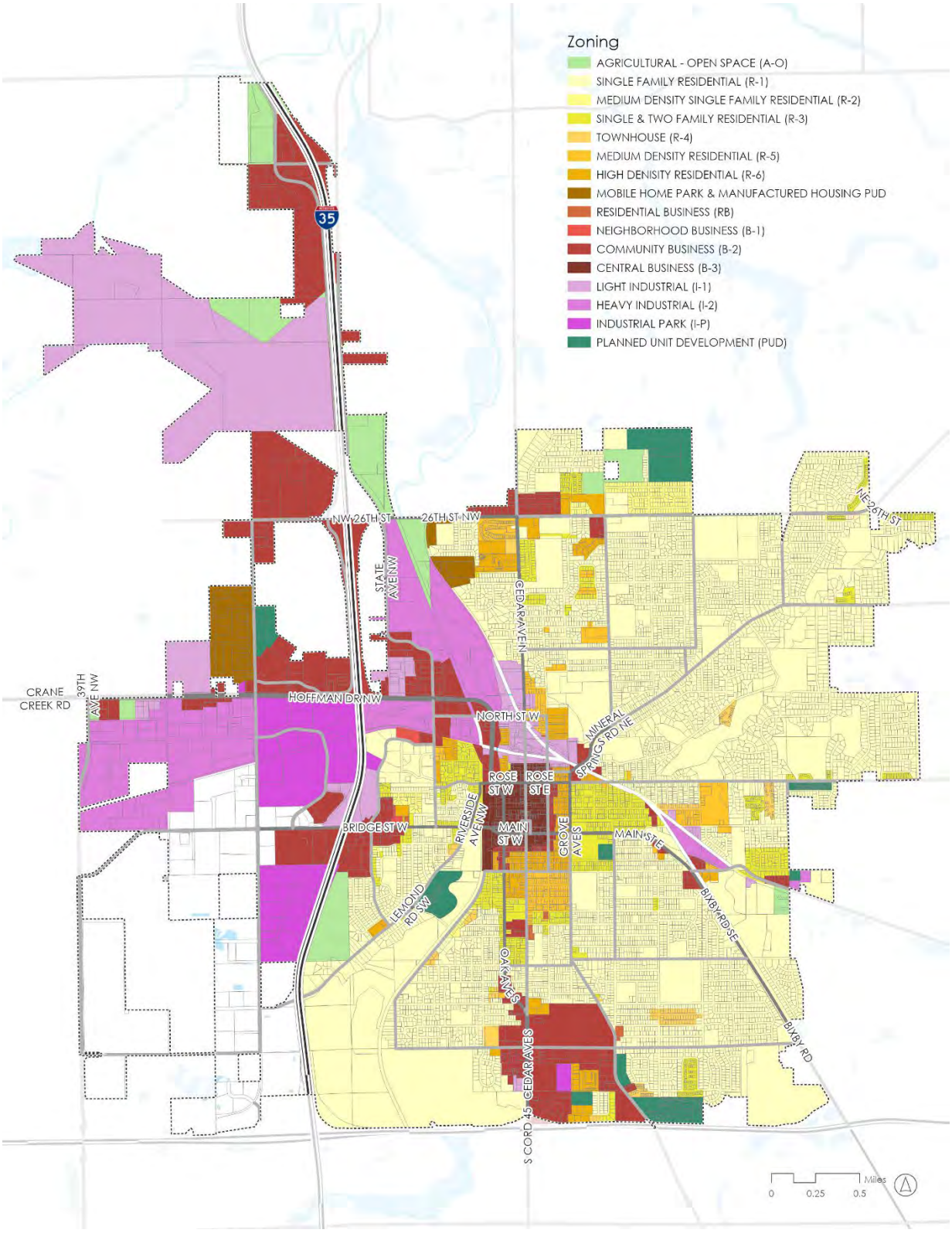


Figure 1.21 Existing Zoning

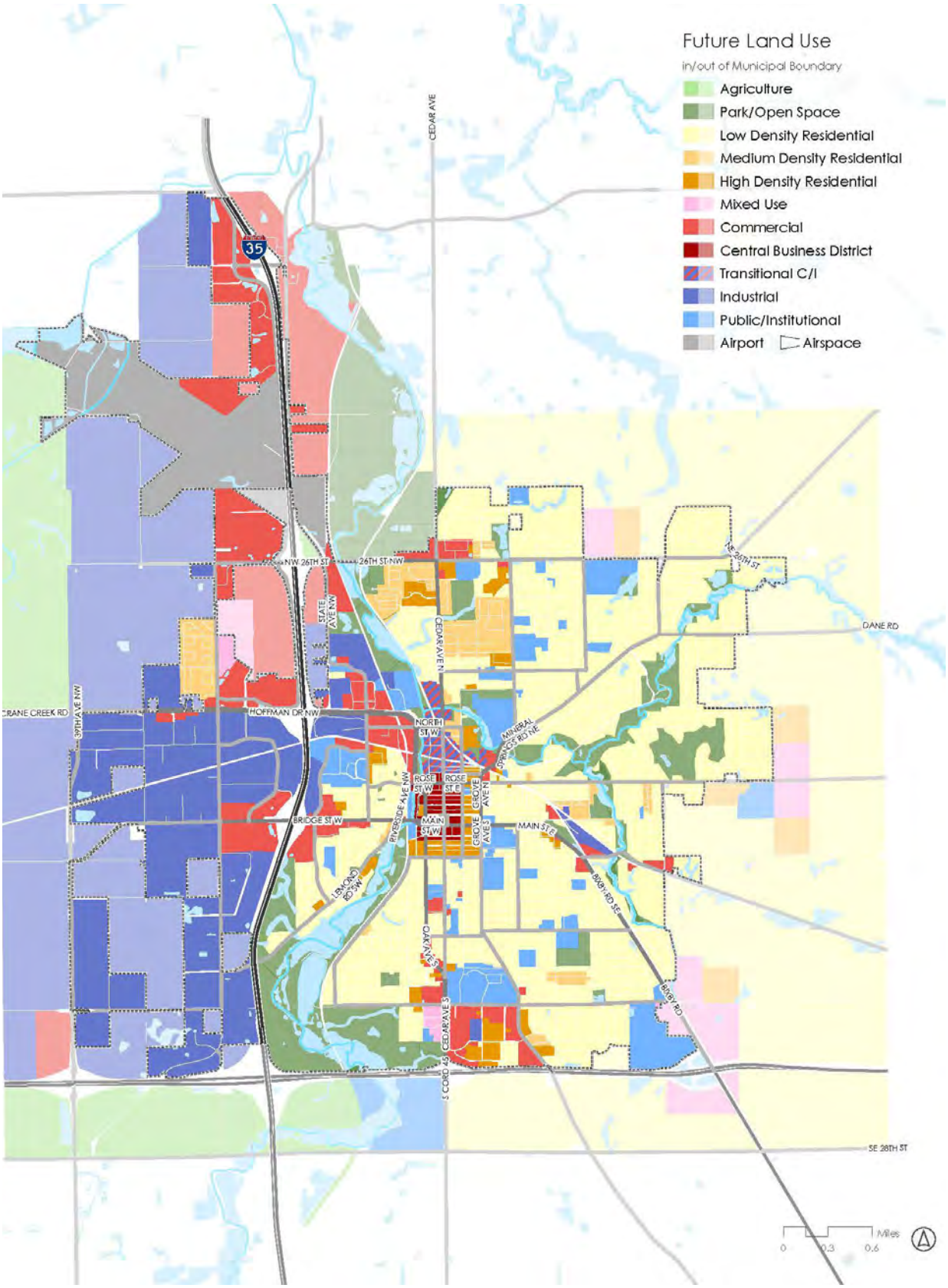


Figure 1.3 – Future Land Use Map

Attachment K – Traffic Study

Memorandum

To: Paul Sponholz, PE, Assistant County Engineer (Steele County)

From: Jason Junge, PE, Senior Traffic Operations Engineer (WSB)

Date: April 3, 2024

Re: Owatonna East Side Corridor Traffic Forecast
WSB Project No. 019850-000

The purpose of this memo is to document the traffic forecasting assumptions, methodology, and results for the preferred alignment for the East Side Corridor. The East Side Corridor is expected to be constructed in 2026, so that was selected as the near-term year. The selected horizon year is 2046, or 20 years after opening.

A travel demand model was not developed for this project. The near-term traffic volumes on the East Side Corridor were estimated based on existing traffic shifting from existing routes onto the new roadway. The forecast volumes for the horizon year include trips generated by anticipated future development in the area surrounding the corridor in addition to a general increase in traffic from the near-term year.

Existing annual average daily traffic (AADT) volumes were compiled for nearby roadway segments from the MnDOT Traffic Mapping Application. The most recent data available for most of the relevant segments is from 2019. Near-term traffic shifts were estimated considering the existing roadway network, the locations of likely origins and destinations, and an analysis of travel times for representative trips that would be likely to use the new roadway. The preferred alternative would provide a more direct connection between the northeast and southeast parts of Owatonna, so drivers traveling between these areas will be able to save time by shifting to the East Side Corridor from the less direct existing routes passing through the center of the city.

A background growth rate of 1 percent per year was assumed for existing roadway segments. This rate was selected based on recent AADT history for segments near the corridor and from which traffic would likely divert. For comparison, MnDOT considers Steele County a Medium Growth Area for traffic forecasting purposes. The traffic study for the Owatonna Senior High School used a growth rate of 0.5% per year but noted this was lower than typical traffic growth rates in Steele County. The high school will also have an impact on traffic patterns that is not reflected in the existing AADT data.

Development traffic was estimated using the map included in the 2024 Owatonna Township Orderly Annexation agreement and attached to this memo. The future residential areas labeled C1 on the map were assumed to develop by 2046 at a density similar to existing developments along the east edge of the city. The Owatonna School District is also planning for a future elementary school near the intersection of the East Side Corridor and Rose Street. A trip generation rate from the Institute of Transportation Engineers Trip Generation Manual 11th Edition was used to estimate the additional traffic this future development would generate. Trips were assigned to the network based on the location of likely access points and destinations.

The resulting daily traffic volumes for 2026 and 2046 for the East Side Corridor preferred alternative are shown in **Table 1** and also on a map attached to this memo.

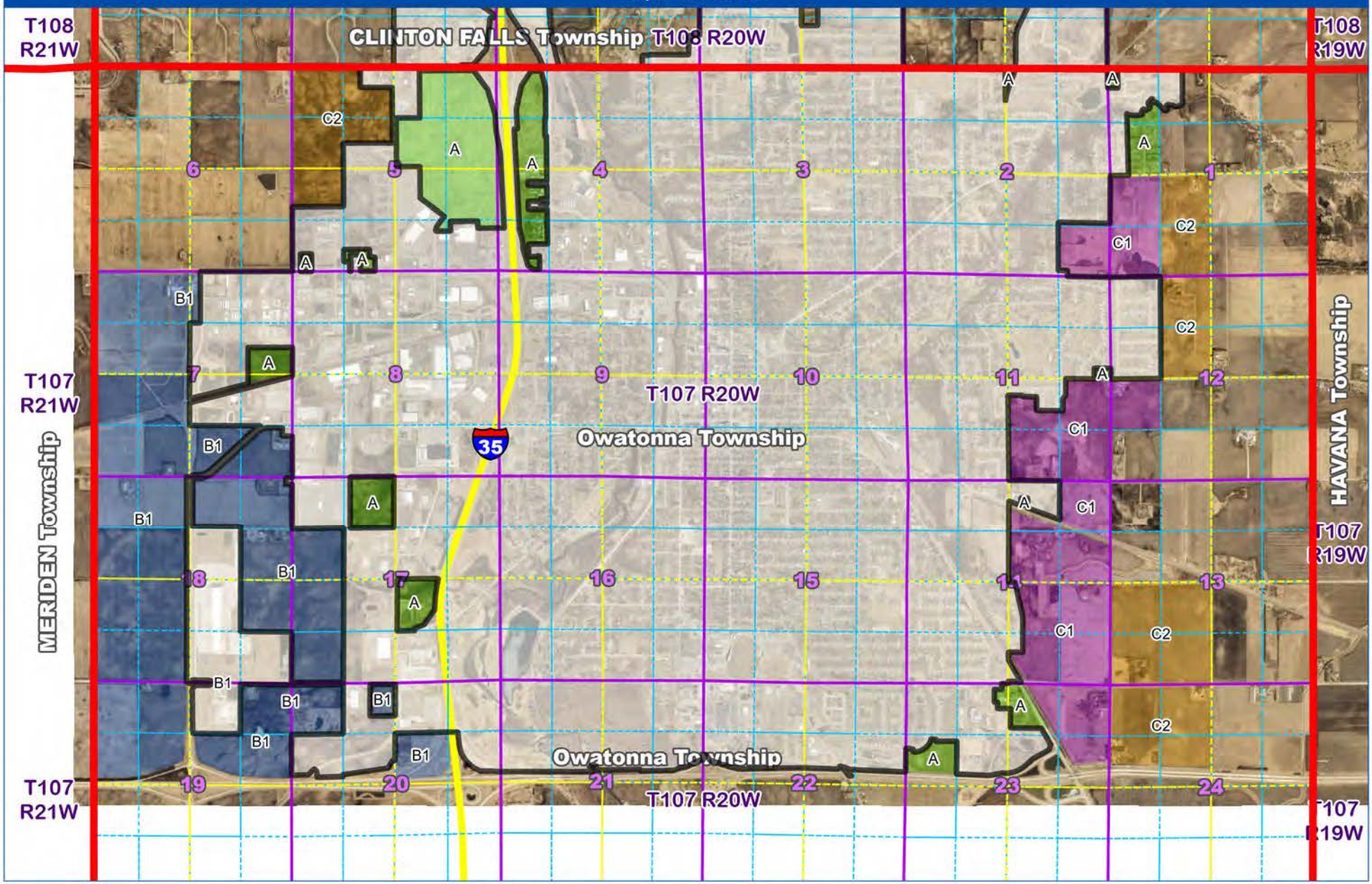
701 XENIA AVENUE S | SUITE 300 | MINNEAPOLIS, MN | 55416 | 763.541.4800 | WSBENG.COM

Table 1. Future traffic volumes for the East Side Corridor preferred alternative.

Roadway	Location	2026 AADT	2046 AADT
East Side Corridor	North of 26th Street NE	1700	2700
East Side Corridor	26th Street NE to Dane Rd	1300	2500
East Side Corridor	Dane Rd to Fox Hollow Ln	1700	3100
East Side Corridor	Fox Hollow Ln to Rose Street	1700	3300
East Side Corridor	Rose Street to County Road 180	1700	3500
East Side Corridor	County Road 180 to Havana Rd	1900	3300
East Side Corridor	Havana Rd to SE 18th Street	1900	3100
SE 18th Street	East Side Corridor to County Road 48	2000	3000

2024 Owatonna Township Orderly Annexation

City of Owatonna



CITY OF OWATONNA

December 13, 2023

Miles

0 0.25 0.5

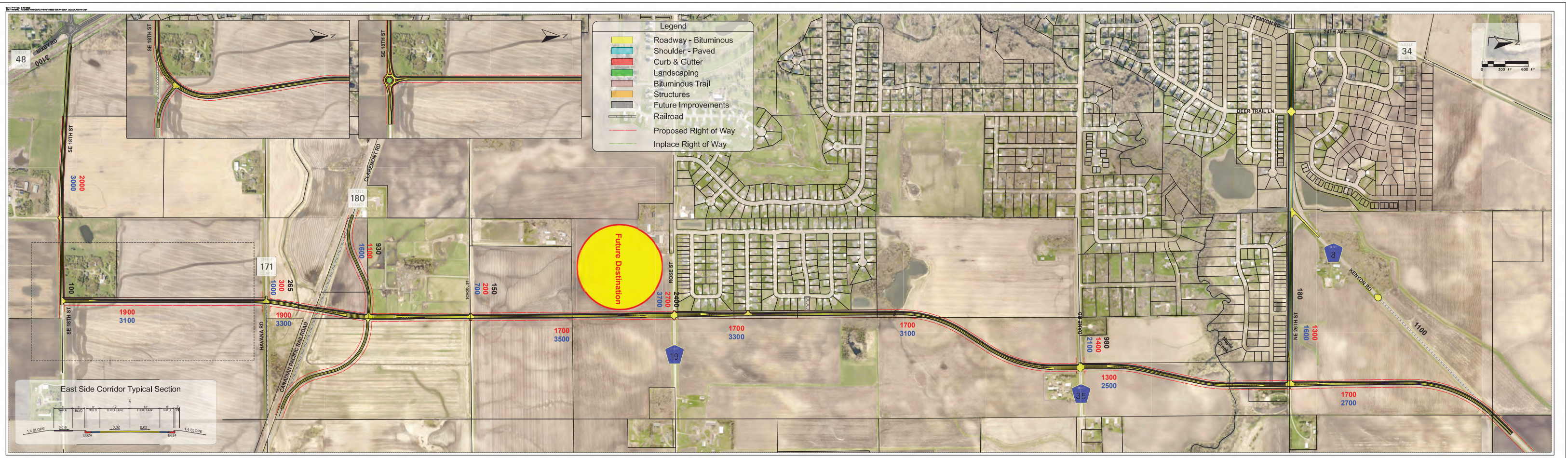
Municipal Limits

OWATONNA TWNSHP - A

OWATONNA TWNSHP - B1

OWATONNA TWNSHP - C1

OWATONNA TWNSHP - C2



East Side Corridor Study
Steele County, Minnesota

Existing Daily Volume
Near Term Build Daily Volume
Horizon Year Build Daily Volume
Growth based on network changes and Owatonna Long Range Land Use Plan

SE 44th Avenue
1100

PROJECT LAYOUT

April 29, 2022

SE 44th Avenue
780

wsb

Memorandum

To: Paul Sponholz, PE, Assistant County Engineer (Steele County)

From: Jason Junge, PE, Senior Traffic Operations Engineer (WSB)

Date: April 3, 2024

Re: Owatonna East Side Corridor Traffic Analysis
WSB Project No. 019850-000

The purpose of this memo is to document the methodology and results for the vehicle mobility evaluation criteria for the East Side Corridor. Two quantitative criteria are included:

- Trip length and travel time between origins and destinations
- Downtown congestion impacts

The alternatives considered in this analysis are shown in **Figure 1**. Alternative 6 has been removed from further consideration but is included here as a basis for comparison.

Trip length and travel time between origins and destinations

Six example trips were analyzed to represent road users that would potentially divert from their current routes onto part or all of the new roadway. These trips are listed in **Table 1** and analyzed in more detail in this section.

Table 1. Representative trips with existing travel time and distance.

Trip	Origin	Destination	Travel time (min)	Length (mi)	Route
1	26th St NE and Kenyon Rd	New Owatonna Senior High School	10	4.5	Kenyon Rd, Mineral Springs Rd, Grove Ave, Main St, Bixby Rd, SE 18th St
2	Country View Ave and Fox Hollow Ln	New Owatonna Senior High School	7	3.5	Rose St, Partridge Ave, Rice Lake Rd, Bixby Rd, SE 18th St
3	26th St NE and Kenyon Rd	Hy-Vee (Cedar Ave and 18th St SW)	10	3.9	Kenyon Rd, Mineral Springs Rd, Grove Ave, Main St, Elm Ave, SE 18th St
4	Country View Ave and Fox Hollow Ln	Hy-Vee (Cedar Ave and 18th St SW)	10	3.7	Rose St, Elm Ave, SE 18th St
5	Country View Ave and Fox Hollow Ln	Owatonna Hospital	11	4.9	Rose St, Cedar Ave, 26th St NE
6	26th St NE and Cedar Ave	New Owatonna Senior High School	10	4.1	Cedar Ave, Rose St, Grove Ave, Main St, Bixby Rd, SE 18th St

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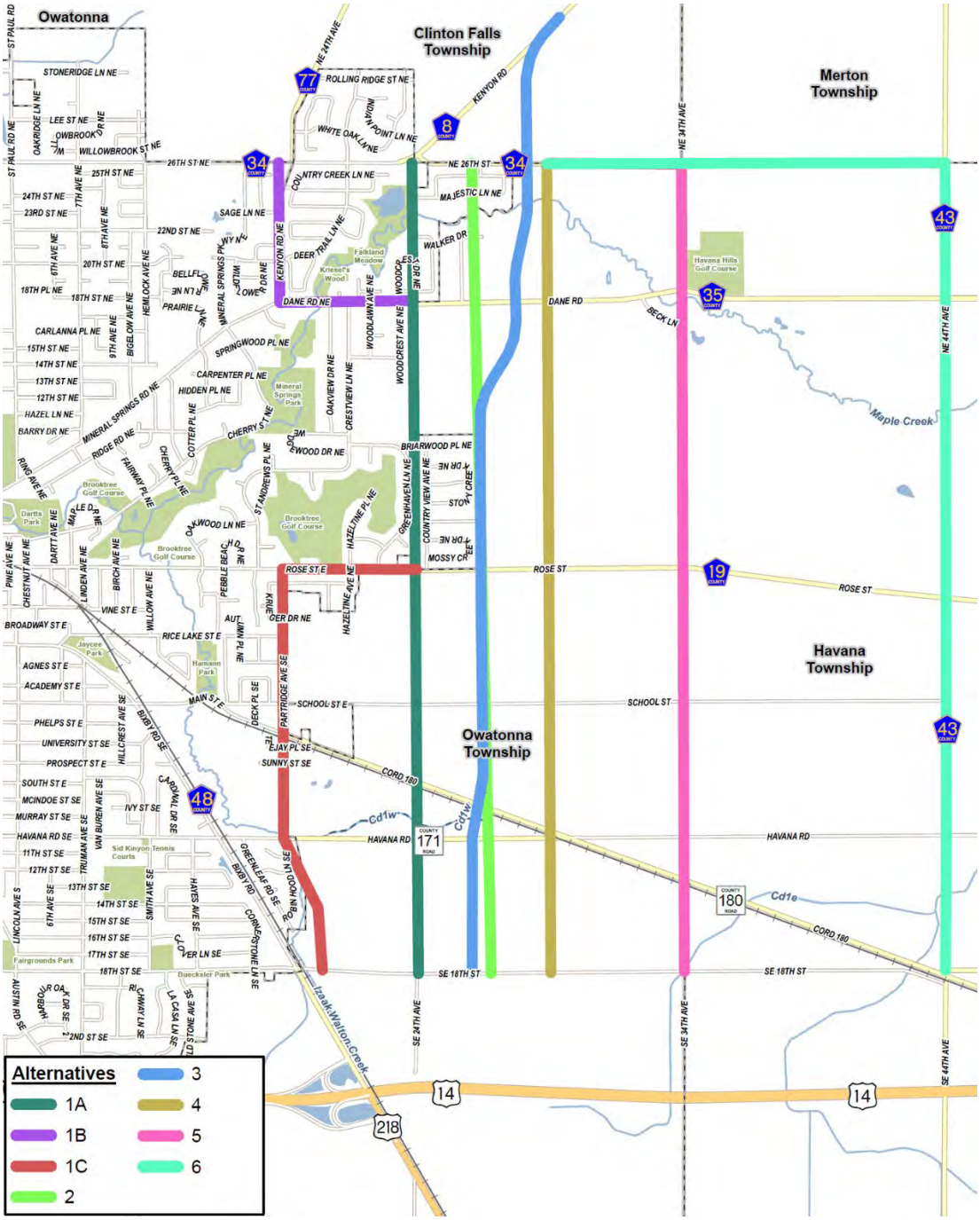


Figure 1. East Side Corridor route alternatives.

The general method of estimating travel time and distance was to use Google Maps where possible for alternatives that follow existing roadways. Estimates for new alignments were determined by adding or subtracting time and distance from the Google Maps measurements. Travel time on new alignments was assumed to be one minute per mile in rural areas and two minutes per mile in developed areas. Although Alternative 6 has been dismissed from further

consideration, it is shown in the tables in this section because it follows the existing SE 44th Avenue alignment and thus serves as the basis for many of the travel time and length estimates.

Trip 1 – 26th St NE and Kenyon Rd to Owatonna Senior High School

This trip represents a connection between a residential area in northeast Owatonna and the new high school near the south end of the proposed corridor. The trip also represents travel to the US 14/US 218 interchange for regional trips. The No Build route for this trip is shown in **Figure 2**, and the travel time and distance estimates for all alternatives are shown in **Table 2**.

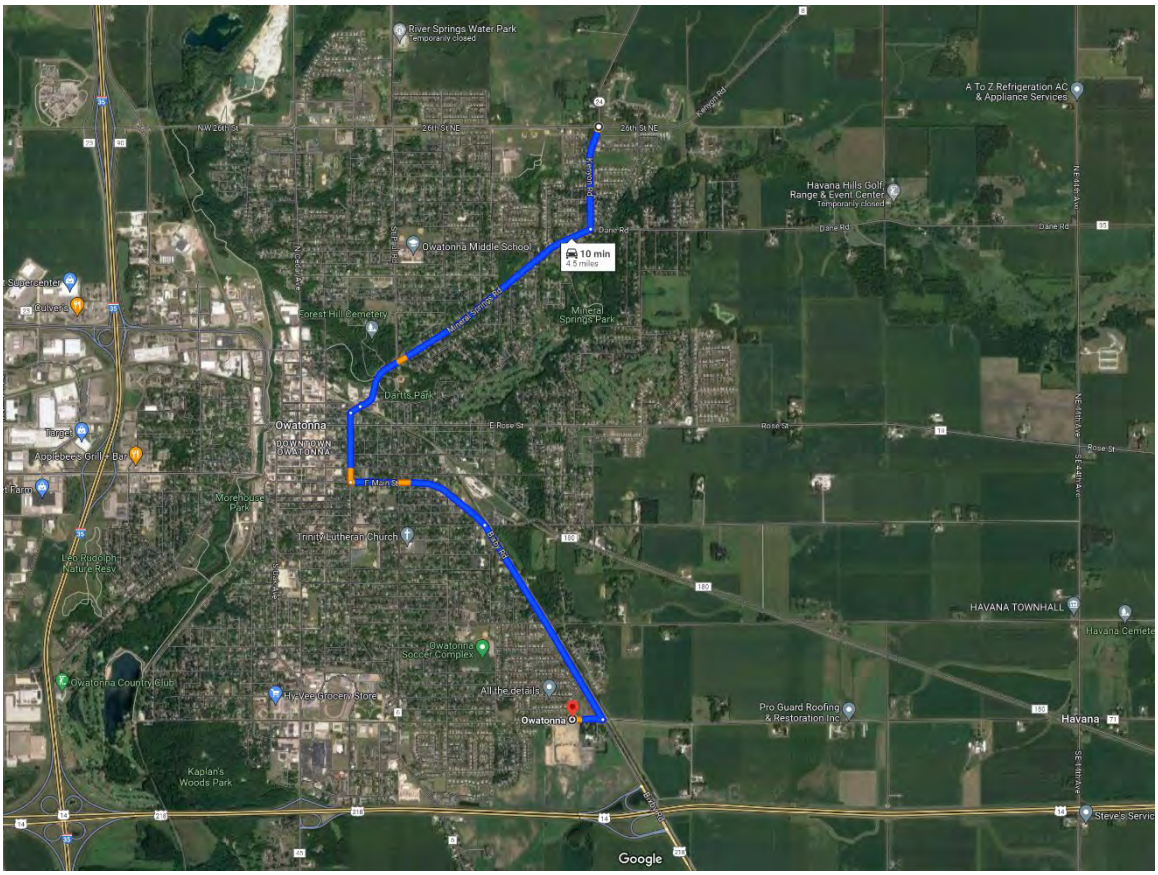


Figure 2. No Build route for Trip 1.

Alternative 1 would provide a route to the new high school that would be both shorter and faster for many residents in northeast Owatonna. Alternatives 2-4 would be slightly longer but similar in travel time. Alternative 5 would add travel time and would be more than a mile longer, so drivers making this trip would be unlikely to divert from their existing routes to that alignment.

Table 2. Travel time and distance by alternative for Trip 1.

Alternative	Minutes	Miles	Estimate method
No Build	10	4.5	Google Maps
1A	9	4.1	Subtract 4 min and 4 mi from Alt 6
1B	9	4.1	Subtract 4 min and 4 mi from Alt 6
1C	9	4.3	Subtract 4 min and 4 mi from Alt 6
2	10	4.6	Subtract 3 min and 3.5 mi from Alt 6
3	10	4.8	Subtract 3 min and 3.3 mi from Alt 6
4	10	5.1	Subtract 3 min and 3 mi from Alt 6
5	11	6.1	Subtract 2 min and 2 mi from Alt 6
6	13	8.1	Google Maps

Trip 2 – Country View Ave and Fox Hollow Ln to Owatonna Senior High School

This trip represents a connection between another residential area on the east side of Owatonna and the new high school. The trip also represents travel to the US 14/US 218 interchange for regional trips. The No Build route for this trip is shown in **Figure 3**, and the travel time and distance estimates for all alternatives are shown in **Table 3**.

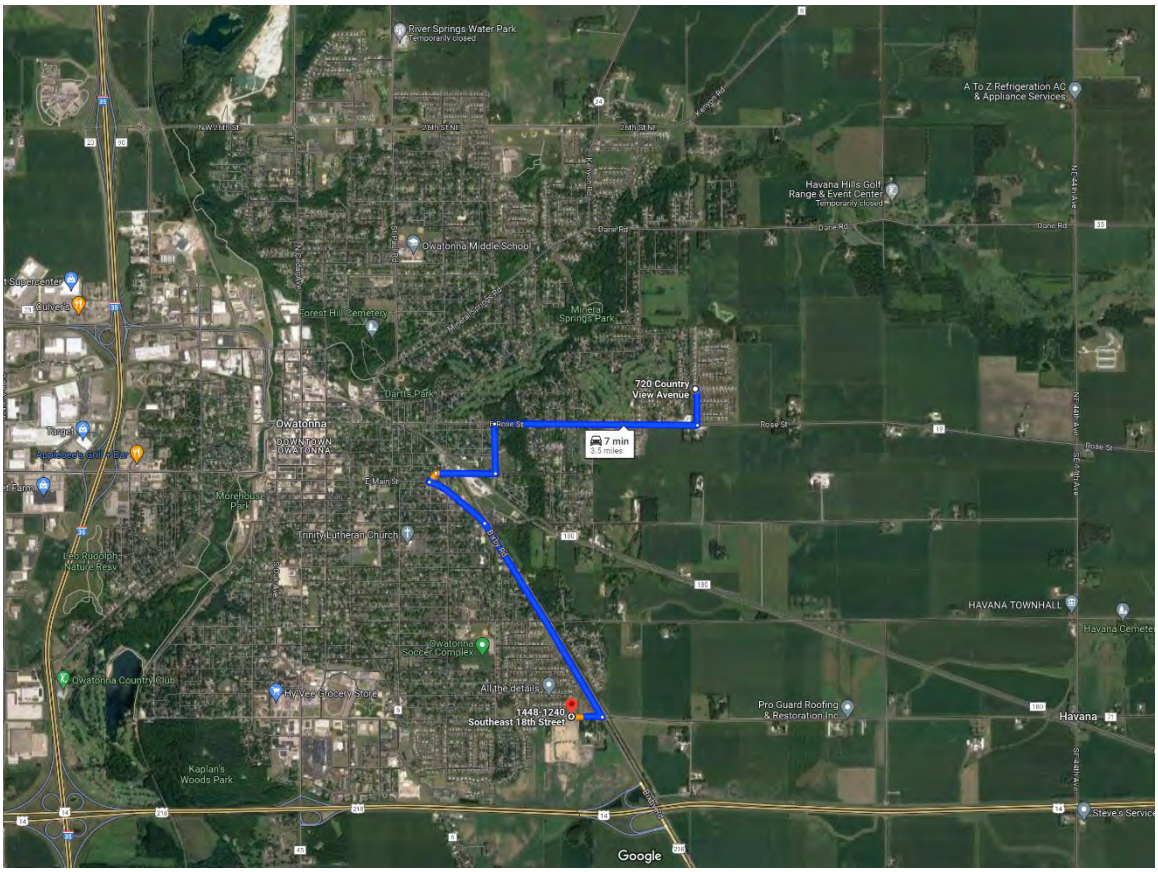


Figure 3. No Build route for Trip 2.

Table 3. Travel time and distance by alternative for Trip 2.

Alternative	Minutes	Miles	Estimate method
No Build	7	3.5	Google Maps
1A	6	2.1	Subtract 4 min and 4 mi from Alt 6
1B	6	2.1	Subtract 4 min and 4 mi from Alt 6
1C	6	2.3	Subtract 4 min and 3.8 mi from Alt 6
2	7	2.6	Subtract 3 min and 3.5 mi from Alt 6
3	7	2.6	Subtract 3 min and 3.5 mi from Alt 6
4	7	3.1	Subtract 3 min and 3 mi from Alt 6
5	8	4.1	Subtract 2 min and 2 mi from Alt 6
6	10	6.1	Google Maps

Alternatives 1-4 would all be more direct routes than No Build for this trip. Alternative 1 would reduce travel time by 1 minute, and travel time with Alternatives 2-4 would be similar to No Build. Alternative 5 would provide a longer route in terms of both travel time and distance.

Trip 3 – 26th St NE and Kenyon Rd to Cedar Ave and 18th Street SW

This trip represents a connection between a residential area in northeast Owatonna and a commercial area across town. The No Build route for this trip is shown in **Figure 4**, and the travel time and distance estimates for all alternatives are shown in **Table 4**.

Table 4. Travel time and distance by alternative for Trip 3.

Alternative	Minutes	Miles	Estimate method
No Build	10	3.9	Google Maps
1A	13	5.6	Subtract 4 min and 4 mi from Alt 6
1B	13	5.6	Subtract 4 min and 4 mi from Alt 6
1C	13	5.8	Subtract 4 min and 4 mi from Alt 6
2	14	6.1	Subtract 3 min and 3.5 mi from Alt 6
3	14	6.3	Subtract 3 min and 3.3 mi from Alt 6
4	14	6.6	Subtract 3 min and 3 mi from Alt 6
5	15	7.6	Subtract 2 min and 2 mi from Alt 6
6	17	9.6	Google Maps

All of the alternatives would be longer in both distance and travel time than the No Build route for this trip. The next best existing route between these points following 26th St NE, I-35, US 14, and Cedar Avenue would also be faster than any of the alternatives at 12 minutes of travel time. No traffic making a trip like this would be likely to divert to any of the new East Side Corridor routes. Traffic remaining on this route could benefit from decreased congestion on the segment of Mineral Springs Rd near downtown, but travel time savings related to this would be minimal.

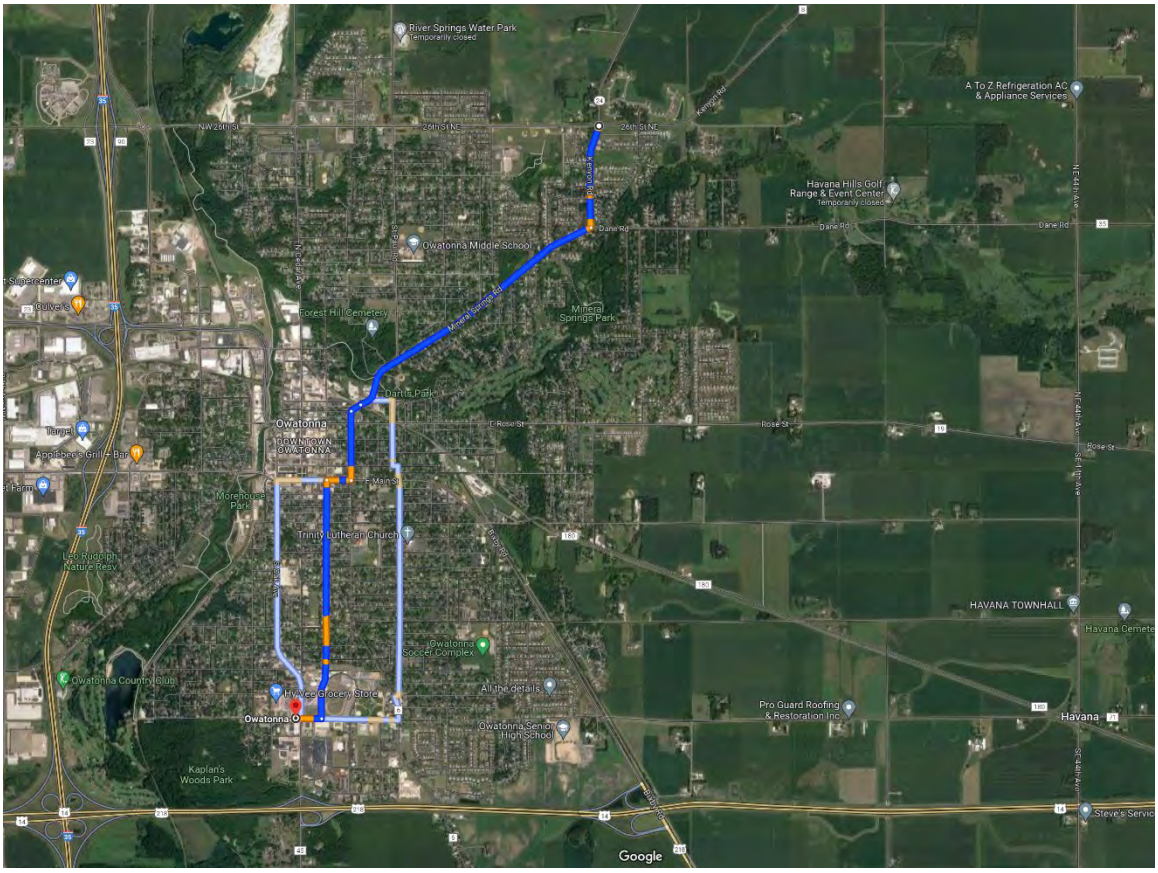


Figure 4. No Build route for Trip 3.

Trip 4 – Country View Ave and Fox Hollow Ln to Cedar Ave and 18th Street SW

This trip represents a connection between another residential area on the east side of Owatonna and a commercial area across town. The No Build route for this trip is shown in **Figure 5**, and the travel time and distance estimates for all alternatives are shown in **Table 5**.

Table 5. Travel time and distance by alternative for Trip 4.

Alternative	Minutes	Miles	Estimate method
No Build	10	3.7	Google Maps
1A	9	3.7	Subtract 1 min from No Build; same length
1B	9	3.7	Subtract 1 min from No Build; same length
1C	9	3.9	Subtract 1 min and add 0.2 mi to No Build
2	10	4.2	Add 1 min and 0.5 mi to No Build
3	10	4.2	Add 1 min and 0.5 mi to No Build
4	11	4.6	Subtract 3 min and 3 mi from Alt 6
5	12	5.6	Subtract 2 min and 2 mi from Alt 6
6	14	7.6	Google Maps

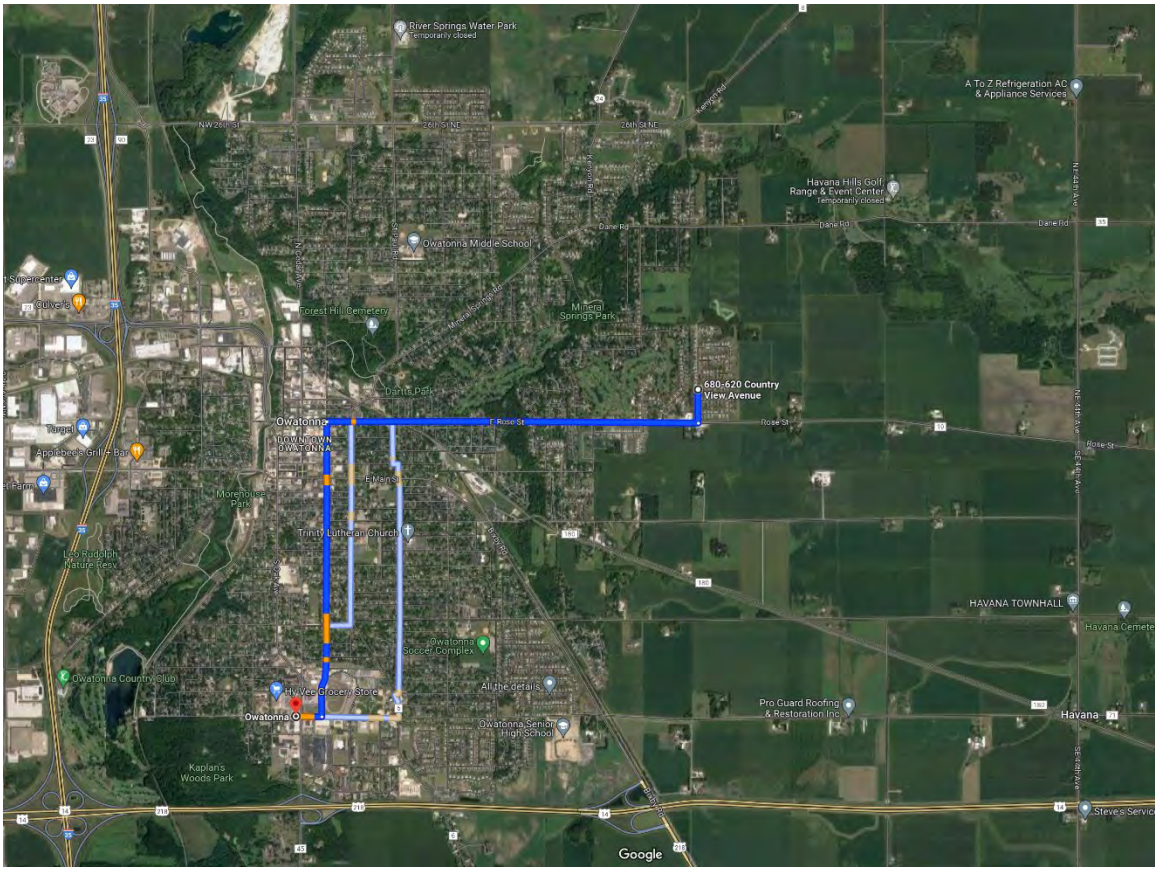


Figure 5. No Build route for Trip 4.

The beginning of this trip is farther east than the beginning of Trip 3, so some of the proposed alternatives would be more useful for this trip. Alternative 1 would offer savings in both time and distance compared to No Build, and Alternatives 2 and 3 would have about the same travel time. Alternatives 4 and 5 would be unlikely to attract traffic making this trip.

Trip 5 – Country View Ave and Fox Hollow Ln to Owatonna Hospital

For some residential areas on the east side of Owatonna, some of the alternative routes would also provide useful connections to points north. The No Build route from this area to Owatonna Hospital in the northwest corner of the city is shown in **Figure 6**, and the travel time and distance estimates for all alternatives are shown in **Table 6**. This trip also represents travel to the I-35/26th Street interchange for regional trips.

Alternatives 1-3 would all be slightly faster than the No Build route for this trip. These routes would provide more direct access to the north from this neighborhood. They would not pass through the center of the city, so travel speed would be faster and traffic delays would be less likely. Alternative 4 would have similar travel time to No Build but would be one mile longer, and Alternative 5 would add both travel time and distance.

Table 6. Travel time and distance by alternative for Trip 5.

Alternative	Minutes	Miles	Estimate method
No Build	11	4.9	Google Maps
1A	9	4.6	Google Maps from Hospital to 2400 Dane Rd, then add 2 min and 0.8 mi
1B	9	4.6	
1C	9	4.6	
2	10	5.1	Add 1 min and 0.5 mi to Alt 1
3	10	5.4	Add 1 min and 0.8 mi to Alt 1
4	11	6.0	Subtract 3 min and 3 mi from Alt 6
5	12	7.0	Subtract 2 min and 2 mi from Alt 6
6	14	9.0	Google Maps

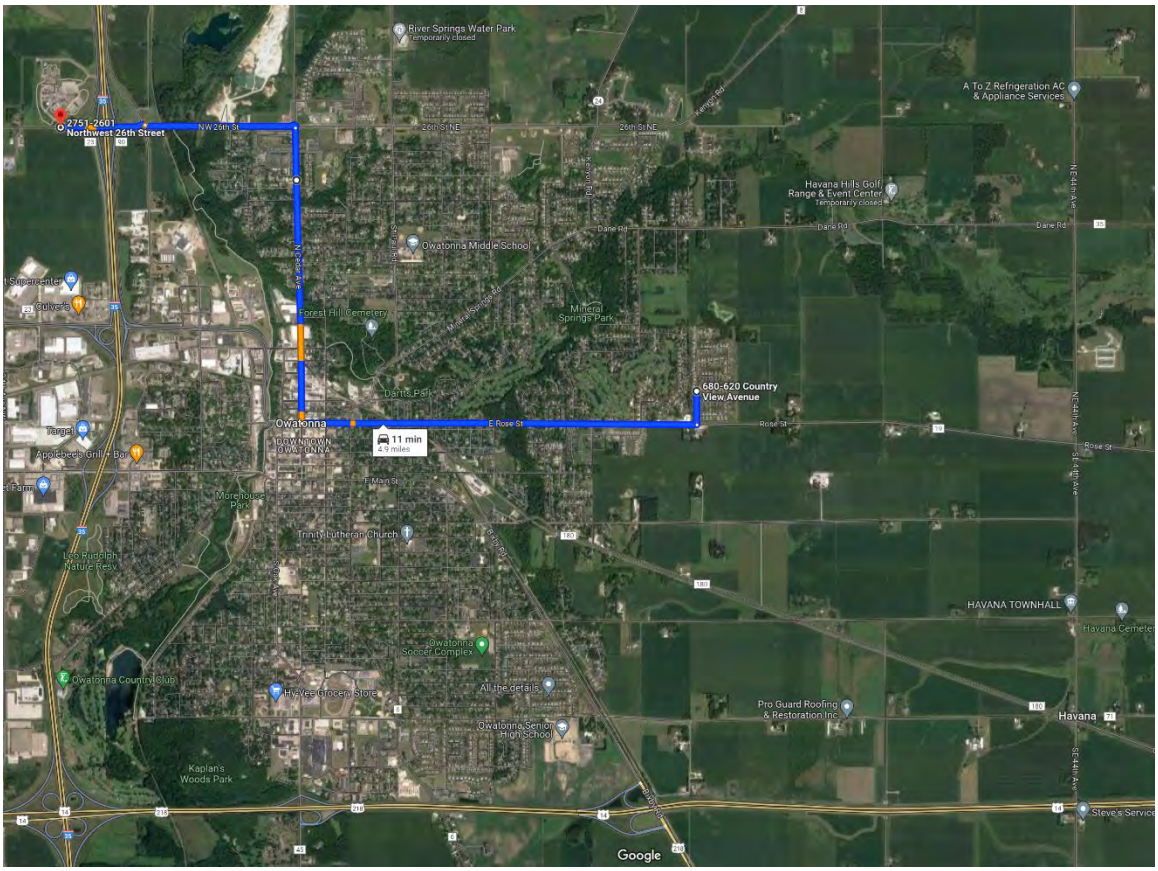


Figure 6. No Build route for Trip 5.

Trip 6 – 26th St NE and Cedar to Owatonna Senior High School

This trip represents a connection between a residential area on the north side of Owatonna and the new high school near the south end of the proposed corridor. The trip also represents travel to the US 14/US 218 interchange for regional trips. The No Build route for this trip is shown in **Figure 7**, and the travel time and distance estimates for all alternatives are shown in **Table 7**.

The No Build route for this trip uses a segment of Cedar Avenue where traffic volume is predicted to approach capacity by 2040. All of the alternative routes for this trip would be longer in terms of both travel time and distance. Alternative 1 would have a similar travel time to a route following I-35 and US 14. This suggests that Alternatives 2-5 would not attract traffic away from the segment of Cedar Avenue where congestion is anticipated, and that traffic impacts related to the corridor alternatives would not extend this far west. As discussed in the following section, traffic remaining on this route could benefit from decreased congestion if any traffic does divert, but travel time savings related to this would be minimal.

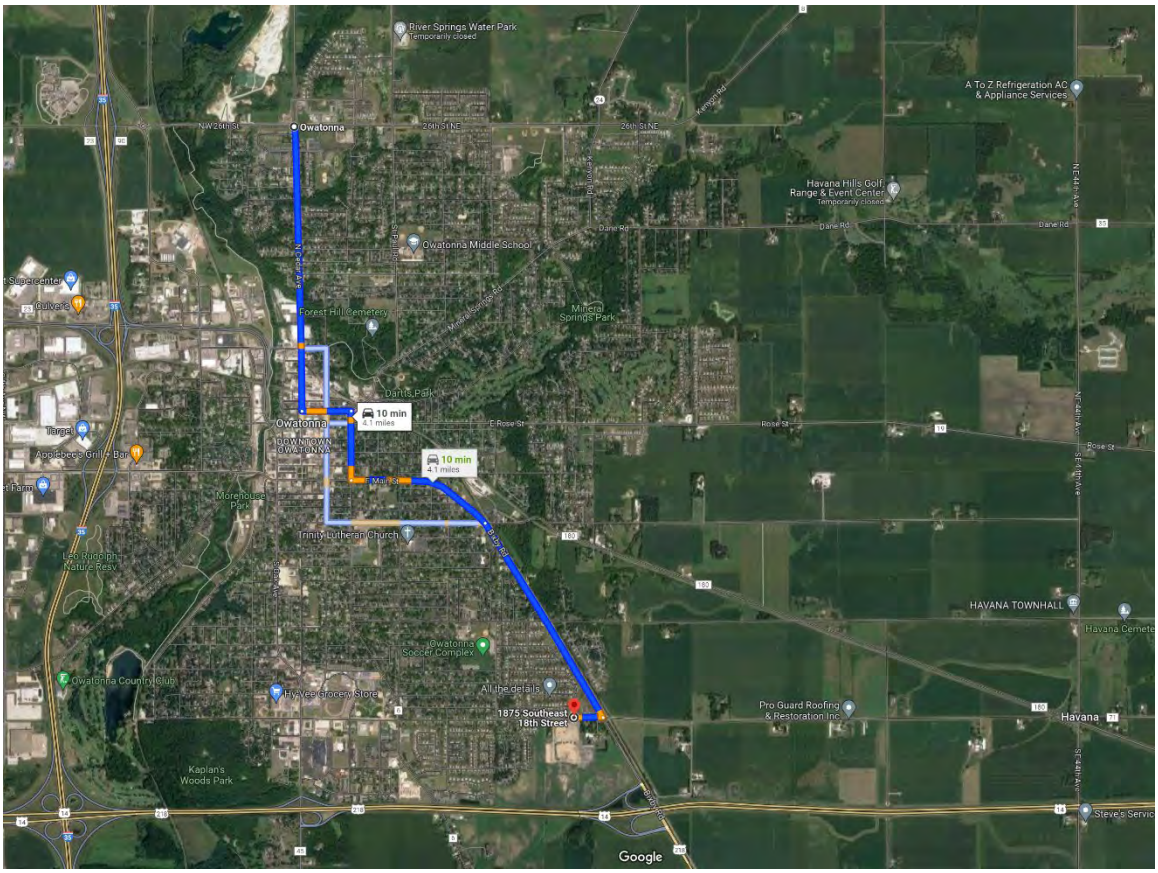


Figure 7. No Build route for Trip 6.

Table 7. Travel time and distance by alternative for Trip 6.

Alternative	Minutes	Miles	Estimate method
No Build	10	4.1	Google Maps
1A	11	5.7	Subtract 4 min and 4 mi from Alt 6
1B	11	5.7	Subtract 4 min and 4 mi from Alt 6
1C	11	5.9	Subtract 4 min and 4 mi from Alt 6
2	12	6.2	Subtract 3 min and 3.5 mi from Alt 6
3	12	6.4	Subtract 3 min and 3.3 mi from Alt 6
4	12	6.7	Subtract 3 min and 3 mi from Alt 6
5	13	7.7	Subtract 2 min and 2 mi from Alt 6
6	15	9.7	Google Maps

Travel time summary

The impact of the East Side Corridor route alternatives on the travel time for representative trips is summarized in **Table 8**. Trip length changes are summarized in **Table 9**. Darker green cells indicate that a route would offer reduced travel time or distance. Lighter green indicates that a route would be competitive, defined as equal travel time or less than one-half mile longer.

Alternative 1 would offer more travel time savings than the other alternatives because it is located closer to more potential users, and therefore would likely be more effective than other alternatives at reducing traffic on the segments of Mineral Springs Rd that were identified in the Steele County 2040 Transportation Plan as likely to become congested. Alternatives 2 and 3 would offer savings for some trips and increases for others and would become more useful as more development occurs on the east side of the city. These alternatives serve much of the existing development indirectly but would provide direct connections to areas identified as likely to develop in the future. Alternative 5 would take longer to travel for all six trips analyzed and would be unlikely to attract much traffic away from existing routes.

Table 8. Travel time change by alternative for each trip (in minutes).

Alternative	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
1A	-1	-1	3	-1	-2	1
1B	-1	-1	3	-1	-2	1
1C	-1	-1	3	-1	-2	1
2	0	0	4	0	-1	2
3	0	0	4	0	-1	2
4	0	0	4	1	0	2
5	1	1	5	2	1	3

Table 9. Trip length change by alternative for each trip (in miles).

Alternative	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
1A	-0.4	-1.4	1.7	0.0	-0.3	1.6
1B	-0.4	-1.4	1.7	0.0	-0.3	1.6
1C	-0.2	-1.2	1.9	0.2	-0.3	1.8
2	0.1	-0.9	2.2	0.5	0.2	2.1
3	0.3	-0.9	2.4	0.5	0.5	2.3
4	0.6	-0.4	2.7	0.9	1.1	2.6
5	1.6	0.6	3.7	1.9	2.1	3.6

Downtown congestion impacts

As illustrated in **Figures 1** and **2**, there is currently no direct route between the northeast and southeast corners of the city, so travelers wishing to make these trips must follow an indirect route that passes through Downtown Owatonna. In the future as traffic volumes increase, this indirect routing could contribute to increased congestion downtown.

The Steele County 2040 Transportation Plan identified six roadway segments that are likely to become congested by 2040. These are shown in **Figure 8** and listed in **Table 10**. The East Side Corridor could decrease traffic volume on the two segments on Mineral Springs Rd. As explained

in the discussion of Trip 6 in the previous section, Alternative 1 would also have some potential to divert traffic from Cedar Ave, but the other alternatives would not. As noted in the discussion on Trip 4, some alternatives may lead to an increase in traffic on 18th Street SW because they would provide a better connection between residential areas on the east side of the city and the commercial node around 18th Street SW and Cedar Avenue. The project would not likely affect traffic on the Bridge Street or North Street segments regardless of which alternative is selected.

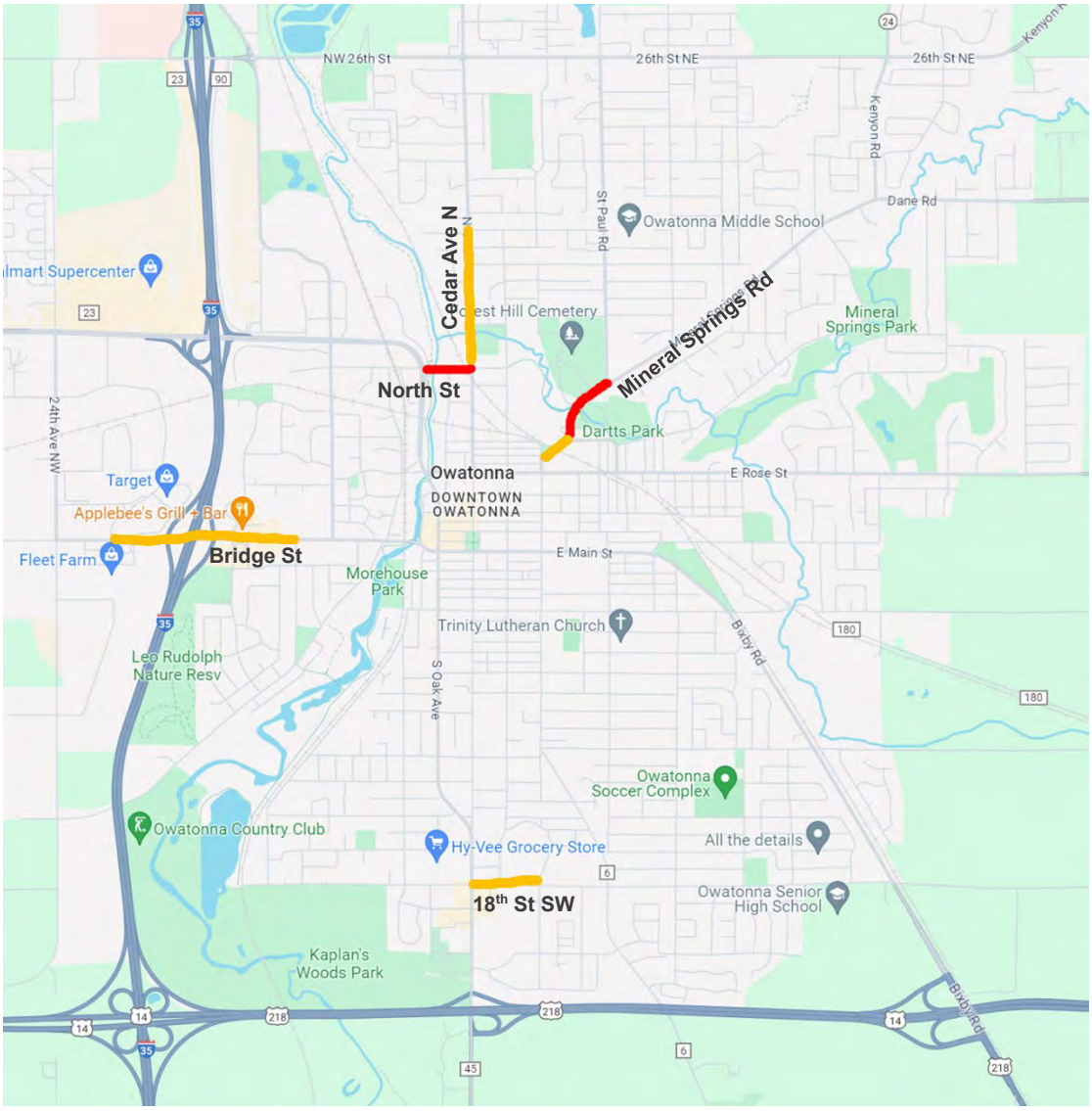


Figure 8. Roadways with potential congestion by 2040. (Gold = V/C between 0.85 and 1.0; Red = V/C greater than 1.0)

Table 10. Roadways approaching or exceeding capacity per the Steele County 2040 Transportation Plan.

Roadway	From	To	2040 AADT	Capacity	V/C
Bridge St	Park Dr NW	Selby Ave	20,500	22,000	0.93
18th St SW	CR 45	Hartle Ave	9,500	10,000	0.95
North St	CR 45	Cedar Ave	11,300	10,000	1.13
Cedar Ave	North St	16th St NE	9,200	10,000	0.92
Mineral Springs Rd	Fremont St	Cherry St	9,300	10,000	0.93
Mineral Springs Rd	Cherry St	St Paul Rd	10,100	10,000	1.01

Traffic volume shift

The Steele County 2040 Transportation Plan evaluated potential congestion by comparing forecast annual average daily traffic (AADT) to a planning-level daily roadway capacity to calculate a volume-to-capacity (V/C) ratio. This analysis uses a similar methodology to evaluate the potential for congestion reduction on the Cedar Avenue and Mineral Springs Rd segments.

Existing AADT from MnDOT's Traffic Mapping Application for the area between these segments and Downtown Owatonna is shown in **Figure 9**. AADT on Mineral Springs Rd and other segments in the northeast (upper right) portion of the map gives an indication of the maximum traffic volume that could shift onto the East Side Corridor from the potentially congested segments of Mineral Springs Rd.

The amount of traffic that could reroute from Mineral Springs Rd to the East Side Corridor was estimated based on existing traffic volumes, the travel time analysis described above, and the following assumptions:

- From **Figure 9**, the 1,500 daily vehicles on Bigelow Ave and the 2,300 daily vehicles on Mineral Springs Rd east of Bigelow Ave (a total of 3,800 vehicles per day) represent the maximum volume of traffic that could shift.
- Of these 3,800 vehicles, 3,100 are making trips that begin or end in the area approximately bounded by Bigelow Avenue on the west; Ridge Road, Mineral Spring Park, and Edgewood Drive on the south; the edge of the developed area on the east; and 26th Street NE on the north. The remaining 700 would begin or end farther east.
- Alternative 1 would provide a faster route for trips to and from about 70 percent of the area described above, and Alternatives 2-4 would be faster for about 30 percent. Alternative 5 would add travel time compared to the existing route.
- Half of trips to and from this area and 25 percent of trips beginning or ending farther east have an origin or destination that could be served by the East Side Corridor instead of Mineral Springs Rd. The remaining trips have origins or destinations downtown or farther west, for which Mineral Springs Rd would remain the preferred route.
- The volume of the rerouted traffic will increase at a rate of 1 percent per year to 2040.

The volume shifts and resulting V/C ratios on the potentially congested roadway segments near downtown are shown in **Table 11** for Alternative 1 and in **Table 12** for Alternatives 2-4. Based on the assumptions listed above, the resulting estimated 2040 traffic diversion from Mineral Springs Rd is 1,500 vehicles per day with Alternative 1 and 800 vehicles per day with Alternatives 2-4. Because Alternative 5 would add travel time and distance to all trips analyzed above, no reduction in potential congestion is likely with that route.

The AADT of 4,750 vehicles per day on Cedar Avenue near 26th Street NE represents a maximum volume that could shift away from the potentially congested segment of Cedar Avenue. As described in the analysis of Trip 6 in the previous section, none of the East Side Corridor alternatives would be faster than the existing routes for traffic using this segment of Cedar Avenue, though Alternative 1 would be similar for some trips that begin or end toward the east edge of the area from which Cedar Avenue would attract traffic. I-35 is less than one mile west of Cedar Avenue and would serve as a much faster parallel route for many trips to and from the southern portion of the city. Because of this, diversion from Cedar Avenue to the East Side Corridor is estimated to be at most 500 vehicles per day with Alternative 1. No diversion from Cedar Avenue appears likely with the other alternatives.

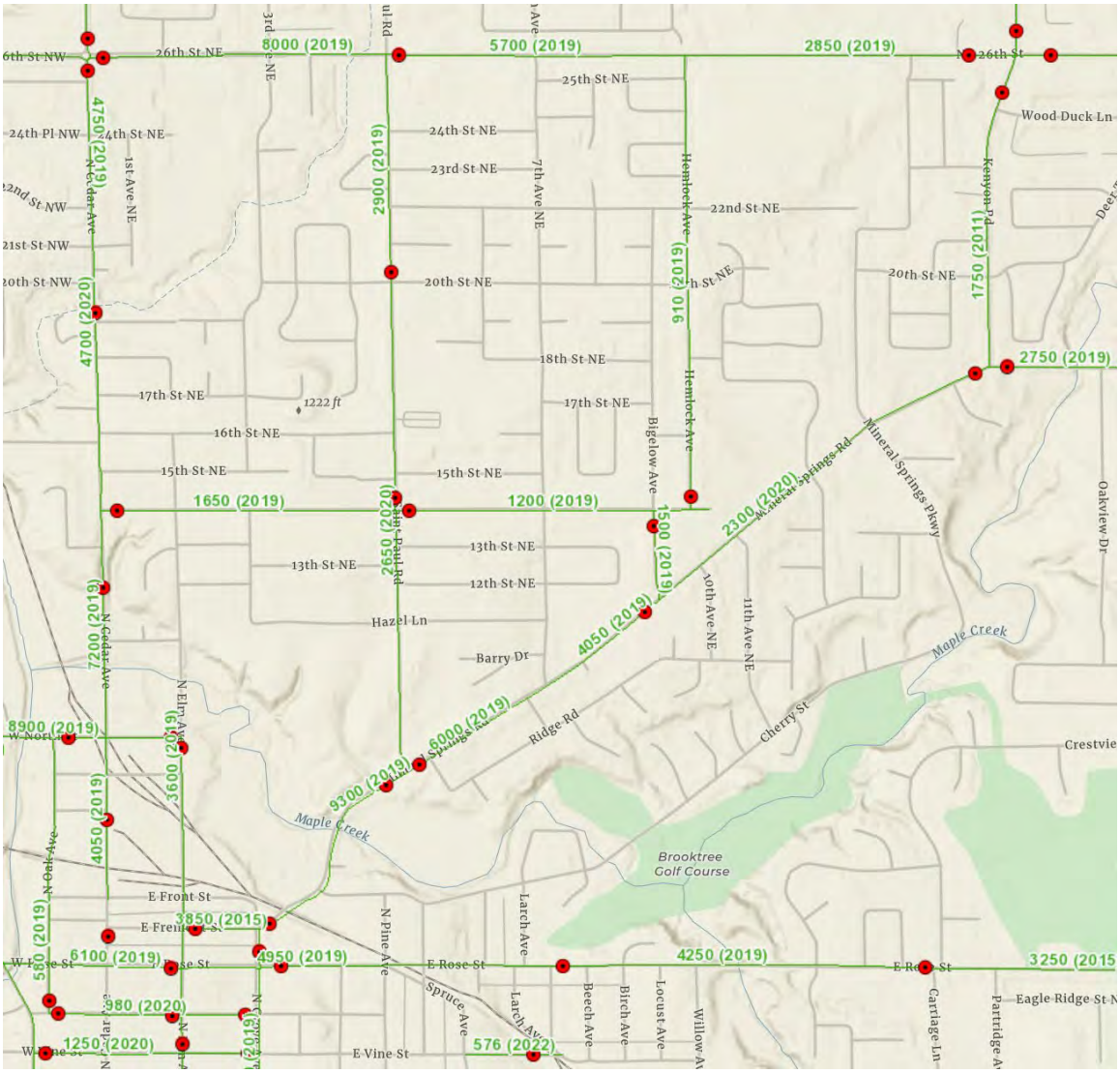


Figure 9. Existing AADT on and near the segments with volumes approaching capacity by 2040.

Table 11. Downtown congestion impact of Alternative 1.

Roadway	From	To	No Build AADT	No Build V/C	Alt 1 AADT	Change	Alt 1 V/C
Mineral Spgs Rd	Fremont St	Cherry St	9,300	0.93	7,800	-1,500	0.78
Mineral Spgs Rd	Cherry St	St Paul Rd	10,100	1.01	8,600	-1,500	0.86
Cedar Ave	North St	16th St NE	9,200	0.92	8,700	-500	0.87

Table 12. Downtown congestion impact of Alternatives 2-4.

Roadway	From	To	No Build AADT	No Build V/C	Alt 2-4 AADT	Change	Alt 2-4 V/C
Mineral Spgs Rd	Fremont St	Cherry St	9,300	0.93	8,500	-800	0.85
Mineral Spgs Rd	Cherry St	St Paul Rd	10,100	1.01	9,300	-800	0.93
Cedar Ave	North St	16th St NE	9,200	0.92	9,200	0	0.92

Congested travel time

The impact of these volume reductions on travel time on the potentially congested segments was estimated using the Bureau of Public Roads volume-delay function shown in **Figure 10**. This is a planning-level equation that estimates travel time on a roadway link based on free-flow travel time and V/C ratio. Free-flow travel time here is based on segment length and the posted speed of 30 miles per hour. No build travel time is shown in **Table 13**.

The resulting congested travel times for Alternatives 1-4 are shown in **Table 14**. Because these segments are short and the potential traffic volume reductions are relatively small, minimal travel time savings would be expected for vehicles that remain on these segments.

$$S_a(v_a) = t_a\left(1 + 0.15\left(\frac{v_a}{c_a}\right)^4\right)$$

- t_a = free flow travel time on link *a* per unit of time
- v_a = volume of traffic on link *a* per unit of time
- c_a = capacity of link *a* per unit of time
- $S_a(v_a)$ is the average travel time for a vehicle on link *a*

Figure 10. Bureau of Public Roads volume-delay function.

Table 13. No build congested travel times.

Roadway	From	To	Length (miles)	Free-flow travel time (s)	No Build travel time (s)
Mineral Springs Rd	Fremont St	Cherry St	0.13	15	17
Mineral Springs Rd	Cherry St	St Paul Rd	0.25	30	35
Cedar Ave	North St	16th St NE	0.50	61	67

Table 14. Congested travel times for Alternatives 1-4.

Roadway	From	To	Alt 1 travel time (s)	Change from No Build	Alt 2-4 travel time (s)	Change from No Build
Mineral Springs Rd	Fremont St	Cherry St	16	-1	16	-1
Mineral Springs Rd	Cherry St	St Paul Rd	33	-2	34	-1
Cedar Ave	North St	16th St NE	66	-1	67	0