Application

to the Minnesota Public Utilities Commission

for a Route Permit for the

Gopher to Badger Link Project

MPUC Docket No. ET3, E002/TL-26-156

Submitted by:

Northern States Power Company d/b/a Xcel Energy

Dairyland Power Cooperative

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ACRONYMS AND ABBREVIATIONS

AC	Alternating current
ACSR	aluminum conductor steel reinforced
AIMP	Agricultural Impact Mitigation Plan
ALJ	Administrative Law Judge
AMA	Aquatic Management Area
Amps	Amperes
amsl	Above mean sea level
APLIC	Avian Power Line Interaction Committee
Applicants	Northern States Power Company d/b/a Xcel Energy and Dairyland Power Cooperative
Application	Route Permit Application
ARMER	Allied Radio Matrix for Emergency Response
ASCE	American Society of Civil Engineers
ASIS	Aggregate Source Information System
ATV	All-terrain vehicle
AQI	Air Quality Index
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BESS	Battery energy storage system
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best management practice
BPA	Bonneville Power Administration
BWSR	Minnesota Board of Water and Soil Resources
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
Commission	Minnesota Public Utilities Commission
CREP	Conservation Reserve Enhancement Program
CSP	Construction Stormwater Permit
Dairyland	Dairyland Power Cooperative
d/b/a	Doing business as

dB	Decibel
dBA	A-weighted decibels
dbh	Diameter at breast height
DCH	Designated critical habitat
Dkey	USFWS Determination Key
DM&E	Dakota, Minnesota and Eastern Railroad
DWSMA	Drinking Water Supply Management Area
EAW	Environmental Assessment Worksheet
ECS	Ecological Classification System
EIS	Environmental impact statement
EMF	Electric and magnetic fields
EPA	U.S. Environmental Protection Agency
EQB	Environmental Quality Board
ERT	Electrical Resistivity Tomography
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FSA	Farm Service Agency
General Permit	Construction Stormwater General Permit
GLH	GridLiance Heartland LLC
GPS	Global Positioning System
GW	Gigawatt
GWP	Global warming potential
Hg	Mercury
HUC	Hydrologic Unit Code
HVTL	High voltage transmission line
I-90	Interstate 90
IBA	Important Bird Area
IPaC	Information for Planning and Consultation
kcmil	thousand circular mil
kV	Kilovolt
kV/m	Kilovolts per meter
LMR	Land Mobile Radio

LRTP	Long-Range Transmission Planning
MASW	Multichannel Analysis of Surface Waters
MBS	Minnesota Biological Survey
MBTA	Migratory Bird Treaty Act
MCE	Minnesota Conservation Explorer
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
mG	milliGauss
MIAC	Minnesota Indian Affairs Council
Minn. Stat. Ch.	Minnesota Statutes Chapter
MISO	Midcontinent Independent System Operator, Inc.
MMRT	Mankato to Mississippi River Transmission
MN	Minnesota
MnDOT	Minnesota Department of Transportation
MN-WI Dkey	Minnesota-Wisconsin All Species Determination Key
MPCA	Minnesota Pollution Control Agency
MW	Megawatt
MWI	Minnesota Well Index
NAAQS	National Ambient Air Quality Standards
NABCI	North American Bird Conservation Initiative
NAC	Noise area classifications
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHIS	Natural Heritage Information System
NLCD	National Land Cover Database
No.	Number
NO_2	Nitrogen dioxide
NOx	Oxides of nitrogen
NPC	Native Plant Community
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSP	Northern States Power Company (Xcel Energy)
NSPW	Northern States Power Company, Wisconsin

NWFR	National Wildlife and Fish Refuge
NWI	National Wetlands Inventory
O_3	Ozone
OPGW	Optical ground wire
ORVW	Outstanding Resource Value Water
OSA	Office of the State Archaeologist
OSHA	Occupational Safety and Health Administration
Pb	Lead
PBF	Physical or biological features
PCB	Polychlorinated biphenyl
PEM	Palustrine Emergent wetland
PFO	Palustrine Forested wetland
PM_{10}	Particulate matter 10 micrometers or less in diameter
$PM_{2.5}$	Particulate matter 2.5 micrometers or less in diameter
Project	Gopher to Badger Link Transmission Line Project
PSS	Palustrine Scrub-Shrub wetland
PWI	Public Waters Inventory
PWP	Permanent Wetland Preserves
Repeater stations	fiber optic signal repeater stations
RGP	Regional General Permit
RJD	Richard J. Dorer
RIM	Reinvest in Minnesota program
RNC	Rare Natural Community
ROI	Region of influence
RPBB Dkey	Rusty Patched Bumble Bee Rangewide Determination Key
RPU	Rochester Public Utilities
RTK	Real-time kinematic
RTO	Regional transmission organization
SBS	Sites of Biodiversity Significance
SDS	State Disposal System
SF_6	Sulfur Hexafluoride
SGCN	Species in Greatest Conservation Need
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area

SO_2	Sulfur dioxide
SO_4	Sulfate
SSURGO	Soil Survey Geographic Database
SWPPP	Stormwater Pollution Prevention Plan
THPO	Tribal Historic Preservation Office
TIMO	Timberland Investment Management Organization
T-Line	Transmission line
TO	Transmission owner
UDP	Unanticipated Discoveries Plan
UMESC	Upper Midwest Environmental Sciences Center
U.S.	United States
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMP	Vegetation Management Plan
VOC	Volatile organic compound
WAN	Wildlife Action Network
WCA	Wetland Conservation Act
WHO	World Health Organization
WHPA	Wellhead Protection Area
WMA	Wildlife Management Area
WI	Wisconsin

GLOSSARY OF TERMS

Term	Definition
Agricultural Impact Mitigation Plan (AIMP)	A project plan describing measures to avoid, minimize, and repair construction impacts on agricultural land and operations.
Alignment	The specific location where a transmission line is proposed or ultimately built within an approved route.
Alternating current (AC)	Electric current that reverses direction at regular intervals; the Project's transmission facilities use AC power.
Applicants	Dairyland Power Cooperative and Xcel Energy, the utilities jointly requesting the route permit for the Gopher to Badger Link Project.
Aquatic community	Plants, animals, and other organisms that live in or depend on rivers, streams, lakes, wetlands, or other water resources.
Area of potential effects (APE)	The geographic area in which a project may directly or indirectly affect historic or archaeological properties.
Best management practices (BMPs)	Established methods used to prevent or reduce environmental impacts during construction, operation, and maintenance.
Birds of Conservation Concern (BCC)	Bird species identified by the U.S. Fish and Wildlife Service as priorities for conservation attention.
Certificate of Need (CN)	A Minnesota Public Utilities Commission approval that determines whether a proposed large energy facility is needed.
Circuit	A complete electrical path. A single-circuit transmission line carries one set of three electrical phases.
Co-location	Where a utility or road right-of-way overlaps with the proposed transmission line right-of-way.
Conductor	A wire that carries electric current on a transmission line.
Conservation easement	A voluntary legal agreement that limits certain uses of land to protect conservation values.
Construction spread	A defined section of a transmission line project where a construction crew and equipment work sequentially to complete construction activities. Dividing a project into construction spreads allows construction to occur in multiple areas along the transmission line at the same time.
Cumulative effects	Environmental effects that result when a project's impacts are considered together with impacts from other past, present, or reasonably foreseeable actions.
Decibel (dB)	A unit used to describe sound level. A-weighted decibels, or dBA, approximate how people perceive sound.

Term	Definition
Direct effect	An effect caused by a project at the same place and time as the project activity.
Distribution line	A lower-voltage electric line that delivers power from substations to homes and businesses.
Easement	A legal right allowing specified use of another person's land, such as constructing, operating, and maintaining a transmission line.
Electric field	A field produced by voltage on electrical equipment or conductors; its strength generally decreases with distance.
Electromagnetic field (EMF)	A general term for electric and magnetic fields associated with electricity and electrical equipment.
Environmental justice	The fair treatment and meaningful involvement of all people in environmental decision-making, including communities that may experience disproportionate effects.
Federal Emergency Management Agency (FEMA) floodplain	An area identified by FEMA as having a defined level of flood risk for mapping and floodplain management.
Federal Energy Regulatory Commission (FERC)	The federal agency that regulates interstate transmission of electricity and certain aspects of the bulk power system.
Foundation	The below-ground structural support that anchors a transmission structure.
Geographic information system (GIS)	A computer-based system used to map, organize, and analyze location-based information.
Ground wire / shield wire	A wire installed above conductors to help protect a transmission line from lightning; some shield wires also carry communications fiber.
H-frame structure	A transmission structure with two vertical poles connected by a horizontal crossarm.
High-voltage transmission line (HVTL)	A transmission line operating at 100 kilovolts or more, as defined for Minnesota permitting purposes.
Hydric soil	Soil that formed under wet conditions and is one indicator used to identify wetlands.
Hydrologic Unit Code (HUC)	A numbered system used to identify watersheds at different geographic scales.
Impaired water	A waterbody that does not meet one or more applicable water-quality standards.
Indirect effect	An effect caused by a project that occurs later in time or farther from the project activity but is still reasonably connected to it.

Term	Definition
Induced voltage	Voltage created on a nearby conductive object by an electric or magnetic field from an energized line.
Invasive species	A nonnative species that can spread and cause environmental, economic, or human-health harm.
Kilovolt (kV)	A unit of electrical voltage equal to 1,000 volts.
Laydown yard	A temporary construction area used to receive, store, assemble, and stage equipment and materials.
Listed species	A plant or animal legally designated as threatened or endangered under federal or state law.
Long-Range Transmission Planning (LRTP)	A regional planning process used to identify future transmission needs and projects.
Magnetic field	A field produced by electric current; its strength varies with current and generally decreases with distance.
Managed land	Public or private land managed for a defined purpose, such as conservation, recreation, wildlife, forestry, or water-resource protection.
Midcontinent Independent System Operator (MISO)	The regional organization that coordinates operation and planning of the electric transmission grid across a large portion of the central United States.
Minnesota Biological Survey (MBS)	A Minnesota Department of Natural Resources program that identifies and documents native plant communities, rare species, and other biodiversity features.
Minnesota Conservation Explorer (MCE)	A Minnesota Department of Natural Resources information system used to review conservation and natural-resource data.
Minnesota Department of Natural Resources (MDNR)	The state agency responsible for managing Minnesota's natural resources, including public waters, wildlife, forests, and rare species.
Minnesota Pollution Control Agency (MPCA)	The state agency that administers programs for air quality, water quality, waste, and pollution prevention.
Minnesota Public Utilities Commission (MPUC or Commission)	The state agency responsible for decisions on certificates of need and route permits for qualifying transmission lines.
Mitigation	Measures used to avoid an impact, minimize it, repair or restore affected resources, reduce it over time, or compensate for it.
Monopole	A transmission structure made of one vertical pole, commonly steel or concrete.

Term	Definition
National Ambient Air Quality Standards (NAAQS)	Federal health- and welfare-based limits for certain common outdoor air pollutants.
National Electrical Safety Code (NESC)	Technical safety standards used for the design, construction, operation, and maintenance of electric utility systems.
National Heritage Information System (NHIS)	A Minnesota database containing information on rare species, native plant communities, and other sensitive ecological features.
National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) permit	A permit that regulates certain discharges to waters, including stormwater from qualifying construction activities.
National Wetlands Inventory (NWI)	A U.S. Fish and Wildlife Service mapping system that identifies the general location and type of wetlands and deepwater habitats.
Native plant community (NPC)	A group of native plants that interact with each other and their environment in a recognizable natural community.
Non-native species	A species occurring outside its natural range because of human activity; not every non-native species is invasive.
Ordinary high water level (OHWL)	A boundary used to identify the normal extent of a public water based on physical evidence of long-term water levels.
Palustrine emergent wetland (PEM)	A freshwater wetland dominated mainly by grasses, sedges, rushes, and other nonwoody plants.
Palustrine forested wetland (PFO)	A freshwater wetland dominated by trees.
Palustrine scrub-shrub wetland (PSS)	A freshwater wetland dominated by shrubs and young trees.
Permanent impact	A change that remains for the life of the Project or longer, such as conversion of forested land at a structure location or within maintained right-of-way.
Proposed Alignment	The Applicants' identified centerline for the transmission facilities within the Proposed Route, subject to final design and permit requirements.
Proposed Route	The geographic area requested for approval within which the final transmission-line alignment may be located.
Proposed Right-of-Way	The land area in which the utility obtains long-term rights to operate, inspect, maintain, repair, and replace the transmission line.
Public water	A waterbody or watercourse designated and regulated by the Minnesota Department of Natural Resources under state public-waters law.

Term	Definition
Public Waters Inventory (PWI)	Minnesota Department of Natural Resources maps and records identifying waters and wetlands regulated as public waters under state law.
Rare and sensitive resources	Species, habitats, communities, cultural properties, or other resources that are uncommon, legally protected, or especially vulnerable to disturbance.
Region of influence (ROI)	The geographic area used to evaluate potential effects for a particular resource; its size may vary by resource.
Regional transmission organization (RTO)	An independent organization that coordinates electric-grid operations and regional transmission planning over a broad area.
Reinvest in Minnesota (RIM)	A state conservation program that protects and restores environmentally sensitive land, often through conservation easements.
Right-of-way	The strip of land used for a transmission line and related access, generally secured through easements or ownership.
Riparian area	Land next to a river, stream, lake, or wetland that influences bank stability, shade, water quality, and aquatic habitat.
Route permit	Authorization from the Minnesota Public Utilities Commission that approves a route and conditions for constructing and operating a qualifying transmission line.
Section 10 permit	A federal authorization for certain work in, over, or under navigable waters of the United States.
Section 404 permit	A federal permit administered by the U.S. Army Corps of Engineers for certain discharges of dredged or fill material into waters of the United States.
Sites of Biodiversity Significance (SBS)	Areas identified by the Minnesota Biological Survey as having varying levels of importance for native biodiversity.
Span	The distance between two adjacent transmission structures.
Species in Greatest Conservation Need (SGCN)	Species identified in Minnesota's State Wildlife Action Plan as having conservation concerns or needing focused conservation attention.
Stormwater Pollution Prevention Plan (SWPPP)	A construction plan that identifies erosion, sediment, and stormwater-control practices and inspection requirements.
Structure	A pole, tower, or frame that supports transmission-line conductors and related equipment.
Structure footprint	The ground area permanently occupied by a transmission structure and its foundation.

Term	Definition
Substation	A facility that switches electric circuits or changes voltage between parts of the electric system.
Switching station	A facility containing equipment used to connect, disconnect, and control electric transmission lines without changing the voltage.
Temporary impact	A short-term change associated with construction that is expected to be restored or recover after construction.
Temporary workspace	Land used only during construction for access, equipment movement, material storage, or specialized activities outside the permanent right-of-way.
Threatened species	A species legally designated as likely to become endangered within the foreseeable future throughout all or a significant part of its range.
Transmission line	Conductors, structures, insulators, and related equipment used to move large amounts of electricity over distance.
U.S. Army Corps of Engineers (USACE)	The federal agency that administers permitting for certain activities affecting waters of the United States and navigable waters.
U.S. Fish and Wildlife Service (USFWS)	The federal agency responsible for administering federal wildlife laws, including protections for listed species and migratory birds.
Unavoidable impact	An impact that remains after reasonable avoidance and minimization measures have been applied.
Vegetation Management Plan (VMP)	A plan describing how vegetation will be cleared, restored, monitored, and maintained for safe transmission-line operation and resource protection.
Waters of the United States (WOTUS)	Waters subject to federal jurisdiction under the Clean Water Act, as determined under applicable federal rules and guidance.
Wetland	An area where water at or near the surface supports wetland soils and water-tolerant vegetation under normal conditions.
Wetland Conservation Act (WCA)	Minnesota law that regulates draining, filling, and certain other impacts to wetlands, generally seeking no net loss of wetland area or function.
World Health Organization (WHO)	The United Nations agency responsible for international public health that develops health guidance, standards, and recommendations.
Wildlife Management Area (WMA)	Land managed by the Minnesota Department of Natural Resources primarily for wildlife habitat, hunting, trapping, and compatible public use.

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1 INTRODUCTION

Northern States Power Company (NSP), a Minnesota corporation, doing business as (d/b/a) Xcel Energy (Xcel Energy) and Dairyland Power Cooperative, a cooperative association incorporated under the laws of the State of Wisconsin, (Dairyland) (together, Applicants)[1] submit this application to the Minnesota Public Utilities Commission (Commission) for a Route Permit Application (Application) for the Gopher to Badger Link Transmission Line Project (Project).

The Project is part of a planned 765 kilovolt (kV) path connecting Minnesota, South Dakota, Iowa, and Wisconsin, and consists of the following (**Figure 1**):

- **Segment 1**: Approximately 39 miles of single-circuit 765 kV high voltage transmission line (HVTL) between the existing North Rochester Substation[2] and a point near Marion, Minnesota;

- **Segment 2**: Approximately 105 miles of 765 kV/161 kV double-circuit HVTL from near Marion, Minnesota, to the eastern border of Minnesota. Segment 2 also includes a new three-circuit breaker 161 kV switching station in Houston County, Minnesota, as well as minor upgrades at existing 161 kV Adams and Harmony substations to support operation of the new Project facilities; and

- **Q-9 Reroute**: Rerouting of approximately 1.2 miles of Dairyland's existing Q-9 161 kV line to connect to the proposed switching station.

All Project facilities are expected to be in service by June 1, 2034 and are estimated to cost $1.015 billion (base) to $1.320 billion (high-range: base plus contingency) ($2024).

The Project was studied, reviewed, and approved as part of the Midcontinent Independent System Operator, Inc. (MISO) Long-Range Transmission Planning (LRTP) Tranche 2.1 Portfolio. MISO is a federally registered regional planning authority and regional transmission organization (RTO). MISO is responsible for planning and operating the transmission system and energy market in parts of 15 states, including Minnesota, and the Canadian province of Manitoba. MISO is an independent not-for-profit entity that has a responsibility, established by the Federal Energy Regulatory Commission (FERC), to identify needed transmission and mandate transmission owners (TOs) to develop necessary transmission projects to address reliability issues. Additional information regarding MISO and LRTP Tranche 2.1 is provided in the Certificate of Need Application in Docket Number (No.) ET3, E002/CN-25-121.[3]

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1 For this Application, Xcel Energy primarily focused on the development of the Segment 1 related transmission facilities, and Dairyland primarily focused on the development of the Segment 2 and Q-9 reroute related transmission facilities, including the Jefferson Ridge Switching Station.

2 The North Rochester Substation will be expanded to accommodate 765 kV facilities and is being reviewed as part of PowerOn Midwest in Commission Docket No. E002, ET2, ET6675/CN-25-117 and a forthcoming related route permit proceeding.

3 The Certificate of Need is available on the Commission's eDockets system under Document ID 2026-227902-02:https://efiling.web.commerce.state.mn.us/documents/%7B00BD339C-0000-C214-824E-62BB284DD946%7D/download?contentSequence=0&rowIndex=207

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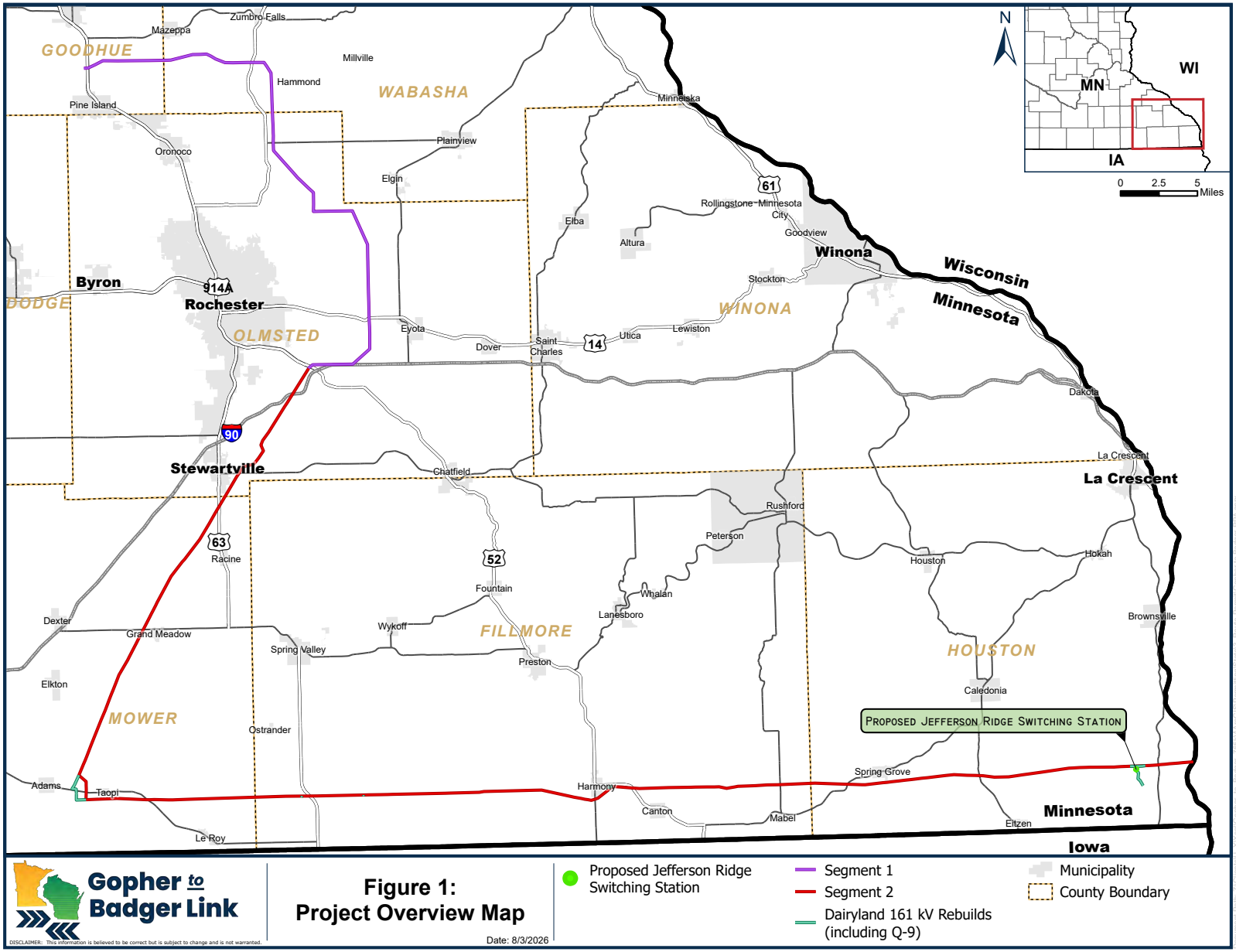
GOODHUE
WABASHA
DODGE
OLMSTED
WINONA
FILLMORE
HOUSTON
MOWER
Zumbro Falls
Mazeppa
Millville
Hammond
Pine Island
Oronoco
Plainview
Elgin
Minneiska
Rollingstone
Minnesota City
Elba
Altura
Goodview
Winona
Stockton
Byron
Rochester
Eyota
Dover
Saint Charles
Utica
Lewiston
Wisconsin
Minnesota
Dakota
Stewartville
Chatfield
La Crescent
Rushford
Peterson
Houston
Hokah
Racine
Fountain
Whalan
Lanesboro
Brownsville
Dexter
Grand Meadow
Wykoff
Spring Valley
Preston
Elkton
Caledonia
Ostrander
Proposed Jefferson Ridge Switching Station
Spring Grove
Adams
Taopi
Harmony
Canton
Mabel
Elizen
Le Roy
Minnesota
Iowa
N
WI
MN
IA
0 2.5 5 Miles
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 1:
Project Overview Map
Date: 8/3/2026
Proposed Jefferson Ridge Switching Station
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Municipality
County Boundary

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The Applicants are submitting this Application pursuant to Minnesota Statutes Chapter (Minn. Stat. Ch.) 216I. To facilitate review, a completeness checklist is included as **Appendix A**, which identifies where in this Application information required by Minnesota statutes can be found.

1.1 APPLICANTS

The Applicants are Xcel Energy and Dairyland.

Xcel Energy is a public utility that generates electrical power and transmits, distributes, and sells it to residential and business customers within service territories assigned by state regulators in parts of Minnesota, Wisconsin, South Dakota, North Dakota, and the upper peninsula of Michigan. Xcel Energy and Northern States Power Company, a Wisconsin corporation (NSPW), (collectively the NSP Companies), own and operate the five-state integrated NSP System pursuant to the terms of the FERC approved Interchange Agreement. The NSP Companies have about 1.8 million electricity customers in the upper Midwest.

Dairyland is a not-for-profit generation and transmission electric cooperative formed in December 1941 and based in La Crosse, Wisconsin. Dairyland provides wholesale electrical energy to more than 800,000 people through its 24 distribution cooperatives and 27 municipal utilities in a four-state area including Wisconsin, Minnesota, Iowa, and Illinois. Dairyland owns over 3,708 miles of transmission line (34.5 kV and higher) and 400 substations in Minnesota, Wisconsin, Iowa, and Illinois.

1.2 PROPOSED PROJECT

The following sections describe the proposed Project facilities, including transmission lines, switching station,[4] and existing substation[5] upgrades.

1.2.1 Transmission Lines

1.2.1.1 Segment 1

Segment 1 of the Proposed Route consists of approximately 39 miles of a single-circuit 765 kV alternating current (AC) HVTL between the North Rochester Substation and a point near Marion, Minnesota (see **Figure 1**). Segment 1 starts north of the City of Pine Island in Olmsted County, and travels east for approximately 12 miles into Wabasha County, crossing the Zumbro River. The Proposed Route then generally travels south back into Olmsted County for approximately 27 miles to the intersection of Interstate 90 (I-90) and United States (U.S.) Highway 52, southeast of the City of Rochester near Marion. Segment 1 is proposed to be co-located[6] with approximately 2.8 miles of Minnesota Department of Transportation (MnDOT) and local roads (approximately 7 percent of Segment 1), and to parallel approximately 0.3 miles of existing transmission lines.

Xcel Energy proposes to construct Segment 1 using four-legged self-supporting lattice structures. The structures will be placed 1,200 to 1,400 feet apart, on average, and will typically be 150 to 175 feet tall. Segment 1 will generally require a 250-foot-wide right-of-way. Technical diagrams of these structures are provided in **Appendix B** and example photos of structures are provided in

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4 A switching station is a facility containing equipment used to connect, disconnect, and control electric transmission lines without changing the voltage.

5 A substation is a facility that switches electric circuits or changes voltage between parts of the electric system.

6 Where a utility or road right-of-way overlaps with the proposed transmission line right-of-way.

Diagram 3.1.5-1 of **Section 3.1.5**. Xcel Energy anticipates starting construction in 2030 and after all required permits and authorizations have been received; construction will take approximately 2 years. Project facilities are planned to be in service by June 1, 2034.

1.2.1.2 Segment 2

Segment 2 of the Proposed Route consists of approximately 105 miles of 765 kV/161 kV double-circuit HVTL between Marion, Minnesota, to the eastern border of Minnesota at the Mississippi River (see **Figure 1**). Segment 2 starts at the intersection of I-90/U.S. Highway 52 near Marion and generally follows Dairyland's existing Q-4[7] 161 kV transmission line right-of-way southwest for approximately 32 miles through Olmsted and Mower Counties to Dairyland's existing Adams Substation, located east of the City of Adams.

At the Adams Substation, approximately 1.5 miles of the Q-4 161 kV transmission line will be rebuilt into the substation, and approximately 1 mile of the Q-8 161 kV transmission line coming out of the Adams Substation. The 765 kV transmission line will continue southeast for approximately 2 miles as a single circuit line before rejoining the Q-8 161 kV transmission right-of-way east of the substation. From there, the double-circuit 765 kV/161 kV portion of the Proposed Route will continue east for approximately 35 miles across Fillmore County to the Harmony Substation.

Dairyland received a Route Permit from the Commission on September 22, 2025 to construct the Beaver Creek Transmission Line, a new approximately 3.5-mile-long, 161 kV transmission line in York Township, Fillmore County.[8] The line will extend from Dairyland's existing Q-8 transmission line near 171st Avenue south to the Minnesota-Iowa state line. As part of the Beaver Creek Transmission Line project, Dairyland will retire and remove approximately four miles of the existing Q-8 161 kV transmission line between 131st Avenue to 171st Avenue (see pages 14 and 15 of **Appendix F**). Because the existing Q-8 line will be removed from this area, the proposed 765 kV transmission line will be constructed as a single circuit along this approximately 4-mile section. Dairyland is currently pursuing the additional federal, state and local permits required for the Beaver Creek Transmission Line, with construction anticipated in 2nd quarter 2027. Additional information about the Beaver Creek Transmission Line is provided in **Section 3.3**.

As part of this Project, Dairyland proposes to install two dead-end structures along the proposed 765 kV line, one near 131st Street and one near 171st Street. These structures will provide connection points between Dairyland's existing Q-8, the new Beaver Creek Transmission Line, and the Q-30, which will be renamed Q-48.

At Dairyland's existing Harmony Substation, approximately 0.2 mile of the Q-8 161 kV transmission line will be rebuilt into the substation, and 0.2 mile of the Q-7 161 kV transmission line will be rebuilt coming out of the substation. The 765 kV transmission line will continue

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7 Dairyland's existing Q-4 161 kV transmission line extends from Rochester to Adams, Minnesota; the Q-8 161 kV transmission line extends from Adams to Harmony, Minnesota; and the Q-7 161 kV transmission line extends from Harmony, Minnesota to Genoa, Wisconsin.

8 *In the Matter of the Application of Dairyland Power Cooperative for a Route Permit for a 161 kV Transmission Line in Fillmore County, Minnesota*, Docket No. E002, ET-3/TL-24-95. ORDER GRANTING ROUTE PERMIT (September 22, 2025). Available online at: https://efiling.web.commerce.state.mn.us/documents/%7BD0787299-0000-C918-BA19-2E9C62F27407%7D/download?contentSequence=0&rowIndex=4.

northeast for 0.3 miles before rejoining the Q-7 161 kV transmission right-of-way. Improvements needed at the Adams and Harmony substations are discussed in **Section 1.2.2.3**.

From the Harmony Substation, the double-circuit 765 kV/161 kV portion of the Proposed Route continues another 34 miles to the new proposed Jefferson Ridge Switching Station. The Jefferson Ridge Switching Station is proposed to be sited approximately 900 feet south of the 765 kV/161 kV Proposed Alignment; therefore, the Q-7 161 kV transmission line will break-off from the double-circuit at this location and travel 900 feet south to the switching station. From there, the Q-7 161 kV line will be renamed the Q-50 coming out of the switching station back north approximately 900 feet to the 765 kV and will continue to be double-circuited with the 765 kV line for an additional 3.6 miles to the Minnesota state line, and then across the Mississippi River into the Genoa Substation in Wisconsin (**Figure 2**).

Currently, Dairyland has two existing 161 kV transmission lines (Q-7 and Q-9) that share a right-of-way across the Mississippi River and connect to the Dairyland-owned Genoa Substation in Wisconsin. As described above, the Q-7 starts at the Harmony Substation and will be rebuilt and double-circuited with the 765 kV transmission line. The Q-9 161 kV transmission line extends from the Genoa Substation in Wisconsin, west across the Mississippi River into Minnesota and south to the Lansing Substation in Lansing, Iowa. To accommodate the new 765 / 161 kV transmission line proposed across the Mississippi River, the portion of the Q-9 161 kV line from the Genoa Substation across the Mississippi River west into Minnesota must be retired and removed. By removing the Q-9 161 kV transmission line, the Applicants can install the new 765 kV / 161 kV double-circuited line using the existing 200-foot-wide right-of-way without expanding the right-of-way through the U.S. Fish and Wildlife Service (USFWS) Upper Mississippi River National Wildlife and Fish Refuge (NWFR). To continue to provide 161 kV service to the Lansing Substation, Dairyland will build a new three position 161 kV switching station near the Mississippi River, further described in **Section 1.2.2.2**, and will reroute the Q-9 line, as further described in **Section 1.2.1.3** and illustrated in **Figure 2**.

The lattice structure design was also selected for Segment 2. The existing 161 kV transmission line will be rebuilt as a double-circuit on the new lattice structures with the 765 kV, and the old 161 kV structures will be removed. The Proposed Right-of-Way is co-located with an existing transmission line right-of-way for approximately 98 miles, or 93 percent of Segment 2. Wherever the new 765 kV Proposed Route deviates from the current 161 kV transmission right-of-way, the 161 kV transmission line will be re-routed with the 765 kV alignment, except at the Adams and Harmony substations as previously described. The structures will be placed 1,200 to 1,500 feet apart, on average, and will typically be 150 to 199 feet tall. Technical diagrams of these structures are provided in **Appendix B** and example photos of structures are provided in **Diagram 3.1.5-1** of **Section 3.1.5**. Segment 2 will generally require up to a 250-foot-wide right-of-way; by exception, a 300-foot-wide right-of-way may be required in some locations depending on span length, terrain, and other design requirements.

The portions of the 161 kV single circuit line to be rebuilt at the Adams and Harmony substations will consist of steel monopole structures spaced 300 to 1,000 feet apart, on average. Transmission structures will typically range in height from 75 to 145 feet above ground, depending upon the terrain and environmental constraints. The single circuit 161 kV right-of-way will generally reuse Dairyland's existing 80-foot-wide right-of-way, and expand the right-of-way by 20 feet for a total of a 100-foot-wide right-of-way. Technical diagrams of these structures are provided in **Appendix B** and example photos of structures are provided in **Diagram 3.1.5-1** of **Section 3.1.5**.

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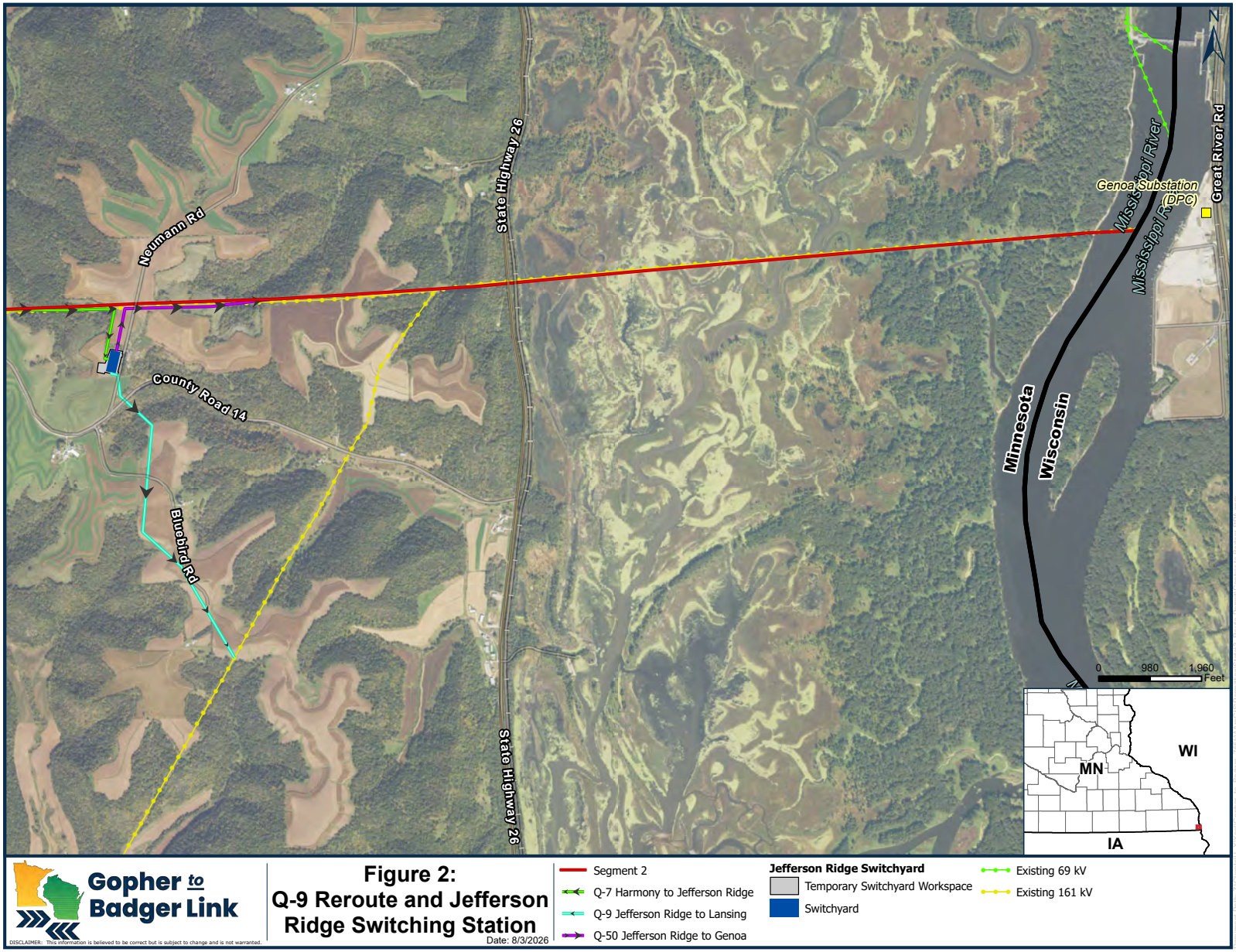
Neumann Rd
State Highway 26
County Road 14
Bluebird Rd
State Highway 26
Mississippi River
Mississippi River
Genoa Substation (DPC)
Great River Rd
Minnesota
Wisconsin
N
0 980 1,960 Feet
WI
MN
IA
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 2:
Q-9 Reroute and Jefferson Ridge Switching Station
Date: 8/3/2026
Segment 2
Q-7 Harmony to Jefferson Ridge
Q-9 Jefferson Ridge to Lansing
Q-50 Jefferson Ridge to Genoa
Jefferson Ridge Switchyard
Temporary Switchyard Workspace
Switchyard
Existing 69 kV
Existing 161 kV

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The existing 161 kV structures along Dairyland's existing Q-4/Q-8/Q-7 rights-of-way were originally constructed between 1962 and 1968; and therefore, have been installed for 66 to 72 years. These lines consist of approximately 673 wooden H-frame structures that range in height from 80 to 120 feet tall, with spans averaging between 600 and 800 feet between each structure. The foundational width of the H-frame structures is approximately 25 to 40 feet. Where double-circuited, these structures would be removed and replaced with the new lattice structures, which although larger than the existing H-frame structures, would have longer spans therefore resulting in fewer structures than currently installed. The Applicants currently estimate that the 673 existing structures would be replaced by approximately 419 new lattice structures associated with the 765 kV/161 kV transmission line and 39 monopole structures associated with the rebuilt 161 kV transmission lines; or approximately 215 fewer structures than are currently installed.

Dairyland anticipates starting construction after all required permits and authorizations have been received in 4th quarter 2030; construction will occur over approximately 3 years. Project facilities are expected to be in service by June 1, 2034.

1.2.1.3 Q-9 Reroute

Dairyland will re-route an approximately 1.2-mile portion of its existing Q-9 161 kV transmission line, located near the Mississippi River, west of State Highway 26 in Houston County (see **Figure 2**) to tie-in to the new switching station. The existing portion of the Q-9 161 kV transmission line will then be retired and removed to enable the crossing of the Mississippi River without expanding Dairyland's existing 200-foot-wide right-of-way through the USFWS Upper Mississippi River NWFR, as described in **Section 1.2.1.2**.

The Q-9 161 kV single circuit line will use steel monopole structures spaced 300 to 1,000 feet apart, on average. Monopole structures will typically range in height from 75 to 145 feet above ground, depending upon the terrain and environmental constraints. The single circuit 161 kV right-of-way will generally require a 100-foot-wide right-of-way. Technical diagrams of these structures are provided in **Appendix B** and example photos of structures are provided in **Diagram 3.1.5-1** of **Section 3.1.5**.

Dairyland anticipates starting construction on the rebuild in 2031. Project facilities are expected to be in service by June 1, 2034.

1.2.2 Facilities

1.2.2.1 Repeater Stations

The Project requires fiber optic signal repeater stations (repeater stations) along the 765 kV transmission line to overcome signal loss. The Applicants anticipate up to four repeater stations will be required; potentially one in Segment 1, and up to three on Segment 2. A typical repeater station will occupy an area of approximately 80 feet by 40 feet (0.07 acres) and will consist of two fenced-in, pad-mounted equipment cabinets. The Applicants plan to locate each repeater station within existing infrastructure, such as at an existing substation, switching yard, or within proposed lattice structure footprints within the Proposed Right-of-Way in order to avoid additional disturbance. The Applicants will perform fiber loss calculations to determine the exact location of repeater stations.

1.2.2.2 Switching Station

As discussed in **Sections 1.2.1.2** and **1.2.1.3**, with the removal of the Q-9 161 kV transmission line from the Genoa Substation west across the Mississippi River into Minnesota, Dairyland must build a new three position 161 kV switching station near the Mississippi River in order to continue to provide 161 kV service to the Lansing Substation. The new three-circuit breaker 161 kV Jefferson Ridge Switching Station will occupy approximately 3.4 acres of land owned by Dairyland and accessed off Neumann Road in Houston County, Minnesota, approximately 1.4 miles west of State Highway 26 and the Mississippi River (see **Figure 2**). Dairyland's Q-7 161 kV line from the Harmony Substation (see **Section 1.2.1.2**), relocated Q-9 161 kV line to the Lansing Substation in Lansing, Iowa (see **Section 1.2.1.3**), and the Q-7 (to be renamed Q-50) 161 kV segment from the Jefferson Ridge Switching Station to the Genoa Substation in Genoa, Wisconsin (see **Section 1.2.1.2**), will all connect at the Jefferson Ridge Switching Station (see **Figure 2**).

Dairyland anticipates starting construction on the new switching station in 2031. Project facilities are expected to be in service by June 1, 2034.

1.2.2.3 Existing Substation Upgrades

Modifications to the North Rochester Substation, to which Segment 1 will connect, are being permitted as part of a separate route permit application in the PowerOn Midwest Docket No. E002, ET2, ET6675/CN-25-117. No substation modifications are proposed as part of Segment 1 in this Application.

Dairyland is planning upgrades at two existing substations as part of the proposed Project: Adams Substation (ITC Midwest-owned) and the Harmony Substation (Dairyland-owned) along Segment 2 (see **Figure 1**). Substation design and site requirements will be refined through ongoing system studies and detailed substation engineering. All upgrades are anticipated to occur within the existing fenceline of the facilities.

1.3 PROJECT LOCATION

The Project (including the new 765 kV transmission line, Q-9 161-kV transmission line reroute, switching station, and existing substation upgrades) is located in Goodhue, Olmsted, Wabasha, Mower, Fillmore, and Houston counties, Minnesota, and in the Township, Ranges, and Sections as shown in **Table 1.3-1**.

TABLE 1.3-1

Townships, Ranges, and Sections Crossed by the Project

Project Component	County Name	Township Name	Township	Range	Sections
Segment 1					
Proposed Route	Goodhue	Pine Island	109	15	18, 17, 13, 16, 15, 14, 19, 20, 21
	Wabasha	Mazeppa	109	14	18, 17, 16, 15, 22, 20, 21, 19
		Zumbro	109	13, 14	18, 13, 14, 15, 19, 20, 23, 22, 30, 29, 32, 31
	Olmsted	Eyota	106	12	4, 5, 9, 8, 16, 17, 21, 20, 19, 28, 29, 30
		Farmington	108	13	5, 8, 16, 17, 21, 20, 27, 28, 34, 35
		Haverhill	107	13	1, 2, 3
		Marion	106	13	25, 26, 27
		Viola	107	12	6, 8, 7, 17, 21, 20, 28, 29, 33, 32

TABLE 1.3-1

Townships, Ranges, and Sections Crossed by the Project

Project Component	County Name	Township Name	Township	Range	Sections
Segment 2					
Proposed Route	Olmsted	High Forest	105, 104	14	15, 36, 35, 1, 2
		Marion	106	13	27, 33, 34
		Pleasant Grove	105	13	3, 4, 5, 10, 8, 9, 16, 17, 18, 21, 20, 19, 29, 30, 31
	Mower	Clayton	102	15	2, 3, 4, 10, 9, 15, 16, 17, 21, 20, 28, 29, 30, 33, 32, 31
		Frankford	103	14	7
		Grand Meadow	103	15	12, 13, 24, 23, 22, 25, 26, 27, 35, 34, 33
		Le Roy	101	14	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
		Lodi	101	15	6, 5, 12, 11, 10, 7, 8, 13, 14, 15, 16, 18, 17
		Racine	104, 103	14	12, 11, 10, 13, 14, 15, 23, 22, 21, 28, 29, 32, 31, 5, 6
	Fillmore	Beaver	101	13	12, 7, 8, 9, 10, 11, 13, 15, 16, 14, 18, 17, 24, 22, 21, 23
		Bristol	101	11	13, 14, 15, 16, 17, 18, 24
		Canton	101	9	13, 14, 15, 16, 17, 18, 19, 20, 21
		Harmony	101	10	13, 14, 15, 16, 17, 18, 23, 22, 24, 21, 20, 19, 26, 27, 28
		Newburg	101	8	13, 14, 15, 16, 17, 18
		Sumner	104	13	6
		York	101	12	9, 8, 7, 13, 14, 15, 16, 17, 18, 21, 20, 19
	Houston	Jefferson	101	3, 4	8, 7, 18, 12, 11, 10, 9, 8, 7, 13, 14, 15, 16, 17, 18
		Spring Grove	101	7	13, 14, 15, 16, 17, 18
		Wilmington	101	6	13, 14, 15, 16, 17, 18
		Winnebago	101	5	12, 11, 10, 13, 14, 15, 16, 17, 18
Jefferson Ridge Switching Station	Houston	Jefferson	101	4	15
Adams Substation (existing)	Mower	Lodi	101	15	7, 18
Harmony Substation (existing)	Fillmore	Harmony	101	10	13, 14
Q-9					
Proposed Route	Houston	Jefferson	101	4	11, 10, 14, 15, 22

Source: Minnesota Department of Transportation. 2026. City, Township, and Unorganized Territory in Minnesota. Available online at: https://gis.data.mn.gov/. Accessed October 2026.

1.4 PROJECT OWNERSHIP

Xcel Energy will solely own Segment 1, and it is anticipated that both Applicants will have an ownership interest in the 765 kV facilities of Segment 2.

The rebuilt 161 kV facilities in Segment 2, including the Q-4/Q-8/Q-7 161 kV transmission lines, the Harmony substation, the new Jefferson Ridge Switching Station, and the Q-9 161 kV transmission line reroute, will be wholly owned by Dairyland.

In addition to the Applicants, GridLiance Heartland LLC (GLH) will have an ownership interest in the 765 kV facilities and support project development and construction of Segment 2. GLH is a subsidiary of NextEra Energy Transmission, LLC that collaborates with rural electric cooperatives and municipal utilities to invest in electric infrastructure and improve the reliability of regional electric grids. GLH owns and operates transmission assets in the Midwest and focuses on modernizing the grid, replacing aging infrastructure and improving reliability in America's heartland.

1.5 PERMITTEES AND PROJECT CONTACTS

All correspondence relating to this Application should be directed to:

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The Applicants' Project website is **https://www.gophertobadgerlink.com/** and the e-mail address is connect@GophertoBadgerLink.com.

1.6 PROJECT NEED AND PURPOSE

The Project was studied, reviewed, and approved as part of the MISO LRTP Tranche 2.1 Portfolio. MISO is a federally registered regional planning authority and RTO. MISO is responsible for planning and operating the transmission system and energy market in parts of 15 states, including Minnesota, and the Canadian province of Manitoba. MISO is an independent not-for-profit entity that has a responsibility, established by the FERC, to identify needed transmission and mandate TOs to develop necessary transmission projects to address reliability issues.

The Project is needed to maintain system reliability amid fundamental changes in demand for electricity as well as the type, characteristics, and amount of generation that is interconnected to the grid within the MISO Midwest subregion.[9] As more generation is connected, the transmission becomes congested, meaning that not all energy can travel through the least cost path on the transmission system resulting in higher energy prices. In the late 2000s, the level of new generation needing to be connected to MISO to meet system needs and renewable portfolio standards was 25 gigawatts (GW). Today, to serve electrical demands, replace retiring generation capacity, and to meet policies and laws like Minnesota's Carbon-Free by 2040 law,[10] 116 GW of new generation must be connected – a four-fold increase from the 2000s. Energy demand is trending up and the type and location of generation resources to serve this demand have fundamentally transformed over the past two decades.

The Project will enhance the ability of the transmission system to move energy into and out of Minnesota and surrounding areas and reduce congestion. In addition, these new transmission connections will help ensure reliability 24 hours a day, 7 days a week, and 365 days a year during extreme weather events. The Project will enable utilities to reliably serve existing and additional future demands for electricity.

The Commission is evaluating the need for the Gopher to Badger Link Project in Docket No. CN-25-121. More detail regarding Project need is included in the Certificate of Need Application filed in that docket in February 2026.[11]

1.7 SUMMARY OF POTENTIAL HUMAN AND ENVIRONMENTAL IMPACTS

Construction and operation of the Project would result in both temporary and permanent impacts to human and environmental resources within the Project area. Temporary impacts would be primarily associated with construction activities and may include increased traffic and equipment movement, noise, dust, temporary disruption of agricultural operations, vegetation clearing, and short-term disturbance to wildlife habitat, surface waters, wetlands, recreational resources, and adjacent land uses. Construction activities could also result in localized soil disturbance, temporary impacts to streams, wetlands, and floodplains, and temporary displacement of wildlife. The Project has been designed to avoid and minimize impacts where practicable through routing, co-location with existing utility rights-of-way, spanning of water resources, and implementation of construction best management practices (BMPs).

Permanent impacts would be limited primarily to the installation and operation of transmission line facilities, including transmission structures, the Jefferson Ridge Switching Station, and maintenance of the transmission line right-of-way. Long-term impacts include conversion of forested vegetation to compatible low-growing vegetation within the maintained rights-of-way, localized land use conversion at structure foundations and other permanent facilities, and visual changes associated with the presence of transmission infrastructure. The Project would also cross streams, wetlands, floodplains, recreational resources, conservation easements, Important Bird Areas (IBAs), and managed natural resource lands. However, long-term impacts to these

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9 The MISO Midwest subregion includes MISO transmission customers in Minnesota, Montana, North Dakota, South Dakota, Iowa, Wisconsin, Missouri, Illinois, Indiana, Michigan, and Kentucky.

10 Minn. Stat. § 216B.1691, subd. 2(g).

11 Application to the Minnesota Public Utilities Commission for a Certificate of Need for the Gopher to Badger Link Project. Docket No. ET3, E002/CN-25-121. Available online at: https://efiling.web.commerce.state.mn.us/documents/%7B00BD339C-0000-C214-824E-62BB284DD946%7D/download?contentSequence=0&rowIndex=157.

resources are expected to be limited because waterbodies and wetlands would be avoided or spanned where practicable, disturbed areas would be restored following construction, and resource-specific mitigation measures would be implemented. With the proposed avoidance, minimization, and restoration measures, impacts are expected to be primarily temporary and localized, with no significant long-term effects anticipated to regional agricultural, environmental, recreational, or wildlife resources.

1.8 PRE-APPLICATION COORDINATION AND PUBLIC INVOLVEMENT

The Applicants conducted an extensive public involvement and agency coordination process during development of the Project and preparation of this Application. Public outreach included establishment of a Project website, mailings to more than 15,000 landowners and stakeholders, newspaper notices, Project newsletters, virtual engagement opportunities, and two rounds of public open houses held throughout the Project area. More than 680 attendees participated in the open house process, and hundreds of comments were received regarding routing, land use, agriculture, aesthetics, natural resources, residential impacts, recreation, and other Project-related considerations. Input received through public outreach was reviewed and incorporated into route development, route refinement, and preparation of the Proposed Routes presented in this Application (see **Section 7.2** and **Appendix C**).

In addition, the Applicants are conducting ongoing coordination with federal, state, and local agencies, Tribal Nations, county and township governments, and other stakeholders. Outreach to date has included Project notification and update letters, agency meetings, technical coordination, data requests, and consultation regarding environmental resources, land use, permitting requirements, cultural resources, transportation infrastructure, conservation lands, and other Project considerations. Feedback received through this process informed route selection, environmental review, and development of impact avoidance and mitigation measures. The Applicants will continue to coordinate with agencies, Tribal Nations, local governments, landowners, and other stakeholders throughout the permitting, final design, and construction phases of the Project.

2 REGULATORY PROCESS

2.1 CERTIFICATE OF NEED

Pursuant to Minn. Stat. § 216B.243, a Certificate of Need is required for a "large energy facility," as defined in Minn. Stat. § 216B.2421. A large energy facility includes "any [HVTL] with a capacity of 300 [kVs] or more and greater than one mile in length in Minnesota" and "any [HVTL] with a capacity of 100 [kVs] or more with more than ten miles of its length in Minnesota."[12] The Project is therefore a large energy facility requiring a Certificate of Need. An application for a Certificate of Need to construct the Project was filed on February 6, 2026, and is currently being reviewed by the Commission in Docket No. ET3, E002/CN-25-121.[13] On April 29, 2026, the Commission stayed the Certificate of Need proceeding until the filing of this Route Permit Application and determined that the Certificate of Need and Route Permit Applications would be jointly processed pursuant to Minn. R. 7849.1900.

2.2 ROUTE PERMIT

Minn. Stat. § 216I.05, subd. 2, provides that "[a] person is prohibited from constructing a[n] [HVTL] without a [R]oute [P]ermit issued by the [C]ommission." An HVTL is defined by Minn. Stat. § 216I.02, subd. 8, as "a conductor of electric energy and associated facilities that is (1) designed for and capable of operation at a nominal voltage of 100 kV or more, and (2) is greater than 1,500 feet in length." Because the Project exceeds this voltage and length, a Route Permit from the Commission is required.

2.3 MAJOR REVIEW PROCESS

This Application is submitted under the Major Review process set forth in Minn. Stat. § 216I.06. Minn. Stat. § 216I.05, subds. 3-4, identify the content requirements for the Application, including the requirement that Applicants propose "a single route for a[n] [HVTL]" and discuss other routes that were considered and rejected by the Applicants. A Route Permit Application Completeness Checklist is provided in **Appendix A**.

Interested persons may sign up for the Commission's Project Contact List by contacting the Commission staff for this Project is included below:

Sam Lobby
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101
Sam.Lobby@State.mn.us
651-201-2205

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[12] Minn. Stat. § 216B.2421, subds. 2(2) and 2(3).

[13] Application to the Minnesota Public Utilities Commission for a Certificate of Need for the Gopher to Badger Link Project. Docket No. ET3, E002/CN-25-121. Available online at: https://efiling.web.commerce.state.mn.us/documents/%7B00BD339C-0000-C214-824E-62BB284DD946%7D/download?contentSequence=0&rowIndex=157.

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Additional information on the Project can also be found on the Commission's Project website at: **https://puc.eip.mn.gov/web/project/25121**.

The sections that follow provide additional information on the Major Review process.

2.3.1 Preapplication Coordination and Review

Pursuant to Minn. Stat. § 216I.05, subd. 5, an applicant must provide notice to each local unit of government within which a route is proposed, Minnesota Tribal governments, and state technical resource agencies. Preapplication coordination is summarized in **Section 1.8,** with further details provided in **Section 7.2.** Documentation of this coordination is provided in **Appendix C**.

In addition, Minn. Stat. § 216I.05, subd. 6, requires that an applicant must provide a draft application to Commission staff for review. The Applicants provided a draft of this Application to the Commission on August 19, 2026. The Commission's October 8, 2026 Draft Application Review Comments letter, and the Applicants' response, are provided in **Appendix D**.

2.3.2 Post-Filing Application Notice

After an application is filed, the Commission determines whether the application is complete within 10 working days (Minn. Stat. § 216I.05, subd. 7). Upon the Commission's acceptance of this Application as complete, the Commission will provide notice in accordance with Minn. Stat. § 216I.05, subd. 8. This includes newspaper notice, notice to local governments and Tribes, and notices to landowners. To facilitate this notice, a list of the names of each owner whose property is within or adjacent to the Proposed Routes is included in **Appendix E**. Contact information for agencies and Tribal governments, and regional and local government units, is included in **Appendix C**.

In addition, an electronic version of the Application is available on eDockets in Docket No. TL-26-156 and on the Project website at: **https://www.gophertobadgerlink.com**.

2.3.3 Public Meeting – Scoping and Route Alternatives

The Major Review process requires the Commission to schedule at least one public meeting (also referred to as a "scoping meeting") near the proposed Project's location. The Applicants and the Commission will have representatives available at the public meeting(s). The purpose of the meeting is to provide information about the Project and permitting process, present key issues, answer questions, and accept public comments on the scope of the environmental impact statement (EIS) under Minn. Stat. § 216I.06, subd. 1. Once the Commission finds the Application complete, notice of the scoping meeting(s) for the EIS will be provided to the landowners within or adjacent to the Proposed Routes, agencies and Tribal governments, and regional and local government units, and those individuals who have asked to be placed on the Project Contact List.

At the public meeting(s) and in a written comment period that must be open for at least 10 days after the public meeting, the Commission will accept comments on potential impacts and alternative routes to be considered in the EIS, as well as potential route permit conditions (Minn. Stat. § 216I.05, subd. 9). The public meeting(s) and associated written comment period provide the public an opportunity to propose route alternatives for study in the EIS and consideration by the Commission.

2.3.4 Draft Route Permit and Scope of EIS

Once the public meetings have been held and after the public comment period closes, the Commission will identify the scope of the EIS and prepare a draft Route Permit for the Project. The draft Route Permit will "identify the person or persons who are the permittee, describe the proposed project, and include proposed permit conditions" (Minn. Stat. § 216I.05, subd. 10). The Commission can change the draft permit in any respect before final issuance or may deny the permit (Minn. Stat. § 216I.05, subd. 10). After determining its scope, the Commission will prepare a draft EIS. The draft EIS must be issued at least 15 days in advance of the public hearing and will address the issues and alternatives identified within the scope of the EIS. After the Commission issues a draft Route Permit and the draft EIS, a public hearing and associated comment period will be held to again solicit public input. Hearings are typically held in the same locations as the initial public information meetings. The Commission will select a person to preside over the hearing, which may be an administrative law judge (ALJ) from the Court of Administrative Hearings. In this case, an ALJ will preside over the hearing and the Applicants will be present and available to answer questions. Commission staff also will be available to answer questions (Minn. Stat. § 216I.06, subd. 2). Members of the public may provide oral and/or written comments and may offer testimony and exhibits without intervening as a formal party. The Commission must prepare and publish a Final EIS that responds to the timely substantive comments on the draft EIS. The Commission must determine that the Final EIS is adequate prior to making a decision on the Route Permit. The ALJ will prepare a report based on the record. After the report is issued, the matter will come to the Commission for a decision. During an open meeting, the Commission will deliberate and make a decision on the Route Permit using the criteria set forth in Minn. Stat. § 216I.05, subd. 11.

3 PROPOSED PROJECT

Chapter 3 discusses the proposed transmission line route, alignment, right-of-way, structure design, conductor design, transmission line clearances, safety equipment and plans, facilities, and estimated costs.

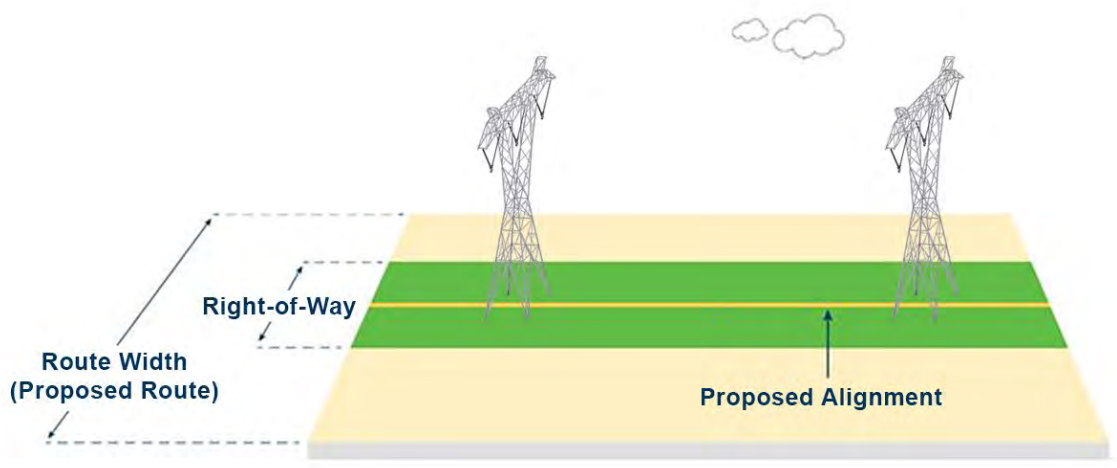
3.1 TRANSMISSION LINE

If the Commission issues a route permit, the permit would designate a "route." "Proposed route" or "route width" refers to the location of a high-voltage transmission line between two end points. The route may have a variable width of up to one and one-quarter miles (Minn. Stat. § 216I.02, subd. 15). The transmission line must be constructed within the route designated by the Commission unless, after permit issuance, permission to proceed outside of the route is sought by the Applicants and approved by the Commission. The "right-of-way" is the physical land area within the route used for a transmission line and related access, generally secured through easements or ownership. The "anticipated alignment" or "proposed alignment" is the anticipated location of the structures and line within the right-of-way and route width.

An illustration summarizing the concepts of route width (proposed route), right-of-way, and proposed alignment is provided in (see **Diagram 3.1-1**). The route width, in combination with the proposed alignment, is intended to balance flexibility and predictability.

DIAGRAM 3.1-1

Route Width, Right-of-Way and Alignment



3.1.1 Proposed Route Width

A proposed route (or, route width) should be wide enough to provide flexibility for the permittee to address engineering issues and to work with landowners, agencies, and other external stakeholders to address concerns that may arise if a Route Permit is issued. This Application identifies the Applicants' requested route widths for the Project. When the Commission issues a route permit, it designates a "route" for a new transmission line.

For this Project, except as otherwise identified in **Table 3.1.1-1**, the Applicants generally request a route width of 1,500 feet for Segments 1 and 2, referred to as the 765 kV Proposed Route throughout this Application. Dairyland is also requesting a 1.2-mile-wide route width associated with the relocation of the Q-9 161 kV transmission line, referred to as the Q-9 Proposed Route throughout this Application.

Appendix F contains a series of topographic and aerial maps depicting the requested 765 kV and Q-9 kV Route Widths (Proposed Routes), Proposed Rights-of-Way, Proposed Alignments, and the footprint associated with the Jefferson Ridge Switching Station. Upgrades to the existing Adams and Harmony substations are anticipated to occur within the existing fenceline of these facilities.

TABLE 3.1.1-1

Summary of Additional Route Widths Requested

Explanation for Additional Route Width Requested	Route Width (miles)*	Length Along Proposed Route (miles)	County	Township	Appendix F Map Page
Segment 1					
Allow for flexibility in design to connect to the expanded North Rochester Substation	0.78	1.6	Goodhue	Pine Island	1
Allow flexibility for routing in proximity to residential areas and the crossing of the Zumbro River	1.22	4.9	Wabasha	Mazeppa and Zumbro	1, 2
Allow flexibility for routing in proximity to the Lemon Hill Solar Project and along I-90	1.25	7.3	Olmsted	Viola and Eyota	5, 6
Allow flexibility for the point of ownership change and crossing of U.S. Highway 52	1.02	0.4	Olmsted	Marion	6, 7
Segment 2					
Allow flexibility for the point of ownership change and crossing of U.S. Highway 52	0.70	0.5	Olmsted	Marion	7
Allow flexibility to avoid the Rochester International Airport Federal Aviation Administration elevation limitation and potential realignment to avoid impacts to calcareous fen	1.25	9.8	Mower	Pleasant Grove, High Forest, Sumner, and Racine	7, 8
Allow flexibility for routing in proximity to existing wind turbines, solar gardens, and at the existing Adams Substation	1.25	11.4	Mower	Grand Meadow, Clayton and Lodi	10, 11, 12
Allow flexibility to site the alignment to minimize impacts to the Minnesota Department of Natural Resources-managed lands and waters and residences	1.25	8.5	Mower	Lodi and Le Roy	12, 13, 14
Allow flexibility for routing in proximity to an existing solar garden, and potential realignment to avoid impacts to calcareous fen	1.25	5.7	Fillmore	Beaver and York	14, 15
Allow flexibility for routing in proximity to residential areas, karst features, a shooting range, and at Dairyland's existing Harmony Substation	1.25	10.1	Fillmore	Harmony and Canton	16, 17, 18
Allow flexibility for routing through steep terrain adjacent to the Mississippi River Valley, and for siting and interconnection of the 161 kV transmission line into the new switching station	0.5	2.4	Houston	Jefferson	23

TABLE 3.1.1-1

Summary of Additional Route Widths Requested

Explanation for Additional Route Width Requested	Route Width (miles)*	Length Along Proposed Route (miles)	County	Township	Appendix F Map Page
Q-9					
Allow flexibility for the rerouting of Dairyland's existing Q-9 161 kV transmission line to the new switching station	1.2	1.2	Houston	Jefferson	23

* Note: Measured from the widest point of the requested route width.

3.1.2 Proposed Alignment

The Commission's practice is to identify an "anticipated alignment" in its Route Permit decisions. Accordingly, the Applicants developed alignments for the 765 kV transmission line, which consists of Segments 1 and 2, 161 kV circuit loops in and out of the substations and the Q-9 161 kV transmission line, that minimize the overall potential impacts based on the routing considerations identified in Minn. Stat. §216I.05, sub. 11. These alignments are referred to as the "Proposed Alignments."[14] These Proposed Alignments may require modifications after a Route Permit is issued due to limitations inherent in identifying an alignment absent detailed survey and engineering work, site review, and final design.

Should the Commission issue a Route Permit for the Project identifying the route and an "anticipated alignment," a final alignment will be developed after discussions with individual landowners and agencies with permitting responsibilities and performing detailed survey and engineering work, site review, and final design. The final alignment will be provided to the Commission through the Plan and Profile submission during the Commission's pre-construction compliance review process. As part of that submission, the Applicants will inform the Commission of deviations from the "anticipated alignment" in the final alignment.

3.1.3 Proposed Rights-of-Way

The Applicants anticipate constructing Segments 1 and 2 using structures that typically require up to a 250-foot-wide right-of-way. In some areas, the width may vary depending on span length and other design requirements. The final right-of-way width will be established once final engineering design is complete for the designated route.

Segment 1 is proposed to be co-located with approximately 2.8 miles of MnDOT and local roads (approximately 7 percent of Segment 1) and would parallel approximately 0.3 miles of existing transmission lines. Opportunities to further co-locate with existing transmission lines and transportation rights-of-way are limited along this portion of the Project, as further discussed in **Section 4**. When paralleling existing road rights-of-way, Xcel Energy proposes to place poles on adjacent private property, offset from the existing road right-of-way, subject to easements with landowners, as well as road authority design requirements that could affect the offset distance. These pole placements allow the transmission line right-of-way to share existing road rights-of-

[14] The term Proposed Alignment is used to refer to the location of the transmission line and structures. There are two Proposed Alignments discussed in this Application – the 765 kV Proposed Alignment and the Q-9 161 kV Proposed Alignment.

way to the greatest extent feasible and may reduce the overall size of the easement required from the private landowner. Pole placement and offset distances may vary in areas such as highway interchanges due to county or state design requirements and in areas of planned future road expansion.

On Segment 2, Dairyland proposes to utilize its existing approximately 80-foot-wide Q-4/Q-8/Q-7 161 kV transmission line right-of-way to construct the new double-circuit 765 kV / 161 kV transmission lines, expanding this existing right-of-way typically by up to 170 feet. The Proposed Right-of-Way is co-located with an existing transmission line right-of-way for approximately 98 miles, or 93 percent of Segment 2. Wherever the new 765 kV Proposed Route deviates from the current 161 kV transmission right-of-way, the 161 kV transmission line will be re-routed with the 765 kV alignment and the old structures removed, with limited exceptions such as at the Adams and Harmony substations, and the Jefferson Ridge Switching Station.

For the short 161 kV rebuild sections into the Adams and Harmony Substations, Dairyland plans to reuse its existing 80-foot-wide right-of-way into and out of the substations and expand it by 20 feet for a 100-foot-wide right-of-way. For the new connection into the Jefferson Ridge Switching Station, Dairyland will seek a 100-foot-wide right-of-way for the 161 kV lines.

Dairyland's Q-9 161 kV 1.2-mile relocated transmission line right-of-way requires a 100-foot-wide right-of-way and is co-located with local roads for approximately 0.2 mile. This line is being relocated to tie-in to the new Jefferson Ridge Switching Station. Dairyland continues to explore other alignments within the Proposed Route, including an alignment that would parallel the proposed 765 kV / 161 kV transmission right-of-way. The final alignment is dependent upon the final location of the switching station and the 765 kV / 161 kV route.

In most locations where the new 765 kV transmission line crosses an existing transmission line, no changes to the existing line are expected. The Project will, however, require modifications to certain existing 161 kV transmission lines, including along Segment 2 and near the Adams and Harmony substations, Jefferson Ridge Switching Station, and the Q-9 reroute. At the time of final design of the Project, however, the Applicants may determine that short segments of existing transmission lines crossed or paralleled by the new transmission line or at substations may need to be relocated or reconstructed to ensure National Electrical Safety Code (NESC) and Applicant design criteria and clearances are maintained. If such lines are not owned by Xcel Energy or Dairyland, the applicable Company will coordinate with the transmission line owner. Likewise, Xcel Energy and Dairyland will coordinate with any distribution line owners regarding relocation, as applicable.

3.1.4 Temporary Easements

Temporary construction workspace beyond the right-of-way may be required at certain locations, such as road or railroad intersections, utility crossings, along steep slopes, and at stringing locations. In addition, temporary staging of materials, such as structures and hardware, may occur in the Project area prior to construction installation, and temporary fly yards may be used to support aerial construction activities, where applicable. Temporary workspace will also be required adjacent to some structures where the direction of the line changes to allow for the pulling and stringing of the wires. The Applicants will avoid the placement of temporary construction workspace in wetlands and near waterbodies as practicable.

3.1.5 Structure Descriptions

Table 3.1.5-1 summarizes the typical structure designs for both Segments 1 and 2, and for the Q-9. Technical diagrams of these proposed structures are provided in **Appendix B** and representative simulations are provided in **Diagram 3.1.5-1**.

TABLE 3.1.5-1

Transmission Line Characteristics

Line Type	Structure Type	Structure Material	Typical Right-of-Way Width (feet)	Typical Structure Height (feet)	Typical Footprint (feet)	Typical Foundation Diameter (feet)	Typical Foundation Depth (feet)	Average Span between Structures (feet)
Segment 1								
765 kV	Lattice	Galvanized Steel	250	150-175	45 x 45–60 x 60	4-8	25-65	1,200 – 1,400
Segment 2								
765 kV/ 161 kV	Lattice	Galvanized Steel	250	150-199	45 x 45–60 x 60	4-8	30-65	1,200 – 1,500
161 kV	Monopole	Galvanized/ Weathered Steel	100	75-145	4-6	4-6	20-50	450 – 1,000
Q-9								
161 kV	Monopole	Galvanized/ Weathered Steel	100	75-145	4-6	4-6	20-50	450 – 1,000

Note: Structure sizes may change based on site conditions and analysis of Proposed Routes. Typical dimensions provided in this table are based on tangent structures, which would be the predominant structure type. Angle and dead-end structures may exceed these dimensions.

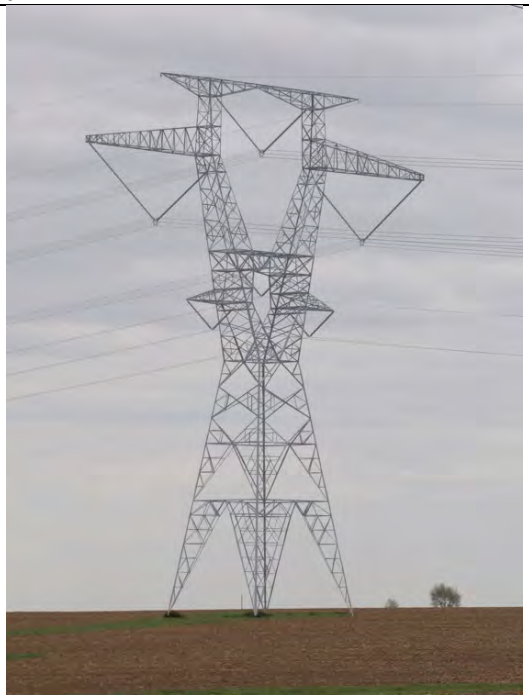
Foundation type and depth will be based on site-specific conditions and detailed engineering design and could include larger than typical foundation sizes.

DIAGRAM 3.1.5-1

Example Simulations of Typical Structures



Segment 1 Single Circuit 765 kV Lattice Structure



Segment 2 Double-Circuit 765 kV / 161 kV Lattice Structure

DIAGRAM 3.1.5-1

Example Simulations of Typical Structures



Segment 2 and Q-9
161 kV Monopole Structure – Weathered Steel



Segment 2 and Q-9
161 kV Monopole Structure – Galvanized Steel

Segment 1

Proposed structure heights for the 765 kV single circuit will typically range in height from approximately 150 to 175 feet tall. However, where existing transmission lines are crossed, or where topography, environmental constraints, or design needs necessitate, structure heights could be up to 200 feet tall, or greater. The typical spans between structures will be approximately 1,200 to 1,400 feet, with shorter or longer spans used as needed. The Applicants will generally install structures on drilled pier concrete foundations. The typical foundations will range in size from approximately 4 to 8 feet in diameter and 25 to 65 feet in depth. The typical footprint size will range from 45 feet by 45 feet to 60 feet by 60 feet. Alternate foundations, including but not limited to concrete spread footings, steel grillages and micro-piles, rock anchors, or helical piles with a pile cap may also be considered depending on site specific geology, loading, and construction constraints. Foundation type and depth will be based on site-specific conditions and detailed engineering design and could include larger than typical foundation sizes. Technical diagrams of these structures are provided in **Appendix B**.

Segment 2

Proposed structure heights for the 765 kV / 161 kV double-circuit will typically range in height from approximately 150 to 199 feet tall. However, where existing transmission lines are crossed or terrain factors require, structure heights could exceed 200 feet tall. Structures along Segment 2 may be somewhat taller than those along Segment 1 for several reasons. Segment 2 will carry both the new 765 kV line and an existing 161 kV line on the same structures, which requires additional space between the conductors and the ground in some locations. The structure designs also differ: Segment 1 generally uses a horizontal lattice configuration, while Segment 2 uses a delta lattice configuration. In addition, structures along Segment 2 are generally planned farther apart, which can require taller structures to maintain appropriate ground clearance between structures.

The typical spans between structures will range from 1,200 to 1,500 feet. The structures will typically be installed on drilled pier concrete foundations ranging from 4 to 8 feet in diameter and depths that are expected to range from 30 to 65 feet. The typical footprint size will range from 45 feet by 45 feet to 60 feet by 60 feet. Alternate foundations, including but not limited to concrete spread footings, steel grillages and micro-piles, rock anchors, or helical piles with a pile cap may also be considered depending on site specific geology, loading, and construction constraints. Foundation type and depth will be based on site-specific conditions and detailed engineering design and could include larger than typical foundation sizes. Technical diagrams of these structures are provided in **Appendix B**.

The portions of the 161 kV single circuit line to be rebuilt at the Adams and Harmony stations and to the Jefferson Ridge Switching Station will consist of steel monopole structures spaced 450 to 1,000 feet apart, on average. Transmission structures will typically range in height from 75 to 145 feet above ground, depending upon the terrain, potential crossings, and environmental constraints. The structures will either be direct-embedded or installed on reinforced concrete foundations. In general, the excavated holes for each type of foundation will range from 4 to 6 feet in diameter and 20 to 50 feet in depth, or greater, depending on soil conditions. The method of installation, diameter and depth of the foundation will vary depending on the soil capability and structure loadings. Technical diagrams of these structures are provided in **Appendix B**.

Q-9 Reroute

The Q-9 161 kV single circuit line will use steel monopole structures spaced 450 to 1,000 feet apart, on average. Transmission structures will typically range in height from 75 to 145 feet above ground, depending upon the terrain and environmental constraints. The structures will either be direct-embedded or installed on reinforced concrete foundations. In general, the excavated holes for each type of foundation will range from 4 to 6 feet in diameter and 20 to 50 feet in depth, or greater, depending on soil conditions. The method of installation, diameter and depth of the foundation will vary depending on the soil capability and structure loadings. Technical diagrams of these structures are provided in **Appendix B**.

3.1.6 Conductors

A single-circuit transmission line carries three phases (conductors) and separate shield wire(s) that consist of optical ground wire (OPGW). A double-circuit transmission line carries six phases (conductors) and two separate shield wires, that also consist of OPGW. Each phase can consist of one wire or multiple “bundled” wires.

Segment 1

On Segment 1, a six-conductor bundle of 954 thousand circular mil (kcmil) 45/7 aluminum conductor steel reinforced (ACSR) Cardinal conductor with 15-inch sub-conductor spacing is proposed and will meet applicable MISO criteria for the Project.[15] Conductor selection for Segment 1 was based on a comprehensive conductor selection study that evaluated multiple conductor sizes, types, and bundle configurations through a multi-criteria analysis encompassing electrical performance, mechanical performance, and economic considerations.

Segment 2

On Segment 2, the majority of the 765 kV / 161 kV double-circuit will utilize a six-conductor bundle of 795 kcmil 30/19 ACSR Mallard conductors with 18-inch sub-conductor spacing for the 765 kV circuit and a two-conductor bundle of 795 kcmil 30/19 ACSR Mallard conductors with 18-inch subconductor spacing for the 161 kV circuit. In the approximately 4 miles of Segment 2 from the Jefferson Ridge Switching Station to the Mississippi River Crossing, the Project proposes to utilize a horizontal (rather than delta) lattice configuration, along with associated sub-conductor spacing adjustments. This design is intended to reduce both the vertical complexity of the river crossing for birds and correspondingly reduce associated avian collision risk. In addition, through this approximately 4-mile segment, the Project proposes to utilize a three-conductor bundle of 795 kcmil 30/19 ACSR Mallard conductors for the 161 kV circuit.[16] A specialty high tension, low sag conductor may be utilized at the Mississippi River crossing if necessary to reduce tower heights.

Conductor selection for Segment 2 was based on a comprehensive conductor selection study that evaluated multiple conductor sizes, types, and bundle configurations through a rigorous multi-criteria analysis encompassing electrical performance, mechanical performance, and economic considerations. The analysis factored in the criticality of each criterion for the proposed double-circuit configuration. Audible noise compliance and reduced conductor sags and conductor blowout were most impactful to the selection to help minimize structure heights and maximize use of the Proposed Right-of-Way. The proposed conductors provide superior sag and blowout performance due to the relatively high mechanical strength of the conductor cores. Like the conductor selected for Segment 1, the conductors selected for Segment 2 meet all Project and regulatory requirements.

The Project will be designed to meet or surpass relevant local and state codes including the NESC and the Applicants' standards. Applicable standards will be met for construction and installation, and applicable safety procedures will be followed during design, construction, and after installation.

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15 Note that Xcel Energy has updated its conductor selection since the filing of the Certificate of Need Application. See Certificate of Need Application at Section 2.2.3. Xcel Energy selected the 954 ACSR as a consistent conductor to use across all active 765 kV projects across Xcel Energy, Inc.'s operating company's operating areas.

16 The proposed conductor design in this segment crossing the Mississippi River is intended to preserve the capability for future 345 kV service in the Genoa area, potentially through 765 kV/345 kV configuration, without requiring substantial reconstruction through the USFWS Upper Mississippi River NWFR or across the Mississippi River. Given the environmental, permitting, and construction challenges associated with this crossing, incorporating the additional capability during initial construction provides long-term flexibility, subject to future regulatory approvals (including obtaining a Certificate of Need from the MPUC, if needed), should future transmission system needs require 345 kV service.

3.1.7 Transmission Line Clearance Requirements

The Project will be designed and constructed to meet or exceed all applicable federal, state, and industry requirements governing transmission line clearances, including the NESC, applicable Minnesota statutes and rules, applicable North American Electric Reliability Corporation (NERC) reliability standards, and the Applicants' engineering design standards. The current engineering design defines the conductor configurations, structure types, and design criteria needed to support safe construction and operation along the Proposed Routes. As the design progresses, final engineering will refine the design as needed and confirm compliance with all applicable clearance, safety, and reliability requirements before construction.

The Project includes both single-circuit 765 kV transmission line segments and double-circuit transmission line segments carrying both 765 kV and 161 kV circuits. Because Segment 2 will mainly carry two transmission circuits on the same structures with the 765 kV circuit located above the 161 kV circuit, the structure configuration will be different than the structures on Segment 1, which carries only the 765 kV circuit. Although the configuration and overall appearance of the structures differ, both segments use lattice structures and ACSR conductors and will be designed to meet applicable clearance and other regulatory requirements.

Each transmission line segment will be designed to satisfy the clearance requirements applicable to its operating voltage.

Engineering evaluations consider the transmission line under applicable loading conditions, including conductor sag and conductor movement due to wind, temperature, and ice loading, as well as maximum operating conditions, to ensure required clearances are maintained during operation. These evaluations verify that the transmission line maintains the required vertical and horizontal clearances to roadways, railroads, agricultural lands, buildings, existing electric and communication facilities, waterways, vegetation, and other features encountered along the route.

The Project will comply with applicable NESC provisions governing induced currents on conductive objects, including the NESC limit on steady-state induced current. As part of the design, the Applicants will evaluate conductive objects that may be located, stored, or operated beneath or adjacent to the transmission line, including farm equipment, irrigation systems, and other agricultural implements, to ensure compliance with applicable induced current criteria. Where necessary, mitigation measures—such as grounding, bonding, or adjustments to conductor or structure configurations—will be incorporated. These measures may include increasing conductor attachment heights or otherwise increasing ground clearance to reduce induced current levels and ensure compliance with applicable safety requirements during normal operations.

3.1.8 Safety Equipment and Plans

The Project will be designed in compliance with local, state, and NESC standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. Appropriate standards will be met for construction and installation, and all applicable safety procedures will be followed during and after installation.

The Project will be equipped with protective devices (e.g., circuit breakers and relays located in substations where transmission lines terminate) to safeguard the public in the event of an accident, or if a structure or conductor falls to the ground. The protective equipment will de-energize the transmission line should such an event occur.

3.1.9 Outages

Transmission infrastructure has few mechanical elements and is built to withstand weather extremes that are normally encountered. With the exception of outages due to severe weather such as tornadoes and heavy ice storms, transmission lines rarely fail.

Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

However, unplanned outages of transmission facilities can happen for a variety of reasons. Unplanned outages can occur due to mechanical failures or severe weather like heavy ice, wind, and lightning. In the event an unplanned outage of the proposed Project occurs, the Applicants have the necessary infrastructure and crews in place in southern Minnesota to respond quickly and safely to return this line to service.

If there is a storm or emergency outage on the lines, Xcel Energy and Dairyland have service centers in the region that will initiate a tactical response by deploying on-call first responders to the lines as quickly as possible to patrol the line and assess the damage. Once the damage has been assessed, the first responder will relay the following information back to the service center:

- magnitude of damage;
- isolation requirements for switching;
- material required for restoration;
- number of line crew needed; and
- equipment needed.

Based on the assessment of the first responder, Xcel Energy or Dairyland will develop a plan to restore the damaged facilities. The goal of the repair is to place the transmission system back into service as quickly as possible to minimize the impact to the transmission system.

3.1.10 Distribution Lines

Distribution utilities located within the Project area include People's Energy Cooperative, Rochester Public Utilities, Freeborn-Mower Cooperative Services, and MiEnergy Cooperative.[17] If the Proposed Rights-of-Way overtake existing distribution lines, the Applicants will coordinate with distribution owners if relocation or burying of these lines is needed for the Project. This work will be undertaken by the distribution owner and will be conducted separately from the Project.

3.1.11 Service Life

The service life of a transmission line is approximately 65 years; however, transmission lines commonly remain in service beyond this period and are rarely completely retired. Given the engineering design standards to be applied to this Project, it is reasonable to expect the Project infrastructure to remain operational beyond the anticipated service life.

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[17] MPUC. 2026. Electric Utility Service Areas, Minnesota. Available online at: https://experience.arcgis.com/experience/620665d68e6e4deda1ae882e30d85b5a. Accessed October 2026.

3.2 FACILITIES

3.2.1 Repeater Stations

The Applicants will install OPGW that will provide telecommunication connectivity for Project operations. The optical data signal will degrade with distance as it travels through the optical fiber due to attenuation of the optical fiber and distortion of the optical signal. Consequently, the Project requires repeater stations along the 765 kV transmission line to overcome signal loss.

During detailed engineering, the Applicants will perform fiber loss calculations to determine the exact location of repeater stations; however, the maximum distance between repeater stations is estimated to be around 30 to 40 miles. Therefore, the Project will include up to four repeater stations; potentially one on Segment 1, and up to three on Segment 2. A typical repeater station will occupy an area of approximately 80 feet by 40 feet (0.07 acres). The Applicants plan to locate each repeater station within existing infrastructure, such as at an existing substation, switching station, or within proposed lattice structure footprints in order to avoid additional disturbance. The Applicants will perform fiber loss calculations to determine the exact location of repeater stations.

3.2.2 Switching Station

Dairyland's new Jefferson Ridge Switching Station will consist of a new three-circuit breaker 161 kV switching station in Houston County, Minnesota. The new switching station will occupy approximately 3.4 acres and will be accessed off Neumann Road. The 161 kV switching station will connect Dairyland's Q-7 161 kV line from the Harmony Substation (see **Section 1.2.1.2**), relocated Q-9 161 kV line to the Lansing Substation in Lansing, Iowa (see **Section 1.2.1.3**), and the Q-7 (to be renamed Q-50) 161 kV segment from the Jefferson Ridge Switching Station to the Genoa Substation in Genoa, Wisconsin (see **Section 1.2.1.2**). This will allow for the retirement and removal of the portion of the Q-9 161 kV transmission line crossing the Mississippi River into the Genoa Substation in Wisconsin to accommodate the new 765 kV circuit, which will be conducted as part of this Project as described in **Sections 1.2.1.2** and **1.2.1.3**.

3.2.3 Existing Substation Upgrades

On Segment 1, the single circuit 765 kV transmission line will connect to the North Rochester Substation, the expansion of which will be included in a route permit application related to PowerOn Midwest, further discussed in **Section 1.2.2.3**. No substation upgrades are planned on Segment 1 as part of this Application.

Segment 2 includes minor upgrades at the existing Adams and Harmony 161 kV substations to accommodate the operation of the new 765 kV facilities in shared right-of-way with the 161 kV transmission facilities. Upgrades at existing substations are expected to include modifications to bus configurations, protection and control systems, grounding and communication equipment, and installation or replacement of switches, surge arresters and insulation components, as needed. Substation design and site requirements will be refined through ongoing system studies and detailed substation engineering. All upgrades are expected to occur within the existing fenceline of the facilities.

3.3 DESIGN CONSIDERATIONS TO ACCOMMODATE FUTURE NEEDS

Minnesota statutes require the consideration of the potential for a project to accommodate future improvements to the transmission system. The Project is designed to maintain reliability

requirements and support growth, as described in the Certificate of Need Application. The Project also rebuilds significant portions of Dairyland's existing Q-4/Q-8/Q-7 161 kV transmission lines. These 161 kV facilities are all approximately 70 years old. Rebuilding these lines as part of the Project avoids near-term age and condition replacements and improves the reliability of the 161 kV system in this area into the future. The Jefferson Ridge Switching Station will also be built for current system needs but designed to accommodate expansion, if needed. This will allow for future improvements, minimizing impacts to landowners and providing cost efficiency.

As discussed in **Section 1.2.1.2**, Dairyland received a Route Permit from the Commission on September 22, 2025 for a new 3.5-mile-long 161 kV transmission line from its existing Q-8 transmission line along 171st Avenue in York Township, Fillmore County to the Minnesota-Iowa state line, referred to as the Beaver Creek Transmission Line.[18] The Beaver Creek Transmission Project is a network upgrade to provide transmission capacity for wind energy to be generated at the North Hills Wind Project in Howard County, Iowa, owned by ENGIE North America, Inc., while maintaining safety and reliability of the existing transmission network.

As part of the Beaver Creek Transmission Line, four miles of Dairyland's existing Q-8 161 kV transmission line between 131st Avenue to 171st Avenue will be retired and removed prior to construction of this Project; therefore, the 765 kV transmission line will be single circuit through this 4-mile section. As part of this Project, Dairyland has proposed to install two dead-end structures on the proposed 765 kV line at 131st Street and 171st Street to interconnect Dairyland's existing Q-8, including the new Beaver Creek Transmission Line, and the Q-30 (to be renamed Q-48). These structures would also allow Dairyland in the future to reinstall a 161 kV line, double-circuited with the 765 kV line, between 131st Street and 171st Street, creating a full loop between the Q-8/Q-48 and the Chester Switching Station in Howard County Iowa.

3.4 ESTIMATED COSTS

3.4.1 Construction Costs

Project costs are broken down by component in **Table 3.4.1-1**. Applicants have provided low-range and high-range cost estimates. All costs are presented in 2024 dollars and include permitting, mitigation, engineering, materials, land rights and right-of-way, and construction costs. Estimated costs for the proposed Project are approximately $1.015 billion (base) to $1.320 billion (high-range: base plus contingency). The high-range (base plus contingency) cost estimate adds 30 percent to the base cost to account for a reasonable level of potential factors which could impact the final cost of the Project as detailed below.

TABLE 3.4.1-1

Project Cost Estimate Ranges by Project Component ($2024)

Project Component	Base	High-Range
Segment 1	$247 million	$321 million
Segment 2	$764 million	$993 million
765 kV	*$706 million*	*$918 million*
161 kV	*$58 million*	*$75 million*
Q-9	$4 million	$5 million
PROJECT TOTAL	**$1.015 billion**	**$1.320 billion**

[18] Commission Docket No. E002/CN-24-95.

These estimates were developed by the Applicants based upon the scope of the Project presented in this Application. The cost estimates are based on design, analysis, and bids from contractors, engineering firms, and independent consultants. The final cost of the Project will be impacted by materials and labor costs that may increase due to multiple factors, including but not limited to shortages, price escalation, and tariffs.

The Applicants' high-range (base plus contingency) cost estimate includes a 30 percent contingency adder from the base cost estimate to account for a reasonable level of potential factors which could impact the final cost of the Project. A 30 percent contingency is consistent with industry practices, Applicants' experiences, and MISO guidelines for this stage of project development. The contingency is generic (i.e., a total pool) which accounts for a reasonable level of potential changes attributed but not limited to:

- materials and labor costs (e.g., raw material pricing, substation and transmission line equipment pricing, shortages, taxes and tariffs, etc.);
- routing (e.g., length of the transmission lines, crossings, specialty structures, easement and land costs, etc.); and• detailed survey, design, and engineering (e.g., topology, soil conditions; and
- final structure designs, final substation designs, etc.).

The Applicants will comply with Minn. Stat. § 216I.05, subd. 12(d), which directs the Commission to require the recipient of a route permit to construct an energy infrastructure facility, including contractors and subcontractors, to "pay no less than the prevailing wage rate," as defined in Minn. Stat. § 177.42. These cost estimates assume that the Applicants will pay prevailing wages for applicable positions for the construction of the Project.

3.4.2 Operation and Maintenance Costs

The Applicants anticipate post-construction annual maintenance cost of approximately $3,200 - $4,500 per mile. The majority of this cost is related to vegetation management. The Applicants also perform other general maintenance, such as conducting regular right-of-way patrols and repairing storm-damaged, aged, or worn equipment or facilities. The specific operation and maintenance costs for an individual transmission line vary based on the location of the line, the number of trees located along the right-of-way, the age and condition of the line, the voltage of the line, and other factors.

Over the life of the new switching station and existing substations, inspections will be performed monthly to maintain equipment and make necessary repairs. Circuit breakers, batteries, protective relays, and other equipment need to be serviced periodically in accordance with the manufacturer's recommendation. Routine compliance inspections will be performed, and the site must also be kept free of vegetation and drainage maintained.

3.5 PROJECT SCHEDULE

The anticipated permitting and construction schedule for each segment of the Project is provided in **Table 3.5-1** and **Table 3.5-2**. This schedule is based on information known as of the date of the filing of this Application and subject to change.

TABLE 3.5-1

Segment 1 Anticipated Schedule

Activity	Estimated Date
Minnesota Certificate of Need Application Filed	February 6, 2026
Certificate of Need / Route Permit Joint Proceeding Commenced	Fall 2026
Land Acquisition Begins	2027
Required Federal, State, and Local Permits Obtained	2030
Start Project Construction	2030
Project Operation	2034

TABLE 3.5-2

Segment 2 and Q-9 Anticipated Schedule

Activity	Estimated Date
Minnesota Certificate of Need Application Filed	February 6, 2026
Certificate of Need / Route Permit Joint Proceeding Commenced	Fall 2026
Land Acquisition Begins	2027
Required Federal, State, and Local Permits Obtained	2030
Start Project Construction*	2030
Project Operation	2034

* This is inclusive of the 765 kV / 161 kV double-circuit, 161 kV rebuilds, Jefferson Ridge Switching Station, and Q-9 reroute.

The Applicants developed the overall Project schedule based on the anticipated timing of the Certificate of Need and Route Permit joint proceedings, while also considering the subsequent activities that must be completed prior to the commencement of construction of the Project. The Applicants are commencing this permitting process years before the in-service dates MISO identified because the Applicants anticipate that the entirety of this time will be needed to accomplish necessary processes and tasks prior to commencement of construction, and then complete construction.

For example, following the issuance of the Route Permit, the Applicants considered the anticipated time and resources needed for such things as land acquisition, survey, environmental permits, detailed design, procurement of materials, lead time of materials, and above and below grade construction.

Material lead times are largely based on current lead times. However, lead times are likely to increase by the time material orders are placed for the Project, due in large part to the likely increase in demand for materials across the industry during this timeframe. In addition, the material needs for the Project will be sizable, which will likely contribute to increased material lead times. Adding to some of the lead time uncertainty is the likelihood that some materials may need to be sourced internationally, whether for technical reasons, qualified supplier availability, or other reasons. Similar to material availability, the Applicants also believe that labor resources will be in high demand during the anticipated construction timeframe for the Project.

For these reasons, meeting the target in-service date for the Project will depend on the timely receipt of necessary approvals and permits, the timely execution of tasks that must be completed

prior to the start of construction, material availability, outage constraints and resource availability. There is little flexibility in the schedule to meet the target in-service date for the Project.

3.6 WORK FORCE REQUIRED

Based on early analysis, the Applicants assume that approximately 500 to 600 full-time personnel may be needed for construction of the Project, and 5 to 8 full-time personnel may be needed for operation and vegetation management.[19] Operation personnel will manage a wide range of assets, spending only part of their time operating, and maintaining the assets that are a part of this Project.

Applicants expect that the selected contractor or contractors will employ a range of workers with differing skills and specialties to complete different tasks. Applicants endeavor to hire where they operate while assuring that the Project is constructed safely, at an efficient cost. When practical, the contractor(s) will employ a local workforce that will be supplemented by specialized personnel from a more regional pool, as may be needed. The Applicants will comply with Minn. Stat. § 216I.05, subd. 12(d), which directs the Commission to require the recipient of a route permit to construct an energy infrastructure facility, including contractors and subcontractors, to "pay no less than the prevailing wage rate," as defined in Minn. Stat. § 177.42.

The Applicants have initiated coordination with the following labor unions:

- Minnesota Pipe Trades Association
- IBEW Local 343
- Teamsters Local 120
- IBEW State Council
- LiUNA Minnesota & North Dakota
- LiUNA Laborers Local 563
- IUOE Local 49

[19] Workforce estimates provided in this Route Permit Application have been updated and differ from those provided in February 2026 in the Certificate of Need Application (Docket No. ET2, E002/CN-25-121) based on refined analysis of the proposed route and construction practices.

4 ROUTE SELECTION PROCESS

The Applicants conducted a thorough and systematic route selection process beginning in 2024 and extending through the summer of 2026. This process included consideration of the route prescribed in MISO's approval of Tranche 2.1 LRTP 26, statutory and administrative requirements, data collection, public and agency outreach and input (including multiple rounds of public meetings), and comparison of route segments and alignments. Information gathered through public outreach, agency coordination, publicly available sources, and on-site field review was compiled into a GIS database and used to evaluate routing options with a goal of developing Application routes that minimize impacts to sensitive resources to the extent practicable.

4.1 ROUTING CRITERIA

The Applicants applied the criteria set forth in Minn. Stat. § 216I.05, subd. 11, in their route development process. These criteria guide the Commission's decision when selecting a route for an HVTL.

Minn. Stat. § 216I.05, subd 11(a) provides that the Commission's route permit determinations "must be guided by the state's goals to conserve resources, minimize environmental impacts, and minimize human settlement and other land use conflicts, consider impacts to environmental justice areas,...including cumulative impacts..., and ensure the state's electric energy security through efficient, cost-effective power supply and electric transmission infrastructure."

In addition to the statutory criteria noted above, Minn. Stat. § 216I.05, subd 11(b) provides factors the Commission will consider in determining whether to issue a route permit for an HVTL. These factors are:

(1) Evaluating research and investigations related to:
   i. the effects on land, water, and air resources; and
   ii. the effects water and air discharges and electric and magnetic fields (EMF) resulting from large infrastructure facilities have on public health and welfare, vegetation, animals, materials, and aesthetic values, including air discharges and other matters pertaining to large energy infrastructure facilities' effects on the water and air environment.
(2) Conducting environmental evaluation of routes that are proposed for future development and expansion, and the relationship of proposed sites and routes for future development and expansion to Minnesota's land, water, air and human resources.
(3) Evaluating the effects on measures designed to minimize adverse environmental effects.
(4) Evaluating the potential for beneficial uses of waste energy from proposed large power generating plants.
(5) Analyzing the direct and indirect economic impact of proposed routes, including but not limited to productive agricultural land lost or impaired.
(6) Evaluating adverse direct and indirect environmental effects that are unavoidable should the proposed route be accepted.
(7) Evaluating alternatives to the applicant's proposed route, if applicable.
(8) When appropriate, evaluating potential routes that would use or parallel existing railroad and highway rights-of-way.
(9) Evaluating governmental survey lines and other natural division lines of agricultural land to minimize interference with agricultural operations.

(10) Evaluating the future needs for large energy infrastructure facilities in the same general area as any proposed route.
(11) Evaluating irreversible and irretrievable commitments to resources if proposed route is approved.
(12) When appropriate, considering the potential impacts raised by other state and federal agencies and local entities.
(13) Evaluating the benefits of the proposed facility with respect to:
    i. The protection and enhancement of environmental quality; and
    ii. The reliability of state and regional energy supplies.
(14) Evaluating the proposed facility's impact on socioeconomic factors; and
(15) Evaluating the proposed facility's employment and economic impacts in the facility site's vicinity and throughout Minnesota, including the quantity, quality and compensation level of construction and permanent jobs. The commission must consider a facility's local employment and economic impacts, and may reject or place conditions on a site or route permit based on the local employment and economic impacts.

In addition, under Minn. Stat. § 216I.05, subd. 11(e), the Commission must make a specific finding that the Commission considered locating a route for an HVTL on an existing high-voltage transmission route and using parallel existing highway right-of-way. To the extent an existing high-voltage transmission route or parallel existing right-of-way is not used for the route, the Commission must state the reasons.

4.2 ROUTE DEVELOPMENT PROCESS

The Applicants utilized a systematic process of identifying, refining, and comparing route options to arrive at the 765 kV Proposed Route identified in this Application. The following steps were taken as part of this process:

- establish boundaries for Routing Study Area;
- identify opportunities and constraints;
- conduct initial outreach in the routing study area;
- conduct local government, agency and Tribal outreach;
- hold public open house meetings;
- review and refine routes, run comparative analysis to remove most impactful routes;
- hold second round of open house meetings;
- review, refine routes, run comparative analysis to remove most impactful routes;
- optimize route segments and connect for end-to-end routes for Route Permit Application; and
- conduct constructability review of end-to-end routes.

This process resulted in the identification of the 765 kV Proposed Route consisting of Segments 1 and 2. This process is more thoroughly documented in the sections below.

4.2.1 Routing Study Area

The Routing Study Area was designed to include an area large enough that a reasonable number of route options to the MISO Tranche 2.1 Project 26 end point at North Rochester Substation and the Project's crossing Minnesota/Wisconsin state line could be identified without it being so large as to encumber the analysis with excessive data and routing options that did not present reasonable alternatives. The purpose of identifying a Routing Study Area for the Project was to establish boundaries and limits for the information-gathering process (e.g., identifying environmental and land use resources, routing constraints, and routing opportunities) and the subsequent development of route options for the Project.

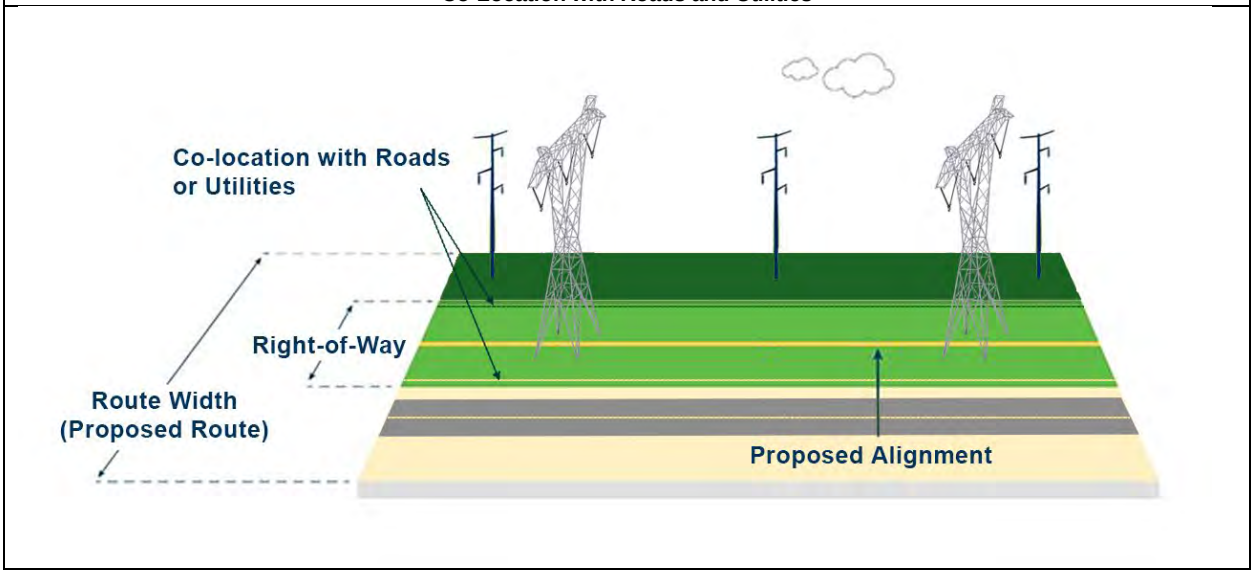
The Applicants reviewed an area extending from the North Rochester Substation area northeast to Kellogg, Minnesota and the Minnesota/Wisconsin state line along the Mississippi River, and south to the Minnesota/Iowa border and east (see **Figure 3**) to identify potential routing opportunities and constraints.

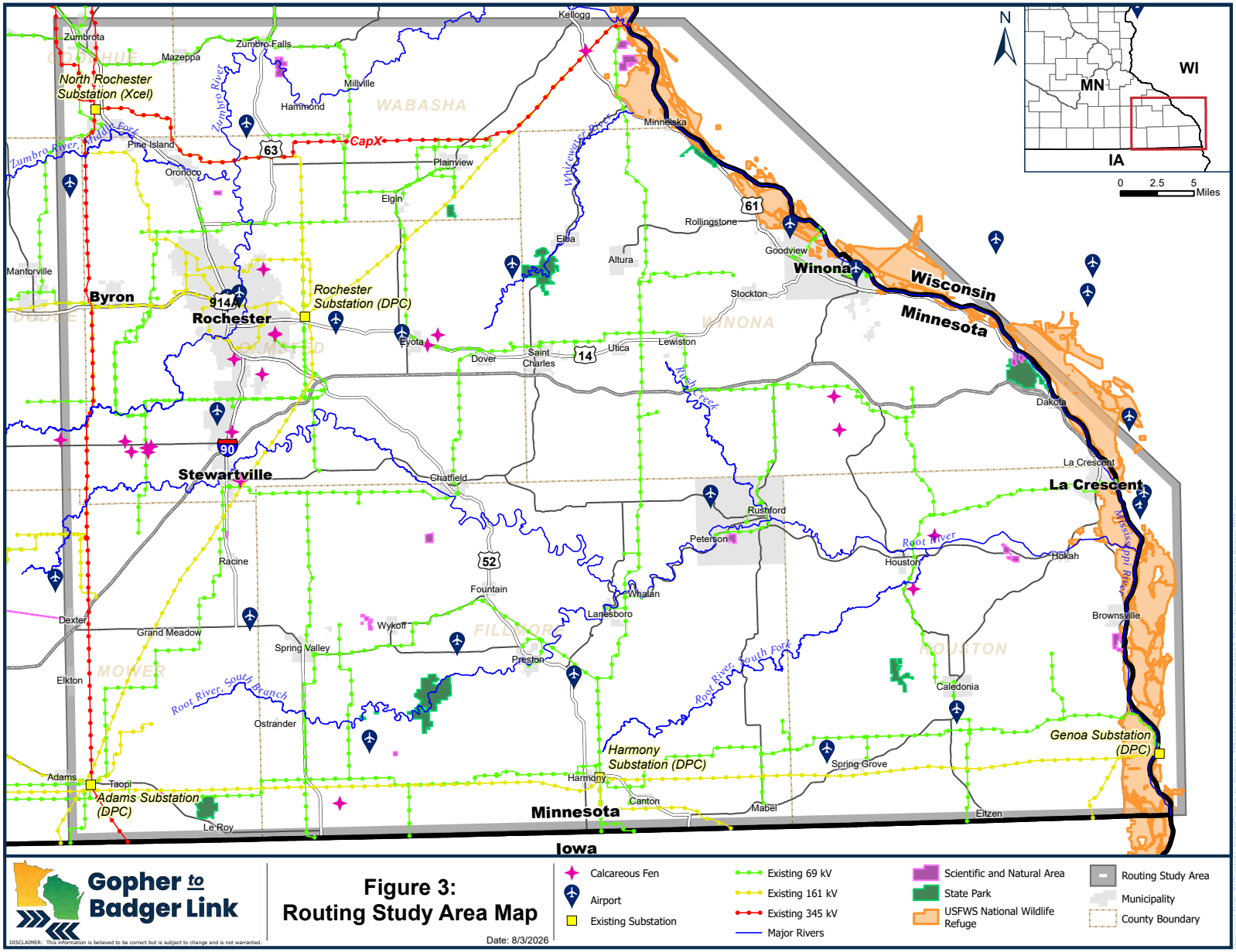
4.2.2 Routing Constraints and Opportunities

After establishing a Routing Study Area, the next step was to identify potential routes that minimized impacts to the human and natural environment. As shown in **Figure 3**, there are opportunities to co-locate with existing utility and transportation rights-of-way, including existing 345, 161 and 69 kV transmission line rights-of-way and major highway rights-of-way that run north/south and east/west through the Routing Study Area (see **Diagram 4.2.2-1**). Because MISO identified the Segment 2 portion of the Project as a co-location with Dairyland's existing 161 kV transmission lines, this route option presented an opportunity to reduce the number of new transmission routes in this area, while also realizing the benefits of rebuilding the existing 161 kV transmission line. Fewer opportunities for right-of-way sharing exist along Segment 1 from the North Rochester Substation to I-90 near Marion Road, where Segment 2 begins.

DIAGRAM 4.2.2-1

Co-Location with Roads and Utilities




Zumbrota
Mazeppa
Zumbro Falls
Kellogg
North Rochester Substation (Xcel)
Millville
Hammond
WABASHA
Zumbro River
Pine Island
CapX
63
Oronoco
Plainview
Elgin
Minneiska
Whitewater River
Elba
Altura
Rollingstone
61
Goodview
Winona
Wisconsin
Minnesota
Mantorville
Byron
Rochester
Rochester Substation (DPC)
Stockton
WINONA
Eyota
Dover
Saint Charles
14
Utica
Lewiston
Dakota
Stewartville
90
Chatfield
La Crescent
Rushford
Peterson
Root River
Houston
Hokah
Racine
52
Fountain
Whalan
Lanesboro
Brownsville
Dexter
Grand Meadow
Wykoff
Spring Valley
Preston
FILLMORE
HOUSTON
Elkton
MOWER
Root River, South Branch
Root River, South Fork
Caledonia
Ostrander
Genoa Substation (DPC)
Harmony Substation (DPC)
Spring Grove
Adams
Taopi
Adams Substation (DPC)
Harmony
Canton
Mabel
Elizen
Le Roy
Minnesota
Iowa
N
WI
MN
IA
0 2.5 5 Miles
Gopher to Badger Link
Figure 3:
Routing Study Area Map
Date: 8/3/2026
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Calcareous Fen
Airport
Existing Substation
Existing 69 kV
Existing 161 kV
Existing 345 kV
Major Rivers
Scientific and Natural Area
State Park
USFWS National Wildlife Refuge
Routing Study Area
Municipality
County Boundary

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The Applicants considered the opportunity to follow the CapX 345 kV transmission line that extends from the North Rochester Substation east to Kellogg, Minnesota and the I-90 right-of-way starting southeast of Rochester east to Dakota, Minnesota. Both of these route alternatives were suggested by members of the public during open house meetings and are further discussed in **Sections 4.3.1** and **4.3.2**. In addition, members of the public also suggested a route alternative running due south from the North Rochester Substation on the west side of the City of Rochester to the Adams Substation. This route alternative is discussed in **Section 4.3.3**.

The Applicants further identified several constraints that limited routing options. For example, the up to 250-foot right-of-way created more constraints along some route options, particularly where residences or other infrastructure are present in close proximity to existing rights-of-way. In general, routes were designed to avoid towns and cities located within the Routing Study Area in order to avoid siting the transmission line over high concentrations of residences, businesses, schools, churches, etc. and associated utility and transportation infrastructure and to comply with required clearances. In addition, the right-of-way width was informed by the need to meet the Minnesota State Noise Standards found in Minn. R. Ch. 7030.

Furthermore, changes in direction are more challenging for a 765 kV transmission line because turns generally require larger, heavier structures with more substantial foundations, resulting in greater construction impacts and costs. Suspension structures can generally accommodate relatively small changes in direction of up to approximately 15 degrees; greater angles require larger dead-end structures with structure size increasing as the angle increases. As a result, avoiding or routing the 765 kV transmission line around certain features can be more challenging than for lower-voltage transmission lines.

The Mississippi River crossing poses its own set of challenges, which includes the USFWS Upper Mississippi River NWFR, significant terrain on either/both banks in areas, and the fact that it is a designated Section 10 navigable water managed by the U.S. Army Corps of Engineers (USACE). The process to permit a transmission line crossing of a Section 10 waterbody requires coordination with the U.S. Coast Guard (USCG) to ensure that the transmission line design allows safe passing of commercial vessels beneath the conductors, including during high-water conditions. This evaluation typically considers maximum conductor sag, maximum operating temperatures, ice loading, flood-stage water elevations and navigation channel location. For large rivers, such as the Mississippi River, the required clearance typically exceeds the NESC minimal clearances discussed above. The locations of the structures are also considered relative to the navigation channel to avoid risk of collision and to consider effects of future channel modifications. In addition, the USFWS Upper Mississippi River NWFR extends from the Wabasha, Minnesota area south along the Mississippi River into Iowa. There are breaks within that stretch of non-USFWS-managed property, including at Winona, Donehower, and La Crescent. Dairyland has been coordinating with the USFWS since December 2025 regarding the Project. Further analysis of the Mississippi River crossings are presented in **Section 4.3.4**.

4.2.3 Project Outreach

4.2.3.1 Public Outreach

Public outreach for the Project consisted of digital engagement, informational mailings, newspaper advertisements, and in-person open house meetings, as described below. The Applicants also provided the materials presented at the open houses online.

Website and Digital Engagement

The Applicants established a Project website to provide key Project information for the public. The website contains a description of the Project scope and schedule, explanation of the Project need, benefits, static and interactive segment maps, and a Project library that includes Frequently Asked Questions, fact sheets, open house meeting boards and presentations from the on-demand self-guided online open houses (**Appendix G**). To facilitate public involvement, the website contains links to subscribe to the Project mailing list for email notifications, comment form and comment map where landowners and stakeholders could comment on impacts or considerations for a specific area, information line telephone number, and a page with past and upcoming events including open houses.

The Applicants' Project website, **www.gophertobadgerlink.com**, launched on January 2, 2026. From January 2 to October 19, the site had 17,137 users and 40,603 views.[20] The top five regional cities of origin for users were Minneapolis, Rochester, Chicago, Ashburn and La Crosse. Most users visited in January and May 2026 corresponding with the open house meeting outreach. The top visited pages were the home page and the Applicants' Route Development Process that contained the route development process information and interactive comment map.

Mailings and Newsletters

The Applicants sent two mailers, each with a distribution of approximately 15,000 recipients in the Project Notice Area, providing notification of the January 2026 and May 2026 open houses to landowners and agencies. In addition to providing information on dates and locations of the open houses, notifications also included a general Project description, a Project schedule, a map of the Project Routing Study Area, the Project's website address, and Project contact information. Open houses were advertised in the Austin Daily Herald, Caledonia Argus, Kenyon Leader, Preston Fillmore County Journal, and the Rochester Post Bulletin. A media advisory was also provided to local media in the region. See **Appendix G** for Project mailings, social media posts and newspaper advertisements.

Open Houses

Two public open houses were held in November 2025 to introduce the Project, share information and gather feedback. Total attendance at both open houses was 134 people. In January 2026, seven in-person open house meetings were held for the Project and an on-demand self-guided online open house was made available on the Project website. A total of 356 people attended the January 2026 open houses; the breakdown of attendance by meeting is presented in **Table 4.2.3-1**. Some attendees chose not to sign in and are not included in the attendance totals. During and after the open house meetings, the public could provide comments in-person, online, through the Project map, to the Project email, or through the Project hotline.

[20] A 'user' is described as one individual who may visit the website multiple times but is still counted as only one user. 'Views' include the total number of times all users visited any webpage throughout the website.

TABLE 4.2.3-1

Public Open House Summary

Open House Venue	Open House Location	Date of Open House	Meeting Attendance*
Grand Meadow Community Center	Grand Meadow, MN	November 17, 2025	42
Four Seasons Event Center	Caledonia, MN	November 18, 2025	92
Zumbrota VFW	Zumbrota, MN	January 12, 2026	57
Blue Moon Ball Room	Rochester, MN	January 13, 2026	81
LeRoy Community Center	LeRoy, MN	January 13, 2026	34
Stewartville American Legion	Stewartville, MN	January 14, 2026	55
Preston Depot Museum and Riverfront Center	Preston, MN	January 14, 2026	31
Mabel Community Center	Mabel, MN	January 15, 2026	47
Four Seasons Community Center	Caledonia, MN	January 15, 2026	51
Stewartville Golf Course	Stewartville, MN	May 4, 2026	70
Floral Hall in Graham Park	Rochester, MN	May 5, 2026	80
Zumbrota VFW	Zumbrota, MN	May 5, 2026	55
Wykoff Commons	Wykoff, MN	May 6, 2026	15
LeRoy Community Center	LeRoy, MN	May 6, 2026	35
Mabel Community Center	Mabel, MN	May 7, 2026	35
Four Seasons Community Center	Caledonia, MN	May 7, 2026	40

* Note: Some attendees chose not to sign in and were not included in the attendance totals. MN = Minnesota.

In May 2026, an additional seven in-person open house meetings were held for the Project and an on-demand self-guided online open house available on the Project website. A total of 330 people attended this round of meetings; the breakdown of attendance by meeting is presented in **Table 4.2.3-1**. Some attendees chose not to sign in and are not included in the attendance totals. Commenters, again, could submit comments through multiple different options, as described above with respect to the January 2026 open houses.

The on-demand self-guided online open house includes the same content presented during the in-person public open houses. It provides an opportunity for viewers to attend at their convenience to learn more about the Project, the routing process and provide input. Information about the on-demand self-guided online open house was included in outreach materials in addition to being linked from the Project website. This on-demand self-guided online open house has been available since January 12, 2026 to present day and includes the following pages:

- Welcome
- Project Area
- Project Need
- Benefits
- Minnesota Regulatory Process
- Applicants' Route Development Process
- 765 kV Technology
- Structures
- Construction
- Share your Feedback
- Contact Us

Summary of Common Themes in Public Comments

Comments submitted about the Project during and after the open house meetings were centered on the following themes:

- residential impacts (proximity, property values, aesthetics, noise, etc.);
- EMF;
- business impacts (proximity, operational disturbances, etc.);
- agricultural and environmental impacts (farmland disturbance, harvest interruption, etc.);
- proximity and potential impacts to aviation, quarrying and landfill operations;
- use of existing transmission rights-of-way and infrastructure;
- general routing questions and concerns;
- questions about data centers and other utility projects in the region including PowerOn Midwest and the Mankato-Mississippi River Transmission Project; and
- other Project questions and concerns.

The Applicants used stakeholder comments to inform routing opportunities and constraints.

4.2.3.2 Local Government Outreach

The Applicants also met and/or coordinated with interested local units of government, including:

- City of Harmony – October 22, 2025
- Houston County – November 18, 2025, February 17, 2026, and July 29, 2026
- Mower County – February 3, 2026
- Fillmore County – May 5, 2026
- Beaver Township (Fillmore County) – May 11, 2026
- Olmsted County Physical Development Committee – June 16, 2026

On July 30, 2026, the Applicants also conducted a virtual presentation to which all townships within the Notice Area were invited.

4.2.3.3 Agency and Tribal Outreach

During the development of the Routing Study Area, the Applicants also sent Project introductory and update letters in December 2025, May 2026 and August 2026 to solicit feedback on the routing process from the federal, state and local agencies, and Tribal Nations. The Applicants met with the USFWS, USACE, Minnesota Board of Water and Soil Resources (BWSR), Minnesota

Department of Natural Resources (MDNR), MnDOT, and the Houston and Olmsted County Highway Departments; feedback from these agencies has been incorporated into the route selection process. More details regarding outreach may be found in **Section 7.0** of this Application.

4.3 ROUTE ALTERNATIVES CONSIDERED AND REJECTED

As described in **Section 4.2**, the Applicants evaluated both route alternatives (i.e., end-to-end route alternatives) and route segment alternatives (i.e., alternatives to portions of a route). This section describes route alternatives the Applicants considered but rejected for the 765 kV Proposed Route. Route alternative segments are described in **Section 4.4**. These route alternatives consist of preliminary alignments; rights-of-way for each route alternative have not been developed due to the feasibility constraints identified in the following sections.

In developing and evaluating route alternatives, consistent with the Commission's routing criteria, the Applicants began by identifying opportunities for following existing linear features—in particular, existing HVTL rights-of-way and public roads between the North Rochester Substation and the Mississippi River. In addition to the route that has been refined into the 765 kV Proposed Route presented in this Application, which follows an existing Dairyland 161 kV right-of-way for nearly the entirety of Segment 2, this initial analysis included evaluation of the route alternatives discussed in this section. The bullets below identify each route alternative and summarize the reason(s) for the Applicants' rejection of that route alternative. Additional detail is provided in the sections that follow.

- **CapX Route Alternative**: A route alternative that follows the existing CapX 345 kV line from the North Rochester Substation into Wisconsin near Alma, Wisconsin, would not follow the existing 161 kV line that MISO identified to be rebuilt as part of the Project, which would extend the length of the transmission line on the Wisconsin side to reach the MISO-designated termination point near Bell Center, Wisconsin, and would require traversing a congested area east of the North Rochester Substation (**Section 4.3.1**).

- **I-90 Route Alternatives**: The Applicants evaluated three route alternatives following I-90 for all or a portion of the length of Segment 2, each of which was rejected for the Proposed Route because of potential human and environmental impacts and/or because they would not make use of the existing 161 kV right-of-way followed by Segment 2, resulting in two transmission line rights-of-way (one 765 kV and the 161 kV) (**Section 4.3.2**).

- **West of Rochester Route Alternative**: A route alternative on the west side of Rochester was rejected because of the density of constraints in the area, and because of concerns related to system reliability if two 765 kV lines were located in the same general area (**Section 4.3.3**).

- **Mississippi River Crossing Route Alternatives**: The Applicants evaluated six different crossings of the Mississippi River before selecting the proposed crossing at Genoa. Several of these crossings were infeasible due to existing infrastructures, municipal developments, and other constraints present at the crossings. The crossing along the Proposed Route was ultimately selected to minimize new or additional right-of-way within the USFWS Upper Mississippi River NWFR. Rebuilding the existing 161 kV line with the 765 kV line results in fewer structures within the existing right-of-way, leading to a smaller permanent footprint as compared to a new right-of-way crossing, and impacts fewer natural resources through the NWFR (**Section 4.3.4**).

Ultimately, Applicants' analysis and evaluation of route alternatives determined that the Proposed Route best meets the Commission's routing criteria, minimizes human and environmental impacts, meets applicable engineering and design criteria and standards, and meets the need for the Project. The Proposed Route is consistent with MISO's identification of LRTP 26 as including an upgrade of the 161 kV line, follows an existing HVTL right-of-way for nearly the entirety of Segment 2, allows for rebuilding the existing 161 kV in the same right-of-way, and has been refined by the Applicants to avoid and minimize potential impacts to humans and the environment to the extent feasible.

4.3.1 CapX Route Alternative

The Applicants evaluated a route alternative that would parallel the existing CapX 345 kV line from the North Rochester Substation and into Wisconsin near Alma, Wisconsin. The Applicants rejected this route alternative primarily because it does not follow the existing 161 kV line that is identified to be rebuilt as part of the Project, and would not connect to the corresponding section in Wisconsin on the other side of the Mississippi River crossing.

Furthermore, a route alternative paralleling a portion of the CapX line going east out of the North Rochester Substation is problematic due to the close proximity to the City of Oronoco and land owned by the Prairie Island Indian Community, infrastructure congestion at the crossing of the Zumbro River at White Bridge Road, and the Mankato to Mississippi River Transmission (MMRT) project. The MMRT project was recently approved by the Commission and includes constructing a new 161 kV line generally in parallel with the existing double-circuit 345 kV CapX structures. This results in a 230-foot-wide right-of-way for existing and planned infrastructure and there are several situations where an additional 250 feet of right-of-way for the Project parallel to the MMRT/CapX lines is not available.

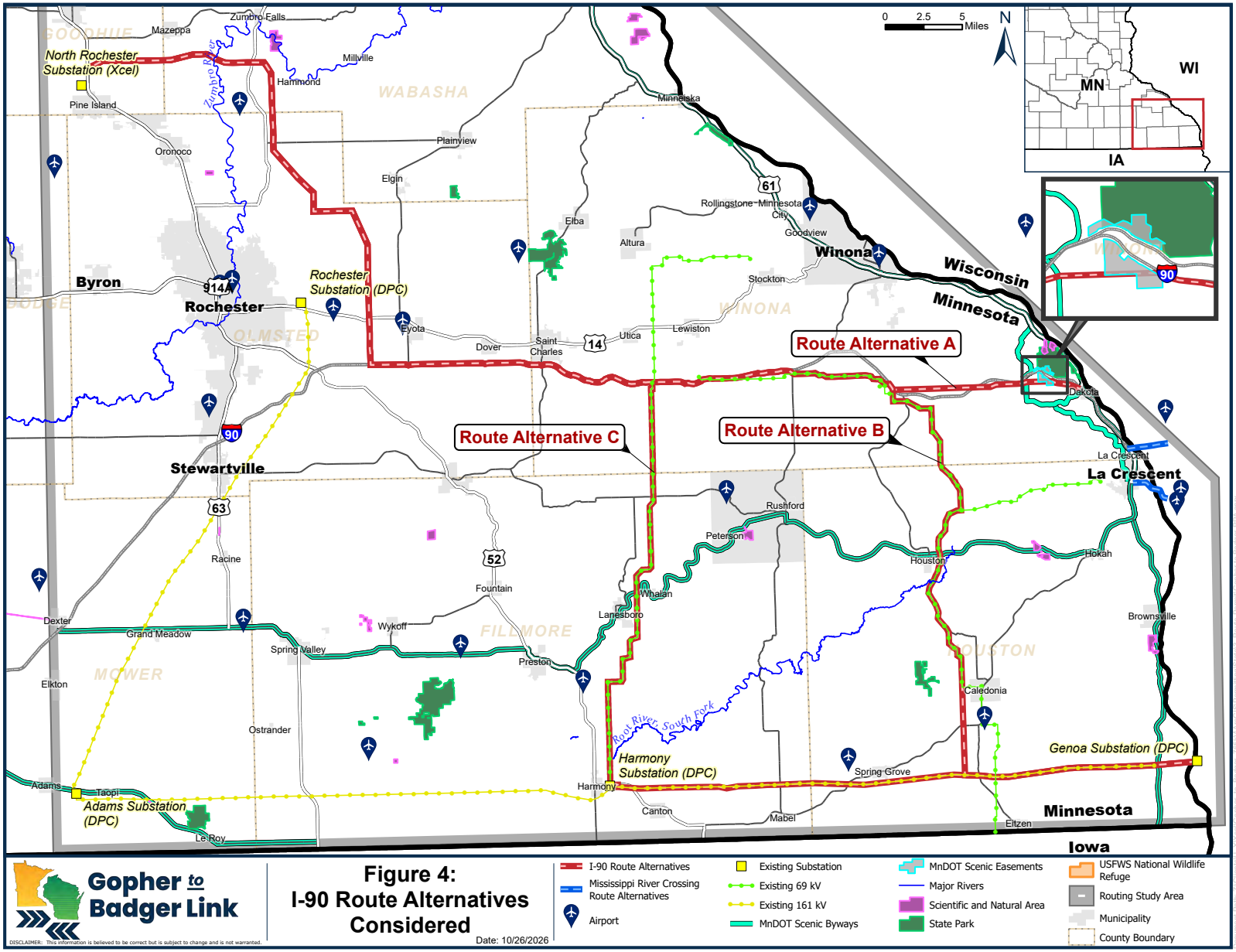
For these reasons, an alternative following the existing CapX route was rejected.

4.3.2 I-90 Route Alternatives

Because I-90 is an east-west transportation right-of-way in the Project area, the Applicants evaluated routes that would follow I-90 along most or portions of Segment 2; following I-90 is generally not an option for most of Segment 1 due to its north/south orientation. The Applicants evaluated three different I-90 route alternatives (**Figure 4**):

- Route Alternative A would start near where Segment 1 meets Segment 2 of the Project (near Marion Road) and then follows I-90 for approximately 47 miles to the Minnesota/Wisconsin border. Route Alternative A is not co-located with HVTL rights-of-way.

- Route Alternative B would start where Segment 1 and 2 meet near Marion Road and then generally follow I-90 for approximately 35 miles before turning south near Ridgeway, Minnesota and following an existing Dairyland 69 kV line until meeting the existing 161 kV right-of-way along the Proposed Route south of Caledonia, Minnesota. Route Alternative B would then follow the existing 161 kV right-of-way to the Minnesota/Wisconsin border and cross the Mississippi River at the crossing location associated with the Proposed Route (see **Figure 4**). Route Alternative B would follow an existing HVTL right-of-way for approximately 14.9 miles.


Route Alternative A
Route Alternative B
Route Alternative C
North Rochester Substation (Xcel)
Rochester Substation (DPC)
Harmony Substation (DPC)
Adams Substation (DPC)
Genoa Substation (DPC)
Byron
Rochester
Stewartville
Winona
La Crescent
Wisconsin
Minnesota
Iowa
Gopher to Badger Link
Figure 4:
I-90 Route Alternatives Considered
Date: 10/26/2026
I-90 Route Alternatives
Mississippi River Crossing Route Alternatives
Airport
Existing Substation
Existing 69 kV
Existing 161 kV
MnDOT Scenic Byways
MnDOT Scenic Easements
Major Rivers
Scientific and Natural Area
State Park
USFWS National Wildlife Refuge
Routing Study Area
Municipality
County Boundary

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- Route Alternative C would start where Segment 1 and 2 meet near Marion Road and then generally follow I-90 for approximately 19 miles before turning south near Fremont, Minnesota and following an existing Dairyland 69 kV line until meeting the existing 161 kV right-of-way along the Proposed Route in Harmony, Minnesota. Route Alternative C would then follow the existing 161 kV right-of-way to the Minnesota/Wisconsin border and cross the Mississippi River at the existing crossing location associated with the Proposed Route (see **Figure 4**). Route Alternative C would follow an existing HVTL for approximately 37.5 miles.

As described in further detail in the subsections that follow, the Applicants rejected each of the I-90 route alternatives because they presented significant design and engineering challenges, do not co-locate with and rebuild the Dairyland 161 kV line, and/or would increase potential Project impacts, as described in **Section 4.3.2.1**. The Applicants concluded that a route that follows an existing HVTL right-of-way for the majority of its length is, in this case, more consistent with the Commission's routing criteria and better avoids and minimizes potential human and environmental impacts than a route along I-90.

The Applicants met with MnDOT on June 16, 2026, to discuss the potential for the Project to follow I-90. Applicable feedback received from MnDOT as part of that coordination is included in the sections below.

4.3.2.1 I-90 Route Alternative Comparisons

The Applicants first considered Route Alternative A and rejected it for several reasons. First, crossing the Mississippi River at I-90 is not feasible because of significant constraints in the La Crosse area. Second, Route Alternative A would result in Segment 2 no longer following the existing 161 kV right-of-way, meaning that the Project would result in an additional HVTL right-of-way as compared to the Proposed Route.

More specifically, the most significant constraint associated with Route Alternative A is the crossing of the Mississippi River near La Crosse, Wisconsin. The density of residences near I-90 increases as I-90 moves east to the Mississippi River, and there is dense residential and commercial development in Onalaska, French Island, and La Crosse. Further, the La Crosse Regional Airport is approximately 0.5 mile from I-90, which would likely require shorter structures. However, shorter structures could conflict with USACE clearance requirements for the Mississippi River (Section 10) crossing. Finally, the Applicants understand from MnDOT that MnDOT has scenic easement rights along this portion of I-90, particularly from Nodine towards Dakota and the Mississippi River Valley. MnDOT has confirmed, however, that there are no current plans for further improvements or expansions of this portion of the I-90 right-of-way over the next 10 years; if improvements were to occur, they would most likely occur around interchanges.

The Applicants also assessed following U.S. Highway 61 from La Crescent, Minnesota to La Crosse, Wisconsin (see **Diagram 4.3.2-1**). This crossing presents many engineering and constructability challenges; the highway crossing is approximately 3 miles long and is very narrow, and there is limited space on either side of the highway footprint for structure placement. There are also businesses, residences and marinas located along the highway that would be difficult to avoid due to limited space. Either side of the crossing also consists of densely populated areas of La Crescent and La Crosse. This crossing alternative was rejected due to displacement of residences, and constructability constraints along Highway 61 due to congestion and limited buildable space.

DIAGRAM 4.3.2-1

U.S. Highway 61 from La Crescent, Minnesota to La Crosse, Wisconsin



Another potential crossing paralleling an existing 69 kV transmission line between La Crescent and La Crosse was considered and rejected, and is further discussed in **Section 4.3.4** (Crossing Alternative 5).

After rejecting Route Alternative A as infeasible, the Applicants evaluated Route Alternatives B and C. Neither Route Alternative B nor Route Alternative C would follow existing HVTL right-of-way for as much length as the Proposed Route and, as a result, would result in two transmission line rights-of-way (a new 765 kV right-of-way and the continued existence of the 161 kV right-of-way) (see **Figure 4**). Likewise, whereas the Proposed Route would require the incremental expansion of an existing right-of-way for most of Segment 2, Route Alternatives B and C would each require entirely new right-of-way for the 765 kV line for the 100.5 and 83.6 miles, respectively, that those corridors do not follow the existing 161 kV line. Portions of both I-90 Route Alternatives B and C were analyzed as a double-circuit 765 kV / 69 kV transmission line. Although this might be technically feasible, the lower-voltage circuit would be subject to greater electrical effects, including induced voltages, switching surges, faults, lightning-related overvoltages, and operational challenges, necessitating additional detailed engineering studies during final design. These issues can be addressed through appropriate design modifications and mitigation measures to the 69 kV system but would likely result in increased costs for the Project. These modifications and mitigations would extend beyond the double-circuited portion of the 69 kV system and may require upgrades or replacement of the existing 69 kV single circuit section, installation of new tap/switch structures, and equipment upgrades at the 69 kV stations.

As shown in **Table 4.3.2-1**, although the Proposed Route is the longest alternative and crosses the greatest number of parcels, it has no residences within 125 feet and fewer residences within 250 feet than either Route Alternative B or C. The Proposed Route also provides substantially greater co-location with existing transmission infrastructure, which is consistent with Minnesota's routing objectives that seek to parallel existing linear facilities where feasible. In this case,

rebuilding Dairyland's existing Q-4, Q-7 and Q-8 161 kV lines has the benefit of rebuilding 70-year-old infrastructure, avoiding near-term age and condition replacements that would otherwise need to occur along this right-of-way. Environmentally, the Applicants' Proposed Route was proposed as it is anticipated to require the least estimated acres of tree clearing, cross fewer trout streams, and has fewer overlaps with IBAs, Native Plant Communities (NPCs), Minnesota Biological Survey (MBS) Sites of Biodiversity Significance (SBS), and rusty patched bumble bee high and low potential zones compared to Route Alternatives B and C. In contrast, I-90 Route Alternatives B and C are shorter and cross fewer parcels but would place more residences in close proximity to the transmission line, require greater tree clearing, involve less use of existing transmission rights-of-way, and result in greater overlap with several sensitive ecological resources. Overall, the comparison indicates that while no alternative avoids all impacts, the Proposed Route offers a favorable balance between human and environmental considerations by emphasizing co-location with existing infrastructure, reducing potential effects on nearby residences and key natural resources, and avoiding the challenges and costs associated with a 765 kV/69 kV facility.

TABLE 4.3.2-1

I-90 Route Alternatives Comparison

Resource / Characteristic	Proposed Route			I-90 Route Option B	I-90 Route Option C
	Shared 161 kV Right-of-Way (80 feet)	New Right-of-Way	TOTAL		
Length (miles)	102.1	41.9	144.0	115.4	121.1
Land Ownership					
No. of parcels crossed	407	170	577	469	483
Land Use Features / Utilities and Transportation					
Residences within 125 feet [a,b]	0	0	0	8	1
Residences within 250 feet [a,b]	6	4	10	30	12
Co-location with high-voltage transmission lines (miles / percentage) [c]	102.1	0	102.1 (71%)	14.9 (13%)	37.5 (31%)
Co-location with roads (miles / percentage) [c]	0	2.6	2.6 (2%)	31.3 (27%)	20.0 (17%)
Co-location with I-90 (miles / percentage) [c]	0	1.5	1.5 (1%)	28.3 (25%)	18.8 (16%)
Overall co-location with high-voltage transmission lines and roads (miles / percentage) [c]	102.1	2.6	104.7 (72%)	46.2 (40%)	57.5 (47%)
Airports within 3 miles of the alignment [d]	3	3	6	3	5
Agricultural land use acres (acres within right-of-way) [e]	735.5	2,102.5	2,838	1,761	2,091
Estimated tree clearing (acres within right-of-way)	82.8	280.2	363	487	550
Recreation and Managed Lands					
USFWS Lands (miles) [f]	2.2	0	2.2	2.2	2.2
MDNR Public Lands (miles) [g]	0.2	0	0.2	1.0	0.3
BWSR Reinvest in Minnesota (RIM) / Conservation Reserve Enhancement Program (CREP) Easements (miles) [h]	0.4	0	0.4	0.6	0.3
MDNR State Trail Crossings (miles) [i]	0.03	0.07	0.1	0	0.1
Snowmobile Trail Crossings (miles) [j]	0.8	2.0	2.8	5.0	3.8
Surface Water Features					
National Wetlands Inventory (NWI) (miles crossed) [k]	5.4	2.0	7.4	5.8	6.0
MDNR Public Water Watercourses (no. of crossings) [l]	22	9	31	27	24
Waterbodies/Ditches (no. of crossings) [m]	136	68	204	147	172
Trout Streams (no. of crossings) [n]	16	0	16	27	20
Rare and Sensitive Resources					
IBAs (miles) [o]	17.2	0.4	17.6	25.2	28.0
MBS SBS (miles) [p]	5.3	1.5	6.8	7.0	9.3
MDNR NPCs (miles) [q]	1.2	0	1.2	2.0	1.5
MDNR Native Prairie Communities (miles) [r]	0.2	0	0.2	0.2	0.2
MDNR Old Growth Forest (miles) [s]	0	0	0	0.1	0
Rusty Patched Bumble Bee High and Low Potential Zones) (miles) [t]	48.5	34.8	83.3	87.5	88.6

TABLE 4.3.2-1

I-90 Route Alternatives Comparison

Resource / Characteristic	Proposed Route			I-90 Route Option B	I-90 Route Option C
	Shared 161 kV Right-of-Way (80 feet)	New Right-of-Way	TOTAL		

Notes:

[a] Aerial photography interpretation. 2026. and FEMA. 2026. USA Structures dataset. Available online at: https://gis-fema.hub.arcgis.com/pages/usa-structures. Accessed July 2026.

[b] Distance from the alignment.

[c] Co-location is defined as any utility or road right-of-way that overlaps with the proposed transmission line right-of-way.

[d] FAA/USDOT. 2026. Airports data layer. Available online at: https://services6.arcgis.com/ssFJjBXIUyZDrSYZ/arcgis/rest/services/US_Airport/FeatureServer/0. Accessed July 2026.

[e] NLCD/USGS. 2026. Land Cover dataset. Available online at: https://dmsdata.cr.usgs.gov/geoserver/mrlc_Land-Cover-Native_conus_year_data/wms. Accessed July 2026.

[f] USFWS. 2026. USFWS Boundaries dataset. Available online at: https://services.arcgis.com/QVENGdaPbd4LUkLV/ArcGIS/rest/services/National_Wildlife_Refuge_System_Boundaries/FeatureServer/0. Accessed July 2026.

[g] MDNR. 2026. DNR Management Units dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/bdry_dnr_managed_areas/FeatureServer/3. Accessed July 2026.

[h] BWSR. 2026. BWSR dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_bwsr/bdry_bwsr_rim_cons_easements/FeatureServer/0. Accessed July 2026.

[i] MDNR. 2026. MN State Trails dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_state_trails_minnesota/FeatureServer/0. Accessed July 2026.

[j] MDNR. 2026. Trails Snowmobile dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_snowmobile_trails_mn/FeatureServer/0. Accessed July 2026.

[k] MDNR. 2026. US FWS NWI Wetlands dataset. Available online at: https://fwspublicservices.wim.usgs.gov/wetlandsmapservice/rest/services/Wetlands/MapServer/0. Accessed July 2026.

[l] MDNR. 2026. PWI Watercourses dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/water_mn_public_waters/FeatureServer/0. Accessed July 2026.

[m] MDNR. 2026. DNR Rivers and Streams. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/water_dnr_hydrography/FeatureServer/0. Accessed July 2026.

[n] MDNR. 2026. Trout Stream dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/env_trout_stream_designations/FeatureServer/0. Accessed July 2026.

[o] Audubon. 2025. IBA dataset. Available online at: https://services1.arcgis.com/lDFzr3JyGEn5Eymu/ArcGIS/rest/services/iba_polygons_public/FeatureServer/0. Accessed July 2026.

[p] MDNR. 2026. SBS dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/biota_mcbs_sites_of_biodiversity/FeatureServer/0. Accessed July 2026.

[q] MDNR. 2026. Native Plant Communities dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/biota_dnr_native_plant_comm/FeatureServer/6. Accessed July 2026.

[r] MDNR. 2026. Native Prairie subset of NPC. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/biota_dnr_native_prairies/FeatureServer/0. Accessed July 2026.

[s] MDNR. 2026. Forest Inventory Old Growth dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/biota_dnr_forest_inv_old_growth/FeatureServer/1. Accessed July 2026.

[t] USFWS. 2026. Rusty Patch Bumble Bee - HPZ, LPZ dataset. Available online at: https://services.arcgis.com/QVENGdaPbd4LUkLV/ArcGIS/rest/services/RPBB_HPZModel_Update/FeatureServer/0. Accessed July 2026.

4.3.3 West of Rochester Route Alternative

Comments received during public outreach suggested routing the Project south from the North Rochester Substation on the west side of Rochester to the Adams Substation before turning east. The Applicants evaluated whether a reasonable and feasible route alternative could be developed west of Rochester paralleling existing transmission lines. The Applicants also initially evaluated a potential greenfield route in this area but rejected it from further consideration because of significant routing constraints (residences and other development).

There are several existing and planned HVTLs approximately 5 miles to the west of Rochester between the North Rochester Substation and the Pleasant Valley Substation, which is approximately 17 miles north of the Adams Substation. Currently there is a single-circuit 345 kV line between the North Rochester and Pleasant Valley substations, and a 161 kV line which runs between the Pleasant Valley Substation and Byron Substation. In addition, the Tranche 2.1 Portfolio includes a new 765 kV Lakefield – Pleasant Valley – North Rochester 765 kV line (LRTP 24) and a new 345 kV Pleasant Valley – North Rochester – Hampton 345 kV line (LRTP25) to be double-circuited with the existing 345 kV line in that right-of-way. These two new transmission lines are being developed as part of PowerOn Midwest (see **Section 6.4.4** and **Figure 13**).

If the Project were also routed west of Rochester, the area between Pleasant Valley and North Rochester would contain two separate 765 kV transmission lines, a double-circuit 345 kV transmission line, and, over a portion of its length, an existing 161 kV transmission line. The Applicants determined that such a concentration of backbone transmission facilities is not prudent from a system reliability perspective.

Locating multiple 765 kV facilities within the same transmission line corridor would increase the likelihood that a single extreme weather event could simultaneously affect multiple backbone transmission facilities. Such a common-mode outage could have significantly greater regional reliability consequences than an outage affecting a single facility. Dispersing critical infrastructure across multiple areas is a key resiliency principle, fundamental to transmission system planning. The Applicants therefore rejected a route alternative west of Rochester.

4.3.4 Mississippi River Crossings

Because the Project's crossing of the Mississippi River is a primary routing constraint, and due to the length of the USFWS Upper Mississippi River NWFR along much of the Minnesota/Wisconsin border in this area, the Applicants evaluated multiple potential crossings of the Mississippi River.

The Applicants have coordinated with the USFWS, USACE, and USCG to identify environmental resources and potential constraints in the vicinity of each river crossing alternative. These discussions included an overview of the alternatives, potentially affected resources, and environmental and technical considerations relevant to the feasibility of each crossing. The coordination informed the identification and evaluation of navigational factors, wetlands and other aquatic resources, threatened and endangered species and designated critical habitat, and recreational and conservation resources.

In addition to agency coordination, the Applicants reviewed National Register of Historic Places (NRHP)-listed properties and historic districts, Federal Aviation Administration (FAA) and engineering clearance constraints, and previous analyses of river crossing alternatives documented in state and federal environmental review documents. Collectively, this information

informed the comparative evaluation of the river crossing alternatives, including potential environmental impacts and feasibility constraints.

The crossing locations evaluated by the Applicants were identified based on the presence of other existing infrastructure at those crossing locations and made use of the extensive analysis of potential crossing locations conducted as part of prior projects. The locations included:

- Crossing Alternative 1: Paralleling the CapX crossing between Kellogg, Minnesota and Alma, Wisconsin
- Crossing Alternative 2: Paralleling a 69 kV line crossing at Goodview, Minnesota
- Crossing Alternative 3: Paralleling a 69 kV line crossing at Winona, Minnesota
- Crossing Alternative 4: Crossing between Donehower, Minnesota and Trempealeau, Wisconsin
- Crossing Alternative 5: Parallelling a 69 kV line crossing between La Crescent, Minnesota to La Crosse, Wisconsin

Crossing Alternatives 1 through 5 would cross the Minnesota/Wisconsin border at a different location than the existing 161 kV line that MISO identified to be rebuilt as part of the Project, which in all cases, would extend the length of the transmission line on the Wisconsin side to reach the identified end point near Bell Center, Wisconsin. These crossings are shown on **Figure 5** and are further described below.

Crossing Alternative 1

Section 4.3.1 describes the constraints associated with following the CapX transmission line from the North Rochester Substation to the Mississippi River. The crossing of the Mississippi River between Kellogg, Minnesota and Alma, Wisconsin also already includes three existing transmission lines including CapX, Dairyland's existing 161 kV, and a new 345 kV transmission line associated with the Alma-Blair Transmission Project,[21] anticipated to start construction in Winter 2026. Xcel Energy will also be installing the second 345 kV line on the existing structures associated with CapX as part of the Mankato-Mississippi 345 kV Transmission Line Project[22] starting in 3rd quarter 2026. This location also crosses approximately 13 acres of the USFWS Upper Mississippi NWFR, 27 acres of wetlands, and 20 acres of forested areas (see **Table 4.3.4-1**). The existing transmission right-of-way through this location is approximately 300 feet wide. Adding the 765 kV transmission line parallel to this right-of-way would require an additional 250- to 400-foot-wide right-of-way.

Crossing Alternative 1 was rejected due to the existing transmission congestion and expansion of the right-of-way to up to 600 to 650 feet wide through the USFWS Upper Mississippi River NWFR.

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21 Public Services Commission of Wisconsin Docket No. 1515-CE-103.

22 Commission Docket Nos. E-002/CN-11-532 and E-002/TL-23-157.

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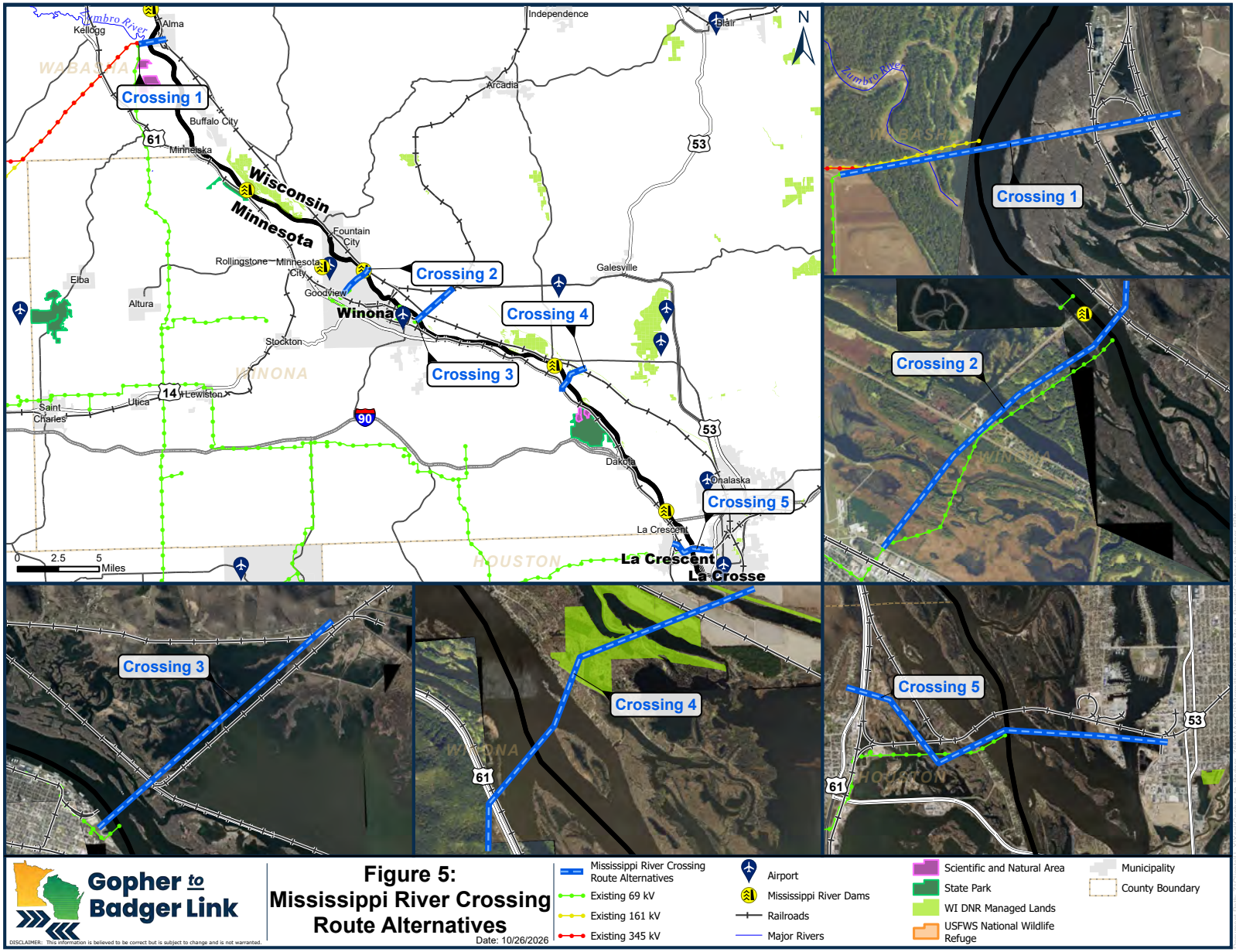

Figure 5: Mississippi River Crossing Route Alternatives

Date: 10/26/2026

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TABLE 4.3.4-1

Mississippi River Crossings Comparison

Evaluated Constraints and Opportunities	Proposed Crossing	Crossing Alternative 1 CapX Kellogg, Minnesota	Crossing Alternative 2 69 kV Goodview, Minnesota	Crossing Alternative 3 69 kV Winona, Minnesota	Crossing Alternative 4 Donehower, Minnesota	Crossing Alternative 5 La Crescent 69 kV / Railroad
Length of total River Crossing Alternatives (miles)	2.9	1.7	2.4	3.0	2.3	2.8
Length of Floodplain Crossed (miles)	2.4	1.4	2.1	2.4	1.5	2.7
Length (span) of Channels (feet)	1,701	2,072	1,915	2,378	3,670	4,037
MDNR Public Lands Crossed (acres)	0[a] (~2.6 existing easement)	0	0	0	0[c]	0
USFWS Refuge Crossed (acres)	0[a] (40 existing easement)	13	0	110	0	14
Residences within Right-of-Way	0	0	27[b]	2	2	3
Pipeline Crossings (no. of crossings)	0	0	0	0	0	0
Co-location with HVTL (miles)	2.9	0	0	0	0	0
Co-location with Roads (miles)	0	0	0	0	0	0
MDNR State Trail Crossings (no. of crossings)	0[a] (1 existing crossing Reno Bottoms Canoe Trail)	0	0	0	0	0
Wetlands Crossed (acres)	~0[a] (58 existing easement)	27	43	65	27	56
Wetland Crossings greater than 1,800 feet (requiring larger structures and/or placement in wetland)	~0[a]	4	5	8	2	6
Forested Areas Crossed (acres)	~0[a] (16 existing easement)	20	36	11	18	55

Note:

[a] Due to the use of an existing easement, no new crossings of MDNR public lands, U.S. Fish and Wildlife Service Refuge lands, wetlands or forested areas will be required.

[b] Residences in unavoidable approach to crossing. No residences within crossing itself.

[c] Alternative 4 requires the crossing of 16 acres of WIDNR Public Lands.

Crossing Alternative 2

The Applicants reviewed a potential crossing at Goodview, Minnesota that would parallel Xcel Energy's existing 69 kV transmission line and would avoid crossing the USFWS Upper Mississippi River NWFR. Before reaching the Mississippi River, the 765 kV transmission line would need to be routed through densely populated areas of Goodview, Minnesota. The Winona Municipal Airport is also located near Goodview on the western bank of the Mississippi River, within approximately 0.5 mile of the crossing location. The USACE Lock and Dam No. 5A is located on the main channel of the Mississippi River approximately 0.25 mile north of the potential crossing location.

Crossing Alternative 2 was determined to be infeasible due to the proximity to the Winona Airport runway and the USACE dam. As discussed in **Section 4.3.2.1**, the transmission structures required to span the Mississippi River and meet Section 10 navigational clearance requirements would exceed 200 feet and conflict with protected airport height restriction surfaces associated with nearby Winona Municipal Airport-Max Conrad Field and are incompatible within the area available to route the line. Therefore, the crossing was eliminated from further consideration. Additionally, the approach to the crossing would displace 27 residences (see **Table 4.3.4-1**) and cross recreational facilities at the Prairie Island Park (owned by the City of Winona).

Crossing Alternative 3

The Applicants reviewed a potential crossing at Winona, Minnesota that would parallel Xcel Energy's existing 69 kV transmission line. Before reaching the Mississippi River, the 765 kV transmission line would need to be routed through a densely populated area on the eastside of Winona, Minnesota. On the eastern side of the Mississippi River, the route would parallel the Canadian National Railway through an expansive wetland area associated with the Upper Mississippi NWFR.

Crossing 3 was eliminated from further consideration due to its comparatively greater environmental and engineering impacts. This alternative would require approximately 110 acres of new transmission line right-of-way within the USFWS Upper Mississippi River NWFR and would result in approximately 65 acres of wetland impacts, the greatest wetland impact among the crossing alternatives. The route would also parallel the existing railroad through an extensive wetland complex that cannot be fully spanned. These conditions would require larger foundations, resulting in greater wetland and floodplain disturbance. Foundation design would also need to account for wetland hydrology influenced by fluctuations in Mississippi River water levels. Compared with the proposed crossing, Crossing 3 would require a longer channel span, with a supporting structure located within a wetland, affecting both structure height and design. In addition, the approach to Crossing 3 would displace two residences (see **Table 4.3.4-1**) and would require mitigation for rail induction associated with paralleling the railroad.

Crossing Alternative 4

The Applicants reviewed a potential crossing of the Mississippi River north of Donehower, Minnesota that would avoid crossing the USFWS Upper Mississippi River NWFR. The crossing would occur approximately 1 mile south of USACE Lock and Dam No. 6 and would cross a residential area located on the eastern bank of the Mississippi River. The approach to the crossing would displace two residences (see **Table 4.3.4-1**). This crossing would also cross the Trempealeau Lake Fishery Area managed by Wisconsin Department of Natural Resources.

Crossing Alternative 4 was not preferred due to the proximity to the USACE Lock and Dam No. 6, impacts to residences and the Trempealeau Lake Fishery Area. The steep slopes located on the western bank of the Mississippi River adjacent to the highway and railroad, along with the island construction and span lengths would increase structure heights and sizes.

Crossing Alternative 5

The Applicants reviewed a potential crossing that would parallel Xcel Energy's existing 69 kV transmission line crossing of the Mississippi River between 25 and 850 feet south of the Canadian Pacific Railway bridge, crossing an industrial area on the south end of French Island, and into the Lower Northside neighborhood of La Crosse, Wisconsin. This alternative has the longest channel crossing length at 4,037 feet, would cross approximately 14 acres of the Upper Mississippi River NWFR, and would displace three residences. The crossing would also cross 56 acres of wetlands and 55 acres of forested areas (see **Table 4.3.4-1**).

Crossing Alternative 5 was eliminated from further consideration due to residential displacement, impacts to wetlands and forested areas, and engineering constraints associated with the Mississippi River crossing. As discussed in **Section 4.3.2.1**, the 765 kV transmission structures needed to span the Mississippi River while meeting Section 10 navigational clearance requirements would exceed 200 feet in height and conflict with protected airport height restriction surfaces associated with the nearby La Crosse Regional Airport. The available route area does not provide sufficient flexibility to reduce structure heights while accommodating the wide river crossing and maintaining required clearances from the navigational channel, railroad, and existing transmission infrastructure. As a result, a feasible crossing configuration could not be developed within the route. The alternative would also displace residences, affect wetland and forested areas, and require mitigation for rail induction associated with paralleling the railroad.

Conclusion

The Applicants thus selected Dairyland's existing Q-7/Q-9 161 kV crossing of the Mississippi River to minimize new or additional right-of-way within the USFWS Upper Mississippi River NWFR and to avoid and minimize impacts to other human and environmental resources. Dairyland's existing right-of-way for the Q-7/Q-9 is approximately 200 feet wide and will not require expansion. To accommodate the new 765 / 161 kV double-circuit configuration and utilize the existing right-of-way width, the portion of the Q-9 161 kV line from the Genoa Substation across the Mississippi River west into Minnesota will be retired and removed. The existing 161 kV transmission line through this area consists of approximately 28 existing wooden H-frame structures, and two lattice structures on the banks of the Mississippi River. These structures will be replaced with approximately eight double-circuit lattice structures with a priority on placing structures within existing disturbance footprints where practicable, resulting in approximately 22 fewer structures within the USFWS Upper Mississippi River NWFR. The final number of structures and locations are subject to change based on future studies, engineering, and surveys, and coordination with the USFWS.

The Applicants are coordinating with the USFWS Upper Mississippi River NWFR to pursue the approvals that will be required for the proposed crossing location. Agency coordination to date is documented in **Appendix C**.

4.4 REFINEMENT AND ANALYSIS OF ROUTE SEGMENT ALTERNATIVES

Once the Applicants identified the broader route for the Project, they worked to evaluate viable route segment alternatives within the Routing Study Area. This section focuses on the Applicants' analyses of various potential route segment alternatives for both Segments 1 and 2.

4.4.1 Segment 1

Routing opportunities in the Segment 1 portion of the Routing Study Area included:

- locations where there was an opportunity to parallel a roadway, and potentially share public right-of-way between the transmission line and road;
- locations where there was an opportunity to place the transmission alignment on a field or property line, where land uses could continue mostly uninterrupted in the transmission line easement; and
- routes that minimize the number of angle or dead-end structures by following straight lines.

Based on the examination of routing opportunities and constraints, the Applicants developed a network of initial routes for Segment 1. Initial routes along Segment 1 included numerous route segments that, when combined, created various route combinations, referred to as route segment options (refer to **Figure 6**).

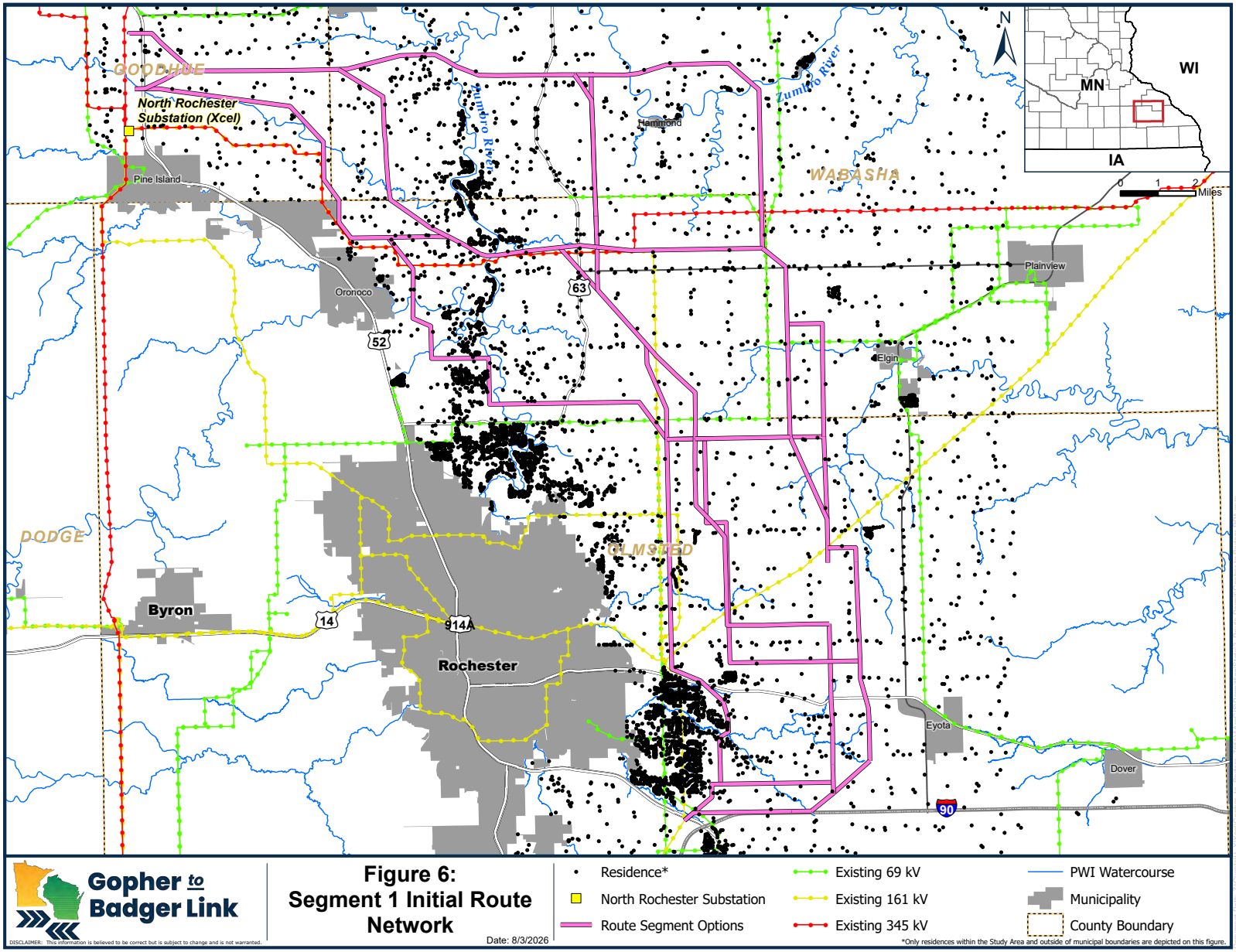
The Applicants focused the Segment 1 initial routing efforts on locations where identifying route options was most difficult due to existing constraints. These locations include:

- crossings of the Zumbro River;
- proximity to more densely developed residential areas near the City of Rochester; and
- the existing 345 kV CapX transmission line in an area where residences and other infrastructure exists.

The Applicants found that route segment options in the northwestern portion of the Routing Study Area were limited by the presence of residential communities near the City of Rochester and surrounding communities. **Figure 6** illustrates these residential routing constraints in the Segment 1 portion of the Routing Study Area.

The Applicants conducted a desktop review of the remaining route segment options, refined alignments, then finalized Route Segment Options A-S, which were presented to stakeholders at the January 2026 public open houses (see **Section 4.2.3**) (refer to **Figure 7**). There was only one route segment option that was removed during this refinement process prior to the open houses due to its close proximity to communities such as Oronoco, Cascade, and Chester.

After desktop review and consideration of comments received at the public open houses, the Applicants further refined the route segment options and also performed an in-field review of the Routing Study Area. The site visit evaluated route segment options in the field, where access was available, verified and documented features not apparent on aerial imagery, assessed constructability considerations, and observed the broader context of each route segment option.


GOODHUE
North Rochester Substation (Xcel)
Pine Island
Zumbro River
Hammond
Zumbro River
WABASHA
WI
MN
IA
N
0 1 2 Miles
Plainview
Oronoco
63
52
Elgin
DODGE
OLMSTED
Byron
14
914A
Rochester
Eyota
Dover
90
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 6: Segment 1 Initial Route Network
Date: 8/3/2026
Residence*
North Rochester Substation
Route Segment Options
Existing 69 kV
Existing 161 kV
Existing 345 kV
PWI Watercourse
Municipality
County Boundary
*Only residences within the Study Area and outside of municipal boundaries are depicted on this figure.

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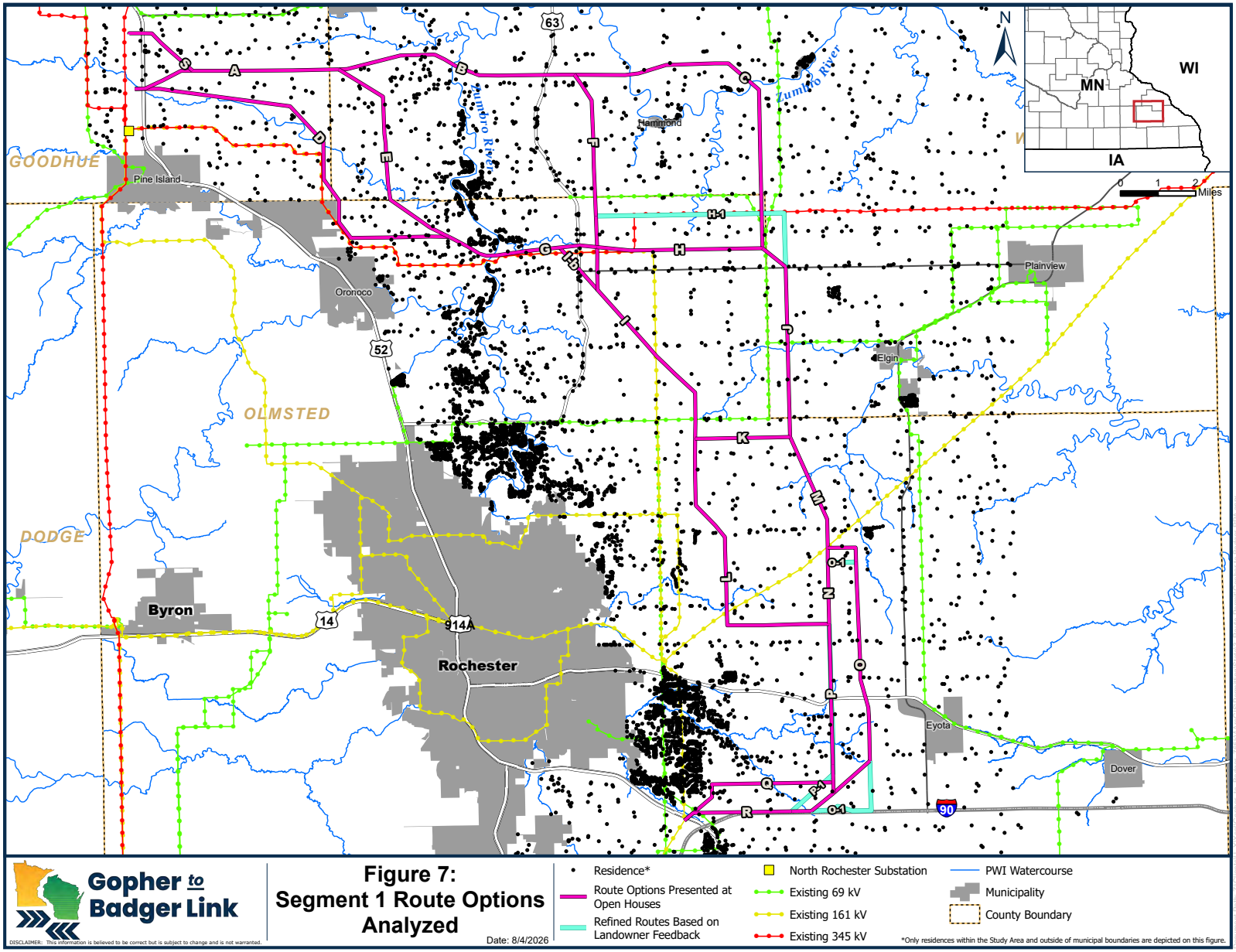
N
WI
MN
IA
0 1 2 Miles
GOODHUE
OLMSTED
DODGE
Pine Island
Oronoco
Hammond
Zumbro River
Plainview
Elgin
Byron
Rochester
Eyota
Dover
63
52
14
90
Gopher to Badger Link
Figure 7:
Segment 1 Route Options Analyzed
Date: 8/4/2026
Residence*
Route Options Presented at Open Houses
Refined Routes Based on Landowner Feedback
North Rochester Substation
Existing 69 kV
Existing 161 kV
Existing 345 kV
PWI Watercourse
Municipality
County Boundary
*Only residences within the Study Area and outside of municipal boundaries are depicted on this figure.
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.

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Because it was identified as a routing constraint, the Applicants evaluated five potential crossings of the Zumbro River along four different route segment options within the Routing Study Area (**Figure 8**). One crossing was associated with the aforementioned route segment option, which was dismissed early on in the routing process due to proximity to residential communities. Another crossing of the Zumbro, along Route Segment Option G, was also dismissed after the January 2026 round of open houses. This was primarily due to infrastructure congestion at the CapX crossing of the Zumbro River at White Bridge Road discussed in **Section 4.3.1**, as well as right-of-way constraints east of the crossing associated with residences.

4.4.1.1 Route Segment Comparison and Refinement

Throughout the Route Development Process described in **Section 4.2**, the Applicants used a data-driven alternatives analysis to evaluate and compare route segment options. Evaluation criteria were developed based on the routing factors identified in Minn. Stat. § 216I.05, subd. 11, and Minn. R. 7850.4000 and generally addressed human settlement, environmental, and engineering considerations. Factors evaluated included route length, engineering feasibility, proximity to residences, wetland and waterbody crossings, sensitive environmental resources, agricultural land impacts, utility conflicts, constructability, opportunities to follow existing infrastructure or property boundaries, and stakeholder feedback. Using these criteria, route segment options with comparatively greater impacts or constructability challenges were screened out in favor of alternatives that better balanced environmental, land use, engineering, and stakeholder considerations. **Tables 4.4.1-1** and **4.4.1-2** summarize the comparative evaluation of route segment options. The discussion below describes the rationale for refining and eliminating individual route segment options. In many cases, the route segments were highly comparable, and selection of a preferred segment reflects relative advantages identified during the comparative evaluation rather than the unsuitability of other alternatives.

Route Segment Option C

Route Segment Option C was removed from further consideration after the January 2026 public open houses because it would require an additional and topographically challenging crossing of the Zumbro River. The option is also one of the longer options, and includes multiple public water crossings, wetland impacts, SBS impacts, NPC impacts, and four large angles. These factors contributed to the conclusion that Route Segment Option C presented greater routing and constructability challenges than other available route segments.

Route Segments D, E, G, and I-b

After the January 2026 public open houses, Route Segment Options D, E, and G were compared against Route Segment Options A and B which provided alternative crossing locations of the Zumbro River. Route Segment Option D was removed because it had more homes within 500 feet, was very close to Oronoco, had more public water crossings, did not follow property lines, and included more large angles. Route Segment Option E was removed because it had more public water crossings and similarly did not follow property lines. Both Segments D and E would have required crossing the Zumbro River via Route Segment Option G which was not selected due to transmission line congestion at the Zumbro River crossing (as noted in **Section 4.3.1**) and right-of-way availability concerns associated with existing transmission lines and residences. Route Segment Option I-b was identified as an option only if Route Segment Option G was selected; therefore, it was also removed.

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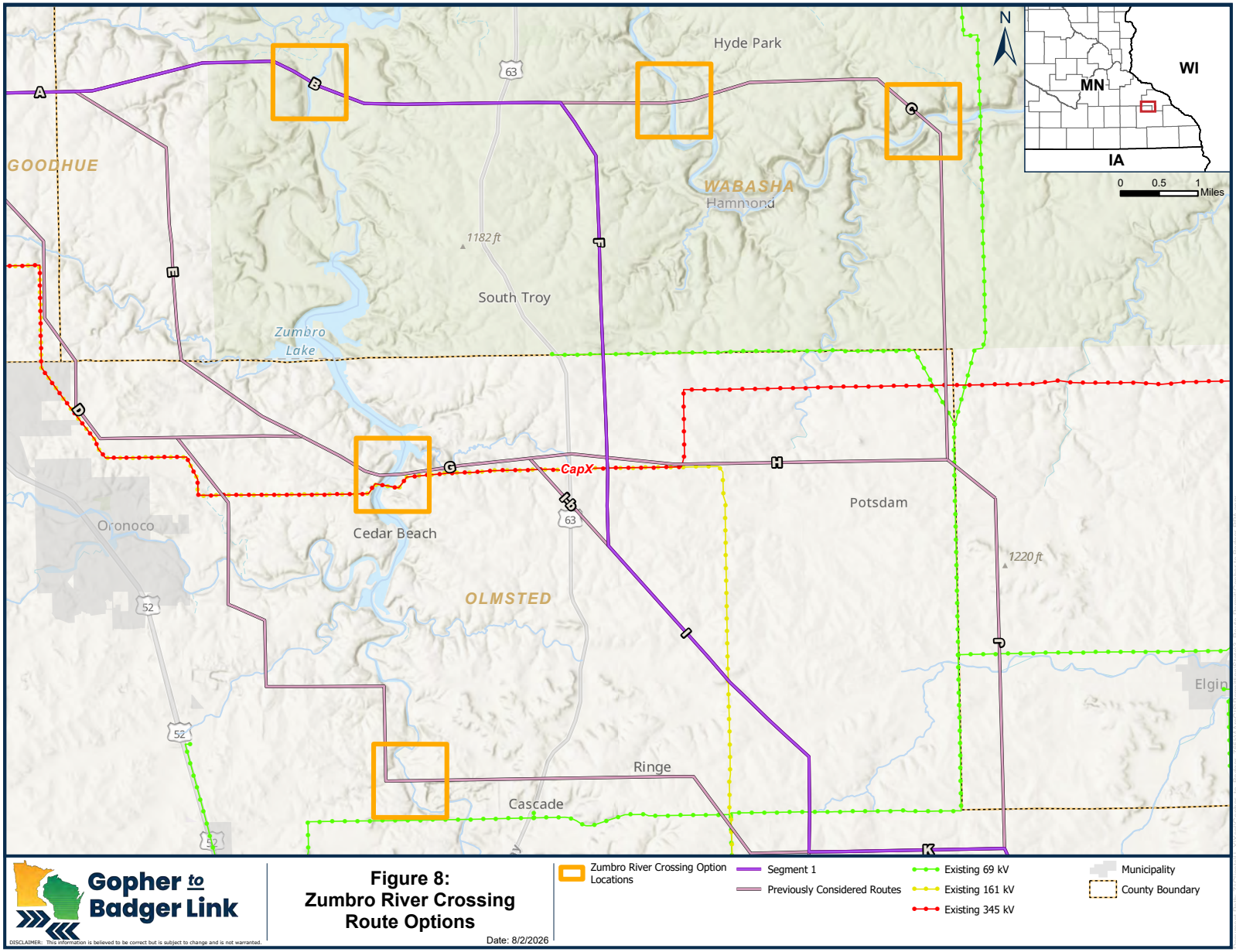
Hyde Park
WABASHA
Hammond
GOODHUE
South Troy
1182 ft
Zumbro Lake
CapX
Cedar Beach
Oronoco
Potsdam
1220 ft
OLMSTED
Ringe
Cascade
Elgin
N
WI
MN
IA
0 0.5 1 Miles
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 8:
Zumbro River Crossing
Route Options
Date: 8/2/2026
Zumbro River Crossing Option Locations
Segment 1
Previously Considered Routes
Existing 69 kV
Existing 161 kV
Existing 345 kV
Municipality
County Boundary

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TABLE 4.4.1-1

Route Segment Comparison of Residences, Surface Water Features, and Rare and Sensitive Resources

Route Segment Option	Length (miles)	Number of Residences			Surface Water Features			Rare and Sensitive Resources	
		Within 125 feet	Within 250 feet	Within 500 feet	MDNR Public Water Crossings (No.)	NWI Forested Wetlands (acres)	NWI Non-Forested Wetlands (acres)	MDNR SBS (acres)	MDNR NPC (acres)
A	5.5	-	-	1	1	0.6	0.3	1.9	-
B	6.4	-	1	5	1	3.9	2.1	44.9	0.7
C	9.4	-	1	3	2	4.3	4.4	21.7	3.7
D	10.8	-	4	8	4	0.5	2.5	7.3	-
E	6.0	-	1	3	1	0.7	2.5	2.5	-
F	4.7	-	-	4	-	1.5	0.6	-	-
G	4.1	-	1	7	4	0.9	4.7	31.0	6.3
H	4.4	-	1	2	-	0.6	0.1	-	-
H-1	6.4	-	-	1	1	-	1.6	1.6	-
I	6.1	-	1	1	-	-	1.2	-	-
I-b	1.5	-	-	-	-	-	-	-	-
J	5.3	-	1	3	1	-	0.03	-	-
K	2.5	-	-	-	-	3.7	5.4	-	-
L	8.0	-	-	1	1	3.1	10.2	-	-
M	3.2	-	-	2	2	2.5	0.1	-	-
N	2.0	-	-	-	-	-	2.0	-	-
O	7.7	1	1	1	1	0.9	3.7	-	-
O-1	9.0	-	-	3	1	0.7	3.0	-	-
P	4.5	-	1	4	2	6.2	4.5	1.6	-
P-1	5.5	-	-	3	3	4.6	5.9	1.0	-
Q	4.5	-	1	3	2	2.2	4.5	-	-
R	4.2	-	1	2	2	-	5.0	-	-

TABLE 4.4.1-2

Route Segment Comparison of Land Use Features, Utilities, and Transportation

Route Segment Option	Length (miles)	Following Parcels (miles)	Following Roads (miles)	Following T-Lines >115 kV (miles)	Agricultural land (miles)	Forested land (miles)	T-Line Crossings (No.)	Large Angles (No.)
A	5.5	3.2	0.5	-	1.8	-	-	2
B	6.4	1.3	0.2	-	2.6	2.3	-	3
C	9.4	3.8	-	-	2.9	1.4	1	4
D	10.8	1.7	1.8	1.2	5.8	0.3	-	8
E	6.0	0.8	-	-	4.1	0.2	-	3
F	4.7	3.2	-	-	1.4	0.2	-	2
G	4.1	-	-	-	1.7	2.0	-	3
H	4.4	3.0	-	0.6	0.9	-	1	-
H - 1	6.4	-	-	4.0	2.4	-	1	2
I	6.1	1.7	0.7	-	3.8	-	2	2
I-b	1.5	-	-	-	1.5	-	1	1
J	5.3	-	-	-	5.2	0.2	-	2
K	2.5	2.5	-	-	-	-	-	1
L	8.0	5.0	-	-	2.1	-	1	4
M	3.2	0.5	0.3	-	2.0	0.1	1	2
N	2.0	2.0	-	-	-	-	-	-
O	7.7	3.4	-	-	4.0	-	-	5
O-1	9.0	4.4	1.0	-	3.0	0.1	-	8
P	4.5	3.9	-	-	0.3	0.3	-	1
P-1	5.5	2.2	-	-	2.1	0.6	-	1
Q	4.5	1.4	-	-	2.3	-	-	2
R	4.2	0.4	1.9	-	1.7	-	-	2

The Applicants recognize that Route Segment Options A and B are similar to a route alternative (CapX North Route) that was not selected during the state's review and approval of the CapX Project in May 2012. The route ultimately approved and constructed was likely the more suitable option at that time because it utilized an existing right-of-way and crossed the Zumbro River at White Bridge Road. However, there is no indication that the CapX North Route crossing was categorically unsuitable under Minnesota routing criteria. Rather, it was not selected because the approved route more closely aligned with existing infrastructure and offered a marginal reduction in resource impacts. As such, the prior decision does not preclude consideration of a similar crossing location for the proposed Project, particularly given the different project-specific objectives, constraints, and evaluation factors considered in the current routing process.

Route Segment Options H, H-1, and J

Route Segment Option H-1 was developed following public open houses to take advantage of following the CapX 345 kV transmission line at a location where additional available right-of-way exists. It is also farther from the Potsdam community and nearby homes. Route Segment Options H-1 and J were not included in the proposed route after comparison to Route Segment Option I showed they would affect more landowners and individual parcels. Route Segment Option I, although it does not follow property lines, may be preferable from an agricultural land crossing perspective because less acreage would be impacted overall. Although the Applicants ultimately selected Route Segment Option I instead of Route Segments Option H-1 and J for inclusion in the Proposed Route, the Applicants plan to request that the Commission also evaluate Route Segments Option H-1 and J in the EIS.

Route Segment Option L

Route Segment Option L was removed after the January 2026 public open house, as compared to Route Segment Options K M and N, due to its proximity to the Rochester city limits and areas of potential city expansion. Route Segment Option L would also have greater wetland impacts, crosses the Haverhill Wildlife Management Area (WMA), and would have four large angle structures.

Route Segment Options N, O, and P

After removal of Route Segment Option L, Route Segment Option N was incorporated into Route Segment Option P. Route Segment Option O was not included in the proposed route because it was located in closer proximity to an existing natural gas pipeline, would require at least three additional angle structures, and was longer than other comparable options. Route Segment Option O-1 was developed in response to comments received during the open house process; however, it would only have been relevant had Route Segment Option O been retained. Route Segment Option P would cross through a portion of the Lemon Hill Solar Project (Commission Docket No. 25-126). Xcel Energy has had discussions with representatives for that project and at this time there appears to be adequate room for the Project to cross the solar project. However, Xcel Energy will continue to coordinate with that team as more detailed design is completed to ensure this continues to be the case. The proposed alignment for Route Segment Option P includes a modification, referred to as Route Segment Option P-1, to angle the southern portion of the route segment away from a nearby residence, consistent with landowner feedback and routing objectives.

Route Segment Option Q

Route Segment Option Q was removed after the January 2026 public open house because it had more residences within 500 feet and had more forested wetland impact than Route Segment Option R. Route Segment Option R also parallels I-90, which is a comparative advantage under the routing criteria. Similar to the refinement of Route Segment Option P, this exercise reflects the use of both quantitative impact factors and public/stakeholder input in narrowing route options.

Overall, the route segment option comparison process used an iterative screening approach to evaluate route options against residential, environmental, land use, engineering, constructability, and stakeholder considerations. Segments were removed where they presented notable routing disadvantages, such as greater proximity to homes, more public water or wetland impacts, conflicts with municipal expansion areas, challenging river crossings, pipeline proximity, transmission line congestion, poor alignment with property boundaries, increased agricultural field crossings, more large angles, or landowner concerns.

Based on the route segment option comparison, the combination of Route Segment Options A, B, F, I, K, M, P, and R was identified as minimizing impacts consistent with Minnesota routing criteria and combined to form the Proposed Route for Segment 1. Minor adjustments were subsequently incorporated to refine the overall alignment and improve route continuity. That said, as stated above, selection of one route segment over another does not necessarily indicate that the alternative was unsuitable or would be excluded from future consideration, and the Applicants anticipate that the EIS will include evaluation of some of the route alternatives discussed above that were not incorporated into the Proposed Route (see **Section 2**).

4.4.2 Segment 2

MISO identified Segment 2 as a double-circuit 765 kV / 161 kV line based in part on the possibility of utilizing an existing transmission line approaching the river valley and ultimately crossing the Mississippi River. The existing 161 kV circuits being double-circuited with the 765 kV line consist of multiple segments of 161 kV lines connecting to several existing substations spread out geographically, meaning loss of a portion of the double-circuit line will not result in complete loss of the 161 kV circuits—power can be backfed from adjacent substations, and each 161 kV substation has an alternate source available. In addition, Dairyland's existing 161 kV lines in this area are aging, creating additional economic, grid resiliency and reliability benefits to rebuilding the lines as part of this Project. Further, following the existing 161 kV transmission line is consistent with the Minn. Stat. § 216I.05, subd. 11(e) that requires the Commission to make specific findings that it has considered locating a route for an HVTL on an existing high-voltage transmission route.

Dairyland reviewed the existing 161 kV transmission line right-of-way for potential constraints and opportunities to refine the route to further avoid and reduce environmental and human impacts. Dairyland also reviewed stakeholder comments provided on the Project to date to look for further refinement opportunities. The detailed route maps in **Appendix F** illustrate where Segment 2 of the 765 kV Proposed Route deviates from the current 161 kV transmission line. These deviations include the revised alignment in proximity to the Rochester International Airport to avoid encroachment into airspace, and minor alignment shifts along the segment to avoid residences and agricultural operations. As discussed in **Section 3.1.1**, there are other locations where Dairyland is in ongoing conversations with landowners, businesses and/or agencies to determine the best alignment within the Proposed Route. Also, as discussed in **Section 6.4.6**, Dairyland

continues to coordinate with the USFWS regarding the crossing of the Upper Mississippi River NWFR.

4.4.2.1 County Road 14 Route Segment Alternative

During a meeting between the Applicants and the MDNR on October 20, 2026, the MDNR suggested a Route Segment Alternative to minimize impacts to trout streams, SBS and NPCs, and state-listed species that may occupy these areas on the eastern end of the Project between State Highway 76 and the proposed Jefferson Ridge Switching Station generally following County Road 14 in Houston County, Minnesota. MDNR staff have been in the area recently conducting surveys and documenting an extensive list of species. The MDNR has also communicated that the large block habitats the MDNR is interested in preserving extend beyond the mapped boundaries of the SBS and NPCs and include the intact forested tendrils that are adjacent and connected to these communities that should be protected (see correspondence provided in **Appendix C**).

The Applicants' preliminary evaluation indicated that there are challenges associated with the County Road 14 Route Segment Alternative, including proximity to the Houston County Airport (see **Section 6.4.4.2**), and increased density of residences and agricultural operations along County Road 14. The Applicants will continue to coordinate with the MDNR regarding this Route Segment Alternative and may introduce an alternative in this area during the scoping period for further study by the Commission in the EIS.

4.5 ALIGNMENT ALTERNATIVE

As a result of coordination with MDNR, the Applicants evaluated an alignment alternative that avoids crossing the Shooting Star Prairie Scientific and Natural Area (SNA), referred to as the Shooting Star Prairie SNA Alignment Alternative. The Shooting Star Prairie SNA consists of an approximately 0.7 mile long by 100-foot-wide (8.3 acres) strip of mesic tallgrass prairie remnant that occurs on the southwest side of State Highway 56 along the abandoned Milwaukee Railroad right-of-way in LeRoy, Minnesota.[23] The SNA was established in 1989 and has no maintained trails or other recreational facilities. As further discussed in **Section 6.4.6**, the current Proposed Right-of-Way follows Dairyland's existing 161 kV transmission line. The 80-foot-wide existing right-of-way does not cross the SNA; however, the Proposed Right-of-Way associated with the 765 kV / 161 kV transmission line would be expanded to 200 feet at this location, resulting in approximately 0.03-acre overlap of the SNA in the northwestern corner (see page 12 of **Appendix F**). The Project would span the SNA; no structure would be located within the SNA. The MDNR has expressed concern with the Proposed Right-of-Way overlapping the SNA. The MDNR is currently working with MnDOT to restore the SNA, inclusive of the adjacent highway right-of-way, to diverse prairie, through management of native woody species and non-native species.[24]

Furthermore, per Minn. R. 7850.4300, no HVTLs may be routed through state or national parks or state SNAs unless the transmission line would not materially damage or impair the purpose for which the area was designated, and no feasible and prudent alternative exists.

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[23] Minnesota Seasons. 2026. Shooting Star Prairie SNA. Available online at: https://minnesotaseasons.com/Destinations/Shooting_Star_Prairie_SNA.html. Accessed October 2026.

[24] MDNR. 2026. Shooting Star Prairie SNA. Available online at: https://www.dnr.state.mn.us/snas/detail.html?id=sna01004. Accessed October 2026.

There are several considerations in this area that must be taken into account during the siting of the transmission line, including, but not limited to:

- a residence on the corner of State Highway 56 and 730th Avenue;
- additional residences along State Highway 56 and 140th Street to the north;
- agricultural operations throughout the Proposed Route;
- the forested valley of the Upper Iowa River, an MDNR public water, extends north and south of the Proposed Right-of-Way through this area;
- Shooting Star Trail, an MDNR-managed trail, parallels the route for approximately 1 mile through this area;
- BWSR conservation easement; and
- MDNR-managed Lake Louise State Park, located south of the Proposed Route.

As discussed in **Table 3.1.1-1**, the Applicants have proposed a wider Route Width in this area to allow flexibility in siting the alignment.

In conversations with the MDNR, the MDNR has indicated their preference that a revised alignment avoid moving further south of the currently Proposed Right-of-Way due to concerns with potential visual impacts to recreational users at the Lake Louise State Park. The MDNR has also indicated that the Shooting Star Prairie SNA forms a block of continuous and contiguous habitat that includes the Upper Iowa River valley and the adjacent BWSR conservation area. Dairyland's existing 161 kV transmission line currently crosses both the Upper Iowa River and BWSR conservation easements east of State Highway 56 (see correspondence provided in **Appendix C**).

During a meeting between the Applicants and the MDNR on October 20, 2026, the MDNR suggested a potential Alignment Alternative starting west of the Shooting Star Prairie SNA that would deviate from Dairyland's current 161 kV transmission line and extend north of State Highway 56 and 140th St, traversing agricultural fields east to the vicinity of the Fillmore County line, where the alignment would rejoin Dairyland's existing 161 kV transmission line right-of-way (see **Figure 9)**. This Alignment Alternative would avoid the Shooting Star Prairie SNA and the BWSR conservation easement and would increase the distance of the transmission line from the Lake Louise State Park. The Alternative Alignment would still cross the Shooting Star Trail and would add a crossing of the Upper Iowa River and the Little Iowa River. **Table 4.5-1** provides a comparison of the environmental and human features crossed between the Proposed Alignment and the Shooting Star Prairie SNA Alternative Alignment. The Applicants have not incorporated the Shooting Star Prairie SNA Alignment Alternative into the Proposed Route but will request that the Commission evaluate this alternative in the EIS.

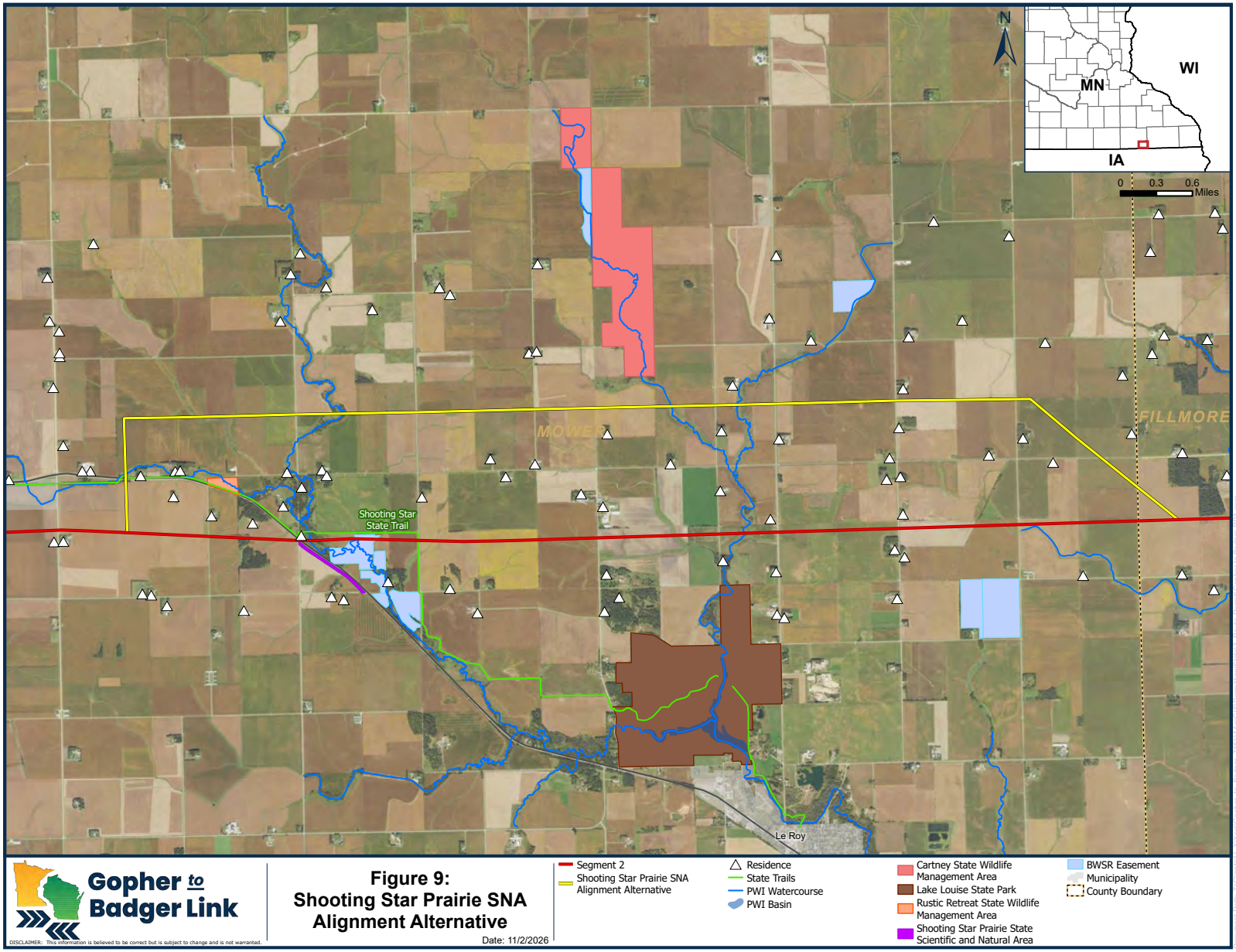
N
WI
MN
IA
0 0.3 0.6
Miles
MOWER
FILLMORE
Shooting Star State Trail
Le Roy
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 9:
Shooting Star Prairie SNA Alignment Alternative
Date: 11/2/2026
Segment 2
Shooting Star Prairie SNA Alignment Alternative
Residence
State Trails
PWI Watercourse
PWI Basin
Cartney State Wildlife Management Area
Lake Louise State Park
Rustic Retreat State Wildlife Management Area
Shooting Star Prairie State Scientific and Natural Area
BWSR Easement
Municipality
County Boundary

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TABLE 4.5-1

Proposed Alignment and Shooting Star Prairie SNA Alternative Alignment Comparison

Resource / Characteristic	Proposed Alignment	Shooting Star Prairie SNA Alternative Alignment
Length (miles)	8.8	10.1
Land Ownership		
No. of parcels crossed	28	45
Land Use Features / Utilities and Transportation		
Residences within 125 feet [a,b]	0	0
Residences within 250 feet [a,b]	1	0
Co-location with high-voltage transmission lines (miles / percentage) [c]	8.8 (100%)	0 (0%)
Co-location with roads (miles / percentage) [c]	0 (0%)	0 (0%)
Overall co-location with high-voltage transmission lines and roads (miles / percentage) [c]	8.8 (100%)	0 (0%)
Agricultural land use acres (miles crossed) [d]	7.7	9.7
Recreation and Managed Lands		
MDNR Public Lands (miles) [e]	0	0
BWSR Reinvest in Minnesota (RIM) / Conservation Reserve Enhancement Program (CREP) Easements (miles) [f]	0.2	0
MDNR State Trail Crossings (miles)[g]	0.04	0.04
Snowmobile Trail Crossings (miles)[h]	0.2	0.2
Surface Water Features		
National Wetlands Inventory (NWI) (miles crossed) [i]	0.4	0.3
MDNR Public Water Watercourses (no. of crossings) [j]	2	4
Waterbodies/Ditches (no. of crossings) [k]	14	10
Trout Streams (no. of crossings) [l]	0	0

[a] Aerial photography interpretation. 2026. and FEMA. 2026. USA Structures dataset. Available online at**:** https://gis-fema.hub.arcgis.com/pages/usa-structures**.** Accessed July 2026.

[b] Distance from the alignment.

[c] Co-location is defined as any utility or road right-of-way that overlaps with the proposed transmission line right-of-way.

[d] NLCD/USGS. 2026. Land Cover dataset. Available online at: https://dmsdata.cr.usgs.gov/geoserver/mrlc_Land-Cover-Native_conus_year_data/wms**.** Accessed July 2026.

[e] MDNR. 2026. DNR Management Units dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/bdry_dnr_managed_areas/FeatureServer/3. Accessed July 2026.

[f] BWSR. 2026. BWSR dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_bwsr/bdry_bwsr_rim_cons_easements/FeatureServer/0. Accessed July 2026.

[g] MDNR. 2026. MN State Trails dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_state_trails_minnesota/FeatureServer/0. Accessed July 2026.

[h] MDNR. 2026. Trails Snowmobile dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_snowmobile_trails_mn/FeatureServer/0**.** Accessed July 2026.

[i] MDNR. 2026. US FWS NWI Wetlands dataset. Available online at: https://fwspublicservices.wim.usgs.gov/wetlandsmapservice/rest/services/Wetlands/MapServer/0. Accessed July 2026.

[j] MDNR. 2026. PWI Watercourses dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/water_mn_public_waters/FeatureServer/0**.** Accessed July 2026.

[k] MDNR. 2026. DNR Rivers and Streams. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/water_dnr_hydrography/FeatureServer/0**.** Accessed July 2026.

[l] MDNR. 2026. Trout Stream dataset. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/env_trout_stream_designations/FeatureServer/0**.** Accessed July 2026.

5 RIGHT-OF-WAY ACQUISITION, CONSTRUCTION, RESTORATION, AND MAINTENANCE PROCEDURES

The Applicants developed right-of-way acquisition, construction, restoration, and maintenance procedures for the Project. Although certain procedures will be site-specific based upon the final route design, general procedures are discussed in some detail in this Application.

5.1 RIGHT-OF-WAY ACQUISITION

The Applicants will work with landowners to acquire easements for an approximate typical 250-foot-wide right-of-way. In some areas, the width may vary depending on span length and other design requirements, as further described in **Section 3.1.3**. The Applicants will review and make these modifications on a case-by-case basis. The final right-of-way width will be established once final engineering design is complete for the route designated by the Commission.

The Applicants will address land rights and related matters with landowners and other stakeholders throughout the permitting proceedings. On Segment 1, the Applicants intend to contact landowners to obtain rights-of-entry agreements to support survey efforts when there is more certainty regarding the route location. On Segment 2, because the majority of the route follows an existing Dairyland transmission line, the Applicants have initiated and will continue to contact landowners to obtain rights-of-entry agreements to support survey efforts. It is anticipated that the more detailed land rights acquisition discussions with landowners will occur in conjunction with the Applicants' survey efforts and will continue throughout the permitting and post-permitting periods. In those discussions, the Applicants will describe the survey, construction, and access plans, as well as potential impacts on the land, mitigation opportunities, and restoration. The land rights evaluation and acquisition process will include title search, contact with the landowner, survey, real estate document preparation, discussion and negotiation, and completion of land rights agreements, including permanent easements, temporary easements, and/or other agreements as necessary to support the initial survey, construction, operation, and maintenance of the Project.

The Applicants may discuss special considerations such as temporary or permanent gates, fencing, and access accommodations. The Applicants' experience with easement discussions is that, in most cases, they are able to work with landowners to address their concerns and reach a voluntary agreement for the purchase of the necessary land rights. In all cases, the Applicants will use fair market value data to try in good faith to reach voluntary agreements with landowners. In some cases, voluntary agreements cannot be reached. In those cases, the Applicants may need to obtain the necessary land rights for the Project by exercising their right of eminent domain under Minnesota law. The process of exercising the right of eminent domain is called condemnation. Minnesota law establishes a common process – through Minn. Stat. Ch. 117 – for condemnation actions and has a well-developed body of law for determining valuation issues to ensure that landowners receive just compensation.

Typically, before commencing a condemnation proceeding, a condemning authority (a utility) obtains an appraisal and provides it to the property owner, along with the condemning authority's offer of compensation. To start the formal condemnation process, a utility (or other condemning authority) files a petition in the district court where the property is located and serves that petition on all owners of interests in each of the properties identified in the petition. At or around the date the petition is filed, the utility also issues a notice to the owners that identifies the date on which the utility is asking the district court to grant the utility title to and possession of the land rights pursuant to Minnesota's "quick take" process.

If the court grants the petition, the court appoints a three-person condemnation commission that will determine the just compensation for the easement. The three people must be knowledgeable of applicable real estate issues. The commissioners schedule a viewing of the property and a valuation hearing. As part of the valuation process, the landowner typically also obtains an appraisal and has certain rights of reimbursement in connection with the costs of obtaining an appraisal. At the commissioners' hearing on valuation, the parties offer their evidence, such as testimony by appraisers or the landowners, about the fair market value impacts the acquisition has on the property's fair market value. The condemnation commission then makes an award in an amount representing just compensation and that award is filed with the court. Each party has the right to appeal the award to the district court for a trial. In the event of an appeal, the jury or judge considers the parties' evidence and renders a verdict. At any point in this process, the case can be dismissed if the parties reach a settlement.

In addition, the Project is subject to Minnesota's "Buy the Farm" law (Minn. Stat. § 216I.21, subd. 4). Under the Buy the Farm law, when a utility files condemnation to obtain the transmission line easement rights necessary to support the Project, landowners having interest in certain classes of land have the right to elect that the utility acquire the owners' fee interest in the property instead of the easement sought by the utility. These eligible classes of property include agricultural and non-agricultural homestead, non-homestead agricultural land, rental residential property, and commercial and non-commercial seasonal residential recreational property. Owners who make Buy the Farm elections may also be entitled to relocation assistance. The Applicants intend to communicate with landowners early in the acquisition process to make clear the options that are available if a landowner wants to further explore or pursue a Buy the Farm transaction. As part of the Buy the Farm discussions, the Applicants will also provide landowners resources regarding the relocation assistance that may be available to them.

5.2 PRE-CONSTRUCTION GEOTECHNICAL BORINGS

Collection of geotechnical data is necessary for final design of the transmission line foundations and will be performed in one or more mobilizations during the design phase. Soil borings are generally completed using rubber tired or tracked drill rigs, depending on site and access conditions. A pick-up truck or all-terrain vehicle (ATV) transports the crew and drilling supplies to the work area. Construction mats may be installed as needed based on site conditions and where access is required in wetland areas. Limited tree trimming/clearing and/or access road development may be necessary to access certain sites. Sites will be restored to pre-construction conditions upon completion of geotechnical investigations. The Applicants will obtain the applicable permits, right-of-entry, and other approvals prior to conducting this work.

The Project is located in a region of Minnesota known to have karst features (see **Section 6.8.4**). The MDNR, in its early coordination comments, noted the presence of karst in the Project area, noting that several karst features have been documented within 1,000 feet of the Project area (see **Appendix F**). Karst landscapes can develop where the dissolution of soluble bedrock can result in voids, sinkholes, springs, caves, or other such features at or near the surface.[25] This necessitates planning to identify karst features prior to construction, as well as development of a contingency plan should karst features be encountered during construction.

[25] National Park Service. 2022. Karst Landscapes. Available online at: https://www.nps.gov/subjects/caves/karst-landscapes.htm. Accessed July 2026.

The Applicants will develop a Karst Survey Plan identifying the locations of the proposed geotechnical investigations in relation to proposed structure locations and the extent and potential impact of subsurface features. Two near-surface geophysical methods, Electrical Resistivity Tomography (ERT) and Multichannel Analysis of Surface Waves (MASW), may be used to evaluate subsurface conditions and identify potential karst features for the route designated by the Commission. ERT measures differences in the electrical properties of subsurface materials, while MASW uses seismic waves to identify density differences in subsurface materials. Each method has advantages and limitations depending on site conditions, including the type of material within potential karst voids and the presence of energized transmission lines. Because both methods provide indirect information about subsurface conditions, results would be verified through direct subsurface investigation, as appropriate, to support foundation design. This Karst Survey Plan may include site reconnaissance by a geologist, geophysicist, and/or geotechnical engineer, geophysical studies, additional soil borings, or other geotechnical investigation methods as appropriate. Additional details regarding geophysical investigation methods will be provided in the Karst Survey Plan.

Following completion of the Karst Survey Plan outlined above, the Applicants will develop a Karst Contingency Plan prior to construction that includes actions to take to mitigate any unexpected voids encountered during construction.

5.3 CONSTRUCTION PROCEDURES

Work on each construction spread[26] will begin after final design is completed, required federal, state and local approvals are obtained, pre-construction provisions of permits have been met, and necessary land rights are acquired. The precise timing of construction will account for various requirements that may be in place due to permit conditions, outage constraints and available workforce.

The Applicants will notify landowners prior to the start of the construction phase of the Project, including an update on the Project schedule and other related construction activities.

Construction will follow the Applicants' standard construction and BMPs as developed to minimize temporary and permanent impacts to land and the environment. Construction typically progresses as follows:

- mobilization and laydown yard construction;
- survey marking of the right-of-way;
- vegetation clearing;
- installation of erosion and sediment control;
- installation of travel lanes, access road and road approaches**;**

[26] A defined section of a transmission line project where a construction crew and equipment work sequentially to complete construction activities. Dividing a project into construction spreads allows construction to occur in multiple areas along the transmission line at the same time.

- grading, excavation and foundation installation;
- assembly and structure installation and switching station construction;
- wire stringing;
- installation of wire accessories and any aerial markers required by state or federal permits;
- removal of existing structures; and
- site restoration.

The Project will be constructed with multiple construction spreads to be determined once the final route is selected. Construction of Segment 1 will take approximately two years, and Segment 2 will take approximately 3 years to construct and the Project will require approximately 500 to 600 on-site workers. As described in **Section 3.5**, depending on various scheduling constraints, construction is planned for 2030 to 2034.

5.3.1 Mobilization and Laydown Yard Construction

Initially, labor and equipment will be mobilized to prepare staging areas/laydown yards for temporary trailer(s) and security measures to receive materials, storage containers, portable toilets, dumpsters, construction mats, tools, and equipment, etc. Activities involved to prepare the staging / laydown yards include installation of erosion and sediment control BMPs as described in **Section 5.3.5**, leveling of uneven surfaces, stripping and stockpiling of topsoil (if necessary), installation of gravel and/or construction matting (see **Section 5.3.6**), installation of tracking pads near entry/exit (if necessary), and installation of culvert(s), power, and fencing. This work is generally completed using equipment such as a bulldozer and dump trucks. The disturbance from the laydown yard is dependent on soil type and topography. Depending on landowner preferences, laydown yards may be left in place or returned to prior conditions following construction activities. The Applicants estimate that construction of the Project will likely include 1-2 staging areas on Segment 1 and 6-8 staging areas on Segment 2, each ranging from 20 to 60 acres in size. The Applicants are currently evaluating multiple staging area locations to support construction of the Project. However, not all evaluated locations will be selected or used.

5.3.2 Fly Yards and Landing Areas

The Applicants may use helicopters to facilitate structure setting, wire pulling, and installation of line hardware such as spacer dampers, spiral vibration dampers, bird diverters, and aerial navigation markers on the lines. Therefore, the Project may require both helicopter fly yards and landing areas.

The Applicants estimate that fly yards or landing yards will be sited approximately every 5-10 miles along each Segment. Segment 1 is currently considering up to 8 fly or landing yard locations, and Segment 2 is currently considering up to 25 fly yards, or landing area locations, not all of which will be selected or used for construction. The Applicants will locate helicopter fly yards in upland areas that have been previously disturbed such as existing yards, parking lots, or fields, and will avoid impacts to environmentally and culturally sensitive sites.

Helicopter landing areas will need to occur adjacent to the right-of-way and near access roads to allow access for fueling trucks. Landing areas will be located in relatively flat areas and will avoid environmental and culturally sensitive areas.

5.3.3 Survey Marking of the Right-of-Way

Surveyors will stake the limits of disturbance for construction, and will flag environmentally sensitive features, including wetlands and waterbodies. The limits of disturbance will encompass the transmission rights-of-way, designated off right-of-way access routes, structure work areas, stringing sites, laydown yards, fly yards, and other temporary workspaces along the approved alignment for the Project.

The Gopher State One-Call system will be used to locate and mark all existing underground utilities prior to the start of right-of-way clearing to avoid impacts to existing utilities. If crossing an underground utility is required, the Applicants will coordinate with the utility owner to identify mitigation measures, such as construction matting, to protect existing infrastructure from the weight of heavy construction equipment.

Prior to foundation installation, structure locations and offset stakes will be surveyed and staked.

5.3.4 Vegetation Clearing

To facilitate construction equipment access and ensure safe clearances between vegetation and the transmission line, vegetation will be cleared for the full width of the right-of-way. While clearing typically occurs shortly prior to the installation of structures and their associated foundations, there are instances where clearing must occur earlier during the construction process. This is often the result of calendar restrictions related to protected species.

As a general practice, low-growing brush will be allowed to reestablish at the outer limits of the easement area after vegetation has initially been cleared, unless it would interfere with construction access or setup. Trees that endanger safe and reliable operation of the transmission line will be removed throughout Project operation.

Vegetation will be cut at or slightly above the ground surface using mechanized mowers, sky trims, processors, harvesters, or by hand. Rootstocks will generally be left in place, except in areas where stump removal is necessary to facilitate the movement of construction vehicles, or when reasonably requested by the landowner. Side trimming the right-of-way would happen shortly after the clearing is completed. Following the side trimming, a final mowing of debris and stump cleanup will be completed. Where allowed, stumps of tall-growing species will be treated with herbicide to discourage re-growth.

Material resulting from the clearing operations will either be slashed on site and spread on the easement area outside of sensitive environmental areas, stacked in the easement area for use by the property owner, or removed and disposed of as otherwise agreed to with the property owner during easement negotiations, and in accordance with applicable permits.

5.3.5 Erosion and Sediment Control

Installation of erosion and sediment control BMPs, such as mulch, silt fence, and fiber logs, will be implemented prior to anticipated ground disturbance and in accordance with the Minnesota Pollution Control Agency (MPCA) National Pollutant Discharge Elimination System (NPDES) /

State Disposal System (SDS) Construction Stormwater General Permit (General Permit) (see **Section 7.1**). Equipment used to install erosion and sediment control BMPs includes ATVs and trucks for crew transportation, as well as skid loaders, tractors, backhoes, hydro-seeders, and other light-duty equipment. BMPs will be inspected, maintained, repaired, and replaced in accordance with the General Permit. Prior to start of construction, Stormwater Pollution Prevention Plans (SWPPP) will be developed that provide details on the types and locations of BMPs that will be implemented.

5.3.6 Travel Lanes, Access Road and Road Approaches

The Applicants will evaluate construction access opportunities by identifying existing transmission lines, roads, or trails that occur near the approved route. When feasible, the Applicants will limit construction activities to the right-of-way. In certain circumstances, additional off-right-of-way access or workspace may be required. The Applicants may need to improve existing access roads or road approaches or develop new access roads or road approaches. Road improvements may include tree trimming, tree clearing, road grading, installation of erosion and sediment control BMPs, installation of construction mats, widening and fill placement. Road improvement work is generally completed using equipment such as a bulldozer, track-hoe, skid-loader, and dump trucks. The travel surface of the access road is generally 16 to 20 feet wide but may be wider at turns (due to turning radius of equipment), pull-off areas (to allow equipment passing), and turnaround areas. The total amount of disturbance of the road (cut slope to base of the spoils slope) is dependent on soil type and topography. Depending on maintenance needs, landowner preferences and permit requirements, access roads may be left in place or returned to prior conditions following construction.

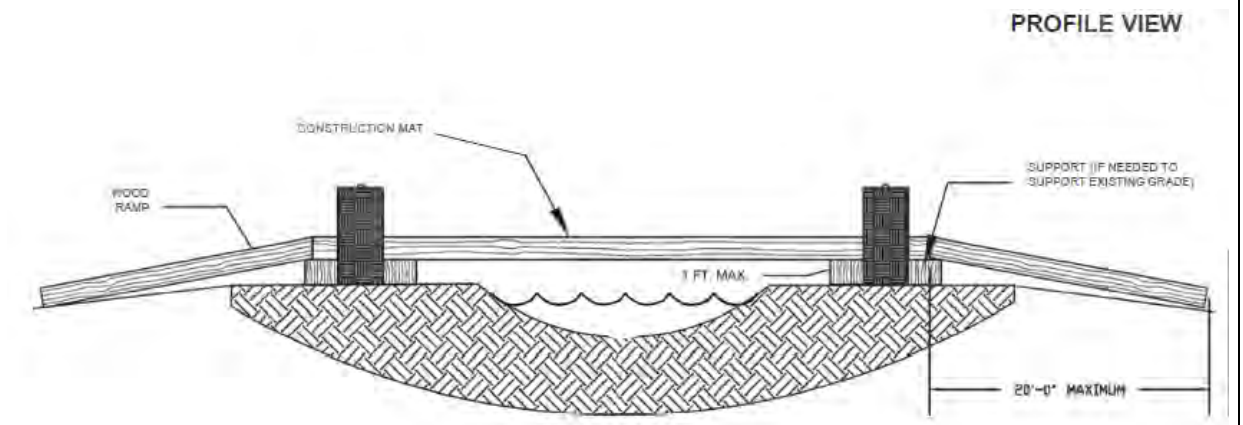
The Applicants will obtain permits for new approaches from local road authorities when needed. The Applicants will also work with appropriate road authorities to ensure proper maintenance of roadways traversed by construction equipment. Construction will require the use of many different types of construction equipment, including, amongst other things, tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, drill rigs, dump trucks, front-end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks, stringing equipment, helicopters, drones, and various trailers or other hauling equipment. To the extent practicable, construction crews will implement construction practices to minimize impacts to resources including use of matting, selection of appropriate equipment, and construction during frozen conditions for select areas.

Matting may be used as a protective measure to minimize ground impacts through wetlands, farm fields, or other unstable soil areas. Mats are also used to support and stabilize large equipment required for construction. Construction mat travel lanes will generally be 16 to 20 feet wide but may be wider at turns (due to turning radius of equipment), pull-off areas (to allow equipment passing), and turnaround areas. Construction matting may consist of composite, timber, or laminate mats and will be installed with rubber-tired grapple trucks, forwarders, forklifts, or skid loaders. The Project will be constructed in segments with mats being moved and used in other sections as construction progresses.

In addition, permitted temporary bridges will be installed over waterbodies. An example of a temporary clear span bridge is shown in **Diagram 5.3.6-1**. Equipment bridges will be designed to meet the requirements of the applicable agencies and local authorities. Bridges will be installed during clearing and will be removed as soon as possible during final restoration once the bridge is no longer required to complete or monitor restoration activities.

DIAGRAM 5.3.6-1

Temporary Clear Span Bridge Typical



5.3.7 Grading, Excavation and Foundation Installation

The Applicants will generally design the transmission line structures for installation at the existing ground elevations. Where terrain requires (typically on slopes exceeding 10 percent), access roads, and working areas may be graded or leveled with fill or construction mats. Where grading is required, the Applicants will strip the topsoil layer and potentially into the subsoil layer and will separate the topsoil and subsoil in storage piles within the Project workspace.

If acceptable to the landowner and in accordance with permits, the Applicants will leave the graded/leveled areas after construction to allow for access during future maintenance activities. If not acceptable to the landowner or permit conditions, the Applicants will, to the extent practicable, return the site to pre-construction conditions.

Concrete may be brought to the site by concrete trucks or from a local concrete batch plant. In some cases, steel casings may be installed in the foundations to keep the hole open and stable until the concrete foundation can be placed. If hard rock is encountered during excavation for structure foundations, blasting may be necessary to loosen or fracture the rock to reach the required depth. Dewatering of the foundation holes may also occur in areas with high water tables, or where water is needed to stabilize the hole during drilling; the amount of dewatering will be determined by the geotechnical investigations that will occur prior to construction based on the route designated by the MPUC (see **Section 5.2**). The Applicants will follow the requirements of the General Permit regarding concrete work and construction dewatering and will obtain a MDNR Water Appropriations Permit should the anticipated amount of dewatering meet the permit thresholds established by the MDNR (see **Section 7.1.2**).

5.3.8 Assembly and Structure Installation

The Applicants will erect the transmission structures for the Project using conventional ground-assembly and crane-erection methods, supplemented by helicopter erection in areas where

terrain or access constraints make ground-based methods infeasible or too impactful. Structure assembly and erection will follow completion and curing of the supporting foundations (**Section 5.3.6**) and will precede conductor stringing (**Section 5.3.8**).

The Applicants will transport bundles of steel members, associated hardware, and wood blocking to each structure site by truck. Sections of transmission structures will be moved from staging areas and assembled on site.

For lattice structures, assembly and erection typically proceed in the following sequence. Crews first assemble the leg extensions at the base of the structure, generally using a small crane. Working from the blocked-out steel, crews then bolt together larger subsections of the tower on the ground. A large crane hoists each completed subsection into place, and the erection crew fastens the subsections together to build up the complete structure. A follow-up crew then tightens the bolts in the joints to the specified torque, and the connections are inspected as part of the Applicants' quality control procedures. Monopole structures on the rebuilt 161 kV segments are similarly transported to site in sections, framed, and direct-embedded or set on their foundations.

Helicopters may also be used to erect structures. Where helicopters are used, the Applicants will site helicopter fly yards and landing areas adjacent to the applicable structure locations where feasible.

Once structures are set, insulators, hardware, and stringing sheaves are installed at each conductor and shield-wire position in preparation for conductor stringing. Tower grounding is installed, tested, and bonded to the tower legs. Required structure signage and other miscellaneous appurtenances are installed to complete the assembly.

5.3.9 Wire Stringing

Conductor and OPGW stringing is the last major component of transmission line construction. Where the Project crosses streets, roads, highways, or other energized conductors or obstructions, the Applicants may install temporary guard structures before conductor stringing. The temporary guard structures ensure that conductors will not obstruct traffic or contact existing energized conductors or other cables during stringing operations and also protect the conductors from damage. Guard structures are removed following completion of conductor installation at each crossing. Depending on the type of crossing, traffic control may be applicable based on local and MnDOT permitting requirements. Where the Project crosses railroads, the Applicants will coordinate with the railroad operator to schedule flaggers during stringing operations.

Stringing setup areas are dependent on the line design and configuration. However, it is anticipated that stringing sites will typically be located at approximately 3- to 4-mile intervals, consistent with the practical pulling lengths achievable for the conductor and bundle sizes. These sites are typically located within the right-of-way where practicable. At angle structures where the transmission line changes direction, additional workspace outside the right-of-way may be needed to appropriately position conductor pulling and tensioning equipment. The need for and size of this additional workspace will depend on the degree of the angle, final structure design, stringing requirements, and site-specific conditions. When necessary, the Applicants will acquire temporary construction easements for work areas extending outside the right-of-way. Equipment at each stringing site may include pulling machines, tensioning equipment, wire reels, reel carts, crawler cranes, skid loaders, and bucket trucks.

Stringing is performed using the tension (controlled-tension) method, in which the conductor and OPGW are kept under tension and off the ground throughout installation to maintain clearances and protect the wire, existing facilities, and the public. A lightweight pilot line is strung from structure to structure and threaded through the stringing sheaves, commonly with helicopter support. The pilot line is used to pull progressively larger cables, ending with a hard-line, which is then used to pull the conductor and OPGW through the travelers. Pulling equipment at one end and braking/tensioning equipment at the opposite end work in tandem to string each phase bundle and each OPGW through the sheaves under controlled tension.

After each conductor and shield wire is pulled and tensioned, crews adjust the wire sag using survey instruments or other approved methods to ensure final sags are compliant with Applicants' procedures and minimum code clearances. The wire is then transferred (clipped-in) from the stringing sheaves into the permanent suspension and dead-end hardware at each structure. Clipping-in can be conducted via crane, aerial lift, or helicopter, depending on structure site access.

5.3.10 Wire Accessory and Aerial Marker Installation

Wire accessories will be installed as required after OPGW and conductor installation is complete. These accessories may include vibration dampers, spacer-dampers, bird flight diverters, or aerial navigation markers and will be installed directly onto the shield wires or conductors at the applicable locations and spacings. The Applicants will work with the appropriate agencies to identify locations where bird flight diverters or aerial navigation marking devices are required.

Along accessible portions of the alignment, crews reach the conductor and shield-wire attachment points using bucket trucks, aerial manlifts, or cranes to install dampers, spacer-dampers, diverters, and markers. To install spacer-dampers at multiple points along a bundled span, crews may use specialized equipment, such as a manned spacer cart (or "spacer buggy"), that rides along the conductor bundle to facilitate placement by the crews. Helicopters may also be used to install required wire accessories and aerial markers. Helicopter-assisted installation reduces the need for ground access and associated disturbance in areas with constraints or difficult terrain.

5.3.11 Removal of Existing Structures

On Segment 2 and the Q-9, where the existing 161 kV transmission structures will be replaced by 765 kV / 161 kV double-circuit or rebuilt 161 kV structures, the existing wooden structures and wire will be removed. The removed materials will be evaluated to determine their appropriate disposal at an off-site authorized disposal facility. Typical equipment used includes cranes, bucket trucks, reel trailers, wirepullers, and related stringing equipment. The existing transmission structures will be removed in accordance with applicable permits and regulations. The determination will be site specific and will be based on the type of structure, land use at the site, and construction vehicle access constraints.

5.3.12 Switching Station Construction

The Jefferson Ridge Switching Station is proposed to be a 3.4-acre site that will include the switching station, access drive, control enclosure, and stormwater pond. Site preparation would include installing erosion and sediment control BMPs, stripping topsoil, and hauling in structural fill to build up the subgrade for the switching station pad. Once the pad is built to grade, the site will be allowed to settle over one freeze/thaw cycle.

Construction within the newly prepared pad will consist of drilled pier foundations ranging in size from 2.5 to 7 in diameter and 12 to 35 feet deep, depending on the results of geotechnical investigations. The foundations will be installed to support transmission line dead-end structures, static masts, and bus and equipment support structures. Slabs-on-grade approximately 8 feet square by 1.5 feet thick will be used for 161 kV circuit breakers. The control building will be on a 20-foot by 40-foot by 2-foot-thick concrete slab. Conduit for control and communication cables and grounding conductor will be installed prior to the placement of the final layer of crushed rock surfacing. The ground grid will be installed 18 inches below the subgrade surface throughout the switching station pad and extend 4 feet outside the security fenceline.

5.4 RESTORATION AND CLEAN-UP PROCEDURES

Disturbed areas will be restored to their original condition to the maximum extent practicable, in accordance with applicable permit requirements, or as otherwise 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 agreed upon with landowners. Further details are provided in the draft Agricultural Impact Mitigation Plan (AIMP) in **Appendix H**, which has been provided to the Minnesota Department of Agriculture (MDA) for review and the draft Vegetation Management Plan (VMP) provided in **Appendix I**, which will be reviewed by the MPUC's VMP Working Group.

The Applicants will contact landowners after construction is complete to determine if the clean-up measures have been to their satisfaction and identify if any other damage may have occurred. If damage has occurred to crops, fences, or the property, the Applicants 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.

Further, after construction activities are complete, the Applicants will ensure that township, city, and county roads used for purposes of access during construction will be restored to their prior condition. The Applicants will meet with township road supervisors, city road personnel, or county highway departments to address any issues that arise during construction with roadways to ensure the roads are adequately restored or compensate the road authority for repairs, if necessary, after construction is complete.

5.5 MAINTENANCE PROCEDURES

The Applicants will design and maintain the transmission lines in accordance with the NESC and the Applicants' standards. In general, HVTL facilities are highly reliable, and industry outage data show that TOs track outage frequency, duration, and causes through NERC's Transmission

Availability Data System.[27] Regular maintenance and asset renewal of transmission line components is necessary for longer term reliable operation.

The Applicants will require access to the transmission line right-of-way to periodically conduct inspections, perform maintenance, and repair damage that may occur. Generally, the Applicants will inspect the Project at least once by air and once by ground annually. These inspections will be limited to the defined easement areas and through other access easement areas where obstructions or terrain dictate. If maintenance concerns are identified during inspection, the landowner will be notified and repairs will be performed as necessary. Should any damage occur to the right-of-way, the right-of-way will be restored to its original condition, or the landowner will be provided with reasonable compensation for any damage to the property.

The Applicants will manage the right-of-way to control any encroachments that may interfere with the operation of the transmission line, including removal of vegetation that interferes with the operation and maintenance of the transmission line, as further described in Section 10 of the draft VMP (**Appendix I**).

[27] North American Electric Reliability Corporation (NERC). Undated. Transmission Availability Data System (TADS). Atlanta, GA: NERC. https://www.nerc.com/programs/reliability-assessment--performance-analysis/transmission-availability-data-system. Accessed June 2026.

6 ENVIRONMENTAL INFORMATION

Chapter 6 discusses the potential human and environmental impacts from construction and operation of the Project, as well as potential mitigation measures.

6.1 METHODOLOGY AND DEFINITIONS

A potential impact is a change to existing environmental, social, or economic conditions that may result from the construction, operation, maintenance, or decommissioning of a proposed project. Potential impacts may be beneficial or adverse, direct or indirect, and short-term or long-term. The nature and significance of an impact can vary based on its duration, magnitude, the sensitivity of the affected resource, and the location where it occurs.

Direct impacts are caused by the proposed project and occur at the same time and place as the activity that creates them. Indirect impacts are also caused by the proposed project but occur later in time or farther from the project area. This Application evaluates direct and indirect impacts that are reasonably foreseeable, meaning they can reasonably be expected to occur based on available information and the expected effects of the project.

Potential impacts to both the human and natural environment are evaluated by resource area in the following sections.

Cumulative impacts result from the incremental effects of the proposed project when considered together with the effects of past, present, and reasonably foreseeable future actions within the environmentally relevant area. While an individual impact may be small, its contribution to cumulative impacts may be greater when combined with other actions affecting the same resource. Cumulative impacts are discussed in **Section 6.11**.

To provide appropriate context, the following terms and concepts are used to describe and analyze potential impacts:

- **Duration** – Impacts differ in how long they last. Short-term impacts generally occur during construction and are temporary. Long-term impacts continue during project operation. Permanent impacts remain after the project has been decommissioned and the site has been reclaimed.

- **Magnitude** – Impacts differ in their size or extent. When possible, impacts are described using measurable information, such as the number of acres affected, the length of a resource impacted, or the percentage of a population that may be affected.

- **Resource Sensitivity** – Resources vary in their rarity, importance, and ability to recover from disturbance. Some resources are common and widely distributed, while others are rare, unique, protected, or particularly sensitive to change.

- **Location** – The significance of an impact can depend on where it occurs. A resource that is common in one area may be uncommon or especially valuable in another. As a result, the same activity may have different levels of impact depending on the location.

The context of an impact, together with its expected effect on a resource, is used to determine impact intensity. Impact intensity describes the degree of change caused by the project and ranges from highly beneficial to highly adverse. The intensity levels below provide a consistent

way to evaluate and compare impacts across resources. These terms are intended to support a common understanding among readers and are not intended as value judgments.

- **Negligible** – The impact causes little or no measurable change to the existing condition or function of a resource. The impact is unlikely to be noticeable to the average observer and does not affect the resource's ability to function or recover.

- **Minor** – The impact causes a small change to the condition or function of a resource. The change may be noticeable to the average observer but does not substantially affect the resource's overall quality, use, or function. The resource remains largely unchanged and continues to function as it did before the impact.

- **Moderate** – The impact causes a measurable change to the condition or function of a resource. The change is generally noticeable to the average observer or can be demonstrated through analysis or modeling. Although the resource continues to function, its quality, availability, or use may be reduced.

- **Significant** – The impact causes a substantial change to the condition or function of a resource. The resource is impaired, substantially altered, or may no longer be able to perform key functions. The impact is likely to be noticeable to the average observer or clearly demonstrated through analysis or modeling.

Also discussed are opportunities to mitigate potential impacts by avoiding, minimizing, or correcting the on-the-ground effect. Collectively, these actions are referred to as mitigation.

- Avoiding an impact means preventing it from happening in the first place. This can be done by not carrying out part of the project, choosing a different location, or changing the project design to stay away from sensitive resources.

- Minimizing an impact means reducing the size, extent, duration, or severity of the impact when it cannot be completely avoided. This can be done by reducing the project footprint, modifying construction methods, adjusting the project layout, or limiting activities in sensitive areas.

- Correcting an impact means addressing damage that occurs by repairing, rehabilitating, or restoring the affected resource. If restoration is not possible or does not fully offset the impact, compensation may be provided by replacing the resource or enhancing a similar resource elsewhere. Corrective measures are typically used when impacts cannot be fully avoided or further minimized.

Some impacts can be avoided or minimized; some might be unavoidable but can be minimized; others might be unavoidable and unable to be minimized but can be corrected. The level at which an impact can be mitigated might change the impact intensity level. Unavoidable impacts are discussed in **Section 6.9** and irreversible and irretrievable impacts of the Project are discussed in **Section 6.10**.

6.2 REGIONS OF INFLUENCE

Each of the resource sections below include an “Existing Conditions” subsection that provides a general description of the resource within the Proposed Routes, as defined in **Section 3.1.1**, or within a larger geographic area, as indicated. For example, resources such as aesthetics, public

services, and cultural values are described using a geographic area that extends beyond the Proposed Routes due to the nature of the resource.

Potential impacts on human and environmental resources are analyzed within specific geographic areas called regions of influence (ROI). The ROI is the geographic area where the transmission project might exert some influence and is used as the basis for assessing potential impacts. ROIs vary by resource. As necessary, this Application discusses potential impacts and mitigation measures beyond the identified ROI to provide appropriate context. Also, direct impacts within the ROI might cause indirect impacts outside the ROI.

This Application uses the following ROIs assigned by resource in **Table 6.2-1**:

- **Proposed Rights-of-Way**: Typically 125 feet on each side of Proposed Alignment for 765 kV facilities and 40 to 50 feet on each side of 161 kV facilities (see **Sections 3.1.2** and **3.1.3**)
- **Local Vicinity**: Adjacent to and up to 0.5 mile from the Proposed Rights-of-Way
- **Project Area**: 1 mile on either side of the Proposed Alignments
- **Census Tract**: Census tracts crossed by the Proposed Routes
- **County**: Goodhue, Wabasha, Olmsted, Mower, Fillmore, and Houston counties

TABLE 6.2-1

Regions of Influence Description

Resource / Topic	Region of Influence
Human Settlement	
Aesthetics	Project Area
Cultural Values	County
Displacement	Proposed Right-of-Way
Environmental Justice	Census Tract
Noise	Local Vicinity
Public Services and Transportation	Varies (as defined below)
Transportation (Roads, Railways)	*Local Vicinity*
Airports	*FAA-determined*
Emergency Services and Communications	*County*
Local and Regional Utilities	*Local Vicinity*
Public Communication	*County*
Land Use and Zoning	Proposed Right-of-Way
Recreation	Project Area
Socioeconomics	County
Property Values	Local Vicinity
Public Health and Safety	Local Vicinity
Stray and Induced Voltage	Local Vicinity
Electric and Magnetic Fields	Local Vicinity
Emergency Services	County
Public and Worker Safety	Proposed Right-of-Way
Land-Based Economies	
Agriculture	Proposed Right-of-Way
Forestry	Proposed Right-of-Way
Mining	Proposed Right-of-Way
Tourism	County
Archaeological Resources	Local Vicinity
Historic Resources	Project Area

TABLE 6.2-1

Regions of Influence Description

Resource / Topic	Region of Influence
Natural Environment	
Air Quality	County
Greenhouse Gas Emissions	County
Climate Change	County
Geology and Topography	Proposed Right-of-Way
Soils	Proposed Right-of-Way
Groundwater	Proposed Right-of-Way
Surface Waters and Wetlands	Proposed Right-of-Way
Vegetation	Proposed Right-of-Way
Wildlife and Habitat	Proposed Right-of-Way
Rare and Unique Natural Resources	Local Vicinity

6.3 ENVIRONMENTAL SETTING

This section provides an overview of the existing environmental conditions within and surrounding the Proposed Routes. The environmental setting includes the physical, biological, cultural, and land use features that may be affected by the Project. These features are discussed in more detail in the subsections that follow. Understanding existing conditions provides a baseline for evaluating potential Project impacts and helps explain how the Project could affect environmental resources over time.

Unless otherwise noted, environmental features are described from west to east along the Proposed Routes.

The 765 kV Proposed Route is located within portions of Goodhue, Olmsted, Wabasha, Mower, Fillmore, and Houston counties, Minnesota. The Q-9 Proposed Route and Jefferson Ridge Switching Station are located in Houston County. Communities near the Proposed Route for the 765 kV transmission line within populations greater than 2,000 people include Pine Island, Rochester, Eyota, Stewartville, and Harmony. There are no communities with more than 2,000 people in proximity to the Q-9 Proposed Route and Jefferson Ridge Switching Station.[28]

The 765 kV Proposed Route crosses portions of several major watersheds, including the Zumbro River, Mississippi River-Winona, Root River, Cedar River, Upper Wapsipinicon River, Upper Iowa River, and Mississippi River-Reno watersheds.[29] Major rivers in the area include the Zumbro, Root, Whitewater, Cannon, and Mississippi Rivers. The Q-9 Proposed Route and Jefferson Ridge Switching Station occur within the Mississippi River-Reno watershed and do not cross any major rivers.

The Project Area contains a variety of landscapes, ecosystems, and land uses that reflect the region's geologic and natural history. To help describe these environmental conditions, the MDNR

[28] MnDOT. 2026. City, Township, and Unorganized Territory in Minnesota. Available online at: https://gis.data.mn.gov/. Accessed July 2026.

[29] MDNR. 2026. MNDNR Watershed Suite. Available online at: https://gis.data.mn.gov/. Accessed July 2026.

and the U.S. Forest Service developed the Ecological Classification System (ECS),[30] which identifies areas with similar ecological characteristics. The ECS organizes the landscape into progressively smaller units based on climate, geology, soils, vegetation, and other environmental features.

Under the ECS, the Proposed Routes are located within the Eastern Broadleaf Forest Province (222) (**Figure 10**). Most of the 765 kV Proposed Route is located in the Paleozoic Plateau Section (222L), while a small portion of the western end of the 765 kV Proposed Route extends into the Minnesota and Northeast Iowa Morainal Section (222M).

Ecological Sections are further divided into Subsections that share similar landscape characteristics (**Table 6.3-1**). The 765 kV Proposed Route crosses three ECS Subsections: the Rochester Plateau (222Lf) in the western portion, the Oak Savanna Subsection (222Me) in the southwest portion, and The Blufflands Subsection (222Lc) in the eastern portion of the Project. The Q-9 Proposed Route and Jefferson Ridge Switching Station are located entirely within The Blufflands Subsection.

TABLE 6.3-1

Summary of ECS Subsections by Segment

Segment / ECS Subsection	Proposed Route (acres)	Percent of Segment	Proposed Right-of-Way (acres)	Percent of Segment
Segment 1	**14,203**		**1,182**	
Rochester Plateau	11,985	84.4%	971	82.2%
The Blufflands	2,218	15.6%	211	17.8%
Segment 2	**47,858**		**2,644**	
Oak Savanna	21,472	44.9%	783	29.6%
Rochester Plateau	21,966	45.9%	1,456	55.1%
The Blufflands	4,420	9.2%	405	15.3%
Q-9	**700**		**17**	
The Blufflands	700	100.0%	17	100.0%
TOTAL	**62,761**		**3,826**	

Environmental conditions vary across the Project. From the North Rochester area south to the vicinity of Adams, the landscape is characterized by relatively level to gently rolling terrain formed by older glacial deposits. Agriculture is the dominant land use in this portion of the Project, with extensive cultivated fields and scattered rural development.

[30] MDNR. 2026. Ecological Classification System. Available online at: https://www.dnr.state.mn.us/ecs/index.html. Accessed June 2026.

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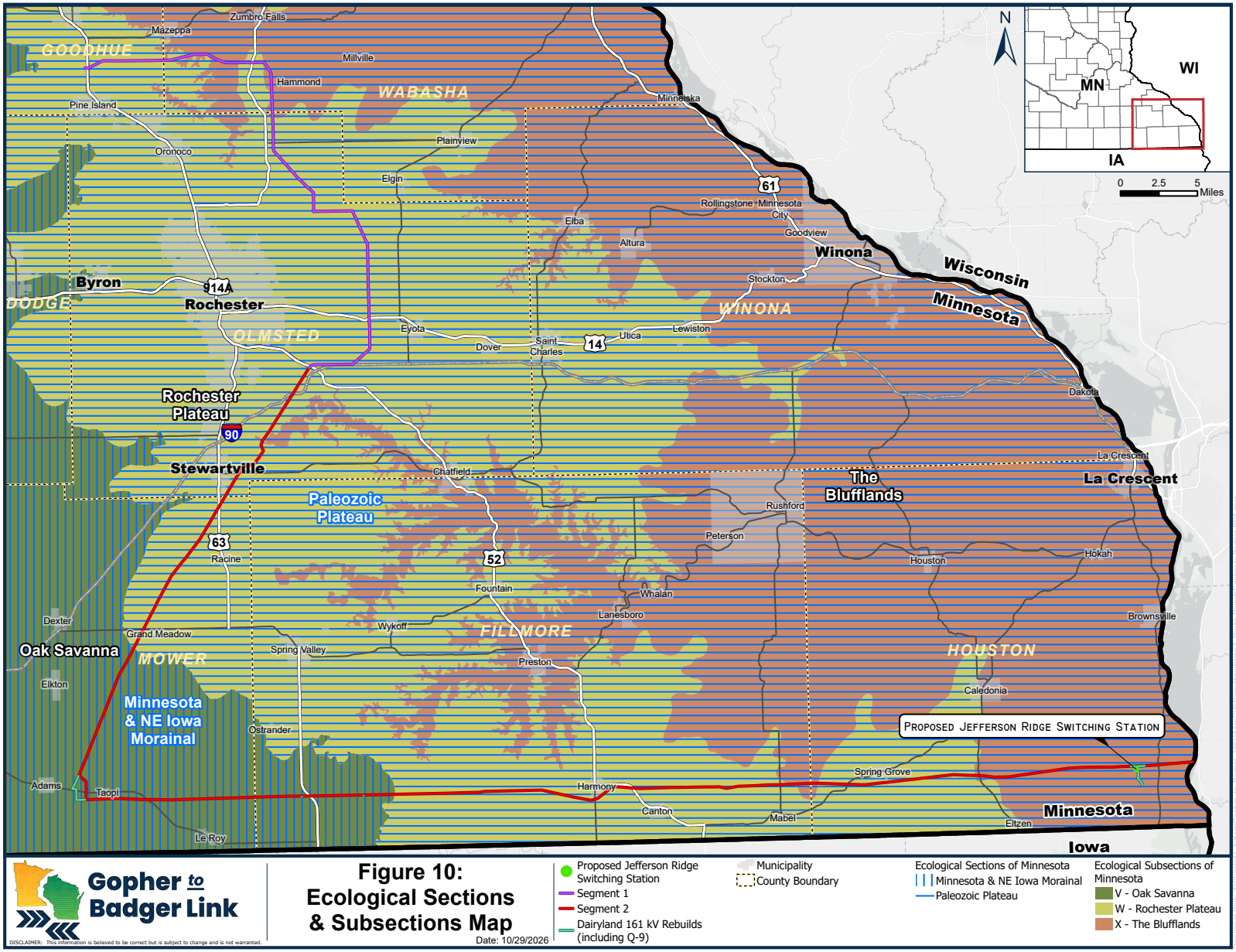
Zumbro Falls
Mazeppa
GOODHUE
Millville
Hammond
WABASHA
Pine Island
Minneiska
Plainview
Oronoco
Elgin
61
Rollingstone
Minnesota City
Elba
Goodview
Altura
Winona
Wisconsin
Minnesota
Byron
14
DODGE
Rochester
Stockton
WINONA
OLMSTED
Eyota
Dover
Saint Charles
14
Utica
Lewiston
Dakota
Rochester Plateau
90
Stewartville
Chatfield
La Crescent
The Blufflands
Paleozoic Plateau
Rushford
Peterson
63
Racine
52
Houston
Hokah
Fountain
Whalan
Lanesboro
Brownsville
Dexter
Grand Meadow
Wykoff
FILLMORE
Oak Savanna
MOWER
Spring Valley
Preston
HOUSTON
Elkton
Caledonia
Minnesota & NE Iowa Morainal
Ostrander
Proposed Jefferson Ridge Switching Station
Spring Grove
Adams
Taopi
Harmony
Canton
Mabel
Minnesota
Le Roy
Elzen
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0 2.5 5 Miles
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 10:
Ecological Sections & Subsections Map
Date: 10/29/2026
Proposed Jefferson Ridge Switching Station
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Municipality
County Boundary
Ecological Sections of Minnesota
Minnesota & NE Iowa Morainal
Paleozoic Plateau
Ecological Subsections of Minnesota
V - Oak Savanna
W - Rochester Plateau
X - The Blufflands

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East of the Mower–Fillmore County line, the Project enters the Driftless Area.[31] Unlike much of Minnesota, the Driftless Area was not covered by glaciers during the most recent Ice Age. As a result, the region contains steep bluffs, deeply carved stream valleys, and a highly diverse natural landscape. Valley walls commonly rise 500 to 600 feet above nearby streams and rivers. The area supports cold-water streams, diverse wildlife habitats, forests, and agricultural lands. Farming and forestry remain important land uses throughout this region.

Together, these landscape features provide important context for understanding existing environmental conditions and evaluating potential Project impacts on natural resources, land use, cultural resources, and nearby communities.

6.3.1 Segment 1

Segment 1 begins at the existing North Rochester Substation, located north of Pine Island in Goodhue County, Minnesota. The segment is entirely within the Paleozoic Plateau Section of the ECS. Most of Segment 1 is located within the Rochester Plateau Subsection, with portions of the eastern segment extending into The Blufflands Subsection, primarily in Wabasha County.

6.3.1.1 Rochester Plateau Subsection[32]

Most of Segment 1 (approximately 84 percent) crosses the Rochester Plateau Subsection. The landscape consists of broad uplands formed by glacial deposits and windblown silt (loess) that overlie bedrock. Terrain is generally level to gently rolling, creating conditions well suited for agriculture, which is the dominant land use throughout the area.

The western portion of the Subsection is characterized by glacial till plains, while the eastern portion becomes increasingly shaped by underlying bedrock as glacial deposits become thinner. Sinkholes and other karst features are present in some areas where limestone bedrock occurs near the surface.

Surface water resources are an important feature of this Subsection. The drainage network is well developed, with streams and rivers flowing toward the Zumbro, Root, Whitewater, and Cannon River watersheds. Several cold-water trout streams occur in the eastern portion of the Subsection, reflecting the area's groundwater-fed stream systems and high-quality aquatic habitats.

Historically, the landscape was dominated by tallgrass prairie and bur oak savanna. Today, most native vegetation has been converted to agricultural uses, with remaining prairie, savanna, oak openings, and barrens occurring as small, scattered remnants. Rural agricultural lands, farmsteads, transportation rights-of-way, and small communities now characterize much of the existing landscape.

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[31] MDNR. 2024. Driftless Odyssey. Available online at: https://files.dnr.state.mn.us/eco/nongame/projects/driftless-odyssey-story.pdf. Accessed June 2026.

[32] MDNR. 2026. Rochester Plateau Subsection. Available online at: https://www.dnr.state.mn.us/ecs/222Lf/index.html. Accessed June 2026.

6.3.1.2 The Blufflands Subsection[33]

As identified in **Table 6.3-1** and shown in **Figure 10**, approximately 15 percent of Segment 1 crosses portions of The Blufflands Subsection, which is part of the Driftless Area of southeastern Minnesota. The Blufflands are characterized by a deeply dissected landscape of steep bluffs, narrow ridges, and deeply incised stream valleys. Elevation changes of 500 to 600 feet are common, particularly along major rivers and tributaries. Thick deposits of loess cover much of the upland landscape, while exposed bedrock and karst features are common throughout the region.

The drainage network is extensive and well developed. Major rivers include the Cannon, Zumbro, Whitewater, Root, and Mississippi Rivers. Numerous cold-water trout streams occur throughout the Subsection and provide important aquatic habitat. Unlike many other regions of Minnesota, natural lakes are largely absent.

Historically, ridge tops and upper slopes supported tallgrass prairie and bur oak savanna, while hardwood forests occupied sheltered valleys and north-facing slopes. Today, agriculture remains the predominant land use on uplands and gentler slopes, while forests are common on steeper terrain and along river corridors. The combination of scenic landscapes, rivers, forests, and trout streams also supports significant recreational use throughout the region.

6.3.2 Segment 2

Segment 2 begins near Marion, Minnesota in Olmsted County and continues south into Mower County before turning east through Fillmore and Houston County. The majority of Segment 2 is located in the Paleozoic Plateau Section of the Eastern Broadleaf Forest Province. The very western portion of Segment 2 overlaps a small portion of the Minnesota and Northeast Iowa Morainal Section.

As shown in **Figure 10**, the north-south portion of Segment 2 crosses the Rochester Plateau Subsection from Marion, Minnesota to the Grand Meadow area, and from approximately the Beaver/York area east to the Eitzen area (see description provided in **Section 6.3.1.1**); this consists of approximately 46 percent of Segment 2. Segment 2 also crosses The Blufflands Subsection from the Eitzen area east to the Mississippi River (see description provided in **Section 6.3.1.2**), consisting of approximately 9 percent of the segment. The proposed Jefferson Ridge Switching Station is also located within The Blufflands Subsection.

The western corner, and approximately 45 percent of Segment 2 from the Grand Meadow area south to Adams and west to the Beaver/York area, crosses the Oak Savanna Subsection, which is described in **Section 6.3.2.1**.

6.3.2.1 Oak Savanna Subsection[34]

The Oak Savanna Subsection is characterized by gently rolling plains with ridges covered by windblown silt (loess) over sandstone, carbonate bedrock, and glacial deposits. Historically, frequent prairie fires spread across the landscape from surrounding grasslands, limiting forest expansion and maintaining extensive oak savanna and oak woodland communities. In the

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[33] MDNR. 2026. The Blufflands Subsection. Available online at: https://www.dnr.state.mn.us/ecs/222Lc/index.html. Accessed June 2026.

[34] MDNR. 2026. Oak Savanna Subsection. Available online at: https://www.dnr.state.mn.us/ecs/222Me/index.html. Accessed June 2026.

southwestern portion of the Subsection, moraine ridges created more rugged terrain that provided protection from fire and supported greater woodland development.

The Subsection contains a generally well-developed drainage network because of its rolling topography and underlying landforms. Lakes are relatively uncommon but occur within moraine complexes along the western edge of the Subsection.

Historically, bur oak savanna was the dominant vegetation community, with areas of tallgrass prairie and maple-basswood forest also occurring across the landscape. Today, most native vegetation has been converted to agricultural use, and farming is the predominant land use. Urban and residential development continues to expand, particularly along the northern boundary of the Subsection.

6.3.3 Q-9 Reroute

The entire Q-9 Proposed Route is located within The Blufflands Subsection, which is described in **Section 6.3.1.2**.

6.4 HUMAN SETTLEMENT

Transmission lines and substations have the potential to affect people, communities, and developed areas during construction and operation. Through careful planning, routing, design, and construction practices, many potential effects can be avoided or minimized.

Potential public health and safety concerns during construction include risks associated with construction equipment, work at elevated heights, traffic interactions, and electrical hazards. During operation, transmission facilities may create concerns related to EMF, induced voltage, noise, and electrical safety. Transmission infrastructure also has the potential to affect nearby residences, businesses, agricultural operations, and communities through changes to visual character, land use, property access, transportation systems, and local economic conditions. In some cases, transmission facilities may also affect electronic communications, public services, and compatibility with local land use plans and zoning regulations.

Segment 1 consists of approximately 39 miles of single-circuit 765 kV transmission line extending between the existing North Rochester Substation and a point near Marion, Minnesota. The segment is located within Goodhue, Wabasha, and Olmsted counties and does not cross any incorporated municipalities. Communities located near Segment 1 include Pine Island (approximately 1.3 miles south), Mazeppa (1.2 miles north), Hammond (1.5 miles away), Eyota (0.6 miles east), and Rochester (1.2 miles northwest).[35] Outside of these communities, development is limited and consists primarily of dispersed rural residences, farmsteads, and agricultural operations.

Segment 2 consists of approximately 105 miles of 765 kV/161 kV double-circuit transmission line extending from the Marion area to the Minnesota–Wisconsin state line. The segment is located within Olmsted, Mower, Fillmore, and Houston counties. The route avoids incorporated municipalities except where it shares a boundary with the City of Harmony in Fillmore County. Communities located near Segment 2 include Rochester (approximately 1.2 miles northwest),

[35] MnDOT. 2026. City, Township, and Unorganized Territory in Minnesota. Available online at: https://gis.data.mn.gov/. Accessed July 2026.

Stewartville (0.1 mile west), Racine (0.3 mile east), Adams (1.5 miles west), Taopi (0.2 mile north), Canton (0.8 mile south), and Spring Grove (less than 0.1 mile north).[36] Similar to Segment 1, development outside incorporated communities is generally characterized by dispersed rural residences, farmsteads, and agricultural land uses.

Dairyland's Q-9 161 kV 1.2-mile relocated transmission line right-of-way requires a 100-foot-wide right-of-way and is co-located with local roads for approximately 0.2 mile. The Q-9 Proposed Route is approximately 1.2 miles northeast of the unincorporated township of Jefferson in Houston County. It is characterized by a few dispersed rural residences and agricultural land uses.

The following sections describe existing human settlement conditions within the Proposed Routes and evaluate potential Project impacts on residences, communities, public services, transportation systems, land use, and other human environment resources. These sections also identify measures that would be implemented to avoid, minimize, or mitigate potential Project effects where appropriate.

6.4.1 Cultural Values

This section describes the cultural values present within the Project area and evaluates how the Project may align with or affect those values. The discussion characterizes the area's history, ethnic heritage, land uses, community identity, and the work, recreational, and other activities that contribute to local character. The section identifies potential consistencies and conflicts between the Project and the cultural values of affected communities and evaluates how the Project may influence community character and sense of place. The section also discusses measures incorporated into Project planning, siting, and design to avoid, minimize, or mitigate potential conflicts with cultural values.

6.4.1.1 Existing Conditions

The Proposed Routes presented in this Application originate at Xcel Energy's North Rochester Substation in Pine Island Township, Goodhue County, and generally extend south and east through Wabasha, Olmsted, Mower, Fillmore, and Houston Counties before terminating at the Mississippi River along the Minnesota-Wisconsin state line. The six-county region encompasses a diverse cultural landscape characterized by rural agricultural communities, small towns, scenic river valleys, recreational resources, historic transportation corridors, and lands that have long been important to Indigenous peoples.

The Project is located within a broader cultural landscape that has been occupied and utilized by Indigenous peoples for thousands of years and continues to hold cultural significance for Tribal Nations today. Archaeological and historical information indicates that southeastern Minnesota has supported human occupation from the Paleoindian, Archaic, Woodland, and Late Precontact periods through European contact and settlement. Rivers, streams, blufflands, forests, prairie uplands, and associated natural resources within the Project area provided opportunities for hunting, fishing, gathering, travel, trade, and settlement. The Mississippi River and its tributaries, including the Root, Zumbro, and Whitewater Rivers, served as important transportation, subsistence, and cultural corridors that connected communities across the region. These landscapes remain culturally significant to Tribal Nations whose ancestors lived, traveled, hunted,

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[36] MnDOT. 2026. City, Township, and Unorganized Territory in Minnesota. Available online at: https://gis.data.mn.gov/. Accessed July 2026.

fished, gathered resources, traded, and maintained cultural connections throughout southeastern Minnesota and the Upper Mississippi River Valley.

The Project area contains numerous landscapes and natural features that are associated with thousands of years of Indigenous use and occupation. Archaeological investigations conducted throughout southeastern Minnesota have documented burial mounds, habitation sites, lithic scatters, quarries, caves, and other cultural resources that demonstrate the long-standing cultural importance of the region. At the time of European contact, the area was occupied and used by the Dakota and other Indigenous peoples and later by additional Tribal Nations with historical ties to Minnesota. Today, the Mississippi River corridor and its tributaries continue to be recognized as culturally significant landscapes by Tribal Nations. Additional information regarding cultural resources, Tribal history, and Tribal coordination is provided in **Section 6.7** and **Appendix J**.

The region's history and cultural heritage also contribute to community identity. The Mississippi River and its tributaries supported early exploration, trade, settlement, and transportation, resulting in the development of historic river communities and agricultural settlements throughout southeastern Minnesota. Communities near the Proposed Routes include historic river towns, agricultural service centers, county seats, and small rural communities that maintain local traditions through county fairs, festivals, school activities, farmers markets, civic events, and community organizations.[37] These historical and cultural traditions contribute to residents' sense of place and community identity.

Agriculture is one of the defining cultural and economic values of the counties crossed by the Project. Corn, soybeans, forage crops, and livestock production are common throughout the region, and many communities remain closely tied to agricultural businesses, services, and supporting industries. Productive farmland, family farming operations, drainage systems, rural residences, and agricultural infrastructure contribute to the cultural identity of southeastern Minnesota. Protection of these resources and continuation of agricultural traditions are important values for many residents and local communities.[38,39]

The Proposed Routes also cross portions of southeast Minnesota's Bluff Country and the Mississippi River region, where natural and scenic resources contribute substantially to local identity and quality of life. Scenic bluffs, river valleys, trout streams, parks, trails, and historic downtowns are important components of the region's character. The Root,[40] Zumbro, Whitewater, and Mississippi River corridors[41] support outdoor recreation activities such as fishing, boating, hunting, hiking, bicycling, snowmobiling, bird watching, camping, and scenic driving. These resources are valued by residents and visitors and support local tourism and recreation-based economies.

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37 Minnesota Department of Employment and Economic Development. 2026. Minnesota County Profiles. Available online at: https://mn.gov/deed/data/data-tools/county-profiles/. Accessed June 2026.

38 U.S. Department of Agriculture, National Agriculture Statistics Service. 2022. Census of Agriculture. Available online at: https://www.nass.usda.gov/AgCensus/. Accessed June 2026.

39 U.S. Department of Agriculture, National Agriculture Statistics Service. 2026. Minnesota Statistics. Available online at: https://www.nass.usda.gov/Statistics_by_State/Minnesota/index.php. Accessed June 2026.

40 Explore Minnesota. 2026. Root River State Trail. Available online at: https://www.exploreminnesota.com/profile/root-river-state-trail/1832. Accessed June 2026.

41 MDNR. 2026. Minnesota State Water Trails. Available online at: https://www.dnr.state.mn.us/watertrails/index.html. Accessed June 2026.

The Project area includes both the Rochester metropolitan area and predominantly rural communities with distinct employment patterns. Rochester serves as a regional employment center, with major employers in health care, education, technology, manufacturing, retail trade, and other commercial sectors. In the more rural portions of the Project area, employment is more closely tied to agriculture, agribusiness, manufacturing, public services, and locally oriented businesses. Smaller communities provide essential services and employment while contributing to the region's rural character and agricultural heritage. Together, the area's Indigenous cultural landscapes, historic settlements, agricultural traditions, recreational resources, and modern communities contribute to the cultural values and identity of the counties crossed by the Proposed Routes.

6.4.1.2 Potential Impacts

The ROI for cultural values is the counties crossed by the Project. Many of the cultural values identified within the counties crossed by the Proposed Routes relate to agriculture, rural character, outdoor recreation, community identity, and stewardship of natural and cultural resources. These values contribute to the character of southeastern Minnesota and are reflected in local land uses, community traditions, recreational opportunities, and the continued importance of farming and natural resource-based activities. Local comprehensive plans adopted by counties crossed by the Project are discussed in **Section 6.4.2**.

Construction of the Project could temporarily affect these values through increased traffic, construction noise, temporary access restrictions, crop disturbance, and temporary disruptions near agricultural operations, recreational areas, community gathering places, or local events. These effects would primarily occur during construction and would generally be localized and temporary. The extent of these effects may differ between Segments 1 and 2 based on existing land use and infrastructure. Segment 2 includes greater opportunities for co-location with existing linear infrastructure, which may reduce the extent to which the Project introduces a new utility right-of-way or changes the existing landscape setting. In Segment 1, where portions of the Project would establish a new transmission right-of-way, effects on rural character, agricultural landscapes, scenic settings, or other locally valued features may be more noticeable. However, the degree of effect would vary by location and by the specific cultural values associated with that location.

Operation of the Project is not expected to substantially alter the cultural values of the counties crossed by the Proposed Routes. The Project Area is expected to remain predominantly rural and agricultural outside of existing communities, and the Project would not change the underlying agricultural, recreational, historic, or community characteristics that help define the region. However, some residents and visitors may perceive changes to rural landscapes, scenic views, or community character where transmission facilities are visible. These effects may be less pronounced in portions of Segment 2 where the Project would be co-located with existing linear infrastructure and more noticeable in portions of Segment 1 where new transmission facilities would be introduced into areas without an existing transmission right-of-way.

Cultural values are also personal and may vary among individuals and communities based on their connections to a particular place, landscape, activity, or resource. As a result, a Project-level assessment may not fully reflect the importance of a particular location to an individual. Although impacts to cultural values are anticipated to be minor overall, some individuals may experience more noticeable localized effects where the Project affects a landscape, view, property, recreational setting, or other resource that contributes to their personal sense of place or community identity.

Over the long term, the Project would support regional electric reliability and help meet future energy needs for homes, farms, businesses, and communities. The Proposed Routes were developed to avoid incorporated communities where practicable and to reduce potential conflicts with existing land uses and community resources. The Applicants will continue to coordinate with landowners, Tribal Nations, local governments, and state and federal agencies throughout Project development and permitting to identify opportunities to avoid or minimize potential impacts.

6.4.1.3 Mitigation Measures

Potential mitigation measures include coordinating construction schedules with landowners, local governments, and event organizers, where practicable, to reduce disruptions to agricultural activities, recreation, community events, and local travel. Access to residences, farms, businesses, recreational areas, and community facilities would be maintained during construction to the extent practicable. Agricultural protection measures would be implemented to minimize impacts on soils, crops, drainage systems, and ongoing farm operations, as further described in **Section 6.6.1**.

Areas temporarily disturbed during construction would be restored following completion of Project activities. The Applicants would also continue coordination with Tribal Nations, government agencies, local governments, landowners, and other stakeholders to identify opportunities to avoid or minimize impacts on areas of cultural, historic, or Tribal significance.

Additional mitigation measures related to agriculture, recreation, visual resources, cultural resources, and Tribal coordination are discussed in the applicable resource sections of this Application.

6.4.1.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures that address resources that contribute to community character and cultural values. These include measures related to agricultural land, public roads, restoration of disturbed areas, cultural and historic resources, recreation, and coordination with landowners, Tribal Nations, local governments, and other stakeholders. Example route permit conditions have been added to these corresponding resource sections based upon the Sample HVTL Permit recently filed by EIP Staff in Docket No. CN-25-117 (hereinafter, Sample Route Permit).[42] Implementation of these measures would help avoid, minimize, or mitigate potential indirect effects on cultural values during Project construction and operation by reducing disruptions to agricultural activities, recreation, community resources, and other features that contribute to local identity and quality of life.

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[42] The Sample Route Permit referenced throughout this Route Permit Application was filed by EIP staff as Appendix C to the Environmental Report *In the Matter of the Application for a Certificate of Need for the PowerOn Midwest 765 kV and 345 kV High-Voltage Transmission Line Project,* PUC Docket Number: E002, ET2, ET6675/CN-25-117 (October 20, 2026) (eDocket ID 202610-237776-07). Text from the Sample Route Permit is meant to be illustrative of typical standard permit conditions included in HVTL Route Permits issued by the Commission, but may not be consistent with any route permit issued by the Commission for this Project. Ultimately, the conditions within the Commission's route permit specific to this Project will be developed through the record in this proceeding.

6.4.2 Land Use and Zoning

6.4.2.1 Land Use

Existing Conditions

Land use and land cover within the Proposed Routes were characterized using the U.S. Geological Survey (USGS) National Land Cover Database (NLCD).[43] The analysis indicates that the Project is located primarily within a rural agricultural landscape dominated by cultivated cropland. Smaller portions of the routes include pasture and hay land, deciduous forest, wetlands, open water, and dispersed rural development. Developed land cover is generally limited to rural residences, farmsteads, transportation rights-of-way, and small communities, while medium- and high-intensity development comprises only a small percentage of the Project area. **Table 6.4.2-1** presents land use / land cover occurring within Segments 1, 2, and Q-9 Proposed Routes, which are also shown in **Figure 11**.

[43] Multi-Resolution Land Characteristics Consortium. 2021. National Land Cover Database Class Legend and Description. Available online at: https://www.mrlc.gov/data/legends/national-land-cover-database-class-legend-and-description. Accessed June 2026.

TABLE 6.4.2-1

Land Use / Land Cover Acres and Percent of Segment Crossed by Proposed Routes

Land Use / Land Cover Type	Proposed Routes							
	Segment 1 (acres)	Segment 1 (percent)	Segment 2 (acres)	Segment 2 (percent)	Q-9 (acres)	Q-9 (percent)	Total Project (acres)	Total Project (percent)
Agriculture Land Use								
Cultivated Cropland	9,898.3	69.7%	37,598.7	78.6%	200.7	28.7%	**47,697.7**	**76.0%**
Pasture/Hay	1,523.9	10.7%	3,572.0	7.5%	148.3	21.2%	**5,244.1**	**8.4%**
Forested								
Deciduous Forest	1,641.0	11.6%	3,257.6	6.8%	300.3	42.9%	**5,198.9**	**8.3%**
Evergreen Forest	10.7	0.1%	13.6	<0.1%	1.6	0.2%	**25.8**	**<0.1%**
Mixed Forest	12.3	0.1%	40.8	0.1%	5.9	0.8%	**59.0**	**0.1%**
Developed								
Developed, High Intensity	2.9	0.0%	4.2	<0.1%	-	**-**	**7.1**	**<0.1%**
Developed, Medium Intensity	107.2	0.8%	145.7	0.3%	-	**-**	**252.9**	**0.4%**
Developed, Low Intensity	458.5	3.2%	1,464.2	3.1%	13.1	1.9%	**1,935.8**	**3.1%**
Developed, Open Space	330.4	2.3%	990.5	2.1%	29.0	4.1%	**1,349.9**	**2.2%**
Herbaceous								
Barren Land	46.0	0.3%	33.5	0.1%	-	**-**	**79.6**	**0.1%**
Grassland/Herbaceous	10.5	0.1%	19.0	<0.1%	0.9	0.1%	**30.4**	**<0.1%**
Wetlands								
Emergent Herbaceous Wetlands	63.2	0.4%	420.5	0.9%	-	**-**	**483.7**	**0.8%**
Woody Wetlands	76.6	0.5%	182.0	0.4%	-	**-**	**258.6**	**0.4%**
Shrubland	0.6	0.0%	34.1	0.1%	-	**-**	**34.7**	**<0.1%**
Open Water	20.9	0.1%	82.0	0.2%	-	**-**	**102.8**	**0.2%**
TOTAL	**14,203.0**		**47,858.3**		**699.8**		**62,760.9**	

Source: Multi-Resolution Land Characteristics Consortium. 2021. National Land Cover Database Class Legend and Description. Available online at: https://www.mrlc.gov/data/legends/national-land-cover-database-class-legend-and-description**.** Accessed June 2026.

Note: The total acres may be off by up to 0.1 acre due to rounding

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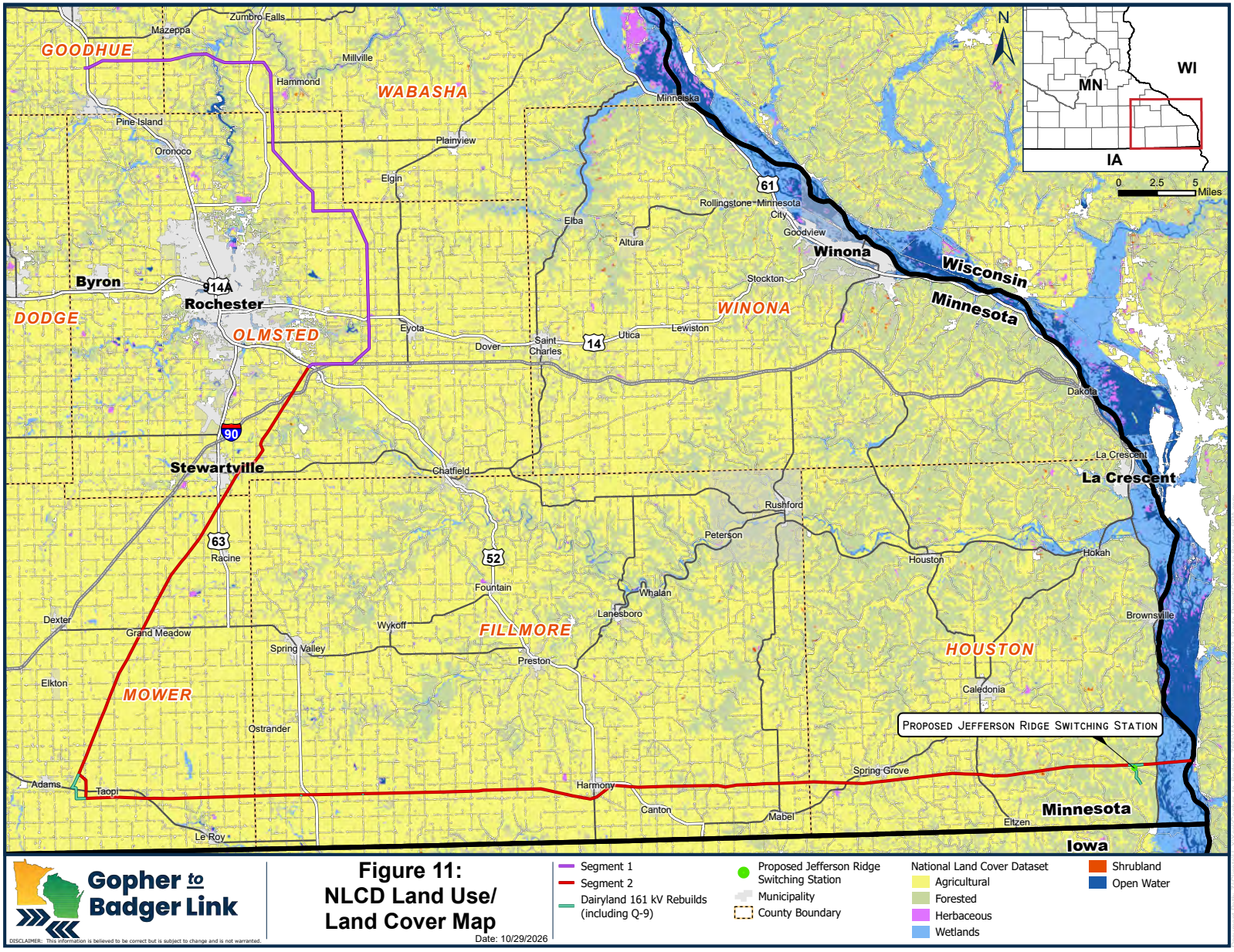
GOODHUE
WABASHA
DODGE
OLMSTED
WINONA
FILLMORE
HOUSTON
MOWER
Zumbro Falls
Mazeppa
Millville
Hammond
Pine Island
Oronoco
Plainview
Elgin
Minneiska
Rollingstone
Minnesota City
Elba
Altura
Goodview
Winona
Stockton
Wisconsin
Minnesota
Byron
Rochester
Eyota
Dover
Saint Charles
Utica
Lewiston
Dakota
La Crescent
Stewartville
Chatfield
Rushford
Peterson
Houston
Hokah
Racine
Fountain
Whalan
Lanesboro
Brownsville
Dexter
Grand Meadow
Wykoff
Spring Valley
Preston
Elkton
Caledonia
Ostrander
Proposed Jefferson Ridge Switching Station
Spring Grove
Adams
Taopi
Harmony
Canton
Mabel
Elzen
Le Roy
Minnesota
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IA
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61
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Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 11:
NLCD Land Use/
Land Cover Map
Date: 10/29/2026
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Proposed Jefferson Ridge Switching Station
Municipality
County Boundary
National Land Cover Dataset
Agricultural
Forested
Herbaceous
Wetlands
Shrubland
Open Water

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Agriculture is the dominant land use (83.4 percent) throughout the Project area and reflects the importance of agricultural production within southeastern Minnesota. Forested land cover (9.3 percent) is most common along stream corridors, valley slopes, and bluffland landscapes, particularly within The Blufflands region. Wetlands, open water, and other natural resource areas (less than 2 percent) occur in localized portions of the routes but represent a relatively small component of overall land cover. Developed areas account for 5.6 percent of the area crossed by the Proposed rights-of-way.

While the Proposed Routes share similar land use characteristics, portions of the Project area contain existing utility rights-of-way, substations, wind energy facilities, solar energy facilities, transportation rights-of-way, and other infrastructure (see **Section 6.4.4**). Existing utility infrastructure is particularly prevalent along portions of Segment 2, where the route is co-located with Dairyland's existing Q-4/Q-8/Q-7 161 kV transmission rights-of-way for approximately 93 percent of its length. The proposed Jefferson Ridge Switching Station is located entirely within cultivated cropland, while the Q-9 Proposed Route traverses agricultural and woodland areas characteristic of The Blufflands region.

Overall, the Project area is predominantly agricultural in character and reflects the agricultural and rural land use patterns identified in local zoning ordinances, comprehensive plans, and other planning documents throughout southeastern Minnesota, as further discussed in **Section 6.4.2.2**.

Potential Impacts

The ROI for land use and land cover consists of the Proposed Rights-of-Way and associated permanent facilities, including transmission structures, and the Jefferson Ridge Switching Station. Because the Proposed Routes primarily traverse agricultural landscapes, potential impacts would occur predominantly within agricultural land uses, with smaller impacts to forested areas, wetlands, rural residential properties, and other compatible land uses.

Table 6.4.2-2 presents land use / land cover impacts associated with Segments 1, 2, and Q-9 Proposed Rights-of-Way, which are also shown in **Figure 11**. Agriculture is the dominant land use (84.3 percent) that would be impacted by the Proposed Rights-of-Way. Forested land cover (9.3 percent) would also be impacted along stream corridors, valley slopes, and bluffland landscapes. Wetlands, open water, and other natural resource areas (2.2 percent) occur in localized portions of the routes but represent a relatively small component of overall land cover. Developed areas account for 4.2 percent of the area crossed by the Proposed Rights-of-Way.

TABLE 6.4.2-2

Land Use / Land Cover Acres and Percent of Segment Crossed by Proposed Rights-of-Way

	Proposed Rights-of-Way							
Land Use / Land Cover Type	Segment 1 (acres)	Segment 1 (percent)	Segment 2 (acres)	Segment 2 (percent)	Q-9 (acres)	Q-9 (percent)	Total Project (acres)	Total Project (percent)
Agriculture Land Use								
Cultivated Cropland	877.3	74.2%	1,967.6	74.2%	9.9	56.9%	**2,854.8**	**74.2%**
Pasture/Hay	114.2	9.7%	276.1	10.4%	2.7	15.5%	**393.0**	**10.2%**
Forested								
Deciduous Forest	117.0	9.9%	234.1	8.9%	1.6	9.2%	**352.7**	**9.2%**
Evergreen Forest	0.2	0.0%	1.7	0.1%	-	**-**	**1.9**	**<0.1%**
Mixed Forest	0.8	0.1%	1.5	0.1%	-	**-**	**2.3**	**<0.1%**
Developed								
Developed, High Intensity	-	-	-	-	-	**-**	**-**	**0%**
Developed, Medium Intensity	1.8	0.2%	1.0	0.0%	-	**-**	**2.8**	**<0.1%**
Developed, Low Intensity	29.8	2.5%	51.3	1.9%	0.1	0.6%	**81.2**	**2.1%**
Developed, Open Space	28.5	2.4%	44.8	1.7%	3.1	17.8%	**76.4**	**2.0%**
Herbaceous								
Barren Land	2.3	0.2%	1.7	0.1%	-	**-**	**4.0**	**0.1%**
Grassland/Herbaceous	0.1	0.0%	1.3	0.0%	-	**-**	**1.4**	**<0.1%**
Wetlands								
Emergent Herbaceous Wetlands	4.1	0.3%	49.0	1.9%	-	**-**	**53.1**	**1.4%**
Woody Wetlands	4.6	0.4%	3.4	0.1%	-	**-**	**8.0**	**0.2%**
Shrubland	-	-	3.5	0.1%	-	**-**	**3.5**	**<0.1%**
Open Water	1.0	0.1%	13.4	0.5%	-	**-**	**14.4**	**0.4%**
TOTAL	**1,181.7**		**2,650.4**		**17.4**		**3,849.5**	

Source: Multi-Resolution Land Characteristics Consortium. 2021. National Land Cover Database Class Legend and Description. Available online at: https://www.mrlc.gov/data/legends/national-land-cover-database-class-legend-and-description. Accessed June 2026.

Note: The total acres may be off by up to 0.1 acre due to rounding

Construction within forested areas would require clearing trees and other woody vegetation within portions of the Proposed Rights-of-Way and at structure locations, access roads, and temporary workspaces. **Table 6.4.2-2** estimates approximately 356.9 acres of forested land use would be cleared by the Project based on NLCD data. However, the Applicants also delineated forested land cover using 2025 aerial photographs[44] to obtain a more accurate estimate. Based on delineated data, the Segment 1 Proposed Right-of-Way would require 167.8 acres of forested land cover clearing, Segment 2 Proposed Right-of-Way would require 253.6 acres of forested land cover clearing, and the Q-9 Proposed Right-of-Way would require 1.6 acres of forested land cover clearing, for a total of 423.0 acres.

Construction activities may also temporarily disturb understory vegetation and soils through equipment travel, grading, and material handling. Following construction, temporarily disturbed areas outside the maintained transmission corridor would be restored as appropriate and allowed to revegetate. Within the maintained Proposed Rights-of-Way, however, trees and other tall-growing woody vegetation that could interfere with the safe and reliable operation of the transmission line would generally not be allowed to reestablish. As a result, portions of existing forested land cover within the Proposed Rights-of-Way would be converted over the long term to lower-growing vegetation, such as grasses, forbs, shrubs, and compatible low-growing woody species. Although these areas would remain vegetated and may continue to provide natural-resource functions, they would no longer be classified or managed as forested land cover. Additional discussion of vegetation clearing and effects to forest resources is provided in **Sections 6.6.2** and **6.8.8**.

Construction activities may temporarily affect existing land uses through crop disturbance, temporary access restrictions, soil compaction, drainage impacts, vegetation clearing, and interference with normal farming operations. Temporary effects may also occur adjacent to transportation facilities, recreation areas, residences, and other developed land uses. These impacts would generally be localized and temporary.

Following construction, agricultural production would generally remain compatible with operation of the transmission facilities because cultivation, grazing, and many other agricultural activities can continue beneath transmission conductors and around transmission structures. Permanent impacts would primarily occur where transmission structures, foundations, and the Jefferson Ridge Switching Station occupy land that would otherwise be available for agricultural production. Depending on structure type and foundation design, individual transmission structure footprints are anticipated to range from approximately 45 feet by 45 feet (0.05 acre) to 60 feet by 60 feet (0.08 acre). Although these areas represent a relatively small portion of the overall agricultural landscape crossed by the Project, they would result in a permanent loss of agricultural productivity within the structure footprint. Further discussion regarding agricultural land use impacts is provided in **Section 6.6.1.2**.

Although these impacts are generally similar throughout the Project area, some facilities would result in localized differences. Portions of the Project would occur adjacent to or within existing utility rights-of-way, while other portions would establish new utility easements within predominantly agricultural landscapes. The Jefferson Ridge Switching Station would permanently convert approximately 3.4 acres of cultivated cropland to utility infrastructure. The Q-9 Proposed

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[44] Minnesota Geospatial Information Office. 2025. Composite Image Service for Minnesota [Web map service]. Available online at: https://mn.gov/mngeo/gis-data-and-maps/web-map-services/composite-image-service/. Accessed October 2026.

Route would result in a relatively small amount of permanent land conversion because of its shorter length and smaller facility footprint.

Overall, the Project would result in temporary construction-related disruptions to agricultural and other existing land uses, while long-term impacts would primarily consist of utility easements, vegetation management requirements, and localized conversion of land cover associated with permanent Project facilities. As further discussed in **Section 6.6.1**, agricultural lands uses would remain available for continued agricultural production following construction.

Mitigation Measures

The Applicants have incorporated routing, design, construction, and restoration measures intended to minimize impacts on existing land uses and maintain compatibility with surrounding agricultural and rural landscapes.

A primary mitigation measure is the use of existing infrastructure rights-of-way where practicable. Portions of the Proposed Routes are co-located with existing transmission rights-of-way, road rights-of-way, property boundaries, and agricultural field edges to reduce fragmentation of agricultural lands, minimize conflicts with existing land uses, and limit the amount of land affected by new utility infrastructure.

Construction activities would be conducted in accordance with the AIMP, VMP, and applicable permit conditions. Measures include maintaining access to agricultural properties and residences, coordinating with landowners, segregating and replacing topsoil where appropriate, repairing drainage systems, alleviating soil compaction, restoring disturbed agricultural lands, minimizing unnecessary vegetation clearing, and revegetating disturbed areas following construction.

Temporary workspaces, staging areas, access routes, and other construction disturbance areas would be restored following construction. Agricultural areas would generally be restored to pre-construction conditions to the extent practicable as further discussed in **Section 6.6.1**, while non-agricultural areas would be revegetated with appropriate vegetation consistent with surrounding land uses. Existing vegetation outside of required safety clearances would be retained where feasible, and long-term vegetation management would focus on maintaining compatible low-growing vegetation within the right-of-way.

The Applicants will continue coordination with landowners, local governments, Tribal Nations, and regulatory agencies during final design and permitting to identify opportunities to avoid or minimize land use conflicts. Through implementation of these measures, most affected agricultural lands would remain available for continued production following construction, and long-term impacts would primarily be limited to transmission structures, utility easements, maintained rights-of-way, and other permanent Project facilities.

Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures that address land use / land cover, as well as agricultural land, soil and vegetation management, restoration, aesthetics, recreation, and coordination with landowners and local governments, which help avoid and minimize effects on land use / land cover. An example route permit condition associated with land use includes:

- Section 1.1 of the Sample Route Permit is a standard condition that states, in accordance with Minn. Stat. § 216I.18, subd. 1, after the Commission approves a route, local zoning, building, and land use regulations are preempted.

Therefore, no mitigation is proposed; however, the Commission can and will consider the impacts to zoning and land use when considering route permit applications.

6.4.2.2 Zoning

Existing Conditions

The Proposed Routes cross portions of Goodhue, Wabasha, Olmsted, Mower, Fillmore, and Houston Counties and traverse lands subject to county and township zoning regulations. Review of publicly available zoning maps, ordinances, and planning documents indicates that the Project is located predominantly within agricultural zoning districts intended to preserve productive farmland, support agricultural operations, maintain rural character, and limit incompatible development.

Tables 6.4.2-3 and **6.4.2-4** and **Figure 12** identify the zoning districts crossed by the Proposed Routes based on publicly available resources. Common zoning classifications crossed by the Project include Agricultural District (AG), Agricultural Protection District, A-1, A-2, and A-3. The proposed Jefferson Ridge Switching Station is located entirely within land zoned Agricultural Protection District in Houston County and is surrounded primarily by agricultural land uses and existing utility infrastructure.

TABLE 6.4.2-3

Zoning Information along Segment 1

County/Municipality	Zoning Districts or Overlay Districts Crossed	Links to Source Information
Goodhue County	A1	Goodhue County Comprehensive Land Use Plan[a] Goodhue County Zoning Ordinance[b] Goodhue County Zoning Map[c]
Wabasha County	A1 A3	Comprehensive Land Use Plan for Wabasha County[d] Wabasha County Comprehensive Land Use Map[e] Wabasha County Zoning Map[f] Wabasha County Zoning Ordinance[g]
Olmsted County	A1 A2 A3 A/RC AER I (Right-of-Way/Roadway)	Olmsted County Zoning Ordinance[h] Olmsted County Code of Ordinances Chapter 3700[i] Olmsted County General Land Use Plan[j] Olmsted County Zoning Map[k]
Eyota Township	A2	Eyota Township Work within the Right-of-Way Policy[l]
Haverhill Township	A1	Haverhill Township Orderly Annexation Agreement with Rochester[m] Haverhill Zoning Ordinance[n]
Viola Township	A1	Viola Township Zoning Ordinance[o]

Sources:

[a] Goodhue County Comprehensive Land Use Plan. 2016. Available online at: https://goodhuecountymn.gov/files/county_ordinances/comprehensive_plan.pdf. Accessed June 2026.

[b] Goodhue County Zoning Ordinance. 2024. Available online at: https://goodhuecountymn.gov/files/county_ordinances/zoning_ordinance.pdf. Accessed June 2026.

TABLE 6.4.2-3

Zoning Information along Segment 1

County/Municipality	Zoning Districts or Overlay Districts Crossed	Links to Source Information
[c]		Goodhue County Zoning Map. 2026. Available online at: https://experience.arcgis.com/experience/a22bf3b838b743aeb718a48b520dd94e/page/Goodhue-County-Zoning/#data_s=id%3AdataSource_7-ParcelsAGOL_6121-0%3A9066834**.** Accessed June 2026.
[d]		Comprehensive Land Use Plan for Wabasha County. 1998. Available online at: https://cms9files1.revize.com/wabasha/planning%20and%20zoning/Zoning%20Maps%20and%20Resources/Land%20Use%20Plan.pdf?t=201909031052310&t=201909031052310**.** Accessed June 2026.
[e]		Wabasha County Comprehensive Plan Map. 2026. Available online at: https://cms9files1.revize.com/wabasha/planning%20and%20zoning/Zoning%20Maps%20and%20Resources/Wabasha%20County%20Comprehensive%20Plan%20Map.jpg?t=201909031052310&t=201909031052310**.** Accessed June 2026.
[f]		Wabasha County Zoning Map. 2026. Available online at: https://cms9files1.revize.com/wabasha/planning%20and%20zoning/Zoning%20Maps%20and%20Resources/Wabasha%20County%20Zoning%20map.pdf. Accessed June 2026.
[g]		Wabasha County Zoning Ordinance. 2004. Available online at: https://cms9.revize.com/revize/wabasha/departments/planning_and_zoning/permit_applications_and_forms.php#outer-121sub-147. Accessed June 2026.
[h]		Olmsted County Zoning Ordinance. 2024. Available online at: https://www.olmstedcounty.gov/sites/default/files/2024-05/Chapter%201400%20Zoning%20Ordinance_2023_0.pdf**.** Accessed June 2026.
[i]		Olmsted County Code of Ordinances Chapter 3700. 2010. Available online at: https://www.olmstedcounty.gov/sites/default/files/2020-10/Chapter%203700%20Wetland%20Conservation%20Ordinance.pdf**.** Accessed June 2026.
[j]		Olmsted County General Land Use Plan. 2026. Available online at: https://www.olmstedcounty.gov/sites/default/files/2023-01/GLUP2045Final.pdf**.** Accessed June 2026.
[k]		Olmsted County Zoning Map. 2026. Available online at: https://gweb01.co.olmsted.mn.us/WebApps/OlmstedCountyGISMap/**.** Accessed June 2026.
[l]		Eyota Township Work within the Right-of-Way. 2021. Available online at: https://www.eyotatownship.com/uploads/7/1/4/9/71492037/eyota_township_work_within_the_row_approved_10_2021.pdf. Accessed June 2026.
[m]		Haverhill Township Orderly Annexation Agreement with Rochester. 2005. Available online at: https://haverhilltwp.org/wp-content/uploads/2026/02/Haverhill-Annexation-Agreement-With-Rochester.pdf**.** Accessed June 2026.
[n]		Haverhill Township Zoning Ordinance. 2015. Available online at: https://tcpamn.org/wp-content/uploads/2024/01/Haverhill_2015_a.pdf**.** Accessed June 2026.
[0]		Viola Township Zoning Ordinance. 2018. Available online at: https://tcpamn.org/wp-content/uploads/2024/01/Viola_2018_a.pdf**.** Accessed June 2026.

TABLE 6.4.2-4

Zoning Information Along Segment 2 and Q-9

County/Municipality	Zoning Districts or Overlay Districts Crossed	Links to Source Information
Olmsted County	A1 A2 RC	Olmsted County Zoning Ordinance[a] Olmsted County General Land Use Plan[b] Olmsted County Zoning Map[c]
High Forest Township	A1	High Forest Township Zoning Ordinance[d]
Pleasant Grove Township	A1 A2	Pleasant Grove Township Zoning Ordinance[e]
City of Canton	A-1 C1 OR C-2 I-1 R-1	City of Canton Zoning Ordinance 201[o]
City of Harmony	AG	City of Harmony Title XV Zoning[p]

TABLE 6.4.2-4

Zoning Information Along Segment 2 and Q-9

County/Municipality	Zoning Districts or Overlay Districts Crossed	Links to Source Information
Mower County	AG BUS IN R1	Mower County Zoning Ordinance[f] Mower County Comprehensive Land Use Plan[g] Mower County Zoning Map[h]
Fillmore County	A-1 M I-1	Fillmore County Zoning Ordinance[i] Fillmore County Comprehensive Land Use Plan[j] Fillmore County Zoning Map[k]
Houston County	Agriculture / Agriculture Protection District	Houston County Zoning Ordinance[l] Houston County Comprehensive Land Use Plan[m] Houston County Zoning Map[n]

Sources:

[a] Olmsted County Zoning Ordinance. 2024. Available online at: https://www.olmstedcounty.gov/sites/default/files/2024-05/Chapter%201400%20Zoning%20Ordinance_2023_0.pdf. Accessed June 2026.

[b] Olmsted County General Land Use Plan. 2026. Available online at: https://www.olmstedcounty.gov/sites/default/files/2023-01/GLUP2045Final.pdf**.** Accessed June 2026.

[c] Olmsted County Zoning Map. 2026. Available online at: https://gweb01.co.olmsted.mn.us/WebApps/OlmstedCountyGISMap/. Accessed June 2026.

[d] High Forest Township Zoning Ordinance. 2016. Available online at: https://tcpamn.org/wp-content/uploads/2024/01/High_Forest_2016_a.pdf**.** Accessed June 2026.

[e] Pleasant Grove Township Zoning Ordinance. 2016. Available online at**:** https://tcpamn.org/wp-content/uploads/2024/01/Pleasant_Grove_2016_b.pdf. Accessed June 2026.

[f] Mower County Zoning Ordinance. 2003. Available online at: https://www.co.mower.mn.us/DocumentCenter/View/1168/Mower-County-Zoning-Ordinance-PDF**.** Accessed June 2026.

[g] Mower County Comprehensive Plan 2045. 2026. Available online at: https://www.co.mower.mn.us/DocumentCenter/View/5097/Mower-County-Comprehensive-Land-Use-Plan-adopted-3122026**.** Accessed June 2026.

[h] Mower County Zoning Map. 2026. Available online at: https://mowercountymn.maps.arcgis.com/apps/mapviewer/index.html**.** Accessed June 2026.

[i] Fillmore County Zoning Ordinance. 2024. Available online at: https://cms9files.revize.com/fillmoremn/2024%20Zoning%20Ordinance.pdf**.** Accessed June 2026.

[j] Fillmore County Comprehensive Plan. 2006. Available online at: https://cms9files.revize.com/fillmoremn/Economic%20Development/Comprehensive%20Land%20Use%20Plan.pdf?t=202005261051450&t=202005261051450**. A**ccessed June 2026.

[k] Fillmore County Zoning Map. 2026. Available online at: https://beacon.schneidercorp.com/Application.aspx?AppID=1066&LayerID=25444**.** Accessed June 2026.

[l] Houston County Zoning Ordinance. 2018. Available online at: https://www.hocomn.gov/departments/zoning_planning/ordinances.php#doc_center_0_panel_0**.** Accessed June 2026.

[m] Houston County 2040 Comprehensive Land Use Plan Update. 2023. Available online at: https://www.hocomn.gov/Documents/Departments/Zoning%20And%20Planning/Plans%20and%20Grants/Houston%20County%20Comp%20Plan%20FINAL.pdf?t=202605141510240**.** Accessed June 2026.

[n] Houston County Zoning Map. 2026. Available online at: https://beacon.schneidercorp.com/Application.aspx?AppID=137&LayerID=1649&PageTypeID=1&PageID=936#**.** Accessed June 2026.

[o] City of Canton Zoning Ordinance 201. 2012. Available online at: https://cantonmn.com/wp-content/uploads/2020/10/MBC-Title-15-Revised.pdf**.** Accessed October 2026.

[p] City of Harmony Title XV: Zoning. 1976. Available online at: https://harmonymn.gov/wp-content/uploads/2025/08/MBC.15-Revised-250828Compressed.pdf**.** Accessed October 2026.

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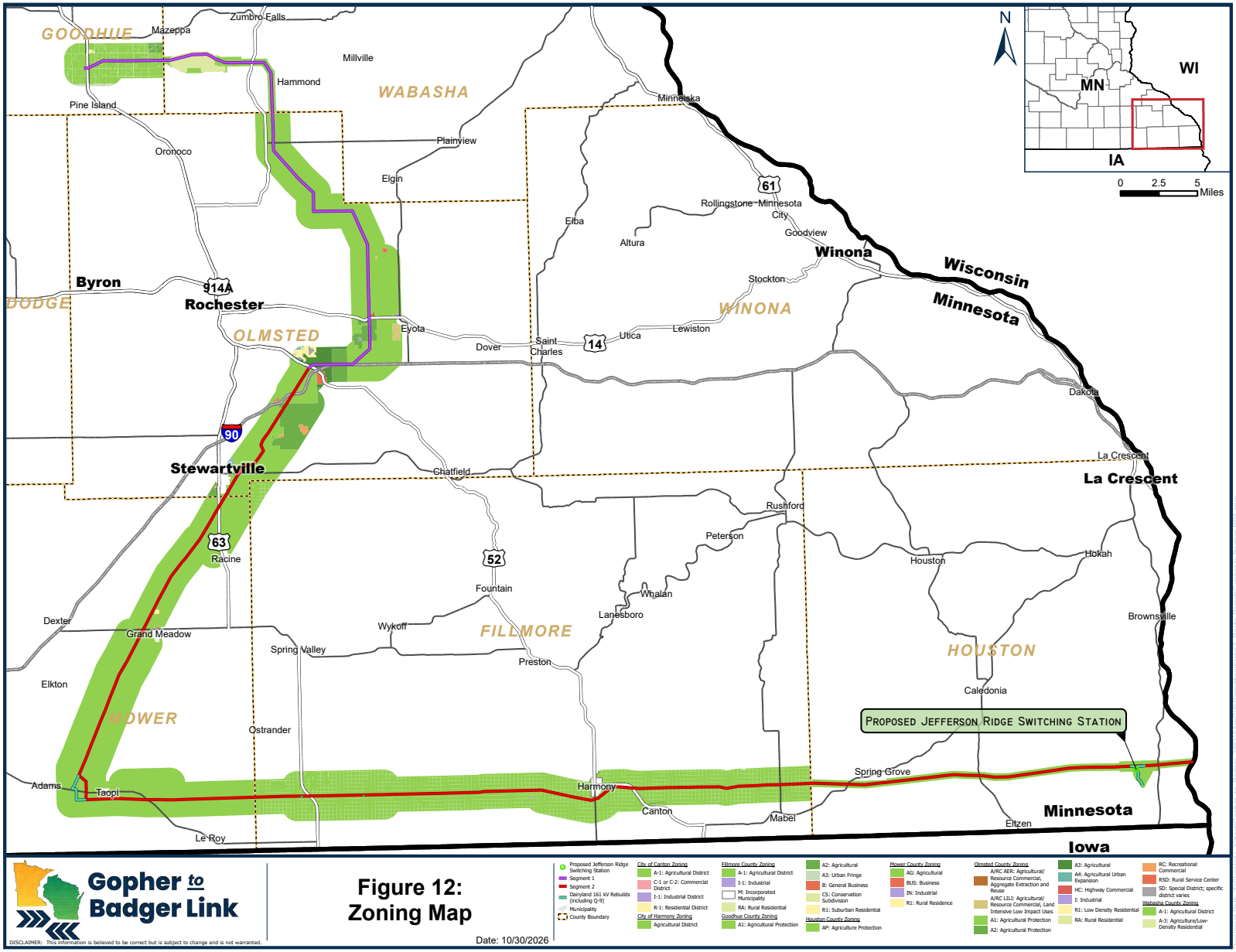
GOODHUE
Mazeppa
Zumbro Falls
Millville
Hammond
WABASHA
Pine Island
Oronoco
Plainview
Elgin
Minneiska
61
Rollingstone
Minnesota City
Elba
Goodview
Altura
Winona
Wisconsin
Minnesota
Byron
DODGE
914A
Rochester
OLMSTED
Eyota
Dover
Saint Charles
14
Utica
Lewiston
Stockton
WINONA
Dakota
90
Stewartville
Chatfield
La Crescent
La Crescent
Rushford
Peterson
63
Racine
52
Houston
Hokah
Fountain
Whalan
Lanesboro
Dexter
Grand Meadow
Wykoff
FILLMORE
Brownsville
Spring Valley
Preston
HOUSTON
Elkton
Caledonia
MOWER
Ostrander
PROPOSED JEFFERSON RIDGE SWITCHING STATION
Spring Grove
Adams
Taopi
Harmony
Canton
Mabel
Minnesota
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Iowa
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WI
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0 2.5 5 Miles
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 12:
Zoning Map
Date: 10/30/2026

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Review of county comprehensive plans, township planning documents, and zoning ordinances indicates that the Project area is generally planned for continued agricultural production, natural resource protection, rural residential development, and limited growth adjacent to existing communities. Land use policies commonly emphasize preservation of agricultural lands, protection of environmental resources, orderly development and accommodation of necessary public infrastructure, and concentration of future growth within or adjacent to existing municipalities. While the reviewed plans do not generally identify development of high-voltage transmission infrastructure as a specific planning objective, transmission infrastructure is considered within the broader context of existing and planned land uses and infrastructure needs. These objectives recognize the importance of maintaining the region's agricultural land base while also providing for infrastructure needed to serve rural communities and support established land uses.

The Proposed Routes generally avoid incorporated municipalities and areas planned for higher-density development. Although much of the Project would cross agricultural land, construction and operation of a transmission line would not generally preclude continued agricultural use of the surrounding land. Accordingly, consistency with agricultural-preservation objectives depends not only on whether agricultural land is crossed, but on the extent to which the Project can minimize conversion or disruption of agricultural land and maintain its long-term agricultural use (see **Section 6.6.1**). The Applicants would continue to coordinate with affected landowners to minimize interference with agricultural operations where practicable.

Localized planning considerations occur within portions of the Project area. Portions of Segment 1 are located within Olmsted County near areas subject to growth management and orderly annexation planning associated with Rochester and surrounding communities. In addition, portions of Segment 1 occur within the Decorah Edge Overlay District, which was established to protect geologically sensitive karst features and associated natural resources. The presence of this overlay district reflects local resource protection priorities within the Project area. Environmental considerations associated with karst resources are discussed further in **Section 6.8.4**.

Pursuant to Minn. Stat. § 216I.18, subd. 1, a route permit issued by the Commission serves as the sole route approval required for the Project and supersedes local zoning, building, and land use regulations. Zoning information is nevertheless provided in this Application to describe existing planning and land use controls, identify local planning considerations, and evaluate the relationship of the Project to existing and planned land uses within the Project area.

Potential Impacts

The ROI for zoning consists of the counties, townships, municipalities, zoning districts, and planning jurisdictions crossed by the Project.

The Project is located predominantly within agricultural zoning districts intended to preserve agricultural land, support rural land uses, and maintain open space. Construction of the Project would not alter existing zoning classifications or local land use designations; however, temporary construction activities may affect existing uses within agricultural, rural residential, transportation, and natural resource protection districts. Potential temporary impacts could include construction traffic, temporary access restrictions, vegetation clearing, and other short-term disruptions occurring adjacent to active construction areas.

Following construction, the Project would introduce utility easements and maintained rights-of-way that may limit placement of buildings, establishment of certain land uses, and growth of tall vegetation within easement areas. However, agricultural production, grazing, transportation activities, and other compatible land uses would generally be able to continue within and adjacent to transmission line rights-of-way. As a result, long-term zoning-related impacts are expected to be limited and would primarily consist of utility easement restrictions associated with operation and maintenance of the transmission facilities.

The Project was developed to avoid incorporated municipalities, concentrated residential development, and areas planned for higher-density future growth where practicable. Review of applicable zoning ordinances, comprehensive plans, and future land use policies indicates that the Proposed Rights-of-Way are located primarily within areas planned for continued agricultural use, natural resource protection, rural residential development, and public infrastructure. Consequently, the potential for conflict with local planning objectives related to urban development, commercial growth, and residential expansion is expected to be limited.

The proposed Jefferson Ridge Switching Station would permanently convert approximately 3.4 acres of land currently used for agricultural production to utility infrastructure. Because the facility would be located within land zoned Agricultural Protection District and adjacent to existing transmission infrastructure, this conversion is expected to remain generally compatible with surrounding land uses and local planning objectives.

Overall, the Project is not expected to result in substantial conflicts with existing zoning patterns, future land use plans, or long-term development objectives within the counties crossed by the Proposed Rights-of-Way. While easement restrictions may limit certain future land uses within portions of the Project area, the predominance of agricultural zoning and the location of the Project outside most developed and planned growth areas substantially reduce the potential for significant zoning-related impacts.

Mitigation Measures

Potential zoning and land use compatibility impacts have been minimized through route selection, facility siting, and consideration of local planning objectives throughout Project development. The Applicants reviewed zoning ordinances, comprehensive plans, orderly annexation areas, future land use maps, and other local planning information to identify and avoid areas where conflicts with existing or planned land uses could occur.

The Proposed Routes were developed to utilize existing utility and transportation rights-of-way and to avoid incorporated municipalities, concentrated residential development, and planned growth areas where practicable. These routing decisions reduce fragmentation of agricultural land, minimize conflicts with existing zoning and development patterns, and support compatibility with surrounding land uses.

During final engineering and route refinement, the Applicants will continue coordination with counties, townships, municipalities, landowners, Tribal Nations, and regulatory agencies to identify opportunities to further reduce potential conflicts with existing and planned land uses. Structure locations, access routes, work areas, and easement boundaries will be refined where practicable to minimize interference with agricultural operations, residences, businesses, transportation facilities, and other existing land uses while maintaining compliance with engineering, safety, and reliability requirements.

Land restoration, vegetation management, and agricultural mitigation measures described elsewhere in this Application will further reduce potential land use compatibility impacts by restoring temporarily disturbed lands, maintaining agricultural productivity where feasible, and allowing continued compatible use of land within transmission line rights-of-way.

Overall, potential zoning and land use compatibility impacts would be mitigated through route selection, avoidance of developed areas and planned growth areas where practicable, continued coordination with local governments and landowners, restoration of disturbed lands, and long-term compatibility of the transmission facilities with surrounding agricultural and rural land uses.

Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures limit land use and zoning impacts by addressing aesthetics and coordination with landowners and local governments, such as using existing roadways for construction where practicable, and generally seeking to minimize loss of agricultural land and vegetation clearing. These conditions are discussed in the related resource sections elsewhere in this section.

6.4.3 Displacement

Displacement is the removal of a residence, business, or other structure to facilitate the construction and operation of a transmission line. This section identifies residences, businesses, and other buildings within or near the Proposed Rights-of-Way and evaluates the potential for displacement. Structures located within the right-of-way may need to be removed because they could interfere with the construction, operation, or maintenance of the transmission line. Although displacement is generally uncommon, it is more likely to occur in developed or densely populated areas where avoiding all residences and other structures is not feasible. This section also discusses measures incorporated into Project planning and routing to avoid or minimize the potential for displacement.

6.4.3.1 Existing Conditions

The Applicants reviewed aerial imagery and available parcel and structure data[45] to identify residences, businesses and other principal structures located within and near the Proposed Rights-of-Way associated with both the 765 kV and Q-9 161 kV transmission lines. Residential development along the Proposed Routes is generally low-density and rural in nature, typically consisting of homes associated with farmsteads or other rural residential properties. As summarized in **Table 6.4.3-1**, there are 81 residences[46] located within 0.5 mile of the Proposed Alignments. Based on the current route design, the closest residents include one resident located 150 feet from the Segment 2 portion of the 765 kV / 161 kV Proposed Alignment, and one resident located 150 feet from the Q-9 161 kV Proposed Alignment. There are no residences located within the Proposed Right-of-Way of either the 765 kV or Q-9 161 kV transmission lines based on the current design. The closest residence to the Jefferson Ridge Switching Station is located 150 feet

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[45] Federal Emergency Management Agency, Geospatial Resource Center. 2025. USA Structures. Available online at: https://gis-fema.hub.arcgis.com/pages/usa-structures. Accessed July 2026.

[46] Residences represent occupied dwelling units. Counts of residences do not include agricultural, commercial, industrial, or accessory structures (e.g., barns, sheds, garages, grain bins, machine sheds, and other non-residential buildings).

from the property on the east side of Neumann Road. Residences are shown on the detailed maps in **Appendix F**.

There are five non-residential structures within the Proposed Right-of-Way; two on Segment 1 and three on Segment 2. These structures are identified on the detailed maps provided in **Appendix F**.

TABLE 6.4.3-1

Residences within 0.5 Mile of the Proposed Alignments

Transmission Line	0-125 feet (typical right-of-way)	126-200 feet	201-300 feet	301-400 feet	401-500 feet	Total Residences within 0.5 mile
Segment 1						
765 kV	0	1	2	4	10	233
Segment 2						
765 kV / 161 kV	0	1	17	19	26	1,112
Q-9						
161 kV	0	1	0	0	0	6
TOTAL	**0**	**3**	**19**	**23**	**36**	**1,351**

The Project has been designed to comply with NESC standards and the Applicants' engineering standards, including required clearances from buildings and other structures for safe construction, operation, and maintenance of the proposed transmission lines. The Proposed Routes provide sufficient design flexibility to avoid residential displacement while maintaining the right-of-way and adhering to applicable safety clearances.

6.4.3.2 Potential Impacts

Based on the Applicants' review, no residential homes or businesses are located within the Proposed Right-of-Way of either the 765 kV transmission line, or the Q-9 161 kV transmission line. Five outbuildings currently intersect the Proposed Right-of-Way, two on Segment 1 and three on Segment 2 (see **Appendix F**).

6.4.3.3 Mitigation Measures

If final engineering identifies a structure that cannot be accommodated within the Proposed Rights-of-Way while maintaining applicable safety and operational requirements, the Applicants will evaluate reasonable avoidance and minimization measures before considering removal or relocation. If displacement becomes necessary, the Applicants will coordinate with the affected property owner regarding compensation, relocation assistance, and any rights available under Minnesota law, including Buy the Farm rights (see **Section 5.1**), where applicable.

6.4.3.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures related to right-of-way acquisition, landowner coordination, agricultural impacts, and restoration, and compliance with these requirements also helps avoid and minimize the potential for displacement and associated property impacts. Example route permit conditions associated with these resources have been included in the corresponding sections.

6.4.4 Public Services and Transportation

This section describes existing public services and infrastructure within the Project area and evaluates how Project construction and operation could affect those services. The discussion addresses transportation resources (roads, railroads, and airports), emergency services and communications, public and private utilities (electric, natural gas, water, wastewater, and pipelines), and communication systems (telephone, internet, radio, and television). The section identifies potential impacts to these services, including traffic disruptions, utility outages, access limitations, interference with communication systems, and aviation safety considerations, and evaluates measures that may be implemented to avoid, minimize, or mitigate such impacts.

6.4.4.1 Existing Conditions

Public services provided in the counties crossed by the Proposed Routes are similar to public services found elsewhere in Minnesota. Roads, railways, and airports are present throughout. Many residents outside cities and towns rely on private wells and septic systems. Larger population centers provide municipal water and sewer treatment via buried public infrastructure. Residents access other utility services from various providers including natural gas/propane, television, and telephone.

Transportation

Existing road infrastructure crossed by the Proposed Routes consists of a mix of federal, state, and county highways and roads, and township roads. This section also identifies railroads crossed by the Proposed Routes, and airports within 10 miles of the Proposed Alignments. These features are identified on **Figure 13** and the maps provided in **Appendix F**.

Roads

Major transportation networks that occur within Segments 1 and 2 of the Proposed Route include State Highways 16, 26, 30, 43, 44, 56, 76, 139, 247, U.S. Highways 14, 52, 63 and I-90. **Table 6.4.4-1** shows the number of road crossings in each jurisdictional category by county by Proposed Routes; this includes multiple crossings of the same road.

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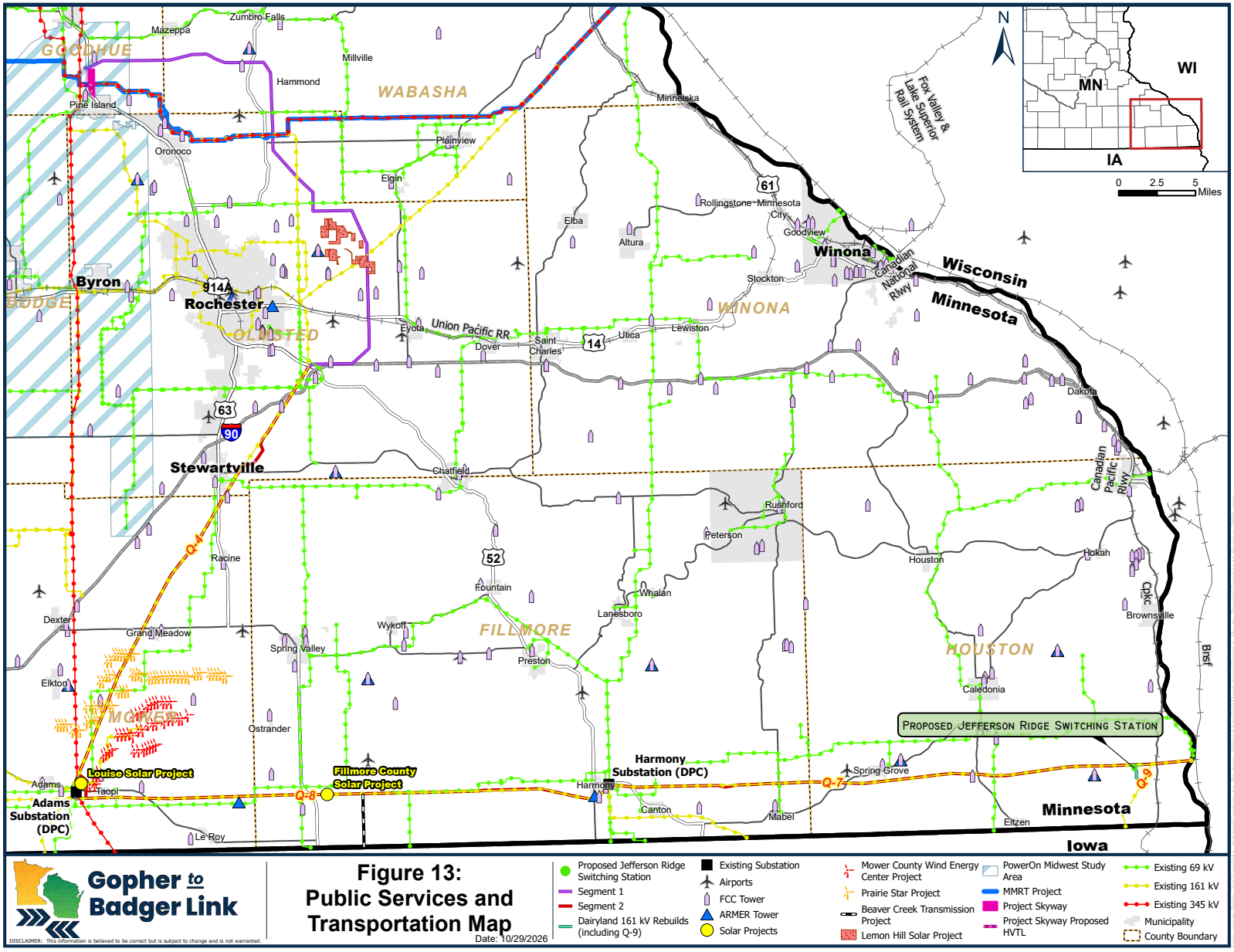
Gopher to Badger Link
Figure 13:
Public Services and
Transportation Map
Date: 10/29/2026
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Proposed Jefferson Ridge Switching Station
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Existing Substation
Airports
FCC Tower
ARMER Tower
Solar Projects
Mower County Wind Energy Center Project
Prairie Star Project
Beaver Creek Transmission Project
Lemon Hill Solar Project
PowerOn Midwest Study Area
MMRT Project
Project Skyway
Project Skyway Proposed HVTL
Existing 69 kV
Existing 161 kV
Existing 345 kV
Municipality
County Boundary
PROPOSED JEFFERSON RIDGE SWITCHING STATION
Louise Solar Project
Fillmore County Solar Project
Adams Substation (DPC)
Harmony Substation (DPC)
Byron
Rochester
Stewartville
Winona
Wisconsin
Minnesota
Iowa
GOODHUE
WABASHA
OLMSTED
WINONA
FILLMORE
HOUSTON
MOWER
DODGE
Q-4
Q-7
Q-8
Q-9
Union Pacific RR
Canadian National Rlwy
Canadian Pacific Rlwy
Fox Valley & Lake Superior Rail System
Cpkc
Brnsf
N
WI
MN
IA
0 2.5 5 Miles

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TABLE 6.4.4-1

Numbers of Road Crossings by the Proposed Routes by Jurisdiction

County	MnDOT	County	Local Township / City Roads
Segment 1			
Goodhue	1	2	3
Wabasha	1	14	27
Olmsted	17	14	27
Segment 2			
Olmsted	7	11	23
Mower	28	70	132*
Fillmore	11	30	69
Houston	4	9	15
Q-9			
Houston	0	3	3

* Note: This includes five crossings on the Mower-Olmsted County Line Road and two crossings on the Mower-Filmore County Line Road.

Three national scenic byways managed by the MnDOT are crossed in Segment 2, including: Shooting Star Scenic Byway (State Highway 56 in Mower and Fillmore Counties), Historic Bluff Country Scenic Byway (Highway 16 in Fillmore County) and Great River Road (State Highway 26 in Houston County). Segment 2 also crosses Laura Ingalls Wilder Historic Highway (U.S. Highway 63 in Olmsted and Fillmore Counties), also managed by the MnDOT (see **Section 6.4.1**).

The MnDOT Traffic Viewer webpage tracks traffic counts on roads throughout the state. **Table 6.4.4-2** provides the average annual daily traffic on state highways in each county crossed by the Proposed Routes based on the traffic count location closest to the Proposed Routes.[47]

TABLE 6.4.4-2

Average Daily Traffic Volume for State Highways within the Proposed Routes

		Traffic Volume		
County	Road Name	Location ID	AADT	Year
Segment 1				
Goodhue	U.S. Highway 52	72611	1,463	2020
		1695	32,540	2025
Wabasha	U.S. Highway 63	5989	3,050	2025
Olmsted	U.S. Highway 14	3813	4,913	2025
	State Highway 247	3824	3,096	2025
		3825	4,997	2025
	Interstate-90	3803	17,170	2025
		6288	17,455	2025
	U.S. Highway 52	3787	19,010	2025
Segment 2				
Olmsted	Interstate-90	3803	17,170	2025
		6288	17,455	2025
	State Highway 30	3828	1,667	2025

[47] MnDOT. 2026. Traffic Forecasting & Analysis. Available online at: https://dot.state.mn.us/traffic/data/tdms.html. Accessed June 2026.

TABLE 6.4.4-2

Average Daily Traffic Volume for State Highways within the Proposed Routes

		Traffic Volume		
County	Road Name	Location ID	AADT	Year
Mower	State Highway 16	3487	2,291	2025
	State Highway 56	3471	1,252	2025
		3473	1,405	2025
	U.S. Highway 63	1505	3,426	2025
	State Highway 139	1501	890	2025
Fillmore	U.S. Highway 52	1538	3,696	2025
	State Highway 43	1495	620	2025
Houston	State Highway 44	68827	3,365	2025
	State Highway 76	1890	1,491	2025
	State Highway 26	1884	1,814	2025
Q-9				
Houston	No State Roads Crossed	N/A	N/A	N/A

Source: MnDOT. 2026. Traffic Count. Available online at: **https://mndot.public.ms2soft.com/tcds/tsearch.asp?mod=tcds**. Accessed July 2026.

Railroads

Segment 1 of the Proposed Route includes one railroad crossing located just west of the town of Eyota in Olmsted County. The railroad is operated by the Dakota, Minnesota and Eastern Railroad (DM&E), a fully owned subsidiary of the Canadian Pacific Railway system. This railroad runs parallel to U.S. Highway 14 between Stockton to Rochester. The line is presently a freight-only route hosting an average of three trains per day on a single track, with all in-town road crossings at grade.[48]

One railroad operated by the DM&E, a fully owned subsidiary of the Canadian Pacific Railway system is in eastern Houston County occurs within the Segment 2 of the Proposed Route. The line is presently a freight-only route hosting an average of thirteen trains per day on a single track, with all in-town road crossings at grade. This railroad runs parallel to State Highway 26 near the Mississippi River.[49]

There are no railroad crossings within the Q-9 Proposed Route.

[48] Federal Railroad Administration. 2026. North American Rail Network Lines. Available online at: https://www.arcgis.com/apps/mapviewer/index.html?url=https://services.arcgis.com/xOi1kZaI0eWDREZv/ArcGIS/rest/services/NTAD_North_American_Rail_Network_Lines/FeatureServer/0&source=sd. Accessed July 2026.

[49] Federal Railroad Administration. 2026. North American Rail Network Lines. Available online at: https://www.arcgis.com/apps/mapviewer/index.html?url=https://services.arcgis.com/xOi1kZaI0eWDREZv/ArcGIS/rest/services/NTAD_North_American_Rail_Network_Lines/FeatureServer/0&source=sd. Accessed July 2026.

Airports

The Proposed Routes do not cross any airports, airstrips, or helipads. **Table 6.4.4-3** identifies airports within 10 miles of the Proposed Rights-of-Way based on information from AirNav.[50]

TABLE 6.4.4-3

Airports within 10-mile Radius of the Proposed Rights-of-Way

Airport Name	Airport Identifier	Public / Private	Latitude	Longitude
Segment 1				
Eyota	MY37	Private	43-58-54.2100N	092-14-45.1800W
Nietz Airstrip	MN32	Private	44-11-28.8770N	092-27-09.6500W
Rochester International Airport	RST	Public	43-54-29.8000N	092-30-00.1000W
Mayo Clinic St. Mary's Hospital	99MN	Private	44-01-11.1550N	092-28-58.9930W
Methodist / Charlton Building	MN56	Private	44-01-26.3748N	092-28-01.1100W
Med-City Aviation	2MN8	Private	43-59-45.8700N	092-20-08.6110W
Kruger Aviation	31MN	Private	44-08-08.0000N	092-41-46.0000W
Segment 2				
Eyota	MY37	Private	43-58-54.2100N	092-14-45.1800W
Rochester International Airport	RST	Public	43-54-29.8000N	092-30-00.1000W
Mayo Clinic St. Mary's Hospital	99MN	Private	44-01-11.1550N	092-28-58.9930W
Methodist / Charlton Building	MN56	Private	44-01-26.3748N	092-28-01.1100W
Med-City Aviation	2MN8	Private	43-59-45.8700N	092-20-08.6110W
Camp Tahigwa Landing Site	1IA2	Private	43-26-19.8980N	091-34-02.5150W
Houston County	CHU	Public	43-35-46.8910N	091-30-14.2070W
Petes	7MY9	Private	43-44-48.1800N	092-43-28.2000W
Fillmore County	FKA	Public	43-40-36.3000N	092-10-47.1000W
High Grove	23MN	Private	43-38-27.8730N	092-01-19.5710W
Deters Farms	MY10	Private	43-33-39.8850N	091-40-53.5280W
Caldbeck Fld	7MN3	Private	43-42-18.8670N	092-27-38.6190W
Pietenpol Field	MN21	Private	43-34-56.1000N	092-18-06.0800W
Q-9				
Houston County	CHU	Public	43-35-46.8910N	091-30-14.2070W

Source: AirNav. Undated. Airport Information. Available online at: **https://www.airnav.com/airports/**. Accessed June 2026.

There are seven airports located within a 10-mile radius of the Segment 1 Proposed Right-of-Way, including six private airports and one public airport. Private airports are privately owned landing strips primarily associated with medical facilities or agricultural operations. The nearest private airport to Segment 1 of the Proposed Route is the Eyota Airport which is approximately 1 mile east of Segment 1 of the Proposed Route. The Rochester International Airport is located approximately 6.8 miles southwest of Segment 1 of the Proposed Route.

There are 13 airports located within a 10-mile radius of the Segment 2 Proposed Right-of-Way, including ten private airports and three public airports. Five of these airports, including Eyota, Rochester International Airport, Mayo Clinic St. Mary's Hospital, Methodist/Charlton Building, and Med-City Aviation, are also included in the airport count of Segment 1. Similar to Segment 1, the

[50] AirNav. Undated. Airport Information. Available online at: https://www.airnav.com/airports/. Accessed June 2026.

private airports are primarily associated with medical facilities or agricultural operations. The closest airports to Segment 2 are the Houston County Airport, which is approximately 2.5 miles north of the Proposed Route, and the Rochester International Airport, which is approximately 2.8 miles northwest of the Proposed Route (see **Table 6.4.4-3**).

As shown in **Table 6.4.4-1**, there are six road crossings within the Q-9 Proposed Route, including three county roads and three local roads. There are no state highway or railroad crossings within the Q-9 Proposed Route. The Q-9 Proposed Route does not cross any airports, airstrips or helipads. There is one airport within a 10-mile radius of the Proposed Right-of-Way, the Houston County Airport (**Table 6.4.4-3**), which is approximately 9.8 miles northwest of the Proposed Route.[51]

Local and Regional Utilities

Due to the rural location of the proposed Project, the majority of residential properties crossed by the Proposed Routes use private wells as a water source. Well water and wellhead protection areas (WHPAs) are discussed further in **Section 6.8.6**.

Electric Transmission Facilities

Existing and proposed transmission lines are shown on the maps provided in **Appendix F**.

Segment 1 of the Proposed Route crosses existing transmission lines four times, including two crossings of 161 kV and two crossings of 345 kV transmission lines.

There are eight existing transmission line crossings that occur within Segment 2 of the Proposed Route, not including Dairyland's Q-4/Q-8/Q-7 161 kV transmission line that will be double-circuited with the proposed 765 kV transmission line. The crossings include six crossings of 161 kV and two crossings of 345 kV transmission lines. As discussed in **Section 3.1.3**, the Proposed Right-of-Way is co-located with Dairyland's existing Q-4/Q-8/Q-7 161 kV transmission line rights-of-way for approximately 98 miles, or 93 percent of Segment 2.

Approximately 1.2 miles of Dairyland's existing Q-7 161 kV transmission line that will be double-circuited with the proposed 765 kV transmission line occurs within the Q-9 Proposed Route, in addition to the approximately 1.6 miles of the Q-9 161 kV line that is proposed to be relocated within this Proposed Route.

Xcel Energy is also proposing to construct a new 1.2-mile double-circuit 345 kV HVTL from Xcel's existing North Rochester Substation to new substations located at the proposed Pine Island Industrial Planned Unit Development near the City of Pine Island in Goodhue County, referred to as North Rochester to Skyway HVTL Project.[52]. This will also include an approximately 11-acre expansion of the existing North Rochester Substation. The North Rochester to Skyway HVTL Project construction is anticipated to start in May 2027 and to be in-service in December 2029. The North Rochester to Skyway HVTL Project runs south from the North Rochester Substation, approximately 0.9 mile south of Segment 1 of the Proposed Route. The North Rochester Substation expansion is proposed adjacent to and on the east side of U.S. Highway 52,

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[51] AirNav. Undated. Airport Information. Available online at: https://www.airnav.com/airports/. Accessed June 2026.

[52] Commission Docket No. E002/TL-26-135.

overlapping with Segment 1 of the Proposed Route. Xcel Energy has requested a wider route width at this location to accommodate the final design of the expanded substation (see **Section 3.1.1**).

Xcel Energy will soon commence construction of the Mankato-Mississippi 345 kV Transmission Line Project[53]. Segments 3 and 4 of the Mankato-Mississippi 345 kV Transmission Line Project occurs within the Project area. The Project also involves upgrades to the North Rochester substations to accommodate the 345 kV transmission line. Segment 4 converts approximately 27 miles of the existing 345 kV/161 kV double-circuit CapX line to 345 kV / 345 kV double-circuit on the existing CapX structures between the North Rochester Substation to near the City of Kellogg, Minnesota. Segment 4 would consist of installing a new 161 kV transmission line that was displaced from the CapX structures largely parallel to the CapX transmission line between the North Rochester Substation to a point of connection on the Chester Junction transmission line. The Segment 3 and Segment 4 lines occur from 0.9 to 4.5 miles south of Segment 1 of the Proposed Route and crosses the Proposed Route between U.S. Highway 63 and 40th Avenue and 125th St NE and Highway 247 in Farmington Township, Olmsted County, Minnesota. The Route Permit for the Mankato-Mississippi 345 kV Transmission Line Project was issued on April 20, 2026. Xcel Energy is looking to initiate construction activities in 3rd quarter 2026, with an anticipated in-service date in 1st quarter 2030.

The Great River Energy, ITC Midwest LLC and Xcel Energy PowerOn Midwest Project is also proposed within the Project area.[54] This includes a new 31-mile-long 765 kV transmission line near the Pleasant Valley Substation in Mower County, Minnesota to the North Rochester Substation in Goodhue County. In addition, a new 69-mile-long 345 kV circuit would also be installed between the Pleasant Valley Substation and the North Rochester Substation and 31 miles of 345 kV transmission line would also be installed from the North Rochester Substation to the Hampton Substation in Dakota County, Minnesota. This project also includes modifications at the North Rochester Substation. The project is anticipated to start construction in 4th quarter 2029, with the 765 kV portion operational in 2nd quarter 2034 and the 345 kV portion operational in 3rd quarter 2032. The modifications proposed at the North Rochester Substation as part of the PowerOn Midwest Project would allow for the 765 kV interconnection for this Project. The Proposed Route would not cross the 765 kV or 345 kV transmission lines associated with PowerOn Midwest Project; however, the Applicants did consider co-location, as further discussed in **Section 4.3.3**.

As discussed in **Sections 1.2.1.2** and **3.3**, Dairyland received a Route Permit from the Commission on September 22, 2025 for a new 3.5-mile-long 161 kV transmission line from its existing Q-8 transmission line along 171st Avenue in York Township, Fillmore County to the Minnesota-Iowa state line, referred to as the Beaver Creek Transmission Line.[55] Segment 2 of the Proposed Route crosses this Project at 171st Avenue. Dairyland is currently working on obtaining the additional federal, state and local permits required for the Project, with construction anticipated in 2nd quarter 2027.

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53 Commission Docket Nos. E-002/CN-11-532 and E-002/TL-23-157.

54 Commission Docket No. E002, ET2, ET6675/CN-25-117.

55 Commission Docket No. E002/CN-24-95.

Pipelines

Oil and gas transmission pipelines are also present within the Project area.

There is one Magellan petroleum products pipeline that is owned by Midstream Partners that is crossed by Segment 1 of the Proposed Route. Additionally, Segment 1 of the Proposed Route parallels this pipeline for approximately 5 miles. The Proposed Route also parallels a natural gas pipeline owned by Northern Natural Gas for approximately 2.5 miles near the town of Eyota in Olmsted County.

The Segment 2 Proposed Route crosses two natural gas pipelines, both owned by Northern Natural Gas, in Olmsted and Fillmore counties. The Proposed Route also crosses a BP Pipeline carrying petroleum products located in Olmsted County.[56]

There are no known pipelines within the Q-9 Proposed Route.

Solar Facilities

The Applicants reviewed publicly available records of existing photovoltaic solar farms 1 megawatt (MW) or more to identify solar farms in the counties crossed by the Proposed Routes.[57] The Applicants also reviewed the Commission's Energy Infrastructure Permitting webpage for proposed facilities greater than 50 MW in counties crossed by the Project.[58] Known existing and proposed solar farm facilities are shown on the maps provided in **Appendix F**. The Applicants will continue to attempt to identify existing and proposed solar facilities as part of the routing process and will coordinate with owners/developers of those facilities, as needed.

SS Greenhouse Solar is located approximately 0.6 mile west of the existing North Rochester Substation and Pine Island Solar is located approximately 1.5 miles south of the existing North Rochester Substation. Lemon Hill Solar, LLC has proposed a 180 MW solar farm just northeast of the City of Rochester with areas that occurs within Segment 1 of the Proposed Route.[59]

Segment 2 of the Proposed Route crosses two solar farms: the Fillmore County Solar Project and the Louise Solar Project, both operated by Geronimo Power. The Louise Solar Project is a 50 MW facility located off State Highway 56 east of Adams in Lodi Township, Mower County. The Fillmore County Solar Project is located at the intersection of 151st Avenue and 140th Street in Beaver Township, Fillmore County. It is 470-acre 45 MW Solar farm. There are no new solar farm facilities currently being proposed in any of the counties crossed by Segment 2 of the Proposed Route.

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56 BP. 2026. BP Pipelines North America Inc. Available online at: https://www.bp.com/en_us/united-states/home/products-and-services/pipelines.html#accordion_minnesota. Accessed July 2026.

57 Fujita, K.S., Ancona, Z.H., Kramer, L.A., Straka, M., Gautreau, T.E., Garrity, C.P., Robson, D., Diffendorfer, J.E., and Hoen, B., 2023. United States Large-Scale Solar Photovoltaic Database (v4.0, April, 2026). U.S. Geological Survey and Lawrence Berkeley National Laboratory data release. Available online at: https://doi.org/10.5066/P9IA3TUS Accessed June 2026.

58 Minnesota Public Utilities Commission. 2025. Energy Infrastructure Permitting. Available online at: https://puc.eip.mn.gov/. Accessed June 2026.

59 Minnesota Public Utilities Commission. 2025. Energy Infrastructure Permitting. Available online at: https://puc.eip.mn.gov/. Accessed June 2026.

There are no known existing or proposed solar farms within the Q-9 Proposed Route.

Wind Facilities

The Applicants reviewed the U.S. Wind Turbine Database Viewer to identify existing wind farms in the Project area.[60] Applicants also reviewed the Commission's Energy Infrastructure Permitting webpage for proposed wind projects within the Project area.[61] Known existing and proposed wind farm facilities are shown on the maps provided in **Appendix F**. The Applicants will continue to attempt to identify existing and proposed wind facilities as part of the routing process and will coordinate with owners/developers of those facilities, as needed.

No wind farms are currently proposed or installed within Segment 1 of the Proposed Route. The Applicants will continue to attempt to identify existing and proposed wind facilities as part of the routing process and will coordinate with owners/developers of those facilities, as needed.

There are multiple wind turbine farms that exist in Mower County. Segment 2 of the Proposed Route will pass through the Prairie Star Project, owned by EDP Renewables North America LLC, southwest of the town of Grand Meadow. There are approximately 14 wind turbines located within the Proposed Route. Just east of the town of Adams, the Xcel Energy-owned Mower County Wind Energy Center Project has one wind turbine within the Proposed Route. The Rose Creek Wind Project owned and operated by ConEdison Development received a Site Permit on December 29, 2022 to repower its existing facility in Mower County.[62] The proposed repower project will involve decommissioning the 11 Rose Wind turbines and constructing 6 to 7 new turbines with greater power outputs to continue to deliver up to 17.4 MW of electricity to Dairyland. This project was delayed and construction is now anticipated to start in Fall 2027. The northeastern portion of this project intersects with the southwestern portion of Segment 2 of the Proposed Route near the Adams Substation.

There are no known existing or proposed wind farms within the Q-9 Proposed Route.

Battery Energy Storage Facilities

The Applicants reviewed the Commission's Energy Infrastructure Permitting webpage for battery energy storage systems (BESSs).[63] The Applicants will continue to attempt to identify existing and proposed BESS facilities as part of the routing process and will coordinate with owners/developers of those facilities, as needed.

Public Communication

Existing communications infrastructure may include cellular towers, microwave communications facilities, broadband infrastructure, and public safety communications towers.

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60 USGS. 2025. U.S. Wind Turbine Database Viewer. Available online at: https://www.usgs.gov/tools/us-wind-turbine-database-uswtdb-viewer. Accessed June 2026

61 Minnesota Public Utilities Commission. 2025. Energy Infrastructure Permitting. Available online at: https://puc.eip.mn.gov. Accessed June 2026.

62 Minnesota Public Utilities Commission. 2025. Energy Infrastructure Permitting. Available online at: https://puc.eip.mn.gov. Accessed June 2026.

63 Minnesota Public Utilities Commission. 2025. Energy Infrastructure Permitting. Available online at: https://puc.eip.mn.gov. Accessed June 2026.

Capitol Airspace Group prepared a Communication Systems (AM/FM Radio, TV, Land Mobile Radio [LMR], and Communication Towers) Interference Analysis and Microwave Path Analysis for both Segment 1[64,65] and Segment 2.[66,67] These studies are provided in **Appendix N**. The Interference Analysis identified the following communication systems within proximity to the Project:

- AM Radio Station KFAN is approximately 4.3 miles west of both Segments 1 and 2;
- There is a group of six FM radio stations 2.4 miles west of Segment 1, and there is one FM station (KFNL-FM) located within the Segment 2 Proposed Route; and
- Low power TV station K25NK-D is located 2.4 miles west of Segment 1, and KTTC-TV is located 1.4 miles west of Segment 2.

Table 6.4.4-4 identifies communication towers that are located within 10 miles of the Proposed Alignments. There are eight towers located within the Proposed Routes, one within the Segment 1 Proposed Route and seven within the Segment 2 Proposed Route. The closest tower is approximately 0.1 mile from the Segment 2 Proposed Route in Harmony, Minnesota. As further described in the Interference Analysis, there are no Very High Frequency LMR base station radios located within 165 feet of the transmission line, there are no Ultra High Frequency LMR base stations located within 98 feet of the transmission line, and there are no known cellular or E911 signaling towers located within 98 feet of the transmission line. The Microwave Path Analysis identified 34 paths associated with 13 microwave links that overlie Segment 1 and 71 paths associated with 33 microwave links that overlie Segment 2 (see **Appendix N**).

Local internet in the counties crossed by both the Proposed Routes is provided by Century Link, Spectrum, and Frontier among others. Satellite internet is available from companies such as Starlink as well as various mobile telephone companies.[68] Local telephone service is provided by Qwest Corp, Century Link and a variety of local telephone providers such as Pine Island Telephone Company, Sleepy Eye Telephone Company, Citizen's Telecom Company and Spring Grove Communications.[69]

6.4.4.2 Potential Impacts

The ROI for transportation facilities, and local and regional utilities consists of the Local Vicinity where construction and operation could directly affect access, infrastructure, or service. The ROI for aviation facilities includes airports and associated airspace surfaces that may be affected by

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64 Capitol Airspace Group. 2026. LRTP 765 kV Route – Gopher to Badger Transmission Link Segment 1. Communications Systems (AM/FM Radio, TV, LMR, and Communication Towers) Interference Analysis. Completed August 14, 2026.

65 Capitol Airspace Group. 2026. Microwave Path Analysis for GBTL Segment 1. Completed October 16, 2026.

66 Capitol Airspace Group. 2026. LRTP 765 kV Route – Gopher to Badger Transmission Link Segment 2. Communications Systems (AM/FM Radio, TV, LMR, and Communication Towers) Interference Analysis. Completed August 14, 2026.

67 Capitol Airspace Group. 2026. Microwave Path Analysis for GBTL Segment 2. Completed October 16, 2026.

68 Minnesota Department of Employment and Economic Development. 2023. Minnesota Broadband Providers by County. Available online at: https://mn.gov/deed/assets/providers-county_tcm1045-190762.pdf. Accessed June 2026.

69 Minnesota Department of Commerce. 2026. Minnesota Telephone Exchange Boundaries. Available online at: https://minnesota.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=a61fe43236994d43b097d439befb8e70. Accessed June 2026.

Project structures or construction equipment. Emergency and public communication services are evaluated at the county and local service-provider level because emergency response resources and public communication services are organized and dispatched on that basis.

Transportation

Roads

Table 6.4.4-5 identifies the number of road crossings by jurisdiction associated with the Proposed Rights-of-Way; this includes multiple crossings of the same road.

TABLE 6.4.4-5

Number of Roads Crossings by the Proposed Rights-of-Way by Jurisdiction

County	MnDOT	County	Local Township / City Roads
Segment 1			
Goodhue	1	2	2
Wabasha	1	7	7
Olmsted	4	2	20
Segment 2			
Olmsted	2	3	11
Mower	9	16	47*
Fillmore	4	8	27
Houston	4	8	10
Q-9			
Houston	0	1	3

* This includes five crossings on the Mower-Olmsted County Line Road and two crossings on the Mower-Filmore County Line Road.

Segment 1 would cross MnDOT-managed roads six times, including one crossing of U.S Highways 14 and 63, three crossings of U.S. Highway 52, and one crossing of State Highway 247. The Segment 1 Proposed Right-of-Way would also be co-located for approximately 7,183 feet (1.4 miles) with I-90 managed by MnDOT. Segment 1 is also proposed to be co-located with a total of approximately 7,548 feet (1.4 miles) on three different local township/city roads including 595th Street located in Wabasha County, and 60th Ave NE and 45th St SE in Olmsted County.

The Applicants met with MnDOT on June 16, 2026 to discuss the proposed co-location of Segment 1 with I-90 (see **Appendix C**). MnDOT indicated that they may be planning some snow fencing on the north or south side of the right-of-way at this location, but this would be further assessed during the Early Notification Memo process. MnDOT also indicated that the I-90 improvements between the Rochester and Winona segment are currently occurring and no additional improvements are currently planned over the next 10 years. Federal Highway Administration approval will be required for any structures within the MnDOT right-of-way associated with I-90. Any occupation of I-90 right-of-way would be subject to MnDOT's Utility Accommodation Permit application review and issuance process.

Segment 2 would cross MnDOT-managed roads 19 times, including:

- two crossings of I-90;
- one crossing of U.S. Highway 52;
- three crossings of U.S. Highway 63;

- one crossing of State Highways 26, 43, 44 and 139;
- two crossings of State Highway 76;
- three crossings of State Highway 16; and
- four crossings of State Highway 56.

Based on the current design, Segment 2 does not parallel any road rights-of-way. The Q-9 Proposed Right-of-Way would cross one county road and three local roads, but is not proposed to parallel any road rights-of-way.

The Applicants propose to construct a new permanent access road from Neumann Road to the Jefferson Ridge Switching Station in Houston County. MnDOT traffic count data collected on County Road 14, approximately 1.7 miles from the proposed switching station, indicates an average annual daily traffic volume of 209 vehicles.[70] Construction of the switching station is expected to result in a temporary increase in traffic on local roads due to the transportation of construction personnel, equipment, and materials. These increases would be limited to the construction period and are not expected to substantially affect local roadway operations. Following construction, traffic associated with operation of the switching station would be minimal and limited to periodic maintenance and inspection activities.

Construction of the Project across public roads may result in short-term impacts to transportation facilities, including temporary lane closures, traffic delays, reduced roadway capacity, increased construction traffic, and occasional detours associated with delivery of materials, structure installation, conductor stringing, and road-crossing activities. Temporary traffic control measures may be required to maintain public safety and minimize disruption to the traveling public. Construction equipment and oversize loads may also place additional demands on local road networks and require coordination with MnDOT, counties, cities, and townships. Operational impacts are expected to be minimal because transmission lines typically cross roadways overhead and do not restrict normal roadway use. Following construction, roads would be restored as necessary, and the transmission line would be designed to maintain required safety clearances over roadways in accordance with applicable engineering and safety standards. While the presence of transmission structures may result in a minor long-term change to views along roadways, no substantial impacts to roadway function, capacity, or public access are anticipated.

Railroads

The Segment 1 Proposed Right-of-Way crosses the DM&E Railroad west of Eyota, where the railroad generally parallels U.S. Highway 14. The Segment 2 Proposed Right-of-Way crosses the DM&E railroad that parallels State Highway 26 near the Mississippi River.

Construction of the Project across railroads may result in temporary impacts associated with structure installation, conductor stringing, equipment movement, and access activities near active rail operations. The Applicants will pursue railroad licenses where the Project crosses railroad rights-of-way based on the route designated by the Commission. Construction may require coordination with the railroad operator to ensure worker and public safety, minimize disruptions to rail traffic, and comply with railroad crossing and clearance requirements. Temporary rail slow orders, flagging operations, restricted work windows, or other protective measures may be required during certain construction activities. Construction could also result in temporary

[70] MnDOT. 2026. Traffic Count. Available online at: https://mndot.public.ms2soft.com/tcds/tsearch.asp?mod=tcds. Accessed July 2026.

increases in noise, dust, and traffic near railroad facilities. Operationally, impacts are expected to be minimal because the transmission line will cross railroads overhead and will be designed to maintain all required vertical and horizontal clearances. The Project may require grounding, shielding, and other engineering measures to address electrical induction, electromagnetic interference, and railroad signaling or communication systems where applicable. Following construction, railroad operations are expected to continue without interruption, and no substantial impacts to railroad capacity, safety, or long-term functionality are anticipated.

Airports

The nearest private airport to Segment 1 is the Eyota Airport which is approximately 2.1 miles east of the Proposed Right-of-Way. The nearest airports to Segment 2 are the Houston County Airport, which is approximately 2.7 miles north of the Proposed Right-of-Way, and the Rochester International Airport, which is approximately 3.2 miles northwest of the Proposed Right-of-Way.

The Applicants evaluated the Project to determine whether proposed structures exceed FAA notice criteria using the FAA's Pre-Screening Tool.[71] Based on the current Project design information and the FAA's Pre-Screening Tool results, notice is not currently required for Segment 1 or the Q-9. The Segment 2 screening flagged the Rochester International Airport and Houston County Airport areas for further evaluation; the Applicants are currently working on the Project design to remain below applicable thresholds in those areas. The Applicants anticipate that the structures at the Mississippi River crossing may exceed 200 feet, pending further coordination with the USFWS. The Applicants will re-evaluate the final Project design and will notify the FAA, as required.

The Applicants met with Houston County on July 29, 2026; the County indicated that there are no current plans to extend or improve the Houston County Airport at this time (**Appendix C**). As discussed in **Section 3.1.1**, the Applicants have requested an additional Route Width where the Proposed Alignment is in proximity to the Rochester International Airport to allow flexibility to avoid the FAA elevation limitation.

Construction of the Project within the vicinity of airports may result in temporary impacts associated with the use of cranes, helicopters, tall construction equipment, and the erection of transmission structures that could affect aviation operations during construction. Construction activities may require coordination with airport operators, the FAA, and other aviation stakeholders to ensure safe operation of aircraft and compliance with applicable aviation requirements. Temporary notices to airmen, construction notifications, equipment height restrictions, or other aviation safety measures may be required during construction. Construction-related impacts would be temporary and are not expected to significantly affect airport operations with appropriate coordination and implementation of safety measures.

Operationally, the transmission line could present a potential aviation obstacle depending on its proximity to airport facilities, approach and departure surfaces, navigation aids, and flight paths.

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[71] Federal Aviation Administration Undated. Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) Pre-Screening Tool. Available online at: https://oeaaa.faa.gov/oeaaa/oe3a/main/#/noticePrescreen. Accessed October 2026.

Local and Regional Utilities

Construction could temporarily affect buried municipal water, wastewater, stormwater, and other utility infrastructure if encountered during excavation activities. Such impacts would be localized and temporary and would be minimized through utility locating, coordination with utility operators, and implementation of standard construction practices. No operational impacts to municipal water or wastewater systems are anticipated.

Based on the current Project design, the Q-9 Proposed Right-of-Way does not cross any existing transmission lines, pipelines, or existing or known proposed solar, wind or storage facilities.

Electric Transmission Facilities

Existing transmission lines are shown on the maps provided in **Appendix F**.

The Segment 1 Proposed Right-of-Way will cross three existing transmission lines, including two 161 kV, and one 345 kV transmission lines. The Segment 2 Proposed Right-of-Way will cross five existing transmission lines, including three 161 kV, and two 345 kV transmission lines; this excludes the Q-4/Q-8/Q-7 161 kV transmission line that will be double-circuited with the 765 kV transmission line.

Segment 1 of the Proposed Right-of-Way would also overlap with Xcel Energy's proposed modifications and expansions of the North Rochester Substation associated with the North Rochester to Skyway HVTL Project, Mankato-Mississippi 345 kV Transmission Line Project, and the PowerOn Midwest Project. The Mankato-Mississippi 345 kV Transmission Line Project would also be crossed by the Segment 1 Proposed Right-of-Way between U.S. Highway 63 and 40th Avenue and 125th St NE and Highway 247 in Farmington Township, Olmsted County, Minnesota. North Rochester to Skyway HVTL Project and Mankato-Mississippi 345 kV Transmission Line Project are anticipated to be in-service prior to construction of this Project; and the PowerOn Midwest Project construction will partially overlap with the construction of this Project.

As discussed in **Sections 1.2.1.2** and **3.3**, Dairyland received a Route Permit from the Commission on September 22, 2025 for a new 3.5-mile-long 161 kV transmission line from the existing Q-8 transmission line along 171st Avenue in York Township, Fillmore County to the Minnesota-Iowa state line, referred to as the Beaver Creek Transmission Line.[72] Four miles of Dairyland's existing Q-8 161 kV transmission line between 131st Avenue to 171st Avenue will be retired and removed; therefore, the 765 kV transmission line will be single circuit through this 4-mile section. Dairyland has proposed to install two dead-end structures on the proposed 765 kV line at 131st Street and 171st Street to interconnect Dairyland's existing Q-8, including the new Beaver Creek Transmission Line, and the Q-30 (to be renamed Q-48). Dairyland is currently working on obtaining the additional federal, state and local permits required for the project, with construction anticipated in 2nd quarter 2027.The Project is expected to provide a long-term beneficial impact to regional electric transmission infrastructure by increasing transmission capacity, enhancing system reliability, improving operational flexibility, and supporting the movement of electricity across the transmission network.

Construction and operation of the proposed 765 kV transmission line are not expected to adversely affect the long-term operation of existing transmission facilities in the area. However,

[72] Commission Docket No. E002/TL-24-95.

temporary, localized disruptions may occur during construction, particularly where the Project crosses, parallels, or interconnects with existing transmission lines and substations. Construction activities may require planned outages, temporary de-energization of existing facilities, line relocations, or other system modifications to maintain worker safety and system reliability. These activities would be coordinated with affected utilities and system operators to minimize service interruptions and maintain reliable electric service for customers.

Pipelines

Based on the current Project design, the Segment 1 Proposed Right-of-Way crosses the Magellan petroleum products pipeline at four locations. Segment 1 would also parallel the Magellan petroleum products pipeline for approximately 5 miles at a distance varying from 700 to 3,000 feet from the Proposed Alignment. Segment 1 does not cross the Northern Natural Gas pipeline, but does parallel the pipeline for approximately 2.5 miles at a distance varying from 4,000 to 6,000 feet from the Proposed Alignment.

Based on the current Project design, the Segment 2 Proposed Right-of-Way crosses the Northern Natural Gas pipelines in Olmsted and Fillmore counties twice on each pipeline. Segment 2 also parallels the pipeline located in Fillmore County for approximately 15 miles at a distance varying from 2,800 to 8,800 feet from the Proposed Alignment. The Segment 2 Proposed Right-of-Way also crosses the BP petroleum products pipeline twice.

Construction of the Project across or parallel to existing pipelines could result in temporary construction-related disturbances and may require coordination with pipeline owners to avoid damage to existing facilities. Construction activities near pipelines may require special crossing procedures, inspection by pipeline operators, and restrictions on excavation, blasting, grading, and vehicle crossings to ensure pipeline integrity and worker safety. Operationally, HVTLs can induce AC voltages onto nearby metallic pipelines through electromagnetic coupling. Depending on the length of parallel exposure, separation distance, pipeline characteristics, and transmission line loading, induced voltages could interfere with cathodic protection systems, increase corrosion risk, or create personnel safety concerns. These potential effects are typically evaluated through project-specific AC interference studies and can generally be mitigated through grounding, pipeline bonding, cathodic protection modifications, and other engineering measures.[73]

Solar Facilities

Known existing and proposed solar farm facilities are shown on the maps provided in **Appendix F**.

Based on current Project design, the Segment 1 Proposed Right-of-Way would intersect the proposed Lemon Hill Solar Project footprint in Viola Township, Olmsted County. The Lemon Hill Solar Project Environmental Assessment issued by the Commission in May 2026, indicates that Lemon Hill Solar, LLC anticipates initiating construction activities in 4th quarter 2026, with commercial operations in 4th quarter 2028.[74] Based on this schedule, the Lemon Hill Solar Project

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[73] Zhang, B., L. Li, Y. Zhang, and J. Wang. 2023. Study on the Interference Law of AC Transmission Lines on the Cathodic Protection Potential of Long-Distance Transmission Pipelines. *Magnetochemistry* 2023, 9(2), 75. Available online at: https://www.mdpi.com/2312-7481/9/3/75. Accessed July 2026.

[74] Minnesota Public Utilities Commission. 2026. Environmental Assessment: Lemon Hill Solar Project. Docket No. GS-25-126. Available online at: https://efiling.web.commerce.state.mn.us/documents/%7B40B26B9E-0000-CD14-8108-FF4AB4F86821%7D/download?contentSequence=0&rowIndex=62. Accessed July 2026.

would be operational prior to construction of Segment 1. As further discussed in **Section 4.4.1**, Xcel Energy has had discussions with representatives from Lemon Hill Solar and at this time there appears to be adequate room for the Project to cross the solar project. The Applicants have requested a wider Route Width in this area to allow for flexibility for routing in proximity to the solar facility (see **Section 3.1.1**).

On Segment 2, the 765 kV / 161 kV transmission line would split just north of the Louise Solar Project, owned by Geronimo Power, and the 161 kV transmission line would continue as a single-circuit along its current alignment to the existing Adams Substation through the solar farm. The 765 kV line would continue to the southeast outside of the solar farm until it reconnects with the 161 kV transmission right-of-way east of the Adams Substation (see **Appendix F**). The proposed 765 kV / 161 kV right-of-way also bisects the Fillmore County Solar Project, also owned by Geronimo Power, for approximately 0.75 miles. The Proposed Right-of-Way follows Dairyland's existing 161 kV transmission line right-of-way through the facility. The Proposed Alignment would be between 75 and 200 feet from the existing solar panels. Dairyland has initiated conversations with Geronimo Power and are currently conducting shading impact studies. As discussed in **Section 3.1.1**, the Applicants have requested a wider Route Width in this area to allow for flexibility for routing in proximity to the solar facility. Dairyland has initiated coordination with Geronimo Power regarding the Project.

Construction of a new 765 kV transmission line through an existing solar facility could result in temporary construction-related disturbances and temporarily reduce generating capacity. Long-term, the structure towers may cause shading, reducing the generating capacity of affected panel rows. The Project could also restrict the ability for future facility expansion and may require modifications to the solar facility's electrical grounding and collector systems. Most technical issues can be addressed through engineering design and coordination between the TO and solar facility operator.

Wind Facilities

Known existing and proposed wind farm facilities are shown on the maps provided in **Appendix F**.

The Segment 2 Proposed Right-of-Way intersects with the Prairie Star Project, owned by EDP Renewables North America LLC, and the Mower County Wind Center Project facilities, owned and operated by Xcel Energy, located in Mower County. The closest existing wind turbine to the Segment 2 Proposed Alignment in the Prairie Star Project is approximately 540 feet, and approximately 1,220 feet on the Mower County Wind Energy Center Project. Dairyland has contacted Xcel Energy to discuss the proposed Project and Xcel Energy did not identify any issues. As discussed in **Section 3.1.1**, the Applicants have requested a wider Route Width in this area to allow for flexibility for routing in proximity to the wind facilities.

Construction of the Project through or adjacent to existing wind energy facilities may result in temporary impacts associated with access restrictions, construction traffic, installation of transmission structures and conductors, and potential short-term turbine outages required to safely complete construction activities near operating turbines. Construction may also require coordination with wind facility operators to avoid conflicts with turbine maintenance activities and to protect existing infrastructure, including access roads, collector lines, communications systems, and substations. Operationally, the Project may introduce new visual elements within the wind farm landscape and could require ongoing coordination between the transmission line owner and wind facility operator to accommodate future maintenance activities involving large

cranes and equipment. Additional engineering evaluation may be necessary where turbines are located in close proximity to the transmission line to ensure adequate clearances are maintained under all operating conditions, including conductor sag and wind-induced conductor movement. Potential electromagnetic interference, induced-voltage effects, and interactions with wind facility communications and electrical systems are expected to be addressed through detailed design and industry-standard grounding and protection measures. With appropriate design, construction planning, and coordination with wind energy operators, long-term operational impacts are expected to be minimal.

Battery Energy Storage Facilities

No existing or proposed BESS are crossed by the Proposed Rights-of-Way; therefore, impacts are not anticipated and are not discussed further.

Public Communication

Construction of the Project may result in temporary impacts to public communication services, including internet, telephone, cable television, wireless communications, and fiber-optic networks, where construction activities occur near existing communications infrastructure. Potential construction impacts could include accidental damage to buried or overhead communications facilities, temporary service interruptions, restricted access to communications sites, and localized disruptions associated with excavation, structure installation, or access road construction. These impacts are generally short term and can typically be avoided or minimized through coordination with communications providers and implementation of standard utility protection practices.

Operational impacts to communications infrastructure are expected to be minimal. Transmission lines can generate electromagnetic noise associated with corona discharge; however, interference is generally limited to frequencies associated with certain AM radio broadcasts and typically dissipates rapidly beyond the transmission line right-of-way. Modern communications systems, including cellular, broadband, digital television, Global Positioning System (GPS), and public safety communication networks, generally operate at frequencies well above the range of transmission-line-generated electromagnetic noise and are not expected to experience adverse effects.

In some circumstances, transmission structures could create line-of-sight obstructions or affect microwave communication paths if located directly within a communications corridor. As discussed in **Section 6.4.4.1**, the Applicants completed a Microwave Path Analysis, which identified 34 paths associated with 13 microwave links that overlie Segment 1 and 71 paths associated with 33 microwave links that overlie Segment 2 (**Appendix N**). Transmission line towers located within the potentially affected Fresnel zones could create a physical obstruction that degrades signal performance and reliability. Additionally, catenary wires could also interfere with microwave links depending on tower placement and wire sag.

Based on the anticipated structure locations and heights, significant impacts to communications towers, public communication services, or emergency communications networks are not anticipated. Existing project documentation also notes that the distance between communication towers and the proposed transmission facilities is sufficient to avoid interference and that the Project is not expected to obstruct or degrade radio signals used by local emergency service providers. See **Section 6.5.1.2** for a discussion about electrical interference.

6.4.4.3 Mitigation Measures

Transportation

Roads

The Applicants will coordinate with MnDOT, counties, cities, and townships to obtain necessary permits and approvals and to develop appropriate traffic control measures for construction activities occurring near or across roadways. Construction will be conducted to maintain safe and efficient traffic flow to the extent practicable through the use of signage, flaggers, temporary lane closures, and other traffic management measures as appropriate. Disturbed roadway surfaces, shoulders, ditches, and drainage features will be repaired or restored following construction. The Project will be designed to maintain applicable roadway crossing clearances and comply with relevant engineering and safety standards, minimizing long-term impacts to transportation facilities and roadway users.

Railroads

The Applicants will coordinate with railroad owners and operators to obtain required approvals and ensure compliance with applicable railroad safety, design, and operational requirements. Transmission facilities will be designed to maintain required clearances over railroads, and construction activities will be conducted in accordance with railroad-approved work plans, safety procedures, and access requirements. Where necessary, grounding, bonding, shielding, or other engineering measures will be implemented to prevent interference with railroad signaling, communications, or electrical systems. Disturbed railroad property will be restored following construction, minimizing long-term impacts to railroad operations and infrastructure.

Airports

Potential impacts to airports and aviation facilities would be minimized through Project design, compliance with applicable FAA requirements, and coordination with airport operators and other aviation stakeholders. Transmission structures and conductors would be designed and located to avoid or minimize conflicts with airport approach, departure, and transitional airspace surfaces where practicable and to maintain structure heights below applicable FAA notification thresholds where feasible. Transmission structures are generally anticipated to be less than 200 feet above ground level, with the potential exception of structures at the Mississippi River crossing pending further coordination with the USFWS. Structures exceeding applicable FAA notification thresholds or potentially affecting protected airport airspace surfaces would undergo FAA obstruction evaluation and airspace review, as required, and FAA-recommended marking or lighting would be incorporated where necessary. During construction, the Applicants would coordinate the use of cranes and other temporary tall equipment with airport operators, as appropriate, and implement applicable aviation notifications and safety procedures to avoid interference with aircraft operations. With implementation of these design, coordination, and aviation safety measures, no substantial long-term impacts to airport functionality, aircraft operations, or aviation safety are anticipated.

Additional mitigation measures related to potential interference with agricultural aerial spraying operations are discussed in the AIMP (**Appendix H**).

Local and Regional Utilities

Electric Transmission Facilities

The Applicants will coordinate with affected TOs and operators throughout Project design and construction to identify and avoid potential conflicts with existing transmission facilities. The Project will be designed to maintain applicable electrical and safety clearances and comply with utility, NESC, and other applicable engineering standards. Construction activities near existing energized facilities will be conducted in accordance with utility safety requirements and may include protective grounding, temporary outages, or other measures necessary to maintain worker safety and system reliability. Any disturbed utility property will be restored following construction, and ongoing coordination with facility owners will occur to minimize impacts to transmission system operations and maintenance activities.

Pipelines

The Applicants will coordinate with pipeline owners and operators during Project design and construction to identify crossing requirements and avoid conflicts with existing pipeline facilities. Construction activities will comply with pipeline operator requirements and applicable safety standards. Where necessary, engineering evaluations will be conducted to assess potential induction effects associated with parallel transmission line segments. Appropriate grounding, bonding, cathodic protection modifications, or other mitigation measures will be implemented to maintain pipeline integrity and reduce personnel safety risks.

Solar Facilities

The Applicants will coordinate with affected solar facility owners and operators during design and construction to identify and minimize or avoid potential conflicts with existing solar infrastructure. Transmission structures, access routes, and work areas will be located to minimize impacts to solar arrays, collection systems, substations, and operational facilities to the extent practicable. Existing electrical and communications facilities will be identified and protected during construction, and access for solar facility operations and maintenance will be maintained. The Project will be designed to meet applicable electrical clearance and safety standards, and disturbed areas will be restored following construction to minimize long-term impacts to solar energy facilities and operations.

Wind Facilities

The Applicants will coordinate with affected wind energy facility owners and operators during design and construction to identify and minimize or avoid potential conflicts with existing wind energy infrastructure. Transmission structures and access routes will be located to minimize impacts to turbines, collector systems, substations, communications facilities, and maintenance operations to the extent practicable. Existing wind facility infrastructure will be identified and protected during construction, and access for operations and maintenance will be maintained. The Project will be designed to maintain applicable electrical, operational, and safety clearances and may include additional engineering analyses to evaluate turbine clearances, conductor behavior, grounding, and electromagnetic compatibility. Through coordination, design, and implementation of standard construction and operational practices, long-term impacts to wind energy facilities are expected to be minimal.

Battery Energy Storage Facilities

No existing or proposed BESS occur within or adjacent to the Proposed Routes; therefore, mitigation measures are not proposed for these facilities.

Public Communication

The Applicants will use the results of the Microwave Path Analysis (see **Appendix N**) during the design and siting of structures to avoid communication interference. The Applicants will coordinate with communications providers and utility owners during Project design and construction to identify and protect existing communications infrastructure, including internet, telephone, cable television, wireless, and fiber-optic facilities. Utility locating, damage prevention, and construction BMPs, such as potholing, and/or installing protective mats over utilities, will be implemented to minimize the potential for service disruptions. Where necessary, engineering evaluations and appropriate grounding, shielding, separation, or other design measures will be incorporated to address potential interference concerns. Access to communications facilities will be maintained throughout construction, and any damaged facilities will be repaired or restored in coordination with the facility owner, minimizing impacts to public communication services.

6.4.4.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include several conditions and mitigation measures relevant to public services and transportation, including:

- Section 5.3.4 of the Sample Route Permit is a standard condition that requires the permittee to minimize disruption to public services or public utilities, promptly restore service to disrupted public services or public utilities, work with landowners and local entities to determine mitigation measures where any impacts to utilities have the potential to occur, and coordinate with county and city road authorities to develop appropriate signage and traffic management during construction.

- Section 5.3.14 is a standard condition that requires the permittee to advise the appropriate governing bodies having jurisdiction over the roads that will be used during construction, use existing roadways for all construction activities where practical, and obtain required permits and approvals to haul oversize or overweight loads across public roads.

- Section 5.4.3 is a standard condition that requires permittees to take whatever action is feasible to restore or provide equivalent reception should interference occur to “radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices” as a result of the Project.

- Section 5.5.1 is a standard condition that requires the permittee to design the project to meet or exceed all relevant local and state codes, the NESC, and NERC requirements regarding standards relating to clearance to crossing utilities and clearances over roadways.

6.4.5 Aesthetics

This section evaluates potential aesthetic impacts associated with construction and operation of the Project. The assessment considers changes to visual character resulting from transmission

structures, conductors, switching station, right-of-way maintenance, and other Project facilities, as well as how those changes may be experienced by residents, landowners, recreation users, and travelers. The section also identifies measures incorporated into Project routing, design, and construction planning to avoid, minimize, and mitigate aesthetic impacts.

Representative photographs and visual simulations are provided in **Appendix M**. The visual simulations were developed in response to the Certificate of Need Order Points 6(c) and 6(d) filed on April 26, 2026. The visual simulations were prepared with industry standard methodology. The visual simulations were prepared using three locations in the Project area — one in Segment 1 of the Project area, one in a flat agricultural area of Segment 2, and one in the Driftless Area of Segment 2. Structure locations, size, configuration, and spacing shown in the visual simulations are reflective of preliminary design, which is subject to change.

The Project team selected the following locations for the visual simulations:

- Segment 1: Location is at the Project crossing of U.S. Highway 14 between Chester and Eyota, Minnesota. Location is representative of Segment 1 typical landscape with agricultural land use and gently rolling hills. Location is representative of Segment 1 greenfield construction with only electrical distribution lines currently present.

- Segment 2 (Agricultural): Location is at the Project crossing of 295th Avenue 2.5 miles west of Harmony, Minnesota. Location is representative of Segment 2 typical landscape with agricultural land use and gently rolling hills. Location is representative of Segment 2 double-circuit structures, an existing 161kV transmission line to be relocated to Project structures, and existing electrical distribution lines.

- Segment 2 (Driftless): Location is at Project crossing of County Road 5, 5.5 miles south southeast of Caledonia, Minnesota in the Winnebago Creek valley. Location is representative of Segment 2 Driftless landscape with steep, tree covered valley walls and agricultural land use on valley floors. Location is representative of Segment 2 double-circuit structures replacing an existing 161kV transmission line.

Each location includes an image of existing conditions and visual simulations from as close as possible to one quarter mile, one-half mile, and one mile from the identified location showing a four-legged lattice structure like that proposed for the Project. The Segment 2 (Driftless) locations vary slightly in distance due to accessibility in rugged terrain with limited road options. Each attachment also includes an inset map showing the location of the simulation.

The camera sensor and focal length of the lens used to photograph the view determines its horizontal angle of view. These photos were taken using a focal length of 50 millimeters (mm) on a 35 mm film. If printed, the simulations should be printed so that the image is 16 inches wide. The appropriate viewing distance for photographs printed in landscape mode on tabloid (16 inch wide) sheets is approximately 22 inches (arm’s length). This will represent Project elements in their appropriate scale as they would be if seen at the viewpoint.

6.4.5.1 Existing Conditions

The Project is located within a predominantly rural landscape characterized by agricultural lands, dispersed residences and farmsteads, small communities, transportation rights-of-way, and existing utility and energy infrastructure. The visual setting consists primarily of open agricultural fields, rolling topography, woodlots, shelterbelts, stream corridors, and rural development typical

of southeastern Minnesota. The open nature of much of the landscape allows for relatively long viewing distances and visibility of both natural and human-made features.

Existing infrastructure is a prominent component of the visual environment throughout much of the Project. Common visual features include local roads, county roads, state highways, I-90, railroads, electrical substations, overhead transmission and distribution lines, communication towers, wind turbines, solar facilities, and agricultural infrastructure. Existing utility rights-of-way, transmission lines, substations, renewable energy facilities, and transportation infrastructure already contribute to the visual character of many portions of the Project, particularly along Segment 2 where the proposed route is largely co-located with an existing transmission rights-of-way. Additional infrastructure within the broader viewshed includes underground pipelines, airports, heliports, and other communication and transportation facilities described in **Section 6.4.4**.

The Project traverses portions of the Rochester Plateau, Oak Savanna, and Blufflands Ecological Subsections (see **Section 6.3** and **Figure 10**). The Rochester Plateau and Oak Savanna are dominated by row-crop agriculture and rural development, where roads, farmsteads, transmission lines, communication towers, wind turbines, solar facilities, and other infrastructure are common components of the landscape. In contrast, The Blufflands region contains steep wooded bluffs, forested valleys, exposed bedrock, trout streams, and river corridors that create a more visually distinctive landscape.

Segment 1 traverses primarily agricultural landscapes and rural communities where existing infrastructure includes transportation rights-of-way, transmission lines, substations, communication towers, and other utility facilities.

Segment 2 crosses a similar agricultural setting but is distinguished by extensive co-location with Dairyland's existing Q-4/Q-8/Q-7 transmission rights-of-way and the presence of existing substations, transmission facilities, wind energy facilities, and utility-scale solar projects. As a result, much of Segment 2 already exhibits a developed utility and energy infrastructure character. The eastern portion of Segment 2 traverses The Blufflands and Mississippi River Valley, including several designated scenic byways and other visual resources.

Segment 2 also crosses several designated scenic and historic travel corridors, including the Shooting Star Scenic Byway, Historic Bluff Country Scenic Byway, Great River Road National Scenic Byway, and the Laura Ingalls Wilder Historic Highway managed by MnDOT. These routes provide important public viewing opportunities from which travelers experience the surrounding agricultural landscapes, blufflands, river valleys, forests, and rural communities. Existing views from these roads include a combination of natural features, agricultural land uses, transportation infrastructure, renewable energy facilities, and existing utility infrastructure.

The Q-9 Proposed Route occurs entirely within The Blufflands and is characterized by a combination of agricultural uplands, wooded slopes, forested valleys, and existing transmission infrastructure.

Key visual resources within the Project Area include residences and farmsteads, public roadways, scenic byways, recreational areas, The Blufflands region, and the Mississippi River Valley. Existing views throughout the Project Area range from highly modified landscapes containing transmission lines, substations, transportation rights-of-way, renewable energy facilities, and other infrastructure to settings where natural landforms, forests, river valleys, and recreational resources dominate the viewshed.

6.4.5.2 Potential Impacts

The ROI for aesthetics includes areas where Project facilities may be visible to residents, landowners, recreation users, and travelers. While the Project Area extends 1 mile from the Proposed Alignments, visual effects may extend beyond this distance depending on topography, vegetation, viewing location, atmospheric conditions, and the height of Project facilities.

Impacts to aesthetics depend on both the characteristics of the Project facilities and the setting in which they are viewed. Factors influencing aesthetic impacts include viewing distance, viewer sensitivity, existing landscape character, topography, vegetation, and the extent to which utility and transportation infrastructure are already present within the viewshed. In general, visual changes would be most noticeable to nearby viewers and would diminish with increasing distance from Project facilities. There are 81 residents located within 0.5 mile of the Proposed Alignments, as discussed in **Section 6.4.3**.

Construction would result in temporary aesthetic impacts associated with construction equipment, staging areas, access roads, vegetation disturbance, and construction personnel. Larger equipment such as cranes and helicopters may be visible over relatively long distances and temporarily draw attention within the landscape. Following construction, these temporary effects would cease; however, transmission structures, conductors, maintained rights-of-way, and associated facilities would remain for the operational life of the Project.

The proposed 765 kV facilities would utilize galvanized steel lattice structures generally ranging from approximately 150 to 199 feet in height typically within a 250-foot-wide maintained right-of-way. Structure footprints would generally range from approximately 45 feet by 45 feet to 60 feet by 60 feet (see technical diagrams provided in **Appendix B** and visual simulations provided in **Appendix M**). Aeronautical safety markings and avian diverters may also be installed, where necessary, on the transmission lines. The right-of-way would be cleared of tall woody vegetation as described in **Section 5.3.4** and would be periodically maintained to comply with required electrical clearances (see Section 10 of the VMP provided in **Appendix I**). These structures would be taller and more visually prominent than most existing landscape features and would increase the visibility of utility infrastructure within the Project Area. The degree of visual change would vary based on existing land uses, infrastructure, and scenic quality.

Segment 1

Segment 1 would introduce a new high-voltage transmission right-of-way across predominantly agricultural and rural landscapes. Impacts to aesthetics would be most noticeable from nearby residences, farmsteads, public roadways, and recreational areas, particularly within open agricultural settings where long views are common. In these areas, the transmission structures and conductors would become prominent visual features and increase the overall presence of utility infrastructure within the viewshed. Nighttime aesthetic impacts are expected to be limited because the transmission structures would not typically require aviation lighting where structure heights remain below FAA notification thresholds (i.e., 200 feet); however, any structures that exceed applicable FAA criteria or require marking due to site-specific aviation considerations could introduce additional nighttime visibility.

Overall, Segment 1 would result in a moderate to significant long-term aesthetic impact due to the introduction of a new high-voltage transmission right-of-way. Impacts would generally be greatest in open agricultural landscapes and visually sensitive portions of The Blufflands and less

pronounced in areas where existing utility or transportation infrastructure already contributes to landscape character.

Segment 2

Segment 2 would result in a long-term visual change associated with larger transmission structures, a wider maintained right-of-way, and expanded utility infrastructure. However, aesthetic impacts would be moderated by the fact that approximately 93 percent of the route is co-located with Dairyland's existing Q-4/Q-8/Q-7 transmission rights-of-way. Throughout the Rochester Plateau and Oak Savanna Subsections, the proposed facilities would be viewed within working agricultural landscapes that already contain transmission lines, substations, roads, farmsteads, communication towers, wind turbines, solar facilities, and other infrastructure, as further discussed in **Section 6.4.4**.

Because the Project would largely replace existing transmission infrastructure rather than introduce a new right-of-way, aesthetic impacts would primarily be experienced as an increase in the height, scale, and visibility of an existing utility feature. As discussed in **Section 1.2.1.2**, the existing H-frame transmission structures associated with Dairyland's Q-4/Q-8/Q-7 161 kV transmission rights-of-way generally range from approximately 80 to 120 feet tall, and would be replaced by double-circuit facilities that are 30 to 119 feet taller and would be visible over greater distances and occupy a more prominent position within the landscape (see **Appendix M**). Although the new structures would be taller, because there would also be longer spans in between structures, there would be fewer lattice structures than the currently installed H-frame structures. Although the larger structures would increase the visual prominence of the transmission line infrastructure, the overall change would generally be less pronounced than where transmission infrastructure is currently absent.

Existing utility infrastructure influences much of Segment 2, including the Adams and Harmony substations, the existing Q-4/Q-8/Q-7 161 kV transmission rights-of-way, and numerous transmission line crossings (see **Section 6.4.4**). Portions of Segment 2 also pass through areas containing existing wind turbines and utility-scale solar facilities (see **Section 6.4.4**). In these locations, viewers already experience large-scale energy infrastructure as part of the existing landscape. The overall visual contrast would generally be less substantial than in areas where transmission facilities, substations, wind turbines, solar farms, and other utility infrastructure are not already present.

Motorists, recreation users, and other viewers near The Blufflands, Mississippi River Valley, and designated scenic and historic routes such as the Shooting Star Scenic Byway, Historic Bluff Country Scenic Byway, Great River Road National Scenic Byway, and Laura Ingalls Wilder Historic Highway may experience views of taller transmission structures within landscapes valued for their scenic quality. The magnitude of these impacts would vary depending on viewing distance, vegetation screening, topography, and the extent to which existing utility infrastructure is already present within a particular view.

The proposed Jefferson Ridge Switching Station would also introduce a new utility facility into the landscape. Although the facility would be located adjacent to existing transmission infrastructure, it would create a new long-term visual feature visible from nearby roads and properties. Impacts associated with the switching station would generally be localized and diminish with increasing distance.

The selected conductor design was chosen, in part, to reduce conductor sag and blowout and thereby help minimize structure heights and optimize use of the Proposed Right-of-Way. As a result, certain visual effects may be reduced relative to other design alternatives that would require taller structures or wider rights-of-way.

Overall, Segment 2 would result in a moderate long-term aesthetic impact that would primarily reflect the expansion and intensification of an existing utility right-of-way rather than the introduction of a new right-of-way.

Q-9 Proposed Route

Construction and operation of the Q-9 Proposed Route would result in a localized long-term visual change associated with approximately 1.2 miles of relocated 161 kV transmission facilities. The reroute would utilize steel monopole structures generally ranging from approximately 75 to 145 feet in height. Because the reroute is relatively short and occurs within an area where transmission infrastructure is already present, impacts to aesthetics would generally be less substantial than those associated with the proposed 765 kV facilities.

The Q-9 Proposed Route is located entirely within The Blufflands and would be viewed within a landscape characterized by wooded bluffs, forested valleys, agricultural ridgelines, and existing transmission infrastructure. Visibility would vary depending on topography and vegetation. Open agricultural areas and ridgelines may provide longer views of the structures, while forested slopes and valley landforms would provide screening in many locations (see **Section 6.8.4**).

Impacts to aesthetics would be most noticeable to nearby residences, farmsteads, and local road users, particularly where structures are visible against scenic Blufflands backdrops. However, the relatively short length of the reroute, lower structure heights, partial co-location with existing roads and transmission facilities, and the screening effects of topography and vegetation would limit the overall magnitude of visual change.

Overall, the Q-9 Proposed Route would result in a low to moderate long-term aesthetic impacts. Impacts would be localized and would diminish with distance from the transmission line, particularly where existing vegetation and landforms limit visibility.

6.4.5.3 Mitigation Measures

Aesthetic impacts would be mitigated through co-location with existing utility and transportation rights-of-way where practicable, preservation of existing vegetation and natural screening features, restoration and revegetation of disturbed areas, careful consideration of visually sensitive resources during final facility design, and ongoing coordination with landowners and agencies.

For the 765 kV transmission line, a primary mitigation measure is co-location with existing infrastructure. Approximately 93 percent of Segment 2 is co-located with Dairyland's existing Q-4/Q-8/Q-7 161 kV transmission rights-of-way, and portions of Segment 1 utilize existing transportation rights-of-way where feasible. As discussed in **Section 1.2.1.2**, there would also be fewer structures along Segment 2 than are currently installed on the existing 161 kV transmission line.

The Applicants will preserve existing vegetation and natural screening features to the extent compatible with safety, reliability, and operational requirements. Where feasible, shelterbelts,

woodland edges, living snow fences, streamside vegetation, and other natural screening features will be retained, particularly near residences, roadways, recreational resources, scenic byways, and other visually sensitive areas. Disturbed areas will be restored and revegetated in accordance with the VMP (**Appendix I**).

Final structure locations will be refined during detailed engineering. Where practicable, structures will be sited to take advantage of existing topography, vegetation, and landform screening and to reduce visibility from residences, public roads, recreation areas, scenic byways, and other sensitive viewpoints. Particular attention will be given to visually sensitive areas including The Blufflands, Mississippi River Valley, scenic byways, recreational corridors, and designated viewpoints.

The selected structure type also serves as an important aesthetic mitigation measure. According to guidance published by the Bureau of Land Management,[75] lattice transmission structures are generally preferred over monopole structures in rural landscapes where viewing distances exceed one-half mile because the open framework allows background landscapes to remain visible through the structure, reducing perceived visual mass. The Project's self-supporting lattice structures are therefore expected to be less visually impactful than comparable monopole structures in both open agricultural settings and in Bluffland areas where structures may be visible on ridgelines or elevated terrain. By allowing greater visual permeability than solid monopole structures, the lattice design may reduce visual contrast and help the structures blend more effectively into the broader landscape.

The Applicants will continue to coordinate with landowners, local governments, and resource agencies during final design to identify opportunities to further minimize aesthetic impacts. This includes ongoing coordination with MnDOT, the Mississippi River Parkway Commission, and the MDNR regarding scenic, recreational, and visually sensitive resources. As described further in **Section 7.2.5**, the Applicants met with MnDOT on June 16, 2026, and will submit an Early Notification Memo describing where the Project would cross or co-locate with MnDOT right-of-way.

Jefferson Ridge Switching Station

Aesthetic impacts associated with the Jefferson Ridge Switching Station would be minimized through siting the facility adjacent to existing transmission infrastructure, retaining existing vegetation outside of required safety clearances where feasible, and restoring disturbed areas following construction. The Applicants do not currently anticipate installing lighting at the Jefferson Ridge Switching Station but would install shielded and downward facing lighting in the future, if needed. Because the switching station would occupy a relatively small footprint and be located within an existing utility setting, aesthetic impacts are expected to be localized and diminish with distance.

Q-9 Reroute

Aesthetic impacts associated with the Q-9 Proposed Route would be minimized through the use of a relatively short alignment, partial co-location with existing roads and transmission

[75] Bureau of Land Management. 2013. Reducing Visual Impacts of Renewable Energy Facilities. Available online at: https://www.blm.gov/sites/default/files/docs/2025-09/BLM_RenewableEnergyVisualBMPs_LowRes.pdf. Accessed July 2026

infrastructure, retention of existing vegetation where feasible, and final structure siting that considers topography, residences, roads, and other sensitive viewing locations. Preservation of woodland edges, stream corridor vegetation, and other natural screening features common within The Blufflands would further reduce visibility and help maintain the scenic character of the surrounding landscape.

6.4.5.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures to mitigate aesthetic impacts, including:

- Section 5.3.7 of the Sample Route Permit requires the permittee to consider input pertaining to visual impacts from landowners and land management agencies prior to the final location of structures, right-of-way, and other potential visual disturbance areas. In addition, the permittee is required to use care to preserve the natural landscape, minimize tree removal, and prevent any unnecessary destruction of the natural surroundings in the vicinity of the transmission facilities during construction and maintenance.

6.4.6 Recreation and Managed Lands

6.4.6.1 Existing Conditions

The recreation and managed lands ROI includes all recreational facilities, trails, water trails, and publicly managed conservation lands located within 1 mile of the Project, referred to as the Project Area. Resources identified within the ROI include USFWS-managed refuge lands, state forests, SNAs, WMAs, aquatic management areas (AMAs), MDNR-managed state trails, state water trails, snowmobile trail systems, and private recreational facilities. **Table 6.4.6-1** summarizes the recreational and managed land resources located within the Project Area and their relationship to the Proposed Routes and Rights-of-Way, which are also depicted in **Figure 14** and in **Appendix F**.

In addition to the recreational resources identified in **Table 6.4.6-1**, the Project Area contains numerous public fishing opportunities associated with rivers, streams, and designated trout streams. Cold-water trout streams throughout southeastern Minnesota provide recreational angling opportunities, while larger waterways such as the Zumbro River and Mississippi River support a variety of fishing and water-based recreational activities. Public access to these resources is available through state water trails, AMAs, WMAs, and other publicly accessible lands within the Project Area (see **Figures 14** and **18**). Additional information on surface water resources, including trout streams, is discussed in **Section 6.8.7**.

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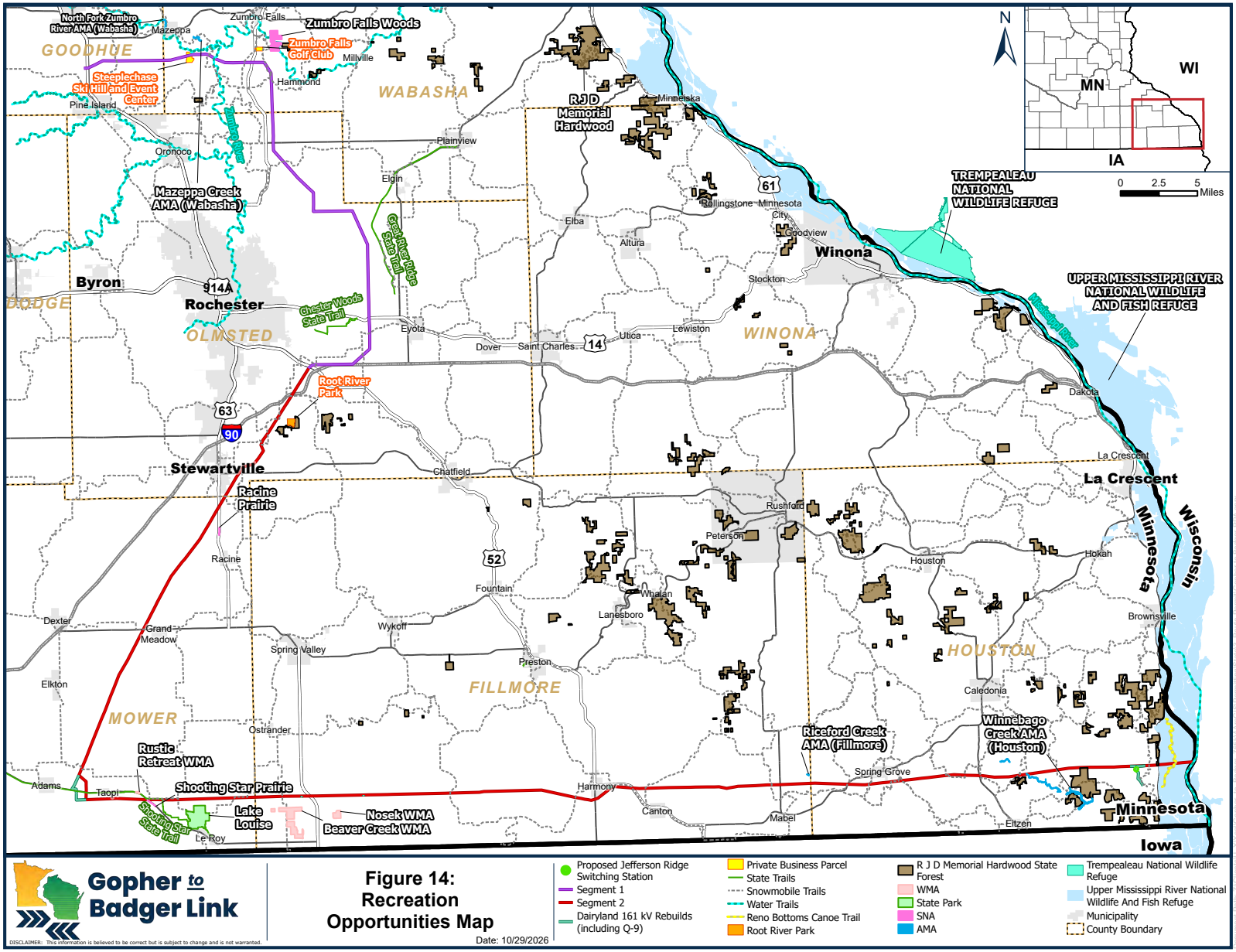
North Fork Zumbro River AMA (Wabasha)
Zumbro Falls
Zumbro Falls Woods
Mazeppa
GOODHUE
Zumbro Falls Golf Club
Millville
Steeplechase Ski Hill and Event Center
Hammond
WABASHA
Pine Island
Zumbro River
Plainview
Oronoco
Elgin
Mazeppa Creek AMA (Wabasha)
Great River Ridge State Trail
R J D Memorial Hardwood
Minneiska
61
Rollingstone
Minnesota City
Elba
Altura
Goodview
Winona
TREMPEALEAU NATIONAL WILDLIFE REFUGE
N
WI
MN
IA
0 2.5 5 Miles
Byron
DODGE
14A
Rochester
Chester Woods State Trail
OLMSTED
Eyota
Dover
Saint Charles
14
Utica
Lewiston
WINONA
Stockton
UPPER MISSISSIPPI RIVER NATIONAL WILDLIFE AND FISH REFUGE
Mississippi River
Root River Park
63
90
Stewartville
Chatfield
Dakota
La Crescent
Racine Prairie
Rushford
Peterson
Racine
52
Houston
Hokah
Minnesota
Wisconsin
Fountain
Whalan
Lanesboro
Brownsville
Dexter
Grand Meadow
Wykoff
Spring Valley
Preston
HOUSTON
FILLMORE
Elkton
Caledonia
MOWER
Ostrander
Riceford Creek AMA (Fillmore)
Winnebago Creek AMA (Houston)
Rustic Retreat WMA
Spring Grove
Adams
Taopi
Shooting Star Prairie
Harmony
Shooting Star State Trail
Lake Louise
Nosek WMA
Beaver Creek WMA
Canton
Mabel
Le Roy
Elzen
Minnesota
Iowa
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 14: Recreation Opportunities Map
Date: 10/29/2026
Proposed Jefferson Ridge Switching Station
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Private Business Parcel
State Trails
Snowmobile Trails
Water Trails
Reno Bottoms Canoe Trail
Root River Park
R J D Memorial Hardwood State Forest
WMA
State Park
SNA
AMA
Trempealeau National Wildlife Refuge
Upper Mississippi River National Wildlife And Fish Refuge
Municipality
County Boundary

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Federally Managed Recreational Areas

The USFWS Upper Mississippi River NWFR is the only federal land crossed by the Project and is one of the most significant wildlife conservation and recreation resources within the Project Area. Established in 1924, the NWFR extends approximately 261 river miles along the Mississippi River from Wabasha, Minnesota, to Rock Island, Illinois, and protects more than 240,000 acres of river floodplain habitat. The refuge was established to conserve fish, wildlife, plants, and migratory bird habitat associated with the Upper Mississippi River corridor and remains one of the premier conservation areas within the Mississippi Flyway. The refuge is recognized as a Wetland of International Importance under the Ramsar Convention and a Global IBA due to its ecological significance and value to migratory birds, fish, and other wildlife. It receives more than 3.7 million recreational visits annually. The Ramsar Convention is further discussed in **Section 6.8.7** and IBAs are discussed in **Section 6.8.9**.

In addition to its conservation function, the refuge provides a wide variety of public recreation opportunities. Recreational uses include hunting, fishing, boating, paddling, wildlife observation, birdwatching, photography, environmental education, and other nature-based activities. The refuge encompasses a diverse mosaic of backwater lakes, side channels, wetlands, islands, floodplain forests, and open river habitats that support both recreational use and wildlife conservation. The Mississippi River corridor within the refuge is widely recognized for its scenic character, waterfowl migrations, bald eagle concentrations, and river-based recreation opportunities.[76]

The Segment 2 Proposed Route crosses approximately 392 acres of the NWFR along Dairyland's existing Q-7 161-kV transmission line right-of-way at the Mississippi River crossing in Houston County (see **Figure 14**). The crossing occurs within an area that is already occupied by existing transmission infrastructure and associated right-of-way, consistent with the Applicants' objective of utilizing existing utility rights-of-way where practicable. The Applicants have coordinated, and will continue to coordinate, with the USFWS regarding the refuge crossing and associated federal interests. Previous USFWS correspondence recommended minimizing habitat fragmentation and utilizing existing developed rights-of-way where feasible, which the Applicants would achieve by using the existing 200-foot-wide transmission right-of-way without any further expansion through the NWFR as previously described in **Sections 1.2.1.2** and **1.2.1.3**.

State-Managed Recreational Areas

Lake Louise State Park

Lake Louise State Park is an MDNR state park located in Mower County near Le Roy, Minnesota, and is approximately 0.3 miles from the Proposed Route at its closest point and is not crossed by the Proposed Route (see **Figure 14**). The park was established to protect and provide public access to the scenic landscape surrounding Lake Louise and portions of the Upper Iowa and Little Iowa River corridors.

Lake Louise State Park supports a wide range of year-round recreational opportunities. Popular activities include hiking, horseback riding, bicycling, camping, fishing, paddling, swimming, picnicking, wildlife observation, and nature study. The park is traversed by the Shooting Star State

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[76] USFWS. 2026. Upper Mississippi River National Wildlife and Fish Refuge. Available online at: https://www.fws.gov/refuge/upper-mississippi-river. Accessed July 2026.

Trail, a paved multi-use trail that provides regional bicycle and pedestrian connectivity through southeastern Minnesota. The park's trail system passes through a variety of habitats, including hardwood woodlands, open meadows, and riparian areas, providing visitors with opportunities to experience the area's natural scenery and wildlife resources. Lake Louise itself supports fishing, boating, paddling, and swimming, while picnic facilities, campgrounds, and equestrian trails contribute to the park's recreational appeal.[77]

In this area, the Proposed Route is generally co-located with existing transmission infrastructure and remains outside park boundaries. Because of its variety of recreational facilities, connection to the Shooting Star State Trail, and popularity for outdoor recreation activities, Lake Louise State Park is an important public recreation resource within the Project vicinity.

Richard J. Dorer Memorial Hardwood State Forest

The Richard J. Dorer (RJD) Memorial Hardwood State Forest is one of Minnesota's largest and most significant state forest systems, encompassing more than 1 million acres across southeastern Minnesota, including portions of Dakota, Goodhue, Wabasha, Winona, Olmsted, Fillmore, and Houston Counties. Established in 1961, the forest was created to restore and conserve the region's hardwood forest ecosystems, improve wildlife habitat, reduce soil erosion, stabilize stream corridors, and support sustainable timber production. Unlike most state forests, the RJD Memorial Hardwood State Forest consists of a mosaic of non-contiguous public and private lands distributed throughout the Driftless Area. Although the state forest boundary encompasses more than 1 million acres, only about 45,000 acres are publicly owned and managed by the MDNR. The remaining acres are privately-owned. The forest plays an important role in protecting the region's steep blufflands, mature hardwood forests, cold-water stream systems, and wildlife habitat while providing opportunities for public recreation and natural resource management.[78]

The RJD Memorial Hardwood State Forest is a regionally important recreation destination that supports a wide variety of year-round outdoor recreation activities. Public lands within the forest provide opportunities for hiking, hunting, wildlife observation, birdwatching, dispersed camping, horseback riding, mountain biking, snowshoeing, cross-country skiing, snowmobiling, and off-highway vehicle use in designated areas. Numerous trout streams, scenic bluffland landscapes, and several State Water Trails—including portions of the Mississippi, Root, Whitewater, Zumbro, and Cannon Rivers—occur within the state forest boundary and contribute to a diverse recreation experience that attracts local residents and visitors from throughout the region. The forest is widely recognized for its scenic hardwood forests, fall color viewing opportunities, bird habitat, and outdoor recreation opportunities associated with southeastern Minnesota's unique karst and bluffland environment. [79]

Segment 2 of the Proposed Route crosses approximately 297 acres of the RJD Memorial Hardwood State Forest, primarily within Houston County. These lands consist of forested blufflands and associated natural resource areas managed by the MDNR for multiple uses, including sustainable forestry, wildlife habitat conservation, watershed protection, and public

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77 MDNR. 2026. Lake Louise State Park. Available online at: https://www.dnr.state.mn.us/state_parks/park.html?id=spk00214#homepage. Accessed July 2026

78 MDNR. 2026. Richard J. Dorer Memorial Hardwood Forest. Available online at: https://www.dnr.state.mn.us/state_forests/forest.html?id=sft00033#homepage. Accessed July 2026.

79 MDNR. 2026. Richard J. Dorer Memorial Hardwood Forest. Available online at: https://www.dnr.state.mn.us/state_forests/forest.html?id=sft00033#homepage. Accessed July 2026.

recreation. The state forest lands crossed by the Proposed Route contribute to the larger network of publicly accessible natural areas within southeastern Minnesota and provide opportunities for dispersed recreation activities such as hunting, hiking, wildlife observation, nature study, and seasonal recreation. The Proposed Route is generally co-located with existing utility infrastructure where it traverses state forest lands.

Scientific and Natural Areas

SNAs are lands administered by the MDNR to protect outstanding NPCs, rare species habitat, geologic features, and other natural features of exceptional scientific and educational value. SNAs are established to preserve examples of Minnesota's natural heritage and provide opportunities for nature observation, scientific research, environmental education, and other low-impact recreational activities. Unlike many other public recreation lands, management of SNAs emphasizes long-term resource protection and ecological preservation, with public uses generally limited to activities that are compatible with conservation objectives. The SNA system protects some of the state's highest-quality remnant prairies, forests, wetlands, and other native ecosystems.

Several SNAs occur within the Project Area (see **Figure 14**). The Zumbro Falls Woods SNA occurs within the Project Area but is not crossed by the Proposed Routes. The SNA contributes to the protection of native forest communities. Based on coordination with the MDNR, the Applicants revised the Segment 2 Proposed Route to avoid the Racine Prairie SNA; however, the Segment 2 Proposed Route crosses 2.5 acres of Shooting Star Prairie SNA. Both SNAs were designated to protect native prairie communities and associated ecological resources that are increasingly uncommon within Minnesota's landscape.

Minnesota’s Outdoor Recreation System classification identifies SNAs as lands managed for the preservation and protection of areas containing natural features of exceptional scientific and educational value (Minn. Stat. § 86A.05, subd. 5). Similarly, transmission line routing criteria require consideration of effects on rare and unique natural resources and public conservation lands during route selection. Consistent with these policies, the Applicants sought to avoid and minimize impacts to SNAs during route development and incorporated additional route width in the vicinity of the Shooting Star Prairie SNA to provide flexibility during final alignment selection.

As discussed in **Section 3.1.1**, the wider Proposed Routes in these locations allows the Applicants to refine the final alignment, structure placements, access routes, and other design features during detailed engineering to avoid or minimize impacts to SNAs and other sensitive environmental resources to the extent practicable. Consequently, the acreage identified within the Proposed Routes represents the route evaluated for permitting purposes and does not indicate that the final transmission line alignment will necessarily cross these protected natural areas. Rather, the expanded route width was intentionally developed to provide opportunities to avoid or reduce impacts to SNAs, wetlands, cultural resources, residences, and other environmental constraints during subsequent project design. The MPUC routing process is further discussed in **Section 2**.

Wildlife Management Areas

WMAs are lands administered by the MDNR to conserve, enhance, and manage wildlife habitat while providing opportunities for wildlife-based recreation. WMAs are a key component of Minnesota’s outdoor recreation system and include a variety of habitat types, such as forests, grasslands, wetlands, riparian corridors, and native prairie communities. Management objectives

generally focus on maintaining and improving habitat for game and nongame wildlife species while supporting public recreation opportunities including hunting, trapping, wildlife observation, birdwatching, photography, hiking, and other nature-based activities.[80]

As shown in **Table 6.4.6-1**, the Beaver Creek WMA, Cartney Slough WMA and Nosek WMA occur within the Project Area but are not crossed by the Proposed Routes. These WMAs contribute to the network of publicly accessible wildlife habitats and recreation lands in southeastern Minnesota and support wildlife conservation and wildlife-dependent recreational uses. The Segment 2 Proposed Route crosses 16.2 acres of the Rustic Retreat WMA. The Segment 2 Proposed Route crosses a portion of the WMA where the Project is generally co-located with existing utility infrastructure.

Aquatic Management Areas

AMAs are lands administered by the MDNR to protect aquatic and riparian habitats, support fisheries management, maintain public access to lakes, rivers, and streams, and provide opportunities for fishing and other compatible outdoor recreation. AMAs are commonly located along rivers, streams, and lakes and may include publicly owned lands, conservation easements, stream corridors, wetlands, and floodplain habitats. Management objectives generally focus on protecting water quality, conserving fish and wildlife habitat, maintaining public access, and supporting recreational uses associated with aquatic resources. AMAs are an important component of Minnesota's outdoor recreation and natural resource management system, particularly in southeastern Minnesota where many AMAs are associated with cold-water stream systems and trout fisheries.[81]

Several AMAs occur within the Project Area, including the Mazeppa Creek, Zumbro River, Riceford Creek, and Winnebago Creek AMAs. As shown in **Table 6.4.6-1**, the Mazeppa Creek, Zumbro River, and Riceford Creek AMAs occur within the Project Area but are not crossed by the Proposed Routes.[82] Segment 2 of the Proposed Route crosses approximately 3.7 acres of the Winnebago Creek AMA. The AMA is associated with Winnebago Creek, a high-quality cold-water stream in Houston County that supports trout habitat and recreational fishing opportunities.[83] The Segment 2 Proposed Route crosses a portion of the AMA where it is co-located with existing utility infrastructure.

Locally Managed Recreational Areas

Root River Park is a 126-acre Olmsted County park located along the Root River between the City of Rochester and Stewartville. The park provides opportunities for hiking, fishing, picnicking, horseback riding, and nature-based recreation. A two-mile loop trail extends through meadows, wooded hills, and areas along the Root River, providing access to the park's natural and scenic

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80 MDNR. 2026. Wildlife Management Areas. Available online at: https://www.dnr.state.mn.us/wmas/index.html. Accessed July 2026.

81 MDNR. 2026. Aquatic Management Areas. Available online at: https://www.dnr.state.mn.us/amas/index.html. Accessed July 2026.

82 MDNR. 2026. Stateland Interest Easements. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/plan_stateland_dnr/FeatureServer/7. Accessed July 2026.

83 MDNR. 2026. Winnebago Creek AMA. Available online at: https://www.dnr.state.mn.us/amas/detail_report.html?id=AMA00178. Accessed July 2026.

resources. The 2021 Root River Park Master Plan guides the long-term management and development of the park.[84] The park occurs within the Segment 2 Proposed Route.

Private Recreational Areas

Two private recreational facilities are within the Project Area of Segment 1 in Wabasha County. The Steeplechase Ski Hill and Event Center is located within the Segment 1 Proposed Route and 0.3 mile south of the Proposed Right-of-Way. While the ski hill does not operate any recreational activities in the spring, summer or fall, the event center is available to rent year-round. Zumbro Falls Golf Club is a nine-hole golf course located approximately 0.6 mile north of the Proposed Route and 0.7 mile north of the Proposed Right-of-Way. In addition to offering rounds of golf, the club also has an outdoor wedding venue area available to rent.

The Maple Valley Golf and Country Club occurs adjacent to, but is not crossed by the Segment 2 Proposed Route, located between the City of Rochester and Stewartville in Olmsted County. It is a family-owned public golf course established in 1964. The course is situated within the Root River valley and is bordered on three sides by limestone bluffs and the Root River. The surrounding wooded bluffs, river corridor, and varied terrain contribute to the course's scenic and recreational character.[85]

Trails

Table 6.4.6-1 identifies the state water trails,[86] snowmobile trails,[87] state park trails roads,[88] and state trails[89] occurring within the Proposed Routes. There are no state hunter/hiking trails[90] or off-highway vehicle trails crossed by the Proposed Routes.[91]

Segment 1 crosses the planned Blufflands State Trail – Chesterwood Segment, three Grant-in-Aid snowmobile trail systems (Goodhue County, Zumbrowatha, and Hiawatha 1 & 2), and the Zumbro River State Water Trail. The MDNR has acquired properties along U.S. Highway 14 for

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84 Olmsted County Board. 2021. Root River Park Master Plan. Available online at: https://www.olmstedcounty.gov/sites/default/files/2021-12/2021_RootRiverMasterPlan%20FINAL.pdf. Accessed October 2026.

85 Maple Valley Golf and Country Club. Undated. Available online at: https://www.maplevalleygolf.com/. Accessed October 2026.

86 MDNR. 2026. Water Trails Minnesota. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_water_trails_minnesota/FeatureServer/0. Accessed July 2026.

87 MDNR. 2026. Snowmobile Trails. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_snowmobile_trails_mn/FeatureServer/0. Accessed July 2026.

88 MDNR. 2026. State Park Trails Roads. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_state_park_trails_roads/FeatureServer/0. Accessed July 2026.

89 MDNR. 2026. State Trails Minnesota. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_state_trails_minnesota/FeatureServer/0. Accessed July 2026.

90 MDNR. 2026. State Hunter Walking Trails. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_hunter_walking_trails/FeatureServer/0. Accessed July 2026.

91 MDNR. 2026. OHV Trails Minnesota. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/trans_ohv_trails_mn/FeatureServer/0. Accessed July 2026.

the future development of the Chesterwood Segment of the Blufflands State Trail; however, the trail has not yet been constructed. Segment 1 also parallels the Great River Ridge State Trail for approximately 5 miles. Segment 2 crosses nine Grant-in-Aid snowmobile trail systems and the Mississippi River and Reno Bottoms Canoe water trails. The Segment 2 Proposed Route also parallels the Shooting Star State Trail for approximately 5 miles and the Bluff Valley Snowmobile Trail System for approximately 1.4 miles. These trails provide a range of recreational opportunities, including bicycling, walking, horseback riding, snowmobiling, paddling, fishing, and wildlife observation. The Q-9 Proposed Route also crosses the Gopherland Snowmobile Trail System.

In addition to the existing trails identified in **Table 6.4.6-1**, a member of the public informed the Applicants of the effort to develop the Minnesota Driftless Hiking Trail. The trail would be a 100-mile trail from Chatfield, Minnesota to the Mississippi River in Fillmore and Houston Counties in the vicinity of Segment 2. Based on currently available information, it appears the organization is working with landowners to obtain land access, and the final trail corridor will depend upon granted access.[92]

6.4.6.2 Potential Impacts

Potential impacts on recreational and managed land resources would be primarily associated with temporary construction activities, including vegetation clearing, construction access, equipment operation, noise, and the presence of construction personnel and equipment. Long-term operational impacts would generally be limited to the presence of transmission structures and conductors, maintenance activities, and changes in visual character. The Project is not expected to result in the permanent loss of access to recreational facilities, trails, managed lands, or water-based recreation opportunities within the Project Area.

As discussed in **Section 6.4.5**, operation of the Project would introduce or modify transmission infrastructure within portions of the landscape and could result in visual and aesthetic effects experienced by recreational users, particularly at locations where recreation activities are oriented toward scenic views, natural settings, wildlife observation, and nature-based experiences. However, substantial portions of the Proposed Rights-of-Way are co-located with existing transmission infrastructure, which would reduce the degree of visual change experienced by recreational users.

Federally Managed Lands

The USFWS Upper Mississippi River NWFR is the most significant recreational and conservation resource crossed by the Project along Segment 2. The Segment 2 Proposed Right-of-Way would cross approximately 52.2 acres of the Upper Mississippi River NWFR. Construction within the refuge would occur primarily within and adjacent to Dairyland's existing Q-7 and Q-9 161-kV transmission rights-of-way. Temporary construction impacts could include localized disturbance to refuge visitors, including hunters, anglers, paddlers, birdwatchers, wildlife observers, and other users of the Mississippi River corridor. Construction activities could temporarily affect access to localized areas, create intermittent noise and visual disturbances, and temporarily alter recreational experiences in the vicinity of active construction areas.

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[92] Minnesota Driftless Hiking Trail. Undated. Current Progress. Available online at: https://www.mndriftlesshikingtrail.org/. Accessed July 2026.

Operational impacts within the Upper Mississippi River NWFR are expected to be limited because the crossing would occur within an existing transmission right-of-way where utility infrastructure is already present. As further described in **Sections 1.2.1.2** and **4.3.4,** the Applicants can install the new 765 kV / 161 kV double-circuited line using the existing 200-foot-wide right-of-way without expanding the right-of-way through the refuge. The existing 161 kV transmission line through this area consists of approximately 28 existing wooden H-frame structures, and two lattice structures on the banks of the Mississippi River. These structures will be replaced with approximately eight double-circuit lattice structures with a priority on placing structures within existing disturbance footprints where practicable, resulting in approximately 22 fewer structures within the USFWS Upper Mississippi River NWFR. The final number of structures and locations are subject to change based on future studies, engineering, and surveys, and coordination with the USFWS.

Long-term impacts would primarily consist of the visual presence of the new transmission facilities and maintenance of vegetation within the right-of-way. Recreational users of the Mississippi River State Water Trail, Reno Bottoms Canoe Trail, and refuge lands may experience changes in visual character as a result of the larger transmission facilities. These aesthetic impacts are discussed further in **Section 6.4.5**. The Applicants have coordinated, and will continue to coordinate, with the USFWS regarding the refuge crossing, construction methods, access, and measures to avoid and minimize impacts to refuge resources and recreational uses.

State-Managed Lands

State Parks and Forests

The Segment 2 Proposed Route does not cross Lake Louise State Park; therefore, direct impacts to park facilities, trails, campgrounds, or recreational amenities are not anticipated. Construction activities occurring north of the park could result in temporary visual and noise disturbances for some park visitors, particularly users of open recreational areas and the Shooting Star State Trail where views toward the Project may be available. Given the separation distance between the park and the Proposed Route and the presence of existing transmission infrastructure in portions of the area, impacts are expected to be limited and temporary.

The Segment 2 Proposed Right-of-Way crosses approximately 3.1 acres of the RJD Memorial Hardwood State Forest, primarily in areas where existing transmission infrastructure is already present. Temporary construction activities could result in localized disruptions to dispersed recreational uses such as hunting, wildlife observation, birdwatching, and nature study occurring near construction areas. Construction access and vegetation management activities could temporarily affect user experience within portions of the state forest. Operational impacts would largely be associated with the continued presence of transmission infrastructure and periodic maintenance activities. Because the Project generally follows existing utility rights-of-way through forest lands, long-term impacts on recreation opportunities are expected to be limited.

Scientific Natural Areas

Neither the Proposed Route nor the Proposed Right-of-Way crosses the Zumbro Falls Woods or Racine Prairie SNAs. Both the Segment 2 Proposed Route and Proposed Right-of-Way cross the Shooting Star Prairie SNA (0.03 acres).

Per Minn. R. 7850.4300, no HVTLs may be routed through state or national parks or state SNAs unless the transmission line would not materially damage or impair the purpose for which the area was designated, and no feasible and prudent alternative exists. The Applicants avoided these

areas during the routing process, with one exception; the Segment 2 Proposed Right-of-Way intersects the MDNR Shooting Star Prairie SNA.

The Applicants have proposed the maximum 1.25-mile wide Proposed Route in the vicinity of the Shooting Star SNA. The broader Proposed Route width in the vicinity of the Shooting Star Prairie SNA was intentionally developed to provide flexibility for final alignment selection (**Section 3.1.1**). During final design, the Applicants will refine structure locations, access routes, and the transmission line alignment to avoid or minimize impacts to sensitive natural resources to the extent practicable. As currently proposed, the Applicants' Proposed Right-of-Way would utilize Dairyland's existing 161 kV transmission line right-of-way; however, a wider right-of-way will be needed, which overlaps approximately 0.03 acres of the Shooting Star SNA.

The Applicants coordination with the MDNR to date is summarized in **Section 7.2.5** and documented in **Appendix C**. The MDNR has suggested an alternative alignment through this area, described in **Section 4.5**, that would avoid the Shooting Star Prairie SNA. The Applicants will continue to discuss potential alignment alternative options in this area with the MDNR. Through ongoing coordination and final design refinement, impacts to SNAs are expected to be minimized to the extent practicable.

Impacts to recreational use of SNAs are expected to be minimal because recreational use is generally limited to nature observation, environmental education, and scientific study. Temporary construction activities could affect the experience of visitors using these areas for passive recreational purposes if construction occurs nearby.

Wildlife Management Areas and Aquatic Management Areas

The Segment 2 Proposed Route crosses portions of the Rustic Retreat WMA and the Winnebago Creek AMA. The Segment 2 Proposed Right-of-Way crosses approximately 1.1 acres of the Winnebago Creek AMA based on the current Project design. Recreational uses associated with these managed lands include hunting, fishing, wildlife observation, birdwatching, photography, and other nature-based activities.

The Beaver Creek WMA, Cartney Slough WMA, Nosek WMA, Mazeppa Creek AMA, Zumbro River AMA, and Riceford Creek AMA occur within the Project Area but are not crossed by the Proposed Routes. Because the Project would not directly intersect these resources, impacts are expected to be limited to potential temporary visual or noise disturbance during construction where activities occur nearby.

Operational impacts to WMAs and AMAs would be limited primarily to visual changes associated with transmission infrastructure and periodic maintenance activities. Existing recreational access and management objectives are expected to continue following construction. **Section 7.2.5** provides a summary of the Applicants coordination with the MDNR to date; the Applicants will continue coordination with MDNR regarding managed lands crossed by the Project and opportunities to avoid or minimize impacts to recreational and natural resource values.

Private Recreational Facilities

The Steeplechase Ski Hill and Event Center, Zumbro Falls Golf Club, and Maple Valley Golf and Country Club are the only identified private recreational facilities within the Project Area. The Project would not directly affect operational facilities at any of these locations. Construction

activities occurring in the vicinity of these resources could temporarily affect recreational users and event attendees through construction noise, visual disturbance, and increased traffic.

Operational impacts would primarily consist of aesthetic and visual changes associated with the presence of transmission structures and conductors in the surrounding landscape. As discussed in **Section 6.4.5**, aesthetic impacts may be more noticeable to users of outdoor recreational facilities where views of the Project are available. No long-term restrictions on use of these facilities are anticipated.

Trails and Water Trails

The Proposed Routes cross or occur in proximity to numerous recreational trail resources, including the Great River Ridge State Trail, Shooting Star State Trail, multiple Grant-in-Aid snowmobile trail systems, the Mississippi River State Water Trail, the Zumbro River State Water Trail, and the Reno Bottoms Canoe Trail. Because the trail corridor has not yet been finalized and no mapped route was available at the time of this filing, potential Project interactions with the proposed Minnesota Driftless Hiking Trail cannot be evaluated. The Applicants will continue to monitor publicly available route information during Project development.

Construction activities could result in temporary disruptions at trail crossings, including short-term trail closures, temporary detours, or access restrictions where necessary for safety. Most trail crossing impacts would be temporary and localized. Although portions of the Project would occur in proximity to the Shooting Star State Trail, no permanent closure or relocation of the trail is anticipated. Coordination with trail managers, local snowmobile clubs, MDNR, and other appropriate entities would occur to minimize disruption and maintain recreational access to the extent practicable.

Snowmobile trail systems may experience temporary construction-related disruptions if construction occurs during the winter recreation season. Construction activities at snowmobile trail crossings would require implementation of safety measures to protect trail users and construction personnel. Depending on the season and timing of construction, temporary trail closures, trail reroutes, controlled crossing procedures, signage, fencing, and flagging may be used where active construction occurs adjacent to or across snowmobile trails. Coordination with local snowmobile clubs, trail managers, and the MDNR would occur to identify appropriate safety measures and communicate trail conditions or temporary restrictions to users. Where construction occurs during the winter recreation season, additional precautions may be implemented to minimize potential conflicts between snowmobile traffic and construction activities. Any trail closures or access restrictions would be temporary and limited to the period necessary to complete construction safely. Construction activities occurring during winter months may temporarily affect trail continuity and trail user experience at crossing locations. However, impacts would be localized and temporary, and trail use would resume following completion of construction.

The Mississippi River State Water Trail, Zumbro River State Water Trail, and Reno Bottoms Canoe Trail may experience temporary impacts during transmission line construction activities associated with water crossings, including temporary visual disturbance, increased activity levels, and potential short-duration restrictions for user safety. Following construction, recreational navigation and use of these waterways would continue.

Following construction, snowmobile trail crossings would continue to function as they do at existing utility crossings throughout Minnesota. Snowmobiles routinely operate beneath existing

transmission lines, and no long-term restrictions on trail use are anticipated. The transmission line would be designed to comply with applicable safety and clearance requirements, and recreational use of the affected snowmobile trail systems would be expected to continue following Project construction. Periodic maintenance activities could result in temporary and localized trail access restrictions or increased activity near crossings; however, these activities would be infrequent and short in duration.

Operational impacts to trails and water trails would primarily consist of visual and aesthetic effects associated with transmission facilities. Trail users and paddlers may experience changes in views where the Project crosses or parallels recreational corridors. Recreational resources most likely to experience visual changes include the Upper Mississippi River NWFR, Mississippi River State Water Trail, Reno Bottoms Canoe Trail, RJD Memorial Hardwood State Forest, Lake Louise State Park vicinity, Shooting Star State Trail, and associated snowmobile trail systems where views of Project facilities are available (see **Figure 14** and **Appendix F**). However, many crossings occur in areas already influenced by existing transmission infrastructure, roads, agricultural development, or other human-made features. For example, the recreational users of the Mississippi River State Water Trail and Reno Bottoms Canoe Trail would experience the Project within an area that already contains Dairyland's existing Q-7 and Q-9 161-kV transmission line crossings. The Segment 2 Proposed Right-of-Way crosses the Shooting Star Trail as follows:

- Crossing 1: The existing 161 kV transmission line that would be rebuilt as part of the Project crosses the Shooting Star Trail approximately 550 feet from the Adams Substation before entering the substation. There is one existing 345 kV line, two existing 161 kV lines, and two existing 69 kV lines that cross the Shooting Star Trail at this same location to enter into the existing Adams Substation. The Shooting Star Trail runs parallel to State Highway 56 and is located approximately 0.9 mile southwest of a wind turbine associated with the Mower County Wind Energy Center and approximately 0.25 miles southwest of the Louise Solar Project.

- Crossing 2: The single circuit 765 kV line would cross the Shooting Star Trail approximately 0.6 mile east of the Adams Substation. The Shooting Star Trail runs parallel to State Highway 56 and is located approximately 0.4 mile southwest of a wind turbine associated with the Mower County Wind Energy Center and approximately 0.25 miles southeast of the Louise Solar Project.

- Crossing 3: The double-circuit 765 kV / 161 kV transmission line would cross the Shooting Star Trail where the trail turns south along 740th Avenue. This is an open agricultural area. There is an existing 69 kV line that runs east-west and crosses the trail approximately 0.4 mile south along 740th Avenue. State Highway 56 is located approximately 0.6 mile southwest of the trail at this crossing location.

Existing energy infrastructure is a prominent component of the existing visual environment at the proposed crossings 1 and 2 of the Shooting Star Trail, and to a lesser extent at crossing 3. As further discussed in **Section 7.2.4**, the Applicants will continue to coordinate with the MDNR on the best alignment through this area.

No long-term closures or loss of recreational access are anticipated, and recreational use of the affected trails and waterways would continue following Project construction.

6.4.6.3 Mitigation Measures

The Applicants would implement measures to avoid, minimize, and mitigate impacts on recreational resources, managed lands, trails, water trails, and recreational users during Project construction and operation. Mitigation efforts would focus on maintaining public safety, minimizing disruption to recreational access and activities, protecting recreational and conservation resources, and restoring affected areas following construction. The Applicants would continue to coordinate with the USFWS, MDNR, local governments, snowmobile clubs, trail managers, and other stakeholders throughout final design and construction to identify and implement appropriate resource protection measures.

A primary mitigation measure incorporated into Project design is the extensive use of existing utility rights-of-way and co-location with existing transmission infrastructure where practicable. In addition, as discussed in **Section 3.1.1**, the Applicants developed a wider route width in certain locations to provide flexibility during final engineering and alignment selection. This approach allows refinement of structure locations, access routes, and transmission line placement to avoid or minimize impacts to sensitive recreational and managed land resources, including SNAs, WMAs, AMAs, and other environmentally sensitive features where practicable. The MPUC scoping and route permit processes are further described in **Section 2**.

The Applicants will continue to coordinate with the MDNR regarding recreational resources crossed by or occurring near the Project, including ongoing discussions regarding the location and boundaries of the Shooting Star Prairie SNA and opportunities to avoid or minimize impacts to SNA resources through final alignment refinement. Coordination with the USFWS will continue regarding construction activities within the Upper Mississippi River NWFR, including access, vegetation management, construction methods, and protection of refuge resources and recreational uses.

Based on preliminary review, federal funding may have been used to acquire or manage the portion of the RJD Memorial State Hardwood Forest crossed by the Segment 2 Right-of-Way. Accordingly, the Applicants will coordinate with the MDNR and any applicable federal agency during the permitting process to determine whether additional review or coordination is required.

To reduce ground disturbance in environmentally sensitive and recreational areas, the Applicants may utilize helicopters for conductor stringing, structure installation, material transport, and other construction activities where appropriate. Use of helicopters can reduce or eliminate the need for temporary access roads, minimize impacts to wetlands, steep terrain, forests, refuge lands, and other sensitive recreational resources, and reduce the amount of vegetation clearing required for construction. Although helicopter operations may result in short-term noise and visual disturbances, these effects would be temporary and localized. Where helicopter activities occur near recreational areas, trails, or waterways, appropriate safety measures and public notification procedures would be implemented.

Construction activities would be planned to maintain recreational access to the extent practicable. Temporary closures, detours, or access restrictions may be required where construction activities intersect trails, water trails, snowmobile trails, recreational facilities, or public lands. Any such restrictions would be temporary, limited to the minimum duration necessary to safely complete construction activities, and coordinated with the applicable land management agency or recreational organization. Advance public notification, signage, barricades, flagging, alternate access points and other traffic or access control measures would be used where necessary to protect public safety. Final construction schedules will be coordinated, where practicable, to avoid

high-use recreational periods or special events when doing so would reduce disruptions to recreational users.

Special consideration would be given to snowmobile trails and other actively used recreational corridors. Construction activities at trail crossings may require temporary trail closures, reroutes, controlled crossing procedures, or establishment of temporary exclusion zones. The Applicants will coordinate with the MDNR, local trail managers, county trail coordinators, and snowmobile clubs regarding construction timing, trail management measures, and public notifications. Where practicable, construction activities would be scheduled to minimize conflicts with peak recreational use periods. Following construction, affected trail surfaces, crossings, and associated facilities will be restored to pre-construction conditions.

For recreational waterways, including the Mississippi River State Water Trail, Zumbro River State Water Trail, and Reno Bottoms Canoe Trail, construction activities would be planned to avoid prolonged disruptions to recreational navigation and public use. Any temporary restrictions required for public safety during conductor installation, helicopter operations, or other construction activities would be coordinated with the applicable agencies and communicated to recreational users in advance.

The Applicants would implement appropriate construction BMPs to protect recreational and managed lands from unnecessary disturbance. Measures may include limiting construction activities to designated work areas, utilizing existing roads and access routes where practicable, controlling erosion and sedimentation, restoring temporarily disturbed areas following construction, and revegetating disturbed lands in accordance with landowner and agency requirements. Within public conservation lands and other sensitive areas, temporary workspaces, staging areas, and access routes would be located outside sensitive resources whenever practicable.

Following construction, recreational uses of the affected areas would generally be expected to continue. Long-term impacts would primarily consist of the presence of transmission structures and conductors, periodic maintenance activities, and associated changes in visual character. As discussed in **Section 6.4.5**, recreational users may experience aesthetic and visual effects where the Project is visible from recreational lands, trails, waterways, and recreational facilities. These effects would be minimized to the extent practicable through co-location with existing transmission rights-of-way, use of existing crossings where available, avoidance of recreational resources where practicable, and refinement of final structure locations during detailed design.

6.4.6.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures related to trail crossings, traffic management, vegetation screening, water resources, avian protection, restoration, and cleanup that also avoid and minimize impacts to recreation resources. Example route permit conditions include:

- Section 5.3.7 of the Sample Route Permit requires the permittee to consider input pertaining to visual impacts from landowners or land management agencies prior to final location of structures, rights-of-way, and other areas with the potential for visual disturbance.

- Section 5.3.18 requires the permittee to restore the right-of-way, temporary workspaces, access roads, abandoned right-of-way, and other public or private lands affected by construction of the Project.

6.4.7 Noise

This section evaluates the potential noise impacts associated with Project construction and operation. Project-related noise levels are evaluated relative to applicable Minnesota noise standards and the locations of nearby noise-sensitive receptors, such as residences. This section also discusses measures that may be implemented to avoid, minimize, or mitigate potential noise impacts.

6.4.7.1 Existing Conditions

Sound is caused by the vibration of air molecules and is measured on a logarithmic scale with units of decibels (dB). The MPCA defines noise as undesired sound. Sound is composed of various frequencies, which are measured in hertz, or the number of cycles per second. Human hearing is not equally sensitive to all frequencies of sound. Thus, the most noticeable frequencies of sound are given more "weight" in most measurement schemes. The A-weighted scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA, which is the A-weighted sound level recorded in dB.

A Guide to Noise Control in Minnesota, published by the MPCA, indicates that a noise level change of 1 dBA is not noticeable.[93] A 3-dBA change is considered the "threshold of perception" or the lowest change in sound level that is generally perceptible to human hearing. A 5-dBA change in noise level is a noticeable change. A 10-dBA change in noise level is perceived as a doubling of noise loudness, while a 20-dBA change is considered a dramatic change in loudness (i.e., four times as loud). **Table 6.4.7-1** shows noise levels associated with common, everyday sources.

TABLE 6.4.7-1

Common Noise Sources and Levels

Sound Pressure Level (dBA)	Noise Source
110	Rock band at 5 meters
100	Jet flyover at 300 meters
90	Gas lawnmower at 1 meter
80	Food blender at 1 meter
70	Vacuum cleaner at 3 meters
60	Normal speech at 1 meter
50	Quiet urban daytime
40	Library, quiet urban nighttime
30	Bedroom at night
20	Quiet rural nighttime
10	Broadcast recording studio
0	Threshold of hearing

[93] MPCA. 2015. *A Guide to Noise Control in Minnesota*. Available at: https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf**.** Accessed July 2026.

TABLE 6.4.7-1

Common Noise Sources and Levels

Sound Pressure Level (dBA)	Noise Source

Source: MPCA. 2015. *A Guide to Noise Control in Minnesota*. Available at: https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf**.** Accessed July 2026

The MPCA has promulgated noise standards in Minnesota Rules Chapter 7030. These standards limit the level of sound based on the noise area classifications (NAC) determined at the location of the person who hears the noise. Residences are in the most restrictive NAC and are classified as NAC 1, business areas are classified as NAC 2, and industrial/agricultural areas are classified as NAC 3. A fourth area, NAC 4, is defined as undeveloped and unused land, but no noise standards apply to this land class. The standards are expressed as limiting levels of dBA within a 1-hour period; L_{50} is the dBA not to be exceeded over 50 percent of the time (30 minutes) within an hour, while L_{10} is not to be exceeded over 10 percent of the time (6 minutes) within the hour. The MPCA's noise standards for daytime hours and nighttime hours are shown in **Table 6.4.7-2**.

TABLE 6.4.7-2

MPCA State Noise Standards - Hourly A-Weighted Decibels

	Daytime (7:00 a.m. – 10:00 p.m.)		Nighttime (10:00 p.m. – 10:00 a.m.)	
Noise Area Classification	L_{10}	L_{50}	L_{10}	L_{50}
1 – Residential	65	60	55	50
2 – Commercial	70	65	70	65
3 – Industrial	80	75	80	75

Source: Minn. R. 7030.0040

The Project is located primarily within agricultural and rural landscapes where ambient daytime sound levels are generally influenced by vehicle traffic, agricultural machinery, active farming operations, lawn maintenance equipment, and other localized human activities. Ambient nighttime sound levels are generally lower and are influenced primarily by intermittent traffic, farm operations, and natural sounds such as wind, insects, and wildlife. Ambient sound levels are expected to vary seasonally, with increased noise associated with spring planting, summer agricultural activities, fall harvest operations, and snow removal during winter.

As presented in **Table 6.4.7-2**, the most stringent applicable MPCA noise standard for a NAC 1 property is the L_{50} daytime and nighttime standards equivalent to 60 dBA and 50 dBA, respectively. Agricultural fields and other nonresidential portions of the Project are generally consistent with NAC 3 land uses. Residences, including farmsteads and farmhouses, are classified as NAC 1 receptors and are subject to the most restrictive noise standards. Parks and other recreational areas (exclusive of designated camping and picnicking areas) are classified as NAC 2 land uses.

The NAC 2 daytime and nighttime standard is 65 dBA for both time periods, and the NAC 3 daytime and nighttime standard is 75 dBA for both time periods.

Based on the current route design, there are no public schools,[94] hospitals,[95] nursing care facilities,[96] or childcare facilities[97] within the Proposed Routes. There is one place of worship located approximately 0.5 mile west of the Segment 2 Proposed Route, and 0.7 mile west of the Segment 2 Proposed Alignment in Grand Meadow.[98]

As shown in **Table 6.4.3-1**, there are 1,351 residences located within the Local Vicinity, or 0.5 mile of the Proposed Alignments. There are no residences located within the Proposed Rights-of-Way of either the 765 kV or Q-9 161 kV transmission lines based on the current design. Residences are shown on the detailed maps in **Appendix F**.

6.4.7.2 Potential Impacts

The ROI for noise is the Local Vicinity, defined as the area within 0.5 mile of the Proposed Alignments.

Construction

Construction noise is expected to occur primarily during daytime hours as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction personnel and materials to and from work areas. There may be construction outside these hours due to Project construction schedule or other factors. Construction activities will be performed with standard heavy equipment such as backhoes, cranes, boom trucks, and assorted small vehicles. The typical noise levels of construction equipment generally used in construction activities are presented in **Table 6.4.7-3**.

TABLE 6.4.7-3

Typical Noise Levels of Major Construction Equipment

Generic Construction Equipment	Sound Level at 50 feet, dBA
Backhoe	80
Compactors (rollers)	80
Compressor (air)	80
Concrete Mixer Truck	85
Cranes (movable)	85
Dozers	85
Front End Loaders	80
Generators	82

94 ESRI. Undated. Minnesota Structure School Buildings. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_mde/struc_school_buildings/FeatureServer/0. Accessed July 2026.

95 ESRI. 2026. Health Facility Hospitals. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_mngeo/health_facility_hospitals/FeatureServer/0. Accessed July 2026.

96 ESRI. 2026. Health Facility Nursing Board. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_mngeo/health_facility_nursing_boarding/FeatureServer/0. Accessed July 2026.

97 ESRI. 2026. Econ Child Care. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_mngeo/econ_child_care/FeatureServer/0. Accessed July 2026.

98 Homeland Infrastructure Foundation-Level Data. 2025. All Places of Worship. Available online at: https://services.arcgis.com/XG15cJAlne2vxtgt/arcgis/rest/services/All_Places_Of_Worship__HiFLD_Open_/FeatureServer/42. Accessed July 2026.

TABLE 6.4.7-3

Typical Noise Levels of Major Construction Equipment

Generic Construction Equipment	Sound Level at 50 feet, dBA
Graders	85
Jack Hammers and Rock Drills	85
Pavers	85
Pumps	77
Scrapers	85
Tractors	84
Helicopter (idling/in-flight)[a]	106

Source: Federal Highway Administration, Office of Planning, Environment, and Realty. 2006. *Construction Noise Handbook*. Chapter 9.0, Construction Equipment Noise Levels and Ranges. Available online at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm. Accessed June 2026.

[a] *Shelton-Fairmount Transmission Line Rebuild and Fiber Optic System Replacement Project Environmental Assessment.* DOE/EA-2224. May 2024.

As shown in **Table 6.4.7-3**, the loudest anticipated construction equipment would generate approximately 85 dBA at 50 feet. Sound levels decrease with distance and equipment would not operate continuously at a single location. Therefore, residences located several hundred feet from active construction are expected to experience substantially lower sound levels than those measured immediately adjacent to construction equipment.

Construction activity would occur at a specific portion of the Project for a few days to weeks at a time, and over the construction period. The noise at a single location would be temporary and dissipate as construction crews progress along the route. In addition, due to the steep topography found in portions of the Project Right-of-Way, the Applicants may use helicopters during construction to facilitate structure setting and wire pulling during daytime construction. Noise levels may briefly exceed 100 dBA during helicopter use, as helicopter noise levels are approximately 106 dBA when operating at 50 feet above the ground. During construction, helicopter work would generally be completed in less than an 8-hour workday and would operate only when required. Helicopter noise is generally intermittent and short-term.

Short-term and intermittent noise impacts would occur during construction, resulting in minor impact across the ROI. Under typical construction conditions, noise-generating activities would progress along the transmission line route and would occur at a given location for only a limited period before moving to the next work area. Noise levels experienced at nearby residences would therefore be temporary and intermittent.

Operation

Noise levels during operation and maintenance of the Project will generally be minor. Transmission lines can create noise through small electrical discharges along the surface of the conductor that ionize surrounding air molecules. This phenomenon—common to all power lines—is known as corona and is often described as a “crackling” sound or perceptible hum. Any imperfection on the surface of the conductor might be a source for corona. Examples include dust and dirt or nicks and burrs in the equipment. The level of noise from corona discharge depends on conductor conditions, voltage levels (corona noise increases as voltage increases), and weather conditions. Noise emissions are greatest during heavy rain events when the conductors are consistently wet. During heavy rains, the background noise level is usually greater than the noise from the transmission line. As a result, audible noise is typically not noticeable during heavy

rains. In foggy, damp, snowy, or light rain conditions, transmission lines might produce audible noise higher than background levels. During operations in fair/dry conditions, noise from the transmission line is anticipated to be inaudible or barely perceptible.

Based on the Applicants' analysis of the conductors selected for the Project, operational noise from the transmission line is expected to comply with the MPCA noise standards applicable to the land-use activity at the nearest point of human activity.

Noise contributions from the Jefferson Ridge Switching Station will depend on the final layout and equipment installed within the fenced facility. A switching station generally consists of energized buswork, circuit breakers, disconnect switches, control equipment, and associated electrical infrastructure that under normal operating conditions, generate little to no continuous audible noise. The primary operational noise sources at a switching station are expected to be the intermittent operation of circuit breakers and switching devices, which produce short-duration sounds during switching events. These events occur infrequently and typically last only a few seconds. Additional temporary noise may be associated with maintenance activities or operation of an emergency generator during testing, maintenance, or emergency conditions. If station facilities include control buildings, communication equipment, or heating, ventilation, and air conditioning units, any associated noise would generally be minimal and localized. Noise from equipment housed within enclosed buildings is expected to be substantially attenuated before reaching nearby receptors.

Because switching stations generally lack major continuously operating equipment, operational noise levels are typically low. The Jefferson Ridge Switching Station will be designed and operated to comply with applicable Minnesota noise standards. The closest residence to the Jefferson Ridge Switching Station is approximately 150 feet on the east side of Neumann Road; this resident sold Dairyland the property for the switching station. Dairyland will continue to coordinate with this landowner throughout Project construction and operation.

Periodic vegetation maintenance within the transmission right-of-way may result in temporary noise from mowers, chainsaws, brush-clearing equipment, and maintenance vehicles. This noise would be intermittent and occur only while maintenance activities are underway.

Overall, the operational noise level impacts from the Project are anticipated to be minor and will comply with Minnesota's noise requirements.

6.4.7.3 Mitigation Measures

During construction, common ways to mitigate noise impacts include sound control devices such as mufflers on vehicles and equipment; maintaining equipment in good working order; conducting construction activities during daylight hours, and normal business hours, as practicable; and running vehicles and equipment only when necessary. The Applicants will coordinate with landowners when nighttime work is necessary. Despite implementation of these measures during construction, temporary increases in noise levels near active construction areas cannot be entirely avoided. These effects would be localized, intermittent, and limited to the duration of construction activities at a given location.

For operation of the Project, the Project is designed to comply with applicable MPCA noise standards at the nearest point of human activity within the applicable noise area classification; therefore, no operational noise mitigation is necessary.

6.4.7.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include the following condition:

- Section 5.3.6 of the Sample Route Permit requires the permittee to comply with noise standards established under Minnesota noise standards as defined under Minnesota Rule, part 7030.010 to 7030.0080, and to limit construction and maintenance activities to daytime hours to the extent practicable.

6.4.8 Environmental Justice

This section identifies environmental justice communities within the Project area and evaluates whether construction or operation of the Project could result in disproportionately high and adverse impacts to those communities. The Applicants used the MPCA Environmental Justice Mapping Tool and U.S. Census data to identify and characterize environmental justice communities located within the Project area.

6.4.8.1 Existing Conditions

The Commission defines an environmental justice area – consistent with Minn. Stat. § 216B.1691, subd. 1(e) – as an area that meets one or more of the following criteria:

(1) 40 percent or more of the area's total population is nonwhite;

(2) 35 percent or more of households in the area have an income that is at or below 200 percent of the federal poverty level;

(3) 40 percent or more of the area's residents over the age of five have limited English proficiency; or

(4) the area is located within Indian country, as defined in United State Code (U.S.C.), title 18, section 1151.[99]

Although the statute quoted above applies to the establishment of Minnesota's renewable energy objectives, the Applicants apply this statutory definition because it is the only statutory definition of environmental justice applicable to any Commission proceedings. Census tracts that intersect with the Proposed Routes were analyzed for environmental justice areas. Census tracts are the best approximation of a geographic area where adverse impacts can occur from the Project.

The MPCA website "Understanding Environmental Justice" provides tools to help identify environmental justice communities throughout the state and provide guidance for integrating environmental justice principles such as fair treatment and meaningful involvement of environmental justice communities.

[99] Minnesota Legislature Office of the Revisor of Statutes. 2025. 216B.1691 Renewable Energy Objectives. Available online at: https://www.revisor.mn.gov/statutes/cite/216B.1691. Accessed June 2026.

Table 6.4.8-1 identifies minority populations by race and ethnicity, low-income populations, and populations with a limited English-speaking household for census tracts crossed by the Proposed Routes. Census tracts crossed by the Proposed Routes are also depicted in **Figure 15**. The most recent U.S. Census Bureau American Survey 5-Year Estimate Data were used when possible. Goodhue, Wabasha, Olmsted, Mower, Fillmore, and Houston counties, and the state of Minnesota were used as reference populations.

According to the MPCA Understanding Environmental Justice in Minnesota web viewer,[100] the Project does not cross federally recognized Tribal Areas. As shown in **Table 6.4.8-1**, Project does not cross any environmental justice communities under the definition provided in Minn. Stat. § 216B.1691, subd. 1(e).

The Applicants reviewed MPCA environmental screening information, including potentially contaminated sites, and permitted facilities within and near census tracts crossed by the Project identified in the MPCA What's in My Neighborhood database.[101] These resources are common throughout the Project area and do not represent conditions that would be substantially altered by construction or operation of the Project.

The Applicants also reviewed MPCA environmental screening information for air quality indicators. The MPCA developed the MNRISKS air toxics screening tool to "give a broader picture of the sources of air pollution in Minnesota and the potential health risks posed to residents from cumulative exposure." The highest air score of the block groups crossed by the Project is in Census Tract 16.03, Block Groups 1 and 3 with a score of 1.10. This is in the highest 40 percent of air scores meaning that 60 percent of the state has better air scores than this block group. This air score is not above any health benchmarks. A health benchmark is "...an amount of air pollution that is unlikely to result in health effects in sensitive populations after a lifetime of exposure." None of the air scores for environmental justice communities or any other block groups crossed by the Project are above health benchmarks.[102]

6.4.8.2 Potential Impacts

The ROI for environmental justice consists of the census tracts crossed by the Proposed Routes because demographic and socioeconomic data used to identify environmental justice communities are reported at the census tract level.

No environmental justice areas were identified within the Project area. No portions of the Project are located within federally recognized Tribal lands or other areas that qualify as Indian Country under 18 U.S.C. § 1151. Therefore, the Project will not impact environmental justice populations.

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100 MPCA. Undated. Understanding Environmental Justice in Minnesota. Available online at: https://experience.arcgis.com/experience/bff19459422443d0816b632be0c25228/page/Page/?views=EJ-areas**.** Accessed July 2026.

101 MPCA. 2025. What's in My Neighborhood. Available online at: https://experience.arcgis.com/experience/8258f05029bd45cb95add35e450c92e6#widget_6=active_datasource_id:dataSource_4,center:-10259590.684456633%2C5442598.501094052%2C102100,scale:431318.33761424135,level:10.507008000000091**.** Accessed June 2026.

102 MPCA. Undated. Understanding Environmental Justice in Minnesota. Available online at: https://experience.arcgis.com/experience/bff19459422443d0816b632be0c25228/page/Page?views=Tribal-areas**.** Accessed June 2026.

TABLE 6.4.8-1

Environmental Justice Data

Proposed Route	Census Tract	Population	Total Minority (%)[a]	All Individuals with Income Below 200 Percent of Poverty Level (%) [b]	Limited English-Speaking Household (%)
Minnesota		5,830,405	24.1	22.2	2.2
Goodhue County		48,195	10.9	21.3	0.8
Segment 1	Census Tract 808	4,782	3.6	15.3	0.0
Wabasha County		21,537	6.7	18.2	1.3
Segment 1	Census Tract 4904	4,438	4.2	18.2	0.7
Olmsted County		166,731	24.7	18.2	2.5
Segment 1 / Segment 2	Census Tract 9.03	4,698	13.8	13.1	0.5
Segment 1	Census Tract 16.03	4,901	20.2	8.0	0.2
Segment 1	Census Tract 19.02	4,764	15.1	10.1	0.5
Segment 1	Census Tract 20	6,349	7.6	16.7	0.1
Segment 2	Census Tract 21	6,958	9.3	29.0	0.0
Segment 2	Census Tract 22	3,587	3.5	11.1	0.0
Mower County		40,971	27.5	28.7	4.7
Segment 2	Census Tract 13	4,379	7.8	20.1	0.7
Segment 2	Census Tract 14	3,410	2.6	13.3	0.2
Fillmore County		21,540	5.7	24.0	1.1
Segment 2	Census Tract 9602	4,967	6.1	19.5	1.0
Segment 2	Census Tract 9605	3,107	2.8	33.1	2.8
Segment 2	Census Tract 9606	3,101	3.8	22.8	0.5
Houston County		18,400	6.5	21.3	0.3
Segment 2 / Q-9	Census Tract 209	3,439	6.4	24.0	0.3

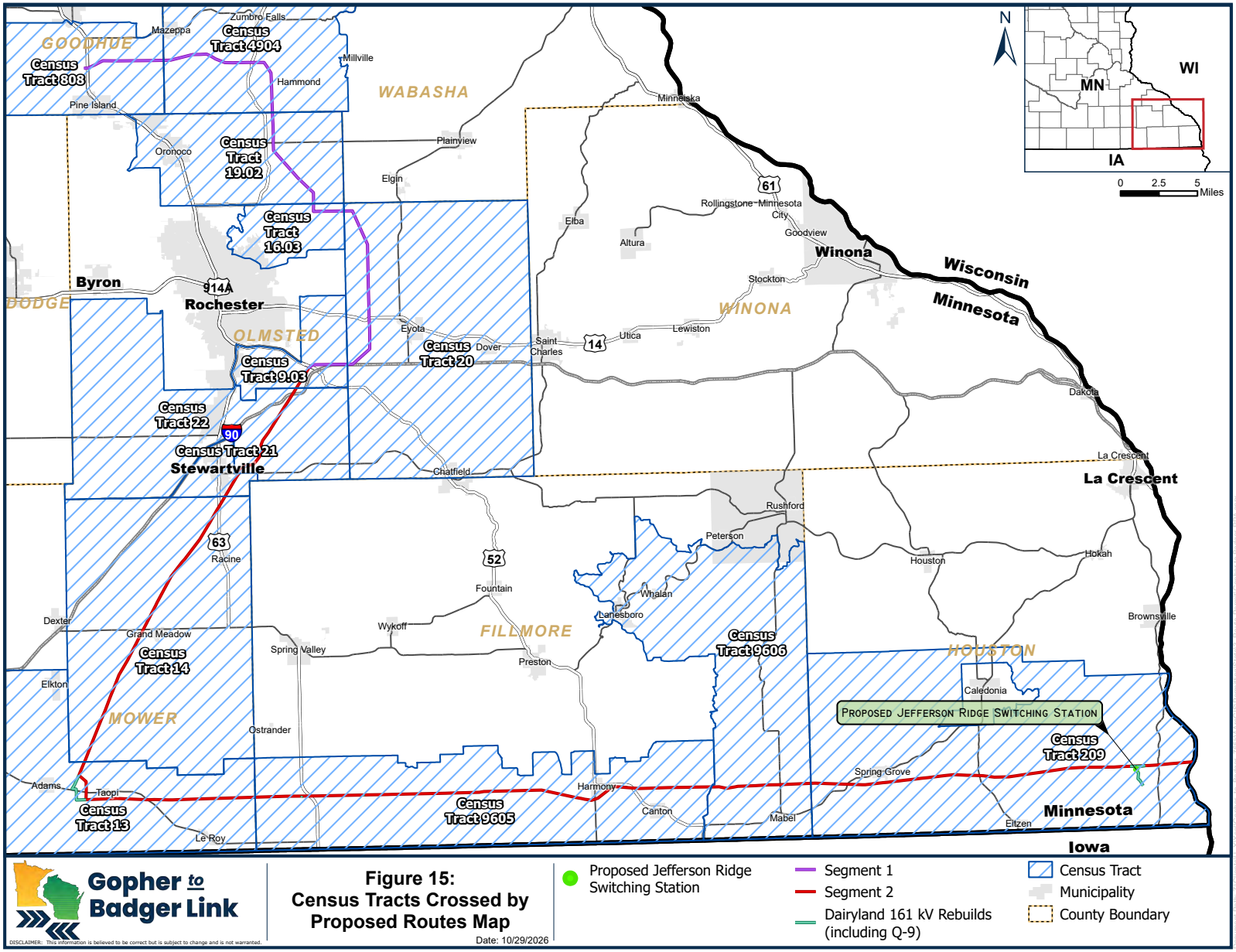
[a] "Minority" refers to people who reported their ethnicity and race as something other than non-Hispanic White.

[b] Gray shading indicates that data meets the definition of an environmental justice area.

Source: U.S. Census Bureau. 2024. American Community Survey. Hispanic or Latino Origin by Race – 5-Year Estimates Data Profiles, Table B03002. Available online at: https://data.census.gov/table/ACSDT5Y2024.B03002?q=B03002&g=050XX00US27045,27049,27055,27099,27109,27157_1400000US27045960500,27045960600,27049080800,27055020900,27099001300,27099001400,27109000903,27109001603,27109001902,27109002000,27109002100,27109002200,27157490400. Accessed June 2026.

U.S. Census Bureau. 2024. American Community Survey. Household Language by Household Limited English-Speaking Status – 5-Year Estimates Data Profiles, Table C16002. Available online at: https://data.census.gov/table/ACSDT5Y2024.C16002?q=C16002&g=050XX00US27045,27049,27055,27099,27109,27157_1400000US27045960500,27045960600,27049080800,27055020900,27099001300,27099001400,27109000903,27109001603,27109001902,27109002000,27109002100,27109002200,27157490400. Accessed June 2026.

U.S. Census Bureau. 2024. American Community Survey. Poverty Status in the Past 12 Months – 5-Year Estimates Data Profiles, Table S1701. Available online at: https://data.census.gov/table/ACSST5Y2024.S1701?q=s1701&g=040XX00US27_050XX00US27045,27049,27055,27099,27109,27157.


GOODHUE
WABASHA
DODGE
OLMSTED
WINONA
MOWER
FILLMORE
HOUSTON
Census Tract 808
Census Tract 4904
Census Tract 19.02
Census Tract 16.03
Census Tract 20
Census Tract 9.03
Census Tract 22
Census Tract 21
Census Tract 14
Census Tract 13
Census Tract 9605
Census Tract 9606
Census Tract 209
Proposed Jefferson Ridge Switching Station
Byron
Rochester
Stewartville
Winona
La Crescent
Wisconsin
Minnesota
Iowa
WI
MN
IA
0 2.5 5 Miles
Figure 15:
Census Tracts Crossed by
Proposed Routes Map
Date: 10/29/2026
Gopher to Badger Link
Proposed Jefferson Ridge Switching Station
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Census Tract
Municipality
County Boundary

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6.4.8.3 Mitigation Measures

The Project is anticipated to provide regional socioeconomic benefits through support of electric reliability and long-term energy infrastructure needs. The Project will not impact any environmental justice populations, therefore no specific mitigation measures are proposed.

6.4.8.4 Typical Route Permit Conditions

The Project will not impact any environmental justice communities, therefore, no typical route permit conditions are proposed.

6.4.9 Socioeconomics

6.4.9.1 Existing Conditions

The Project Study Area for socioeconomic analysis includes the following Minnesota counties: Goodhue, Wabasha, Olmsted, Mower, Fillmore, and Houston. The population and economic characteristics of the counties are provided using U.S. Census Bureau data and 2020 – 2024 American Community Survey 5-Year Estimates.

The population of the Project area accounts for approximately 5.5 percent of the state's total population. Minnesota's population grew by 2.1 percent between 2020 and 2024. Houston County was the only county in the Project Study Area to experience a population decline during the same time period; the county's population declined by 2.4 percent.

The top four industries in Minnesota in 2024 were health care and social assistance (18.2 percent)[103]; manufacturing (10.9 percent); retail trade (9.7 percent); and educational services (8.0 percent). In all six counties, the top industries are the same.

The median household income in the Project area ranges from a low of $73,074 in Mower County to a high of $95,406 in Olmsted County. Olmsted County is the only county with a higher median household income than the state of Minnesota, which has a median household income of $89,062. The unemployment rate in the Project area ranges from 1.6 percent to 3.9 percent in Houston County and Mower County, respectively. The unemployment rate in Minnesota as a whole is 4.1 percent. The percent of persons living in poverty in the Project area ranges from 6.8 percent (Olmsted County) to 9.2 (Mower County), compared to 9.3 percent for the state. **Table 6.4.9-1** details this information discussed in the section.

[103] MNEAED. 2024. Labor Market Information. Available at: https://apps.deed.state.mn.us/lmi/qcew/ResultsDisp.aspx. Last accessed November 2026.

TABLE 6.4.9-1

Socioeconomic Information in the Project Study Area

State, County, Census Tract	2020 Population Census	2025 Population Census	Percent Population Change[a]	Population per Square Mile – 2020	Median Household Income (2024 U.S. $)	Unemployment Rate (%)	Persons in Poverty (%)	Top 3 Industries[b]
Minnesota	5,706,494	5,830,405	+2.13	71.7	89,062	4.1	9.3	E, M, R
Goodhue County	47,582	48,195	+1.27	62.9	84,171	3.6	7.2	E, M, R
Wabasha County	21,387	21,537	+0.70	40.9	82,007	2.2	7.0	E, M, R
Olmsted County	162,847	166,731	+2.33	249.2	95,406	3.6	6.8	E, R, P
Mower County	40,029	40,971	+2.30	56.3	73,074	3.9	9.2	E, M, R
Fillmore County	21,228	21,540	+1.45	24.6	77,512	2.7	8.1	E, M, R
Houston County	18,843	18,400	-2.41	34.1	79,825	1.6	8.6	E, M, R

[a] Percent population change is based on Population Census April 1, 2020, as compared to Population Census July 1, 2025. NA = Census tract data did not exist as part of the Population Census July 1, 2025.

[b] Industries are defined under the 2012 North American Industry Classification System and abbreviated as follows: Ag = Agriculture, Forestry, Fishing, and Hunting, and Mining; Ar = Arts, Entertainment, and Recreation, and Accommodation and Food Services; C = Construction; E = Educational Services, and Health care and Social Assistance; F = Finance and Insurance, and Real Estate and Rental and Leasing; M = Manufacturing; R = Retail Trade; and T = Transportation and Warehousing, and Utilities; P = Professional, Scientific, and Management, and Administrative and Waste Management Services.

Overall, the Project area is characterized by a mix of rural agricultural communities, small cities, and the regional economic center of Rochester in Olmsted County. The local economy is supported by healthcare, education, manufacturing, retail trade, agriculture, and related service industries. Population density varies considerably across the Project area, ranging from approximately 25 persons per square mile in Fillmore County to nearly 250 persons per square mile in Olmsted County. Although socioeconomic characteristics vary among counties, unemployment rates throughout the Project area remain below the statewide average, indicating a relatively stable labor market and economic base.

6.4.9.2 Potential Impacts

Construction

Construction of the Project is expected to generate temporary positive economic impacts within the Project Area and throughout Minnesota. Based on preliminary planning, the Applicants estimate that between 500 and 600 full-time personnel may be needed during construction. Construction activities would require workers representing a variety of trades, professions, and specialties, including project managers, engineers, environmental specialists, inspectors, lineworkers, electricians, heavy equipment operators, truck drivers, laborers, and other support personnel.

The Applicants expect that selected contractors will employ a workforce consisting of workers with varying skill sets and specialties to perform different aspects of Project construction. The Applicants support the use of local workers when practicable, supplemented by workers with specialized skills needed to construct the Project safely and efficiently. When practical, contractors are expected to utilize local workers from communities within the Project area and surrounding region and supplement that workforce with specialized personnel drawn from a broader regional labor pool as necessary to meet Project staffing requirements.

Because construction personnel will require lodging, meals, transportation, fuel, equipment, and various support services, temporary economic benefits are anticipated for local businesses. Hotels, short-term rental properties, restaurants, grocery stores, convenience stores, fuel suppliers, vehicle maintenance providers, equipment rental companies, aggregate suppliers, concrete suppliers, and other local businesses may experience increased demand during construction. To the extent practicable, contractors may also obtain construction materials, supplies, and services from local and regional vendors, generating additional economic activity within the Project area.

Construction activities are not expected to result in substantial population growth within the affected counties. Many workers are anticipated to commute daily or weekly from within the region, while a portion of specialized workers may temporarily relocate to the Project area during construction. As a result, short-term demand for lodging and related services may increase; however, any effects on housing availability, schools, healthcare facilities, or other public services are expected to be limited and temporary due to the dispersed nature of construction activities and the availability of accommodations within the region.

In addition, landowners are expected to receive compensation associated with easement acquisition and other property rights necessary for construction and operation of the Project, as further discussed in **Section 5.1**.

Operations

Long-term socioeconomic effects associated with operation of the Project are expected to be limited but beneficial. The Applicants estimate that approximately 5 to 8 full-time personnel may be required for operation and maintenance activities, depending on operational needs and system requirements. These activities would include routine inspections, maintenance, vegetation management, repairs, and other activities necessary to ensure reliable operation of the transmission system.

Because operation of the Project requires relatively few personnel compared to construction, long-term impacts on population growth, housing demand, schools, and public services are expected to be negligible. However, operation of the Project would contribute to ongoing economic activity through maintenance expenditures and periodic utilization of local contractors, equipment suppliers, and service providers.

The Project would also provide long-term public benefits through increased transmission capability, improved reliability of the regional electric system, and support for existing and future electrical demand. These benefits would extend throughout the Project area and the broader electric system served by the Project.

In addition, operation of the Project is expected to contribute to local tax bases through utility property taxes and associated payments to local taxing jurisdictions, providing a long-term source of revenue for counties, townships, school districts, and other local governmental entities.

6.4.9.3 Mitigation Measures

Overall socioeconomic impacts associated with the Project are anticipated to be predominantly beneficial. Consequently, no specific socioeconomic mitigation measures are proposed. The Applicants will continue coordination with local governments, businesses, and landowners during final design and construction planning to minimize temporary disruptions and maintain access to properties and businesses where practicable.

6.4.9.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions related to socioeconomics, including hiring “local workers” and creating “local job impacts”—as both terms are defined under Minn. Stat. § 216B.2422, subd. 1(g) and (h), filing quarterly labor statistics reports, as well as the following example route permit condition:

- Section 9.5 of the Sample Route Permit requires the permittee, its contractors, and subcontractors to pay no less than the prevailing wage rate.

6.4.10 Property Values

6.4.10.1 Existing Conditions

Property values within the Project area are influenced by numerous factors, including location, land use, parcel size, existing improvements, access to transportation and services, market conditions, and neighborhood characteristics. As discussed in the preceding sections the Project area includes a mix of agricultural, residential, commercial, industrial, and recreational properties.

The relationship between HVTLs and property values has been studied extensively for more than 50 years. However, study results vary considerably based on property type, transmission line characteristics, surrounding land uses, and local market conditions.[104,105]

Published research has not established a consistent cause-and-effect relationship between transmission lines and property values. Many studies have found little or no measurable effect on property sale prices, while others have identified localized impacts, particularly for properties immediately adjacent to transmission lines. Where impacts have been observed, they generally decrease with distance from the transmission line and may be influenced by the presence of existing utility rights-of-way and other infrastructure.[106]

For agricultural properties, potential effects are most commonly associated with the placement of transmission structures and their influence on farming efficiency, field operations, irrigation systems, aerial application, and other agricultural activities. For residential properties, visual character and proximity to transmission facilities are generally the factors most frequently evaluated in property value studies.

6.4.10.2 Potential Impacts

The ROI for property value impacts is the Local Vicinity.

Potential effects on property values would depend on site-specific conditions, including property type, proximity to Project facilities, visibility of transmission structures, existing land uses, and the presence of existing infrastructure. Because these factors vary substantially among individual properties, potential impacts cannot be generalized across all properties within the Project area.

Potential impacts would be most likely to occur on properties immediately adjacent to or crossed by the Project, where transmission structures, conductors, access routes, or easement restrictions may alter existing land use patterns or visual conditions. As discussed in **Section 6.4.5**, visual changes associated with a new 765 kV transmission line may be more noticeable than lower-voltage facilities because of the larger structures and conductor clearances required for operation.

The magnitude of potential effects may be reduced where the Project is co-located with existing transmission facilities, transportation rights-of-way, or other linear infrastructure because utility infrastructure is already an established feature of the landscape. Co-location with existing infrastructure may reduce incremental visual changes and minimize the introduction of new land-use constraints.

For agricultural properties, transmission structures and associated easements may affect field operations, maneuverability of large agricultural equipment, aerial application, irrigation systems, drainage improvements, or other farming activities. However, impacts would vary based on structure placement, field configuration, and existing agricultural practices. As further discussed in **Section 6.6.1**, most agricultural acreage will remain available for crop production, grazing,

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104 Pitts, J.M., and Jackson, T.O. 2007. “Power Lines and Property Values Revisited.” *The Appraisal Journal*, 75(4): 323-325. Available online at: https://real-analytics.com/TAJFall07p.323-325.pdf. Accessed July 2026.

105 Chalmers, J.A., and Voorvaart, F.A. 2009. “High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects.” *The Appraisal Journal*, 77(3): 227–245.

106 Des Rosiers, F. 2002. “Power Lines, Visual Encumbrance and House Values: A Microspatial Approach to Impact Measurement.” *Journal of Real Estate Research*, 23(3): 275–301.

haying, and other agricultural uses following construction, subject to easement restrictions and safe operation and maintenance of the transmission facilities.

The Project is not expected to result in widespread changes in property values throughout the Project area. Any potential effects would likely be localized and influenced by individual property characteristics, existing land uses, visibility, proximity to Project facilities, and local market conditions.

6.4.10.3 Mitigation Measures

The Applicants have incorporated several measures into Project planning and design to avoid or minimize potential effects on property values.

A primary mitigation measure is the extensive use of existing transmission rights-of-way and other linear infrastructure where practicable. Co-location reduces the introduction of new infrastructure into previously unaffected areas and helps minimize visual and land-use changes that may influence property values.

The Applicants have also sought to avoid residences where practicable during route development. As discussed in **Section 3.1**, route widths were developed to provide flexibility during final alignment selection and detailed engineering. This approach allows refinement of structure locations, access routes, and facility placement to avoid or minimize impacts to residences, agricultural operations, and other property improvements where practicable.

Landowners whose properties are crossed by the Project would be compensated for easement rights in accordance with negotiated agreements and applicable law. The Applicants would also be responsible for repairing or compensating landowners for construction-related damages and restoring disturbed areas in accordance with permit requirements and landowner agreements.

Eligible landowners may also exercise rights provided under Minn. Stat. § 216I.21, commonly referred to as the “Buy the Farm” statute, where applicable.

Collectively, these measures are intended to avoid, minimize, and compensate for Project-related effects on private property and ongoing land uses.

6.4.10.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures that may serve to minimize impacts to property values, including:

- Section 5.3.18 of the Sample Route Permit requires the permittee to restore the right-of-way, temporary workspaces, access roads, abandoned right-of-way, and other public or private lands affected by construction.

- Section 5.3.21 requires the permittee to fairly restore or compensate landowners for damage to crops, fences, private roads and lanes, landscaping, drain tile, or other damages sustained during construction.

6.5 PUBLIC HEALTH AND SAFETY

The construction and operation of the Project may present public health and safety considerations common to high-voltage transmission facilities. This section addresses EMF, stray and induced voltage, emergency services, and public and worker safety. The Project will be designed, constructed, operated, and maintained in accordance with the NESC, Occupational Safety and Health Administration (OSHA) requirements, applicable electrical and fire codes, and the Applicants' engineering standards, with additional protective measures incorporated where warranted by the Project's 765 kV and 765/161 kV double-circuit configuration.

The discussion of mitigation measures below references the electric, fire, and safety codes applicable to the Project, as well as additional safety measures built into the Project beyond minimum code requirements.

6.5.1 Electric and Magnetic Fields

EMF are produced whenever electricity is generated, transmitted, distributed, or used. Like all transmission facilities, the Project would produce electric fields and magnetic fields during operation. Electric fields are produced by voltage and are measured in kilovolts per meter (kV/m). Magnetic fields are produced by current flow and are measured in milliGauss (mG).

This section describes existing EMF conditions, calculated EMF levels associated with the Project, potential impacts from EMF, and measures incorporated into Project design to reduce potential effects.

6.5.1.1 Existing Conditions

The Project traverses a predominantly rural and agricultural landscape where existing sources of EMF are typical of southeastern Minnesota. Existing sources include transmission and distribution lines, electrical service to residences and agricultural operations, farm equipment, household appliances, and other electrical infrastructure.

EMF levels from existing electrical facilities vary depending on operating voltage, current flow, and distance from the source. As with all EMF sources, field strength decreases rapidly with distance.

6.5.1.2 Potential Impacts

The ROI for EMF consists of the Local Vicinity, where field levels attributable to the Project would be greatest. As discussed in **Section 6.4.3**, based on the current route design, the closest residences include one residence located 150 feet from the Segment 2 portion of the 765 kV / 161 kV Proposed Alignment, and one residence is located 150 feet from the Q-9 161 kV Proposed Alignment. There are no residences located within the Proposed Rights-of-Way based on the current design.

EMF levels for the Project were calculated using Power Line Systems-Computer Aided Design and Drafting and the Bonneville Power Administration (BPA) Corona and Field Effects Program

(BPA Version 3.1)[107] based on the proposed conductor arrangements, structure configurations, maximum operating voltage, and anticipated loading conditions.

Electric Fields

Electric field strength is determined primarily by transmission line voltage and decreases rapidly with distance from the conductors. Electric fields may also be reduced by buildings, vegetation, terrain features, and other objects located between the transmission line and the receptor.

There is no federal electric field exposure standard applicable to transmission lines. However, the Commission has historically applied a maximum electric field limit of 8 kV/m measured at 1 meter above ground level for new transmission facilities.[108]

As shown in **Table 6.5.1-1**, modeled electric field levels for both the 765 kV single-circuit configuration and the 765/161 kV double-circuit configuration remain below the Commission's 8 kV/m standard. The highest modeled electric field is 7.47 kV/m directly beneath the Segment 1 configuration. Therefore, Project electric fields are expected to comply with Minnesota's electric field standard.

TABLE 6.5.1-1

Electric Field Calculation Summary*

	Distance to Proposed Alignment (feet) kV/m										
Voltage	-125	-100	-75	-50	-25	0	25	50	75	100	125
Segment 1											
765 kV	2.93	4.73	6.98	7.47	5.24	4.96	5.24	7.47	6.98	4.73	2.93
Segment 2											
765/161 kV	2.61	3.52	4.31	4.33	2.89	0.82	2.89	4.33	4.31	3.52	2.61
161 kV	-	-	-	0.51	1.55	1.34	1.10	0.61	-	-	-
Q-9											
161 kV	-	-	-	0.51	1.54	1.33	1.09	0.60	-	-	-

* Note: Electric Field values calculated at 1.05pu overvoltage from nominal (803.3 kV and 169.1 kV).

Approximately 2,400 miles of 765 kV transmission lines are safely and reliably operating in the U.S. and have been since the first 765 kV transmission lines were installed in the 1970s. States that currently have 765 kV transmission lines installed include Illinois, Michigan, Indiana, Ohio, Kentucky, West Virginia and Virigina. The 765 kV voltage level is also in use internationally.

Magnetic Fields

Magnetic field strength is determined primarily by electrical current flow and decreases rapidly with distance from the transmission line. Unlike electric fields, magnetic fields are largely unaffected by vegetation, buildings, or other non-ferromagnetic materials and vary as electrical loading changes over time. The magnetic fields produced by transmission lines are among the

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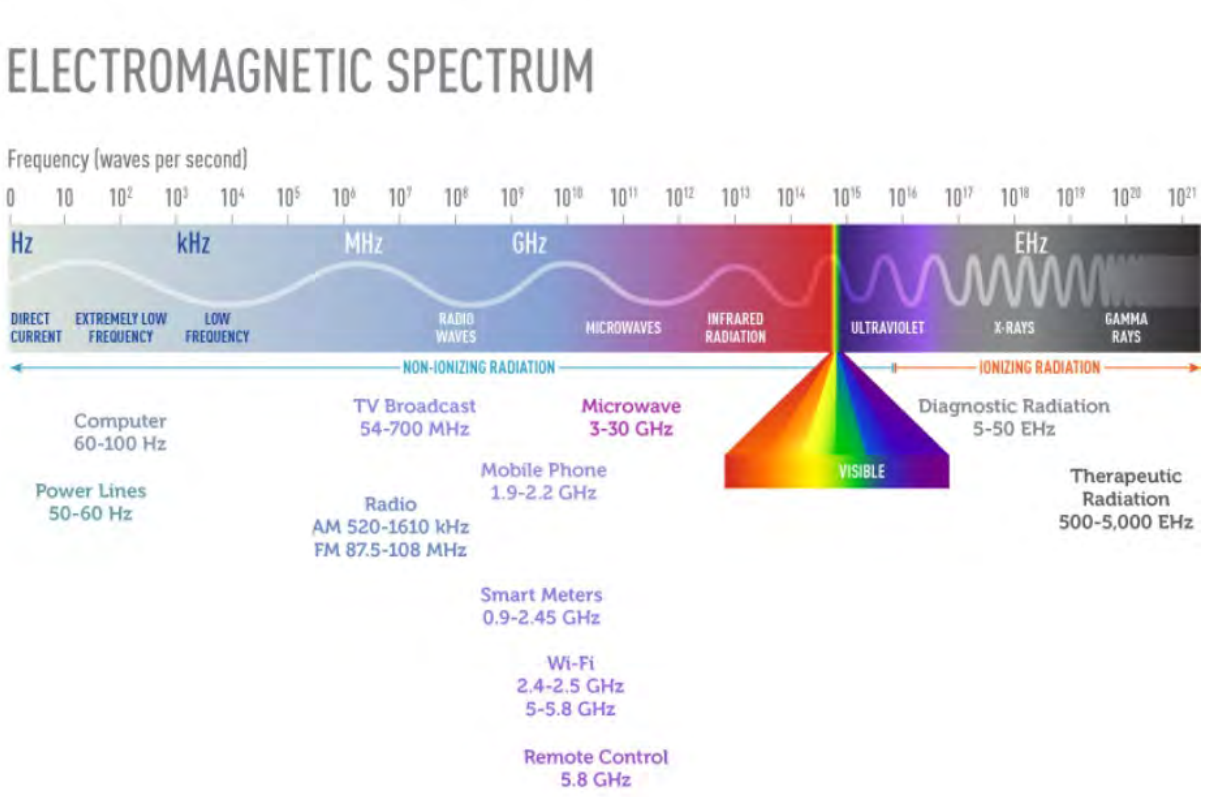
107 Bonneville Power Administration. 2018. Corona and Field Effects Program, (BPA Version 3.1). Available online at: https://www.bpa.gov/-/media/Aep/foia/apps/Corona-and-Field-Effects.zip**.** Accessed June 2026.

108 *In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, S.D. to Hampton*, Docket No. ET2/TL-08-1474, ORDER GRANTING ROUTE PERMIT (Sept. 14, 2010) (adopting the Administrative Law Judge's Findings of Fact, Conclusions, and Recommendation at Finding 194).

slowest cycling magnetic signals, oscillating at 60 cycles per second. By contrast, visible light oscillates at trillions of cycles per second. Ultraviolet light, x-rays, and gamma rays operate at even higher frequencies. **Diagram 6.5.1-1** is a chart from the National Cancer Institute showing the types of magnetic fields across this spectrum.

DIAGRAM 6.5.1-1

Electromagnetic Spectrum



Source: National Cancer Institute. 2022.Electromagnetic Fields and Cancer. Available online at: https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/electromagnetic-fields-fact-sheet**.** Accessed October 2026.

Ultraviolet light, x-rays, and gamma rays operate at extraordinarily high frequencies and, at these frequencies, carry enough energy to break chemical bonds, including those in DNA. This process is known as ionization, and fields capable of causing it are classified as ionizing radiation. The 60 Hz magnetic fields produced by transmission lines do not carry sufficient enough energy to cause ionization and are classified as non-ionizing. This is an important distinction, because the health concerns associated with ionizing radiation, such as direct DNA damage, do not apply to the magnetic fields produced by transmission lines because transmission line magnetic fields are incapable of breaking cellular bonds.[109]

[109] National Cancer Institute. 2022. Electromagnetic Fields and Cancer. Available online at: https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/electromagnetic-fields-fact-sheet**.** Accessed October 2026.

Minnesota has not established a regulatory limit for magnetic fields associated with transmission lines. The Commission has noted that Florida, Massachusetts, and New York have established standards for magnetic field exposure.[110]

Modeled magnetic field levels for the Project under typical operating conditions are presented in **Table 6.5.1-2**. The highest calculated magnetic field is approximately 225 mG directly beneath the 765 kV transmission line alignment. Magnetic field levels decrease substantially with increasing distance from the line. The highest magnetic field level at the edge of the right-of-way is 75.7 mG.

TABLE 6.5.1-2

Magnetic Field Calculation Summary*

Voltage	Current (Amps)	Distance to Proposed Alignment (feet) mG										
		-125	-100	-75	-50	-25	0	25	50	75	100	125
Segment 1												
765 kV	2,264	75.7	108.6	155.8	203.9	225.3	225.0	225.3	203.9	155.8	108.6	75.7
Segment 2												
765 kV / 161 kV	2,264/ 168	57.8	74.9	95.7	117.7	135.1	141.2	135.1	117.7	95.7	74.9	57.8
161 kV	168	-	-	-	17.3	22.5	27.6	26.4	18.9	-	-	-
Q-9												
161 kV	222	-	-	-	22.9	29.8	36.5	34.9	25.0	-	-	-

* Note: Magnetic field levels shown reflect typical operating conditions for the transmission line, based on expected power flow and average structure height.

Amps = amperes

For context, magnetic fields produced by common household appliances at close distances from the appliance can exceed magnetic field levels associated with the transmission lines at the center of the right-of-way, where magnetic fields under typical operating conditions are highest.[111] Example values are provided in **Table 6.5.1-3**.

TABLE 6.5.1-3

Table of Magnetic Fields of Common Electric Appliances (mG)

Appliance	6 Inches from Source	1 Foot from Source	2 Feet from Source
Hair Dryer	300	1	-
Electric Shaver	100	20	-
Can Opener	600	150	20
Electric Stove	30	8	2
Television	N/A	7	2
Portable Heater	100	20	4
Vacuum Cleaner	300	60	10
Copy Machine	90	20	7

110 *In the Matter of the Route Permit Application for the North Rochester to Chester 161 kV Transmission Line Project*, Docket No. E-002/TL-11-800, ORDER at 20 (Sept. 12, 2012).

111 U.S. Environmental Protection Agency. 1992. *EMF in Your Environment. Magnetic Field Measurements of Everyday Electrical Devices*. Available online at: https://www.emf-portal.org/en/article/25886.

TABLE 6.5.1-3

Table of Magnetic Fields of Common Electric Appliances (mG)

Appliance	6 Inches from Source	1 Foot from Source	2 Feet from Source
Computer	14	5	2

Public Health Research

Transmission lines do not have any known health consequences, including childhood leukemia. EMF from transmission lines, and their potential effects on health, have been studied for more than 40 years by health scientists, governmental bodies, public health organizations and government appointed scientific panels from all over the world. Initially, there were concerns of a possible association between childhood leukemia and magnetic fields of transmission lines. The National Cancer Institute raised doubt by noting that there is no known mechanism by which these fields could cause cancer.[112] The National Institute of Environmental Health evaluated this body of research and concluded that the evidence was "weak."[113] Larger, modern studies with improved methodology have demonstrated null results for the past two decades.[114]

The World Health Organization (WHO) concluded that "…EMF exposures below the limits recommended in the ICNIRP international guidelines do not appear to have any known consequence on health."[115]

This Project is expected to produce 225 mG at the center of the 765 kV 250-foot right-of-way, and those levels reduce considerably with further distance. This level is far below ICNIRP's recommendation that magnetic field exposures not exceed 2,000 mG for the general public.[116]

In short, the research that initially raised concern was evaluated and considered of poor quality. The proposed biological mechanism was missing. Modern studies with improved methods did not replicate those initial findings, instead showing no correlation between magnetic fields and cancer. And this project is well below safety standards set by ICNIRP, which is endorsed by the WHO.

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112 National Cancer Institute. 2022. Electromagnetic Fields and Cancer. Available online at: https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/electromagnetic-fields-fact-sheet. Accessed October 2026.

113 National Institute of Environmental Health Sciences. 2022. *Electric and magnetic fields associated with the use of electric power: questions and answers*. National Institutes of Health. Accessed October 26, 2026.

114 Amoon AT, Swanson J, Magnani C, Johansen C, Kheifets L. 2022. Pooled analysis of recent studies of magnetic fields and childhood leukemia. *Environ Res*. Mar 2022; 204(Pt A):111993. doi:10.1016/j.envres.2021.111993

115 World Health Organization. Undated. Radiation and Health: Protection Norms and Standards. https://www.who.int/teams/environment-climate-change-and-health/radiation-and-health/protection-norms. Accessed October 26, 2026.

116 International Commission on Non-Ionizing Radiation Protection. 2010. ICNIRP Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz). *Health Physics*. Dec 2010; 99(6):818-36. doi:10.1097/HP.0b013e3181f06c86. Available online at: https://icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf. Accessed October 2026.

Electrical Interference

Modern agricultural operations increasingly utilize GPS-guided and automated equipment, including auto-steer tractors, precision planting systems, harvesting equipment, and robotic agricultural technologies.

GPS and real-time kinematic (RTK) positioning systems operate at frequencies substantially higher than frequencies associated with transmission line electric fields, magnetic fields, or corona-related radio noise. Accordingly, interference with GPS-guided and robotic farm equipment is not expected under normal operating conditions.

Transmission structures may occasionally create brief line-of-sight obstructions between equipment and satellites when equipment operates immediately adjacent to a structure; however, these effects are expected to be localized and temporary. If interference with GPS-based agricultural navigation systems, communication equipment, radio, television, or other electronic devices is reported and determined to be caused by operation of the Project, the Applicants will work with affected landowners and equipment operators to identify and implement reasonable corrective measures.

6.5.1.3 Mitigation Measures

The Project has been designed to minimize EMF levels while maintaining compliance with applicable safety and reliability standards. The transmission line will be designed and operated so that electric field levels measured one meter above ground remain below the Commission's 8 kV/m standard. Conductor clearances will satisfy applicable NESC requirements, including provisions intended to limit induced currents on vehicles, agricultural equipment, and other conductive objects located beneath the transmission line.

The Applicants will also work with landowners to evaluate and address Project-related concerns regarding EMF, induced currents, or interference with communication systems, electronic equipment, or precision agricultural technologies should such issues arise during operation.

6.5.1.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures relevant to electric and magnetic fields, including:

- Section 5.4.2 of the Sample Route Permit requires the permittee to design, construct, and operate the transmission line in a manner that the electric field falls within the Commission's limits, that is, the electric field measured one meter above ground level immediately below the transmission line shall not exceed 8.0 kV/m.

6.5.2 Stray and Induced Voltage

6.5.2.1 Existing Conditions

Stray voltage refers to voltage that may occur between two conductive surfaces that can be simultaneously contacted by people or animals and is most commonly associated with electric distribution systems, service equipment, grounding systems, and customer-owned electrical facilities. Induced voltage refers to voltage that develops on nearby conductive objects or parallel facilities due to the electric and magnetic fields produced by a transmission line.

Because the Project is a transmission facility and does not directly serve customer electrical loads, stray voltage is not expected to be generated by Project operation. The primary consideration for the Project is the potential for induced voltage on nearby conductive objects or parallel facilities, particularly where transmission and distribution facilities occur in close proximity for extended distances.

6.5.2.2 Potential Impacts

The ROI for induced voltage is the area within and immediately adjacent to the Proposed Right-of-Way where interactions with nearby conductive objects and parallel facilities are most likely to occur.

Because the Project will not provide customer electrical service and will not directly connect to local distribution systems, stray voltage impacts are not anticipated. Potential impacts, if any, would be limited to induced voltage on nearby conductive objects or parallel facilities in locations where separation distances are small and parallel exposure lengths are relatively large.

Examples of conductive objects that can experience induced voltage include fences, gates, irrigation systems, pipelines, communication cables, vehicles, agricultural equipment, metal buildings, and parallel electric distribution facilities. In some circumstances, contact with an inadequately grounded object could result in a nuisance shock. The principal concern is not the induced voltage itself, but the current that could flow through a person or animal contacting the object.

The NESC establishes requirements intended to prevent unsafe induced-current conditions. Specifically, induced currents associated with transmission facilities must remain below the NESC threshold of 5 milliamperes for non-stationary objects. The Project will be designed to comply with applicable NESC requirements.

Project-specific screening analyses have been performed to identify locations where induced voltage may warrant additional evaluation. Locations that do not exceed screening thresholds will not require further review. Locations identified through the screening process will be evaluated during final design, and mitigation measures will be implemented where appropriate. Based on this approach, impacts associated with induced voltage are expected to be minor and localized.

Modern agricultural operations frequently utilize large metal equipment, irrigation systems, and GPS-guided machinery. Although conductive agricultural equipment may experience induced voltage under certain conditions, such equipment is typically grounded through normal operation and use. Induced voltage may occur under certain circumstances, including improper or inadequate grounding, equipment faults, or other abnormal electric conditions. As a result, induced-voltage impacts on agricultural operations are expected to be minimal when appropriate grounding and design practices are employed.

6.5.2.3 Mitigation Measures

The Project will be designed, constructed, and operated in compliance with applicable NESC requirements related to induced voltage and induced current.

During final design, transmission line crossings and parallel facilities will be evaluated through Project-specific screening and engineering review. Where warranted, additional analysis will be performed to identify and address locations where induced-voltage conditions may occur.

Potential mitigation measures may include:

- grounding of fences, gates, irrigation systems, metal buildings, and other conductive objects located within or adjacent to the right-of-way;
- additional grounding improvements for nearby distribution facilities;
- increased separation between transmission and distribution facilities where practicable;
- transmission-line phasing arrangements that reduce induced-voltage effects;
- isolation or modification of neutral grounding systems where appropriate and in coordination with the affected utility; and
- other site-specific grounding or design measures developed during final engineering.

The Applicants will coordinate with affected distribution utilities, landowners, and facility owners to identify and implement appropriate mitigation where required. Through compliance with NESC requirements, Project-specific screening analyses, and implementation of site-specific mitigation measures where necessary, impacts associated with induced voltage is expected to be minimal.

6.5.2.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures that address stray and induced voltage, including:

- Section 5.4.1 of the Sample Route Permit requires the permittee to design, construct, and operate the transmission line in a manner that limits induced short-circuit current between ground and any non-stationary object in the right-of-way, by requiring grounding of all fixed metallic objects on or off the right-of-way to the extent necessary, to comply with the ground fault conditions specified in the NESC, and to address and rectify any induced current problems that arise during operations.

6.5.3 Emergency Services

This section describes emergency services within the Project area and evaluates the potential effects of Project construction and operation on emergency response resources, emergency access, public safety, emergency communications systems, and medical facilities.

6.5.3.1 Existing Conditions

Police, Fire, Ambulance Services, and Hospitals

Public safety services within the Project area include law enforcement, fire protection, emergency medical response, and regional medical facilities. Services are provided through county sheriff's offices, municipal police departments, local fire departments, ambulance service providers operating within designated Primary Service Areas, and regional healthcare systems. Emergency medical care is available through facilities operated by Mayo Clinic Health System, Mayo Clinic Hospital, Gundersen Health System, and other regional providers.

Table 6.5.3-1 summarizes the public safety and emergency service resources serving the counties crossed by the Project.

The Allied Radio Matrix for Emergency Response (ARMER) system provides interoperable emergency communications for state, county, local, Tribal, and other public-safety entities throughout Minnesota. Publicly available ARMER sites by counties crossed by the Project counties are identified in **Table 6.5.3-2**.

TABLE 6.5.3-1

Public Safety and Emergency Services within the Project Area

County	Law Enforcement	Fire Protection	Ambulance / Emergency Medical Service (Primary Service Areas)[a]	Hospitals / Medical Facilities[b]
Goodhue County	Goodhue County Sheriff's Office; Red Wing, Cannon Falls, Goodhue, and Zumbrota Police Departments[c]	Red Wing, Cannon Falls, Goodhue, and Zumbrota Fire Departments	Cannon Falls Ambulance Service; Red Wing Ambulance Service; Zumbrota Ambulance	Mayo Clinic Health System – Red Wing; Mayo Clinic Health System – Cannon Falls
Wabasha County	Wabasha County Sheriff's Office; Wabasha and Lake City Police Departments[d]	Wabasha, Lake City, Plainview, and Kellogg Fire Departments	Elgin Ambulance Service; Lake City Ambulance; Plainview Ambulance; Wabasha Ambulance Service	Gundersen St. Elizabeth's Hospital and Clinics (Wabasha); Mayo Clinic Health System – Lake City
Olmsted County	Olmsted County Sheriff's Office; Rochester, Byron, Stewartville, and Oronoco Police Departments[e]	Rochester, Byron, Stewartville, and Oronoco Fire Departments	Gold Cross Ambulance; Eyota Volunteer Ambulance; Stewartville Ambulance	Mayo Clinic Hospital – Rochester (Methodist Campus); Mayo Clinic Hospital – Rochester (Saint Marys Campus); Olmsted Medical Center Hospital
Mower County	Mower County Sheriff's Office; Austin Police Department[f]	Austin, Adams, Brownsdale, Grand Meadow, Le Roy, Lyle, and Rose Creek Fire Departments	Adams Area Ambulance Service; Austin Ambulance / Mayo Clinic Ambulance; Grand Meadow Ambulance; Le Roy Ambulance; Lyle Ambulance	Mayo Clinic Health System – Austin
Fillmore County	Fillmore County Sheriff's Office; municipal police departments serving Preston, Spring Valley, Chatfield, Rushford, and Harmony[g]	Preston, Spring Valley, Rushford, Chatfield, and Harmony Fire Departments	Chatfield Ambulance Service; Harmony Ambulance; Lanesboro Ambulance Service; Mabel Ambulance; Preston Ambulance; Rushford Ambulance; Spring Valley Ambulance	No general acute-care hospital within the county; residents are served by hospitals in surrounding communities
Houston County	Houston County Sheriff's Office; La Crescent, Caledonia, Houston, and Spring Grove Police Departments[h]	La Crescent, Caledonia, Houston, and Spring Grove Fire Departments	Caledonia Ambulance Service; Houston Community Ambulance; La Crescent Area Ambulance; Spring Grove Ambulance	No general acute-care hospital within the county; residents are served by hospitals in surrounding communities

Sources:

[a] Minnesota Office of Emergency Medical Services. Undated. Ambulance Primary Service Areas. Available online at: https://mn.gov/oems/ambulance-services/primary-service-area-maps.jsp. Accessed July 2026.

[b] Minnesota Department of Health. 2026. Hospital and Provider Facilities Information. Available online at: https://www.health.state.mn.us/data/economics/hccis/facilities.html. Accessed July 2026.

[c] Goodhue County Departments. 2026. Available online at**:** https://goodhuecountymn.gov/departments/. Accessed June 2026.

[d] Wabasha County Departments. 2026. Available online at: https://www.co.wabasha.mn.us/departments/index.php**.** Accessed June 2026.

[e] Olmsted County Departments. 2026. Available online at**:** https://www.olmstedcounty.gov/government/county-departments. Accessed June 2026.

TABLE 6.5.3-1

Public Safety and Emergency Services within the Project Area

County	Law Enforcement	Fire Protection	Ambulance / Emergency Medical Service (Primary Service Areas)[a]	Hospitals / Medical Facilities[b]

[f] Mower County Departments. Undated. Available online at**:** https://co.mower.mn.us/101/Services. Accessed June 2026.
[g] Fillmore County Departments. 2026. Available online at: https://www.co.fillmore.mn.us/departments/index.php**.** Accessed June 2026.
[h] Houston County Departments. 2026. Available online at: https://www.hocomn.gov/departments/index.php**.** Accessed June 2026.

TABLE 6.5.3-2

ARMER Sites by County

Site Name	County	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Distance to Proposed Alignment (feet)	Direction
Viola	Olmsted	44.06361111N	092.35333333W	13,311	N
Goodhue Co. Simulcast	Goodhue	44.33N	092.65W	30,969	S
Zumbrota	Goodhue	44.34280556N	092.64238889W	35,350	S
Zumbro Falls	Wabasha	44.25561111N	092.43794444W	4,910	S
Olmsted Co. Simulcast	Olmsted	44.01257N	092.41425W	24,301	SE
New Haven	Olmsted	44.13416667N	092.58750000W	40,443	N
Guggenheim	Olmsted	44.02069444N	092.46705556W	35,562	SE
Pleasant Grove	Olmsted	43.85491667N	092.33627778W	25,822	NW
Elkton	Mower	43.65836111N	092.68869444W	14,704	SE
Amherst	Fillmore	43.66619444N	091.93102778W	41,881	S
Wykoff	Fillmore	43.65930556N	092.29966667W	39,449	S
Reno	Houston	43.55058333N	091.36147222W	2,833	N
Spring Grove	Houston	43.57030556N	091.61175000W	6,634	S
Caledonia	Houston	43.66875000N	091.40419444W	40,128	S

Source: The Radio Reference Wiki, 2020. Available online at: https://wiki.radioreference.com/index.php/Allied_Radio_Matrix_for_Emergency_Response_(ARMER)_Site_Directory. Accessed June 2026

6.5.3.2 Potential Impacts

The ROI for emergency services is the county-level service area because law enforcement, fire protection, emergency medical services, and hospitals are generally organized and administered at the county, municipal, or ambulance service area level. Construction of the Project may require a workforce of between 500 and 600 personnel at peak construction. Construction activities could result in temporary demands on emergency services through worker injuries, traffic incidents, equipment accidents, fire response needs, or other construction-related emergencies. However, the workforce would be distributed across multiple counties and work areas, and the available law enforcement, fire protection, ambulance, and hospital resources within the Project area are expected to be sufficient to respond to routine construction-related incidents.

Construction activities could also result in temporary traffic delays, lane closures, or localized road restrictions near active work areas. If not coordinated appropriately, these activities could affect emergency vehicle access. Emergency response agencies may also occasionally assist with traffic control or incident response near construction activities.

Because Fillmore and Houston counties do not contain acute-care hospitals, emergency medical transport may require patient transport to hospitals located in neighboring counties. However, this reflects existing emergency response conditions and is not expected to substantially affect emergency response capabilities associated with the Project.

Operation of the Project is not expected to result in substantial demands on emergency services. Approximately 5 to 8 full-time personnel may be required for operation and maintenance activities. Routine operation of transmission facilities generally does not require regular emergency response services. Potential operational emergencies, such as severe weather damage, vehicle

accidents involving Project infrastructure, or damaged conductors and structures, would occur infrequently and would be addressed through established utility and local emergency response procedures.

Based on the anticipated structure locations and heights, significant impacts to ARMER communications towers, or emergency communications networks are not anticipated. The distance between ARMER communication towers and the proposed Project facilities is sufficient to avoid interference with emergency communication systems. Based on the location and height of the proposed structures, the Project is not expected to obstruct or degrade radio signals used by local emergency service providers.

Overall, construction and operation of the Project are not anticipated to significantly affect the availability or effectiveness of emergency services within the Project area.

6.5.3.3 Mitigation Measures

Existing communications facilities will be protected during construction through utility locating, facility marking, access coordination, and adherence to applicable safety procedures. Where necessary, the Applicants will conduct engineering evaluations and implement appropriate grounding, shielding, or other design measures to minimize the potential for electromagnetic interference with communications equipment. Construction activities will be managed to maintain access to communications facilities and minimize disruptions to emergency communications and public safety operations. The Applicants will coordinate with ARMER system operators, emergency service providers, communications companies, and other affected stakeholders to address any conflicts with existing communications infrastructure when identified.

Additional mitigation measures will include:

- maintaining emergency access to residences, businesses, and public roads during construction;
- coordinating temporary road closures, lane restrictions, and traffic-control measures with applicable jurisdictions;
- providing advance notification to emergency service providers regarding construction schedules and temporary access restrictions;
- relocating construction equipment or temporarily suspending construction activities, if necessary, to facilitate emergency response;
- implementing the Applicant-required Safety Plans and applicable OSHA requirements;
- utilizing the Gopher State One Call system and coordinating with utility owners prior to excavation activities;
- share the Project's emergency-response procedures for construction and operation with local emergency services;
- coordinating with emergency communications providers if potential impacts to ARMER, 911, microwave, or other public-safety communication systems are identified during final design; and

- maintaining appropriate security, signage, fencing, and protective equipment at substations and other Project facilities.

With implementation of these measures, impacts on emergency services are expected to be minor, temporary, and localized, and the Project is not anticipated to adversely affect public health, safety, or emergency response capabilities within the Project area.

6.5.3.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures that address emergency services, including a requirement that permittees minimize disruption to public services, and sharing information with local emergency responders.

6.5.4 Public and Worker Safety

This section describes potential public and worker safety impacts associated with construction and operation of the Project and the measures that will be implemented to avoid or minimize safety risks.

6.5.4.1 Existing Conditions

The ROI for public and worker safety is the Local Vicinity, which includes the Proposed Right-of-Way and adjacent areas where construction, operation, and maintenance activities may occur. Receptors include construction personnel, operation and maintenance staff, landowners, agricultural operators, motorists, recreational users, and other members of the public located near the Project.

High-voltage transmission line construction and operation are specialized activities subject to federal and state safety regulations, including OSHA requirements, NESC standards, utility operating procedures, and contractor safety programs.

6.5.4.2 Potential Impacts

Construction

The activities posing the greatest safety risks during construction include:

- working at height during structure assembly and conductor installation;
- crane and heavy-equipment operation;
- excavation and foundation construction;
- helicopter-supported structure installation and conductor stringing;
- vehicle traffic and transportation of oversized equipment;
- work near existing energized facilities and utilities; and
- exposure to severe weather and other environmental conditions.

Construction-related incidents could result in worker injuries, traffic accidents, equipment damage, or localized public safety concerns if not properly managed. However, construction activities will be conducted in accordance with OSHA requirements, applicable industry safety standards, and contractor safety procedures. Because construction areas will be temporary and controlled work zones, impacts to the public are expected to be limited.

In addition, construction activities may temporarily increase traffic volumes on local roads and highways and could result in short-term traffic disruptions at access points, road crossings, and construction staging areas. Public safety risks associated with increased construction traffic could include reduced visibility, conflicts between construction vehicles and the traveling public, slower traffic speeds, and increased potential for vehicle accidents in active construction areas.

Roadway crossing activities, including conductor stringing across highways, county roads, local roads, and railroads, present additional temporary safety considerations. To protect the traveling public, roadway crossings may require temporary traffic control measures, flaggers, pilot vehicles, temporary lane closures, or brief road closures during specific construction activities. Guard structures and other protective measures may be used during conductor installation to maintain safe separation between energized facilities, construction activities, and roadway users, as further described in **Section 5.3.9**.

Because construction activities will progress along the transmission line right-of-way, traffic-related impacts are expected to be temporary, localized, and of limited duration. Long-term transportation safety impacts are not anticipated following completion of construction.

Operations

Operational safety risks are primarily associated with exposure to energized transmission facilities, maintenance activities conducted at height, equipment operation, and severe weather events. Maintenance activities may occasionally occur near energized facilities, requiring specialized work practices, qualified personnel, and protective equipment.

A consideration for the Project is the potential for induced voltage on de-energized facilities located adjacent to energized transmission lines. As discussed in **Section 6.5.2**, induced voltage can occur when conductors or other conductive facilities are located near energized transmission lines. Consequently, de-energized facilities will be tested, grounded, and bonded before maintenance activities occur.

Risks to the public during operation are expected to be limited. Transmission facilities will be designed to comply with applicable NESC clearance requirements and other safety standards. Routine operation does not require public access to Project facilities, and substations and other energized equipment will be secured to prevent unauthorized entry.

Because portions of the right-of-way will remain accessible to landowners and the public, there is potential for unauthorized access to Project facilities, including structures, maintenance areas, and associated electrical equipment. Unauthorized climbing of transmission structures, operation of vehicles near energized equipment, or encroachment into restricted work areas could present safety risks. These risks will be minimized through implementation of warning signage, maintenance of required electrical clearances, landowner outreach, and utility inspection and maintenance programs.

The Jefferson Ridge Switching Station will contain energized equipment that is not intended for public access. To protect public safety, this facility will be enclosed by security fencing with controlled access gates and warning signs. Access will be restricted to authorized personnel and contractors. Facility design will incorporate grounding systems, protective relaying, circuit breakers, and other industry-standard electrical protection systems intended to reduce risks associated with equipment failure, fault conditions, or unauthorized access. Routine inspection and maintenance activities will further support safe operation of the facilities.

Hazardous materials associated with the Project are expected to be limited. During operation, hazardous materials may include insulating oils used in transformers and other electrical equipment and, if applicable, sulfur hexafluoride (SF_6) contained within gas-insulated electrical equipment. Materials that are removed from service would be evaluated and managed based on the applicable waste classification and regulatory requirements. Where appropriate, materials would be reused or recycled; materials requiring disposal would be transported to an appropriately permitted facility for treatment or disposal. Hazardous materials will be stored, handled, and disposed of in accordance with applicable federal and state requirements, including MPCA requirements, manufacturer specifications, and utility operating procedures.

6.5.4.3 Mitigation Measures

The Applicants will implement safety measures consistent with OSHA regulations, NESC requirements, utility operating procedures, and contractor safety programs.

Construction

- Development and implementation of Applicant-required Safety Plans.
- Use of qualified personnel and required worker training programs.
- Job safety briefings and hazard assessments prior to work activities.
- Fall-protection systems for elevated work.
- Coordination with county, township, and state road authorities regarding roadway crossings and transportation routes.
- Development and implementation of traffic control plans where required.
- Use of warning signs, flaggers, pilot vehicles, temporary barriers, and other traffic-control devices consistent with applicable roadway safety requirements.
- Coordination of temporary road closures or lane restrictions with local jurisdictions and emergency service providers.
- Maintenance of access for residences, agricultural operations, businesses, schools, and emergency responders.
- Use of guard structures and other protective measures at road, railroad, and utility crossings during conductor installation.
- Spill prevention and hazardous-material handling procedures.

- Coordination with emergency responders and local agencies, as appropriate.
- Repair of roadway damage caused by Project construction activities.

Operations

- Compliance with clearance, grounding, and protective-device requirements established by the NESC.
- Testing, grounding, and bonding of de-energized facilities before maintenance activities.
- Fencing, access controls, and warning signage at transmission structures, switching stations, substations, and other energized facilities, as appropriate.
- Security fencing and controlled-access gates at the Jefferson Ridge Switching Station and other electrical facilities, where applicable.
- Use of grounding systems, protective relays, circuit breakers, and other protective devices designed to automatically isolate faulted equipment and de-energize facilities during abnormal operating conditions.
- Maintenance of required electrical clearances and enforcement of easement restrictions within the right-of-way.
- Landowner coordination and public outreach regarding safe activities within and near the right-of-way.
- Implementation of utility inspection and maintenance programs to identify and address potential safety concerns.

With implementation of these measures, risks to workers and the public are expected to be minimized during both construction and operation of the Project.

6.5.4.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions and mitigation measures that address public and worker safety, including:

- Section 5.4.1 of the Sample Route Permit requires the permittee to design, construct, and operate the transmission line in a manner that limits induced short-circuit current between ground and any non-stationary object in the right-of-way, by requiring grounding of all fixed metallic objects on or off the right-of-way to the extent necessary, to comply with the ground fault conditions specified in the NESC, and to address and rectify any induced current problems that arise during operations.
- Section 5.5.1 requires the permittee to design the transmission line and associated facilities to meet or exceed all relevant local and state codes, the NESC, and NERC requirements. This includes standards relating to clearances to ground, clearances over roadways, right-of-way widths, and permit requirements.

6.6 LAND-BASED ECONOMIES

6.6.1 Agriculture

6.6.1.1 Existing Conditions

Agriculture is a predominant land use throughout the six-county Project area and is an important component of the regional economy. Agricultural land uses include row-crop production, pasture and hay land, livestock operations, agricultural drainage systems, precision agriculture, irrigation, aerial application, apiaries, and organic farming operations. Existing agricultural land use within the Proposed Routes was characterized using NLCD data and is summarized in **Table 6.6.1-1**.

TABLE 6.6.1-1

Agricultural Land Use by Proposed Route (acres)

Proposed Route	Cultivated Crop	Pasture/Hay	Prime Farmland Soils	Farmland of Statewide Importance Soils
Segment 1	9,989	1,524	8,344	3,219
Segment 2	37,598.7	3,572.0	38,092.2	4,593.0
Q-9	201	148	57	107
TOTAL	**41,364**	**4,739**	**40,312**	**6,817**

The Project also crosses areas mapped as prime farmland and farmland of statewide importance based on Soil Survey Geographic Database (SSURGO) mapping. Prime farmland soils possess the physical and chemical characteristics most favorable for agricultural production, while farmland of statewide importance includes productive agricultural soils with minor limitations. Additional discussion of soil characteristics relevant to agricultural productivity, including hydric soils, erosion potential, compaction-prone soils, and other soil limitations, is provided in **Section 6.8.5.1**.

County-level agricultural statistics from the U.S. Department of Agriculture 2022 Census of Agriculture are summarized in **Table 6.6.1-2**. Across the Project area, land in farms ranges from approximately 223,021 acres in Houston County to 470,312 acres in Fillmore County. Goodhue County has the highest percentage of land in farms at approximately 87 percent, followed by Fillmore County at approximately 85 percent.

TABLE 6.6.1-2

Agricultural Statistics (2022) by County

County	Land in Farms (acres)	Top 3 Crops by Acreage	Top 3 Livestock Inventories by Farms
Goodhue County	421,698 (87% of county)	Corn, soybeans, forage	Hogs and pigs, cattle, poultry, sheep and lambs
Wabasha County	235,417 (70% of county)	Corn, soybeans, forage	Cattle, hogs and pigs, poultry
Olmsted County	308,004 (74% of county)	Corn, soybeans, forage	Cattle, hogs and pigs, poultry
Mower County	380,070 (68% of county)	Corn, soybeans, vegetables	Hogs and pigs, cattle, poultry
Fillmore County	470,312 (85% of county)	Corn, soybeans, forage	Hogs and pigs, cattle, poultry
Houston County	223,021 (63% of county)	Corn, forage, soybeans	Cattle, hogs and pigs, poultry

Source: U.S. Department of Agriculture, National Agriculture Statistics Service. 2022. 2022 State and County Profiles – Minnesota. Available online at : https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/. Accessed July 2026.

Corn, soybeans, and forage crops are the predominant agricultural commodities within the Project Area, while cattle, hogs and pigs, poultry, sheep, and lamb production represent important livestock sectors. Agricultural production supports local employment and economic activity through farming operations, agricultural service providers, grain handling facilities, transportation systems, equipment sales and repair businesses, and agricultural processing industries. The large percentage of land devoted to agricultural production throughout the Project area reflects the importance of agriculture to both the regional economy and local land use patterns.

Agricultural operations within the Project area commonly include subsurface agricultural drainage tile, terraces, grassed waterways, livestock facilities, precision agriculture systems, aerial application, and other conservation or farm-management practices. There are several private airstrips located within 10 miles of the Project, identified in **Section 6.4.4.1**, which may conduct agricultural activities such as aerial spraying. Site-specific agricultural features will continue to be identified through landowner coordination, easement negotiations, engineering review, and implementation of the AIMP.

Where irrigation is used, equipment may include portable or traveling sprinkler systems, pumps, piping, wells, and other irrigation infrastructure. A review of available aerial imagery did not identify any center-pivot irrigation systems within the Proposed Routes or Proposed Rights-of-Way.

Precision agriculture technologies are commonly used throughout the Project area and may include GPS- and RTK-guided systems used for planting, tillage, fertilizer application, pesticide application, and harvesting. These technologies improve operational efficiency and reduce input costs for agricultural producers. These technologies are further discussed in **Section 6.5.1**.

The U.S. Department of Agriculture Organic Integrity Database[117] identifies 97 registered organic farms within the six-county Project Area, including 29 in Fillmore County. Because registration is not required for all organic operations and the database identifies mailing addresses rather than field locations, additional organic farming operations may occur within the Project area. Certified organic farms may require additional consideration during transmission line construction, restoration, and long-term right-of-way maintenance because these operations must comply with USDA organic certification requirements. Potential concerns include the use of prohibited herbicides, pesticides, fertilizers, seed treatments, or other materials on certified organic acreage, as well as maintaining appropriate buffers from potential sources of contamination. Apiaries may also occur throughout the agricultural landscape of the Project area, particularly in association with crop production, specialty crops, conservation areas, and rural residential properties. Additional agricultural operations and specialty agricultural uses will continue to be identified through landowner coordination during final design and easement acquisition.

Due to the prevalence of agricultural production in the region, private airstrips and aviation facilities occur near the Proposed Routes and may support agricultural aerial application activities. Private airstrips located within and adjacent to portions of the Project area are discussed further in **Section 6.4.4.1**.

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[117] U.S. Department of Agriculture. Undated. Organic Integrity Database. Available online at: https://organic.ams.usda.gov/integrity/Search**.** Accessed June 2026.

6.6.1.2 Potential Impacts

Table 6.6.1-3 summarizes agricultural land uses and agricultural soils crossed by the Proposed Rights-of-Way. Based on the current Project design, the Proposed Rights-of-Way cross approximately 2,850 acres of cultivated crop land and 393 acres of pasture/hay land based on NLCD mapping. The Jefferson Ridge Switching Station is also located within an agricultural setting.

TABLE 6.6.1-3

Potential Impacts to Agricultural Land Use within the Proposed Rights-of-Way (Acres)

Proposed Right-of-Way	Cultivated Crop	Pasture/Hay	Prime Farmland Soils	Farmland of Statewide Importance Soils
Segment 1	877	114	709	289
Segment 2	1,961	276	1,833	330
Q-9	10	3	6	5
TOTAL	**2,850**	**393**	**2,548**	**624**

Construction

During construction, temporary impacts may include crop loss, interruptions to field access, soil compaction and rutting, erosion, damage to drainage tile and conservation practices, disruption of irrigation systems, temporary constraints on aerial application, and localized interference with routine farming activities.

Agricultural drainage tile systems may be present within cultivated fields crossed by the Project. Damage to subsurface drainage systems could temporarily affect drainage performance and crop productivity until repairs are completed. Similarly, construction equipment operating during wet conditions may result in soil compaction, rutting, and localized erosion, particularly in highly productive agricultural soils or soils prone to compaction.

Agricultural operations within the Project area may also include irrigation systems, aerial application, precision agriculture technologies, livestock facilities, apiaries, and organic farming operations. Construction activities and temporary construction features may create localized disruptions to these operations.

Organic agricultural operations may require additional coordination during construction and maintenance activities to avoid introduction of prohibited substances or other conditions inconsistent with the farm's Organic System Plan. Similarly, construction activities near apiaries or livestock operations may require operation-specific coordination to minimize temporary disruptions.

Apiaries may occur within or adjacent to agricultural lands crossed by the Project. Construction activities near active apiaries could temporarily disturb bee colonies through increased human activity, equipment operation, dust generation, and vegetation clearing. Vegetation management activities conducted during construction or operation may also involve herbicide application within portions of the right-of-way. Although herbicide use would be conducted in accordance with label requirements and applicable regulations, improper application or off-target drift could temporarily affect flowering vegetation used by pollinators and apiaries located near treatment areas. Potential impacts to apiaries and pollinator resources are expected to be localized and temporary

and would depend on the location of apiaries, vegetation management activities, and site-specific operating conditions.

Operation

Where the Proposed Rights-of-Way cross agricultural lands, most agricultural acreage will remain available for crop production, grazing, haying, and other agricultural uses following construction, subject to easement restrictions and safe operation and maintenance of the transmission facilities. Permanent impacts would primarily occur where transmission structures, foundations, and the Jefferson Ridge Switching Station occupy land that would otherwise be available for agricultural production. Depending on structure type and foundation design, individual transmission structure footprints are anticipated to range from approximately 45 feet by 45 feet (0.05 acre) to 60 feet by 60 feet (0.08 acre). On Segment 2, this impact would be reduced through utilizing Dairyland's existing transmission right-of-way that is currently occupied by 161 kV wooden H-frame structures with foundations ranging from 25 to 40 feet wide. Further, although the lattice structure foundations may be larger than the existing H-frame structures, there would be longer spans between the new structures, resulting in approximately 215 fewer structures than currently installed (see **Section 1.2.1.2**). Although these areas represent a relatively small portion of the overall agricultural landscape crossed by the Project, they would result in a permanent loss of agricultural productivity within the structure footprint.

In addition to the direct loss of productive acreage, transmission structures and conductors may require modifications to aerial spraying patterns, irrigation management, or equipment maneuvering in the immediate vicinity of Project facilities. Depending on field configuration, structure placement may result in additional turning movements, overlap or missed areas during field operations, reduced efficiency of precision agriculture systems, and localized reductions in farm operational efficiency. The magnitude of these effects would vary depending on structure location, field size and shape, equipment used, and existing agricultural practices.

Certified organic farms would generally experience the same types of physical and operational impacts from transmission line construction and operation as other agricultural operations. However, organic farms may require additional coordination during restoration, and right-of-way maintenance to ensure that Project activities are consistent with applicable organic certification requirements, particularly regarding the use of herbicides, pesticides, fertilizers, seed, or other materials on certified organic acreage.

6.6.1.3 Mitigation Measures

Potential impacts to GPS-guided and precision agriculture systems are expected to be minimal and localized. As discussed in **Section 6.5.1**, transmission structures may occasionally create temporary line-of-sight obstructions; however, widespread impacts to precision agriculture systems are not anticipated

The Applicants will avoid, minimize, and mitigate impacts to agricultural operations through route selection, structure placement, landowner coordination, implementation of the AIMP, and compliance with applicable route permit conditions.

The Applicants developed a draft AIMP (**Appendix H**) and will continue to coordinate with the MDA to finalize the plan. The AIMP provides the principal framework for protecting agricultural resources during construction and includes measures related to:

- agricultural drainage tile identification, protection, and repair;
- soil compaction, rutting, and restoration;
- erosion prevention and revegetation;
- agricultural access and field operations;
- irrigation systems and conservation practices;
- agricultural aerial spaying;
- organic agricultural operations;
- crop damage compensation; and
- construction monitoring and landowner coordination.

During final design, the Applicants will continue coordination with landowners regarding structure locations, access routes, drainage systems, irrigation infrastructure, aerial application operations, livestock facilities, apiaries, and other operation-specific concerns. Temporary access roads, staging areas, pull sites, and other workspaces will be located to minimize interference with agricultural operations where practicable.

Damaged drainage tile systems will be repaired or the landowner will be compensated in accordance with Section 4.3 of the AIMP (**Appendix H**). Compacted or rutted soils will be restored, and agricultural lands temporarily disturbed during construction will be restored to pre-construction conditions to the extent practicable as discussed in Section 4.5 of the AIMP (**Appendix H**).

If herbicides or other pesticides are used for vegetation management, the Applicants will comply with applicable route permit requirements, label restrictions, and regulatory notification requirements, including notifications to beekeepers, organic farms, and other affected agricultural operations where required, as further described in Section 5 of the AIMP (**Appendix H**). These requirements will be implemented in conjunction with the AIMP and landowner coordination procedures to minimize potential impacts to apiaries, pollinator resources, and organic agricultural operations.

The Applicants will retain an Environmental/Agricultural Monitor, as described in the AIMP, to monitor implementation of agricultural mitigation measures and coordinate with MDA, landowners, and construction contractors.

Landowners will be compensated for construction-related agricultural damages in accordance with applicable easement agreements, damage settlements, and AIMP provisions.

With implementation of these measures, most agricultural impacts are expected to be temporary and localized, and agricultural land uses are expected to continue throughout the Project area following construction.

6.6.1.4 Typical Route Permit Conditions

Route permits issued by the Commission typically contain the avoidance and minimization measures relevant to agriculture, including:

- Section 5.3.8 of the Sample Route Permit requires the permittee to implement erosion prevent and sediment control practices recommended by the MPCA General Permit, which requires the development of a SWPPP that describes methods to control erosion and runoff.

- Section 5.3.11 is a standard condition that requires the permittee to apply pesticides so as not to damage adjacent properties including crops, orchards, tree farms, apiaries, or gardens. In addition, permittee is required to provide notice of pesticide application to landowners and beekeepers operating known apiaries within three miles of the application area at least 14 days prior to the application.

- Section 5.3.12 requires the permittee to employ BMPs to avoid the potential introduction or spread of invasive species because of the Project on lands disturbed by construction.

- Section 5.3.17 requires the permittee to avoid, promptly repair, or replace all drainage tiles broken or damaged during all phases of the project's life.

- Section 5.3.21 requires the permittee to fairly restore or compensate landowners for damages to crops, fences, private roads and lanes, landscaping, drain tile, or other damage sustained during construction.

- Section 5.4.3 requires the permittee to restore or provide reception equivalent to reception levels in the immediate area just prior to the construction of the project if interference with GPS-based agriculture navigation systems is caused by the presence or operation of the project.

6.6.2 Forestry

6.6.2.1 Existing Conditions

Forested lands are an important component of the natural and economic landscape within the Project area. According to NLCD[118] (see **Section 6.4.2**), the Proposed Routes cross approximately 5,118 acres of forested land cover (**Table 6.6.2-1**), representing approximately 9.3 percent of the land within the Proposed Routes. Deciduous forest is the dominant forest cover type, with smaller amounts of evergreen and mixed forest. Forested areas generally occur within

[118] USGS. 2024. Annual NLCD Collection 1 Science Products (ver. 1.2, June 2026): U.S. Geological Survey. Available at: https://www.sciencebase.gov/catalog/item/655ceb8ad34ee4b6e05cc51a. Accessed June 2026.

blufflands, riparian corridors, wooded ravines and slopes, rural woodlots, and other areas less suitable for agricultural production.

TABLE 6.6.2-1

Forest Land Cover by Proposed Route (Acres)

Proposed Route	Deciduous Forest	Evergreen Forest	Mixed Forest	Totals
Segment 1	1,640	11	12	1,664
Segment 2	3,258	14	41	3,313
Q-9	300	2	6	308
TOTAL	**5,033**	**27**	**58**	**5,118**

The Project area occurs within the MDNR Paleozoic Plateau Forest Management Section,[119] which includes hardwood and riparian hardwood forest communities characteristic of southeastern Minnesota. This forestry management section includes approximately 65,000 acres of state-managed forest lands and is recognized for its high-quality hardwood resources.

Segment 2 of the Proposed Route crosses 297 acres of the RJD Memorial Hardwood State Forest (see **Section 6.4.6**). The State Forest encompasses more than 1 million acres of non-contiguous public and private lands across southeastern Minnesota, including portions of Goodhue, Wabasha, Olmsted, Fillmore, and Houston counties. Forest resources within the State Forest consist primarily of hardwood species and provide multiple benefits, including timber production, watershed protection, wildlife habitat, outdoor recreation, and forest conservation.

Although agriculture is the dominant land use within much of the Project area, forestry also contributes to regional economies through timber harvesting, forest management, wood-product manufacturing, and related services. These activities support employment and wage income (3,238 jobs in 2022 in southeast Minnesota),[120] while privately and publicly managed woodlands provide additional economic and social benefits through recreation, hunting, and other forest-based uses. The forest resources of southeastern Minnesota support both public and private forest management objectives and provide ecological and economic benefits to local communities.[121] While Northern Minnesota features large institutional Timberland Investment Management Organization tracts owned by entities like Molpus Woodlands Group and PotlatchDeltic, southeast Minnesota timberlands are heavily fragmented. They are predominantly owned by private individuals, generational farms, and recreational investors. As such, no commercial forestry operations were identified within the Proposed Routes.

The Applicants reviewed MDNR old growth inventory data[122] and did not identify any mapped old-growth forest communities within the Proposed Routes.

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119 MDNR. 2026. Paleozoic Plateau Section Forest Resource Management Plan (PP SFRMP). Available online at: https://www.dnr.state.mn.us/forestry/section/pps.html. Accessed December 2025.

120 MNDEED. 2022. Labor Market Information. Available at: https://mn.gov/deed/data/data-tools/qcew/. Last accessed November 2026.

121 Minnesota Forest Resource Council. Undated. Southeast Landscape Region. Available online at: https://mn.gov/frc/assets/Brochure_SE_tcm1162-476753.pdf. Accessed July 2026.

122 MDNR. 2026. DNR Forest Inventory Old Growth. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/biota_dnr_forest_inv_old_growth/FeatureServer/1. Accessed July 2026.

6.6.2.2 Potential Impacts

The ROI for forestry resources is the Proposed Right-of-Way because permanent vegetation conversion and long-term forest management restrictions would occur primarily within the maintained transmission line right-of-way.

Based on NLCD mapping, the Proposed Rights-of-Way cross approximately 357 acres of forested land cover (**Table 6.6.2-2**). However, as further discussed in **Section 6.4.2.1**, the Applicants also estimated forested clearing based on delineations from aerial photographs, which estimates the Proposed Rights-of-Way will require approximately 423 acres of forested land cover clearing.

TABLE 6.6.2-2

Potential Impacts to Forest Land Cover (Acres)

Proposed Right-of-Way	Deciduous Forest	Evergreen Forest	Mixed Forest	Totals
Segment 1	117.0	0.2	0.8	**118.0**
Segment 2	234.1	1.7	1.5	**237.3**
Q-9	1.6	0	0	**1.6**
TOTAL	**353**	**2**	**2**	**356.9**

Project impacts on forestry resources would occur primarily through clearing of trees and maintenance of compatible vegetation within the transmission line right-of-way. Following construction, portions of the right-of-way would be maintained in low-growing vegetation to provide safe operation and maintenance clearances for the transmission facilities. As a result, some forested land would be permanently converted from forest cover to shrub, herbaceous, or other compatible vegetation communities.

Temporary impacts may also occur where construction access routes, staging areas, pull sites, laydown areas, or other temporary workspaces require tree clearing or disturbance outside the maintained right-of-way. Most temporary disturbances outside the maintained right-of-way would be restored or allowed to revegetate following construction.

The Project may also affect private forestry operations by removing merchantable timber, reducing future timber production within portions of the right-of-way, and limiting future tree growth within maintained transmission rights-of-way. However, because forest resources crossed by the Project are dispersed across the landscape and represent a small portion of the overall regional forest resource, impacts to the regional forestry economy are expected to be minor.

As discussed in **Section 6.4.6.2**, the Segment 2 Proposed Right-of-Way crosses approximately 3.1 acres of the RJD Memorial Hardwood State Forest. Review of MDNR forestry inventory data indicates that the affected stands are primarily non-merchantable regenerating forest comprised of American elm, red elm, and sugar maple. [123] While forest conversion within these areas would be permanent within the maintained right-of-way, the acreage affected represents a very small portion of the overall State Forest.

[123] MDNR. 2026. MNDNR Forest Inventory NonMerch. Available online at: https://gis.data.mn.gov/datasets/dccf6a1052c14bea84e5fc4baaafad68_0/explore?location=46.385890%2C-93.061852%2C7. Accessed July 2026.

Unavoidable impacts include permanent conversion of forested vegetation within portions of the maintained right-of-way, removal of merchantable and non-merchantable timber, and localized reductions in future timber production potential within the transmission right-of-way.

6.6.2.3 Mitigation Measures

The Applicants will avoid and minimize impacts to forestry resources through route selection, co-location with existing utility rights-of-way where practicable, minimization of tree clearing, and implementation of the VMP (**Appendix I**).

Temporary workspaces, access routes, staging areas, and pulling and tensioning sites will be located in previously disturbed or non-forested areas where practicable to reduce impacts to forest resources. The Applicants will coordinate with the MDNR, other land-management agencies, and affected landowners regarding tree clearing, access, and restoration activities.

Private landowners will be compensated for timber or tree losses in accordance with easement agreements and applicable acquisition procedures. Where safe and practicable, landowners may retain merchantable timber or other forest products removed during construction.

Temporarily disturbed forested areas outside the maintained right-of-way will be restored or allowed to revegetate in accordance with the VMP. However, some permanent conversion of forested land within the maintained right-of-way is unavoidable because tall-growing woody vegetation cannot be allowed to interfere with transmission line clearances, safety, and reliability.

6.6.2.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include requirements relevant to forestry, including requirements related to tree removal, restoration, and avoiding and minimizing the introduction of noxious weeds and invasive species. Example route permit conditions for these resources are provided in the corresponding sections.

6.6.3 Mining

6.6.3.1 Existing Conditions

Mineral extraction within southeastern Minnesota is primarily associated with aggregate resources, including sand, gravel, crushed stone, and other construction materials used for transportation, commercial, residential, and infrastructure projects. Aggregate mining occurs throughout Minnesota and provides materials used in road construction, concrete production, asphalt production, and other construction applications.

Silica sand resources also occur within portions of southeastern Minnesota. Silica sand is a high-purity quartz sand used in a variety of industrial applications, including glass manufacturing, foundry products, filtration systems, and energy production. However, aggregate extraction is more common than silica sand mining within the counties crossed by the Project.[124]

[124] MDNR. 2026. Mining and mineral resources of Minnesota. Available online at: https://www.dnr.state.mn.us/lands_minerals/mining.html. Accessed July 2026

Known aggregate resources and mining operations within the Project area were identified using MnDOT's Aggregate Source Information System (ASIS) and information available through the USGS Upper Midwest Environmental Sciences Center (UMESC).[125,126] The Project does not cross any MDNR peat or mineral leases.[127,128]

Segment 1

The Segment 1 Proposed Route crosses three properties identified in the ASIS database as containing aggregate resources or mining operations. One location appears to intersect a mining property; however, active extraction activities are located adjacent to, rather than within, the Proposed Right-of-Way. The remaining two aggregate resource locations are not located within or immediately adjacent to the Proposed Right-of-Way. No additional aggregate extraction operations were identified through review of available UMESC data.

Segment 2

The Segment 2 Proposed Route crosses nine properties identified in the ASIS database as containing aggregate resources. However, none of the identified aggregate extraction areas are located within the Proposed Right-of-Way. Review of available UMESC data did not identify additional aggregate extraction operations within the Proposed Right-of-Way.

Q-9 Reroute

No known active aggregate extraction operations were identified within the Q-9 Proposed Right-of-Way based on available ASIS and UMESC data.

6.6.3.2 Potential Impacts

The ROI for mineral resources is the Proposed Right-of-Way and adjacent areas where active mineral extraction operations or known aggregate resources occur.

Project impacts to mineral resources are expected to be limited because few active mining operations occur within the Proposed Rights-of-Way. Construction of the Project would not permanently consume substantial mineral resources, nor would it require extraction of mineral deposits within the Project area beyond the use of aggregate materials typically needed for construction.

For Segment 1, the Proposed Right-of-Way crosses a property containing an active aggregate mining operation owned by Mathy Construction Company and Patterson Quarries located off of U.S. Highway 14 between County Highway 102 SE and 100th Avenue SE in Olmsted County (see

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125 USGS, Upper Midwest Environmental Sciences Center. 2025. 24k_Points. Available online at: https://services.arcgis.com/v01gqwM5QqNysAAi/ArcGIS/rest/services/USGS_Topographic_Mine_Symbols/FeatureServer/8. Accessed July 2026.

126 USGS, Upper Midwest Environmental Sciences Center. 2025. 24k_Polygons. Available online at: https://services.arcgis.com/v01gqwM5QqNysAAi/ArcGIS/rest/services/USGS_Topographic_Mine_Symbols/FeatureServer/2. Accessed July 2026.

127 MDNR. 2026. State Peat Leases. Available online at: https://gis.data.mn.gov/maps/minnesota::state-peat-leases-1/about. Accessed October 2026.

128 MDNR. 2026. State Mineral Leases. Available online at: https://gis.data.mn.gov/maps/0d9e0d712c124755933408980351f797/about. Accessed October 2026.

Appendix F). Although the Proposed Right-of-Way crosses the property, available information indicates that active mining operations occur adjacent to the Proposed Right-of-Way rather than within it. Depending on final structure placement and construction access requirements, construction activities could temporarily affect access to portions of the property or require coordination with the property owner to avoid conflicts with existing mining activities.

No known active aggregate extraction operations occur within the Segment 2 or Q-9 Proposed Rights-of-Way. Accordingly, impacts to ongoing mineral extraction activities are not anticipated in those areas.

The presence of transmission structures and associated easements could limit future mineral extraction opportunities within portions of the maintained right-of-way where excavation activities would be incompatible with safe operation of the transmission facilities. However, because only a small number of known aggregate resource sites occur within the Project area and active mining is generally avoided by the proposed routing, impacts on regional mineral resources and future mineral development are expected to be minor.

Unavoidable impacts may include localized restrictions on future extraction activities within portions of the transmission line easement where transmission structures are installed and maintained.

6.6.3.3 Mitigation Measures

The Applicants will avoid and minimize impacts to mineral resources and active extraction operations through route selection, final engineering, and coordination with affected landowners and mining operators.

Prior to construction, the Applicants will continue to identify active mining operations, aggregate resource sites, and future extraction plans within the Project area. Where active extraction operations are present, the Applicants will coordinate with property owners, resource-managing agencies and operators regarding construction access, structure placement, and scheduling to minimize conflicts with mining activities.

During final design, transmission structures and access routes will be located to avoid active extraction areas where practicable. If construction activities temporarily affect access to an active mining operation, the Applicants will coordinate with the operator to maintain reasonable access and minimize operational disruptions.

Through implementation of these measures, impacts to mineral resources and active mining operations are expected to be minimal and localized.

6.6.3.4 Typical Route Permit Conditions

Route permits do not typically include provisions specific to mining. However, general requirements related to landowner coordination, notification, and restoration would also minimize impacts to mining resources. Example route permit conditions for these resources are provided in the corresponding sections.

6.6.4 Tourism

6.6.4.1 Existing Conditions

Tourism is an important component of the economy within the counties crossed by the Project and is supported by outdoor recreation, scenic landscapes, the Mississippi River corridor, state and local parks, trails, wildlife-related recreation, cultural and historic attractions, festivals, and community events. Tourism generates employment, visitor spending, lodging revenues, restaurant sales, and other economic benefits throughout the Project area. Many tourism destinations are closely associated with the region's natural resources, recreational opportunities, scenic river valleys, blufflands, forests, and rural character. Recreational resources that support tourism are discussed in **Section 6.4.6** and shown in **Figure 14**.

Tourism resources within the Project area are diverse and include outdoor recreation destinations, trails, state parks, state forests, WMAs, scenic river corridors, cultural attractions, community festivals, and regional destinations such as Rochester and the Mayo Clinic. The Mississippi River corridor is one of the most significant tourism resources in southeastern Minnesota and supports boating, fishing, wildlife observation, scenic driving, cycling, camping, and community events in Goodhue, Wabasha, and Houston Counties.

In Goodhue County, tourism is centered on the Mississippi River corridor, the City of Red Wing, outdoor recreation opportunities, and regional trail systems. Key attractions include the Cannon Valley Trail,[129] Goodhue Pioneer State Trail, Covered Bridge Park and historic downtown Zumbrota,[130] regional golf courses, and the county snowmobile trail system. Tourism supports approximately 1,448 jobs and generates approximately $195.9 million in annual economic activity.[131]

In Wabasha County, tourism is closely associated with the Mississippi River, historic river communities, outdoor recreation, and wildlife viewing opportunities. Recreational destinations include the Zumbrowatha snowmobile trail system, Steeplechase Ski Hill and Event Center, portions of the RJD Memorial Hardwood State Forest, and natural resources associated with the Mississippi River corridor. Tourism supports approximately 380 jobs and generates approximately $42.3 million in annual economic activity.[132]

Olmsted County has the largest tourism economy within the Project area, supporting more than 9,000 jobs and generating approximately $1.2 billion in annual economic activity.[133] Rochester and the Mayo Clinic serve as major regional destinations, attracting visitors from throughout Minnesota, the U.S., and internationally. Additional tourism resources include community festivals, parks, trails, wildlife-related recreation, and destinations such as Quarry Hill Nature Center, Silver Lake Park, the Great River Ridge State Trail, and Haverhill WMA.

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129 Goodhue County Minnesota. 2026. Available at: https://goodhuecountymn.gov/. Accessed June 2026.

130 City of Zumbrota, 2025. Available at: https://www.ci.zumbrota.mn.us/. Accessed June 2026.

131 Explore Minnesota. 2025. 2024 Visitor Economy Impact. Available online at: https://mn.gov/tourism-industry/assets/mn-county-econ-impact-data_tcm1135-720179.pdf. Accessed June 2026.

132 Explore Minnesota, 2025. 2024 Visitor Economy Impact. Available online at: https://mn.gov/tourism-industry/assets/mn-county-econ-impact-data_tcm1135-720179.pdf. Accessed online June 2026.

133 Explore Minnesota, 2025. 2024 Visitor Economy Impact. Available online at: https://mn.gov/tourism-industry/assets/mn-county-econ-impact-data_tcm1135-720179.pdf. Accessed online June 2026.

In Mower County, tourism is supported by community events, historical attractions, and outdoor recreation opportunities. Key destinations include Lake Louise State Park, the Shooting Star State Trail, Shooting Star Prairie SNA, Rustic Retreat WMA, and attractions associated with the Laura Ingalls Wilder heritage. Tourism supports approximately 674 jobs and generates more than $91 million in annual economic activity.[134]

In Fillmore County, tourism is strongly associated with the Driftless Area landscape, outdoor recreation, and historic communities. Major attractions include Forestville/Mystery Cave State Park,[135] the Root River corridor, the Root River State Trail, the City of Lanesboro,[136] portions of the RJD Memorial Hardwood State Forest, and numerous state-managed recreation lands. Tourism supports approximately 237 jobs and generates nearly $28 million in annual economic activity.[137]

In Houston County, tourism is driven by the Mississippi River corridor, the Driftless Area landscape, outdoor recreation, wildlife observation, and community events. Recreational opportunities include portions of the RJD Memorial Hardwood State Forest, Brownsville Bluff SNA, Winnebago Creek WMA, and the Upper Mississippi River NWFR.[138] Tourism supports approximately 210 jobs and generates approximately $26.7 million in annual economic activity.[139]

Overall, tourism throughout the Project area is closely tied to the region's scenic landscapes, natural resources, recreational opportunities, and historic communities. Collectively, these resources support thousands of jobs and generate significant annual visitor spending throughout southeastern Minnesota.

6.6.4.2 Potential Impacts

The ROI for tourism includes the counties crossed by the Project and tourism destinations, scenic resources, recreational areas, historic communities, and other visitor attractions located within and adjacent to the Project area.

Tourism within the Project area is closely tied to outdoor recreation, scenic landscapes, the Mississippi River corridor, state trails, state-managed lands, wildlife observation opportunities, community festivals, cultural attractions, and regional destinations such as Rochester and the Mayo Clinic. Tourism also contributes substantially to local economies through visitor spending, lodging, restaurants, retail services, recreation-related businesses, and community events.

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134 Explore Minnesota. 2025. *2024 Visitor Economy Impact*. Available online at: https://mn.gov/tourism-industry/assets/mn-county-econ-impact-data_tcm1135-720179.pdf. Accessed June 2026.

135 MDNR. 2026. Forestville/Mystery Cave State Park. Available online at: https://www.dnr.state.mn.us/state_parks/park.html?id=spk00148#homepage. Accessed June 2026.

136 Visit Lanesboro and Whalan. 2026. Available online at: https://www.lanesboro.com/. Accessed June 2026.

137 Explore Minnesota. 2025. *2024 Visitor Economy Impact*. Available online at: https://mn.gov/tourism-industry/assets/mn-county-econ-impact-data_tcm1135-720179.pdf. Accessed June 2026.

138 USFWS Upper Mississippi River National Wildlife and Fish Refuge. Undated. Available online at: https://www.fws.gov/refuge/upper-mississippi-river. Accessed June 2026.

139 Explore Minnesota. 2025. *2024 Visitor Economy Impact*. Available online at: https://mn.gov/tourism-industry/assets/mn-county-econ-impact-data_tcm1135-720179.pdf. Accessed June 2026.

Construction

Construction activities may result in temporary and localized impacts on tourism resources and visitor experiences. Potential effects include increased construction traffic, temporary lane closures, short-duration road closures, noise, dust, and the presence of construction personnel and equipment.

Visitors traveling to recreational areas, community events, parks, trails, WMAs, state forest lands, and other tourism destinations may experience temporary travel delays or minor access disruptions during active construction. Construction-related noise and activity may also temporarily reduce the recreational experience for visitors using nearby trails, natural areas, parks, or wildlife-viewing locations.

Because construction activities will be temporary and will progress along the transmission right-of-way, these impacts are expected to be short-term, localized, and limited in duration.

Operations

The most notable long-term tourism-related impact associated with the Project is the potential for visual change in areas where tourism is associated with scenic landscapes, outdoor recreation, natural resources, or river-valley views.

As discussed in **Section 6.4.5**, operation of the Project will introduce additional transmission structures and conductors into portions of the landscape.

Many tourism destinations within the Project area, however, are separated from the Proposed Rights-of-Way by distance, intervening vegetation, topography, existing development, or existing utility rights-of-way. In addition, substantial portions of the Project are co-located with existing transmission infrastructure, reducing the extent of new visual change in some areas.

Potential long-term visual effects may occur at specific tourism resources, including portions of the Great River Ridge State Trail, RJD Memorial Hardwood State Forest, the Upper Mississippi River NWFR, and other public recreational lands where transmission facilities may be visible from portions of the visitor experience. However, these effects are expected to be localized and are not anticipated to substantially affect visitation levels, recreational use, or county-level tourism economies.

Because tourism opportunities are widespread throughout the region and because construction impacts will be temporary and localized, the Project is not expected to measurably affect tourism-related employment, visitor spending, or tourism-based economic activity at the county level.

Unavoidable tourism-related impacts include temporary construction-related traffic delays, noise, and activity near visitor destinations, as well as long-term visual changes where Project facilities are visible from recreational, scenic, or tourism-related resources. These impacts are expected to be localized and are not anticipated to significantly affect regional tourism activity or tourism-based economies.

6.6.4.3 Mitigation Measures

The Applicants will minimize tourism-related impacts through route selection, co-location with existing infrastructure where practicable, construction scheduling, traffic management, and

restoration activities. Temporary road closures and traffic restrictions will be coordinated with local jurisdictions, and advance notice will be provided where appropriate. Construction activities near recreational facilities, tourism destinations, and community events will be coordinated to minimize disruption where practicable.

To reduce long-term aesthetic impacts, the Applicants have sought to utilize existing utility rights-of-way and avoid sensitive recreational and scenic resources where practicable. Following construction, disturbed areas will be restored in accordance with Project restoration plans and the VMP (**Appendix I**).

6.6.4.4 Typical Route Permit Conditions

Typical route permits include conditions related to scenic, recreation, transportation, and public access resources and values. These requirements would also be expected to avoid and minimize impacts to tourism. Example route permit conditions for these resources are provided in the corresponding sections.

6.7 ARCHAEOLOGICAL AND HISTORIC RESOURCES

6.7.1 Existing Conditions

Merjent, on behalf of the Applicants, conducted a Phase Ia Cultural Resources Literature Review for the Proposed Routes and a 1-mile buffer (Study Area) using information obtained from the Minnesota State Historic Preservation Office (SHPO), Minnesota Office of the State Archaeologist (OSA), historical atlases, historical aerial photography, nineteenth-century General Land Office maps, and previously completed cultural resource investigations. In order to streamline the Commission's compliance with Minn. Stat. § 138.665, the Commission has authorized the Applicants to initiate consultation with the SHPO pursuant to Minn. Stat. § 138.665. The Applicants may consult with SHPO to initiate review and consultation. This Phase Ia Cultural Resources Literature Review was submitted to the SHPO for review on July 27, 2026; the SHPO responded on August 26, 2026 (**Appendix C**). A redacted version of the Phase Ia Cultural Resources Literature Review is provided in **Appendix J**.

The Project is located within the Southeast Riverine Archaeological Region of Minnesota, a portion of the Driftless Area characterized by deeply dissected stream valleys, blufflands, extensive river systems, and abundant archaeological resources. Archaeological investigations conducted throughout southeastern Minnesota demonstrate that the region contains evidence of human occupation spanning from the Paleoindian period through the historic period. Archaeological sites are commonly associated with major rivers, stream terraces, blufftops, rockshelters, and other landforms located near permanent water sources. The Mississippi River valley and tributary systems, including the Cannon and Root Rivers, have long supported prehistoric and historic settlement and land use. As a result, the region contains a relatively high density of known and potential archaeological resources.

Historic-era cultural resources within the Project Area are associated primarily with Indigenous occupation, early Euro-American settlement, agriculture, transportation, railroad development, and rural community development. Agricultural use has been widespread throughout the Project Area since the mid- to late nineteenth century, creating potential for historic farmsteads, artifact scatters, transportation-related resources, and other historic-period archaeological sites.

The Phase Ia literature review identified the following resources within the Study Area:

- 48 previously completed cultural resource surveys;
- 77 previously recorded archaeological sites;
- 364 historic architectural resources; and
- 53 potential historic cemeteries.

Although portions of the Study Area have previously been surveyed, the majority remains unsurveyed.

The NRHP is the federal inventory of historic properties considered significant in American history, architecture, archaeology, engineering, or culture. Archaeological sites, historic buildings, structures, districts, and objects that meet the NRHP criteria are afforded consideration during environmental review and agency consultation. The NRHP evaluation helps determine whether a project could affect historic properties and whether avoidance, minimization, or mitigation measures may be necessary. Resources identified during the literature review are categorized as NRHP-listed, NRHP-eligible, not eligible for listing, or unevaluated, based on available SHPO records and prior cultural resource investigations.

Table 6.7.1-1 identifies the archaeological sites and cemeteries that occur within the Proposed Routes and provides their NRHP status. There are no known archaeological sites or cemeteries occurring within the Q-9 Proposed Route.

TABLE 6.7.1-1

Archaeological Sites and Cemeteries within Proposed Routes

Site ID	Site Name	NRHP Status
Segment 1		
22719	Walter McConnell Farm / Walter McConnel Cemetery	Unevaluated
22720	Ben Bear Farm / Ben Bear Farm Cemetery	Unevaluated
20716	Catholic Cemetery	Unevaluated
22676	Randall Farm	Unevaluated
Segment 2		
21FL0081	No Name	Unevaluated
21FL0082	No Name	Unevaluated
21FL0083	No Name	Unevaluated
21FL0084	No Name	Eligible
21FL0085	No Name	Unevaluated
21FL0087	No Name	Unevaluated
21FL0088	No Name	Unevaluated
21FL0089	Hosting	Unevaluated
21FL0143	No Name	Not Eligible
21FL0144	No Name	Not Eligible
21FLbc	Greenfield	Unevaluated
21MW0009	Merle J.	Unevaluated
21MW0014	Whal	Unevaluated
21MW0037	Shooting Star #4	Eligible
21MW0038	Shooting Star #5	Eligible
21MW0039	Shooting Star #6	Unevaluated

TABLE 6.7.1-1

Archaeological Sites and Cemeteries within Proposed Routes

Site ID	Site Name	NRHP Status
21MW0046	Wood	Unevaluated
21OL0042	No Name	Unevaluated
21OLaa	Raygon	Unevaluated
22427	Bethany Cemetery	Unevaluated
20437	Rice Cemetery	Unevaluated
20444	Calvary Cemetery	Unevaluated
20464	Greenfield Cemetery 1/2/Greenfield Norwegian Lutheran Cemetery	Unevaluated
20465	Greenfield Cemetery 2/2/Greenfield Norwegian Lutheran Cemetery	Unevaluated
20492	Love Cemetery	Unevaluated
22695	Fairview Cemetery	Unevaluated

As shown in **Table 6.7.1-1**, there are 14 unevaluated archaeological sites, two not eligible, and three eligible archaeological sites intersected by the Segment 2 Proposed Route; Segment 1 Proposed Route does not intersect any archaeological sites. The Segment 2 Proposed Route also intersects seven cemeteries, and the Segment 1 Proposed Route intersects four cemeteries, all of which are unevaluated.

Because the Project crosses areas with moderate to high archaeological sensitivity, particularly near rivers, streams, terraces, and historic settlement areas, previously unidentified archaeological resources may be present within unsurveyed portions of the Proposed Routes. Similarly, the long history of agricultural settlement throughout southeastern Minnesota indicates a high potential for historic-period archaeological sites associated with former farmsteads and rural land use.

6.7.2 Potential Impacts

Construction and operation of the Project have the potential to affect archaeological sites, historic architectural resources, cemeteries, and other cultural resources. Potential effects may be direct, through physical ground disturbance, or indirect, through changes in visual setting, viewshed character, noise, or other alterations to the historic environment.

Information regarding the location of previously identified cultural resources was considered during route development and refinement. The Applicants sought to avoid known archaeological sites, cemeteries, and historic resources where practicable and to utilize existing utility rights-of-way and previously disturbed areas where feasible.

Archaeological Resources

The ROI for archaeological resources is the Local Vicinity, including the Proposed Rights-of-Way and adjacent areas that may be used for access roads, staging areas, wire-pulling sites, laydown yards, switching station facilities, and other construction work areas where ground disturbance could affect archaeological deposits, structural remains, human burials, or other cultural resources.

Ground-disturbing construction activities, including access road construction, foundation excavation, structure installation, grading, switching station construction, temporary workspace development, and other earthmoving activities, have the potential to directly affect archaeological

resources if present. Potential impacts could include disturbance, damage, displacement, or destruction of archaeological deposits, artifacts, features, human burials, or cultural landscapes.

Based on the current Project design, only one previously recorded and unevaluated archaeological site (Site 21MW0009 on **Table 6.7.1-1**) intersects Segment 2 of the Proposed Right-of-Way. However, much of the Project area remains unsurveyed, and previously unidentified archaeological resources may be present. Based on the archaeological sensitivity of the Southeast Riverine Archaeological Region and the proximity of portions of the Project to rivers, streams, terraces, and historic settlement areas, additional archaeological resources may be encountered during future investigations.

Historic Architectural Resources and Viewshed Effects

The ROI for historic architectural resources includes the Project Area extending approximately 1 mile from the Proposed Alignments because transmission structures and conductors may alter the visual setting, viewshed, feeling, or association of historic properties, even where no physical disturbance occurs.

Historic resources located within approximately 1 mile of the Proposed Alignments are summarized in **Table 6.7.2-2**. The Phase Ia literature review identified 89 historic architectural resources within 1 mile of Segment 1 of the Proposed Alignment, 224 resources within 1 mile of Segment 2 of the Proposed Alignment, and five within 1 mile of the Q-9 Proposed Alignment. This includes:

- Segment 1: 32 not eligible sites, 55 unevaluated sites, one NRHP-eligible site, and one site listed on the NRHP;
- Segment 2: 66 not eligible sites, 18 eligible sites, 135 unevaluated sites, and 5 sites listed on the NRHP; one of the unevaluated sites is listed on the state register; and
- Q-9: three not eligible sites, one unevaluated, and one eligible site.

Potential viewshed impacts may result from the introduction of transmission structures, conductors, switching station facilities, and associated infrastructure into landscapes that historically lacked comparable utility facilities or where additional transmission infrastructure would increase the visual prominence of existing utility rights-of-way. Aesthetic impacts may be particularly relevant for historic farmsteads, rural historic landscapes, historic districts, transportation rights-of-way, and other properties where setting, feeling, and association contribute to historic significance.

The magnitude of visual effects will vary depending on the resource location, topography, vegetation screening, distance from Project facilities, existing development patterns, and the presence of other utility infrastructure within the viewshed. Because much of the Project is co-located with existing transmission facilities, the degree of additional visual change may be reduced in some locations. However, portions of the Project may introduce new visual elements where transmission infrastructure is currently absent or less visually prominent.

Cemeteries and Tribal Cultural Resources

The ROI for cemeteries and Tribal Cultural Resources is the Local Vicinity. Known cemeteries and other identified cultural resources have been considered during route development (see

Table 6.7.1-1). Construction activities that disturb cemeteries, burial sites, or culturally significant locations have the potential to result in significant adverse impacts.

6.7.3 Mitigation Measures

The Applicants will avoid, minimize, and mitigate impacts to archaeological sites, historic properties, cemeteries, and other cultural resources through cultural resource investigations, route and facility design, agency and Tribal consultation, resource avoidance, and implementation of construction procedures. Avoidance will be the preferred mitigation measure for archaeological sites, cemeteries, traditional cultural properties, and historic resources identified during cultural resource investigations. Where practicable, avoidance may include minor adjustments to structure locations, access routes, temporary workspaces, or other Project features, as well as establishment of protective buffers and no-disturbance areas around sensitive resources in consultation with the applicable parties.

The Applicants will conduct a Phase I Cultural Resources Survey and Architectural History Inventory for the route ordered by the Commission. Surveys will be conducted in accordance with the State Archaeologist's Manual for Archaeological Projects in Minnesota,[140] the Historic and Architectural Survey Manual,[141] and the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation.[142]

As discussed in **Section 7**, the Applicants initiated coordination with Tribal Historic Preservation Offices (THPOs) and Tribes with historic and cultural connections to the Project area. Coordination letters were provided to the 11 federally recognized Tribal Nations in Minnesota and additional Tribes with historical ties to southeastern Minnesota. The Applicants also submitted a Project review request to the (MIAC); MIAC provided a response on October 7, 2026.

Responses received to date indicate continued interest in Project review, consultation, and participation in future cultural resource investigations (**Appendix C**). MIAC recommended that Phase I archaeological surveys occur prior to ground disturbance and that construction monitoring occur during all ground disturbing activities within and along the boundaries of any American Indian cemetery sites with a 50-foot buffer in every direction from the boundaries of the site. MIAC also recommended that an Unanticipated Discoveries Plan (UDP) be implemented for the Project. On May 4, 2026 the Iowa Tribe of Kansas and Nebraska THPO responded to the Project introduction letter requesting geospatial data for the proposed Project and also indicated interest in participating in surveys and being present during ground disturbing construction activities. Tribal coordination will continue throughout environmental review, cultural resource evaluation, and Project development in accordance with applicable regulatory requirements and consultation protocols.

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140 Anfinson, Scott. 2011. *State Archaeologist's Manual for Archaeological Projects in Minnesota*. Available online at: https://mn.gov/admin/assets/OSAmanual_tcm36-186982.pdf. Accessed June 24, 2026.

141 Minnesota Historical Society, Heritage Preservation Department. 2017. *Historic and Architectural Survey Manual.* Available online at: https://mn.gov/admin/assets/surveymanual082017_tcm36-327675.pdf. Accessed July 2026.

142 National Park Service. 1983. *Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines*. 48 *Federal Register* 44716. Available online at: https://www.nps.gov/subjects/historicpreservation/upload/standards-guidelines-archeology-historic-preservation.pdf. Accessed June 24, 2025.

A UDP will be implemented during construction. The UDP establishes procedures for responding to previously unidentified archaeological resources, historic properties, cemeteries, or human remains encountered during Project construction. If previously unidentified cultural resources are discovered, work in the immediate vicinity will cease until the discovery can be evaluated and appropriate protective measures are developed in consultation with SHPO, OSA, THPOs, affected Tribal Nations, and other appropriate parties.

If human remains or burial features are encountered, the Applicants will immediately stop work in the vicinity of the discovery and comply with Minn. Stat. § 307.08 and other applicable requirements. The discovery will be reported to the State Archaeologist and other appropriate authorities, and construction will not resume until appropriate treatment and protection measures have been implemented.

With implementation of these measures, impacts to archaeological sites, historic resources, cemeteries, and Tribal cultural resources are expected to be avoided or minimized to the extent practicable. However, final avoidance and mitigation requirements cannot be determined until completion of Phase I investigations, agency review, Tribal consultation, and final Project design.

The Applicants will continue coordination with SHPO, the OSA, THPOs, Tribal Nations, and other interested consulting parties regarding cultural resource evaluation.

6.7.4 Typical Route Permit Conditions

Route permits issued by the Commission typically contain avoidance and minimization measures relevant to archaeological and historic resources, including a requirement that permittees make efforts to avoid impacts to such resources and, when a resource is encountered, that permittees consult with SHPO and the State Archaeologist, and Tribes where applicable (Section 5.3.15 of the Sample Route Permit). Permittees are also typically required to train workers about the importance of avoiding cultural properties.

6.8 NATURAL ENVIRONMENT

6.8.1 Air Quality

Section 109(b) of the Clean Air Act requires that the U.S. Environmental Protection Agency (EPA) establish National Ambient Air Quality Standards (NAAQS) “requisite to protect” public health and welfare (40 Code of Federal Regulations [CFR] Part 50). The Clean Air Act identifies two classes of NAAQS: primary standards, which are limits set to protect the public health of the most sensitive populations, such as asthmatics, children and the elderly; and secondary standards which are limits set to protect public welfare, such as protection against visibility impairment or damage to vegetation, wildlife and structures. The EPA has promulgated NAAQS for six criteria pollutants: ozone (O_3), particulate matter 10 micrometers or less in diameter and 2.5 micrometers or less in diameter (PM_{10}/$PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb).

6.8.1.1 Existing Conditions

Across the country, the EPA and state agencies operate a system of air quality monitoring stations. Readings from these stations are compared to the NAAQS as a way to classify the air quality of the area surrounding the monitoring stations. Areas of the country that do not meet the NAAQS are classified as “non-attainment” areas. Regions that were classified as non-attainment and have

improved their air quality to meet the NAAQS are considered to be in "maintenance." Areas of the country that are not represented by a monitoring station are considered "unclassifiable." Unclassifiable areas are considered to be in attainment with the NAAQS.

None of the counties crossed by the Project are designated by EPA as nonattainment or maintenance areas for any criteria pollutant. Therefore, the Project is located in an area that currently complies with the NAAQS.[143,144]

In Minnesota, air quality is tracked using air quality monitoring stations across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI), on an hourly basis, for O_3, $PM_{2.5}$, SO_2, NO_2, and CO. The pollutant with the highest AQI value for a particular hour sets the overall AQI for that hour. The AQI is used to categorize the air quality of a region as one of six levels of quality: good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, or hazardous.

The Project is located nearest to the Rochester, Minnesota air quality monitoring station, which monitors O_3 and $PM_{2.5}$. Complete air quality data are not yet available for 2025 and 2026. **Table 6.8.1-1** summarizes AQI conditions recorded at the Rochester monitor during the five most recent years for which complete data are available.[145]

TABLE 6.8.1-1

Days in Each Air Quality Index Category (Rochester, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2024	233	131	0	1	0
2023	190	160	14	1	0
2022	280	78	1	0	0
2021	275	84	2	0	0
2020	292	73	1	0	0

As shown in **Table 6.8.1-1**, air quality in the Project area is generally good. Most days during the reporting period were classified as either "Good" or "Moderate." The limited number of days classified as "Unhealthy for Sensitive Groups" or "Unhealthy" were primarily associated with regional wildfire smoke events affecting Minnesota and much of the Upper Midwest. Overall, existing air quality conditions within the Project area are generally favorable and demonstrate compliance with applicable federal air quality standards.

143 U.S. Environmental Protection Agency. 2026. Green Book: Minnesota Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. Available online at: https://www3.epa.gov/airquality/greenbook/anayo_mn.html. Accessed June 2026.

144 MPCA. 2026. Our plan to control criteria air pollutants. Available online at: https://www.pca.state.mn.us/air-water-land-climate/our-plan-to-control-criteria-air-pollutants. Accessed June 2026.

145 MPCA. 2026. Annual AQI Summary Reports. Available online at: https://www.pca.state.mn.us/air-water-land-climate/understanding-the-air-quality-index-aqi. Accessed June 2026.

6.8.1.2 Potential Impacts

The ROI for air quality consists of the counties crossed by the Project. Air quality impacts would primarily occur during construction and would be temporary, localized, and limited to the vicinity of active construction activities.

Transmission line projects have the potential to impact air quality through temporary, construction-related impacts from vehicle emissions and dust. Operation of transmission lines and substations has the potential to create O_3 and oxides of nitrogen (NO_X) due to corona discharges; however, these emissions will be negligible.

Construction

Construction of Project facilities will result in intermittent and temporary emissions of criteria pollutants associated with soil-disturbing activities, construction equipment, employee vehicles, material deliveries, and helicopter operations. These emissions may include exhaust pollutants from internal combustion engines and fugitive dust generated by grading, excavation, earthmoving, vegetation clearing, travel on unpaved roads, equipment movement, and restoration activities, particularly during dry and windy conditions. The magnitude of emissions at any specific location will vary depending on weather conditions, the amount of equipment in operation, and the duration of construction activities. Air quality impacts will be temporary, localized, and concentrated near active work areas, staging areas and laydown yards. Given the dispersed nature of construction activities, the limited duration of work at individual locations, and implementation of standard dust-control measures, impacts to nearby residences and other sensitive receptors are expected to be minor.

Table 6.8.1-2 summarizes the estimated emissions of criteria pollutants associated with Project construction activities, including transmission line, substation, and associated facility construction. This table shows total estimated emissions from construction of the entire Project. Construction is anticipated to occur between 2030 and 2034, with construction of Segment 1 lasting about two years and construction of Segment 2 lasting about three years. The emissions shown in **Table 6.8.1-2** are total estimates for the Project and are not annual emissions. Greenhouse gas emissions associated with construction are discussed in **Section 6.8.2**. Supporting emission calculations are provided in **Appendix K**.

TABLE 6.8.1-2

Estimated Total Construction Emissions of Criteria Pollutants, 2030-2034 (Tons)

Description	NO_X	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
Segment 1						
Off-Road Engine Emissions	1,573.38	350.93	82.51	0.74	53.21	53.21
Unpaved Roads	--	--	--	--	68.29	6.83
Earthmoving	--	--	--	--	188.46	19.87
Segment 1 Subtotal	**1,573.38**	**350.93**	**82.51**	**0.74**	**309.96**	**79.91**
Segment 2						
Off-Road Engine Emissions	4,382.76	1,000.01	224.83	2.04	149.49	149.49
Unpaved Roads	--	--	--	--	181.84	18.18
Earthmoving	--	--	--	--	694.45	73.17
Segment 2 Subtotal	**4,382.76**	**1,000.01**	**224.83**	**2.04**	**1,025.78**	**240.84**
Q-9						
Off-Road Engine Emissions	17.22	4.18	0.84	0.01	0.60	0.60

TABLE 6.8.1-2

Estimated Total Construction Emissions of Criteria Pollutants, 2030-2034 (Tons)

Description	NO_X	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
Unpaved Roads	--	--	--	--	0.79	0.08
Earthmoving	--	--	--	--	1.97	0.21
Q-9 Subtotal	**17.22**	**4.18**	**0.84**	**0.01**	**3.35**	**0.89**
Total Project						
Off-Road Engine Emissions	5,973.36	1,355.12	308.17	2.78	203.29	203.29
Unpaved Roads	--	--	--	--	250.93	25.09
Earthmoving	--	--	--	--	884.87	93.25
PROJECT TOTAL	5,973.36	1,355.12	308.17	2.78	1,339.09	321.64

Note: NO_X = oxides of nitrogen and VOC = volatile organic compounds

Although construction activities will generate emissions of criteria pollutants, the emissions will be temporary and dispersed over a large geographic area. The Project is not expected to independently cause or contribute to an exceedance of any NAAQS, nor would it affect the attainment status of any county crossed by the Project. Air quality impacts associated with construction would cease upon completion of construction activities.

Operations

During operation, transmission lines may produce trace quantities of O_3 and nitrogen oxides as a result of corona discharge. These emissions are extremely small, vary with weather conditions and conductor design, and are well below applicable air quality standards. As a result, operational emissions associated with corona effects are considered negligible. Additional information regarding corona effects is provided in **Section 6.4.7**.

Minor emissions will be generated during routine inspection and maintenance activities, including annual aerial inspections, periodic ground-based inspections, and vegetation management activities that are expected to occur approximately once every four years. These activities would be infrequent and limited in duration and are not expected to have a significant impact on ambient air quality.

6.8.1.3 Mitigation Measures

The Applicants and their contractors will implement BMPs to minimize temporary construction-related air quality impacts. These measures will include, as appropriate:

- applying water or approved dust suppressants to unpaved roads, work areas, and staging areas during dry conditions;
- limiting unnecessary vehicle idling and maintaining construction equipment in good working order;
- reducing vehicle speeds on unpaved roads and construction access routes;
- covering open bed trucks in accordance with MnDOT regulations;
- promptly stabilizing or restoring disturbed areas following construction;

- removing soil tracked onto public roadways and sweeping paved surfaces as needed; and
- minimizing the duration of ground-disturbing activities where practicable.

Air quality impacts associated with construction would be temporary and would cease upon completion of construction activities. During operation, the transmission line will be designed using industry-standard engineering practices that minimize corona discharge effects. Routine inspection and maintenance activities are expected to result in negligible emissions and are not anticipated to adversely affect ambient air quality.

6.8.1.4 Typical Route Permit Conditions

Route permits issued by the Commission typically include conditions related to dust control, including minimizing erosion and sedimentation, including:

- Section 5.3.8 of the Sample Route Permit requires the permittee to implement erosion prevention and sediment control practices recommended by the MPCA Construction Stormwater Program and obtain coverage under the General Permit from the MPCA, which requires the development of a SWPPP that describes methods to control erosion and runoff. It also requires the permittee to implement reasonable measures to minimize erosion and sedimentation during construction

6.8.2 Greenhouse Gas Emissions

The State of Minnesota is proactively implementing measures to reduce the amount of greenhouse gas emissions produced in the state. As of 2023, Minnesota has experienced a 19.8 percent reduction in greenhouse gas emissions across all sectors based on 2005 levels.[146] While greenhouse gas emissions from electrical generation decreased by 50 percent, greenhouse gas emissions from residential, commercial, and industrial sources increased. Transportation is now the highest emitting source of greenhouse gas emissions in Minnesota.[147]

6.8.2.1 Existing Conditions

Greenhouse gases are assigned a global warming potential (GWP) that represents the amount of heat trapped by a greenhouse gas relative to carbon dioxide (CO_2) over a 100-year period. CO_2 has a GWP of 1. Methane (CH_4) has a GWP of 25, meaning that 1 ton of CH_4 has the same warming effect as 25 tons of CO_2. Sulfur hexafluoride (SF_6), discussed in **Section 6.8.2.2**, has a GWP of 22,800. Carbon dioxide equivalent (CO_2e) is a common metric used to express the combined warming potential of different greenhouse gases and is calculated by multiplying emissions by their respective GWPs.

Minnesota's Greenhouse Gas Inventory shows emissions within Minnesota totaled 117,493,456 metric tons (129,514,366 short tons) of CO_2e in 2023. When compared to statewide emissions

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146 MPCA. Undated. Minnesota Greenhouse Gas Inventory. Minnesota's Greenhouse Gas Emissions and Statutory Goals. Available online at: https://data.pca.state.mn.us/views/Greenhousegasemissionsdata/TotalGHGemissionsgoals?%3Aembed=y&%3AisGuestRedirectFromVizportal=y. Accessed June 2026.

147 MPCA. Undated. GHG Emissions and Sequestration from 2005 to 2023, by Sector. Available at: https://data.pca.state.mn.us/views/Greenhousegasemissionsdata/Emissionsbysector2005-2023?%3Aembed=y&%3AisGuestRedirectFromVizportal=y. Accessed June 2026.

levels, Project-related greenhouse gas emissions would represent a very small contribution to total annual emissions.[148]

6.8.2.2 Potential Impacts

The ROI for greenhouse gas emissions consists of the counties crossed by the Project. Because greenhouse gases disperse globally rather than remaining localized near their source, greenhouse gas emissions are evaluated in the context of statewide emissions inventories and broader climate trends.

Construction

Project construction activities will result in temporary and intermittent greenhouse gas emissions from fuel combustion in construction equipment, commuter vehicles, and delivery trucks. **Table 6.8.2-1** summarizes the estimated potential emissions of greenhouse gases from construction activities for the Project. Emissions are based on typical counts of construction equipment and commuter vehicles, typical fuel types, expected hours of operation, and estimated vehicle miles traveled. Detailed emission calculations are provided as **Appendix K**. At the completion of construction activities, all construction-related greenhouse gas emissions would cease. Construction-related greenhouse gas emissions would occur over a finite construction period and would not represent a long-term operational source of emissions.

TABLE 6.8.2-1

Construction Emissions of Greenhouse Gases (Tons)

Description	CO_2	CH_4	N_2O	CO_2e
Segment 1				
Off-road engine emissions	69,217.68	2.81	0.56	69,445.07
On-road engine emissions	6,050.40	0.00	0.00	6,050.40
Segment 1 Subtotal	75,268.07	2.81	0.56	75,495.46
Segment 2				
Off-Road Engine Emissions	191,932.36	7.78	1.56	192,562.88
On-road engine emissions	14,461.78	0.00	0.00	14,461.78
Segment 2 Subtotal	206,394.14	7.78	1.56	207,024.66
Q-9				
Off-Road Engine Emissions	743.73	0.03	0.01	746.17
On-road engine emissions	3,515.08	0.00	0.00	3,515.08
Q-9 Subtotal	4,258.81	0.03	0.01	4,261.25
Total Project				
Off-Road Engine Emissions	261,893.77	10.62	2.12	262,754.12
On-road engine emissions	24,027.25	0.00	0.00	24,027.25
PROJECT TOTAL	**285,921.03**	**10.62**	**2.12**	**286,781.38**

148 MPCA. Undated. Minnesota Greenhouse Gas Inventory. Minnesota's Greenhouse Gas Emissions and Statutory Goals. Available online at: https://data.pca.state.mn.us/views/Greenhousegasemissionsdata/TotalGHGemissionsgoals?%3Aembed=y&%3AisGuestRedirectFromVizportal=y. Accessed June 2026.

Compared to Minnesota's annual greenhouse gas emissions inventory, the Project's estimated construction-related greenhouse gas emissions would represent a negligible contribution to statewide emissions totals.

Operations

Vegetation clearing may temporarily reduce carbon sequestration capacity within portions of the right-of-way; however, cleared areas will continue to support herbaceous and shrub vegetation, and long-term greenhouse gas impacts associated with vegetation management are expected to be minor. The Applicants calculated greenhouse gas emissions from vegetation clearing and land use change using the Minnesota Climate Calculator and conservative estimates of Project impacts.[149] Across the entire Project, the footprint of new structures will occupy approximately 3 acres of land, while the footprint of existing structures to be removed will allow approximately 1 acre of land to be reclaimed. At the new Jefferson Ridge Switching Station, approximately 3.4 acres of agricultural land will be converted to impervious surface. As discussed in **Section 6.4.2.1**, approximately 423 acres of forested areas will be cleared for right-of-way maintenance. As discussed in **Section 6.8.7.2**, the Proposed Rights-of-Way cross 155 acres of wetlands. The Applicants will minimize impacts to wetlands as discussed in **Section 6.8.7**; however, the land use change calculations assume the full 155 acres will be converted to brush and grassland. With these assumptions, the total CO_2e resulting from Project land use change is 76,711.5 kg CO_2e, or 84.6 short tons of CO_2e.

Direct greenhouse gas emissions associated with Project operation would be limited primarily to vehicle and equipment use during routine inspections, maintenance activities, and vegetation management. These activities would be infrequent and limited in duration. SF_6, a potent greenhouse gas used in certain electrical equipment, would remain contained within properly functioning equipment under normal operating conditions. As a result, operational greenhouse gas emissions are expected to be minimal.

6.8.2.3 Mitigation Measures

During operation, the Applicants will minimize SF_6 emissions through routine equipment inspections, leak monitoring, proper handling procedures during maintenance activities, and timely repair of any identified leaks. Where applicable, SF_6 removed from equipment during maintenance or equipment replacement will be recovered and managed in accordance with applicable regulations and industry practices.

Currently, there are no Minnesota-specific thresholds of significance for determining impacts of GHG emissions from an individual project on global climate change. In the absence of such a threshold, Minnesota Rule 4410.4300, Subpart 15, Part B, establishes a mandatory category requiring preparation of an Environmental Assessment Worksheet (EAW) for stationary source facilities generating 100,000 tons of GHGs per year. The purpose of an EAW is to assess whether a proposed project has the potential to result in significant environmental effects, which aids in determining whether an EIS is needed. Regarding GHG emissions, state regulations establish 100,000 tons per year as the threshold to prepare an EAW to aid in determining if potential significant environmental effects might exist. A reasonable conclusion is that a project with GHG

[149] Minnesota Environmental Quality Board. 2026. Minnesota Climate Calculator, Version 1.2 March 2026. Available online at: https://www.eqb.state.mn.us/sites/eqb/files/mn_climate_calculator_v1.2_march_2026.xlsm. Accessed October 2026.

emissions below 100,000 tons per year does not have the potential to result in significant GHG effects.

6.8.2.4 Typical Route Permit Conditions

Route permits issued by the Commission typically do not include standard conditions that specifically address greenhouse gas emissions.

6.8.3 Climate Change and Resilience

Climate change refers to long-term shifts in temperature, precipitation patterns, and the frequency and intensity of extreme weather events. In Minnesota, observed climate trends indicate generally warmer temperatures, increased precipitation, and changes in the occurrence and severity of climate-related hazards.[150]

6.8.3.1 Existing Conditions

The Applicants evaluated existing and projected climate conditions in accordance with the Minnesota Environmental Quality Board's (EQB's) EAW guidance,[151] which recommends consideration of observed climate trends, projected future climate conditions, and potential changes in climate-related hazards.

The Applicants identified current climate trends using the MDNR's Minnesota Climate Explorer tool.[152] The Project is located within the southeast climate division. From 1980 to 2026, the southeast climate division experienced an increase in overall temperature of 0.42 degrees Fahrenheit per decade. During this same period, the minimum temperature increased 0.50 degrees Fahrenheit per decade. Precipitation has increased by 0.78 inches per decade with periods of extended drought in 1989-1990, 2004, 2012-2013, and 2024. The overall Palmer Drought Severity Index shows a trend of 0.12 per decade. A positive trend in the Palmer Drought Severity Index generally indicates increasing moisture availability and less severe drought conditions over time. In addition, heavy rain events are becoming more intense and more frequent. The MNDNR defines mega-rain events as rainfall events of more than 6 inches over 1,000 square miles in 24 hours or less, with at least 8 inches falling somewhere in that area. Since 1973, Minnesota has experienced 17 mega-rain events. Of those, 12 have occurred since 2000.[153]

The Applicants used the University of Minnesota's Climate Mapping and Analysis tool[154] to estimate anticipated changes in occurrence of extreme heat, drought, wildfire, and flooding

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150 MDNR. 2019. *Minnesota's Climate Is Already Changing*. Available online at: https://files.dnr.state.mn.us/natural_resources/climate/change/climatechange-factsheet.pdf. Accessed July 2026.

151 Minnesota Environmental Quality Board. 2024. *Environmental assessment worksheet (EAW) guidance. Developing a carbon footprint and incorporating climate adaptation and resilience*. Available online at: https://www.eqb.state.mn.us/sites/eqb/files/2024_eaw_climate_guidance_2.pdf. Accessed July 2026.

152 MDNR. 2026. Minnesota Climate Explorer. Available online at: https://climate-explorer.dnr.state.mn.us/main/historical. Accessed July 2026.

153 Minnesota Department of Natural Resources. 2026. Historic mega-rain events in Minnesota. Available online at: https://www.dnr.state.mn.us/climate/summaries_and_publications/mega_rain_events.html. Accessed August 2026.

154 University of Minnesota. 2026. Minnesota CliMAT (Climate Mapping and Analysis Tool). Available online at: https://climate.umn.edu/MN-CliMAT. Accessed July 2026.

hazards for the southeast climate division. To provide conservative estimates, the "high emissions" category was used. The estimates shown in the following paragraph are associated with an increase or decrease from the baseline period of 1995 to 2014 into the mid-century (2040 to 2059).

Climate projections indicate that extreme heat events are likely to become more frequent in the Project area. Under a high-emissions scenario, the annual number of days with temperatures exceeding 100°F is projected to increase relative to historical conditions by 7.4 days. Projected changes in precipitation are less consistent, with some models indicating decreased annual precipitation and others indicating modest increases. These differences illustrate the uncertainty associated with long-term precipitation forecasting.

To supplement the climate division-level analysis, the Applicants also reviewed county-level climate projections using the U.S. Climate Resilience Toolkit's Climate Mapping for Resilience and Adaptation tool.[155] This tool provides data on a county basis rather than a climate region basis. The Applicants selected one county to represent each Project segment. Counties were selected based on the number of acres in the Project Right-of-Way. For Segment 1, the Applicants used Olmsted County, for Segment 2, the Applicants used Fillmore County, and for the Q-9, the Applicants used Houston County. This tool predicts changes in climate variables from the conditions during the years of 1951-1980. To closely match the variables used in the above analysis, the Applicants selected the mid-century timeframe (2041-2070) and the higher emissions scenario. The results are summarized in **Table 6.8.3-1** for the representative counties.

TABLE 6.8.3-1

Projected Mid-Century Climate Conditions by Representative County

Proposed Route	Representative County	Project Change in Annual Days with Maximum Temperature Greater than 100 degrees Fahrenheit	Projected Change in Average Annual Total Precipitation	Project Change in Maximum Number of Consecutive Dry Days
Segment 1	Olmsted County	+3.2 days	+1.3 inches	-2.0 days
Segment 2	Fillmore County	+2.7 days	+1.6 inches	-2.0 days
Q-9	Houston County	+2.5 days	+1.7 inches	-1.5 days

Note: Projected changes are based on the U.S. Climate Resilience Toolkit's Climate Mapping for Resilience and Adaptation tool for the mid-century timeframe under the higher-emissions scenario. Values represent projected changes from the 1951–1980 baseline period to the 2041–2070 mid-century period. County selections are based on the county containing the greatest number of acres within the applicable Proposed Route. The Climate Mapping for Resilience and Adaptation tool provides county-level climate projections for common climate hazards and future time periods.

Results for the representative counties are generally consistent and indicate increasing temperatures, a greater frequency of extreme heat events, and modest changes in precipitation patterns. Projected decreases in consecutive dry days suggest a potential shift toward wetter conditions.

The Applicants reviewed FEMA's Resilience Analysis and Planning Tool for each of the Project counties.[156] The overall risk rating for the Project counties ranges from very low in Houston County

[155] U.S. Climate Resilience Toolkit. 2026. Climate Mapping for Resilience and Adaptation. Available online at: https://cris.ncics.org/assessment-tool/home/explore/details/. Accessed July 2026.

[156] Federal Emergency Management Agency. 2026. National Risk Index Data: All Counties. Available online at: https://www.fema.gov/about/openfema/data-sets/national-risk-index-data. Accessed October 2026.

to relatively moderate in Olmsted County. Risks that potentially affect the Project counties include winter weather, cold waves, tornadoes, strong winds, hail, and lightning. These weather events are typical of southeastern Minnesota. The inland flooding risk is relatively low in Fillmore, Goodhue, Houston, and Wabasha counties and relatively moderate in Mower and Olmsted counties.

Although uncertainty remains regarding future precipitation patterns, the available climate projections consistently indicate warmer temperatures and more frequent extreme heat events in the Project area. Depending on future precipitation trends, climate change could also influence the frequency and severity of drought, wildfire conditions, extreme precipitation events, and flooding.

6.8.3.2 Potential Impacts

The ROI for climate change consists of the counties crossed by the Project. Climate-related effects are anticipated to occur over the long term and would primarily be associated with changes in environmental conditions affecting Project infrastructure and surrounding resources. Project facilities may be exposed to climate-related stressors during their operational life, including increased temperatures, changes in precipitation patterns, more intense storm events, flooding, and drought. These conditions have the potential to affect construction scheduling, access roads, vegetation management requirements, and operation and maintenance activities. However, transmission facilities are routinely designed to accommodate a wide range of environmental conditions and are expected to remain resilient under projected future climate conditions.

Factors that can contribute to climate change include land use conversion, vegetation removal, water use, and greenhouse gas emissions. The Project will result in a limited amount of permanent land conversion associated with transmission structures and related facilities. Similarly, vegetation clearing will be required within portions of the rights-of-way; however, the affected area is small relative to the agricultural and forested landscape of the Project area and is not expected to measurably affect regional carbon storage or climate conditions. GHG emissions from vegetation clearing and land use change is discussed in **Section 6.8.2.2**. The Project will not require water during routine operation, and temporarily disturbed areas will be restored to pre-construction conditions and revegetated in accordance with the VMP (**Appendix I**), maintaining existing drainage patterns and site stability. GHG emissions associated with Project construction and operation are discussed in **Section 6.8.2**. Overall, the Project is not expected to result in measurable impacts on local or regional climate conditions.

As discussed in **Section 6.8.7.3**, the Project crosses 100-year floodplains. If precipitation and the severity of storms increases, the potential for flooding could increase. Climate models differ regarding the magnitude and direction of future precipitation changes; however, many projections indicate an increased likelihood of intense precipitation events. As a result, the potential for localized flooding may increase in some portions of the Project area over time. Localized flooding could increase the chance of water pooling around structure footings, potentially increasing degradation and marginally decreasing the life of the structure.

6.8.3.3 Mitigation Measures

The Applicants will minimize Project-related contributions to climate change by limiting permanent land conversion to the extent practicable, minimizing vegetation clearing where feasible, and restoring temporarily disturbed areas following construction. No water will be required during normal operation and disturbed areas will be returned to their pre-construction conditions. The

Applicants will revegetate disturbed areas according to the VMP (**Appendix I**). Revegetation will restore ground cover, promote soil stability, and support long-term ecosystem function within disturbed areas.

The Project will be designed to accommodate a range of future weather conditions, including elevated temperatures, flooding, high winds, ice loading, and severe storm events consistent with applicable engineering requirements and industry guidance, including American Society of Civil Engineers (ASCE) Manual of Practice No. 74, *Guidelines for Electrical Transmission Line Structural Loading*.[157] Transmission structures, conductors, and associated facilities will be designed in accordance with applicable industry standards and electrical codes to ensure long-term reliability and structural integrity. Where practicable, structures will be sited in upland areas and designed to span wetlands, hydric soils, and other areas subject to prolonged saturation. Site-specific geotechnical investigations will inform final structure and foundation design to ensure that facilities are constructed to withstand anticipated environmental conditions throughout the Project's operational life.

6.8.3.4 Typical Route Permit Conditions

Route permits issued by the Commission typically do not include standard conditions that specifically address climate change.

6.8.4 Geology and Topography

6.8.4.1 Existing Conditions

Geology

The Project area is located within southeastern Minnesota's Driftless Area and Karst Province, where sedimentary bedrock and relatively thin glacial deposits influence groundwater movement, topography, and the occurrence of karst features. All Project components, including Segment 1, Segment 2, and the Q-9, occur within this broader geologic setting. Carbonate bedrock underlying much of the Project area is susceptible to dissolution where overburden is thin, resulting in karst features such as sinkholes, springs, fractures, solution-enlarged joints, caves, and subsurface drainage pathways.[158] Karst features inventoried by the MDNR occurring within the Proposed Routes and Proposed Rights-of-Way are summarized in **Table 6.8.4-1** and shown on **Figure 16**.

TABLE 6.8.4-1

Karst Features

Feature	Segment 1	Segment 2	Q-9
Sinkholes within the Proposed Routes	89	405	0
Undefined Karst Feature within the Proposed Routes	13	17	0
Springs within the Proposed Routes	27	37	0
Sinkholes within the Proposed Rights-of-Way	3	15	0

[157] ASCE. 2020. "Guidelines for electrical transmission line structural loading." *ASCE Manuals and Reports on Engineering Practices No. 74*. 4th edition. Ed. F. Agnew. Task Committee on Electrical Transmission Line Structural Loading. Available online at: https://ascelibrary.org/doi/pdf/10.1061/9780784415566.fm. Accessed October 2026.

[158] MDNR. 2026. Springs, Springsheds, and Karst. Available online at: https://www.dnr.state.mn.us/waters/groundwater_section/mapping/springs.html. Accessed July 2026.

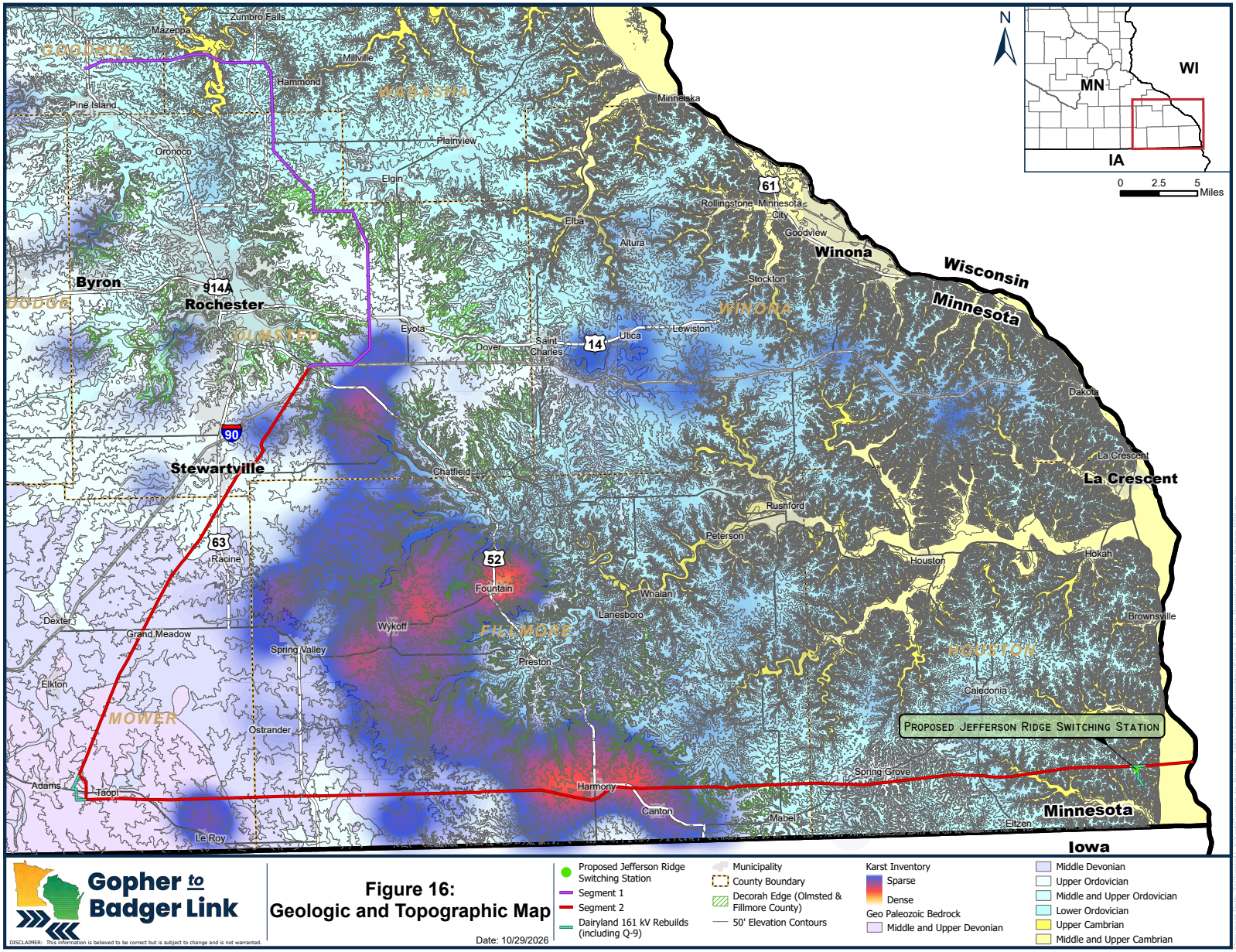
TABLE 6.8.4-1

Karst Features

Feature	Segment 1	Segment 2	Q-9
Undefined Karst Feature within the Proposed Rights-of-Way	0	17	0
Springs within 150 feet of the Proposed Rights-of-Way	2	3	0

Sources: MDNR. 2026. Karst Feature Inventory Points. Available online at: https://enterprise.gisdata.mn.gov/aghost/rest/services/us_mn_state_dnr/geos_karst_feature_inventory_pts/FeatureServer/0. Accessed July 2026.

MDNR. 2026. Springs in Minnesota. Available online at: https://gis.data.mn.gov/datasets/7c2982dffc9940ea8ed69bc71e98427d_0/explore?location=46.435000%2C-93.380000%2C7. Accessed October 2026.


Zumbro Falls
Mazeppa
GOODHUE
Millville
Hammond
WABASHA
Pine Island
Minneiska
Plainview
Oronoco
Elgin
61
Rollingstone
Minnesota City
Elba
Altura
Goodview
Winona
Wisconsin
Minnesota
Byron
DODGE
914A
Rochester
OLMSTED
Eyota
Dover
Saint Charles
14
Utica
Lewiston
Stockton
WINONA
Dakota
90
Stewartville
Chatfield
La Crescent
Rushford
Peterson
63
Racine
52
Houston
Hokah
Fountain
Whalan
Lanesboro
Brownsville
Dexter
Grand Meadow
Wykoff
FILLMORE
HOUSTON
Spring Valley
Preston
Elkton
Caledonia
MOWER
Ostrander
PROPOSED JEFFERSON RIDGE SWITCHING STATION
Adams
Taopi
Harmony
Spring Grove
Canton
Mabel
Minnesota
Le Roy
Elizen
Iowa
N
WI
MN
IA
0 2.5 5 Miles
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 16:
Geologic and Topographic Map
Date: 10/29/2026
Proposed Jefferson Ridge Switching Station
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Municipality
County Boundary
Decorah Edge (Olmsted & Fillmore County)
50' Elevation Contours
Karst Inventory
Sparse
Dense
Geo Paleozoic Bedrock
Middle and Upper Devonian
Middle Devonian
Upper Ordovician
Middle and Upper Ordovician
Lower Ordovician
Upper Cambrian
Middle and Upper Cambrian

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The uppermost bedrock along Segment 1 generally consists of Ordovician-aged dolostone, limestone, shale, and sandstone. Depth to bedrock is typically greater than 20 feet but may be less than 10 feet below ground surface in portions of the eastern segment. Segment 2 is underlain primarily by Devonian-aged dolostone, limestone, shale, and sandstone, with Cambrian-aged sandstone, siltstone, and shale present in the easternmost portion of the segment. Depth to bedrock along Segment 2 is highly variable, ranging from less than 10 feet to greater than 200 feet below ground surface. The Q-9 is located entirely within Houston County and is characterized by the same regional carbonate bedrock formations and karst-prone conditions that typify the Driftless Area of southeastern Minnesota. The presence of shallow bedrock in portions of the Project area may influence foundation design and construction methods, such as requiring blasting as further discussed in **Section 6.8.4.2**.[159]

In Olmsted and Fillmore Counties, the Proposed Route occurs within the Decorah Edge formation, a geologically sensitive groundwater recharge area associated with the Decorah-Platteville-Glenwood confining unit where depth to bedrock is less than 25 feet and Cummingsville rock formations are contiguous. The Decorah-Platteville-Glenwood confining unit consists of approximately 75 feet of shale and limestone of the Decorah Shale, and Platteville and Glenwood Formations. These formations act as a confining layer, hydraulically separating the upper carbonate aquifer from the underlying St. Peter-Prairie du Chien-Jordan aquifer.[160] Water flows laterally across the confining unit, filtering water through the upper layers until it encounters a fracture in the confining unit and recharges the underlying aquifer. The Applicants reviewed Olmsted Country GIS data[161] and Fillmore County GIS Data[162] to identify the Decorah Edge within the Project area. The Segment 1 Proposed Route crosses approximately 1,235 acres of designated Decorah Edge areas, primarily located northeast of Rochester. The Segment 2 Proposed Route crosses approximately 495 acres of designated Decorah Edge areas, primarily on the northern end of the segment, located southeast of Rochester (see **Figure 16**). The Q-9 does not cross this feature.

Topography

The Project area traverses several Ecological Subsections characterized by varying degrees of relief (see **Section 6.3** and **Figure 16**). Segment 1 is located primarily within the Rochester Plateau Subsection, with a smaller portion located within The Blufflands Subsection. The Rochester Plateau is characterized by level to gently rolling till plains, whereas The Blufflands are characterized by deeply dissected plateaus and river valleys. Elevations along Segment 1 range from approximately 840 feet to 1,280 feet above mean sea level (amsl), with the lowest elevations

159 University of Minnesota. 2025. D 05 Bedrock Geology 2025. Available online at: https://services.arcgis.com/8df8p0NlLFEShl0r/arcgis/rest/services/D_05_Bedrock_Geology_2025/FeatureServer. Accessed June 2026.

160 USGS. 1996. *Geologic Atlas of Fillmore County, Minnesota. Plate 7 — Pollution Sensitivity*. Available online at: https://files.dnr.state.mn.us/waters/groundwater_section/mapping/cga/c08_fillmore/pdf_files/plate07.pdf. Accessed June 2026.

161 Olmsted County. 2026. Decorah Edge GIS Layer. Available online at: https://gweb01.co.olmsted.mn.us/arcgis/rest/services/Environment_and_Geology/MapServer/8. Accessed June 2026.

162 Fillmore County. 2026. Decorah Edge GIS Layer. Available Online at: https://www.co.fillmore.mn.us/departments/gis/gis_services.php. Accessed June 2026.

occurring near the Zumbro River and the highest elevations occurring in the southern portion of the segment.[163]

Segment 2 traverses the Rochester Plateau, Blufflands, and Oak Savanna Subsections. Similar to Segment 1, topography ranges from gently rolling uplands to steeply dissected river valleys; however, Segment 2 exhibits substantially greater overall relief as it extends eastward toward the Mississippi River Valley. Elevations along Segment 2 range from approximately 620 feet amsl in the Mississippi River Valley to approximately 1,420 feet amsl between Grand Meadow and Adams. Similar to eastern portions of Segment 2, the Q-9 is located within The Blufflands region of Houston County and is characterized by steep slopes, incised stream valleys, and significant local relief associated with the Driftless Area landscape. [164]

Additional details regarding slope features crossed by the Project are provided in **Section 6.8.5**.

6.8.4.2 Potential Impacts

The ROI for geology and topography is the Proposed Rights-of-Way. Potential impacts are anticipated to occur primarily during construction and are expected to be localized and minimal. Construction activities may require minor grading associated with access improvements, structure installation, staging areas, and other temporary workspaces. Disturbed areas will be restored to pre-construction conditions to the extent practicable following construction, as described in the VMP (**Appendix I**).

Construction activities have the potential to encounter shallow bedrock, variable soil depths, and localized karst features, particularly within portions of Olmsted, Fillmore, and Houston counties. **Table 6.8.4-1** identifies karst features inventoried by the MDNR that occur within the Proposed Right-of-Way of Segments 1 and 2. There are no known karst features crossed by the Q-9 Proposed Right-of-Way. As discussed in **Section 3.1.5**, the foundation depths for the 765 kV structures range from 25 to 65 feet in depth and from 20 to 50 feet in depth for the 161 kV structures. Excavation for transmission structures may require specialized construction methods in areas where bedrock is near the ground surface. In karst-prone areas, improper excavation practices or concentration of stormwater runoff could potentially alter drainage patterns or affect subsurface voids and fractures. Because transmission line structures occupy a relatively small footprint and construction activities will be temporary and dispersed, impacts to geologic resources are expected to be minor.

If competent bedrock is encountered during foundation excavation, controlled blasting may be required to fracture rock and allow construction of foundations to the required depth. Blasting activities would result in localized and permanent disturbance of bedrock at individual structure locations and may generate fractured rock and excess rock spoil requiring management or disposal. These effects would be limited to the immediate foundation excavation area and would not be expected to substantially alter regional geologic conditions due to the relatively small footprint of individual structure foundations and the temporary nature of construction activities.

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[163] MDNR. 2026. Ecological Classification System. Available online at: https://www.dnr.state.mn.us/ecs/index.html. Accessed June 2026.

[164] MDNR. 2026. Ecological Classification System. Available online at: https://www.dnr.state.mn.us/ecs/index.html. Accessed June 2026.

Based on the current Project design, the Segment 1 Proposed Right-of-Way crosses 168 acres, and the Segment 2 Proposed Right-of-Way crosses 60 acres of the Decorah Edge formation. The Q-9 Proposed Right-of-Way does not cross the Decorah Edge formation. This area is recognized for its groundwater recharge function and association with karst development. Structure installation within these areas may require site-specific engineering considerations; however, impacts are expected to be minimal because transmission line construction requires limited ground disturbance and final structure locations and foundation designs will be informed by geotechnical investigations completed during final engineering, as further described in **Section 5.2**. Ground-disturbing activities conducted in these areas may increase the potential for groundwater contamination because of enhanced hydraulic connection between surface water and groundwater. Project construction is not expected to substantially alter regional groundwater flow patterns, recharge rates, or aquifer availability because transmission structures occupy relatively small footprints and impervious surfaces associated with Project facilities represent a small proportion of the overall landscape.

Following construction, the transmission line will operate at existing grade and will not substantially alter landforms, geologic features, or topographic conditions. Long-term impacts to geology and topography are therefore expected to be negligible.

6.8.4.3 Mitigation Measures

As discussed in **Section 5.2**, Project-specific geotechnical investigations will be conducted during final design to identify any karst features or sinkholes in the vicinity of proposed structure locations. If geotechnical investigations identify unstable karst features, sinkholes, shallow bedrock conditions, or other unsuitable subsurface conditions, structure locations may be adjusted where practicable, or specialized foundation designs may be used to maintain structural integrity and avoid impacts to geologic resources.

To minimize impacts to geology and topography, the Applicants will limit grading to the extent practicable, restore disturbed areas to pre-construction conditions, implement erosion and sediment control measures during construction, and use site-specific foundation designs appropriate for local subsurface conditions. In areas where karst features, shallow bedrock, or Decorah Edge conditions are identified, the Applicants may incorporate specialized engineering and construction techniques to avoid or minimize impacts to geologic and groundwater resources.

If blasting is required to excavate foundation holes in areas of competent bedrock, the Applicants will implement a site-specific Blasting Plan and conduct blasting in accordance with applicable federal, state, and local requirements. Blasting activities will be performed by qualified and licensed personnel using controlled blasting techniques designed to limit the extent of rock fracturing and minimize vibration effects. The Applicants will provide advance notification to affected landowners, restrict blasting to daylight hours, and implement appropriate safety measures to protect workers, nearby infrastructure, and environmental resources. Following blasting, excess rock will be managed in accordance with the construction plan, and disturbed areas will be restored as practicable.

6.8.4.4 Typical Route Permit Conditions

Typical route permit conditions require permittees to implement erosion prevention and sediment control practices, which would also be anticipated to minimize impacts on geologic resources. Example route permit conditions for these resources are provided in the corresponding sections.

6.8.5 Soils

6.8.5.1 Existing Conditions

Soils within the Proposed Routes were evaluated using the U.S. Department of Agriculture Natural Resources Conservation Service SSURGO database.[165] The SSURGO database provides detailed information regarding soil properties and limitations, including prime farmland, farmland of statewide importance, hydric soils, erosion potential, revegetation concerns, and susceptibility to compaction and rutting.

Prime farmland consists of soils with the combination of physical and chemical characteristics necessary to sustain high agricultural productivity. Farmland of statewide importance includes soils that are productive for agriculture but may have minor limitations such as steeper slopes or reduced moisture-holding capacity. Hydric soils are soils that formed under conditions of prolonged saturation, flooding, or ponding and are commonly associated with wetlands. Wind erosion potential, water erosion potential, revegetation constraints, and susceptibility to compaction and rutting are important indicators of a soil's sensitivity to construction-related disturbance.

Table 6.8.5-1 summarizes the occurrence of these soil characteristics within the Proposed Routes. Prime farmland and farmland of statewide importance occur throughout the Project area and reflect the predominance of agricultural land uses described in **Sections 6.4.2** and **6.6.1**. Hydric soils are present along all route segments but are most common in areas associated with wetlands, streams, floodplains, and poorly drained landscapes. Water-erodible soils generally correspond to steeper slopes and highly dissected terrain, whereas compaction-prone soils are typically associated with poorly drained soils that are more susceptible to rutting during wet conditions.

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[165] Soil Survey Staff, Natural Resources Conservation Service, U.S. Department of Agriculture. 2026. Official Soil Series Descriptions. Available online at: https://www.nrcs.usda.gov/resources/data-and-reports/soil-survey-geographic-database-ssurgo. Accessed July 2026.

TABLE 6.8.5-1

Summary of Soils within the Proposed Routes

	Segment 1		Segment 2		Q-9	
Soil Characteristics	Acres	Percent	Acres	Percent	Acres	Percent
Prime Farmland [a]	8,343.7	58.7%	38,092.2	79.6%	57.3	8.2%
Farmland of Statewide Importance [b]	3,218.9	22.7%	4,593.0	9.6%	107.0	15.3%
Wind Erodible [c]	291.9	2.1%	90.5	0.2%	--	0.0%
Water Erodible [d]	3,931.7	27.7%	7,514.3	15.7%	606.0	86.6%
Hydric [e]	913.3	6.4%	12,887.1	26.9%	--	0.0%
Revegetation Concerns [f]	2,786.6	19.6%	4,909.9	10.3%	534.7	76.4%
Compaction-Prone [g]	1,908.1	13.4%	21,769.7	45.5%	--	0.0%
TOTAL	**14,203.0**	**100.0%**	**62,761**	**100.0%**	**699.7**	**100.0%**

Note: Soils may have more than one characteristic.

[a] Includes soils that meet the prime farmland or prime farmland if a limiting factor is mitigated.

[b] Includes soils classified as farmland of statewide importance by SSURGO.

[c] Includes soils in Wind Erodibility Group designation of 1 or 2.

[d] Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.

[e] Includes soils that are classified as hydric by SSURGO.

[f] Includes soils with a non-irrigated land capability classification of 4 or greater.

[g] Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.

6.8.5.2 Potential Impacts

The ROI for soils is the Proposed Rights-of-Way. Soil impacts are anticipated to occur primarily during construction and are expected to be temporary and localized. Most areas within the Proposed Rights-of-Way will be spanned by the transmission line, and ground disturbance will be limited to structure locations, access routes, staging areas, the switching station, and other temporary workspaces. As a result, the impacts discussed below represent a conservative assessment because only a fraction of the soils within the Proposed Rights-of-Way will be directly disturbed.

Table 6.8.5-2 summarizes soil characteristics within the Proposed Rights-of-Way. In addition to the characteristics summarized in the table, slope, seasonal high-water tables, and restrictive layers influence construction suitability and restoration potential. Detailed soil properties by individual soil map unit are provided in **Appendix L**.

Most soils within the Proposed Rights-of-Way occur on nearly level to gently sloping terrain, with approximately 76 percent of Segment 1 soils, 82 percent of Segment 2 soils and 34.7 percent of the Q-9 having representative slopes of less than 8 percent. Seasonal high-water tables and restrictive layers occur within portions of the Proposed Rights-of-Way; however, approximately one-half of the soils within both Segment 1 and Segment 2 do not have a minimum annual water table within 60 inches of the ground surface, and most soils do not contain a restrictive layer within the upper 60 inches of the soil profile. Within the Q-9 Proposed Right-of-Way, there are no soils that have a minimum annual table depth within 60 inches of the ground surface, and there are no restrictive layers present within the upper 60 inches of the soil profile. As a result, slope, shallow groundwater, and restrictive layers are expected to present only localized construction and restoration considerations.

Construction

Construction activities have the potential to temporarily affect soil structure, productivity, and stability. Potential impacts include soil compaction and rutting from construction equipment; mixing of soil horizons during excavation and restoration; disturbance of agricultural drainage systems; increased susceptibility to wind and water erosion where vegetation is removed and soils are exposed; and temporary reductions in agricultural productivity resulting from soil disturbance and compaction.

As summarized in **Table 6.8.5-2**, the Proposed Rights-of-Way contain prime farmland, farmland of statewide importance soils, hydric soils, water-erodible soils, compaction-prone soils, and soils with revegetation limitations. Potential impacts are greatest where construction occurs on prime farmland, farmland of statewide importance, poorly drained soils, hydric soils, or steeper slopes, particularly during wet conditions when soils are most susceptible to rutting, compaction, and erosion.

Construction of the switching station and associated access areas will result in temporary soil disturbance and permanent conversion of a limited area of soil to maintained facility uses. Until permanent stabilization measures are established, exposed soils may be subject to temporary erosion from stormwater runoff. Similar impacts may occur at structure workspaces, temporary access routes, and staging areas.

TABLE 6.8.5-2

Summary of Soils within the Proposed Rights-of-Way

	Segment 1		Segment 2		Q-9	
Soil Characteristics	Acres	Percent	Acres	Percent	Acres	Percent
Prime Farmland [a]	708.8	60.0%	1,841.5	69.1%	3.1	21.0%
Farmland of Statewide Importance [b]	289.3	24.5%	331.8	12.4%	4.8	32.7%
Wind Erodible [c]	24.4	2.1%	15.1	0.6%	--	0.0%
Water Erodible [d]	348.3	29.5%	655.6	24.6%	11.4	77.5%
Hydric [e]	73.0	6.2%	543.6	20.4%	--	0.0%
Revegetation Concerns [f]	191.5	16.2%	462.9	17.4%	6.8	46.4%
Compaction-Prone [g]	156.8	13.3%	937.9	35.2%	--	0.0%
TOTAL	**1,181.5**	**100.0%**	**2,666.3**	**100.0%**	**14.7**	**100.0%**

Note: Soils may have more than one characteristic.

[a] Includes soils that meet the prime farmland or prime farmland if a limiting factor is mitigated.

[b] Includes soils classified as farmland of statewide importance by SSURGO.

[c] Includes soils in Wind Erodibility Group designation of 1 or 2.

[d] Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.

[e] Includes soils that are classified as hydric by SSURGO.

[f] Includes soils with a non-irrigated land capability classification of 4 or greater.

[g] Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.

Operation

Permanent soil impacts will be limited to areas occupied by Project facilities, including transmission structure foundations, permanent access roads, and the switching station. These facilities will permanently convert the soil within the facility footprint from existing land uses and result in localized losses of soil productivity and soil functions.

Long-term impacts to soils outside of permanent Project facilities are not anticipated. Following construction and restoration, agricultural activities and other existing land uses are expected to continue within most of the Proposed Rights-of-Way. Consequently, permanent impacts to soil resources are expected to be limited relative to the overall area of the Proposed Rights-of-Way.

6.8.5.3 Mitigation Measures

The Applicants will minimize soil disturbance during construction and restore temporarily disturbed areas following construction. Ground disturbance will be limited to the extent practicable, and construction methods will be implemented to reduce soil compaction, rutting, erosion, and impacts to agricultural productivity. Where significant soil disturbance occurs, affected areas will be restored and revegetated in accordance with the VMP (**Appendix I**) using approved noxious weed-free seed mixes.

The Applicants have developed a draft AIMP (**Appendix H**) and have provided the draft to the MDA for review. The AIMP identifies measures to avoid, minimize, and mitigate impacts to agricultural soils and farming operations, including soil decompaction, restoration of disturbed agricultural lands, segregation and replacement of topsoil where appropriate, and repair or replacement of damaged agricultural drainage systems.

To minimize erosion and sediment transport, the Applicants will implement BMPs and comply with the requirements of the General Permit, as further discussed in **Section 5.3.5** and the VMP provided in **Appendix I**. Erosion and sediment control measures include stabilization of exposed soils, perimeter sediment controls, slope protection measures, management of soil stockpiles, control of vehicle tracking onto public roads, and prompt revegetation of disturbed areas. These measures will minimize soil loss and help protect adjacent wetlands, waterbodies, and other downgradient resources from sedimentation.

6.8.5.4 Typical Route Permit Conditions

Route permits issued by the Commission typically contain avoidance and minimization measures relevant to soils, including:

- Section 5.3.8 is a standard condition that requires the permittee to implement erosion prevent and sediment control practices recommended by the MPCA Construction Stormwater Program and obtain coverage under the General Permit, which requires the development of a SWPPP that describes methods to control erosion and runoff. Reasonable measures to minimize erosion and sedimentation during construction, include:
    - employing perimeter sediment controls;

- protecting exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain tile inlets, protecting soil stockpiles, and controlling vehicle tracking;
- grading contours as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate revegetation and prevent erosion;
- and returning all areas disturbed during project construction to pre-construction conditions.

- Section 5.3.9 requires the permittee to develop wetland impact avoidance measures and implement them during construction of the HVTL.
- Section 5.3.24 is a standard condition that requires the permittee to use wildlife friendly erosion control materials such as “bio-netting” or “natural netting” and mulch productions without synthetic fiber additives or malachite green dye

6.8.6 Groundwater

6.8.6.1 Existing Conditions

The Project is located within Minnesota’s Karst Province,[166] which is characterized by carbonate and sandstone bedrock overlain by relatively thin glacial sediments. Groundwater resources in the Karst Province occur primarily within bedrock aquifers because unconsolidated sediments are generally less than 50 feet thick throughout much of southeastern Minnesota. The Project area is underlain by the St. Peter-Prairie du Chien-Jordan aquifer system and the Upper Carbonate Aquifer, which serve as important sources of groundwater for municipal, agricultural, commercial, and domestic water supplies. The St. Peter-Prairie du Chien-Jordan aquifer is the most widely used drinking water source in the region and supplies approximately 60 percent of wells in southeastern Minnesota.[167]

The thin glacial cover and presence of carbonate bedrock have resulted in development of karst features throughout the Project area. Karst landscapes are characterized by sinkholes, springs, caves, fractures, solution-enlarged conduits, and subsurface drainage systems that facilitate rapid movement of groundwater between the land surface and underlying aquifers. As a result, groundwater resources in the Project area are generally more vulnerable to contamination than groundwater systems in areas with thicker unconsolidated deposits.[168] Additional discussion of karst geology is provided in **Section 6.8.4**.

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166 MDNR. 2026. Minnesota Groundwater Provinces. Available Online at: https://www.dnr.state.mn.us/waters/groundwater_section/mapping/index.html. Accessed June 2026.

167 MDNR. 1996. *Geologic Atlas of Fillmore County, Minnesota. Plate 6-Bedrock Hydrogeology*. Available online at: https://files.dnr.state.mn.us/waters/groundwater_section/mapping/cga/c08_fillmore/pdf_files/plate06.pdf. Accessed June 2026.

168 MDNR. 2025. *Groundwater Atlas of Houston County, Minnesota. County Atlas Series C-33, Part B – Hydrogeology.* Available online at: https://files.dnr.state.mn.us/waters/groundwater_section/mapping/cga/c33_houston/hous-report.pdf. Accessed June 2026.

Public and Private Water Supply

The Applicants reviewed EPA designated sole source aquifers, Minnesota Well Index (MWI) records, Minnesota Department of Health (MDH) WHPAs and Drinking Water Supply Management Areas (DWSMAs). No sole source aquifers occur within the Project Area.

Each state is required to develop and implement a Wellhead Protection Program under the Safe Drinking Water Act, to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. The Safe Drinking Water Act was updated in 1986 with an amendment requiring the development of a broader-based Source Water Assessment Program, which includes the assessment of potential contamination of both groundwater and surface water based on a watershed approach. As a result, Minnesota adopted the State Wellhead Protection Rule 4720.5100-4720.5590 in 1997.[169]

Source-water protection for water supply wells in Minnesota is administered by the MDH through its Wellhead Protection Program. A WHPA encompasses the area around a drinking water well where contaminants could enter and pollute the well. WHPAs for public and community water-supply wells identify the area that contributes groundwater to a well and are delineated based on a zone of capture for a 10-year groundwater time-of-travel to the well. DWSMAs surround WHPAs but are outlined by easily identifiable jurisdictional boundaries. A DWSMA is managed in a Wellhead Protection Program plan, usually by a local government agency.

Segment 1 of the Proposed Route does not cross any mapped DWSMAs or WHPAs. Segment 2 crosses the Stewartville DWSMA and WHPA in Olmsted County and the Harmony DWSMA in Fillmore County. The Stewartville source-water area is classified as having low vulnerability to contamination, the Harmony DWSMA is classified as having moderate vulnerability to contamination, and the Canton DWSMA is classified as having high vulnerability to contamination (see **Table 6.8.6-1**). These features are shown on **Figure 17**.

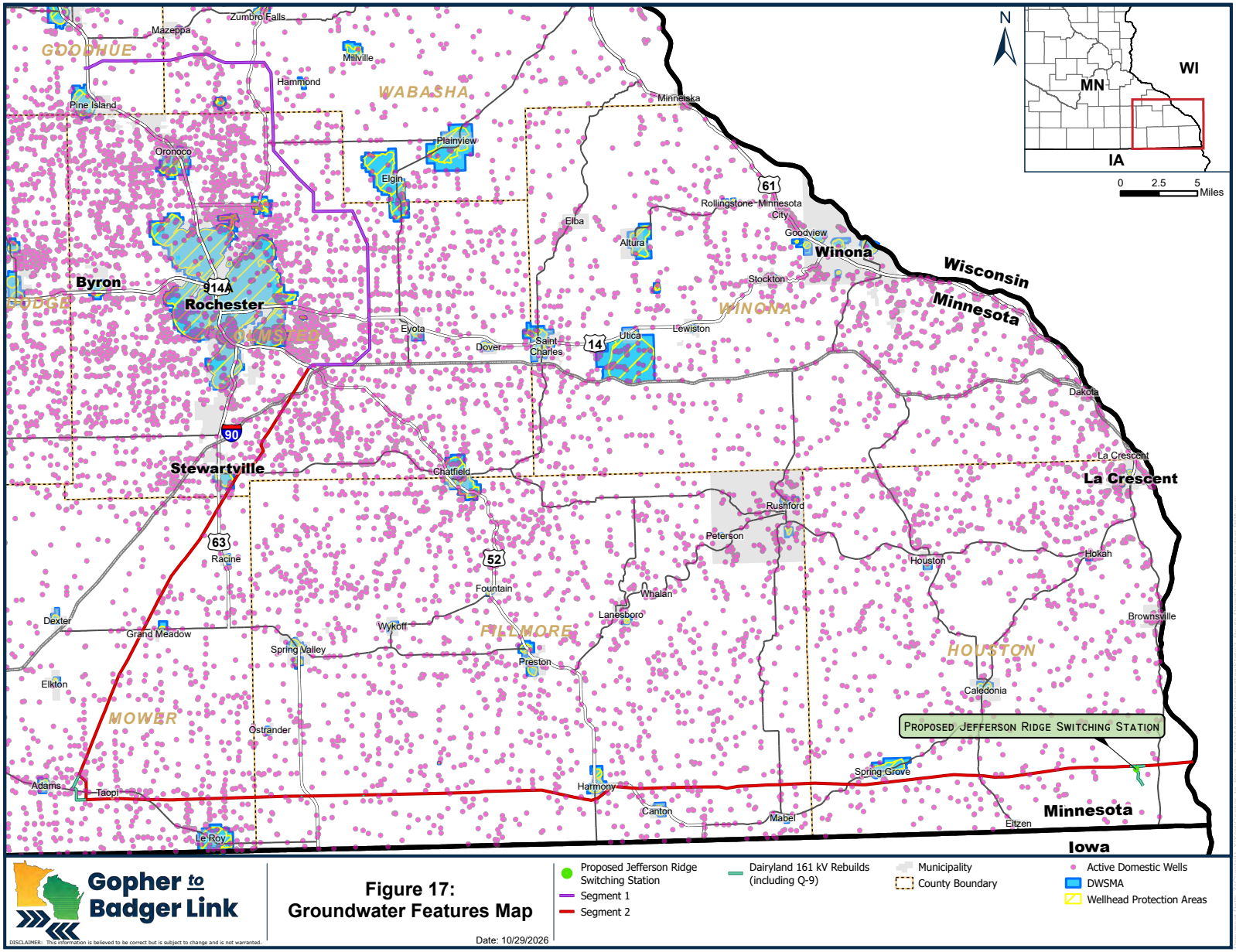
TABLE 6.8.6-1

Drinking Water Supply Management Areas and Wellhead Protection Areas Crossed by Segment 2

County	DWSMA/WHPA Name	Location	Vulnerability to Contamination
Olmsted	Stewartville DWSMA and WHPA	Directly Southeast of Stewartville	Low
Fillmore	Harmony DWSMA	Directly Southeast of Harmony	Moderate
Fillmore	Canton DWSMA	Directly North of Canton	High

Source: MDH. 2026. Source Water Protection Web Map Viewer: Reports and Geospatial Data, Source Water Protection, Wellhead Protection Areas. Available online at: https://www.health.state.mn.us/communities/environment/water/swp/mapviewer.html**.** Accessed June 2026.

[169] MDH. 2026. Wellhead Protection Rule. Available online at: https://www.health.state.mn.us/communities/environment/water/rules/wellhead.html. Accessed June 2026.


N
WI
MN
IA
0 2.5 5 Miles
Zumbro Falls
Mazeppa
GOODHUE
Millville
Hammond
WABASHA
Pine Island
Minneiska
Plainview
Oronoco
Elgin
61
Rollingstone
Minnesota City
Elba
Altura
Goodview
Winona
Wisconsin
Minnesota
Byron
914A
Rochester
Stockton
WINONA
Eyota
Dover
Saint Charles
14
Utica
Lewiston
Dakota
90
Stewartville
Chatfield
La Crescent
Rushford
Peterson
63
Racine
52
Houston
Hokah
Fountain
Whalan
Dexter
Grand Meadow
Wykoff
Lanesboro
Brownsville
FILLMORE
HOUSTON
Spring Valley
Preston
Elkton
Caledonia
MOWER
Ostrander
PROPOSED JEFFERSON RIDGE SWITCHING STATION
Spring Grove
Adams
Taopi
Harmony
Canton
Mabel
Minnesota
Elzen
Le Roy
Iowa
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 17:
Groundwater Features Map
Date: 10/29/2026
Proposed Jefferson Ridge Switching Station
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Municipality
County Boundary
Active Domestic Wells
DWSMA
Wellhead Protection Areas

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The MWI is the most complete record of well construction and location in Minnesota and is kept up-to-date and maintained by the Minnesota Geological Survey, in cooperation with the MDH. A search of the MWI[170] identified 69 active domestic wells occurring within the Segment 1 of the Proposed Route, 180 active domestic wells within the Segment 2 of the Proposed Route, and 1 active domestic well within the Q-9 Proposed Route. **Table 6.8.6-2** identifies the number of active domestic wells by county by Proposed Route. These features are also shown on **Figure 17**.

TABLE 6.8.6-2

Active Domestic Wells by County within the Proposed Routes

Proposed Route	Wabasha	Goodhue	Olmsted	Mower	Fillmore	Houston	**TOTAL**
Segment 1	18	1	50	0	0	0	**69**
Segment 2	0	0	48	85	43	4	**180**
Q-9	0	0	0	0	0	1	**1**
TOTAL	**18**	**1**	**98**	**85**	**43**	**1**	**250**

Source: MDH. 2026. Minnesota Well Index. Available online at: **https://mnwellindex.web.health.state.mn.us/**. Accessed June 2026.

On Segment 1, active domestic wells are concentrated primarily in Olmsted County, with fewer records in Wabasha County and one in Goodhue County. Active domestic wells generally have completed depths ranging from approximately 30 to 453 feet, with a median completed depth of approximately 312 feet where data are available. Depth to bedrock is relatively shallow where reported, with a median of approximately 17.5 feet. Static water levels for active domestic wells range from approximately 25 to 250 feet below ground surface, with a median of approximately 184.5 feet where data are available.

On Segment 2, active domestic wells generally have completed depths ranging from approximately 19 to 660 feet, with a median completed depth of approximately 320 feet where data are available. Depth to bedrock is variable but also relatively shallow in many records, ranging from approximately 1 to 185 feet, with a median of approximately 33 feet. Static water levels for active domestic wells range from approximately 6.5 to 430 feet below ground surface, with a median of approximately 191 feet where data are available.

The one record within the Q-9 Proposed Route is an active domestic well with a completed depth of approximately 240 feet, casing depth of approximately 240 feet, reported depth to bedrock of approximately 20 feet, and static water level of approximately 100 feet below ground surface.

6.8.6.2 Potential Impacts

The ROI for groundwater resources is the Proposed Rights-of-Way. Potential groundwater impacts are anticipated to be localized, temporary, and primarily associated with construction activities.

Construction activities have the potential to affect groundwater quality through vegetation removal, soil disturbance, temporary dewatering, and accidental spills or releases of fuels, lubricants, concrete washout, or other construction materials. As discussed in **Section 3.1.5**, the

[170] MDH. 2026. Minnesota Well Index. Available online at: https://mnwellindex.web.health.state.mn.us/. Accessed June 2026.

foundation depths for the 765 kV structures range from 25 to 65 feet in depth and from 20 to 50 feet in depth for the 161 kV structures. Groundwater sensitivity is elevated within portions of the Project area because of shallow bedrock conditions, karst features, springs, and Decorah Edge recharge areas that may facilitate rapid infiltration of surface water to underlying aquifers.

The Segment 2 Proposed Right-of-Way crosses approximately 13.7 acres of the Stewartville DWSMA and approximately 0.2 acre of the Stewartville WHPA but avoids both the Harmony and Canton DWSMAs. County Well Index data indicate that three water supply wells occur within 150 feet of the Segment 1 right-of-way, and 6 wells within 150 feet of the Segment 2 right-of-way. No known wells occur within the 150 feet of the Q-9 Proposed Right-of-Way. Construction activities in proximity to public and private water supplies have the potential to affect groundwater quality if spills or other releases occur; however, direct impacts to water-supply wells are not anticipated.

Permanent groundwater impacts are expected to be minimal. Water use associated with Project operation will be limited, any dewatering that may be required during construction would be temporary, and the limited area of permanent facilities is not expected to measurably affect groundwater recharge or groundwater availability.

6.8.6.3 Mitigation Measures

The Applicants will implement measures to avoid or minimize impacts to groundwater resources, including public and private water supplies, karst features, springs, and groundwater recharge areas. The Applicants initiated coordination with the MDH for this Project. The MDH provided comments on May 7, 2026 (**Appendix C**), providing geospatial information for the DWSMA and WHPA and private well locations. The MDH also recommended avoidance of the DWSMAs and requested that BMPs be implemented to prevent potential groundwater contamination. The Applicants will continue to coordinate with MDH, MDNR, and local agencies regarding groundwater-sensitive resources identified during final engineering and construction planning.

Prior to construction, geotechnical investigations will be conducted to identify areas with shallow groundwater, karst features, Decorah Edge conditions, springs, and other groundwater-sensitive resources, as described in **Section 5.2**. Information obtained during these investigations will be used to refine structure locations and foundation designs, as appropriate, to avoid or minimize impacts. Where karst conditions or shallow groundwater are encountered, specialized foundation designs or construction techniques may be used.

The Applicants will implement spill prevention and response procedures and BMPs to minimize the potential for groundwater contamination during construction in accordance with the requirements of the General Permit. Construction materials used for foundations will consist of non-hazardous materials. If temporary dewatering is required and exceeds applicable regulatory thresholds, the Applicants will obtain any necessary permits from MDNR and coordinate with resource agencies as appropriate. Construction dewatering discharge activities will comply with the General Permit.

The Applicants will continue to work with landowners to identify any additional wells or springs located near the Project and will coordinate with MDH regarding public water-supply resources within the Project area.

6.8.6.4 Typical Route Permit Conditions

Route permits typically include conditions related to spill prevention, erosion and sediment control, wetland protection, and restoration of disturbed areas, and these requirements would also be protective of groundwater quality and groundwater-dependent resources. Example route permit conditions are included in the corresponding resource sections.

6.8.7 Surface Waters and Wetlands

6.8.7.1 Existing Conditions

Watersheds

Hydrologic Unit Codes (HUCs) are used nationwide to differentiate drainage areas with a series of numbers. There are eight major watershed basins (HUC-04) and 81 major surface water watersheds (HUC-08) covering Minnesota. The Proposed Routes occur within portions of the Mississippi River, Zumbro River, Root River, Cedar River, Upper Iowa River, and Upper Wapsipinicon River watersheds (**Table 6.8.7-1**).[171] Surface water features within the Project area generally drain west-to-east toward the Mississippi River through a network of perennial and intermittent streams, drainageways, and associated floodplain systems. While the Proposed Routes cross portions of seven HUC-8 watersheds, crossing a watershed boundary does not necessarily indicate a crossing of the primary river associated with that watershed. The watershed boundaries are shown on **Figure 18**.

TABLE 6.8.7-1

Watersheds (HUC-8) Crossed by the Proposed Routes

Proposed Route	USGS Watershed Name	8-digit HUC-8	Acreage within Proposed Route
Segment 1	Zumbro River	07040004	11,535
	Mississippi River - Winona	07040003	2,668
Segment 2	Zumbro River	07040004	424
	Upper Wapsipinicon River	07080102	111
	Cedar River	07080201	3,937
	Root River	07040008	23,346
	Mississippi River – Reno	07060001	3,260
	Upper Iowa River	07060002	16,780
Q-9	Mississippi River – Reno	07060001	700
		TOTAL	**3,842**

[171] MDNR. Undated. Minnesota's Watershed Basins. Available online at: https://www.dnr.state.mn.us/watersheds/map.html. Accessed June 2026.

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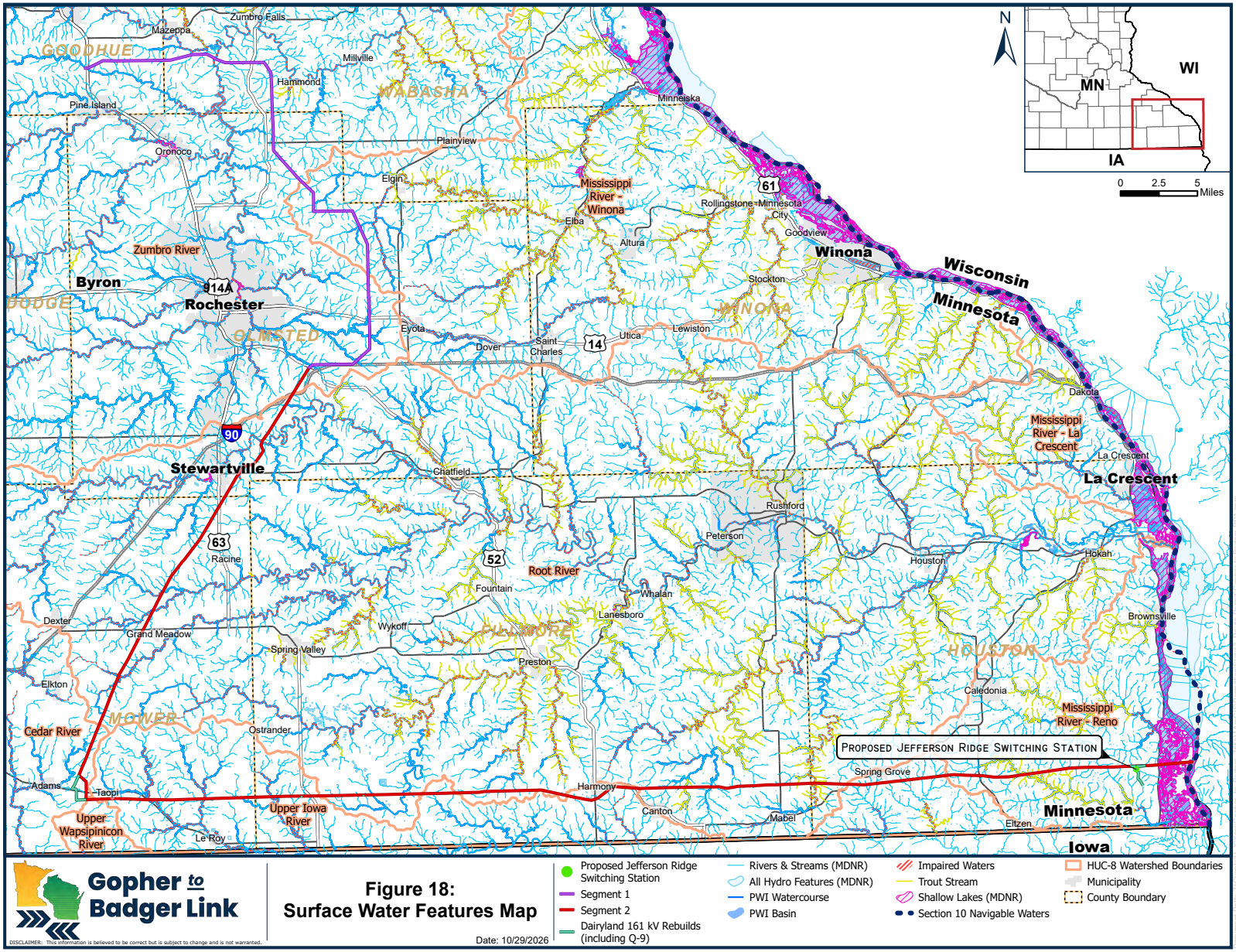
N
WI
MN
IA
0 2.5 5 Miles
Zumbro Falls
Mazeppa
GOODHUE
Millville
Hammond
WABASHA
Pine Island
Oronoco
Plainview
Elgin
Minneiska
Mississippi River - Winona
Elba
Altura
Rollingstone
Minnesota City
Goodview
61
Winona
Wisconsin
Minnesota
Zumbro River
Byron
DODGE
14A
Rochester
OLMSTED
Stockton
WINONA
Eyota
Dover
Saint Charles
14
Utica
Lewiston
Dakota
Mississippi River - La Crescent
La Crescent
90
Stewartville
Chatfield
Rushford
Peterson
63
Racine
52
Root River
Houston
Hokah
Fountain
Whalan
Lanesboro
Dexter
Grand Meadow
Wykoff
FILLMORE
Brownsville
Spring Valley
Preston
HOUSTON
Elkton
Caledonia
MOWER
Cedar River
Ostrander
Mississippi River - Reno
PROPOSED JEFFERSON RIDGE SWITCHING STATION
Spring Grove
Adams
Taopi
Harmony
Upper Iowa River
Canton
Mabel
Minnesota
Upper Wapsipinicon River
Le Roy
Elzen
Iowa
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 18:
Surface Water Features Map
Date: 10/29/2026
Proposed Jefferson Ridge Switching Station
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Rivers & Streams (MDNR)
All Hydro Features (MDNR)
PWI Watercourse
PWI Basin
Impaired Waters
Trout Stream
Shallow Lakes (MDNR)
Section 10 Navigable Waters
HUC-8 Watershed Boundaries
Municipality
County Boundary

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Lakes, Rivers, Streams, and Ditches

Surface water resources are abundant throughout the Project area and include rivers, streams, drainage ditches, ponds, and floodplain water features. Surface waters are particularly concentrated along the Mississippi River corridor and within the dissected stream valleys characteristic of southeastern Minnesota's Driftless Area landscape. Review of the MDNR Hydrography Dataset[172] identified 430 unique stream, river, and ditch crossings and 98 lake or pond features within the Proposed Routes (**Table 6.8.7-2**). These features are shown on **Figure 18**.

TABLE 6.8.7-2

Number of Water Resources Crossed by the Proposed Routes

Waterbody Feature	Segment 1	Segment 2	Q-9	**TOTAL**
Total Streams/Rivers/Ditches	141	282	7	**430**
Total Lakes/Ponds	17	81	0	**98**
Public Waters Inventory (PWI) Watercourses [a]	11	30	0	**41**
PWI Basins [b]	0	1	0	**1**
USACE Navigable Waters (Section 10) [a]	0	1	0	**1**
Outstanding Resource Value Waters [a]	0	0	0	**0**
Trout Streams [a]	0	20	0	**20**
Trout Lakes [b]	0	0	0	**0**
Shallow Lakes [b]	0	1	0	**1**
Wild Rice Waters [b]	0	1	0	**1**

[a] Included in total count of Streams/Rivers/Ditches.
[b] Included in total count of Lakes/Ponds.

As shown in **Table 6.8.7-3**, approximately 90 percent of identified watercourse crossings are intermittent streams or drainage ditches. These features generally convey runoff seasonally or following rainfall and snowmelt events, while perennial streams maintain flow throughout the year. Major perennial watercourses crossed by the Proposed Routes include the Mississippi River, Winnebago Creek, Root River, Upper Iowa River, Zumbro River, Beaver Creek, Riceford Creek, Bear Creek, and Deer Creek.

TABLE 6.8.7-3

Watercourse Flow Regimes Crossed by Proposed Routes

Waterbody Feature	Segment 1	Segment 2	Q-9	**TOTAL**
Perennial Stream	8	30	0	**38**
Perennial Drainage Ditch	0	2	0	**2**
Intermittent Stream	130	228	7	**365**
Intermittent Drainage Ditch	1	10	0	**11**
Underground/Karst	0	1	0	**1**
Connector	2	3	0	**5**
Unknown Stream/Drainage Ditch	0	8	0	**8**
TOTAL	**141**	**282**	**7**	**430**

[172] MDNR. 2026. MDNR Hydrography Dataset. Available online at: https://gisdata.mn.gov/dataset/water-dnr-hydrography. Accessed June 2026.

Public Waters

In Minnesota, rivers, streams, and lakes may be designated as Public Waters (Minn. Stat. § 103G.005, subd. 15). The MDNR Public Waters Inventory (PWI) was reviewed to identify designated Public Waters within the Proposed Routes. Segment 1 of the Proposed Route crosses 11 Public Watercourses, while Segment 2 crosses 19 Public Watercourses and one Public Water Basin (**Table 6.8.7-4**). No Public Watercourses or Public Water Basins are crossed by the Q-9.[173]

Public Watercourses crossed by the Proposed Routes include several regionally important stream systems such as the Zumbro River, Root River, Winnebago Creek, Riceford Creek, Deer Creek, Bear Creek, Beaver Creek, and the Upper Iowa River. These features are shown on **Figure 18**.

TABLE 6.8.7-4

Public Watercourses Crossed by the Proposed Route

Public Watercourse Name*	Kittle Number
Segment 1	
Whitewater River, North Branch	M-031-018
Unnamed Creek	M-031-018-012
Unnamed Creek	M-031-018-012-014
Unnamed Creek	M-031-018-012-014-001
Zumbro River	M-034
Dry Run Creek	M-034-052
Bear Creek	M-034-073
Badger Run	M-034-073-002
Unnamed Creek	M-034-073-004
Unnamed Creek	M-034-073-005
Unnamed Creek	M-034-073-006
Segment 2	
Iowa River, Upper	I-023
Deer Creek	I-023-000.4-001
Beaver Creek	I-023-000.9
Unnamed Creek	I-023.000.9-002
Little Iowa River	I-023-003
Unnamed Creek	I-023-003-001
Iowa River, North Branch	I-023-006
Unnamed Creek	I-025-002
Mississippi River	M
Winnebago Creek	M-001
Unnamed Creek	M-001-023
Unnamed Creek	M-001-024
Unnamed Creek	M-001-025
Root River	M-009
Riceford Creek	M-009-010-005
Donaldson Creek	M-009-010-010-004
Frego Creek	M-009-010-010-006
Unnamed Creek	M-009-010-010-006-000.8
Canfield Creek	M-009-025-010

[173] MDNR. 2026. Public Waters Inventory. Available online at: https://gisdata.mn.gov/dataset/water-mn-public-waters. Accessed June 2026.

TABLE 6.8.7-4

Public Watercourses Crossed by the Proposed Route

Public Watercourse Name*	Kittle Number
Unnamed Creek	M-009-025-010-017
Bear Creek	M-009-033-008
Bear Creek, North Fork	M-009-033-009-003
Deer Creek	M-009-033-009
County Ditch 8	M-009-033-009-003 (2 crossings)
Deer Creek	M-009-033-009-B003
Whitney Creek	M-009-044
Nicols Creek	M-009-048
Unnamed Creek	M-009-053
Root River	M-009-B006.5

* Gray shading indicates the waterbody is also crossed by the Proposed Right-of-Way.

Navigable Waters

The Mississippi River is the only USACE-designated Section 10 navigable water crossed by Segment 2 of the Proposed Route.[174] The crossing occurs within the navigation pool associated with USACE Lock and Dam No. 9 near the Minnesota-Iowa border. The Mississippi River in this area supports commercial navigation, recreation, fisheries, floodplain wetlands, and migratory bird habitat and is one of the most environmentally significant surface water resources crossed by the Project.

Outstanding Value Resource Waters

Specific lakes, rivers, and wetlands that possess exceptional recreational, cultural, aesthetic, ecological, or scientific value are designated as Outstanding Resource Value Waters (ORVWs). As specified in Minnesota Rules, Wild, Scenic, and Recreational River segments comprise a part of the definition of ORVWs. The Applicants reviewed Minn. R. 7050.0335[175] to identify resources. No designated ORVWs are crossed by the Proposed Routes.

Trout Waters

Certain surface waters are designated as trout streams or lakes by the State of Minnesota, according to Minn. Stat. § 6264.0050. No designated trout streams are crossed by Segment 1. Trout stream crossings are concentrated within the Segment 2 of the Proposed Route, particularly within the Root River and Winnebago Creek watersheds. These streams support cold-water aquatic communities sustained by groundwater inputs associated with southeastern Minnesota's karst geology. Segment 2 crosses 20 trout streams identified in **Table 6.8.7-5**. No designated trout

174 USACE. 2026. *Navigable Waters of the United States in Minnesota*. Available Online at: https://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/mn_nav_waters.pdf. Accessed June 2026.

175 State of Minnesota. 2025. Chapter 7050 – Water Quality Standards for Protection of Waters of the State Part 77050.0335 – Designated Outstanding Resource Value Waters. Available Online at: https://regulations.justia.com/states/minnesota/agency-167/chapter-7050/water-quality-standards-for-protection-of-waters-of-the-state/part-7050-0335/. Accessed June 2026.

lakes are crossed by either Segment 1 or 2, and the Q-9 Proposed Route does not cross any trout streams or lakes.[176] These features are shown on **Figure 18**.

TABLE 6.8.7-5

Trout Streams Crossed by the Proposed Route

Trout Stream Name*	Kittle Number
Segment 2	
Winnebago Creek	M-001
Burg Creek	M-001-010
Unnamed Creek	M-001-010-002
Unnamed Creek	M-001-010-004
Unnamed Creek	M-001-015
Unnamed Creek	M-001-017
Unnamed Creek	M-001-020
Unnamed Creek	M-001-021
Unnamed Creek	M-001-022
Unnamed Creek	M-001-023
Unnamed Creek	M-001-024
Unnamed Creek	M-001-024-001
Unnamed Creek	M-001-025
Riceford Creek	M-009-010-005
Unnamed Creek	M-009-010-005-004.4
Unnamed Creek	M-009-010-005-004.4-001
Unnamed Creek	M-009-010-005-004-002
Frego Creek	M-009-010-010-006
Unnamed Creek	M-009-010-010-006-000.4
Unnamed Creek	M-009-010-010-006-000.8

* Gray shading indicates the waterbody is also crossed by the Proposed Right-of-Way.

Shallow Lakes and Wild Rice Waters

The MDNR has developed a dataset of potential shallow lakes, which may provide valuable wildlife habitat. A “shallow lake” is defined as a basin 50 acres or greater in size with a maximum depth of 15 feet or less. Lakes of unknown depths are also included in the dataset. Neither Segment 1 of the Proposed Route nor the Q-9 Proposed Route cross any identified shallow lakes. Segment 2 of the Proposed Route crosses a network of designated shallow lakes associated with the Mississippi River floodplain fringe (**Figure 18**).[177] These occurrences of shallow lakes are not identified as wild rice waters by the MDNR statewide inventory of wild rice waters[178] or MDNR

[176] State of Minnesota. 2026. State Designated Trout Streams Minnesota. Available online at: https://gis.data.mn.gov/datasets/43392623c7dc471da0b84615b3a0faa4_0/explore?location=46.219224%2C-93.329495%2C6. Accessed June 2026.

[177] MDNR. 2026. Shallow Lakes Identified by DNR Wildlife. Available online at: https://gis.data.mn.gov/maps/ad5983f428b84b4fbc8adfb946a06c3b/about. Accessed June 2026.

[178] MDNR. 2026. *Statewide Inventory Wild Rice Waters*. Available Online at: https://files.dnr.state.mn.us/fish_wildlife/wildlife/wildrice/statewide-inventory-wild-rice-waters.pdf statewide-inventory-wild-rice-waters.pdf Accessed June 2026.

350 Important Wild Rice Waters in Minnesota;[179] however, the Mississippi River is identified as a Wild Rice Water.

Impaired Waters

The MPCA establishes water quality standards and maintains the State's Section 303(d) Impaired Waters List. Impaired waters are waterbodies that do not meet one or more designated beneficial uses and require restoration measures through development and implementation of Total Maximum Daily Loads.

The MPCA Impaired Waterbodies 2024 dataset[180] was reviewed for the Project. **Table 6.8.7-6** summarizes MPCA designated impaired waterbodies crossed by the Proposed Route. The Q-9 Proposed Route does not cross any impaired waters. These features are shown on **Figure 18**.

TABLE 6.8.7-6

Impaired Waterbodies Crossed by the Proposed Route

Waterbody Name [a]	County	Reach Description	Impairment [b]
Segment 1			
Zumbro River	Wabasha	Zumbro Lk to N Fk Zumbro R	Hg-F; PCB-F
Whitewater River, North Fork	Olmsted	T107 R12W S28, east line to T107 R12W S4, north line	InvertBio
Segment 2			
Root River, North Branch	Olmsted	Unnamed Cr to Mill Cr	InvertBio, Turbidity
Unnamed Creek	Olmsted	Unnamed Cr to Unnamed Cr	InvertBio
Bear Creek, North Fork	Mower	Unnamed Cr to Unnamed Cr	InvertBio
Bear Creek (South Fork Bear Creek)	Mower	Headwaters to Kedron Cr	InvertBio
Deer Creek	Mower	Headwaters to M Br Root R	E.coli
County Ditch 8	Mower	Unnamed Cr to Deer Cr	InvertBio
Upper Iowa River	Mower	-92.5901, 43.5985 to Little Iowa R	E.coli InvertBio
Little Iowa River	Mower	770th Ave to Upper Iowa R	E.coli
Unnamed Creek	Mower	Unnamed Cr to Little Iowa R	InvertBio
Beaver Creek	Fillmore	Mower-Fillmore Rd to Upper Iowa R	E.coli InvertBio
Pine Creek	Fillmore	T101 R10W S24, north line to MN/IA border	E. coli
Riceford Creek	Houston	T101 R7W S19, south line to T102 R7W S30, north line	InvertBio
Mississippi River	Houston	Root R to MN/IA border	Hg-F; PCB-F; SO_4

[a] Gray shading indicates the waterbody is also crossed by the Proposed Right-of-Way.

[b] E.coli – *Escherichia coli*; Hg-F – mercury in fish tissue; InvertBio – aquatic macroinvertebrate bioassessments; PCB-F – polychlorinated biphenyl in fish tissue; SO_4 – sulfate.

179 MDNR 2018. *350 Important Wild Rice Waters in Minnesota*. Available Online at: https://files.dnr.state.mn.us/wildlife/wildrice/important-wild-rice-waters.pdf?v=2026.03.13-09.57.07. Accessed June 2026.

180 MPCA. 2024. Minnesota's Impaired Waters List. Available online at: https://www.pca.state.mn.us/air-water-land-climate/minnesotas-impaired-waters-list. Accessed June 2026.

Impaired waters crossed by the Proposed Routes are primarily impaired for aquatic life indicators (macroinvertebrate bioassessments), bacteria (E. coli), turbidity, sulfate, and fish tissue contaminants such as mercury (Hg) and polychlorinated biphenyls (PCBs).

Floodplains

The 765 kV Proposed Route crosses Federal Emergency Management Agency (FEMA)-mapped 100-year floodplains primarily along the Mississippi River, Root River, Zumbro River, Upper Iowa River, Bear Creek, Deer Creek, Riceford Creek, and associated tributaries. Approximately 1,523 acres of mapped 100-year floodplain occur within the Proposed Route, with the majority associated with Segment 2 due to its crossing of the Mississippi River and several major tributary systems. **Table 6.8.7-7** provides the total acres of FEMA designated floodplains that would be crossed by the Proposed Routes.[181] The Q-9 Proposed Route only crosses locations mapped as areas of minimal flood hazard. Areas mapped as Zone X represent areas of minimal flood hazard and are not considered part of the FEMA Special Flood Hazard Area. These features are shown on **Figure 19**.

TABLE 6.8.7-7

FEMA Designated 100-Year Floodplain Areas Crossed by the Proposed Route

Proposed Routes	Floodplain Designation	Acreage
Segment 1	100-year - Zone A and AE*	297
Segment 2	100-year - Zone A and AE*	1,226
	TOTAL	**1,523**

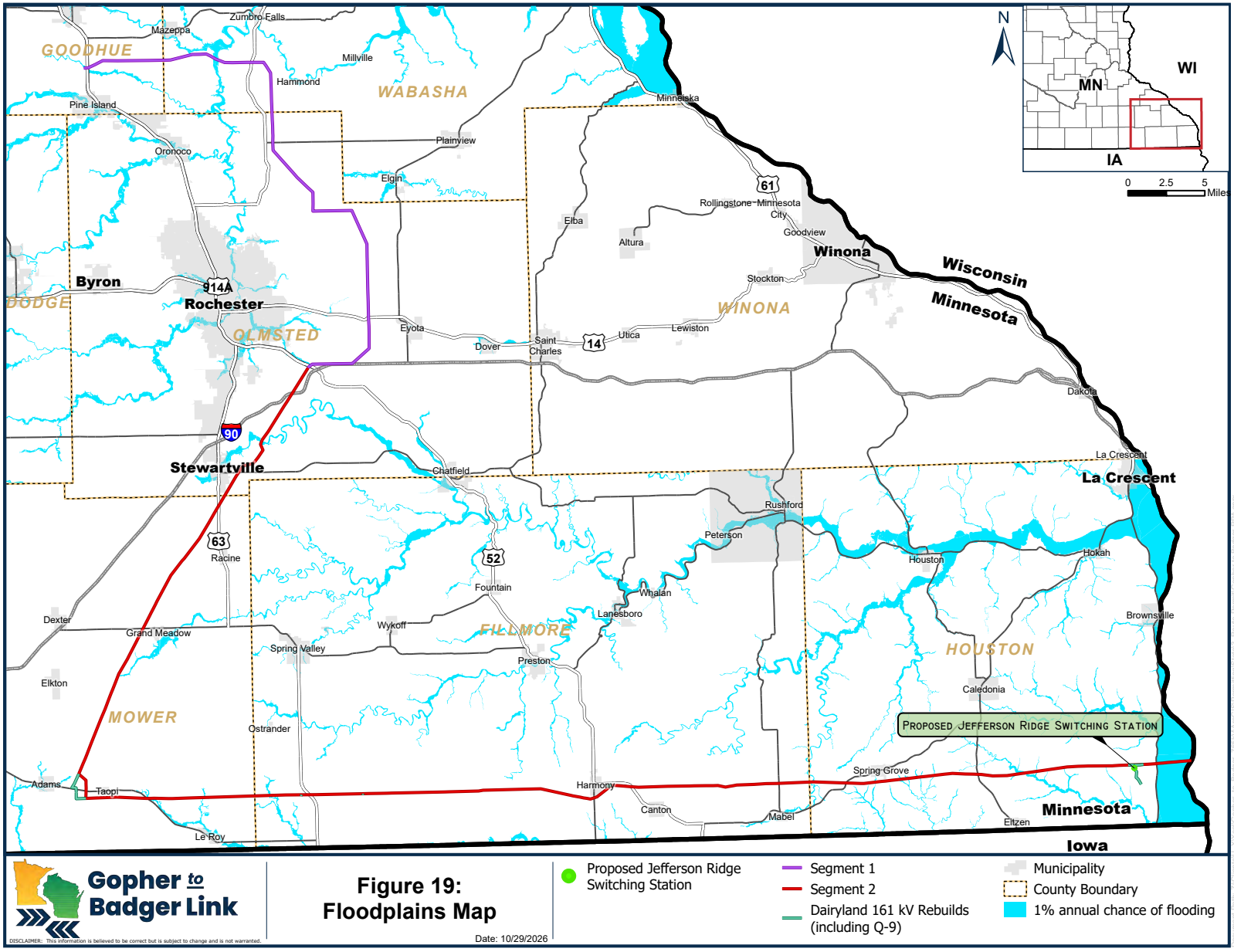
* Note: Zone A indicates the 100-year floodplain or areas with a 1% chance of annual flooding. Zone AE indicates areas within 100-year floodplain for which the base flood elevation has been determined.

Source: FEMA. 2024. National Flood Hazard Layer. Available online at: https://www.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd. Accessed June 2026.

Wetlands

Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated much of the year). Wetlands are part of the foundation of water resources and are vital to water quality. Wetlands detain floodwaters, recharge groundwater supplies, remove pollution, and provide habitat. Wetlands are also economic drivers because of their key role in fishing, hunting, agriculture, and recreation. Wetland types may include marshes, swamps, bogs, and fens, and can vary widely based on differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors.

[181] FEMA. 2024. National Flood Hazard Layer. Available online at: https://www.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd. Accessed June 2026.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Pine Island
Oronoco
Plainview
Elgin
Minneiska
Rollingstone
Minnesota City
Goodview
Winona
Elba
Altura
Stockton
Lewiston
Utica
Saint Charles
Dover
Eyota
Byron
Rochester
Stewartville
Chatfield
Dakota
La Crescent
Rushford
Peterson
Houston
Hokah
Whalan
Lanesboro
Brownsville
Fountain
Wykoff
Spring Valley
Preston
Caledonia
Dexter
Grand Meadow
Elkton
Ostrander
Adams
Taopi
Le Roy
Harmony
Canton
Mabel
Spring Grove
Elzen
Wisconsin
Minnesota
Iowa
PROPOSED JEFFERSON RIDGE SWITCHING STATION
Gopher to Badger Link
DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.
Figure 19:
Floodplains Map
Date: 10/29/2026
Proposed Jefferson Ridge Switching Station
Segment 1
Segment 2
Dairyland 161 kV Rebuilds (including Q-9)
Municipality
County Boundary
1% annual chance of flooding

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The USFWS National Wetlands Inventory (NWI), as updated by the MDNR,[182] was reviewed to assess the presence of wetlands along the Proposed Routes. Wetland complexes and small isolated wetlands are present throughout the Proposed Routes. Many of the wetlands are associated with riverine and floodplain ecosystems or are in localized depressions. Palustrine Emergent (PEM) wetlands comprise approximately 67 percent of all wetlands identified within the Proposed Routes. PEM wetlands along the Project route are primarily comprised of seasonally flooded agricultural drainages, seasonally flooded depressional wetlands, and freshwater emergent and shallow marsh floodplain wetlands associated with waterways. **Table 6.8.7-8** summarizes the wetlands present within the Proposed Routes. These features are shown on **Figure 20**.

TABLE 6.8.7-8

Wetlands within the Proposed Routes

Wetland Feature	Segment 1 (acres)	Segment 2 (acres)	Q-9 (acres)	**TOTAL**
PEM Wetland Community*	281	1,271	<1	**1,553**
Palustrine Scrub-Shrub (PSS) Wetland Community*	16	82	<1	**98**
Palustrine Forested (PFO) Wetland Community*	188	424	0	**612**
Shallow Open Water/Non-vegetated Aquatic Community*	9	49	<1	**58**
Palustrine Forested / Emergent Wetland Complex (PFO/PEM)	0	4	0	**4**
Palustrine Scrub-Shrub / Emergent Wetland Complex (PSS/PEM)	0	1	0	**1**
TOTAL	**495**	**1,832**	**1**	**2,326**

* Source: Cowardin et al. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Available online at: https://www.epa.gov/sites/default/files/2017-05/documents/cowardin_1979.pdf. Accessed June 2026

Wetlands associated with the Mississippi River floodplain and the Upper Mississippi River NWFR form one of the largest contiguous wetland complexes crossed by the Project and are internationally recognized through their designation as a Wetland of International Importance under the Ramsar Convention.[183]

In addition to rivers, streams, and lakes, wetlands may also be designated as Public Waters in Minnesota (Minn. Stat. § 103G.005, subd. 15). As described above, these waters are listed in the PWI and meet the criteria set forth in Minn. Stat.§ 103G.005, subd. 15. The MDNR PWI dataset was reviewed to identify PWI Wetlands within the route options. A Minnesota Public Waters Work Permit is required for any impacts below the ordinary high-water mark within PWI Wetlands on private lands. No public water wetlands are crossed by the Proposed Routes.[184]

182 MDNR. 2024. National Wetlands Inventory Update. Available online at https://www.dnr.state.mn.us/wetlands/nwi_proj.html. Accessed June 2026.

183 Secretariat of the Convention on Wetlands. 2026. *List of Wetlands of International Importance.* Available online at: https://www.ramsar.org/sites/default/files/2023-08/sitelist.pdf. Accessed July 2026.

184 MDNR. 2026. Public Waters Inventory – Basins. Available online at: https://gisdata.mn.gov/dataset/water-mn-public-waters. Accessed June 2026.

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