COMMERCE DEPARTMENT

Forks-Rost Transmission Line Project Environmental Assessment

The Human and Environmental Impacts of the Forks-Rost 161kV Transmission Line Project

May 2025

Docket Number ET-6675/TL-24-232

Abstract

Responsible Government Unit
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
St. Paul, MN 55101

Commission Representative
Jacques Harvieux
651-201-2233
Jacques.Harvieux@state.mn.us

Preparer
Minnesota Department of Commerce
85 7th Place East, Suite 280
Saint Paul, MN 55101

Commerce Representative
Larry Hartman
651-539-1839
larry.hartman@state.mn.us

Applicant
ITC Midwest LLC
20789 780th Ave
Albert Lea, MN 56007

Applicant Representative
Mark Rothfork
319-297-6700
mrothfork@itctransco.com

ITC Midwest LLC (applicant) proposes to construct a 161 kilovolt (kV) transmission line from the new Forks Switching Station to the new Rost Substation in Jackson County, Minnesota (Forks-Rost Transmission Line Project or project). The project includes construction of the new Forks Switching Station and approximately 8.5 miles of 161 kV high voltage transmission line from the Forks Switching Station to the new Rost Substation; this new substation will be permitted and constructed as a separate project by Great River Energy.

The Forks-Rost Transmission Line Project requires a route permit from the Minnesota Public Utilities Commission (Commission). The applicant submitted a route permit application to the Commission on September 30, 2024. Department of Commerce (Department) Energy Environmental Review and Analysis (EERA) staff have prepared this environmental assessment (EA) for the project.

This EA addresses the issues and mitigation measures identified in the Department's scoping decision of February 10, 2025. It evaluates the project's potential for human and environmental impacts and possible measures to mitigate these impacts.

Public hearings for the project will be held in the project area and are anticipated to occur the week of May 13, 2025. Notice of the hearings will be issued separately. An administrative law judge (ALJ) from the Minnesota Office of Administrative Hearings will preside over the hearings. Upon completion of the hearings, the ALJ will submit a report to the Commission including recommendations to the Commission regarding the applicant's route permit application. Commission decisions on a route permit are expected in the fourth quarter of 2025.

Additional materials related to this project and its permitting proceedings are available on the Department's website: http://mn.gov/commerce/energyfacilities and on the state of Minnesota's eDockets system: https://www.edockets.state.mn.us (enter the year "24" and the number "232").

Persons interested in receiving future project notices and updates can place their names on the project mailing list by emailing docketing.puc@state.mn.us or calling 651-201-2246 and providing the docket number (24-232), their name, email address, and mailing address. Please indicate how you would like to receive notices—by email or U.S. mail.

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List of Preparers

Minnesota Department of Commerce
Energy Environmental Review and Analysis
Larry Hartman and Ray Kirsch

Barr Engineering Co.

Environmental Assessment
Forks-Rost Transmission Line Project

May 2025

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Acronyms

ALJ	administrative law judge
Applicant	ITC Midwest LLC
AQI	Air Quality Index
BGEPA	Bald and Golden Eagle Protection Act
BMP(s)	best management practices
BWSR	Minnesota Board of Water and Soil Resources
CO_2	carbon dioxide
Commission	Minnesota Public Utilities Commission
dBA	A-weighted decibel
Department	Department of Commerce
DNR	Minnesota Department of Natural Resources
EA	environmental assessment
EERA	Energy Environmental Review and Analysis
EJ	Environmental justice
EJC	Environmental Justice Communities
EMF	electromagnetic fields
FAA	Federal Aviation Administration
GHGs	Greenhouse gases
GPS	global position systems
ICD	implantable cardioverter defibrillators
IPaC	Information for Planning and Consultation
kV	kilovolt
LGU(s)	local units of government
MBTA	Migratory Bird Treaty Act
MDA	Minnesota Department of Agriculture
MEPA	Minnesota Environmental Policy Act
Merjent	Merjent, Inc
mG	milliGauss
MnDOT	Minnesota Department of Transportation
MnSHIP	Minnesota's Statewide Historic Inventory Portal
MWI	Minnesota Well Index
NAAQS	National Ambient Air Quality Standards
NAC	Noise Area Classification
NERC	Electric Reliability Corporation
NESC	National Electrical Safety Code
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
O_3	ozone
OSA	Office of the State Archaeologist
PSA(s)	Primary Service Areas
PWI	public waters inventory
ROW	right-of-way
SDS	State Disposal System

SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SSP	Shared Socioeconomic Pathway
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WCA	Wetland Conservation Act

Summary

This environmental assessment (EA) has been prepared for the Forks-Rost 161 kilovolt (kV) transmission line project (the project), a 161 kV transmission line proposed by ITC Midwest LLC (applicant). This EA evaluates potential human and environmental impacts of the project and possible mitigation measures.

This EA is not a decision-making document but rather a guide for decision-makers. The EA is intended to facilitate informed decisions by state agencies, particularly with respect to the goals of the Minnesota Environmental Policy Act (MEPA) — "to create and maintain conditions under which human beings and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of the state's people" (Minn. Statute 116D.02).

Electrical Transmission System Reliability and the Shift to Renewable Energy

Over the past few decades, the generation of electricity in Minnesota has evolved away from fossil-fueled baseload generating plants to renewable generating resources (e.g., wind and solar power). In 2011, over half of the electricity generated in Minnesota came from coal-fired electric power plants. In 2023, these plants produced only 22 percent of the electricity in Minnesota, while renewable generating resources provided 33 percent (reference (1)). This change in electrical generation has implications for the current transmission system and whether the current system can handle the increased energy that these renewable energy projects generate.

The Forks Rost Project

The project includes constructing 8.5 miles of 161 kV transmission line in Ewington and Rost Townships, Jackson County, Minnesota. The project will start at the proposed new Rost Substation, near the intersection of County Road 5 and 790th Street. Great River Energy has permitted and constructed the Rost Substation for this project. The project will run south from the Rost substation along County Road 5 until turning east on 780th Street. It will run east for one mile until reaching 360th Avenue and then turn south for another mile. Then the line will turn east on 770th Street for 5.5 miles until connecting to the new Forks Switching Station, which will be constructed, owned, and operated by the applicant as part of this project (Map 1-1).

The project requires a right-of-way (ROW) of 100 feet, with 50 feet on either side of the transmission line's centerline. Where the project follows existing road ROW, transmission line structures will be placed approximately 5 to 8 feet outside the road ROW.

The State of Minnesota's Role

The project requires a route permit from the Minnesota Public Utilities Commission (Commission) and approvals from other state and federal agencies with permitting authority for specific resources. For the Forks-Rost 161kV Transmission Line Project, the Commission must determine how best to mitigate potential impacts of the project.

To help the Commission with its decision-making and to provide a fair and thorough airing of the issues, the state of Minnesota has set out a process for the Commission to follow in making its decisions. This

process requires (1) the development of an EA and (2) public hearings before an administrative law judge (ALJ) (Minn. Statutes 216B and 216E). The goal of the EA is to describe the potential human and environmental impacts of the project ("the facts"); the goal of the hearings is to advocate, question, and debate what the Commission should decide about the project ("what the facts mean"). The entire record developed in this process, including all public input and testimony, is considered by the Commission when it makes its decision on the applicant's route permit application.

Commission Decision Criteria

The Commission makes its decision on the applicant's route permit application through criteria set out in Minnesota statutes and rules. For a route permit, the Commission is charged with selecting transmission line routes that minimize adverse human and environmental impacts while providing continuing electric power system reliability and integrity. Per Minn. Rule 7850.4100, the Commission must consider 14 factors when making a route permit decision:

A. Effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services.

B. Effects on public health and safety.

C. Effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining.

D. Effects on archaeological and historic resources.

E. Effects on the natural environment, including effects on air and water quality resources and flora and fauna.

F. Effects on rare and unique natural resources.

G. Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity.

H. Use or paralleling of existing ROW, survey lines, natural division lines, and agricultural field boundaries.

I. Use of existing large electric power generating plant sites.

J. Use of existing transportation, pipeline, and electrical transmission systems or ROWs.

K. Electrical systems reliability.

L. Costs of constructing, operating, and maintaining the facility, which are dependent on design and route.

M. Adverse human and natural environmental effects which cannot be avoided.

N. Irreversible and irretrievable commitments of resources.

Environmental Assessment

MEPA requires that environmental review be conducted for major governmental actions with the potential to create significant environmental impacts (Minn. Statute 116D.04). To meet this requirement, the Commission has authorized the preparation of an EA. Department of Commerce (Department) Energy Environmental Review and Analysis (EERA) staff is responsible for preparing the EA on behalf of the Commission.

This EA is intended to facilitate informed decision-making by the Commission and other entities with regulatory authority over the project. It also assists citizens in providing guidance to decision-makers regarding the project. This EA analyzes the potential human and environmental impacts of the project and possible mitigation measures. The EA does not advocate or state a preference for a specific alternative. Instead, it analyzes and compares alternatives so that citizens, agencies, and governments can work from a common set of facts.

Public Participation

In preparing this EA, EERA staff solicited public comments on (1) the human and environmental impacts that should be evaluated in the EA, and (2) possible mitigation measures to study. This process of soliciting comments on the contents of the EA is known as “scoping.” EERA staff solicited comments through public meetings in December 2024 and through a comment period that ended on December 24, 2024. Based on the public comments received and after review by the Commission, the Department issued the scoping decision for this EA on February 10, 2025.

Human and Environmental Impacts of the Project

Project construction and operation will impact human and environmental resources within the designated project area. Some impacts will be short-term and similar to those of any large construction project (e.g., noise, dust, soil disturbance). These impacts can be mitigated by measures common to most construction projects.

Other impacts will exist for the life of the project and may include aesthetic impacts, impacts on land-based economies such as agriculture, as well as impacts to the natural environment and on rare and unique natural resources. These long-term impacts are generally not well mitigated by construction measures. That is, these impacts do not flow from how the project is constructed but rather through its design and location. Long-term impacts can be somewhat mitigated by prudent design for the project.

Many impacts are anticipated to be minimal—in and of themselves or with common mitigation measures—for the project. These include:

A. Impacts on human settlements (factor A) – displacement, environmental justice communities, noise, property values, electronic interference, cultural values, zoning and land-use compatibility, and public services.

B. Impacts on public health and safety (factor B) – EMF, implantable medical devices, stray voltage, induced voltage, and air quality.

C. Impacts on land-based economies (factor C) – forestry, mining, and recreation and tourism.

D. Impacts on archaeological and historic resources (factor D).

E. Impacts on rare and unique natural resources (factor F) – federal- and state-protected species.

F. Impacts on electric system reliability (factor K).

G. Costs that are dependent on design and route (factor L).

Use or paralleling of existing rights-of-way (factors H and J).

However, other aspects may have more moderate impacts:

Impacts on human settlements (factor A) – aesthetics.

Impacts on land-based economies (factor C) – agriculture

Impacts on the natural environment (factor E) – water resources, vegetation (flora), and wildlife (fauna).

Impacts on rare and unique natural resources (factor F) – sensitive ecological resources.

Potential human and environmental impacts are summarized in Table S-1 and discussed further below.

Table S-1 Human and Environmental Impacts for the Applicant's Proposed Route

Resource	Element	Applicant's Proposed Route
Length (miles)		8.5
Human Settlement	Residences within 0-50 feet (count)	0
	Residences within 50-250 feet (count)	4
	Residences within 250-500 feet (count)	2
	Residences within 500-1,000 feet (count)	3
Environmental Justice	Communities of EJ concern crossed by the 100-ft ROW (count)	0
Land-Based Economies	Agricultural land in 100-ft ROW (acres) and Forks Switching Station	67
Archaeological and Historic Resources	Archaeological sites in route width (count)	0
	Historic resources in route width (count)	1 (not eligible)
Water Resources	Stream crossings (count)	3
	PWI crossings (count)	2
	Desktop delineated wetland crossings (count)	9
	Total desktop delineated wetlands in 100-foot ROW (acres)	11.1
Vegetation	Forested landcover in 100-foot ROW (acres)	0
Wildlife	Wildlife Management Areas in 100-foot ROW (acres)	0
	Scientific and Natural Areas in 100-foot ROW (acres)	0
	Potential for Federal- or state-protected species in 100-foot ROW (count)	2
ROW Sharing and Paralleling	Transmission line (miles, percent)	0.86 (10)
	Roadway (miles, percent)	8.5 (100)
	Field, parcel, or section lines (miles, percent)	8.5 (100)
	Total ROW sharing and paralleling (miles, percent)	8.5 (100)
Estimated Cost	Total estimated cost (million)	$13.5- $18.8

Human Settlements

Potential project impacts on human settlements are assessed through an evaluation of several elements, including noise, property values, electronic interference, cultural values, zoning and land-use compatibility, and public services. For most of the human settlement elements, project impacts are anticipated to be minimal. Analysis of impacts to human settlements focuses on those elements where impacts have the potential to occur, which for the project includes aesthetics.

Aesthetics

Aesthetic impacts are assessed, in part, through consideration of the existing viewshed, landscape, character, and setting of any given area, followed by an evaluation of how a proposed project will change these aesthetic attributes. Determining the relative scenic value or visual importance in any given area

depends, in large part, on the values and expectations held by individuals and communities about the aesthetic resource in question.

Based on the project's proximity to residences, aesthetic impacts may occur as a result of the project. There are four residences located between 50 and 250 feet of the applicant's proposed route. The project will result in the introduction of new infrastructure in a relatively rural area. However, aesthetic impacts will be minimized by sharing existing road ROW. In addition, there is an existing 69 kV transmission line approximately 450 feet away that the project parallels until 780th street, which has a similar visual appearance, albeit on a smaller scale than the project. The applicant has also committed to minimizing permanent impacts on the aesthetics and visual character of the area by avoiding and/or minimizing tree clearing and avoiding residential areas to the maximum extent practicable.

Land-Based Economies

Potential impacts to land-based economies are assessed through several elements including agriculture, forestry, mining, and recreation and tourism resources. The majority of elements considered under land-based economies would be minimally impacted by the project; only agricultural impacts are discussed further.

Agriculture

According to the NLCD, there are 55.5 acres of agricultural land within the ROW. This agricultural land is comprised of hay/pastureland and cultivated crop land and equates to 54.4 percent of the total land cover within the ROW. In addition, there are 11.8 acres of agricultural land within the Forks Switching Station siting area. Permanent impacts to agriculture as a result of the project will include loss of farmland due to the Forks Switching Station and structure placement in agricultural fields, which can restrict certain types of farming equipment. Impacts to agricultural operations have been mitigated by proposing a project that primarily follows existing road ROW. Additionally, the applicant will work with landowners regarding compensation for any unintended impacts (e.g., repair of drain tile).

Natural Environment

Potential impacts to the natural environment are assessed by looking at several specific elements. For some of the elements of the natural environment, impacts from the project are anticipated to be minimal and are therefore not discussed here further. This section addresses those elements that do have the potential to be impacted by the project – water resources, vegetation, and wildlife.

Water Resources

The project crosses two streams that are identified as public waters – Judicial Ditch 28 and the Little Sioux River– as well as one non-public water stream. In addition, nine wetlands totaling approximately 11.1 acres are located in the project ROW. However, it is anticipated that impacts on water courses and wetlands will be avoided by adjusting structure locations to avoid disturbing the streams and wetlands. No stream or wetland crossing would be greater than 1,000 feet, meaning all stream crossings can be spanned to avoid placing a structure within these resources. In addition, the project will develop a SWPPP that identifies BMPs to be implemented during construction to minimize erosion and sedimentation impacts to surface waters. The applicant will also work with the Minnesota Department of Natural Resources (DNR) to obtain appropriate approvals for public water crossings.

Vegetation

Present-day vegetation consists of herbaceous agricultural vegetation, cultivated crops, hay and pasture land, and developed lands. Project construction will result in short-term impacts on existing vegetation, including localized physical disturbance and soil compaction. Development and use of access roads, staging, and stringing areas for the project will also have short-term impacts on vegetation by concentrating surface disturbance and equipment use. Permanent vegetation clearing would be required in the designated structure installation areas, resulting in an impact area measuring up to 5 feet in diameter for typical structures and up to 12 feet in diameter for dead-end and angle structures. The trees and understory brush would be cleared for installation of structures and where canopy heights would interfere with the project. Construction will also result in long-term impacts to vegetation by permanently removing taller-growing woody vegetation within the ROW.

Mitigation will include following existing road ROW, limiting new access road construction, constructing during fall and winter months to limit vegetation damage, leaving or replanting compatible vegetation at the edge of the transmission line ROW, replanting the transmission line ROW outside of active farmed areas with low-growing, native species, and limiting vehicle traffic to roads along the ROW and within previously disturbed areas.

Wildlife

Wildlife in the general vicinity of the project includes songbirds, raptors, and small mammals. In addition, Minnesota is in the Central Flyway of North America. Migratory birds use portions of the Central Flyway as resting grounds during spring and fall migration, as well as breeding and nesting grounds throughout the summer. Within and near the project, there is limited suitable habitat for migratory birds. Migratory birds are protected under the Migratory Bird Treaty Act (MBTA). In addition, bald eagles and golden eagles are protected under the MBTA and the federal Bald and Golden Eagle Protection Act (BGEPA).

For non-avian wildlife, construction activities that generate noise, dust, or disturbance may result in short-term, indirect impacts. During project construction, wildlife will generally be displaced within the ROW. Potential impacts to avian species (e.g., songbirds, raptors, and waterfowl) include displacement during construction, electrocution, and collision with transmission line conductors. Independent of the electrocution risk, birds may be injured by colliding with transmission line structures and conductors. The collision risk is influenced by several factors including habitat, flyways, foraging areas, and bird size.

The primary mitigation strategy is to avoid disturbing and placing structures within riparian areas and wetlands. Bird collisions with transmission lines can be mitigated by configuring the conductors in a single horizontal plane or through the use of bird flight diverters.

Rare and Unique Natural Resources

There are six documented federally listed species within 1 mile of the applicant's proposed route. The northern long-eared bat and tricolored bat, have the potential to be within the 100-foot ROW and, if present, could potentially be directly impacted by the project if trees are removed during the active nesting period. Impacts on northern long-eared bats and tricolored bats could be minimized by conducting tree clearing activities while the bats are hibernating during their inactive season and avoiding tree removal from June 1 through August 15.

Summary of Project-Specific Routing Factors

The discussion here uses text and a color graphic to summarize the relative merits of the applicant's proposed route (Table S-2). The color graphic and related notes for a specific routing factor or element are not meant to suggest that accommodations and/or changes need to be made to the route but are provided as a relative comparison to be evaluated together with all other routing factors. For example, if the applicant's proposed route is "red" for a particular factor or element, this is not meant to indicate a fatal flaw within the proposed route.

For routing factors that express the state of Minnesota's interest in the efficient use of resources (e.g., the use and paralleling of existing rights-of-way), the graphic represents the consistency of the route with these interests. For the remaining routing factors, the graphic represents the magnitude of the anticipated impacts.

Table S-2 Guide to Relative Merits of the Applicant's Proposed Route

Anticipated Impacts or Consistency with Routing Factor	Symbol
Minimal: Impacts are anticipated to be minimal with mitigation – OR – route option is very consistent with this routing factor.	
Moderate: Impacts are anticipated to be minimal to moderate with mitigation; special permit conditions may be required for mitigation – OR – the route may not be the least impactful with respect to the routing factor.	
Significant: Impacts are anticipated to be moderate to significant and likely unable to be mitigated – OR – route alternative is not consistent with the routing factor or consistent only in part. Indicates that the route is impactful with respect to the routing factor.	

A summary of the relative merits of the applicant's proposed route, broken down by each routing factor, is provided in Table S-3.

Table S-3 Summary of Routing Factors for the Applicant's Proposed Route

Routing Factor/Resource	Applicant's Proposed Route	Summary
Human Settlement – Displacement, Noise, Aesthetics, Cultural Values, Recreation, and Public Services		There are four residences located between 50 and 250 feet of the applicant's proposed route. Some tree clearing along the ROW may occur. The project will result in a viewshed change for the area.
Public Health and Safety		No impacts to public health and safety are anticipated as a result of the project.
Land-based Economies – Agriculture, Forestry, Tourism, and Mining		Permanent impacts to agriculture as a result of the project may include loss of farmland due to construction of the Forks Switching Station and structure placement in agricultural fields and restriction of farming equipment. Impacts to agricultural operations have been mitigated by proposing a project that follows existing roadway ROW entirely.
Archaeological and Historic Resources		No impacts to eligible archaeological and historic resources are anticipated as a result of the project.

Routing Factor/Resource	Applicant's Proposed Route	Summary
Natural Environment – Air and Water Quality Resources and Flora and Fauna		Impacts to water courses and wetlands will be avoided by adjusting structure locations to avoid impacting streams and wetlands. Project construction will result in short- and long-term impacts to existing vegetation. Short-term impacts to non-avian wildlife may occur. Avian electrocution and/or collision may occur as a result of the project.
Rare and Unique Natural Resources		The project may result in impacts to northern long eared bats if they are present in the ROW; however, this can be mitigated by conducting clearing activities while the bats are hibernating during their inactive season and avoiding tree removal from June 1 through August 15.
Application of Design Options that Maximize Energy Efficiencies, Mitigate Adverse Environmental Effects, and could Accommodate Expansion of Transmission or Generating Capacity		The project has been designed to maximize energy efficiencies and mitigate adverse environmental effects.
Use or Paralleling of Existing Rights-of-Way, Survey Lines, Natural Division Lines, and Agricultural Field Boundaries		The project parallels existing road ROW for 100 percent of its length.
Use of Existing Transportation, Pipeline, and Electrical Transmission Systems or Rights-of-Way		The project parallels existing road ROW for 100 percent of its length.
Electrical System Reliability		The project supports electrical system reliability.
Costs of Construction, Operating, and Maintaining the Facility which are Dependent on Design and Route		The project has been designed to minimize construction and operating costs to the extent possible.
Adverse Human and Natural Environmental Effects which Cannot be Avoided		Unavoidable adverse human and environmental effects have been minimized to the extent possible.
Irreversible and Irretrievable Commitments of Resources		Irreversible and irretrievable commitments of resources have been minimized to the extent possible.

1 Introduction

This EA has been prepared for a new 161 kV transmission line from the new Forks Switching Station to the new Rost Substation in Jackson County, Minnesota, proposed by ITC Midwest LLC (applicant). This EA evaluates the potential human and environmental impacts of the project and possible mitigation measures.

This EA is not a decision-making document, but rather a guide for decision-makers. The EA is intended to facilitate informed decisions by state agencies, particularly with respect to the goals of the Minnesota Environmental Policy Act "to create and maintain conditions under which human beings and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of the state's people" (Minn. Statute 116D.02).

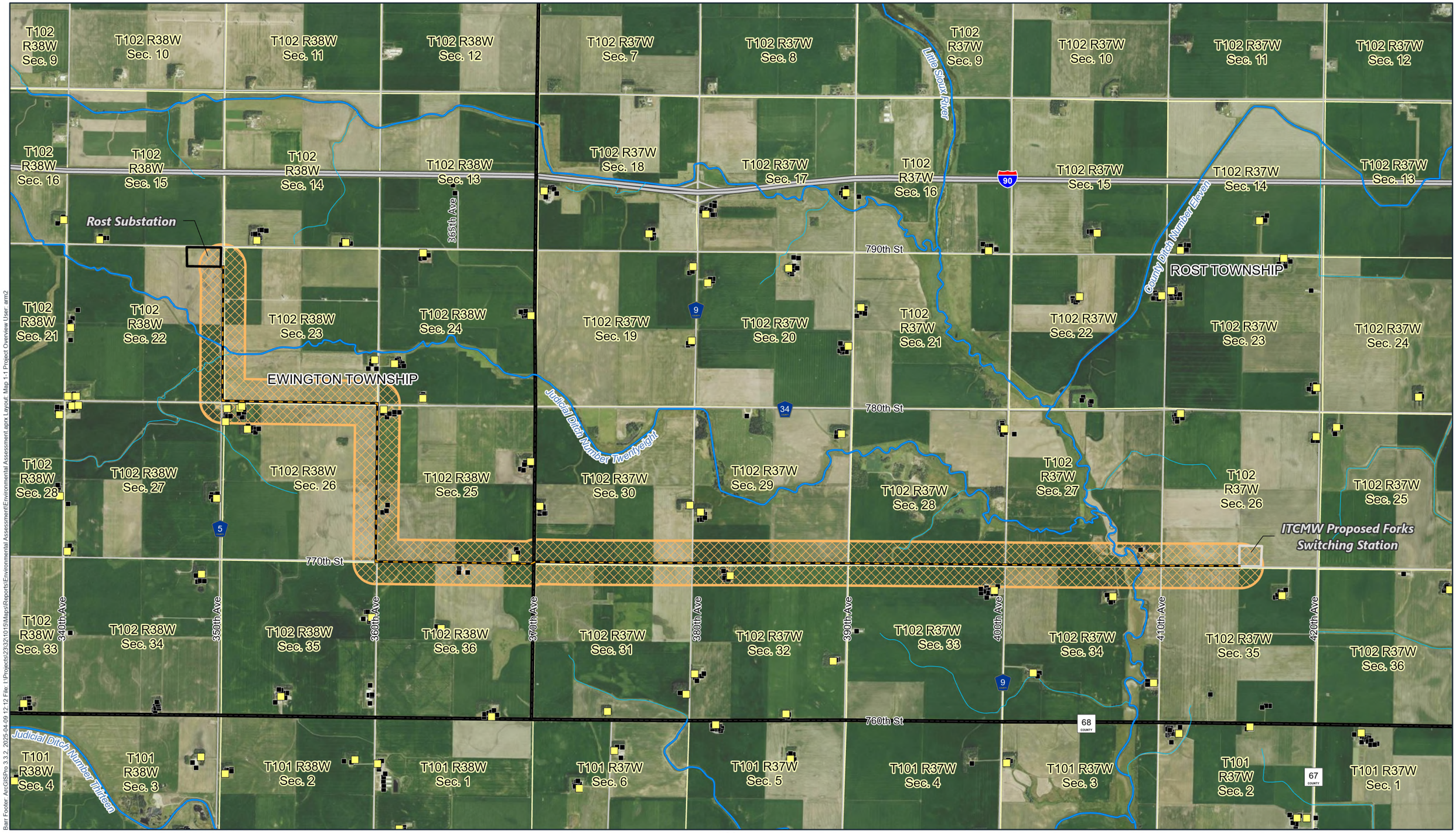
1.1 Purpose and Need

The project is needed to ensure long-term electrical reliability and resilience in the project area. A joint study between the applicant, Great River Energy, and Missouri River Energy Services (MRES) identified long-term reliability and load serving needs for the Worthington, Minnesota area. The project would, in conjunction with the MRES Lorraine Substation project in Worthington and the Great River Energy Rost Substation project and Rost to Lorraine 69 kV transmission line project, address system susceptibility to low voltage conditions when certain transmission facilities are out of service. The project would mitigate low voltage issues experienced by the existing system and help provide long-term reliability for the area, considering existing load and potential future load growth.

1.2 Project Description

The project includes constructing 8.5 miles of 161 kV transmission line in Ewington and Rost Townships, Jackson County, Minnesota. The project would start at the proposed new Rost Substation, near the intersection of County Road 5 and 790th Street. The Rost Substation was permitted and constructed separately by Great River Energy. The project will run south from the Rost substation along County Road 5 until turning east on 780th Street. It will run east for one mile, reaching 360th Avenue, and then turn south for another mile. Then the line will turn east on 770th Street for 5.5 miles until connecting to the new Forks Switching Station, which will be constructed, owned, and operated by the applicant as part of this project (Map 1-1).

The project requires a ROW of 100 feet, with 50 feet on either side of the transmission centerline. Where the project follows existing road (ROW, transmission line structures will be placed approximately 5 to 8 feet outside the road ROW.



Barr Foster ArcGISPro 3.3.2, 2025-04-09 12:12 File: I:\Projects\23\32\1015\Maps\Reports\Environmental Assessment\Environmental Assessment.aprx Layout: Map 1-1 Project Overview User: arm2

- Applicant's Proposed Alignment
- Route Width (Proposed Route)
- Interstate
- Roads
- Residence
- Out Building
- PWI
- NHD

0 3,000 6,000
Feet

Map 1-1

PROJECT OVERVIEW
Forks-Rost 161 kV Project

1.3 State of Minnesota's Role

The project requires a route permit from the Minnesota Public Utilities Commission (Commission) and approvals (e.g., permits, licenses) from other state and federal agencies with permitting authority for specific resources (e.g., the waters of Minnesota). A route permit supersedes and preempts zoning restrictions, building, and land-use regulations promulgated by local units of government (Minn. Statute 216E.10).

The applicant applied to the Commission for a project route permit on September 30, 2024. With this application, the Commission must determine the most appropriate route for the project and how best to mitigate potential impacts of the project.

To help the Commission with its decision-making and to ensure a fair and robust airing of the issues, the state of Minnesota has set out a process for the Commission to follow in making its decisions. This process requires: (1) the development of an EA and (2) public hearings before an administrative law judge. The goal of the EA is to describe the potential human and environmental impacts of the project ("the facts"); the goal of the hearings is to advocate, question, and debate what the Commission should decide about the project ("what the facts mean"). The entire record developed in this process—the EA and the report from the administrative law judge, including all public input and testimony—is considered by the Commission when it makes its decisions on the applicant's route permit application.

1.4 Organization of Environmental Assessment

This EA is based on the applicant's route permit application, public comments received during the scoping comment period for this EA, and input from the Commission. This EA addresses the matters identified in the project scoping decision (Appendix A), and is organized as outlined in Table 1-1.

Table 1-1 Environmental Assessment Organization Outline

Chapter Number	Chapter Name	Summary
	Summary	Provides a summary of the project – its potential impacts and possible mitigation measures
Chapter 1	Introduction	Provides an overview of the project need, the project itself, the state of Minnesota's role, and discusses the organization of the document.
Chapter 2	Regulatory Framework	Describes the regulatory framework associated with the project, including the state of Minnesota's route permitting processes, the environmental review process, and the permits and approvals that are be required for the project.
Chapter 3	Engineering, Design, and Construction	Describes the engineering, design, and construction of the project.
Chapter 4	Affected Environment, Impacts, and Mitigation Measures	Discusses the resources in the project area and the potential human and environmental impacts of the project. Identifies measures that could be implemented to avoid or mitigate impacts. Also included is a discussion of the potential cumulative effects of the project.
Chapter 5	Application of Routing Factors to the Project	Discusses the merits of the applicant's proposed route relative to the routing factors of Minnesota Rule 7850.4100.
Chapter 6	References	Provides references for resources used in the development of the EA.

1.5 Sources of Information

The primary EA information source is the route permit application submitted by the applicant and other publicly available data sources. Additional sources of information are indicated in Chapter 6. Data provided by the applicant and from state agencies during the preparation of the EA is also included.

A number of spatial data sources, which describe the resources in the project area, were used in preparing this EA (Appendix B). Spatial data from these sources can be imported into geographic information system (GIS) software, where the data can be analyzed and potential impacts of the project and routing alternatives quantified (e.g., acres of forested wetlands within the anticipated project ROW).

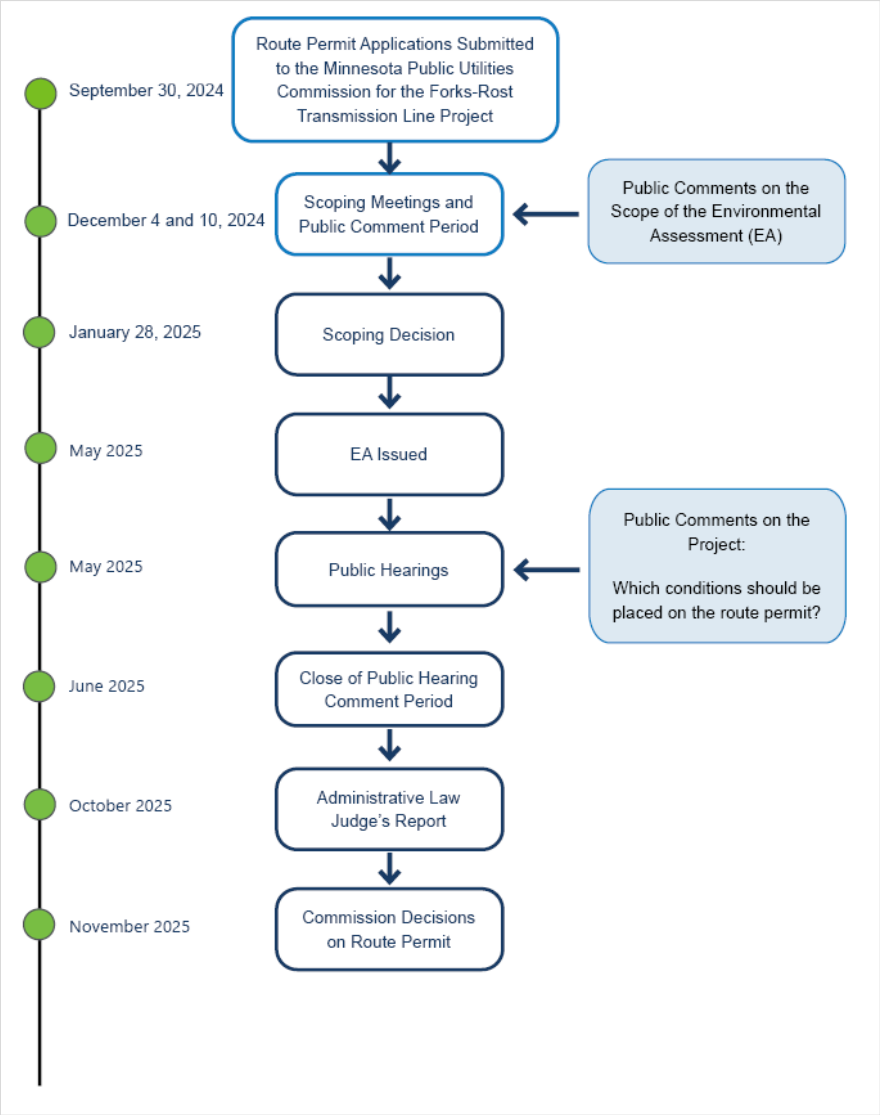
2 Regulatory Framework

This chapter describes the regulatory framework for the project. Department of Commerce, EERA staff is responsible for conducting the project's environmental review. The project will also require approvals from other state and federal agencies with permitting authority over related actions.

2.1 Route Permit

Construction of a high-voltage transmission line in Minnesota requires a route permit from the Commission (Minn. Statute 216E.03). The project, a single-circuit 161 kV transmission line, meets the definition of a high-voltage transmission line and associated facilities. The applicant filed a route permit application on September 30, 2024. The Commission accepted the application as complete on November 12, 2024. The Commission referred the application to the Office of Administrative Hearings and authorized public hearings and environmental review of the project (Figure 2-1).

Figure 2-1 Commission's Environmental Review and Permitting Process for the Project



2.1.1 Route Permit Criteria

The Commission is charged with selecting transmission line routes that minimize adverse human and environmental impacts while ensuring electric power system reliability and integrity. Route permits issued by the Commission include a permitted route and anticipated alignment, as well as conditions specifying construction, restoration and operation standards.

Minn. Statute 216E.03, identifies considerations that the Commission must take into account when designating transmission lines routes, including minimizing environmental impacts and minimizing human settlement and other land-use conflicts. Specifically, the Commission considers the following 14 factors when making a route permit decision (Minn. Rule 7850.4100):

A. Effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services.

B. Effects on public health and safety.

C. Effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining.

D. Effects on archaeological and historic resources.

E. Effects on the natural environment, including effects on air and water quality resources and flora and fauna.

F. Effects on rare and unique natural resources.

G. Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity.

H. Use or paralleling of existing ROW, survey lines, natural division lines, and agricultural field boundaries.

I. Use of existing large electric power-generating plant sites.

J. Use of existing transportation, pipeline, and electrical transmission systems or ROW.

K. Electrical systems reliability.

L. Costs of constructing, operating, and maintaining the facility which are dependent on design and route.

M. Adverse human and natural environmental effects which cannot be avoided.

N. Irreversible and irretrievable commitments of resources.

The Commission must make specific findings that it has considered locating a route for a new transmission line along an existing transmission line ROW or parallel to existing highway ROW and, to the extent these are not used for the route, the Commission must state the reasons why (Minn. Statute 216E.03, Subd. 7). The Commission is charged with making a final decision on a route permit within six months after finding the route permit application complete. The Commission may extend this time limit for up to three months for just cause or upon agreement of the applicants. Once a route permit is issued by

the Commission, the applicant could exercise the power of eminent domain to acquire land for the project if deemed necessary (see Chapter 3.3.1 for additional information regarding ROW acquisition).

2.2 Environmental Review

MEPA requires that environmental review be conducted for major governmental actions with the potential to create significant environmental impacts (Minn. Statute 116D.04). For this project, the environmental review is an EA. Department EERA staff is responsible for preparing the EA on behalf of the Commission.

An EA describes and analyzes the potential human and environmental impacts of a project and possible mitigation measures. An EA is intended to facilitate informed decision-making by the Commission and other entities with regulatory authority over a project. It also assists citizens in providing guidance to decision-makers regarding the project.

2.3 Scoping

The first step in preparing an EA is scoping. The purpose of scoping is to provide citizens, local governments, tribal governments, and agencies an opportunity to focus the EA on those issues and mitigation measures that are relevant to the proposed project.

EERA and Commission staff held two public information and scoping meetings to provide information about the permitting process and the project, answer questions, and gather input on topics to study in the EA. The first meeting was held in person on December 4, 2024, at the Lakefield Community Center, in Lakefield, Minnesota. Approximately 20 members of the public attended this meeting. The second meeting was held virtually on December 10, 2024. One member of the public attended the virtual meeting.

A written comment period ending on December 24, 2024, provided the public an opportunity to submit comments on potential impacts and mitigation measures for consideration in the scope of the EA. During the written comment period, one state agency, the DNR, submitted comments. The DNR comments included mitigation measures suggested for study in the EA. No routing alternatives were suggested during scoping.

EERA staff provided a summary of the scoping process and recommendations to the Commission on January 8, 2025. The Commission concurred with EERA's recommendations on January 21, 2025, and authorized EERA to include only the route proposed by applicant in the scoping decision for the EA. The Department issued the scoping decision for the EA on February 10, 2025, (Appendix A), identifying the potential impacts and route to be evaluated in this EA.

2.4 Public Hearing

Upon completion of the EA, a public hearing will be held in the project area. The hearing will be presided over by an ALJ from the OAH. At the public hearing, citizens will have the opportunity to submit comments, present evidence, and ask questions. Citizens can advocate for conditions to be included in the route permit. Members of the public can also comment on the EA regarding any information that might be inaccurate or missing in the document. EERA staff may respond to comments on the EA received during the hearing comment period, but staff is not required to revise or supplement the EA document.

After the public hearing, the ALJ will submit a report to the Commission with findings of facts, conclusions of law, and recommendations regarding a route permit for the project. Upon completion of the

environmental review and hearing process, the record will be presented to the Commission for final decisions.

2.5 Commission Decision

After considering the entire record, including the EA, input received during the public hearings, and the ALJ's findings and recommendations, the Commission will determine whether to grant the project a route permit. The route permits include a permitted route and an anticipated alignment, as well as conditions specifying construction and operating standards. Route permits also typically include mitigation plans and project-specific mitigation measures. Decisions by the Commission on the route permit are anticipated in the fourth quarter of 2025.

2.6 Other Permits and Approvals

A route permit from the Commission is the only state permit required for routing the project. A route permit supersedes local planning and zoning and binds state agencies (Minn. Statute 216E.10); therefore, state agencies are required to engage in the Commission's permitting process to aid in the Commission's decision-making and to indicate routes that are not permittable.

However, several federal, state, and local permits may be required for construction and operation of the project. All permits subsequent to the issuance of a route permit and necessary for the project must be obtained by the applicant. The information in this EA may be used by the subsequent permitting agencies as part of their environmental resource impact evaluation. Table 2-1 lists permits and approvals that could be required for the project, depending on the final design.

Table 2-1 Summary of Possible Permits, Licenses, Approvals, and Consultations

Permit	Jurisdiction
Federal	
Section 404 Clean Water Act – Dredge and Fill	U.S. Army Corps of Engineers – St. Paul District
Section 10 Clean Water Act	
Section 106 of the National Historic Preservation Act	State Historic Preservation Office
Bald and Golden Eagle Protection Act Consultation	U.S. Fish and Wildlife Service
Migratory Bird Treaty Act Consultation	
Section 7 Endangered Species Act Consultation	
Part 7460 Review	Federal Aviation Administration
State	
Route Permit	Minnesota Public Utilities
National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit	Minnesota Pollution Control Agency
License to Cross Public Lands	Minnesota Department of Natural Resources
State Threatened and Endangered Species Consultation	
National Historic Preservation Act Section 106 consultation; Minnesota Field Archaeology Act; Minnesota Historic Sites Act	Minnesota State Historic Preservation Office
Utility Permit	Minnesota Department of Transportation
Driveway Access	
Oversize/Overweight Permit	
Wetland Conservation Act	Minnesota Board of Water and Soil Resources and Jackson County Soil and Water Conservation District
Local	
Road Crossings/ ROW Permits	Jackson County, Ewington Township, Rost Township
Oversize/Overweight Permits	
Driveway/Access Permits	
Utility Permits	

2.6.1 Federal Approvals

The United States Army Corps of Engineers (USACE) regulates potential impacts to waters of the United States. Dredged or fill material, including material that moves from construction sites into these waters, could impact water quality. The USACE requires permits for projects that may cause such impacts. The USACE is also charged with coordinating with the State Historic Preservation Office (SHPO) and Native American tribes regarding potential impacts to significant cultural resources pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The U.S. Fish and Wildlife Service (USFWS) requires permits for the taking of threatened or endangered species, bald and golden eagles, and native migratory birds. The USFWS encourages consultation with

project proposers to ascertain a project's potential to impact these species and to identify general mitigation measures for the project.

The Federal Aviation Administration (FAA) regulates civil aviation, including the airspace used for aviation. The FAA requires permits for tall structures, including transmission line structures, that could adversely impact aviation.

2.6.2 State of Minnesota Approvals

The Minnesota SHPO is charged with preserving and protecting the state's cultural resources. SHPO consults with project proposers and state agencies to identify cultural resources (e.g., through surveys) and to avoid and minimize impacts to these resources.

The DNR regulates potential impacts to Minnesota's public lands and waters. The DNR requires a license to cross public lands and waters; licenses may require mitigation measures. Similar to the USFWS, the DNR also encourages consultation with project proposers to ascertain a project's potential to impact state-listed threatened and endangered species and possible mitigation measures.

A general NPDES / Sanitary Disposal System (SDS) construction stormwater permit from the Minnesota Pollution Control Agency (MPCA) is required for stormwater discharges from construction sites. A permit is required if a project disturbs 1 acre or more of land. The general NPDES/SDS permit requires (1) use of best management practices (BMPs), (2) a stormwater pollution prevention plan, and (3) adequate stormwater treatment capacity once the project is constructed. The NPDES/SDS permit intends that state water quality standards are not compromised.

The Minnesota Board of Water and Soil Resources (BWSR) oversees implementation of Minnesota's Wetland Conservation Act (WCA). The WCA is implemented by local units of government (LGUs). For linear projects that cross multiple LGUs, BWSR typically coordinates the review of potential wetland impacts among the affected LGUs. The WCA requires anyone proposing to impact a wetland to (1) try to avoid the impact, (2) try to minimize any unavoidable impacts, and (3) replace any lost wetland functions.

A permit from the Minnesota Department of Transportation (MnDOT) is required for transmission lines that are adjacent to or cross over Minnesota trunk highway ROW. MnDOT's utility accommodation policy generally allows utilities to occupy portions of highway ROW where such occupation does not put the safety of the traveling public or highway workers at risk or unduly impair the public's investment in the transportation system.

2.6.3 Local Approvals

The Commission's route permit supersedes local planning and zoning regulations and ordinances. However, the applicants must obtain all local approvals necessary for the project that are not preempted by the Commission's route permit, such as approvals for the safe use of local roads.

2.6.4 Other Approvals

Other approvals and/or crossing agreements may be required where project facilities cross an existing utility, such as a pipeline, solar facility, or railway. The need for such approvals would be determined after the final route is selected, and the applicant has indicated that these approvals would be obtained after a route permit has been issued by the Commission.

2.6.5 Electric Safety and Reliability Costs

The project must meet the requirements of the National Electrical Safety Code (NESC). Utilities must comply with the most recent edition of the NESC, as published by the Institute of Electrical and Electronics Engineers, Inc., and approved by the American National Standards Institute, when constructing new facilities or upgrading existing facilities (Minn. Statute 326B.35).

The NESC is designed to protect human health and the environment. It also ensures that the transmission lines and all associated structures are built from high-quality materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided that routine maintenance is performed.

Utilities must also comply with North American Electric Reliability Corporation (NERC) standards. NERC standards define the reliability requirements for planning and operating the electrical transmission grid in North America.

3 Overview of Project

The applicant is proposing to construct an approximately 8.5-mile long, 161 kV transmission line in Minnesota. The project would start at the new Rost Substation, and after generally travelling east it would end at the new Forks Switching Station. The project is within Ewington and Rost Townships, Jackson County, Minnesota.

This chapter describes the transmission line structures and components that could be used for the project and the project's associated facilities. Additionally, this chapter discusses how the project would be constructed and its anticipated costs and schedule. Several terms used throughout this Chapter and the remaining document have specific meanings and are defined here for clarity.

- **ROW** means the land interest required within a route for the construction, maintenance, and operation of a high-voltage transmission line (Minn. Rule 7850.1000).

- **ROW sharing** means that the new transmission line would be co-located with an existing transmission line or other existing infrastructure ROW (e.g., transportation corridors, pipelines, etc.) to partially share that existing ROW and lessen the overall easement width required from landowners.

3.1 Engineering and Design

Design of transmission lines and associated facilities occurs through multiple stages including identification of existing rights-of-way; transmission line design; ROW acquisition; and geotechnical investigations. The applicant has proposed a single circuit design, using aluminum conductor steel reinforced conductor line, and incorporating two structure types for the project to allow for multiple configurations (Table 3-1). This chapter describes the transmission lines, structures, and configurations that may be used for the project.

Table 3-1 Types of 161 kV Structures Proposed for the Project

Structure Type	Material	Approximate Height Above Ground (feet)	Foundation Diameter (feet)	Span Between Distances (feet)
Monopole	Steel	80 – 120	3 – 5	600 – 800
Monopole (Deadends and Tangents)	Steel	80 – 120	10 – 12	600 – 800

Note: The values in the table are typical values expected for the majority structures based on similar facilities. Actual values may vary.

3.1.1 Transmission Lines

Transmission line circuits consist of three phases, each phase at the end of a separate insulator and physically supported by a structure that holds it above ground. A phase consists of one or more conductors: single, double, or bundled. A typical conductor is a cable consisting of aluminum wires configured in strands around a core of steel wires. There may also be shield wires strung above the phases to prevent damage from lightning strikes. The majority of the project would consist of a single circuit, 161 kV line with steel monopole structures spaced approximately 600 to 800 feet apart.

3.1.2 Structures

The transmission line will be constructed using single circuit, braced post monopole steel structures. The use of monopoles minimizes the project footprint and ROW requirements. Proposed structure designs are shown in Figure 3-2. Transmission structures typically range in height from 80 to 120 feet above ground, depending upon the terrain and environmental constraints. The average diameter of the steel structures at ground level is 7.5 feet.

Some project structures may be installed using a vibratory caisson foundation. Vibratory caissons are a foundation type that can be used in place of typically installed direct embed structure foundations. A vibratory caisson is a straight steel pole section with no bottom that is driven into the ground with a vibratory hammer. The caisson is attached to the hammer, lifted into place, and dropped until it contacts the ground. Then, the hammer vibrates at a high frequency while applying a downward force. This foundation installation method does not produce spoils as would a drilled pier or other traditional foundation type.

A dead-end structure is used to change direction and/or wire tension on a transmission line. Dead-end structures are also used as “storm structures” to limit the number of structures damaged by a cascading effect due to higher line tensions when a pole is knocked down by a storm. Dead-end structures are depicted in Figure 3-1 and would be steel on concrete foundations.

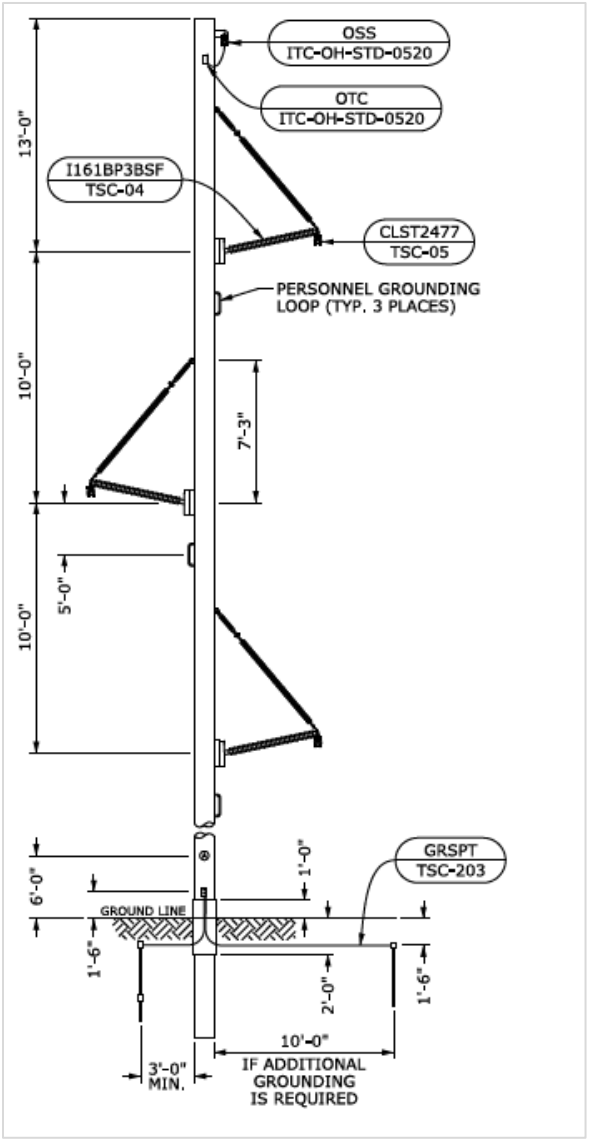


Figure 3-2 Typical Tangent Transmission Structure

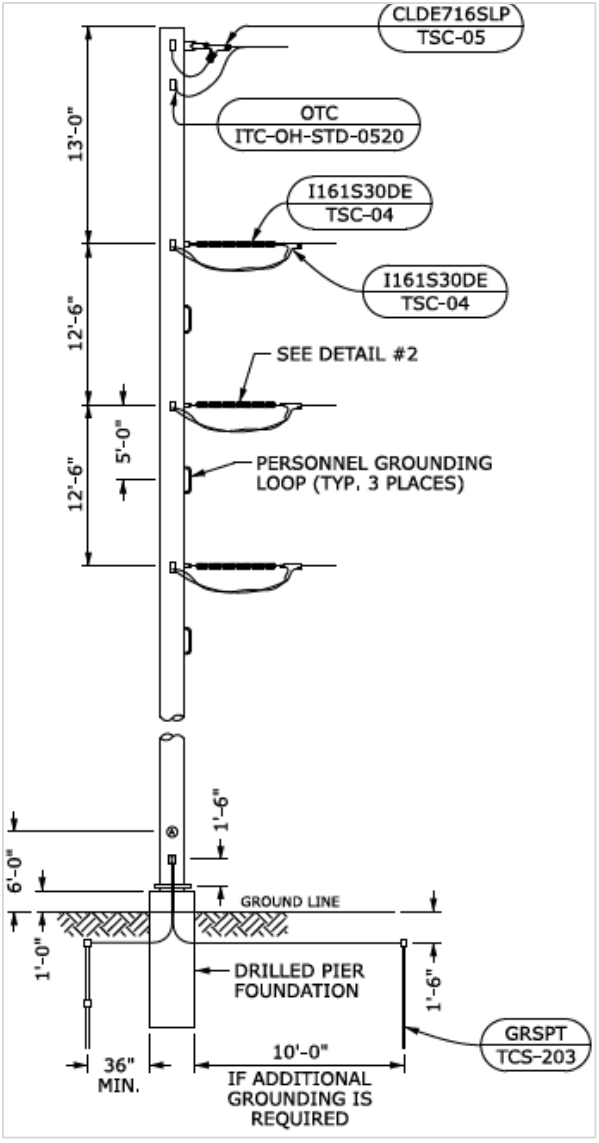


Figure 3-1 Typical Dead-end Transmission Structure

3.1.3 Conductors

The single circuit structures will have three single conductor phase wires and one shield wire. It is anticipated that the phrase wires will be “T2 Grosbeak” which consists of two aluminum conductor steel reinforced “Grosbeak” conductors in a twisted pair configuration, or a conductor with similar electrical capacity and mechanical strength properties. The shield wire will be a 48-count optical ground wire.

3.1.4 Associated Facilities

Associated facilities proposed for the project include the new Forks Switching Station. The new Forks Switching Station will be equipped with SF6 gas circuit breakers with current sensing transformers, voltage sensing and station service type transformers, and a control enclosure which will house required relaying equipment and supervisory control and data acquisition (SCADA) equipment. This equipment is

designed to protect human health as well as the other equipment on the transmission system by isolating the fault and de-energizing a transmission line should any unsafe line faults occur on it, while keeping the other transmission lines connected to the Forks Switching Station in-service. Figure 3-3 depicts the proposed location for the Forks Switching Station.

The Forks Switching Station will initially have three 161 kV lines connected to it. In addition to the new Forks – Rost 161 kV line that will be constructed by this project, the existing ITC Midwest Lakefield Junction – Dickinson County 161 kV line will tie into the Forks Switching Station creating the Forks – Lakefield Junction and Dickinson County – Forks 161 kV lines.

Figure 3-3 Proposed Forks Switching Station Location

(Looking north from 770th Street in Ewington Township in Jackson County)

3.2 Route Width, Right-of-Way, and Anticipated Alignment

When the Commission issues a route permit, it approves a route, a route width, and an anticipated alignment within that route width. The Commission may include conditions in a route permit. These conditions could address the route width or anticipated alignment in a specific area of the project, for

example, requiring the alignment of a specific portion of the route to be north rather than south of a road or requiring that the route width be narrower in a certain area.

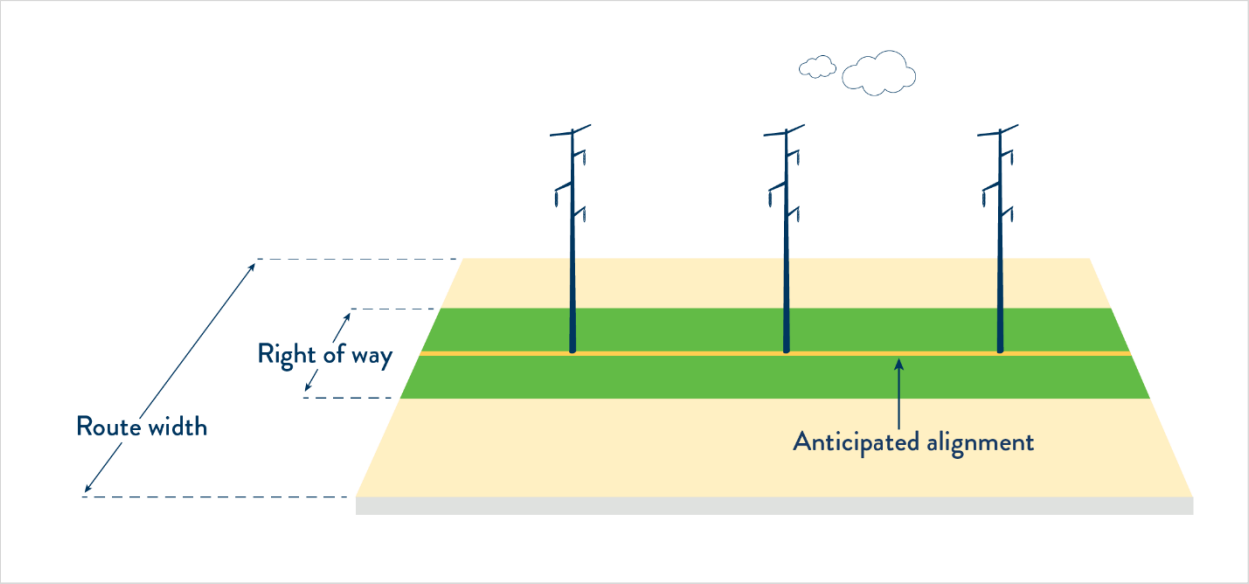
3.2.1 Route Width

The route width is typically larger than the actual ROW needed for the transmission line (Figure 3-4). This additional width provides flexibility in constructing the line, yet is not of such extent that the placement of the line is undetermined. The route width allows the applicant to work with landowners to address their concerns and to address engineering concerns that may arise after a permit is issued. The route width, in combination with the anticipated alignment, is intended to balance flexibility and predictability.

The transmission line must be constructed within the route width designated by the Commission unless, after permit issuance, permission to proceed outside of the route width is sought by the applicant and approved by the Commission.

In general, the applicant is requesting a route width of 750 feet on either side of the proposed transmission line centerline for a total of a 1,500-foot route width. The applicant is requesting a route width that is wide enough to provide flexibility to make alignment adjustments during the final design to work with landowners, to avoid sensitive natural resources, and to manage construction constraints as needed.

Figure 3-4 Route Width, Right-of-Way, and Anticipated Alignment Schematic



3.2.2 Right-of-Way

The right-of-way (ROW) is the specific area required for the safe construction and operation of the transmission line, where such safety is defined by the NESC and the NERC reliability standards. The ROW must be within the designated route and is the area for which the applicant obtains rights from private landowners to construct, operate, and maintain the line.

Once the Commission issues a route permit, the applicant will conduct detailed survey and engineering work. Additionally, the applicant will contact landowners to gather information about their property and

concerns and to discuss how the transmission line ROW might best proceed across the property. A transmission line ROW across private property is typically obtained by an easement agreement between the applicant and landowners.

The applicant has indicated that the project requires a permanent 100-foot-wide ROW (50 feet on either side of the centerline). However, additional temporary workspace beyond the 100-foot-wide ROW may be required for construction at certain locations, such as at road or railroad intersections, utility crossings, along steep slopes, and at stringing locations. In addition, there will be temporary staging of materials such as structures and hardware along the ROW prior to construction.

3.2.3 Anticipated Alignment

The anticipated alignment is the anticipated placement of the transmission line within the route width and ROW; in essence, where the transmission line is anticipated to be built.

After coordinating with landowners and completing detailed engineering plans, the applicant would establish the final project alignment and designate pole placements. These final plans, known as “plans and profiles,” must be provided to the Commission so that they can confirm that the applicant’s plans are consistent with the route permit and all permit conditions prior to construction of the project. This confirmation provides the basis that the built project alignment is consistent with the anticipated alignment in the Commission’s permit.

3.3 Construction and Maintenance

Construction of the project would not begin until all necessary federal, state, and local approvals have been obtained, easements have been acquired for ROW, and final plans and profiles have been approved by the Commission. The precise timing and order of ROW clearing and construction along the line will depend on the receipt of all necessary approvals, landowner agreements, and available workforce.

3.3.1 Right-of-Way Acquisition

After a route permit is issued, the applicant will evaluate what land rights are needed for the project. Then, the applicant and its agents will work directly with individual landowners to acquire the necessary easements for the project. While easement negotiations will not formally begin until after the Commission approves the route, the applicant will continue to engage with landowners through the permitting process to answer any questions they may have regarding the easement process or the project.

New easements will be needed for the 161 kV transmission line. The applicant will work with individual landowners to negotiate the necessary easements. At a minimum, the project would obtain a permanent ROW of 100 feet for the 161 kV transmission line system. Where the transmission line parallels roads, the transmission line structures are typically set back approximately 5 to 8 feet from the road ROW.

Land for the Forks Switching Station will be purchased in fee by the applicant. The final area and design of the station will be determined after approval of the route permit, but the anticipated dimensions are approximately 375 feet by 325 feet (2.8 acres).

In addition to permanent easements needed for the construction of the line, agreements may be obtained from certain landowners for temporary construction or staging areas for the storage of poles, vehicles, or other related items.

3.3.2 Right-of-Way Access

The applicant will evaluate construction access opportunities by identifying existing easements, roads, and/or trails adjacent to the permitted route. Where feasible, the applicant indicated that they will limit access and construction activities to the ROW acquired for the project to minimize impacts to landowners and adjacent properties. In some situations, private field roads, trails, or farm fields may be used to gain access to construction areas. Where no current access is available, where existing access is inadequate, or when access requires incorporation of areas outside the ROW, permission from landowners will be obtained prior to using any of these areas to access the ROW for construction.

Improvements to existing access or construction of new access could be required to accommodate construction equipment. Where applicable, the applicant will obtain permits for new access from local road authorities. The applicant will work with appropriate road authorities to agree on proper maintenance of roadways traversed by construction equipment.

3.3.3 Equipment and Staging

Construction activities will require the use of many different types of equipment, including, but not limited to, tree removal equipment, mowers, cranes, backhoes, line trucks, drill rigs, dump trucks, front-end loaders, bulldozers, flatbed trucks, concrete trucks, cranes, and various trailers for hauling equipment. Excavation equipment is often set on wheel or track-driven vehicles. Small grading equipment will also be used at the switching station. Where possible, construction crews will use equipment that minimizes land impacts.

Construction staging areas will be required for the project and will be identified after a route is permitted. To the extent practicable, staging areas will be located on previously disturbed sites and will be used as receiving locations for delivery and storage of construction materials and equipment until they are needed for the project. Preferable staging areas will be large enough to lay down material and pre-assemble certain structural components or hardware. For staging areas outside the project ROW, rights to use these areas will be obtained individually from the landowners.

3.3.4 Construction Process

Construction for the project will begin once all required approvals are obtained, property and ROWs are acquired, and final design is complete. Construction of an overhead transmission line requires several different activities at any given location. Major construction activities and the approximate construction sequence are described below. Construction will follow the applicant's standard construction and mitigation best practices. Construction typically occurs as follows:

- Surveying and staking the ROW
- ROW clearing and preparation
- Grading/filling, as needed
- Installing foundations
- Installing poles and related equipment
- Stringing conductors

- Installing any require aerial markers

After land rights have been secured and prior to the start of construction activities, landowners will be notified of the project schedule and other related construction activities.

3.3.4.1 Staking and ROW Preparation

The first step of the transmission line construction activities involves survey staking the transmission line centerline and/or pole locations, followed by removal of trees and other vegetation from the ROW. The applicant will use an integrated vegetation management plan that incorporates a wire/border zone practice for ROW clearing and maintenance. As a general practice, low-growing brush or tree species are allowable at the outer limits (the “border zone”) of the easement area. Taller tree species that endanger the safe and reliable operation of the transmission facility will be removed.

In developed areas and to the extent practical, existing low-growing vegetation that will not pose a threat to the transmission facility or impede construction or maintenance may remain in the border zone, as agreed to during easement negotiations. The area below the outer conductors plus 10 to 15 feet (the “wire zone” or “clear zone”) is cleared of all shrubs and trees to provide maintenance trucks access to the line and to be sure that vegetation does not interfere with the safe operation of the transmission line. Very little tree trimming, or removal is anticipated due to the project’s location within agricultural land.

All materials resulting from clearing operations would either be chipped on site and spread on the ROW, stacked in the ROW for use by the property owner, or removed and disposed of otherwise as agreed to with the property owner during easement negotiations or in accordance with agency requirements.

The final survey staking of pole locations may occur after the vegetation has been removed and just prior to structure installation.

3.3.4.2 Structure Installation

Before the structures are installed, existing underground utilities are identified along the route through the required Gopher State One Call process. If temporary removal or relocation of fences is necessary, installation of temporary or permanent gates will be coordinated with the landowner. Depending on the timing of construction, the ROW agent may work with the property owner for early harvest of crops, where possible, with compensation to be paid for any actual crop losses. During the construction process, it may be necessary for the property owner to remove or relocate equipment and livestock from the ROW. Compensation related to these activities would be discussed with the landowner during easement negotiations.

Transmission line structures are generally designed for installation at existing grades. Therefore, structure sites would not be graded or leveled unless it is necessary to provide a reasonably level area for construction access and activities. For example, if vehicles or installation equipment cannot safely access or perform construction operations properly near the structure, minor grading of the immediate terrain may be necessary. The applicant will employ standard construction and mitigation practices as well as industry-specific BMPs. BMPs address ROW clearing, erecting transmission line structures, and stringing transmission lines. BMPs for each specific project are based on the proposed schedules for activities, prohibitions, maintenance guidelines, inspection procedures, and other practices. In some circumstances, these activities, such as schedules, are modified to incorporate BMP installation that will assist in minimizing impacts to sensitive environments. Any contractors involved in the construction of the transmission line are required to adhere to these BMPs.

The proposed structures are steel poles, which may be directly embedded, installed on a vibratory caisson foundation, or set on a concrete foundation. The concrete foundations are approximately 3 to 12 feet in diameter and generally are exposed 1 foot above the existing ground. Concrete trucks are used to bring the concrete in from a local concrete batch plant.

After a direct-embedded pole is set into the hole, the void space is backfilled with crushed rock. Based on typical soil types in Minnesota, it is anticipated that the 80-foot above ground pole would be buried approximately 15 feet into the ground. In poor soil conditions (e.g., peat, marl, soft clay, or loose sand) a galvanized steel culvert is sometimes installed vertically with the structure set inside.

3.3.4.3 Conductor Stringing

After a number of structures have been erected, the project begins to install the conductors and shield wires by establishing stringing setup areas within the ROW. These stringing setup areas are located at dead-end structures along a project route and occupy approximately 15,000 square feet (0.34 acres) for linear segments of the line and approximately 30,000 square feet (0.69 acres) for angled segments of the line. Conductor stringing operations require brief access to each structure to secure the conductor wire and shield wire once the final sag is established. Temporary guard or clearance structures are installed, as needed, over existing distribution or communication lines, streets, roads, highways, railways, or other obstructions after any necessary notifications are made or permits obtained. This helps make sure that conductors will not obstruct traffic or contact existing energized conductors or other cables while protecting the conductors from damage.

3.3.4.4 Switching Station

The final switching station fence line includes an area of approximately 2.8 acres. The site would be surveyed for initial grading work. A Gopher State One-Call utility location would be completed prior to beginning work. Once the initial grading is completed, the site will be re-surveyed to establish equipment and structure locations.

The footprint for the switching station typically includes installing a layer of sand and a layer of compacted class 5 aggregate as a base material. Excavation or drilling would be completed as necessary for concrete foundations and piers to support the station equipment, and concrete will be poured for the foundations or piers. Buildings, structural rigid metal conductors called buswork, breakers, fencing, necessary switches and control equipment, and the transmission line structures for the new 161 kV line will be erected. Once the majority of the equipment has been erected, the station footprint will be topped with 4 to 6 inches of crushed rock.

A short outage will be needed to connect the existing 161 kV line to the new Forks Switching Station. Any and all outages will be coordinated through MISO to mitigate potential impacts to load or generation. MISO ensures that no other planned outages during the same time frame will negatively impact system reliability, evaluating and planning of switching within the transmission system to enhance reliability of the system, and if necessary, scheduling the outage during low demand periods or low generation output periods.

All construction will be completed in accordance with state, NESC, and the applicant's construction standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, erection of power poles (to connect the line to the substation) and stringing of transmission line conductors.

3.3.5 Restoration and Cleanup

Disturbed areas will be restored to their original condition to the maximum extent practicable, or as negotiated with the landowner. Post-construction reclamation activities will include removing and disposing of debris, removing all temporary facilities (including staging and laydown areas), installing appropriate erosion and sediment control BMPs, reseeding areas disturbed by construction activities with vegetation similar to that which was removed with a seed mixture certified as free of noxious or invasive weeds, and restoring the areas to their original condition to the extent possible. In cases where soil compaction has occurred, the construction crew or a restoration contractor will use various methods to alleviate the compaction, as coordinated with affected landowners.

The applicant will contact landowners after construction is complete to determine if the clean-up measures are to their satisfaction and if any other damage may have occurred. If damage has occurred to crops, fences, or the property, the applicant will compensate the landowner. In some cases, an outside contractor may be hired to restore the damaged property as near as possible to its original condition.

3.3.6 Operations and Maintenance Procedures

The project will be designed and maintained in accordance with the NESC and the applicant's standards. In general, transmission lines boast a high level of reliability and lengthy service life, often spanning decades, and seldom undergo complete retirement. Transmission lines have very few mechanical elements, are designed to function for decades, and are constructed to withstand weather extremes typical of the region.

The applicant will be responsible for the operation and maintenance of the project, which will include performing annual inspections and addressing and correcting any deficiencies identified during these examinations. Applicant inspections will be limited to the ROW and to areas where obstructions or terrain may require off ROW access. The ROW will be managed by the applicant or its contractors to control encroachment that may interfere with transmission line operation, including vegetation management activities. Vegetation management activities within the ROW may include mechanical clearing, hand clearing, and herbicide application.

3.4 Project Costs

Total estimated costs to construct the project are approximately $13.5 to $18.8 million, based on 2023 dollars (Table 3-2).

Table 3-2 Estimated Project Construction Costs

Project Component	Lower-Range ($Millions)	Mid-Range ($Millions)	Upper-Range ($Millions)
Transmission Line	$8.2	$9.5	$10.7
Switching Station	$5.3	$6.2	$8.1
Total	$13.5	$15.7	$18.8

3.5 Project Schedule

It is anticipated that the Commission will make decisions on the applicant's route permit application in November 2025. The applicant anticipates that project construction would commence in April 2026. The start of construction is dependent on the receipt of all required permits and approvals. The applicant anticipates that the project would be energized in December 2026.

4 Affected Environment, Potential Impacts, and Mitigation Measures

This chapter provides an overview of human and environmental resources that may be affected by the project. It discusses potential project impacts on these resources and measures that could be used to avoid, minimize, and mitigate these impacts.

Project construction and operation may impact certain human and environmental resources. Some impacts will be short-term and similar to those of any large construction project (e.g., noise, dust, soil disturbance). Impacts may be mitigated by measures common to most construction projects; for example, the use of erosion-control blankets and silt fencing.

Other impacts will exist for the life of the project and may include aesthetic impacts, impacts on agriculture, and impacts on natural resources. Long-term impacts are generally not well mitigated by construction measures, meaning these impacts do not flow from how the project is constructed but rather where it is located and its design. Long-term impacts can be mitigated through prudent project design. Detailed tables summarizing data used for impact analyses are included in Appendix C.

4.1 Describing Potential Impacts and Mitigation

This chapter analyzes potential human and environmental impacts of the project on various resources. Understanding these impacts involves contextualizing their duration, size, intensity, and location. This form of contextual information serves as the basis for assessing overall impact of the project on resources.

- **Duration**—Impacts vary in length of time. Short-term impacts are temporary and generally associated with construction. Long-term impacts are associated with operation and usually end with decommissioning and reclamation. Permanent impacts extend beyond the decommissioning stage.
- **Size**—Impacts vary in size. To the extent possible, potential impacts are described quantitatively, for example, the number of impacted acres or the percentage of affected individuals in a population.
- **Intensity**—Impacts vary in the severity to which a resource is affected, in whatever context that impact occurs.
- **Location**—Impacts are location dependent. For example, common resources in one location might be uncommon in another.

Instead of assigning values based on resource significance, qualitative descriptors are employed. These descriptors provide a standardized language for comparing impact levels and characteristics of the proposed route. This approach offers the reader a clear, common understanding of potential route impacts. For this work, the qualitative descriptors are as follows:

- **Minimal**—Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts may, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short term.

- **Moderate**—Moderate impacts alter an existing resource condition or function and are generally noticeable or predictable for the average observer. Effects may be spread out over a large area, making them difficult to observe, but can be estimated by modeling or other means. Moderate impacts may be long term or permanent to common resources but are generally short- to long-term for rare and unique resources.

- **Significant**—Significant impacts alter an existing resource condition or function to the extent that the resource is severely impaired or cannot function. Significant impacts are likely noticeable or predictable for the average observer. Effects may be spread out over a large area making them difficult to observe but can be estimated by modeling. Significant impacts can be of any duration and may affect common and rare and unique resources.

This EA also discusses ways to avoid, minimize, or mitigate specific impacts. These actions are collectively referred to as mitigation.

- **Avoid**—Avoiding an impact means that the impact is eliminated altogether by moving or not undertaking parts or all of a project.

- **Minimize**—Minimizing an impact means to limit its intensity by reducing the project size or moving a portion of the project from a given location.

- **Mitigate**—Impacts that cannot be avoided or minimized could be mitigated. Impacts can be mitigated by repairing, rehabilitating, or restoring the affected environment, or compensating for it by replacing or providing a substitute resource elsewhere.

4.1.1 Regions of Influence

Potential impacts to human and environmental resources are analyzed in this EA within specific regions of influence (ROI). The ROI for each resource is the geographic area within which the project may exert some influence. It is used in the EA as the basis for assessing potential impacts to each resource as a result of the project. Regions of influence vary with the resource being analyzed and potential impact (Table 4-1). In this EA, the following ROI are used:

- **ROW**. At a minimum, the project will require a distance of 50 feet on each side of the anticipated alignment (100 feet total). ROW is used as the ROI for analyzing potential displacement impacts and impacts to certain elements of land-based economies, the natural environment, and rare and unique natural species.

- **Route Width**. The route width for the project corresponds generally to a distance of 750 feet on each side of the anticipated alignment (1,500 feet total). The route width is used as the ROI for analyzing potential impacts on archaeological and historic resources, public health and safety, noise, and geology.

- **One thousand feet**. A distance of 1,000 feet (2,000 feet total) from the anticipated alignment for the project is used as the ROI for analyzing potential aesthetic and property value impacts, understanding the number of residences in proximity to the project, as well as impacts to certain elements of transportation and public services, and zoning and land use compatibility. Impacts may extend outside of the 1,000-foot distance but are anticipated to diminish relatively quickly such that potential impacts outside of this distance would be minimal.

- **One mile**. A distance of 1 mile (2 miles total) from the project is used as the ROI for archaeological and historic resources, rare and unique species, and airports and airstrips.
- **Project Area**. The project area, defined generally as the civil townships through which the project passes, is used as the ROI for analyzing potential impacts on cultural values, socioeconomics and environmental justice, emergency services, greenhouse gases, climate resilience, air quality, tourism, and recreation. These are resources for which impacts may extend throughout communities in the project area.

Table 4-1 Regions of Influence

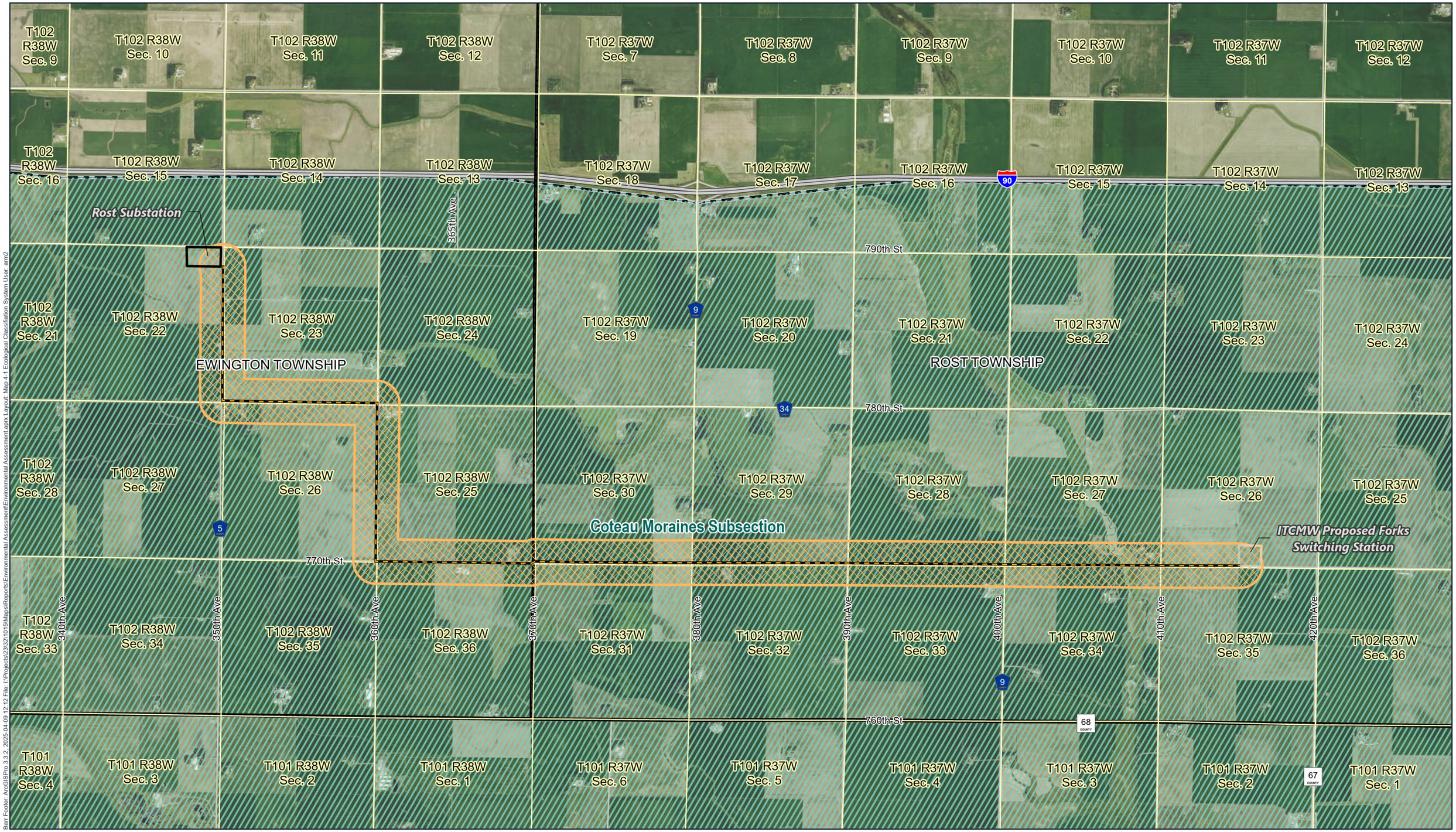
Type of Resource	Specific Resource/Potential Impact to Resource	Region of Influence (ROI)
Human Settlement	Displacement	ROW
Human Settlement	Aesthetics, Property Values, Electronic Interference, Noise, Zoning and Land Use Compatibility	1,000 feet
Human Settlement	Cultural Values, Socioeconomics/EJC	Project Area
Transportation and Public Services	Roadways/Railways, Public Utilities	1,000 feet
Transportation and Public Services	Emergency Services	Project Area
Transportation and Public Services	Airports	1 Mile
Public Health and Safety	Electric and Magnetic Fields, Implantable Medical Devices, Stray Voltage, Induced Voltage	Route Width
Climate Change	Greenhouse Gases, Climate Resilience	Project Area
Air Quality	Air Quality	Project Area
Land-Based Economies	Agriculture, Forestry, Mining	ROW
Land-Based Economies	Tourism and Recreation	Project Area
Archaeological and Historic Resources	Archaeological Resources; Historic Architectural Resources	Route Width, 1 Mile
Natural Environment	Water Resources	ROW
Natural Environment	Soils	ROW
Natural Environment	Vegetation and Wildlife	ROW
Natural Environment	Geology	Route Width
Rare and Unique Natural Resources	Protected Species	1 Mile
Rare and Unique Natural Resources	Sensitive Ecological Resources	ROW, 1 Mile

4.2 Environmental Setting

The project is located in southwest Minnesota in Jackson County. Generally, the project is located within a low density, rural, agricultural landscape. The nearest town to the project is Lakefield, which is located approximately 5.5 miles northeast of the project.

The DNR and the U.S. Forest Service (USFS) have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota that is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features (reference (2)). Map 4-1 shows the ecological sections and subsections near the project. The ECS splits Minnesota into ecological provinces, sections, and subsections. The project is within Prairie Parkland province, which experienced glaciation during the last ice age and has deposits of glacial drift (reference (3)).

The project is within the Coteau Moraines subsection of the North Central Glaciated Plains ecological section. This zone is a transition from shallow loess deposits over glacial till to deep loess deposits. The subsection has two landforms present – rolling moraines to terminal moraines along the outer edges of the subsection. Pre-settlement vegetation consisted of tallgrass prairies with forests concentrated along streams (reference (4)). Currently, the land in this region is used for agriculture.



Applicant's Proposed Alignment

Forks-Rost Project Area

Route Width (Proposed Route)

Ecological Subsection

Prairie Parkland Province,Coteau Moraines

0 3,000 6,000

Feet

Map 4-1

ECOLOGICAL CLASSIFICATION

Forks-Rost 161 kV Project

4.3 Human Settlements

Transmission lines have the potential to negatively impact human settlements through a variety of means. Transmission line structures and conductors could change the aesthetics of an area, displace homes or businesses, introduce new noise sources, lower property values, be incompatible with local zoning, and/or interfere with electronic communications. Impacts to human settlements resulting from the project are anticipated to be minimal to moderate.

4.3.1 Aesthetics

The aesthetic and visual resources of a landscape are defined as the existing natural and built features which affect the visual quality and character of an area. Determining the relative scenic value or visual importance in any given area depends, in large part, on the individual viewer, or community of viewers, whose perceptions are shaped by their values and experiential connection to the viewing area, as well as their physical relationship to the view, including distance to structures, perspective, and duration of the view.

Landscapes that are, for the average person, harmonious in form and use are generally perceived as having greater aesthetic value. Infrastructure that is not harmonious with a landscape or affects existing landscape features reflects a change in the aesthetic view that, for some or many, could negatively affect a viewer's perception and expectation of the area. Assessing visual quality reflects the difference between the landscape change and the individual or communal reaction to that change. As noted above, individual or communal perspectives are complex, affected by individual or shared values and experiences with the land. As such, some viewers may perceive the project setting as having high visual quality while others may perceive the area to have less visual quality.

The project is also shaped by a built environment, where existing infrastructure such as transmission line rights-of-way, highways, and county roads, referred to as "horizontal elements," are consistent throughout the project length. The project is located within a primarily agricultural landscape. There are four wind turbines located just south of the Rost Substation and east of the project and 350th Ave. As the project travels south from the Rost Substation along 350th Ave, there is an existing 69 kV transmission line approximately 450 feet away that the project parallels until 780th street. The Forks Switching Station is located southwest of the city of Lakefield. A 161 kV line crosses the project perpendicularly where the project connects to the Forks Switching Station. Figure 4-1 depicts the existing infrastructure around the Rost substation.

Figure 4-1 Existing Infrastructure Around the Rost Substation, Including the Existing Wind Turbines and 69 kV Transmission Line

The applicant's route was developed to avoid proximity to residences, with no residences located within the ROW. There are nine residences within 1,000 feet of the project, with the closest residences located between 50 and 250 feet of the alignment (Table 4-2). With respect to ROW sharing, the entire project parallels road ROW and field, parcel, or section lines for the entire route (Table 4-3).

Table 4-2 Proximity to Residences

Residences, Distance from Anticipated Alignment	Applicants' Proposed Route
Residences within 0-50 feet	0
Residences within 50-250 feet	4
Residences within 250-500 feet	2
Residences within 500-1,000 feet	3
Total Residences within 1,000 feet	9

Table 4-3 ROW Sharing and Paralleling

Infrastructure	Applicants' Proposed Route[1] Miles (percent)
Follows Existing Railroad	0 (0.0)
Follows Existing Roads	8.5 (100)
Follows Existing Transmission Line	0 (0.0)
Total – Follows Transmission Line, Road, or Railroad	8.5 (100)
Follows Field, Parcel, or Section Lines	8.5 (100)

[1]Portions may share or parallel more than one type of infrastructure ROW or division/boundary line, and therefore, the sum may be greater than 100 percent.

4.3.1.1 Impacts

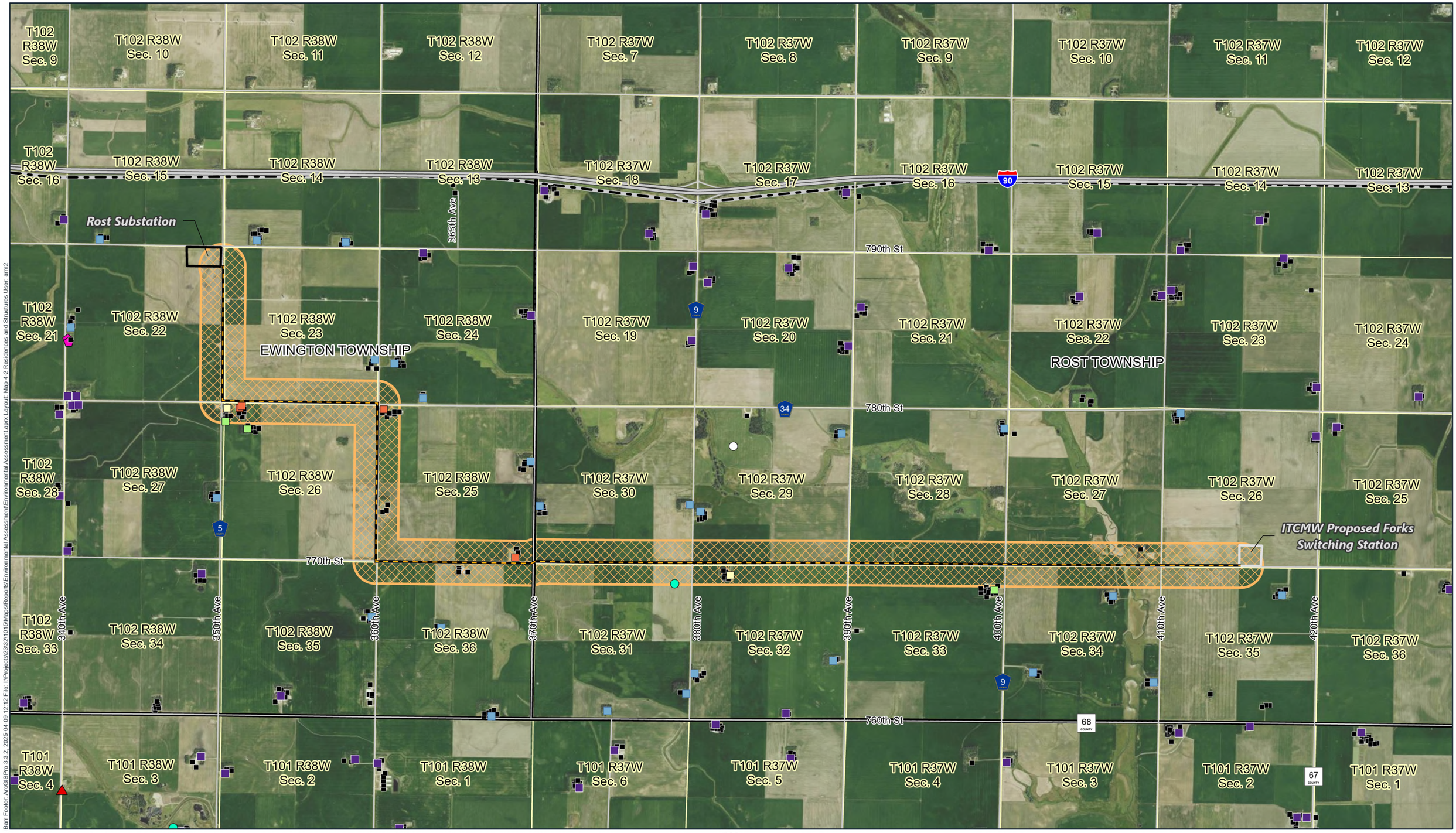
The project's transmission line structures and conductors would create aesthetic impacts. These impacts are anticipated to be minimal to moderate. The degree of these impacts depends on:

- Proximity to homes, schools, churches, etc., where relatively more observers are present to experience aesthetic impacts. Map 4-2 provides an overview of residences and other buildings near the route proposed for the project.
- The presence of terrain and vegetation that could shield views of the transmission line and the preservation of such vegetation.
- The types of structures and structure designs used for the project.
- Use of existing ROW where the project would have an incremental impact relative to existing human modifications to the landscape (i.e., putting like with like).

4.3.1.2 Mitigation Measures

The primary strategy for minimizing aesthetic impacts is prudent routing—that is, choosing routes where a transmission line is most harmonious with the landscape. The applicant has committed to minimizing permanent impacts to the aesthetics and visual character of the area by avoiding and/or minimizing tree clearing and avoiding residential areas to the maximum extent practicable. Other minimization and mitigation measures include:

- Maximizing ROW sharing with existing linear rights-of-way (e.g., roadways,) to minimize incremental aesthetic impacts.
- Using structures and structure designs that minimize impacts (e.g., use of uniform structure types to the extent practical).
- Using construction methods that minimize damage to vegetation near the transmission line.
- Placing structures to take advantage of existing natural screening to reduce the view of the line from nearby residences and roadways.
- Including specific conditions in individual easement agreements with landowners along the route (e.g., requiring new plantings or landscaping).



Barr Foster ArcGISPro 3.3.2, 2025-04-09 12:12 File: I:\Projects\23\32\1015\Maps\Reports\Environmental Assessment\Environmental Assessment.aprx Layout: Map 4-2 Residences and Structures User: amn2

- Applicant's Proposed Alignment
- Route Width (Proposed Route)
- Forks-Rost Project Area
- Commercial Aggregate
- Inactive Aggregate Source
- Out Building
- Church
- Junk yard

Residences by Distance from Alignment

- 50 - 250 Feet
- 250 - 500 Feet
- 500 - 1,000 Feet
- 1,000 Feet - 1 Mile
- > 1 Mile

0 3,000 6,000
Feet

Map 4-2

RESIDENCES AND STRUCTURES
Forks-Rost 161 kV Project

4.3.2 Property Values

Property values have the potential to be affected by the placement of nearby transmission lines. Prior research has found that potential impacts to property values due to transmission lines are generally connected to three main factors. First, how the transmission line affects the viewshed and aesthetics of a property. Second, potential buyers' concerns regarding electromagnetic fields (EMF). Third, effects on agricultural production and properties that are used for farming operations.

4.3.2.1 Impacts

A variety of methodologies have been used to research the relationship between transmission lines and property values. Some general conclusions can be drawn from this body of literature. This chapter highlights relevant outcomes of property value research, with additional detail provided in Appendix D.

Research does not support a clear cause-and-effect relationship between property values and proximity to transmission lines, but has revealed trends that are generally applicable to properties near transmission lines:

- When negative impacts on property values occur, the potential reduction in value is in the range of 1 to 10 percent.
- Property value impacts decrease with distance from the line; thus, impacts are usually greater on smaller properties than on larger ones (e.g., transmission lines can be set back farther from residences on larger parcels, transmission line easements take up a larger percentage of smaller parcels).
- Negative impacts diminish over time.
- Other amenities, such as proximity to schools or jobs, lot size, square footage of the home, and neighborhood characteristics, tend to have a greater effect on sale price than the presence of a transmission line.

The value of agricultural property decreases when transmission line structures interfere with farming operations.

4.3.2.2 Mitigation Measures

Property value impacts can be mitigated by minimizing aesthetic impacts, perceived EMF health risks, and agricultural impacts. This can be achieved by maximizing the use of existing ROW and placing the transmission line away from residences and out of agricultural fields. There is potential for impacts to be mitigated by including specific conditions in individual landowner easement agreements.

4.3.3 Zoning and Land Use

Zoning is a regulatory device used by local governments to geographically restrict or promote certain types of land uses. Minnesota statutes provide local governments with zoning authority to promote public health and general welfare.

This project is subject to Minnesota's Power Plant Siting Act (Minn. Statute 216E). Under this statute, the route permit issued for a transmission line:

…shall be the sole site or route approval required to be obtained by the utility. Such permit shall supersede and preempt zoning restrictions, building or land use rules, regulations or ordinances promulgated by regional, county, local and special purpose government.

Therefore, the applicant is not required to seek permits or variances from local governments to comply with applicable zoning codes. Nonetheless, impacts to local zoning are clearly impacts to human settlements, and the Commission considers impacts to human settlements as a factor in selecting transmission line routes.

The project would located in Ewington and Rost Townships in Jackson County, Minnesota. The closest city to the project is Lakefield, Minnesota. Ewington and Rost Townships fall under Jackson County's authority for zoning and ordinances. Land cover throughout the project consists of agricultural land (93.6 percent) and protected waters (6.4 percent). The Jackson County Comprehensive plan, established in 2010, contains the County's vision and future goals (reference (5)). The land use map in the comprehensive plan shows that, like the landcover data, the majority of the area is cultivated land, with scattered areas of farmsteads and rural residences, grasslands and deciduous forests.

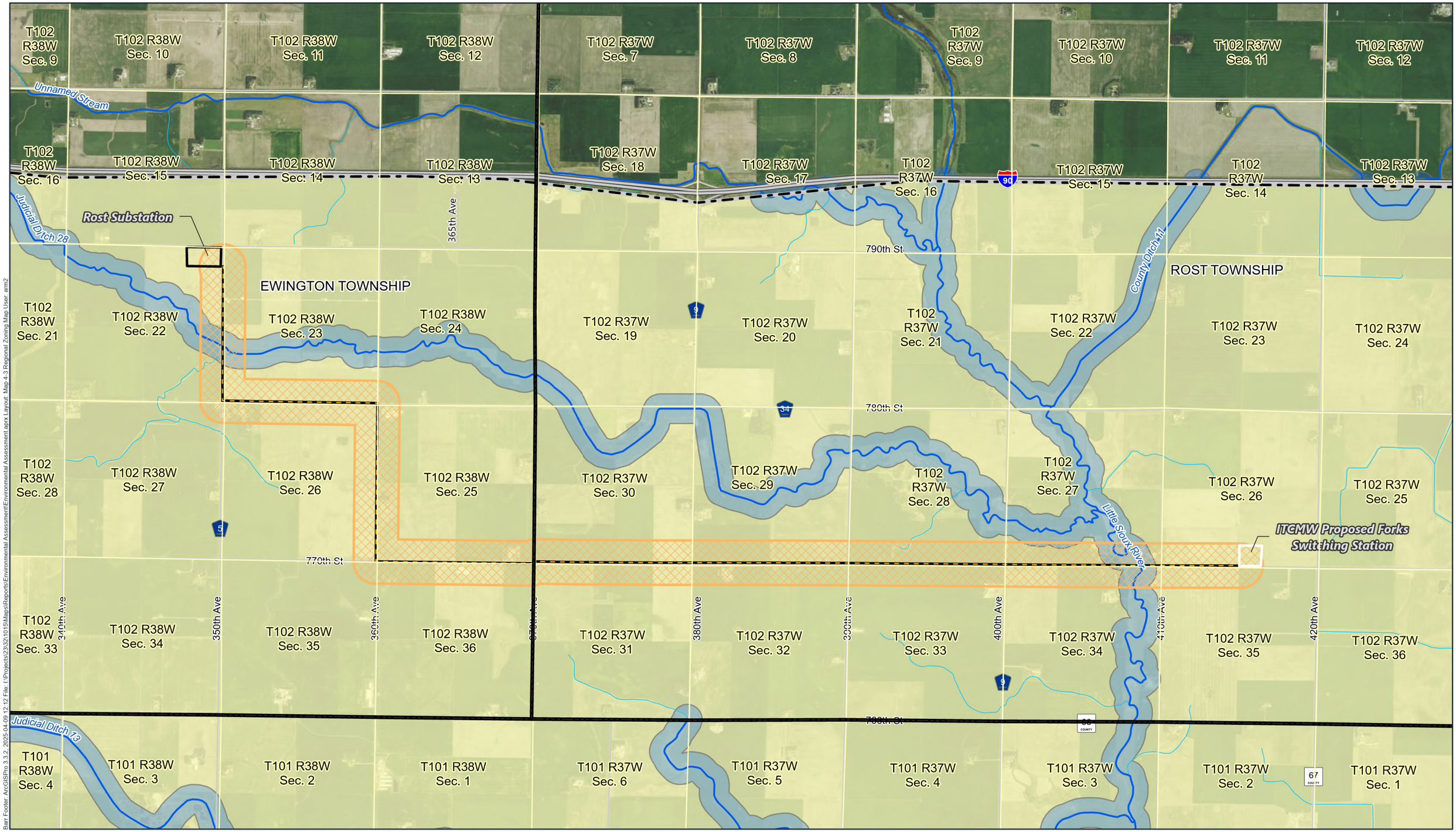
According to the Jackson County Zoning map, the project is in an area zoned agricultural. The project also crosses protected waters as defined by the shoreland zoning district (Map 4-3). According to the Jackson County Development Code adopted in September 1993 and last updated in 2024 (reference (6)), the purpose of the agricultural district is to preserve commercial agriculture as a viable, permanent land use and as a significant economic activity in the county. The purpose of the shoreland district is to preserve the water quality and natural characteristics of the shorelands and public waters in the County. Overhead electrical lines are considered essential services in the development code and are permitted within agricultural and tributary districts. Essential services buildings, like the Forks Switching Station, are considered a conditional use in the shoreland district and a permitted use in the agricultural district.

4.3.3.1 Impacts

Potential project impacts to local zoning are anticipated to be minimal, as the project is compatible with the agricultural and shoreland zoning throughout the project.

4.3.3.2 Mitigation Measures

Land use impacts can be mitigated by minimizing aesthetic impacts of the project, to the extent that zoning and land use plans address aesthetics (e.g., landscaping). The project will be co-located with road ROW for its entire length, which will limit change in land use. Although short term agricultural impacts may occur, these will be mitigated through restoration and/or compensatory payments to landowners. No other mitigation is proposed.



Barr Footer: ArcGISPro 3.3.2, 2025-04-09 12:12 File: I:\Projects\23\32\1015\Maps\Reports\Environmental Assessment\Environmental Assessment.aprx Layout: Map 4-3 Regional Zoning Map User: arm2

Applicant's Proposed Alignment
Route Width (Proposed Route)
Forks-Rost Project Area

Jackson County Zoning
Agriculture
Protected Waters

0 3,000 6,000
Feet

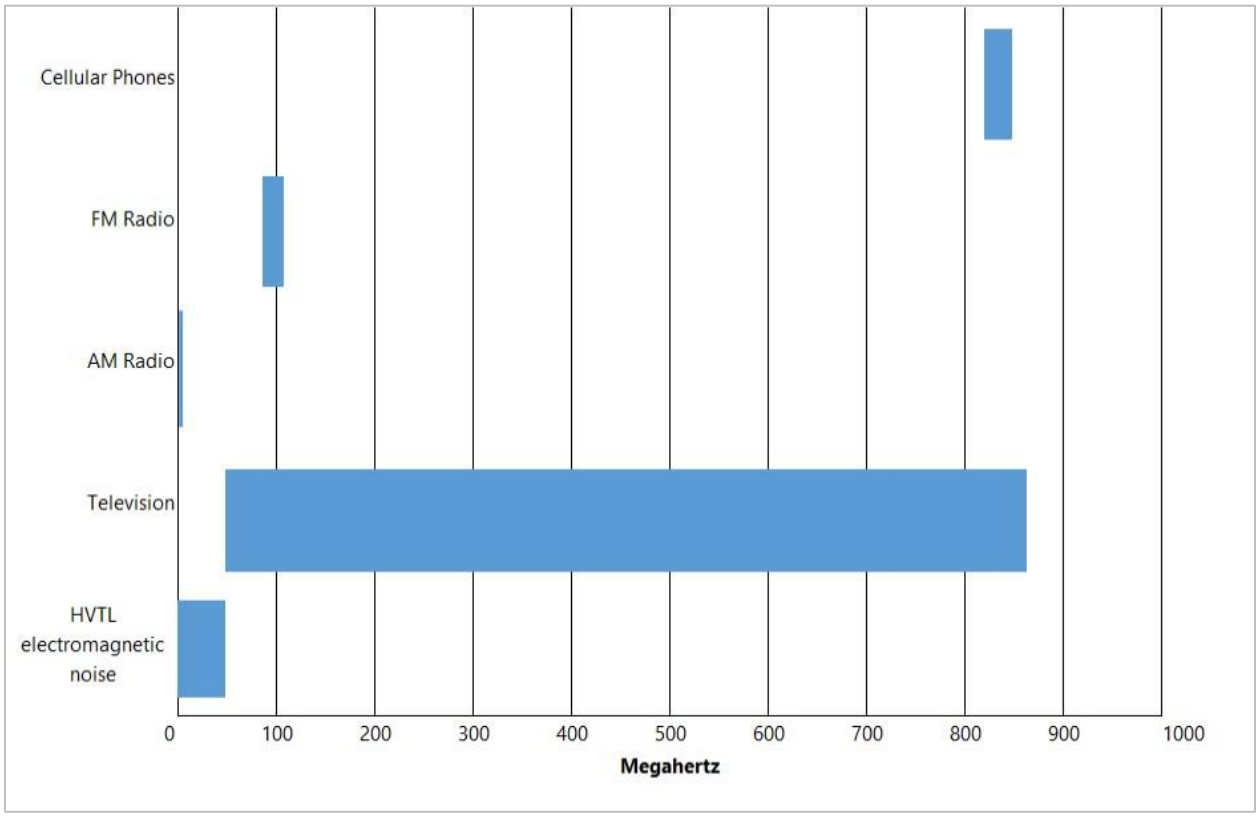
Map 4-3

REGIONAL ZONING
Forks-Rost 161 kV Project

4.3.4 Electronic Interference

Electronic interference refers to a disturbance in an electronic signal that can impair the proper functioning of an electronic device. Transmission lines do not generally cause interference with radio, television, cellular phone, global position systems (GPS), or other communication signals and reception. Information on medical electronic devices is discussed in Chapter 4.5.2. Figure 4-2 compares the spectrum of transmission frequencies for several communication and media signals to the peak intensity disturbance associated with electromagnetic noise from transmission lines. Additional discussion is provided below for each major type of media or communication signal.

Figure 4-2 Frequencies of Electronic Communications and of Electromagnetic Noise Created by Transmission Lines



Source: references (7); (8); (9)

Radio and Television

Generally, transmission lines do not cause interference with radio (amateur, commercial broadcasting, two-way radio services, etc.) or television (reference (10)). There are three potential sources for interference. These include gap discharges, corona discharges, and shadowing and reflection effects.

Gap discharge interference is the most noticed form of power line interference with radio and television signals and typically the most easily fixed. Gap discharges are usually caused by hardware defects or abnormalities on a transmission or distribution line causing small gaps to develop between mechanically connected metal parts. As sparks discharge across a gap, they create the potential for electrical noise, which can cause interference with radio and television signals. The degree of interference depends on the quality and strength of the transmitted communication signal, the quality of the receiving antenna

system, and the distance between the receiver and the power line. Gap discharges are usually a maintenance issue, since they tend to occur in areas where gaps have formed due to broken or ill-fitted hardware (clamps, insulators, brackets). Because gap discharges are a hardware issue, they can be repaired relatively quickly once the issue has been identified.

Corona from transmission line conductors can also generate electromagnetic noise at the same frequencies that radio and television signals are transmitted (Figure 4-2). The air ionization caused by corona generates audible noise, radio noise, light, heat, and small amounts of ozone (O_3). The potential for radio and television signal interference due to corona discharge relates to the magnitude of the transmission line-induced radio frequency noise compared to the strength of the broadcast signals. Because radio frequency noise, like EMF, becomes significantly weaker with distance from the transmission line conductors, very few practical interference problems related to corona-induced radio noise occur with transmission lines. In most cases, the strength of the radio or television broadcast signal within a broadcaster's primary coverage area is great enough to prevent interference.

If interference occurs for an AM radio station where good reception existed before the project was built, reception can be regained by adjusting or moving the receiving antenna system. Interference is unlikely to occur for AM radio frequencies, except for immediately under a transmission line, and interference would dissipate rapidly with increasing distance from the line.

FM radio receivers usually do not pick up interference from transmission lines because corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88-108 Megahertz) (Figure 4-2). Also, the interference rejection properties inherent in FM radio systems make them fairly immune to amplitude type disturbances.

Because the United States has transitioned from analog to digital broadcasting, the potential for television interference from radio frequency noise is unlikely. Digital reception is considerably more tolerant of noise than analog broadcasts. Due to the higher frequencies of television broadcast signals (54 megahertz and above), a transmission line seldom causes reception problems within a station's primary coverage area. In the rare situation where the project may cause interference within a station's primary coverage area, the problem can usually be corrected with the addition of an outside antenna.

Shadowing effect comes from physically blocking communication signals and can impact two-way mobile radio communications and television signals. Television interference due to shadowing and reflection effects is rare but may occur when a large transmission structure is aligned between the receiver and a weak distant signal, creating a shadow effect. In the rare situation where the project may cause interference within a station's primary coverage area, the problem can usually be corrected with the addition of an outside antenna. If television or radio interference is caused by or from the operation of the project, the applicant would evaluate the circumstances contributing to the impacts and determine the necessary actions to restore reception to the present level, including the appropriate modification of receiving antenna systems if necessary.

Internet and Cellular Phones

Wireless internet and cellular phones use frequencies in the 900 MHz ultra-high frequency (UHF) range—a range for which impacts from corona-generated noise are anticipated to be negligible. If internet service at a residence or business is provided by a satellite antenna, this service could be impacted by a line-of-sight obstruction. As with other satellite reception, any interference due to an obstruction could be resolved by moving the satellite antenna to a slightly different location.

Global Positioning Systems

GPS works by sending radio-frequency signals from a network of satellites to the receiver. Because of this, buildings, trees, and other physical structures have the potential to interfere with a GPS signal. Research has evaluated the potential for interference in the use GPS satellite-based microwave signals under or near power line conductors. Results of this research indicates it is unlikely that there will be electronic interference while using GPS (reference (11)). Interference will be more likely near a transmission line structure, and unlikely under a transmission line (reference(11)).

4.3.4.1 Impacts

No impacts to electronic devices are anticipated.

4.3.4.2 Mitigation Measures

Interference due to line-of-sight obstruction will be mitigated by prudent placement of transmission line structures and/or repositioning of electronic antennas as needed. Both cellular phone signals and GPS operate at frequencies outside the range of electromagnetic noise from transmission lines. If gap discharge interference occurs due to a hardware issue, the issue will be repaired and identified. In situations where interference with electronic devices does occur and is caused by the presence or operation of the project, the route permits issued by the Commission requires a permittee to take those actions which are feasible to restore electronic reception to pre-project quality (Appendix E).

4.3.5 Displacement

Displacement refers to the removal of a residence or building to facilitate the operation of a transmission line. For electrical safety code and maintenance reasons, utilities generally do not allow residences or other buildings within the ROW of a transmission line. Any residences or other buildings located within a proposed ROW are generally removed or displaced. Displacements are relatively rare and are more likely to occur in more populated areas where avoiding all residences and businesses is not always feasible.

Displacements can be avoided through several means, including structure placement, the use of specialty structures, and modifications of the ROW width. The applicant indicated in its route permit application that it is committed to working with the landowners to design adequate clearances from buildings, acquire the necessary easements, and address any landowner concerns. Though the general rule is that buildings are not allowed within the ROW of the transmission line, there are instances where the activities taking place in these buildings may be compatible with the safe operation of the line.

4.3.5.1 Impacts

There are no churches, schools, daycares, or nursing homes located within the project ROW. There are also no residential or non-residential structures (e.g., agricultural outbuildings or animal production structures) located within the project ROW.

4.3.5.2 Mitigation Measures

No impacts to residential or non-residential buildings are anticipated; therefore, no mitigation measures are proposed.

4.3.6 Noise

Noise is generally defined as unwanted sound. Noise levels are measured in units of decibel (dB) on a logarithmic scale and can be used to compare a wide range of sound intensities. Certain sound frequencies are given more weight since human hearing is not equally sensitive to all frequencies. The A-weighted decibel (dBA) scale accounts for the sensitivity of the human ear (Table 4-4). Due to the logarithmic dBA, a noise level of 70 dBA is approximately twice as loud as a 60 dBA sound to the average human hearing.

Table 4-4 Common Noise Sources and Levels

Sound Pressure Levels (dBA)	Common Indoor and Outdoor Noises
110	Rock band at 5 meters
100	Jet flyover at 300 meters
90	Chainsaw or gas lawnmower at 1 meter
85	Typical construction activities
80	Food blender at 1 meter
70	Vacuum cleaner at 3 meters
60	Normal speech at 1 meter
50	Dishwasher in the next room
40	Library
30	Bedroom
20	Quiet rural nighttime

Notes: Source: Minnesota Rules 7030.

The MPCA has developed protective standards for daytime and nighttime noise levels that vary based on land use at the location where the sound is heard (noise area classification, NAC). All project noises must be within the MPCA noise standards (Table 4-5). The noise standards are expressed as a range of permissible dBA over the course of a one-hour period; L50 is the dBA that may be exceeded 50 percent of the time within 1 hour, while L10 is the dBA that may be exceeded 10 percent of the time within one hour (Minn. Rule 7030).

Table 4-5 MPCA Noise Limits by Noise Area Classification

Noise Area Classification (NAC)	Daytime (dBA)L_{10}	Daytime (dBA)L_{50}	Nighttime (dBA)L_{10}	Nighttime (dBA)L_{50}
NAC 1: Residential and Other Sensitive Uses	65	60	55	50
NAC 2: Non-Residential Uses (retail, business and government services, recreational activities, transit passenger terminals)	70	65	70	65
NAC 3: Non-Residential Uses (manufacturing, fairgrounds and amusement parks, agricultural and forestry activities)	80	75	80	75

The project is primarily within agricultural zones (NAC-3), where maximum noise levels are currently caused by the movement and operation of farm equipment. Some portions of the project are near

residences (NAC-1). Noise receptors include residences and include individuals working outside or using recreational facilities along the project. For most of the project, ambient noise levels are in the range of 30 to 50 dBA, with temporary, higher noise levels associated with wind, vehicular traffic, and the use of gas-powered equipment (e.g., tractors, chain saws).

Community noise levels are usually closely related to the intensity of human activity. Noise levels are generally considered low when below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA (Table 4-4). In rural areas, noise levels can be below 35 dBA. In small towns or wooded and lightly used residential areas, noise levels are more likely to be around 50 to 60 dBA. Levels around 75 dBA are more common in busy urban areas, and levels up to 85 dBA tend to occur near major freeways and airports.

4.3.6.1 Impacts

Potential noise impacts from the project will occur from construction activities and operation of the transmission line and switching station.

Construction Noise

During project construction, temporary, localized noise from heavy equipment, such as pile drivers, and increased vehicle traffic is expected to occur along the ROW during daytime hours. Construction noise could temporarily affect residences, schools, businesses, libraries, parks, recreational areas, and related public spaces that are close to the ROW. Any exceedances of the MPCA daytime noise limits will be temporary in nature, and no exceedances of the MPCA nighttime noise limits are expected for the project.

Transmission Line Noise

Noise from transmission lines (electrical conductors) is due to small electrical discharges which ionize surrounding air molecules. The level of noise from these discharges depends on conductor conditions, voltage levels, and weather conditions. Noise emissions are greatest during heavy rain events (defined as more than one inch of rain per hour) when the conductors are consistently wet. However, during heavy rains, the background noise level is usually greater than the noise from the transmission line, and few people are in close proximity to a transmission line in these conditions. The applicant calculated project sound levels at the edge of the ROW for the transmission line. Table 4-6 shows the calculated sound level for the line.

Table 4-6 Calculated L50 Audible Noise (dBA) for Proposed Project

Structure Type	Line Voltage	Edge of ROW L_{50} Noise (dBA)
161 kV Single-Circuit Steel Monopole	161 kV	35.49

In foggy, damp, or light rain conditions, transmission lines may produce audible noise higher than background levels. During dry weather, noise from transmission lines is a perceptible hum and sporadic crackling sound. Noise levels are anticipated to be within Minnesota noise standards (i.e., < 50 dBA), and will only be perceptible when ambient noise levels in the project area fall below 40 dBA.

Switching Station

An analysis of the Forks Switching Station was conducted to examine potential noise levels due to the station. The only expected noise is the inconsistent, extremely short-term noise from planned switching or unplanned fault-clearing operations.

The Forks Switching Station will have three power lines terminating at this location. To analyze the average noise that will come from the switching station, data was gathered to find the average number of planned and unplanned switching events on the ITC Midwest 161 kV system. The applicant gathered data that 0.91 unplanned switching events and 3.71 planned switching events are anticipated to take place at the Forks Switching Station per year.

The applicant does not have measurements or vendor-provided specifications for audible noise produced by the circuit breaker or the disconnect switches, but the applicant's field experience has described these events as around 130 dBA. These noise events would be very brief and dissipate as distance increases from the switching station.

4.3.6.2 Mitigation Measures

Project noise impacts are anticipated to be minimal and within Minnesota's noise standards. The project will mitigate potential noise impacts by limiting construction to daylight hours and using construction equipment and vehicles with properly functioning mufflers and noise-control devices. Operational noise levels for the project are anticipated to be within state standards; however, the project will introduce a new noise source that, in certain situations (e.g., a calm evening) may be heard by nearby residents. Route permits issued by the Commission require compliance with Minnesota's noise standards.

4.3.7 Cultural Values

Cultural values are community beliefs and attitudes that provide a framework for community unity and guide community actions. Cultural values are informed, in part, by history and heritage. The project spans land that has been home to a diverse range of people and cultures. Major infrastructure projects can be inconsistent with an area's cultural values, resulting in a deterioration of a community's shared sense of self.

The project area was primarily populated by the Dakota Sioux people in the early to mid-1800s. By the mid-1800s, Canadian, French, and British fur traders began settling in this area. A large wave of European immigrants arrived around 1850; these settlers were primarily of German, Norwegian, Swedish, Dutch, and British heritage (reference (12)).

Cultural values are also influenced by the work and recreation of residents and by geographical features. The Project Area is primarily rural and agricultural. Farming and the ability to continue to farm and support livelihoods through farming tend to be strong values in these settings. Various recreational opportunities, such as hiking, hunting, and wildlife viewing, are supported by a variety of natural resources located in the Project Area, including the Little Sioux River and USFWS Waterfowl Production Areas (reference (13)).

4.3.7.1 Impacts

The project's impact on cultural values is anticipated to be minimal. The project will not adversely impact the work of residents that underlie the area's cultural values, nor is it anticipated to adversely impact geographical features that inform these values.

4.3.7.2 Mitigation Measures

Impacts to cultural values are anticipated to be minimal, and no mitigation measures are proposed.

4.3.8 Socioeconomics

Socioeconomic factors provide an indication of how economic activity affects and is shaped by social processes. Socioeconomic measures indicate how societies progress, stagnate, or regress because of their actions and interactions within and between the local, regional, or global economic scales. Transmission line projects contribute to growth and progress at the local level over time; therefore, socioeconomic impacts of the project are anticipated to be positive.

Table 4-7 shows the population and socioeconomic information for Ewington Township, Rost Township, Jackson County, and Minnesota for comparison using the American Community Survey 2023 5-year Estimates. As shown in Table 4-7, the project is located in a rural setting with all noted parameters falling below the state average, except for median household income and unemployment being relatively higher in Rost Township.

Table 4-7 Socioeconomic Census Data

Area	Minnesota	Jackson County	Ewington Township	Rost Township
Population	5,737,915	9,964	145	213
Population Density (population/sq. miles)	72	14.2	4.6	5.9
Labor Force	3,146,576	5,340	91	112
Labor Force Unemployment Rate (%)	2.1	1.6	0.0	2.6
Per Capita Income	$46,530	$39,494	$41,627	$42,468
Median Household Income	$85,086	$69,955	$49,792	$109,821

Source: reference (14)

Approximately 15 workers will be required for transmission line and substation construction. Transmission line construction is anticipated to begin in April 2026 with the full project in service in December 2026. Local businesses have the potential to experience short-term positive economic impacts through the use of the hotels, restaurants, and other services used by contractors during construction.

4.3.8.1 Impacts

The project would generate minor, short-term positive economic impacts, driven by increased construction activity and a small influx of contractor employees. The project will have some positive impacts on the socioeconomics of the region through the creation of temporary jobs, generation of tax revenue, and providing more reliable electrical service to the surrounding communities.

4.3.8.2 Mitigation Measures

No adverse socioeconomic impacts are anticipated; therefore, mitigation is not proposed.

4.3.9 Environmental Justice

Environmental justice (EJ) is the "just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making and other federal activities that affect human health and the environment (reference (15))." The goal of this fair treatment is to identify potential disproportionately high and adverse effects from implementation of the project and identify alternatives that may mitigate these impacts.

MPCA's Understanding Environmental Justice in Minnesota Mapping Tool (reference (16)) is an online mapping tool that uses census data to identify areas for meaningful community engagement and additional evaluation for disproportionate effects from pollution. The tool identifies Environmental Justice Communities (EJC) using the following four criteria, which aligns with the definition of an EJ area in Minn. Stat. 216B.1691, subdivision 1(e):

- 40 percent or more of the area's total population is nonwhite;
- 35 percent or more households in the area have an income that is at or below 200 percent of the federal poverty level;
- 40 percent or more of the area's residents over the age of five have limited English proficiency; or
- The area is located within Indian country, as defined in US Code, title 18, section 1151.

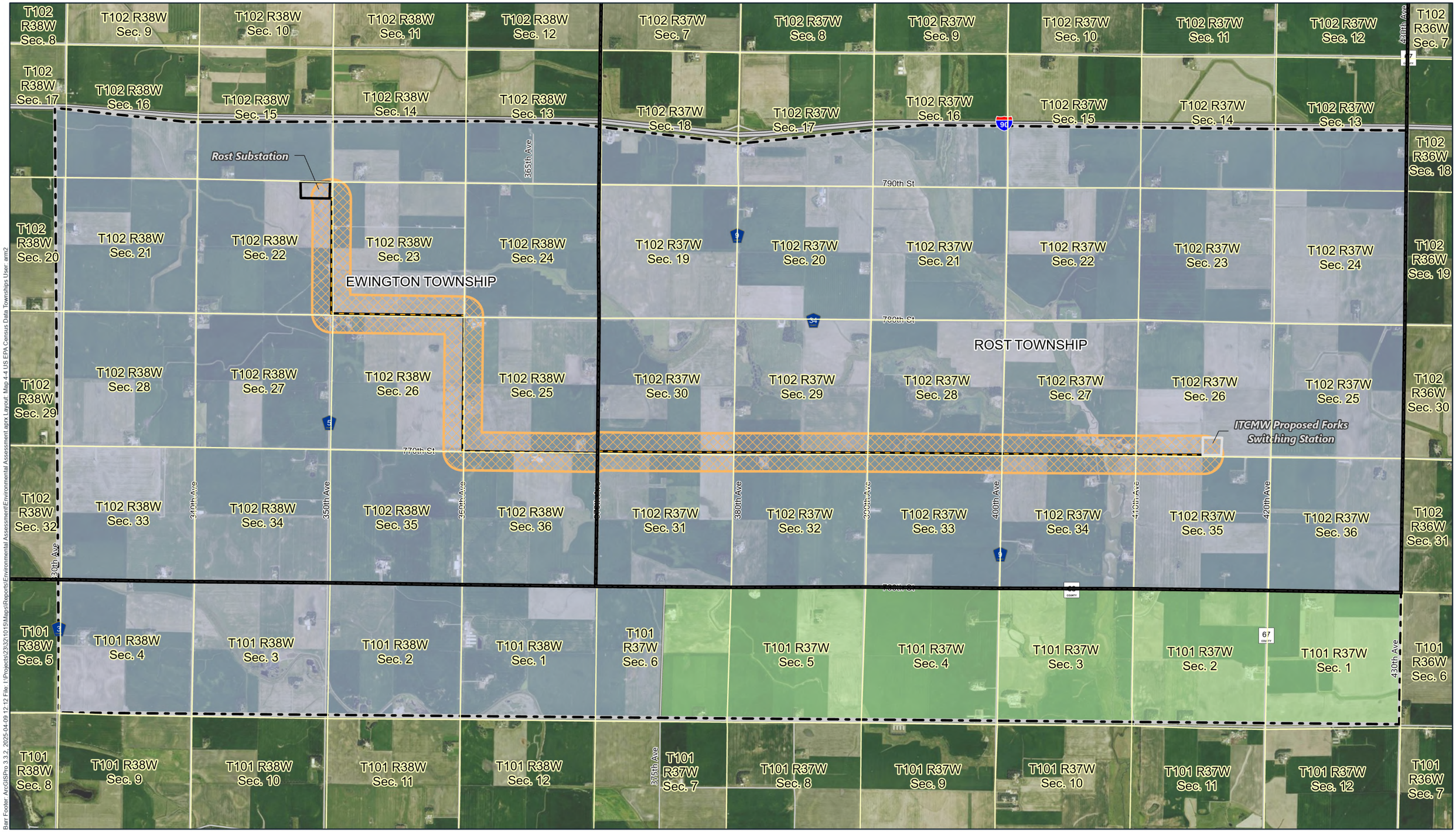
The MPCA mapping tool did not identify any EJCs in the project area.

The EJC definition guidelines from Minn. Stat. 216B.1691, subdivision 1(e) were used to review data from the American Community Survey 2023 5-year estimates. There are two census tracts located within the project area, census tracts 4802 and 4803 (Map 4-4). These census tracts would not be considered EJCs, according to Minn. Stat. 216B.1691 (Table 4-8).

Table 4-8 Population, Low-Income, and Minority Data

Area	Minnesota	Jackson County	Census Tract 4802	Census Tract 4803
Population	5,737,915	9,964	2,114	2,344
Percent Minority (2022)	23.3	9.6	13.5	6.3
Percent people at or below 200 percent of the Federal Poverty Level (2022)	9.3	9.1	7.3	7.1
Percent Limited English-speaking Households	2.2	1.2	2.9	0.9

Source: reference (14)



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- Applicant's Proposed Alignment
- Route Width (Proposed Route)
- Forks-Rost Project Area
- Census Tract 4802
- Census Tract 4803
- Civil Township

0 3,500 7,000
Feet

Map 4-4

MAP 4-4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE
Forks-Rost 161 kV Project

4.3.9.1 Impacts

Due to the absence of EJCs in the project area, the project will not result in environmental justice impacts.

4.3.9.2 Mitigation Measures

No environmental justice impacts are anticipated; therefore, no mitigation is proposed.

4.4 Transportation and Public Services

Transmission line projects have the potential to negatively impact public services (e.g., roads, utilities, and emergency services). These impacts are typically temporary in nature (e.g., the inability to fully use a road or utility while construction is in process). However, impacts could be more long-term if they change the area so that public service options are foreclosed or limited.

This section summarizes the project's potential impacts on local roadways/railways, public utilities, emergency services, and airports and provides methods for mitigating these impacts. Temporary and long-term impacts to public services resulting from the project are anticipated to be minimal.

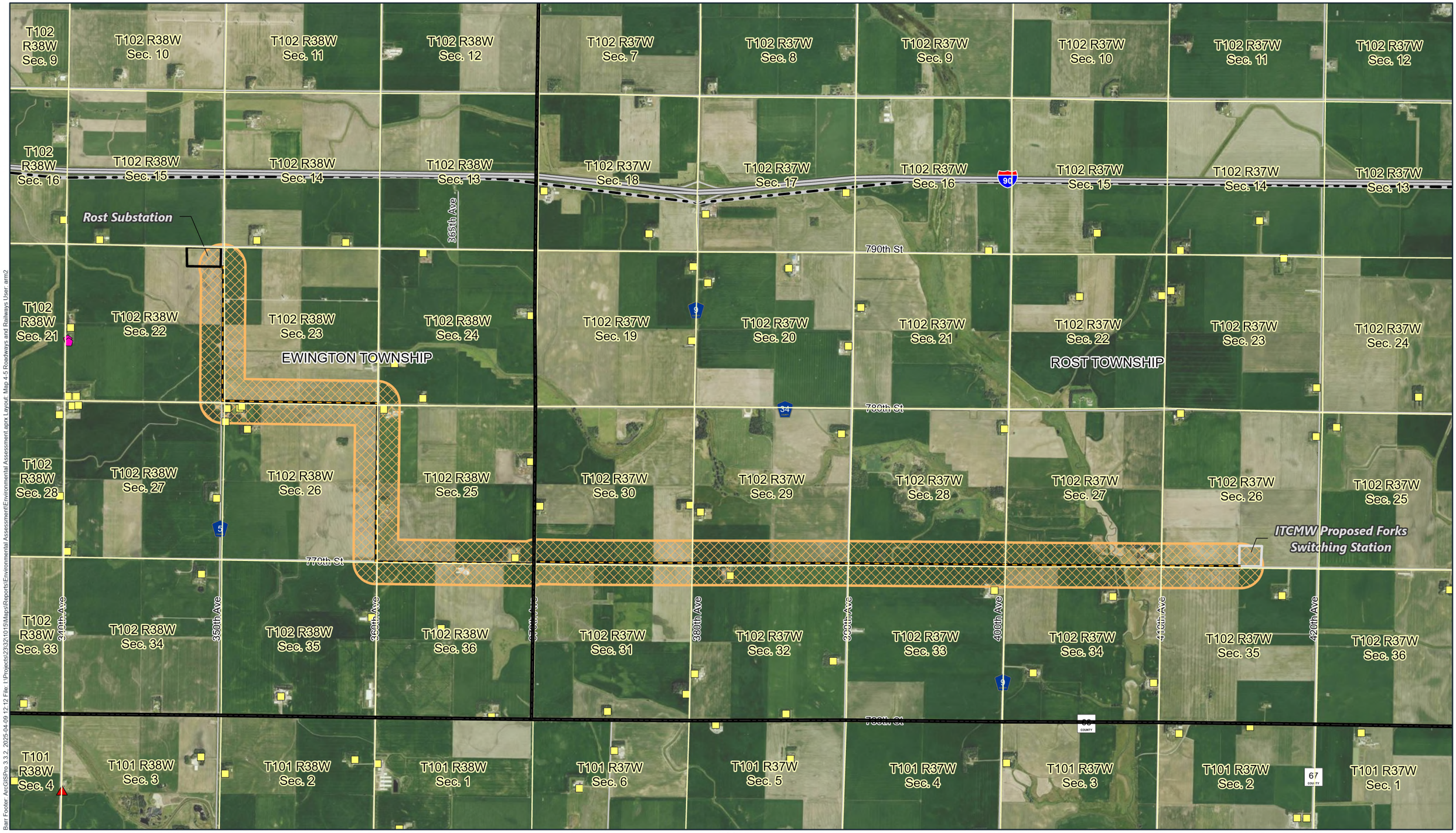
4.4.1 Roadways and Railways

The project is located in a primarily rural area. The project runs adjacent to multiple roadways and crosses roadways in ten locations. The project runs adjacent to the following roads:

- 350th Ave for approximately 0.85 miles
- 780th Street for approximately 1 mile
- 360th Avenue for approximately 1 mile
- 770th Street for approximately 5.5 miles

The project also intersects several local roads. The nearest major highway is Interstate 90, located approximately 0.6 miles north of the project (Map 4-5).

There are no passenger rail service or rail freight lines near the project.



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- Applicant's Proposed Alignment
- Route Width (Proposed Route)
- Forks-Rost Project Area
- Interstate
- Roads
- Residence
- Church
- Junk yard

0 3,000 6,000
Feet

Map 4-5

ROADWAYS AND RAILWAYS
Forks-Rost 161 kV Project

4.4.1.1 Impacts

Construction may occasionally cause lanes of roadways to be closed, although these closures will only last for the duration of the construction activity in a given area. Construction equipment and delivery vehicles will increase traffic along roadways throughout project construction, with effects lasting from a few minutes to a few hours, depending upon the complexity and duration of the construction activities. Drivers could experience increased travel times as a result. Construction vehicles could temporarily block public access to streets and businesses in cities.

The project could impact roadways and roadway users in several ways, including:

- Causing temporary traffic delays, detours, and congestion during construction.
- Interfering with future roadway expansions or realignments.
- Impairing the safe operation and maintenance of roadways.

Vehicles and equipment that will be used for the construction of the transmission line are generally heavier than passenger vehicles and may cause more damage to road surfaces. Oversized/overweight load permits must be obtained from the MnDOT when size and/or weight limits are exceeded.

Construction workers and construction-related vehicles using public roadways to access the transmission line ROW are likely to have localized adverse impacts on traffic volumes. Approximately 15 workers will be employed during construction. During the course of construction, workers will be dispersed throughout the project. Accordingly, the increase in vehicle traffic will represent a slight increase over existing traffic volumes at any given time and location.

Transmission lines that parallel roads could affect future road expansions or realignments because structures placed along the road ROW might need to be moved to preserve a safe distance between structures and the edge of the expanded roadway. The project will be co-located with road ROW for almost its entire length. The applicant will coordinate with Jackson County and Ewington and Rost Townships on road access permits and procedures, as well as utility permits and other road-related approvals, as needed. When stringing wire across a road, the applicant will install appropriate traffic control and safety devices, such as H-braces, signs, or flaggers. The applicant will work with Ewington and Rost Townships and Jackson County on appropriate safety measures.

The applicant indicates that the project's design standards meet the NESC requirements for safe design and operation of transmission lines. These standards include designing transmission lines to withstand severe winds from summer storms and the combination of ice and strong winds from winter weather.

No impacts to railways are anticipated as a result of the project.

4.4.1.2 Mitigation Measures

The increased traffic during construction is anticipated to be minor and temporary; therefore, no mitigation measures are proposed. Long-term impacts to transportation and public services are not anticipated, and mitigation measures are not required.

4.4.2 Public Utilities

The Federated Rural Electric Association (REA) provides electric utility services near the project. Natural gas services near the project are provided by Minnesota Energy Resources (reference (17)). A Northern Natural Gas pipeline intersects the project in two locations, once along 360th Avenue and once along 770th Street. The location of this pipeline and where it intersects with the project are shown on Map 4-6. Other typical public utilities are present, including cable, telephone, rural water, and private water wells.

4.4.2.1 Impacts

The project will not disturb any existing public utilities, and no impacts to public utilities are anticipated. No disruptions to electrical service are anticipated; however, an overarching project objective is to enhance electrical service in the area. The project will need to cross a buried Northern Natural Gas pipeline in two locations. This pipeline is also located within 1,000 feet of the project for approximately 9,060 feet (Map 4-6); however, no impacts to pipelines are anticipated as the project will span the pipeline crossings.

4.4.2.2 Mitigation Measures

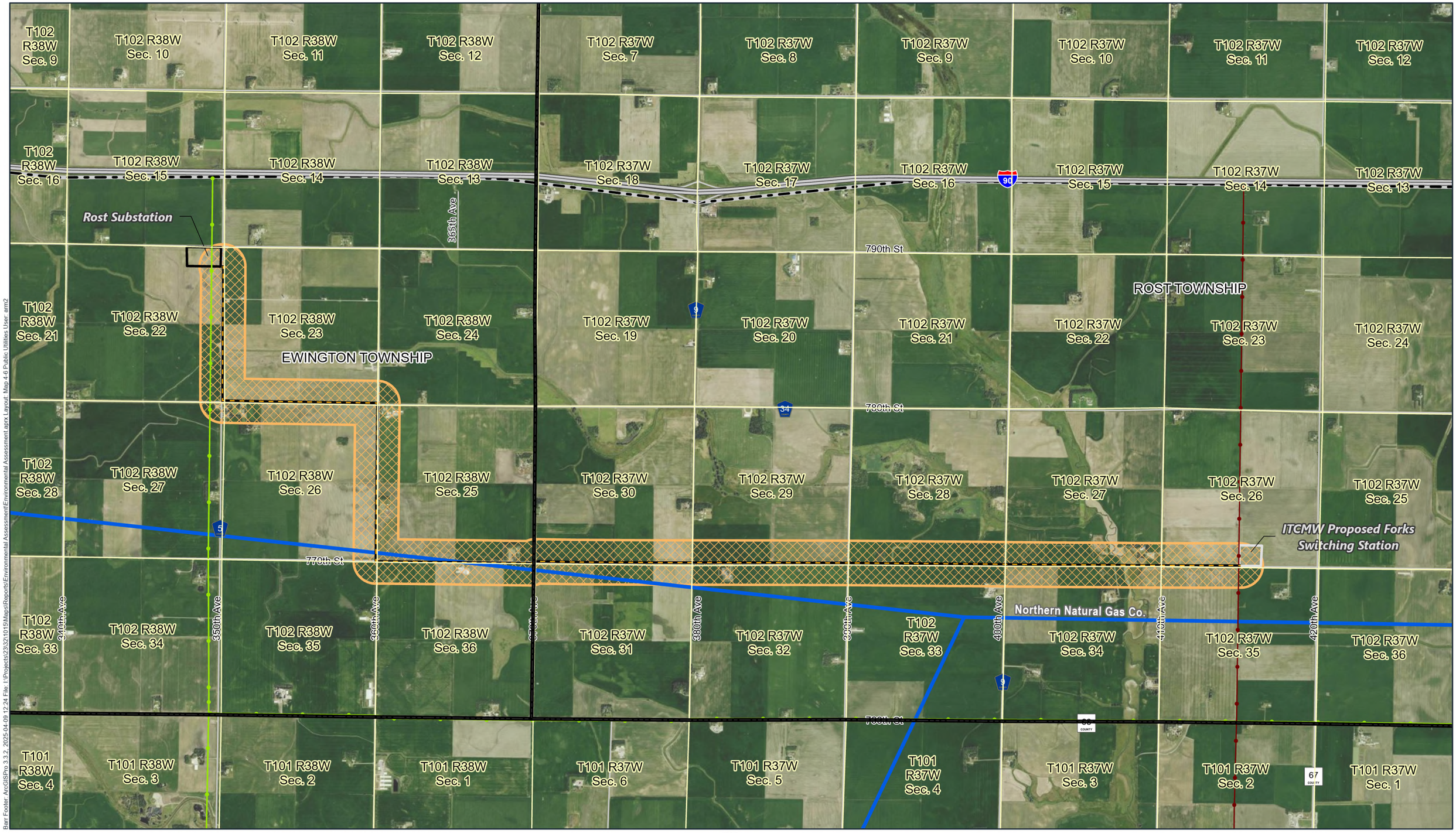
Potential project impacts to pipelines can be avoided and mitigated by spanning the pipeline crossings and coordination with the appropriate pipeline companies. The applicant indicates it will use the Gopher State One-Call system to locate and mark all underground utilities to avoid potential impacts.

4.4.3 Emergency Services

Emergency services in the region are provided by law enforcement and emergency response agencies of the local counties and communities. Sheriffs' offices and municipal police departments located in the surrounding area provide regional law enforcement. The Jackson County Sheriff's Department provides services to the project area. Additionally, the cities of Worthington and Jackson have local police departments that service the project area.

The project is located within Fire Region 13 – Southwest, and fire services for the area are provided by the Lakefield Fire Department, the Jackson City Fire Department, and the Worthington Fire Station (reference (18)).

Ambulance services are broken into Primary Service Areas (PSAs) which provide emergency medical response services throughout each PSA. The project area is located within the Sanford Worthington Jackson County PSA. Emergency medical response is also available from local hospitals, including Sanford Worthington Medical Center in Worthington, MN and Sanford Jackson Medical Center in Jackson, MN. The closest of these facilities is the Sandford Worthington Medical Center, located approximately 11 miles from the project (reference (19)).



Barr Footer: ArcGISPro 3.3.2, 2025-04-09 12:24 File: I:\Projects\23\32\1015\Maps\Reports\Environmental Assessment\Environmental Assessment.aprx Layout: Map 4-6 Public Utilities User: arm2

- Applicant's Proposed Alignment
- Route Width (Proposed Route)
- Forks-Rost Project Area
- Interstate
- Roads
- Northern Natural Gas Pipeline

Exsisting Transmission Lines

- 34kV - 115kV
- 116kV - 500kV

0 3,000 6,000

Feet

Map 4-6

PUBLIC UTILITIES
Forks-Rost 161 kV Project

4.4.3.1 Impacts

The project is not anticipated to impact emergency services. Any temporary road closures required during construction will be coordinated with local jurisdictions to provide safe access for police, fire, and other emergency service vehicles. Any accidents that might occur during the project's construction will be handled through local emergency services. Given the limited number of construction workers involved in the project and the low probability of a construction-related accident, the current emergency services are expected to have ample capacity to address any potential emergencies that may occur during project construction.

4.4.3.2 Mitigation Measures

No impacts to emergency services are anticipated; therefore, no mitigation measures are proposed.

4.4.4 Airports

Transmission line structures and conductors can conflict with the safe operation of an airport if they are too tall and/or too close for the applicable safety zones. Different classes of airports have different safety zones depending on several characteristics, including runway dimensions, classes of aircraft they can accommodate, and navigation and communication systems (reference (20)). These factors determine the necessary take-off and landing glide slopes, which in turn determine the setback distance of transmission line structures.

FAA and MnDOT have each established development guidelines on the proximity of tall structures to public-use airports. Transmission lines near public airports are limited by FAA height restrictions, which prohibit transmission line structures above a certain height, depending on the distance from the specific airport. Private airstrips and personal use airstrips cannot be used for commercial transportation or by the general public and are, therefore, not subject to FAA regulatory obstruction standards (Minnesota Rules 8800.2400).

MnDOT has established separate zoning areas around airports. The most restrictive safety zones are safety zone A, which does not allow any buildings, temporary structures, places of public assembly, or transmission lines, and safety zone B, which does not allow places of public or semi-public, assembly such as churches, hospitals, or schools. Consistent with FAA regulations, MnDOT zoning requirements only apply to public airports (Minnesota Rules 8800.2400).

There are no FAA-listed airports, public airports, or private airports located within one mile of the project.

4.4.4.1 Impacts

There are no FAA airports, public airports, or private airports located within one mile of the project. As such, impacts to airports are not anticipated.

4.4.4.2 Mitigation Measures

No impacts to airports are anticipated; therefore, no mitigation measures are proposed.

4.5 Public Health and Safety

Transmission line projects have the potential to negatively impact public health and safety during project construction and operation. As with any project involving heavy equipment and transmission lines, there

are safety issues to consider during construction. Potential health and safety impacts include injuries due to falls, equipment use, and electrocution. Potential health impacts related to the operation of the project include health impacts from EMF, stray voltage, induced voltage, and electrocution.

4.5.1 Electric and Magnetic Fields

EMFs are invisible lines of force that surround electrical devices (e.g., power lines, electrical wiring, and electrical equipment) which are produced through the generation, transmission, and use of electric power. The term “EMF” is typically used to refer to EMF sources that are coupled together. However, for lower frequencies associated with power lines, EMF are relatively decoupled.

Electric fields are the result of electric charge, or voltage, on a conductor. The intensity of an electric field is related to the magnitude of the voltage on the conductor and is typically described in terms of kV per meter (kV/m). Magnetic fields are created and increase from the strength of the flow of current though wires or electrical devices. The intensity of a magnetic field is related to the magnitude of the current flow through the conductor and is typically described in units of magnetic flux density expressed as Gauss (G) or milliGauss (mG). Magnetic fields, unlike electric fields, are not shielded or weakened by materials that do not conduct electricity (e.g., trees, buildings). Rather, they pass through most materials.

Both magnetic and electric fields decrease rapidly with increased distance from the source. EMF are invisible just like radio, television, and cellular phone signals, all of which are part of the electromagnetic spectrum (reference). EMF are found anywhere there are energized, current-carrying conductors, such as near transmission lines, local distribution lines, substation transformers, household electrical wiring, and common household appliances (reference (21)).

4.5.1.1 Magnetic Field Background Levels

The wiring and appliances located in a typical home produce an average background magnetic field of between 0.5 mG and 4 mG (references (22); (23)). A U.S. government study conducted by the EMF Research and Public Information Dissemination Program determined that most people in the United States are on average, exposed daily to magnetic fields of 2 mG or less (reference (21)). Typical magnetic field strengths near common appliances are shown in Table 4-9.

Table 4-9 Typical Magnetic Field Strengths

Source	Distance from Source			
	0.5 foot	1 foot	2 feet	4 feet
	Typical Magnetic Fields (mG)			
Air Cleaners	180	20	3	0
Copy Machines	90	20	7	1
Fluorescent Lights	40	6	2	0
Computer Displays	14	5	2	0
Hair Dryers	300	1	0	0
Baby Monitor	6	1	0	0
Microwave Ovens	200	4	10	2

Source: reference (21)

4.5.1.2 Research on EMF and Health Impacts

Research on whether exposure to low frequency EMF causes biological responses and health effects has been performed since the 1970s. The U.S. National Institute of Environmental Health Sciences and the World Health Organization have been a part of this research. Their research does not support a relationship or association between exposure to electric power EMF and adverse health effects.

The U.S. National Institute of Environmental Health Science evaluated numerous epidemiologic studies and comprehensive reviews of the scientific literature that examined associations of cancers with living near power lines, with magnetic fields in the home, and with exposure of parents to high levels of magnetic fields in the workplace. They concluded that “no consistent evidence for an association between any source of non-ionizing EMF and cancer has been found” (reference (22)).

The states of Minnesota, Wisconsin, and California have also performed literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group to evaluate EMF research and to develop public health policy recommendations regarding EMF associated with high-voltage transmission lines. The Working Group included staff from a number of state agencies and published its findings in a White Paper on EMF Policy and Mitigation Options. They found that some epidemiological studies have shown no statistically significant association between exposure to EMF and health effects, and some have shown a weak association. The Working Group noted that studies have not been able to establish a biological mechanism for how EMF may cause health impacts.

Worldwide, the majority of scientific panels that have reviewed the research conducted to date conclude that there is insufficient evidence to establish a direct association between EMF and adverse health effects. Based on this work, the Commission has repeatedly found that “there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects” (reference (24)). Appendix F provides detailed background on EMF health impact research.

4.5.1.3 Regulatory Standards

There are currently no federal regulations regarding allowable electric or magnetic fields produced by transmission lines in the United States; however, a number of states have developed state-specific regulations (Table 4-10), and a number of international organizations have adopted EMF guidelines (Table 4-11).

The Commission has established a standard that limits the maximum electric field under transmission lines to 8 kV/m. All transmission lines in Minnesota must meet this standard. The Commission has not adopted a magnetic field standard for transmission lines. However, the Commission has adopted a prudent avoidance approach in routing transmission lines and, on a case-by-case basis, considers mitigation strategies for minimizing EMF exposure levels associated with transmission lines.

Table 4-10 State Electric and Magnetic Field Standards

State	Area where Limits Apply	Field	Limit
Florida	Edge of ROW	Electric	2 kV/m (lines ≤ 500 kV
		Magnetic	150 mG (lines ≤ 230 kV) 200 mG (> 230 kV- ≤ 500 kV) 250 mG (> 500 kV)
	On ROW	Electric	8 kV/m (≤ 230 kV) 10 kV/m (> 230 kV- ≤ 500 kV) 15 kV/m (> 500 kV)
Minnesota	On ROW	Electric	8 kV/m
Montana	Edge of ROW[1]	Electric	1 kV/m
	Road crossings	Electric	7 kV/m
New Jersey	Edge of ROW	Electric	3 kV/m
New York	Edge of ROW	Electric	1.6 kV/m
		Magnetic	200 mG
	Public road crossings	Electric	7 kV/m
	Private road crossings	Electric	11 kV/m
	On ROW	Electric	11.8 kV/m
Oregon	On ROW	Electric	9 kV/m

Notes: Source: reference (21)
[1]May be waived by landowner

Table 4-11 International Electric and Magnetic Field Guidelines

Organization	Electric Field (kV/m)		Magnetic Field (mG)	
	General Public	Occupational	General Public	Occupational
Institute of Electrical and Electronics Engineers	5	20	9,040	27,100
International Commission of Non-ionizing Radiation Protection	4	8	2,000	4,200
American Conference of Industrial Hygienists	1[1]	25	5[1]	20,000[1]
National Radiological Protection Board	10	20	830	4,200

Notes: Source: reference (25)
[1] For persons with cardiac pacemakers or other medical electronic devices

4.5.1.4 Impacts

The predicted electric field levels associated with the project are shown in Table 4-12. Values were calculated assuming minimum conductor-to-ground clearance at mid-span and a height of 1 meter (3.28 feet) above ground. The maximum calculated electric field for the project's configuration is 1.9 kV/m, directly underneath the conductors. This field level is within the Commission's 8 kV/m limit.

Because magnetic fields are dependent on the current flowing on the transmission line and therefore could vary throughout the day, the values in Table 4-13 are provided for two separate scenarios: average load and maximum rated load of the project. Values were calculated assuming minimum conductor-to-

ground clearance at mid-span and a height of 1 meter (3.28 feet) above ground. The maximum calculated magnetic field under maximum rated load is 40.1 mG. The maximum calculated magnetic field at the edge of the ROW (50 ft) is 10.9 mG.

There is no federal standard for transmission line electric or magnetic fields. The Commission has imposed a maximum electric field limit of 8 kV/m measured at 1 meter above ground for new transmission projects. All transmission lines in Minnesota must meet this standard. The Commission has not adopted a magnetic field standard for transmission lines. However, the Commission has adopted a prudent avoidance approach in routing transmission lines and, on a case-by-case basis, considers mitigation strategies for minimizing EMF exposure levels associated with transmission lines.

Table 4-12 Calculated Electric Fields (kV/M) for project (3.28 feet above Ground)

Structure Type (kV)	Voltage (kV)	Horizontal Distance from Pole Centerline (feet)												
		-300	-200	-100	-75	-50	-25	0	25	50	75	100	200	300
161 Single-Circuit Monopole	Nominal Voltage (161 kV)	0.012	0.026	0.11	0.201	0.431	0.903	1.931	1.291	0.348	0.183	0.114	0.03	0.013

Table 4-13 Calculated Magnetic Fields (mG) for the Project

Structure Type	Line Current per Phase (Amps)	Line Current (Amps)	Horizontal Distance (feet) from Pole Centerline												
			-300	-200	-100	-75	-50	-25	0	25	50	75	100	200	300
161 kV Single Circuit Monopole	71.7	Average Load	0.086	0.19	0.67	1.1	2.2	5.2	10.7	7	2.9	1.4	0.84	0.21	0.094
	268	Maximum Rated Load	0.32	0.7	2.5	4.1	8.1	19.3	40.1	26.1	10.9	5.4	3.1	0.8	0.35

4.5.1.5 Mitigation Measures

No EMF impacts are anticipated for the project; therefore, no mitigation measures are proposed.

4.5.2 Implantable Medical Devices

Electromechanical implantable medical devices, such as cardiac pacemakers, implantable cardioverter defibrillators (ICDs), neurostimulators, and insulin pumps may be subject to interference from electromagnetic interference (EMI), which could mistakenly trigger a device or inhibit it from responding appropriately (reference (10)). While EMI can result in either inappropriate triggering or inhibition of a device from responding properly, only a small percentage of these occurrences are caused by external EMI. The American Conference of Governmental Industrial Hygienists (ACGIH) and ICD Manufacturer's recommended magnetic and electric field exposure limits are 1 g and 1 kV/m, respectively, for people with pacemakers (references (10, 26)). One gauss is five to 10 times greater than the magnetic field likely to be produced by a high-voltage transmission line (reference (10)).

4.5.2.1 Impacts

EMF exposure produced by transmission lines generally does not affect implantable devices, but in the event that they are affected it is typically a temporary asynchronous pacing. Electric and magnetic field levels decrease with distance; maximum electric fields at the edge of the ROW are anticipated to be less than 1 kV/m (Table 4-12). Maximum magnetic fields at the edge of the ROW are anticipated to be 10.9 mG (Table 4-13). Accordingly, impacts to implantable medical devices and their users are anticipated to be minimal. If a medical device is affected, the device will return to normal operation when the person moves away from the source of the EMF (reference (10)). Therefore, no adverse health impacts or permanent impacts on implantable medical devices are anticipated as a result of the project.

4.5.2.2 Mitigation Measures

Because no adverse health impacts or permanent impacts on implantable medical devices are anticipated as a result of the project, no mitigation measures are proposed.

4.5.3 Stray Voltage

Electrical systems that deliver power to end-users and electrical systems within the end-user's business, home, farm, or other buildings are grounded to the earth for safety and reliability reasons. The grounding of these electrical systems results in a small amount of current flow through the earth. Stray voltage could arise from neutral currents flowing through the earth via ground rods, pipes, or other conducting objects, or from faulty wiring or faulty grounding of conducting objects in a facility. Thus, stray voltage could exist at any business, house, or farm which uses electricity—independent of whether there is a transmission line nearby.

A small amount of current flows through the earth at points where utility distribution systems are grounded. This is called neutral-to-earth voltage (NEV), which is voltage that is associated with distribution lines and electrical wiring within buildings and other structures (reference (27)). Stray voltage is not created by transmission lines, as they do not directly connect to businesses or residences. Stray voltage is generally associated with electrical distribution lines and electrical service at a residence or on a farm. Site-specific mitigation measures may be required to address potential stray voltage impacts (reference (28)).

4.5.3.1 Impacts

No impacts due to stray voltage are anticipated from the project. Transmission lines do not create stray voltage as they do not directly connect to businesses, residences, or farms. The project will not directly connect to businesses or residences in the area and will not change local electrical service.

4.5.3.2 Mitigation Measures

If there are stray voltage concerns on a landowner's property or a landowner would like an on-site investigation, the applicant suggests they contact their electric service provider directly. The applicant has committed to coordinate with local companies to perform pre- and post-construction testing of potentially impacted facilities and to address property owner concerns if requested.

4.5.4 Induced Voltage

It is possible for electric fields from a transmission line to extend to a conductive object that is near a line. This may induce a voltage on the object; the magnitude of the voltage depends on several factors such as the size, shape, and orientation of the object along the ROW. Smaller conductive objects near the line could cause a nuisance shock to a person, but this nuisance shock is not a potential safety hazard. If there were insulated pipelines, electric fences, telecommunication lines, or other conductive objects with greater lengths and sizes, induced voltage from a transmission line could become unsafe to people who touch them; however, this still has not been found to be a health safety hazard (reference (29)).

4.5.4.1 Impacts

Minimal impacts due to induced voltage are anticipated from the project. Shocks from induced voltage from transmission lines are considered more of a nuisance than a danger. The transmission line will follow the NESC, which requires the steady-state (continuous) current between the earth and an insulated object located near a transmission line to be below 5 milliamps (mA) (reference (29)). In addition, the Commission limits electric fields to 8 kV/m to prevent serious hazard from shocks due to induced voltage under transmission lines (reference (30)). Any issued route permits have to meet the NESC standards and the Commission's electric field limit.

4.5.4.2 Mitigation Measures

Potential impacts from induction will be mitigated through the applicant's appropriate design measures, NESC standards, and Commission permit conditions.

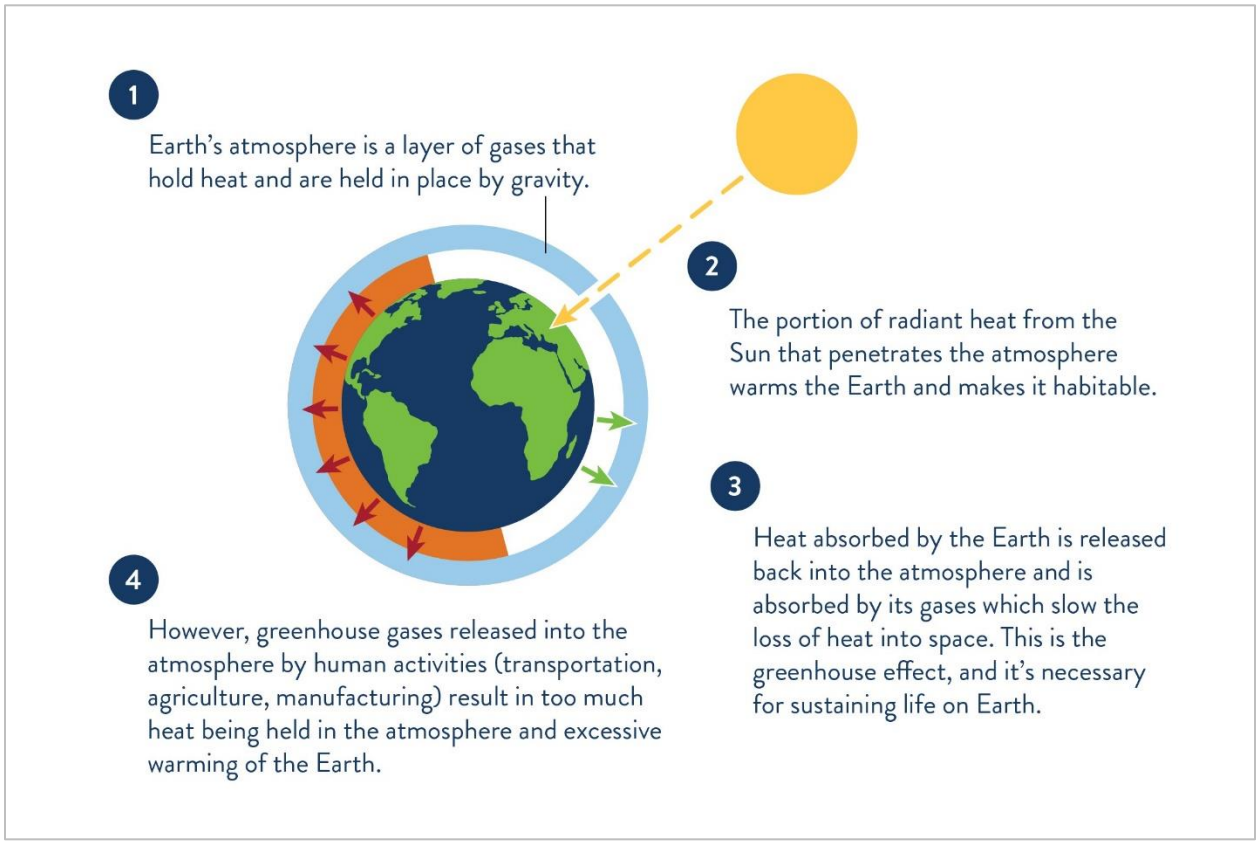
4.6 Climate Change

This section describes potential impacts of the project on climate change and the project's climate resilience.

4.6.1 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. Some of the solar radiation that reaches Earth's surface radiates back toward space as infrared radiation. GHGs trap heat in the atmosphere from the absorption of this infrared radiation, which causes a rise in the temperature of Earth's atmosphere. This warming process is known as the greenhouse effect (reference (31)). This is illustrated below in Figure 4-3.

Figure 4-3 Greenhouse Effect



The most common GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases. Anthropogenic GHG emissions are responsible for about two-thirds of the energy imbalance that is causing Earth's temperature to rise, which has direct and cascading effects on weather and climate patterns, vegetation, agriculture, disease, availability of water, and ecosystems (reference (32)).

The State of Minnesota has established a goal to reduce statewide greenhouse gas emissions across all sectors producing those emissions by at least the following amounts, compared with the level of emissions in 2005: (1) 15 percent by 2015; (2) 30 percent by 2025; (3) 50 percent by 2030; and (4) to net zero by 2050.

4.6.1.1 Impacts

GHG emissions associated with the construction and operation of the project consist of direct emissions generated from combustion sources (mobile off-road sources) and land use change.

Construction emissions from mobile combustion were calculated for construction equipment (dump trucks, cranes, bulldozers, etc.). Construction emissions from temporary land use changes were calculated with an assumed construction duration of nine months. Project construction is expected to produce 6,200.3 metric tons CO_2e, and the temporary land use change is expected to produce 47.69 metric tons CO_2e. Compared to the approximately 126.1 million metric tons CO_2e emitted statewide in 2022, the expected GHG emissions from the project's construction are expected to be minimal. GHG calculations are summarized in Appendix G.

Identified GHG emissions associated with operation of the project include direct emissions generated from combustion sources (mobile sources) and permanent land use changes where the Forks Switching Station will be constructed. Operational emissions from mobile combustion were calculated for inspection maintenance equipment assumed to be used annually (pickup trucks) and vegetation management equipment assumed to be used annually (bucket truck, skid steer mower, and chipper). Project operation and maintenance is expected to produce 1.88 metric ton CO_2e annually. Permanent land use change for the project includes the area of land converted to operate the Forks Switching Station. Permanent land use change is expected to produce 2.67 metric ton CO_2e annually. Permanent land use change from pole locations would be negligible. Small amounts of O_3 are produced from the operation of transmission lines through the ionization of air molecules during corona discharge. These emissions are anticipated to be minimal. Operational emissions from electrical consumption are expected to be negligible for the project.

Although project construction and operations would result in GHG emissions, the project is needed to optimize regional transfer capability as coal-fired generation ceases in Minnesota and significant renewable generation comes online in the upper Midwest. Thus, on whole, the project would assist in achieving the state's GHG reduction goals.

4.6.1.2 Mitigation Measures

Minimization efforts to reduce project GHG emissions may include efficient planning of vehicle and equipment mobilization and travel, vehicle idle time reduction, proper equipment upkeep, efficient planning of material delivery, proper use of power tools, use of battery powered tools when feasible, and alternative fuel vehicle usage when feasible.

4.6.2 Climate Resilience

Climate change is observed as change in temperature and precipitation patterns, increase in ocean temperatures and sea level, change in extreme weather events, and ecosystem change. These changes are largely attributed to the greenhouse effect. As the amount of GHGs in Earth's atmosphere increases, the greenhouse effect causes Earth to become warmer (reference (33)).

There are also naturally occurring climate variations. These are cyclical patterns caused by variations in ocean circulation and atmospheric pressure patterns that occur on timescales of weeks to decades. Increased global surface temperatures may change these natural climate patterns and the resulting impact on regional precipitation and temperature anomalies (reference(34)).

Warmer and wetter conditions have been observed in Minnesota since 1895, especially in the past several decades. An increase in precipitation and precipitation intensity has also been observed, including devastating, large-area, extreme rainstorms. A rise in temperatures, particularly during the winter season, has been occurring as well. These trends are expected to continue (reference (35)).

To understand how climate change is anticipated to affect the project location, historical and projected climate data is considered, as well as climate hazard projections. The DNR's Minnesota Climate Explorer tool provides a summary of historical climate data for various regions across Minnesota.

Figure 4-4 summarizes the mean, maximum, and minimum average daily temperature from 1895 to 2024 for Jackson County. It also shows the temperature trends per decade from 1895 to 2024 and from 1994 to 2024 to represent the full record of data and the most recent 30-year climate normal period, respectively. In each temperature statistic, the county exhibited an increase in daily temperature from

1895 to 2024. The annual average minimum daily temperature has increased at the largest rate of the three temperature statistics.

Figure 4-4 Historical Annual Mean, Maximum, and Minimum Daily Air Temperature (°F) for Jackson County, Minnesota from 1895 to 2024

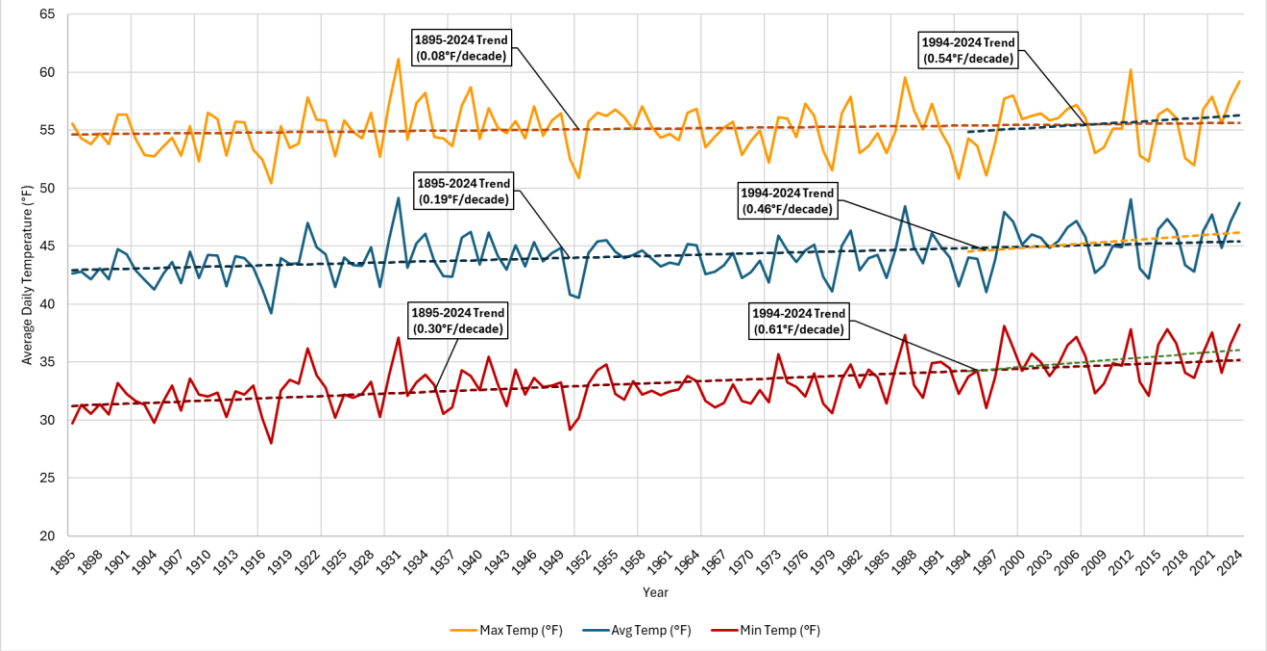
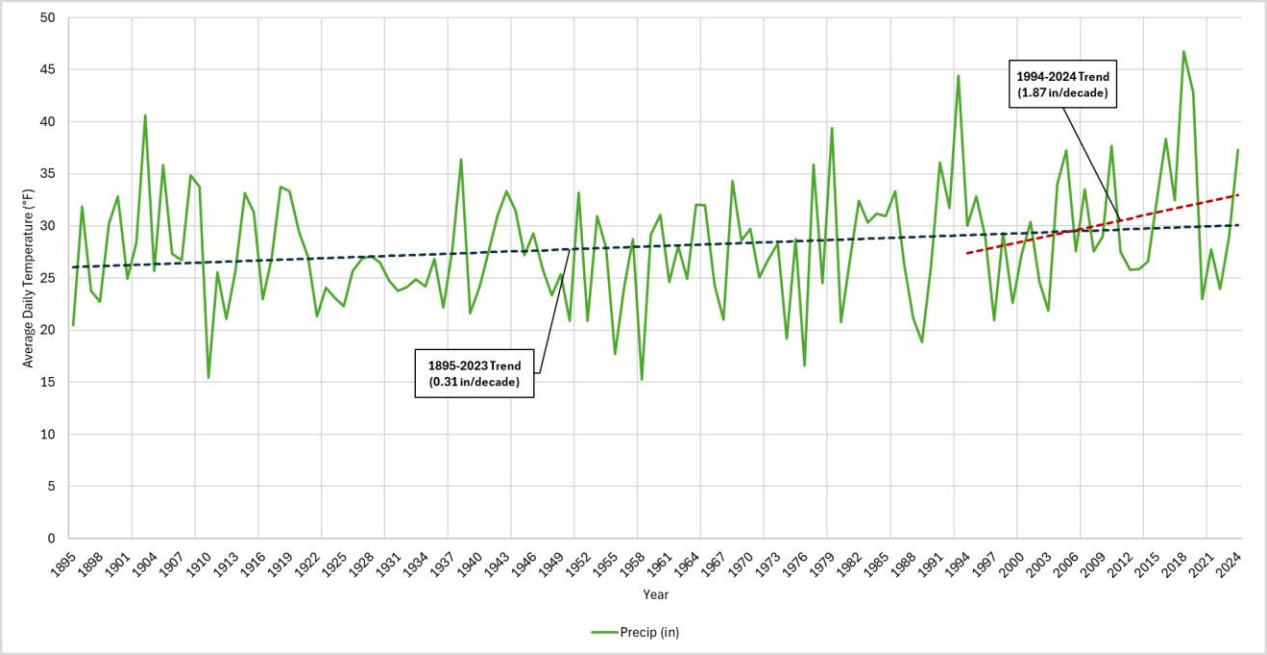


Figure 4-5 shows the total annual precipitation for Jackson County from 1895 to 2024. Total annual precipitation has increased from 1895 to 2024 by a rate of 0.31 in/decade and increased from 1994 to 2024 by a rate of 1.87 in/decade.

Figure 4-5 Historical Total Annual Precipitation (inches) for Jackson County, Minnesota from 1895 to 2024



Future projections are based on the Minnesota dynamically downscaled climate model data that was developed by the University of Minnesota (reference (36)) and are summarized in three scenarios, Shared Socioeconomic Pathway (SSP) 245, SSP370, and SSP585. SSP is a measure adopted by the Intergovernmental Panel on Climate Change (IPCC) to represent various GHG concentration pathways as well as social and economic decisions (reference (36)).

SSP245 represents an intermediate emission scenario where a net radiative forcing of 4.5 watts per meter squared (W/m^2) is received by the earth due to the GHG effect and emissions begin to decrease around 2040 (reference (37)). SSP370 represents a high emissions scenario, where a net radiative forcing of 7.0 W/m2 is received by the earth (reference (37)). SSP585 represents a very high emissions scenario, where a net radiative forcing of 8.5 W/m2 is received by the earth and no emissions are reduced through 2100 (reference (37)).

Table 4-14 shows the model historical and projected temperature values for the project. Under all scenarios for each statistic, temperature values are projected to increase through the end of the 21st century. The largest increases occur in the minimum daily temperature under all scenarios except SSP370 2040-2059 and SSP370 2060-2079, which saw the largest increases in the maximum daily temperature.

Table 4-14 Projected Average, Minimum, and Maximum Daily Temperatures for Jackson County, MN

Scenario	Time Period	Average Daily Temperature (°F) - Ensemble Mean	Minimum Daily Temperature (°F) - Ensemble Mean	Maximum Daily Temperature (°F) - Ensemble Mean
Historical	1995-2014	45.3	35.6	58.0
ssp245	2040-2059	49.0 (3.7)	39.4 (3.8)	61.6 (3.6)
ssp245	2060-2079	50.2 (4.9)	40.8 (5.1)	62.7 (4.7)
ssp245	2080-2099	51.9 (6.6)	42.3 (6.7)	64.5 (6.5)
ssp370	2040-2059	50.4 (5.1)	40.5 (4.9)	63.4 (5.4)
ssp370	2060-2079	52.5 (7.2)	42.6 (7.0)	65.3 (7.3)
ssp370	2080-2099	54.2 (8.9)	44.6 (9.0)	66.8 (8.8)
ssp585	2040-2059	49.6 (4.3)	40.0 (4.4)	62.2 (4.2)
ssp585	2060-2079	52.2 (6.9)	42.7 (7.1)	64.6 (6.6)
ssp585	2080-2099	56.4 (11.1)	47.2 (11.6)	68.6 (10.6)

Table 4-15 shows the model historical and projected precipitation values for the project. Under the SSP245, a slight increase in precipitation followed by a decrease in precipitation is projected. Under SSP370, a decrease in precipitation from modeled historical values is projected to occur under all time periods (largest occurring before 2060). For SSP585, a slight decrease in precipitation from modeled -+historical values is projected followed by a sharp increase in precipitation by the end of the century.

Table 4-15 Projected Annual Precipitation for Jackson County, MN

Scenario	Time Period	Total Annual Precipitation (in) - Ensemble Mean
Historical	1995-2014	31.2
ssp245	2040-2059	31.6 (0.4)
ssp245	2060-2079	32.0 (0.8)
ssp245	2080-2099	29.3 (-1.9)
ssp370	2040-2059	25.8 (-5.4)
ssp370	2060-2079	27.4 (-3.7)
ssp370	2080-2099	29.7 (-1.5)
ssp585	2040-2059	30.2 (-0.9)
ssp585	2060-2079	32.9 (1.7)
ssp585	2080-2099	33.3 (2.1)

The EPA Climate Resilience Evaluation and Awareness Tool (CREAT) provides general climate projections to help planning in water, wastewater, and stormwater utilities (reference (38)). For the project area, CREAT anticipates the 100-year storm intensity increasing from a value between 4.1 and 15.1 percent in 2035 to between 7.9 to 29.4 percent in 2060. The EPA Streamflow Projections Map

summarizes general projections related to streamflow under climate change (reference (39)). The EPA Streamflow Projections Map anticipates a general change in average streamflow of streams within the project area by a ratio of 1.30 to 1.40 (90th percentile) under wetter projections and a ratio of 0.94 to 1.00 (10th percentile) under drier projections in 2071 to 2100 (RCP 8.5) compared to baseline historical flow (1976 to 2005).

4.6.2.1 Impacts

Changes in temperature, precipitation, and extreme weather events are expected to occur over the lifetime of the project. Temperature and precipitation are generally expected to increase, with extreme weather events becoming more frequent. High temperatures can affect the sagging of a transmission line and its thermal tolerance. Changes in storm timing and intensity can lead to compromised structure foundations. Increased storm intensity and high winds can lead to compromised conductors and damaged structures.

4.6.2.2 Mitigation Measures

The project will be designed for resiliency under changing climatic factors such as increased temperatures and changes in intensity and timing of storm events and associated precipitation, as well as in accordance with NERC reliability standards. Additional mitigation measures are not proposed.

4.7 Air Quality

The Clean Air Act (CAA) is a federal law that regulates air emissions from stationary and mobile sources. The CAA requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, referred to as “criteria pollutants”. The six criteria pollutants are ground-level ozone, particulate matter (PM_{10}/$PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb) (reference (40)). NAAQS are set to address the public health and welfare risks posed by certain widespread air pollutants (references (41); (42)). Compliance with the national and state air quality standards in the state of Minnesota is assessed at the county level. The EPA designates Jackson County to be in attainment for all NAAQS.

In Minnesota, air quality is monitored using stations located throughout the state. The MPCA uses data from these monitoring stations to calculate the Air Quality Index (AQI) on an hourly basis for O_3, $PM_{2.5}$, SO_2, NO_2, and CO. Each day is categorized based on the pollutant with the highest AQI value for a particular hour (reference (43)).

The project area is located nearest to the Emmetsburg, Iowa Lakes Community College air quality monitor in Palo Alto County, IA, located approximately 45 miles southeast of the project area. This station monitors for O_3 and $PM_{2.5}$. A summary of days in each AQI category at the Emmetsburg, Iowa Lakes Community College for the most recent five-year period available, covering 2024-2020, is provided in Table 4-16.

Table 4-16 Days in Each Air Quality Index Category – Emmetsburg, Iowa Lakes Community College

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2024	218	84	0	0	0
2023	211	135	14	4	0
2022	271	94	0	0	0
2021	250	108	2	2	0
2020	273	93	0	0	0

Air quality at this monitoring station has generally been considered good for the majority of the past five reported years. Since 2020, 2023 had the largest number of days classified as moderate or worse. In 2023, 142 days were classified as moderate, 14 days were classified as unhealthy for sensitive groups, and four days were classified as unhealthy.

4.7.1 Impacts

Air emissions during construction will primarily consist of emissions from construction equipment and will include pollutants such as CO_2, nitrogen oxides (NO_X), $PM_{2.5}$, and PM_{10}. Dust generated from earth disturbing activities also gives rise to particulate matter. Emissions from construction vehicles could be minimized by using modern equipment with lower emissions ratings. Adverse effects on the surrounding environment are expected to be negligible due to the temporary disturbance during construction and the intermittent nature of the emission- and dust-producing construction phases.

During operation of the transmission line and Forks Switching station, air emissions will be minimal. Small amounts of NO_X will be produced from the operation of the transmission line through ionization of air molecules during corona discharge. These emissions are expected to be minimal. A small amount of ozone will be created due to corona from the operation of transmission lines. The emission of ozone during operations is not anticipated to have a significant impact on the environment (reference (44)).

4.7.2 Mitigation Measures

If construction activities generate problematic dust levels, the applicant may employ construction-related practices such as wetting of unpaved roads and exposed or barren ground to control fugitive dust. Additionally, cleared rights-of way, storage areas, and access roads would be restored and revegetated once construction is complete, limiting further dust production during operation.

During operations, air emissions will be minimal. Small amounts of emissions will be associated with the intermittent project operation and maintenance activities via mobile combustion and roadway dust generation. If dust levels become problematic during operation and maintenance activities, the applicant may employ fugitive dust control practices such as wetting of unpaved roads.

4.8 Land-Based Economies

The project's construction and operation have the potential to impact land-based economies. Transmission lines are a physical, long-term presence on the landscape which could prevent or otherwise limit the use of land for other purposes. When placed in an agricultural field, transmission line structures

have a relatively small footprint, yet they can interfere with farming operations. In addition, structures and tall growing trees are not allowed in transmission line ROW.

Elements of land-based economies include agriculture, forestry, mining, and recreation and tourism, which are discussed in more detail in the following sections.

4.8.1 Agriculture

Agriculture is prevalent throughout the project area (Map 4-7). There are a total of 55.5 acres of agriculture land within the ROW, which equates to 54.4 percent of the total land cover within the ROW (Figure 4-6).

Figure 4-6 Typical Land Use Within the Project ROW

The USDA Natural Resource Conservation Service (NRCS) Soil Survey Geographic (SSURGO) database (reference (45)) identifies farmland soils based on three categories, which are subject to protection under the Farmland Protection Policy Act (FPPA). These categories include prime farmland, prime farmland when drained, and farmland of statewide importance. Prime farmland is defined by the NRCS as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. A total of 100.12 acres within the ROW have soil that is characterized as prime farmland, farmland of statewide importance, or prime farmland if drained, which equates to 98.09 percent of the agriculture land within the ROW (Map 4-8).

In addition, there are 11.8 acres of agricultural land within the Forks Switching Station siting area. Within the Forks Switching Station siting area, 5.5 acres are classified as prime farmland and 6.3 acres are classified as prime farmland if drained (Map 4-8).

According to the Minnesota Natural Resource Atlas (reference (46)), Minnesota Department of Agriculture (MDA) organic farm directory (reference (47)), and the MDA apiary registry (reference (48)), there are no Conservation Reserve Enhancement Program (CREP) enrolled lands, registered organic producers, or apiaries within the ROW.

4.8.1.1 Impacts

The project has the potential to impact agriculture both temporarily and permanently. Temporary impacts typically include impacts from transmission line construction and annual transmission line inspections. Localized construction impacts will cease once the transmission line construction phase is complete. Temporary impacts from annual transmission line inspections will be limited to the ROW and areas where obstructions may require off ROW access. These temporary impacts may result in the displacement of livestock or impacts to crops and soil.

Permanent transmission line impacts result from the placement of transmission line structures within agricultural fields. Permanent structures can have varying sized footprints due to the structure design and distance from each another, See Table 3-1 for the proposed structure design for the project. Examples of permanent impacts resulting from transmission line structures include restriction of farming equipment, interference with aerial spraying, and obstruction of irrigation systems. In addition, the Forks Switching Station will permanently impact up to 2.8 acres of land previously used for agriculture. These impacts can result in financial impacts through loss of income and decreases in property values.

4.8.1.2 Mitigation Measures

Impacts to agricultural operations have been minimized by proposing a project that primarily follows existing roadway ROW. The applicant will work with landowners to minimize the impact on agricultural activities. The following mitigation measures are proposed:

- To the extent practicable, construction will be scheduled during periods when agricultural activities will be minimally affected.
- Local roads will be used as much as possible to move equipment and install structures. If local roads cannot be used, equipment will be limited to the ROW to the full extent. If movement outside the ROW is required, permission from landowner’s will be obtained.
- All temporary workspace required to construct the project will be leased from landowners through agreements.
- All material and debris during construction will be removed and properly disposed of.
- Landowners will be compensated for any crop damage, crop loss, and/or soil compaction.
- All areas disturbed during construction will be repaired and restored to pre-construction conditions. In addition to agricultural fields, this may include fences, gates, ditches, terraces, roads, or other features.

T102 R38W
Sec. 15

T102 R38W
Sec. 14

T102 R38W
Sec. 13

Rost Substation

T102 R38W
Sec. 22

EWINGTON
TOWNSHIP

T102 R38W
Sec. 23

T102 R38W
Sec. 24

T102 R38W
Sec. 27

T102 R38W
Sec. 26

T102 R38W
Sec. 25

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- Applicant's Proposed Alignment
- Right of Way
- Route Width (Proposed Route)
- Residence
- Out Building

National Land Cover Dataset (NLCD, 2021)

- 21 Developed, Open Space
- 22 Developed, Low Inensity
- 23 Developed, Medium Inensity
- 24 Developed, High Intensity
- 31 Barren Land
- 43 Mixed Forest
- 82 Cultivated Crops

0 650 1,300
Feet

Map 4-7
Page 1 of 5
LAND COVER
Forks-Rost 161 kV Project

T102 R38W
Sec. 27

T102 R38W
Sec. 26

EWINGTON
TOWNSHIP

T102 R38W
Sec. 25

T102 R38W
Sec. 34

T102 R38W
Sec. 35

T102 R38W
Sec. 36

Applicant's Proposed Alignment
Right of Way
Route Width (Proposed Route)
Residence
Out Building

National Land Cover Dataset (NLCD, 2021)
21 Developed, Open Space
22 Developed, Low Inensity
23 Developed, Medium Inensity
24 Developed, High Intensity
31 Barren Land
43 Mixed Forest
71 Herbaceous
82 Cultivated Crops

0 650 1,300
Feet

Map 4-7
Page 2 of 5
LAND COVER
Forks-Rost 161 kV Project

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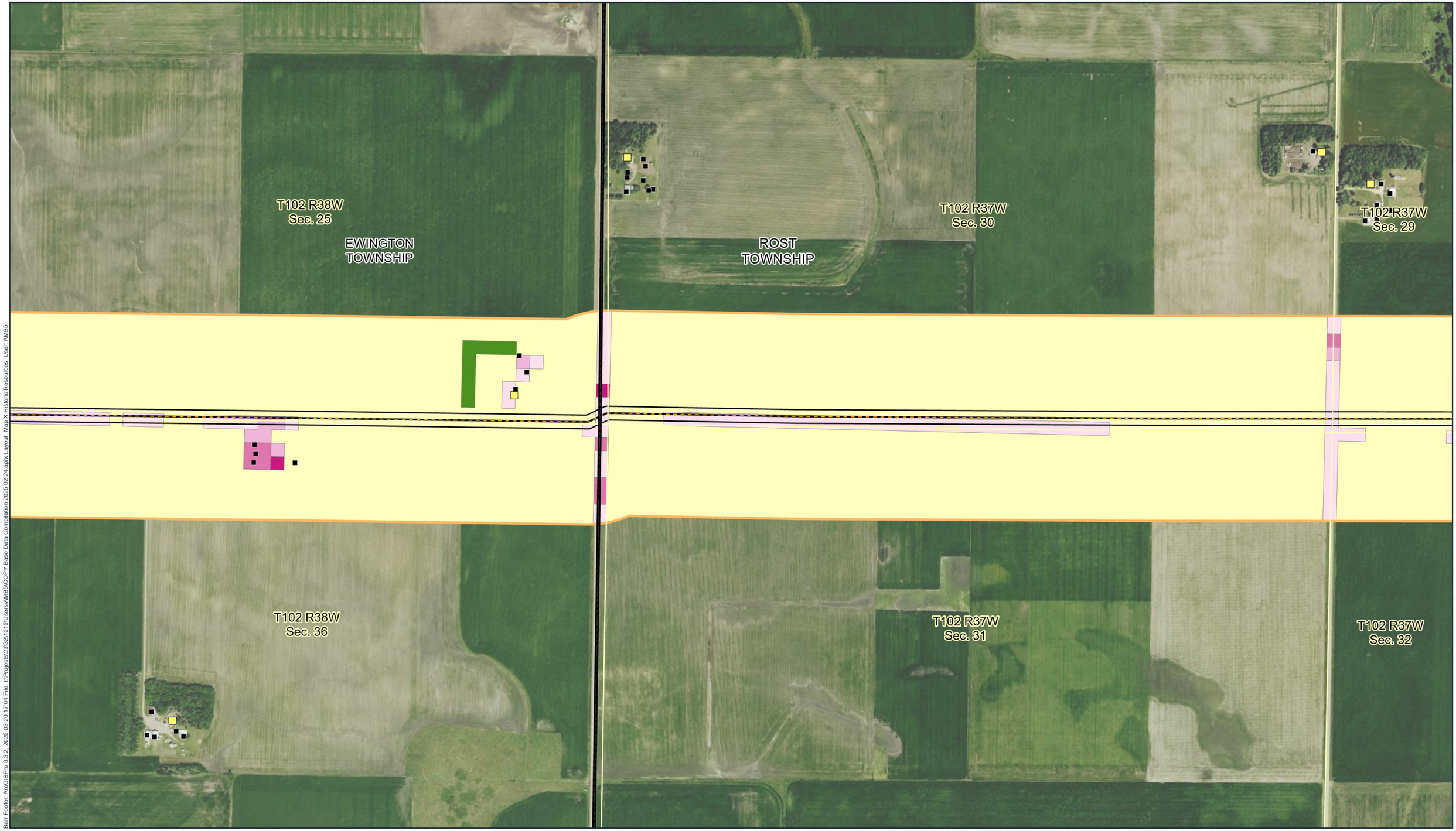

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Applicant's Proposed Alignment
Right of Way
Route Width (Proposed Route)
Residence
Out Building

National Land Cover Dataset (NLCD, 2021)
21 Developed, Open Space
22 Developed, Low Inensity
23 Developed, Medium Inensity
24 Developed, High Intensity
43 Mixed Forest
82 Cultivated Crops

0 650 1,300
Feet

Map 4-7
Page 3 of 5
LAND COVER
Forks-Rost 161 kV Project

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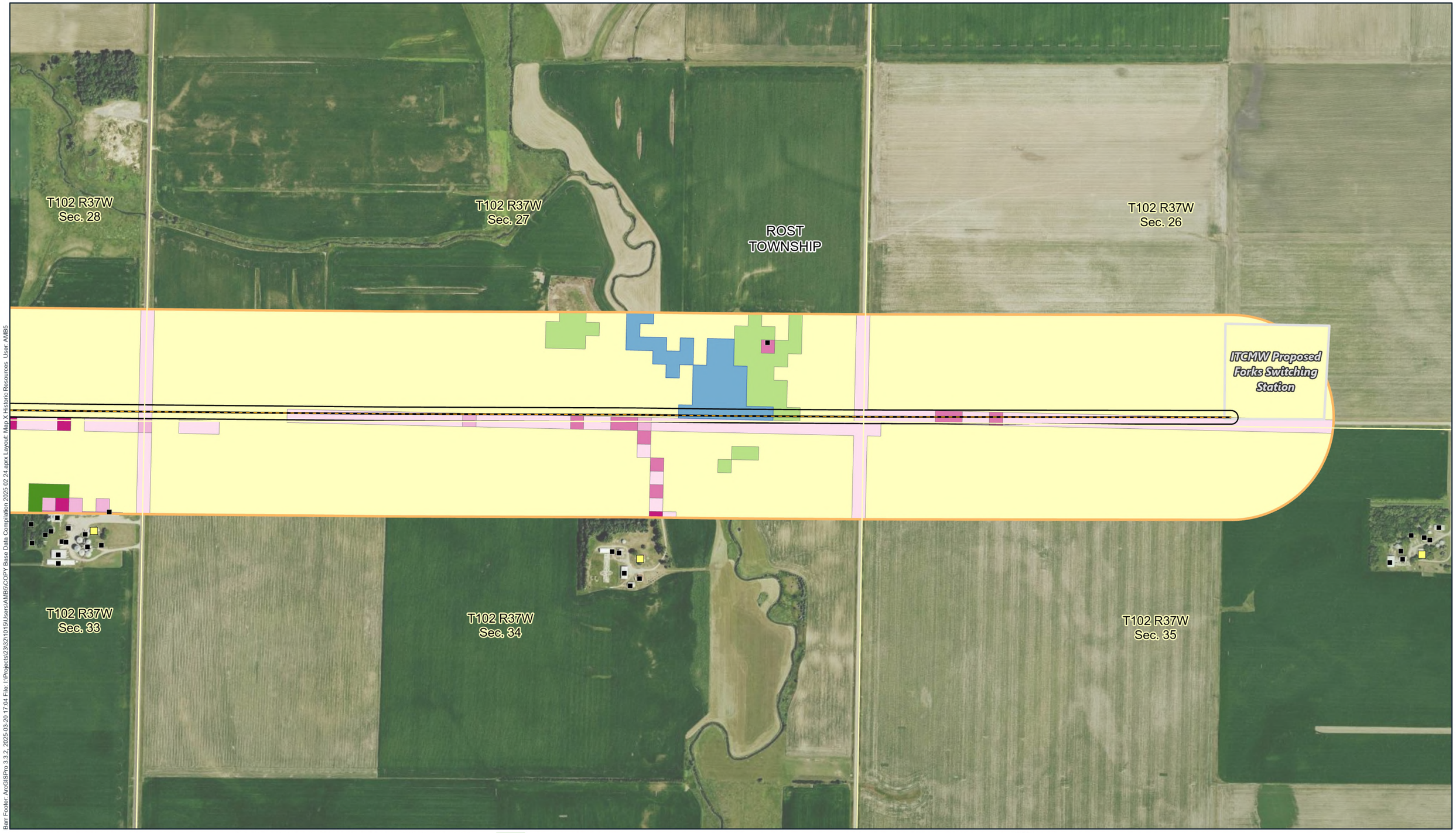
- Applicant's Proposed Alignment
- Right of Way
- Route Width (Proposed Route)
- Residence
- Out Building

National Land Cover Dataset (NLCD, 2021)

- 21 Developed, Open Space
- 22 Developed, Low Inensity
- 23 Developed, Medium Inensity
- 24 Developed, High Intensity
- 43 Mixed Forest
- 71 Herbaceous
- 82 Cultivated Crops

0 650 1,300
Feet

Map 4-7
Page 4 of 5
LAND COVER
Forks-Rost 161 kV Project



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Applicant's Proposed Alignment
Right of Way
Route Width (Proposed Route)
Residence
Out Building

National Land Cover Dataset (NLCD, 2021)
21 Developed, Open Space
22 Developed, Low Inensity
23 Developed, Medium Inensity
24 Developed, High Intensity
43 Mixed Forest
71 Herbaceous
82 Cultivated Crops
95 Emergent Herbaceous Wetlands

0 650 1,300
Feet

Map 4-7
Page 5 of 5
LAND COVER
Forks-Rost 161 kV Project

T102 R38W
Sec. 15

EWINGTON TOWNSHIP

T102 R38W
Sec. 14

T102 R38W
Sec. 13

Rost Substation

T102 R38W
Sec. 22

T102 R38W
Sec. 23

T102 R38W
Sec. 24

T102 R38W
Sec. 27

T102 R38W
Sec. 26

T102 R38W
Sec. 25

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Applicant's Proposed Alignment
Right of Way
Route Width (Proposed Route)
Residence
Out Building

SSURGO Soils Farmland Classification
All areas are prime farmland
Prime farmland if drained

N

0 650 1,300
Feet

Map 4-8
Page 1 of 5
PRIME FARMLAND
Forks-Rost 161 kV Project

T102 R38W
Sec. 27

T102 R38W
Sec. 26

EWINGTON
TOWNSHIP

T102 R38W
Sec. 25

T102 R38W
Sec. 34

T102 R38W
Sec. 35

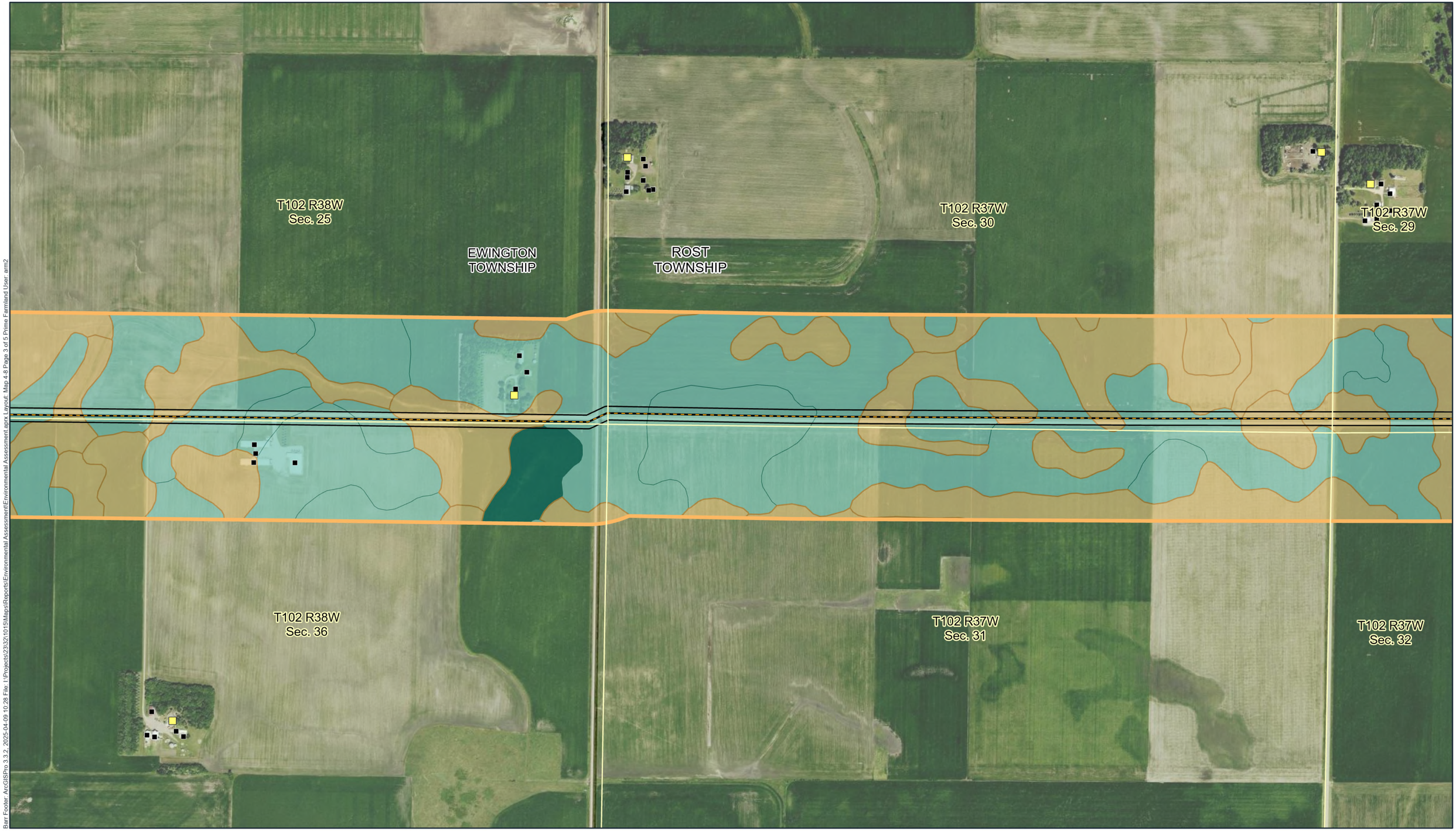
T102 R38W
Sec. 36

Applicant's Proposed Alignment
Right of Way
Route Width (Proposed Route)
Residence
Out Building

SSURGO Soils Farmland Classification
Farmland of statewide importance
All areas are prime farmland
Prime farmland if drained

0 650 1,300
Feet

Map 4-8
Page 2 of 5
PRIME FARMLAND
Forks-Rost 161 kV Project



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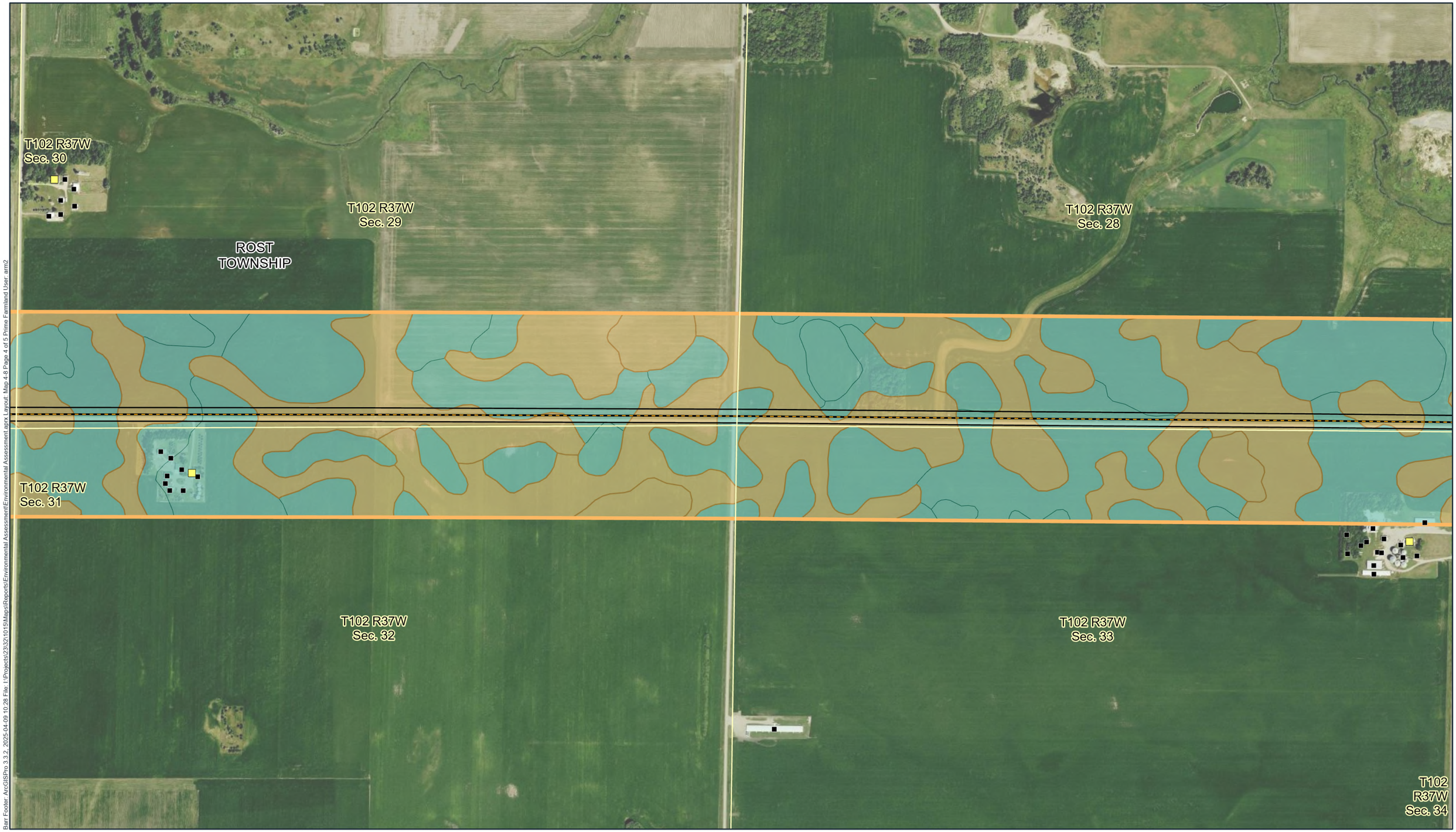
Applicant's Proposed Alignment
Right of Way
Route Width (Proposed Route)
Residence
Out Building

SSURGO Soils Farmland Classification
Farmland of statewide importance
All areas are prime farmland
Prime farmland if drained

0 650 1,300
Feet

Map 4-8
Page 3 of 5
PRIME FARMLAND
Forks-Rost 161 kV Project



Applicant's Proposed Alignment
Right of Way
Route Width (Proposed Route)
Residence
Out Building

SSURGO Soils Farmland Classification
All areas are prime farmland
Prime farmland if drained

N

0 650 1,300
Feet

Map 4-8
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PRIME FARMLAND
Forks-Rost 161 kV Project

Applicant's Proposed Alignment
Right of Way
Route Width (Proposed Route)
Residence
Out Building

SSURGO Soils Farmland Classification
Farmland of statewide importance
All areas are prime farmland
Prime farmland if drained
Not prime farmland

0 650 1,300
Feet

Map 4-8
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PRIME FARMLAND
Forks-Rost 161 kV Project

4.8.2 Forestry

Minnesota's forests primarily consist of aspen/birch, spruce/fir, and oak/hickory forest types, which are managed by private/tribal industry (44 percent), state government (24 percent), federal government (17 percent), and counties/municipalities (15 percent) (reference (49)). As of 2020, Minnesota's forest products industry was the state's fifth largest manufacturing sector by employment and provided 64,500 jobs (reference (49)). In 2017, Minnesota's forest products industry produced $17.8 billion of shipment value (gross sales) and provided 8.5 percent of all manufacturing payroll employment.

Timber harvested in Minnesota is used for construction materials, paper products, and heating for homes, among other commercial goods. Additionally, timber harvested from private commercial forest lands is primarily used in the manufacturing of paper products.

According to the DNR forest inventory, there are no forested lands or commercial forestry operations within the ROW.

4.8.2.1 Impacts

For safe operation of the project, trees and other tall-growing vegetation must be removed from the transmission line ROW. Vegetation clearing typically consists of initial vegetation clearing and minor tree removal before construction and on-going maintenance within the ROW following construction.

Due to the absence of known forested lands or forestry operations in the ROW, impacts to forestry resources are not anticipated as a result of the project.

4.8.2.2 Mitigation Measures

Since impacts to forestry resources are not anticipated, mitigation is not proposed.

4.8.3 Mining

Mining is a significant industry in Minnesota, with mining operations classified into two categories: metallic minerals and non-metallic minerals (reference (50)). Metallic minerals consist of materials such as iron ore, copper, and nickel, while non-metallic minerals consist of materials such as aggregate, peat, and kaolin clay. Aggregate materials are used in construction activities and usually consist of raw materials such as sand, gravel, and crushed stone. There are no known mining operations documented in the ROW (Map 4-2).

4.8.3.1 Impacts

Since there are no known mining operations documented in the ROW, no impacts to mining are anticipated as a result of the project.

4.8.3.2 Mitigation Measures

Since impacts to mining are not anticipated, mitigation is not proposed.

4.8.4 Recreation and Tourism

Tourism and recreational activities commonly overlap; the difference between the two is the distance traveled to access these opportunities. Recreational activities are generally located within the vicinity of

one's home and easily accessible, while tourism involves activities that require substantial travel and may incur additional expenses as a result.

Tourism within Jackson County includes farm and home shows, town and county days, the Jackson County Fair, gold events, holiday parades, and fireworks. Tourism destinations include Fort Belmont, Jason Speedway, the Historic State Theatre, Jackson County Historical Society Museum, and the Round Lake Vineyards and Winery.

In addition, the Rost Waterfowl Production Area (WPA) and the Ulbricht WPA (Map 4-9) provide recreational activities such as hiking, hunting, and wildlife viewing.

There are no Aquatic Management Areas, Wildlife Management Areas (WMAs), Scientific and Natural Areas, golf courses, county parks or trails, local parks or trails, scenic byways, snowmobile trails, state forests, state parks, or State Game Refuges located within the project area.

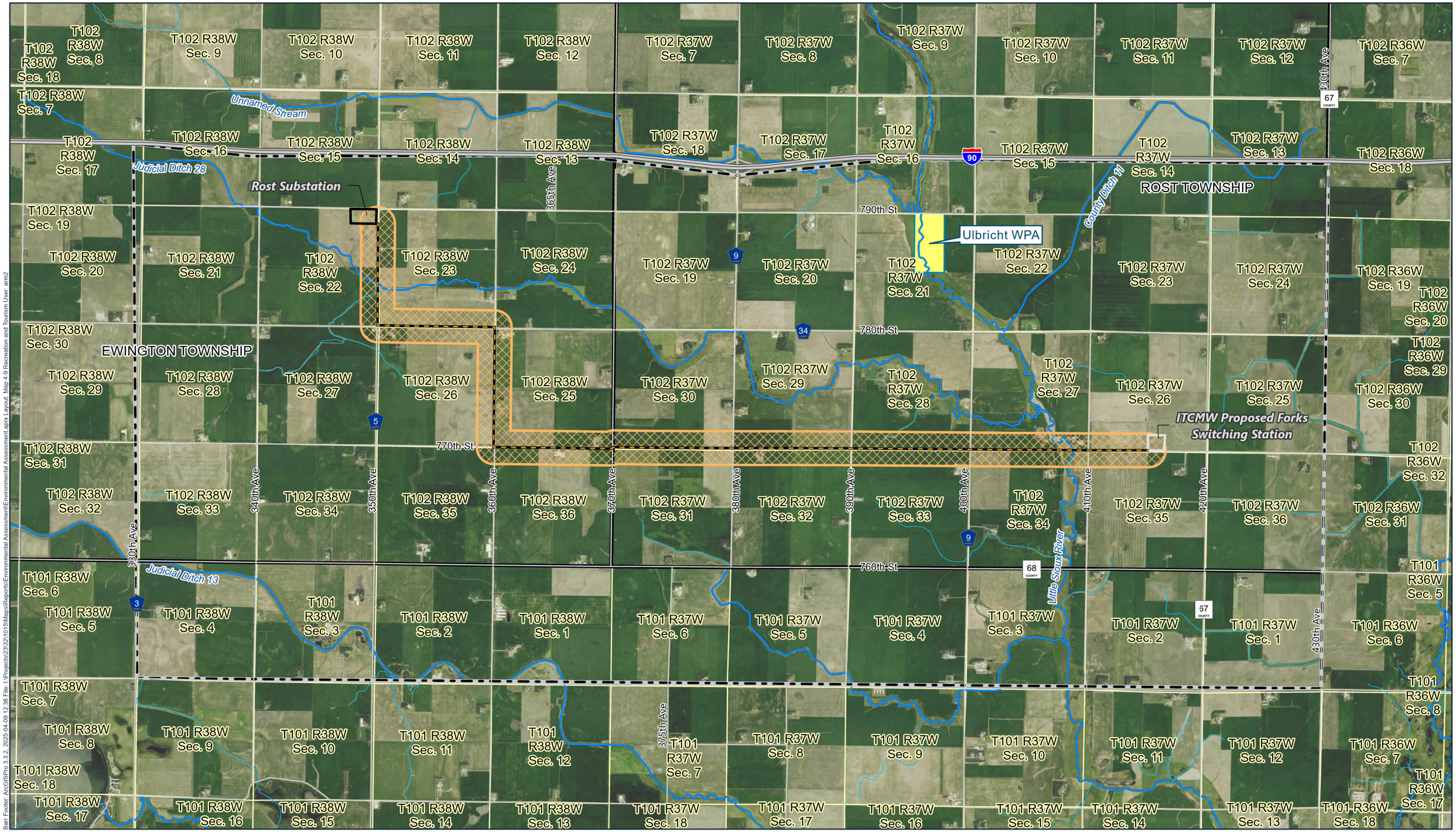
4.8.4.1 Impacts

Project impacts on recreation and tourism are anticipated to be minimal and temporary in nature, lasting only for the duration of construction. Short-term disturbances, such as increased noise and dust, could detract from nearby recreational activities and could, depending on the timing, affect hunting by temporarily displacing wildlife. However, wildlife is expected to return to the area once construction has been completed.

The Rost and Ulbricht Waterfowl Production areas are both located more than one mile from the ROW; therefore, no notable impacts to recreation and tourism are anticipated as a result of the project.

4.8.4.2 Mitigation Measures

Since no impacts to recreation and tourism are anticipated, mitigation is not proposed.



Applicant's Proposed Alignment
Route Width (Proposed Route)
Forks-Rost Project Area
Waterfowl Production Area (WPA)

0 0.75 1.5
Miles

Map 4-9

RECREATION AND TOURISM
Forks-Rost 161 kV Project

4.9 Archaeological and Historic Resources

Archaeological resources are defined as the material remains of past human life or activities (reference (51)). Pursuant to the Minnesota Historic and Architectural Survey Manual (reference (52)), historic resources are defined as sites, buildings, structures, or objects that are over 45 years in age and "create tangible links to the American past, whether in relation to historical events and people, traditional ways of life, architectural design, or methods of construction" (reference (53)).

Federal laws and regulations, including Section 106 of the National Historic Preservation Act of 1966 (Section 106) and the Archaeological Resources Protection Act of 1979, provide the standards for cultural resources identification, evaluation, and mitigation of impacts. Pursuant to Section 106, significant archaeological and/or historic resources (i.e., historic properties) are those resources that are included or eligible for inclusion in the National Register of Historic Places (NRHP). If the Project were to become a federal undertaking, it would be subject to Section 106 requirements.

The project is also subject to the Minnesota Historic Sites Act (Minn. Statutes 138.661 to 138.669) and the Field Archaeology Act (Minn. Statutes 138.31 to 138.42), and the Minnesota Private Cemeteries Act (Minn. Stat. §307.08). The Minnesota Historic Sites Act (Minn. Statutes 138.661 to 138.669) requires that state agencies consult with the SHPO before undertaking or licensing projects that may affect properties on the State or National Registers of Historic Places. The Minnesota Field Archaeology Act (Minn. Statutes 138.31 to 138.42) establishes the position of State Archaeologist and requires State Archaeologist approval and licensing for any archaeological work that takes place on non-federal public property.

Under the Minnesota Private Cemeteries Act (Minn. Statutes 307.08), when human burials are known or suspected to exist in a project area, the landowner or developer must submit construction and development plans to the Office of the State Archaeologist (OSA) for their review before the plans are finalized and prior to any disturbance within the burial area. If the known or suspected burials are thought to be Native American or of Native American ancestry, the landowner or developer must submit construction and development plans to the OSA and the Minnesota Indian Affairs Council (MIAC) for their review before the plans are finalized and prior to any disturbance within the burial area. The OSA and MIAC have 45 days to make recommendations for the preservation or removal of the human burials or remains that may be endangered by construction or development activities.

To determine potential cultural resource impacts, known archaeological and historic resources in or adjacent to the project were identified through a review of the OSA online portal and Minnesota's Statewide Historic Inventory Portal (MnSHIP), the Minnesota SHPO online portal in March 2025. MnSHIP is a comprehensive database of all documented historic architectural resources for the entire state, while the OSA portal is a database of all previously recorded archaeological sites in the state.

4.9.1 Archaeological Resources and Historic Cemeteries

The OSA online portal indicates that there are no previously recorded archaeological resources located within 1 mile of the project. The applicant, in consultation with the Commission, OSA and SHPO, may plan to conduct an archaeological survey for the project as needed ahead of construction.

The OSA Portal was also reviewed for historic cemetery locations, as documented in Vermeer and Terrell (reference (54)). Two historic cemeteries were identified within 1 mile of the project, none of which are within the route width (Map 4-10). St Paul's Cemetery (MNCEMID 21293), also known as the Old

Lutheran Cemetery and the Old Rost Cemetery, is mapped at the PLS Forty level in the OSA portal. However, modern aerial imagery shows that the cemetery is platted and confined to approximately 1.4 acres in the northeast corner of Section 28 of Township 102N, Range 37W, approximately 0.9 miles north of the project centerline.

Grace Church Cemetery (MNCEMID 21280), also mapped at the PLS Forty level in the OSA portal, is a church cemetery associated with historic architectural resource JK-EWT-00002/Grace Lutheran Church. The cemetery is shown on modern aerials within the property of Grace Lutheran Church with a footprint of less than one acre, approximately 1 mile west of the project centerline in the southwest quadrant of Section 22 of Township102N, Range 38W.

4.9.1.1 Impacts

Archaeological resource impacts could result from construction activities such as ROW clearing, placement of structures, construction of access roads, temporary construction areas, and vehicle and equipment operation.

No known archaeological resources have been documented within 1 mile of the project; therefore, no impacts to previously recorded archaeological resources are anticipated as a result of the project. While two historic cemeteries have been recorded within the 1-mile study area, all of these are clearly delineated, and are not within or adjacent to the route width. Therefore, these cemeteries will not be impacted by the project.

4.9.2 Historic Architectural Resources

A review of the MnSHIP portal indicates that there are five previously inventoried historic resources located within 1 mile of the project, one of which is within the Project route width (Table 4-17; Map 4-10). The resource within the route width consists of Bridge L9312/JK-RST-00011. This timber slab bridge, constructed in 1970, crosses the Little Sioux River along 770th street. This resource is not eligible for the NRHP (reference (55)).

Of the four documented resources that are within the 1-mile study area, but outside the route width, three are bridges, all of which were determined not eligible for the NRHP, and Grace Lutheran Church, which is unevaluated for the NRHP. Grace Lutheran Church is approximately one mile west of the westernmost extent of the project route width. Due to the distance from the project, and vegetative screening along the western side of the church, the project would not be within the viewshed of this resource.

Table 4-17 Historic Architectural Resources within the 1 Mile Study Area

Resource Number	Resource Type	NRHP Eligibility	Location
JK-RST-00011	Bridge L9312, ca. 1970	Not Eligible	Route Width
JK-EWT-00002	Grace Lutheran Church, ca. 1932	Unevaluated	1 Mile
JK-EWT-00013	Bridge 32801	Not Eligible	1 Mile
JK-EWT-00016	Bridge L5233	Not Eligible	1 Mile
JK-RST-00018	Bridge 88992	Not Eligible	1 Mile