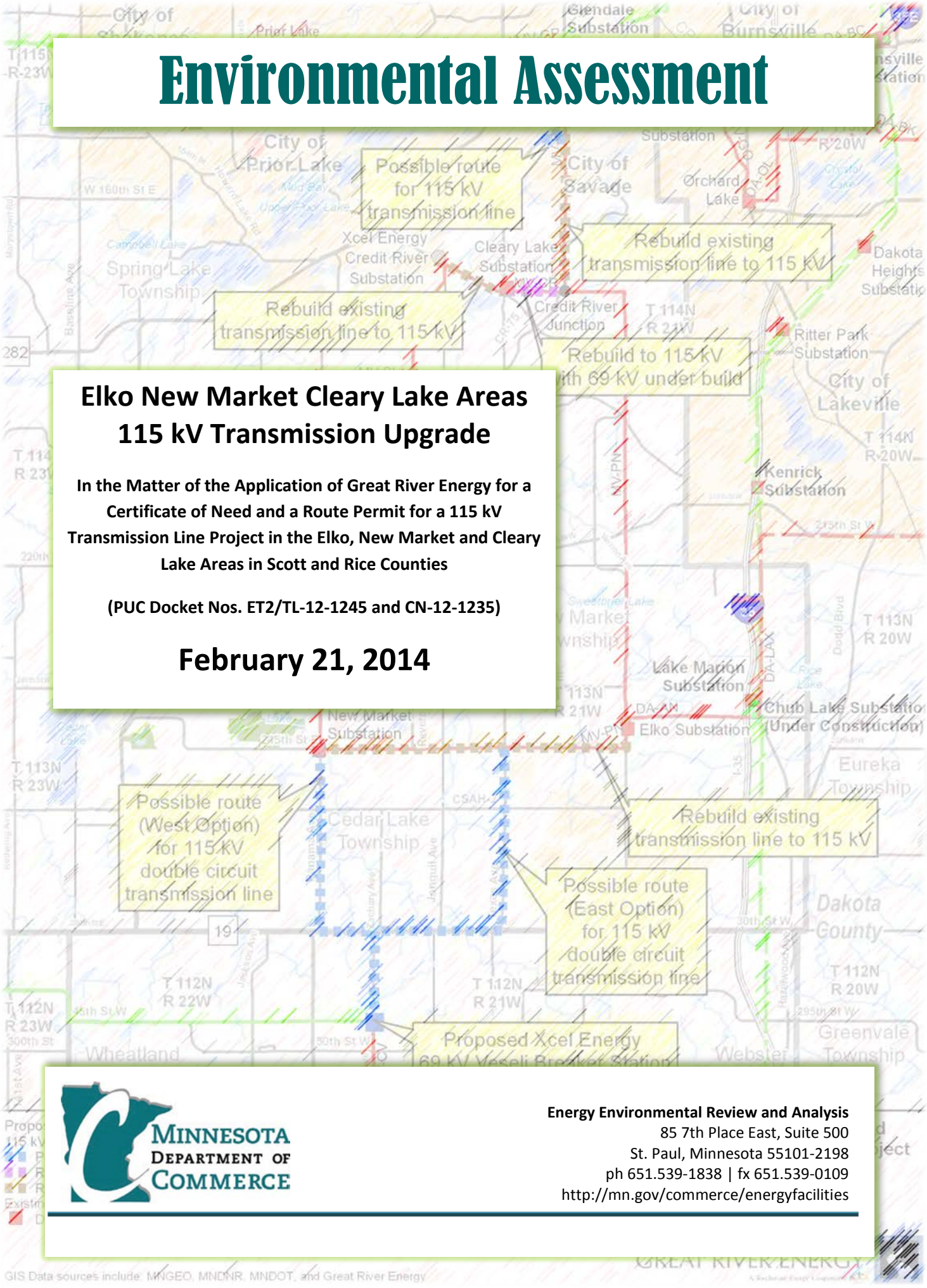
Environmental Assessment



Elko New Market Cleary Lake Areas 115 kV Transmission Upgrade

In the Matter of the Application of Great River Energy for a Certificate of Need and a Route Permit for a 115 kV Transmission Line Project in the Elko, New Market and Cleary Lake Areas in Scott and Rice Counties

(PUC Docket Nos. ET2/TL-12-1245 and CN-12-1235)

February 21, 2014

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Abstract

Great River Energy (GRE or Applicant) has submitted an application for a Certificate of Need (CN) and a High Voltage Transmission Line (HVTL) Route Permit to the Minnesota Public Utilities Commission (Commission) for the Elko New Market Cleary Lake Areas 115 kV Transmission Project (Project). The proposed Project involves converting approximately 11.3 miles of existing 69 kV transmission line to 115 kV capacity. The Project also includes building approximately 5.4 miles of new 115 kV capacity transmission line.

Two separate approvals from the Commission are required for the construction of the Project – a Certificate of Need and a Route Permit. The Applicant submitted a Joint CN and Route Permit Application (Application) to the Commission on June 20, 2013. The Commission issued an Order accepting the Certificate of Need Application as complete and authorizing an Informal Review Process on September 5, 2013. The Commission issued an Order accepting the Route Permit Application as complete and referring the case to the Office of Administrative Hearings on September 9, 2013.

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The Department of Commerce (DOC) Energy Environmental Review and Analysis (EERA) staff is responsible for conducting the environmental review for CN applications submitted to the Commission (Minn. Rule 7849.1200) and the environmental review for route permit applications to the Commission (Minn. Rule 7850.3700). As two concurrent environmental reviews are required, the Department has elected to combine the environmental review for the two applications (Minn. Rule 7849.1900). Thus, this Environmental Assessment (EA) has been prepared to meet the requirements of both review processes.

Persons interested in these matters can register their names on the Project List by contacting the Commission's Public Advisor Tracy Smetana by emailing consumer.puc@state.mn.us, calling 651-296-0406 or calling toll-free at 1-800-657-3782. Official documents for the Project are located at https://www.edockets.state.mn.us/EFiling/search.jsp. Enter "12" and "1235" for the CN docket or "12" and "1245" for the HVTL Route docket as the year and project identification search criteria. Documents of interest can also be found at the EERA website at http://mn.gov/commerce/energyfacilities/Docket.html?Id=32989.

Following the release of this Environmental Assessment, a Public Hearing will be held before an Administrative Law Judge on March 4, 2014, at 1:00 p.m. at the Elko New Market Public Library in Elko New Market and at 6:00 p.m. at Prior Lake High School in Savage.

Preparer: David Birkholz

Acronyms, Abbreviations and Definitions

ACSS	Aluminum Conductor, Steel Supported
AC	Alternate Current
ALJ	Administrative Law Judge
BMP	Best Management Practice
BPA	Bonneville Power Association
Commission	Minnesota Public Utilities Commission
CN	Certificate of Need
dB	decibels
dBA	A-weighted sound level recorded in units of decibels
DC	Direct Current
DG	Distributed Generation
DOC	Department of Commerce
EA	Environmental Assessment
EERA	Energy Environmental Review and Analysis
EMF	Electromagnetic Field
EPA	United States Environmental Protection Agency
ER	Environmental Report
G	Gauss
HVTL	High Voltage Transmission Line
Hz	Hertz
kV	Kilovolt
kV/M	Kilovolt per Meter
kWh	Kilowatt Hour
mA	MilliAmperes
MBS	Minnesota Biological Survey
MDH	Minnesota Department of Health
mG	Milligauss
MHz	Mega Hertz
MnDNR	Minnesota Department of Natural Resources
Mn/DOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MSIWG	Minnesota State Interagency Working Group
MVA	Megavolt Ampere
MW	Mega Watt
NAC	Noise Area Classification
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NEV	Neutral-to-Earth Voltage
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

NWI	National Wetland Inventory
PM	Particulate Matter
ppm	parts per million
PWI	Public Waters Inventory
RAPID	U.S. EMF Research and Public Information Dissemination
ROW	Right-of-Way
SFD	Swan Flight Diverter
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area
SWPPP	Stormwater Pollution Prevention Plan
USCOE	United States Corp of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WCA	Minnesota Wetland Conservation Act
WHO	World Health Organization
WPA	Waterfowl Production Area
WMA	Wildlife Management Area

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1.0 Introduction

Great River Energy made a joint application[1] to the Minnesota Public Utilities Commission for a Certificate of Need and a Route Permit on June 20, 2013, for the construction of the Elko New Market and Cleary Lake Areas 115 kV Upgrade Project. The CN Application was filed pursuant to Minnesota Statute 216B.243 and Minn. Rule 7849.0020-0400, and the Route Permit Application was filed pursuant to Minnesota Statute 216E.04 and Minn. Rule 7850.2800-3900 under the Alternative Process.

The Energy Environmental Review and Analysis staff is tasked with conducting environmental review on applications for certificate of need and route permits. The intent of the environmental review process is to inform the public, the applicant, and decision-makers about potential impacts and possible mitigations for the proposed project and its alternatives.

This document meets the environmental review requirements of both the certificate of need procedures and the route permit process by a) providing information in Section 2 on the regulatory framework for the certificate of need and route permit processes; b) describing the proposed Project in Section 3; c) evaluating alternatives for meeting the stated need in Section 4; d) summarizing the potential effects of the routes on people and the environment in Section 5; and analyzing the relative merits of the proposed and alternative routes in Section 6.

1.1 Project Description

The Project consists of two distinct parts (See **Figures 1 and 2**). The northern part begins in the city of Savage and includes plans to:

- Rebuild approximately 3.5 miles of the existing Great River Energy single circuit 69 kV MV-PN line to 115 kV standards from Prior Lake Junction south along CR 75 to Credit River Junction; or alternately, detouring a portion of the line along CR 27 (Dakota Avenue), see **Figure 1**;
- Rebuild approximately 0.9 mile of the existing Great River Energy single circuit 69 kV MV-CR line to single circuit 115 kV standards with 69 kV underbuild from Credit River Junction west to MVEC's Cleary Lake Substation; and
- Rebuild approximately 1.3 miles of the existing Great River Energy single circuit 69 kV MV-CR line to 115 kV standards northwest from MVEC's Cleary Lake Substation to Xcel Energy's Credit River Substation.

The southern part is west of the city of Elko New Market and involves:

[1] "Application to the Minnesota Public Utilities Commission for a Certificate of Need and Route Permit, Elko New Market and Cleary Lake Areas Project, 115 Kilovolt Transmission Rebuilds and New 115 Kilovolt Transmission Line" (hereafter Application) June 20, 2013, http://mn.gov/commerce/energyfacilities/Docket.html?Id=32989

- Rebuilding approximately 5.6 miles of the existing Great River Energy single circuit 69 kV MV-PN (north of Elko Substation to New Market Substation) line to 115 kV standards from the intersection of County Road 62 and Natchez Avenue, south along Natchez to 250th Street, then west to Panama Avenue); and
- Constructing a new double circuit 115 kV transmission line from the MV-PN line to Xcel Energy's Veseli 69 kV breaker station, either along a 5.4 mile West Option along Panama Avenue, east on 280th Street and south on Halstad Avenue, or along an 5.6 mile East Option along Texas Avenue, west on 280th Street and south on Halstad Avenue.

The route in the southern portion contains expanded route width as requested by the Applicant during scoping.[2] GRE requested an expanded route width at either of two possible route intersections with the Brookings to Hampton 345 kV Transmission Line with a 250 foot radius at the intersection. Also, in conjunction with public comment, GRE requested a widened (additional 500 feet) route width south of 250th Street along Texas Avenue to accommodate the households immediately across the avenue from one another (see **Figure 2**). These route width exceptions have been included in the EA as replacements for those in the original application.

1.2 Project Location

The north end of the Project is located in northeastern Scott County and passes through the city of Savage and Credit River and Spring Lake townships. The south end of the Project is in southeastern Scott County and passes through New Market Township, Elko New Market and Cedar Lake Township. It also passes through northwestern Rice County, through Webster Township and Wheatland Township. **Table 1** below summarizes the proposed Project location.

Table 1. Project Locations

County	Township or City	Township/Range	Sections
Scott	Savage	T115N R21W	28, 29, 32, 33
	Credit River Twn.	T114N R21W	4, 5, 7, 8, 9
	Spring Lake Twn.	T114N R22W	1, 12
Scott	New Market Twn.	T113N R21W	15, 16, 17, 19, 21, 22, 30, 31, 32
	Elko New Market	T113N R21W	20
	Cedar Lake Twn.	T113N R22W	13, 14, 22, 23, 24, 26, 27, 34, 35, 36
Rice	Webster Twn.	T112N R21W	5, 6
	Wheatland Twn.	T112N R22W	1, 2, 11, 12

[2] Great River Energy Scoping Comments, October 15, 2013, eDockets no. 201310-92584-02

Figure 1. Northern Project Area

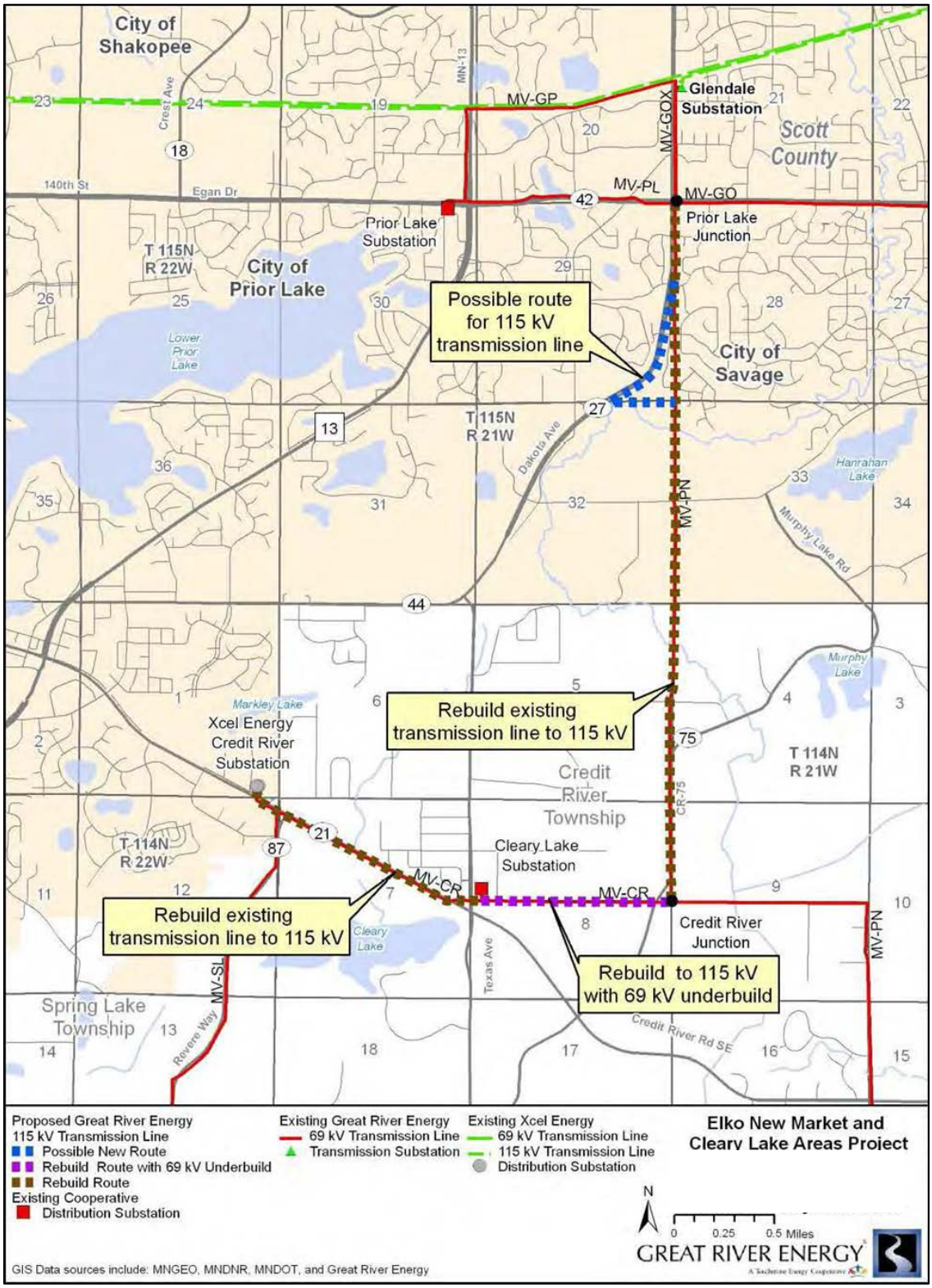
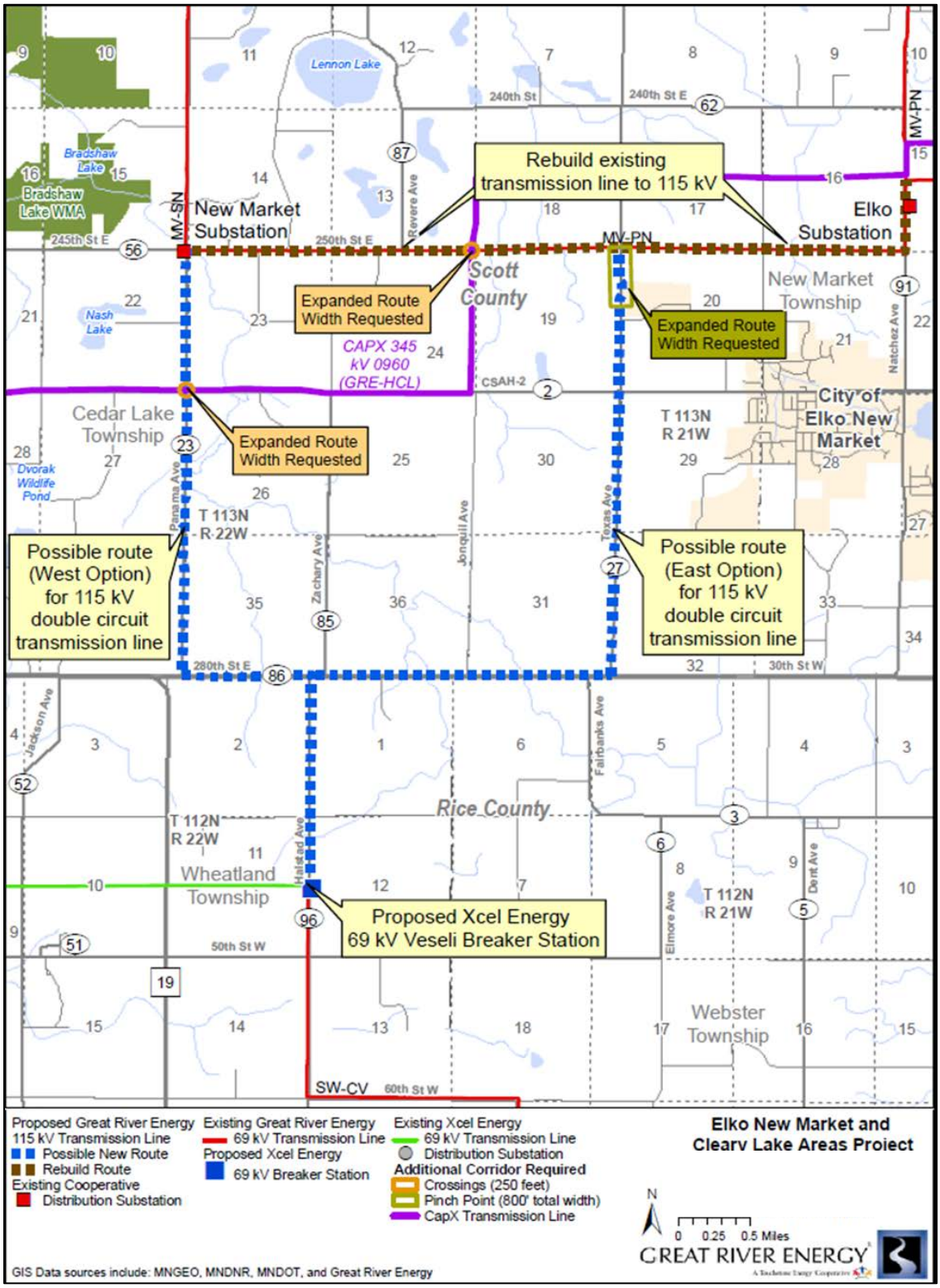


Figure 2. Southern Project Area



The EA analyzes the comparative impacts of the proposed route and the proposed route with the CR 27 variation in the northern part. In the southern part, the EA analyzes the proposed route and both the west and east options the Applicant has defined to connect the New Market Substation to the Veseli Breaker Station.

1.3 Project Purpose

The Applicant has designed and proposed this Project to address needs first identified in the *Minnesota Biennial Transmission Projects Report* from 2009. Great River Energy's most recent annual Transmission System Assessment Study also identified load-serving deficiencies, both low voltage and transmission system overloads, in the extensive Scott-Faribault 69 kV system. A detailed study of this 69 kV system, known as the New Prague Area Study,[3] was completed. This study identified the need to connect the Scott-Faribault System with the 69 kV Cleary-Elko System by 2016 to address these deficiencies. Further, within the Cleary-Elko System, two existing 69 kV lines are of immediate concern for thermal overload and must be rebuilt, even if the Cleary-Elko and Scott-Faribault systems were not connected.[4]

Depending on the duration of a low voltage condition, equipment such as electronic power supplies could malfunction or fail when output voltage drops below certain levels, damaging customer equipment such as process controls, motor drive controls, and automated machines. Thermal overload on transmission lines could damage facilities due to excessive heat and cause safety concerns due to unsafe ground clearance. In addition, overload on facilities that operate at a voltage greater than 100 kV is a violation of North American Electric Reliability Corporation (NERC) standards.

The Applicant notes the current need with the two lines in the Cleary-Elko System could be addressed by rebuilding the 69 kV transmission lines and constructing a 69 kV double circuit transmission line between the New Market Substation and the proposed Veseli Breaker Station. However, GRE suggests the Cleary-Elko System will need to be upgraded to 115 kV operation by 2022, so has proposed the current 115 kV capacity build-out.

1.4 Sources of Information

Much of the information used in this Environmental Assessment is derived from documents prepared by Great River Energy, including the Certificate of Need and Route Permit Application. Discussion of Electromagnetic Field (EMF) issues came primarily from the white paper developed by the Interagency Task Force led by the Minnesota Health Department, the National Institute for Environmental Health and the World Health Organization. Additional information comes from earlier EERA environmental review documents in similar dockets, other state agencies such as the Departments of Natural Resources and Transportation, and additional research. Firsthand information was gathered from site visits along the proposed line.

[3] Application at Appendix H
[4] Id. at 5-1

2.0 Regulatory Framework

In Minnesota, most high voltage transmission line projects go through a two stage regulatory process. First, application is made to the Minnesota Public Utilities Commission for a Certificate of Need. If a CN is granted, the utility must then obtain a Route Permit from the Commission that designates a specific route for the line.

2.1 Certificate of Need

Before any large HVTL can be constructed in Minnesota, the Commission must determine that they are necessary and in the best interest of the state. The certificate of need process includes environmental review and public hearings, and typically takes 12 months. This process is the only proceeding in which a no-build alternative and the size, type, timing, system configuration and voltage of the proposed project will be considered.

A copy of the certificate of need application, along with other relevant documents, can be reviewed at the Energy Facility Permitting web page at:

http://mn.gov/commerce/energyfacilities/Docket.html?Id=32989

The Energy Environmental Review and Analysis staff is responsible for administering the environmental review process. The Commission is responsible for determining if the transmission lines proposed are needed.

Potential routes that the transmission lines would follow, if approved, are put forth and evaluated in the HVTL route permit proceeding (see below). The transmission line routes will be determined through the HVTL route permit process, which is proceeding concurrently with the certificate of need process.

Environmental Review

The environmental review process under the certificate of need procedures includes public information/scoping meetings and the preparation of an environmental review document, the Environmental Report (ER) (Minn. Rule 7849.1200). The environmental report is a written document that describes the human and environmental impacts of the proposed project and alternatives to the project, and methods to mitigate anticipated adverse impacts. The ER must be prepared before the Commission can make a decision on the certificate of need application.

2.2 Route Permit

Minnesota Statutes Section 216E.03, subd. 2, provides that no person may construct an HVTL without a route permit from the Commission. An HVTL is defined as a transmission line of 100 kV or more and greater than 1,500 feet in length in Minnesota Statutes Section 216E.01, subd. 4. The lines in the Application are proposed to be built to 115 kV specifications and are considered HVTLs, therefore a route permit is required prior to construction.

Great River Energy submitted the HVTL route permit application for the proposed transmission line upgrades pursuant to the provisions of the Alternative Permitting Process outlined in Minn. Rule 7849.2900. The alternative permitting process includes environmental review and public hearings, and typically takes six months.

A copy of the HVTL route permit application, along with other relevant documents, can be reviewed at the Energy Facility Permitting web page at:

http://mn.gov/commerce/energyfacilities/Docket.html?Id=32989

The EERA staff is responsible for evaluating the HVTL route permit application and administering the environmental review process. The Commission is responsible for selecting the transmission lines routes and issuing the HVTL route permit.

Environmental Review

Environmental review under the alternative permitting process includes public information and scoping meetings and the preparation of an environmental review document, the Environmental Assessment (EA) (Minn. Rule 7850.3700). The environmental assessment is a written document that describes the human and environmental impacts of the transmission line project (and selected alternative routes) and methods to mitigate such impacts.

The Deputy Commissioner of the Department of Commerce determines the scope of the EA. The EA must be completed and made available prior to the public hearing.

2.3 Combining Processes

Minnesota Rule 7849.1900, Subpart 1, provides that in the event an applicant for a certificate of need for a HVTL applies to the Commission for a HVTL route permit prior to the time the EERA staff completes the environmental report, the Department may elect to prepare an environmental assessment in lieu of the required environmental report. If the documents are combined, EERA staff includes in the EA the analysis of alternatives required by part 7849.1500, but is not required to prepare an environmental report under part 7849.1200.

As two concurrent environmental reviews are required – one for the CN application and one for the route permit application – EERA elected to combine the environmental review for the two applications as noted above. Thus, this EA has been prepared to meet the requirements of both review processes.

2.4 Scoping Process

The Commission and EERA sent notice of the Public Information and Scoping meeting to those persons on the general list, the agency technical representatives list and the project contact list. Notice of the public meeting was also published in the local newspapers.

The Commission and EERA held public information and environmental assessment scoping meetings on October 1, 2013, at the Public Library in Elko New Market and at Prior Lake High School in Savage to discuss the project with the public and gather public input on the scope of the Environmental Assessment to be prepared. Approximately 25 people attended over the two sessions. Comments were recorded by a court reporter at the meeting. Additionally, the public was given until October 15, 2013, to submit written comments.

EERA received written comments from five federal and state agencies, the Applicant and 13 residents.[5] Several people also raised topics at the scoping meetings consistent with the draft scoping document, which described issues that EERA would typically include in an EA. Particularly, the public expressed interest in issues about possible health effects including EMF, aesthetics, property values and natural resource impacts. Alternative routes, alternative route segments and modifications to the GRE's proposed alignment were also discussed during the scoping meeting and in comments received during the scoping comment period.

After consideration of the public comments, the DOC Deputy Commissioner issued his Scoping Decision on November 27, 2013. A copy of this order is attached in **Appendix D**. Items and issues from public comments including route alternative recommendations, along with the typical HVTL routing impacts, were incorporated into the Scoping Decision.

2.5 Public Hearing

The Commission is required by Minn. Rule 7849.5710 subp 1, to hold a public hearing once the EA has been completed. This hearing is scheduled for March 4, 2014, in the project area, and will be conducted by an Administrative Law Judge (ALJ). Interested persons may comment on the EA or other issues at the public hearing. The ALJ will ensure that the record created at the hearing is preserved and will provide the Commission with Findings of Fact and a recommendation on the route permit.

Comments received on the EA become part of the record in the proceeding, but EERA staff is not required to revise or supplement the EA document (Minn. Rule 7850.3700 subp. 8). A final decision on a route permit will be made by the Commission at an open meeting after the public hearing and the ALJ Report, depending on scheduling opportunities.

The Commission's obligation is to determine the need of the project (including size, type and timing of any solution) and, if needed, choose a route that minimizes adverse human and environmental impacts while insuring continuing electric power system reliability and integrity, and also while insuring that electric energy needs are met and fulfilled in an orderly and timely fashion. The route permit will contain conditions specifying construction and system standards (see sample Route Permit in **Appendix E**).

[5] Agency Comments, eDockets no. 201310-92747-02; Applicant Comments, -04 ; Public Meeting Comments, -06; Public Written Comments, -08; October 15, 2013

If issued a certificate of need and route permit by the Commission, GRE may exercise the power of eminent domain to acquire the land necessary for the project pursuant to Minnesota Statute 216E.12 and Minnesota Statute 117.

2.6 Other Permits

The Public Utilities Commission HVTL Route Permit is the only approval required for routing of high voltage transmission lines, but other permits may be required for certain construction activities, such as river crossings. **Table 2** includes a list of permits that may be required for GRE to complete this project.

Table 2. Required and Potential Permits

Permit	Jurisdiction
Federal	
Clean Waters Act Section 404 Permit	U.S. Army Corps of Engineers
State	
Certificate of Need	Public Utilities Commission
Route Permit	Public Utilities Commission
License to Cross Public Waters	MnDNR
Utility Permit	Mn/DOT
Construction Stormwater Permit	MPCA
Local	
Wetland Conservation Act Certification	Scott and Rice Counties
Road Access Permit	Counties, Cities and Townships

Once the Commission issues a Route Permit, local zoning, building and land use regulations and rules are preempted per Minnesota Statute 216E.10, subd 1. However, the Applicant is still required to obtain relevant permissions, such as road crossing permits.

2.7 Applicable Codes

The transmission line, regardless of route location, must meet all requirements of the National Electrical Safety Code (NESC) and the Rural Utilities Service (RUS) Design Manual for High Voltage Transmission Lines. These standards are designed to protect human health and the environment. They also ensure that the transmission line and all associated structures are built from high quality materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment provided normal routine operational and maintenance is performed.

Utilities must comply with the most recent edition of the National Electrical Safety Code, as published by the Institute of Electrical and Electronics Engineers, Inc., and approved by the American National Standards Institute, when constructing new facilities or reinvesting capital in existing facilities. See Minn. Statute 326B.35 and Minn. Rule 7826.0300 subp 1.

The NESC is a voluntary utility developed set of standards intended to ensure that the public is protected. The NESC covers electric supply stations and overhead and underground electric supply and communication lines, and is applicable only to systems and equipment operated by utilities or similar systems on industrial premises. For more information, go to http://standards.ieee.org/faqs/NESCFAQ.html#q1. The RUS provides leadership and capital to "upgrade, expand, maintain, and replace America's vast rural electric infrastructure." For more information, go to http://www.rurdev.usda.gov/UEP_Homepage.html.

2.8 Issues Outside the Scope of the EA

The EA will not consider the following:

- Any route or substation alternatives not specifically identified in the scoping decision;
- Any system alternatives not specifically identified in the scoping decision;
- The impacts of specific energy sources, such as carbon outputs from coal-generated facilities; or
- The manner in which landowners are paid for transmission rights-of-way easements.

3.0 Proposed Project

The Project is located in the city of Savage and Credit River, New Market and Cedar Lake townships in Scott County and Webster and Wheatland townships in Rice County.

GRE has requested a route width of 300 feet for the Project. In the case of the existing 69 kV lines, this anticipates the route at 150 feet on either side of the centerline. However, GRE would construct the rebuild of the existing 69 kV line on the current centerline and within the existing right-of-way (ROW) where possible. For easements through regional parks, Three Rivers Park District (TRPD) has stated it would not allow any expansion of ROW **(see Appendix C)**. Where new right-of-way is required, GRE anticipates a ROW of 70 feet[6] for new 115 kV construction.

3.1 Project Segments

The Applicant proposes to rebuild existing lines along the current alignments to 115 kV specifications, with one possible alternative in the northern portion. There are two possible routes proposed for the new double circuit transmission line connecting the New Market Substation to the Veseli Breaker Station in the southern portion. Specific segments of the line were identified and described in the Application[7] and reproduced for the reader's convenience below (see **Figures 1 and 2** to locate the specified lines):

Cleary Lake Area Rebuild MV-PN Line
Approximately 3.5 miles of the existing Great River Energy single circuit 69 kV MV-PN line will be rebuilt to 115 kV standards. This line begins at Prior Lake Junction, located in the southeast corner of the intersection of Eagan Drive (County State Aid Highway 42) and Dakota Avenue (County State Aid Highway 27), and runs south along County State Aid Highway (CSAH) 27 and the section line for about 1.0 mile. The transmission line leaves the highway and continues along the section line for approximately 1.75 miles until it meets up with a north/south portion of Murphy Lake Boulevard (CR 75) and then continues south on the section line approximately 0.75 mile to Credit River Junction, which is located approximately 350 feet east of Murphy Lake Boulevard on 175th Street East.

Cleary Lake Area Rebuild MV-PN Line with Possible Deviation
On the very north end of the Project, a deviation of approximately 0.6 mile to the west of the existing Great River Energy MV-PN 69 kV line is a possible route because the existing Great River Energy easement in this area is only 60 feet wide (rather than the Great River Energy standard of 70 feet). There are a number of homes very close to the line and the terrain contains several ponds and a ravine that would make rebuilding the line somewhat difficult. Beginning on the north side of Dufferin Drive, the line would run approximately 280 feet west to the east side of (CSAH) 27, then follow CSAH 27 in a southerly direction approximately 0.3 mile, then straight south approximately 0.1 mile along a property line, then east approximately 0.2 mile along another property line to the existing MV-PN line.

[6] Application at 8-2
[7] Id. at 1-7 to 1-9

Cleary Lake Area Rebuild MV-CR Line

Approximately 0.9 mile of the existing Great River Energy single circuit 69 kV MV-CR line will be rebuilt to single circuit 115 kV standards with 69 kV underbuild between Credit River Junction and the MVEC Cleary Lake Substation. From Credit River Junction, the line runs west on 175th Street East for about 0.5 mile and to the end of 175th St., and then west cross country for approximately 0.4 miles into the MVEC Cleary Lake Substation.

Approximately 1.3 miles of the existing Great River Energy single circuit 69 kV MV-CR line will be rebuilt to single circuit 115 kV standards between the MVEC Cleary Lake Substation and Xcel Energy's Credit River Substation. From the Cleary Lake Substation, the transmission line crosses over Texas Avenue (CSAH 27) and then runs northwest adjacent to Eagle Creek Avenue SE (CSAH 21) for 1.2 miles to just past the intersection of CSAH 21 and 170th Street East. The transmission line then runs straight north, for about 0.1 mile across Eagle Creek Ave. (CSAH 21) and Credit River Road SE, and into Xcel Energy's Credit River Substation, on the east side of Welcome Avenue SE.

Elko New Market Area Rebuild MV-PN Line

Approximately 5.6 miles of the existing Great River Energy single circuit 69 kV MV-PN (north of Elko Substation to New Market Substation) transmission line will be rebuilt to 115 kV standards. From the intersection of County Road (CR) 62 (245th St. E) and County Highway 91 (Natchez Avenue), this line runs south along Natchez Avenue for approximately 0.6 miles, then turns and heads west for 5.0 miles along 250th St. E to the New Market Substation (owned by MVEC) at the intersection of 250th St. E and CSAH 23.

Elko New Market Area New Transmission Line

<u>West Option (5.4 miles)</u>

One possible route for the new double circuit transmission line (built to 115 kV standards) to the Veseli Breaker Station would run from the MVEC New Market Substation (at the intersection of 250th St. E and CSAH 23) south along CSAH 23 for 3.0 miles, then east along CSAH 86 for 0.9 mile, then south along Halstad Avenue for about 1.5 miles to the Xcel Energy Veseli Breaker Station.

<u>East Option (6.5 miles)</u>

A second possible route for the new double circuit transmission line (built to 115 kV standards) to the Veseli Breaker Station would run from the Great River Energy MV-PN 69 kV line (at the intersection of 250th Street and CSAH 27 (Texas Avenue)), south on CSAH 27 for 3.0 miles to CSAH 86, then west along CSAH 86 for 2.0 miles, then south along Halstad Avenue for 1.5 miles to the Xcel Energy Veseli Breaker Station.

3.2 Right-of-Way Requirements

The Applicant is requesting a ROW width up to 70 feet wide. The Applicant, however, would rebuild the transmission lines for the project within the existing ROW wherever reasonably possible.

When the line is parallel to a roadway, poles would generally be placed approximately five feet outside the public right-of-way. Therefore, a little less than half of the line right-of-way would share the existing road right-of-way, resulting in an easement of lesser width required from the landowner.

The Applicant proposes to replace existing structures with similar structures. See **Table 3** for dimensions of the proposed structures and general ROW requirements for each type.[8]

Right-of-Way Acquisition

Because the Applicant intends to rebuild the transmission line within the existing right-of-way, the need for new right-of-way acquisition would be limited. All existing easements would be evaluated to determine if the project can be built without obtaining additional land rights. If an easement would accommodate the project, the right-of-way agent would still work with the landowner in order to address any construction needs, impacts, damages or restoration issues.

To the extent new right-of-way acquisition is necessary, the evaluation and acquisition process would include title examination, initial owner contacts, survey work, document preparation and purchase. Most of the time, utilities are able to work with the landowners to address their concerns and an agreement is reached for the utilities' purchase of land rights. In some instances, a negotiated settlement cannot be reached and the landowner may choose to have an independent third party determine the value of the rights taken. Such valuation is made through the utility's exercise of the right of eminent domain pursuant to Minnesota Statute 117.

3.3 Project Construction and Maintenance

The Applicant intends to construct the majority of the upgraded 115 kV lines with single pole wood structures spaced approximately 350 to 400 feet apart. These spans are longer than the existing 69 kV spans, so fewer poles would be required. Both single circuit and double circuit structures will typically range in height from 52 to 92 feet above ground, depending upon the terrain and environmental constraints (such as highway crossings, river and stream crossings, and required angle structures). The average diameter of the wood structures at ground level is anticipated to be 20 inches wide.

Sections of the existing lines have distribution underbuild. In these circumstances, the spacing would need to be closer, approximately 250 to 350 feet apart, to accommodate the distribution.

H-Frame structures may be used in areas where longer spans are required to avoid or minimize impacts to wetlands or waterways. Span lengths in those circumstances would average 600 to 800 feet, up to 1,000-feet in some cases. Structure heights would typically range from 52 to 75 feet above ground, with taller structures required for exceptionally long spans and in circumstances requiring additional vertical clearance to meet the National Electrical Safety Code (NESC) and other agency requirements.

[8] See Application at 4-6 for diagrams of the potential pole types; 4-7 for photographs of typical structures.

Table 3. Pole Dimensions and General ROW Requirements

Line Type	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Foundation	Foundation Diameter (feet)	Span Between Structures (feet)
115 kV Single circuit or Double circuit	Single pole, horizontal post or horizontal braced post insulator	Wood, laminated wood, galvanized steel or weathering steel	70	52-92	Direct embedded for tangents and guyed or self-supporting for angle/ dead-end structures	Direct embedded with rock backfill, 4 foot diameter culvert or 5 to 8 foot concrete	350 to 400
115 kV Single circuit	Two pole or H-Frame	Wood, laminated wood, galvanized steel or weathering steel	70	52-75	Direct embedded for tangent H-Frame and guyed or self-supporting for angle/ dead-end structures	Direct embedded with rock backfill, 4 foot diameter culvert or 5 to 8 foot concrete	600 to 1000
115 kV Single circuit with 69 kV or Distribution Underbuild	Single pole, horizontal post or braced post with underbuild crossarm	Wood, laminated wood, galvanized steel or weathering steel	70	52-92	Direct embedded for tangents and guyed or self-supporting for angle/ dead-end structures	Direct embedded with rock backfill, 4 foot diameter culvert or 5 to 8 foot concrete	250 to 350

Permit conditions require that the proposed transmission line will be designed to meet or surpass relevant local and state codes including the National Electric Safety Code and North American Electric Reliability Corporation.

The 115 kV conductor proposed for the Project will be 795 kcmil 26/7 Aluminum Conductor Steel Supported (ACSS).

Construction

Construction cannot begin until all federal, state and local approvals are obtained, property and rights-of-way are acquired, soil conditions are established and design is completed. The precise timing of construction would take into account various requirements that may be in place due to permit conditions, system loading issues, available workforce and materials.

Actual construction would follow standard construction and mitigation practices, addressing right-of-way clearance, staging, erecting transmission line structures and stringing transmission lines. Construction and mitigation practices to minimize impacts would be based on the proposed schedule for activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain and other practices. Some construction restrictions and requirements will be reviewed in discussion concerning mitigation later in this document.

Maintenance

Annual operating, inspection and maintenance costs for transmission lines in Minnesota and the surrounding states vary. Past applications and environmental reviews have estimated costs at approximately $300 to $500 per mile. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used and the age of the line.

GRE's estimated annual cost of ROW maintenance and operation for transmission lines (69 kV to 500 kV) in Minnesota currently averages about $2,000 per mile.[9] The Applicant's practice provides for the inspection of 115 kV transmission lines every two years. ROW clearing practices include a combination of mechanical and hand clearing, along with herbicide application where allowed. Noxious weed control with herbicides around structures and anchors is planned on a two-year cycle.

Facilities for this Project will primarily be routed along road ROW, which would minimize the tree maintenance required.

3.4 Project Implementation

The Applicant anticipates a summer 2016 in-service date. Construction would be expected to begin in spring 2015.[10] This schedule is based on information known as of the date of the application filing and upon planning assumptions that balance the timing of implementation with the availability of crews, material and other practical considerations. This schedule may be subject to adjustment and revision as further information is developed.

Project Costs

Single pole construction costs are estimated at $498,000 per mile, H-Frame construction at approximately $550,000 per mile and the double circuit construction costs at approximately $747,000 per mile.[11]

There may be areas where construction is more difficult, considering access issues or greater span lengths employed to avoid sensitive features. In these areas the use of construction mats or specialized construction vehicles to minimize environmental impacts during line construction may be required and could increase costs by $50,000 or more per mile.

[9] Application at 8-6
[10] Id. at 4-10
[11] Id. at 4-9

Table 4. Estimated Project Costs (2014 Dollars)[12]

Project Phase	Costs
Planning and Permitting	$388,000
Design and Surveys	$1,487,000
Procurement of Materials and Easements	$5,178,000
Construction	$7,330,000
Closeout (Restoration and Field Verification)	$380,000
Total	**$14,763,000**

[12] Application at 4-8 to 4-9

4.0 Alternatives to the Proposed Project

In addition to need, the CN process reviews possible alternatives to the proposed project that may be able to fill that need. A general description of these alternatives is required per Minn. Rule 7849.1500, subp. 1 (B). The requirements of this rule include an investigation into the feasibility of the following alternatives:

- The no-build alternative
- Demand side management
- Purchased power
- Facilities of a different size or type
- Upgrading of existing facilities
- Generation rather than transmission
- Renewable energy sources

This section discusses the feasibility and availability of potential alternatives to the transmission line which could meet or eliminate the need for the proposed project.

4.1 No Build Alternative

Under the no build alternative none of the existing structures would be replaced and the transmission line would continue to be operated at 69 kV. There would be no new transmission construction or improvement to the Veseli Switching Station.

In that scenario, with no other alternatives considered, low voltage and overloading conditions could arise throughout the study region. Load growth in the affected load area and Project area would strain the system and introduce vulnerability to localized voltage collapses. The Application describes load area peak demand as already exceeding system capacity.[13] As the load increases in the area, the overloads and low voltages would progressively get worse.

Depending on the duration of a low voltage condition, equipment such as electronic power supplies could malfunction or fail when output voltage drops below certain levels, damaging customer equipment such as process controls, motor drive controls, and automated machines. Thermal overload on transmission lines could damage the facilities due to excessive heat and could also cause safety concerns due to unsafe ground clearance of transmission lines.

The Project would rebuild aged infrastructure, thereby improving reliability of the system and reducing system losses. Under the no-build option, this aged infrastructure will be the source of poor reliability and system losses in the affected load area. This is not a feasible alternative and does not address the voltage support issues that are currently being experienced in the area. Under this alternative it is likely that there would be a negative effect on the local economy due to the unreliable electrical service in the area.

[13] Application at 5-35

4.2 Demand Side Management

The proposed Project adds approximately 37 MW of capacity to the local system, which would need to be replaced with Demand Side Management (DSM). The alternative would use a slate of energy conservation measures attempting to ultimately reduce load in the area to a level allowing the current system to operate in a reliable manner. This conservation effort would most likely be phased in and would be above and beyond the companies' current efforts. In addition, any load growth occurring in the area would also need to be met through aggressive conservation effort.

GRE has obtained significant energy savings from various conservation programs, including the Conservation Improvement Program (CIP), as required by Minnesota Statutes 216B.241. While the company anticipates futures savings from the continuation of these efforts, conservation alone will not be sufficient to address the reliability issue that exists in the area. Demand in the study area is projected to increase well beyond projected reductions realized from the Applicant's DSM programs. Thus, while energy conservation is a tool to help in meeting future needs, it will not be able to address issues related to meeting existing demand at the levels indicated here.

A response from the Department's Energy Regulation and Planning analyst, Dr. Steve Rakow, in the Glencoe-Waconia docket applies as well to this situation:

1. The load reduction is too large to be able to be obtained through energy conservation projects in a small geographic area …

2. The load reduction is needed almost immediately. Even if energy conservation over time could provide the load reduction, it would not be able to provide it in a timely manner.

Thus, while energy conservation is an effective alternative for meeting future needs, it will not be able to address issues related to meeting existing demand at the levels indicated above. In summary, the required load reductions are too large, in too small an area, and required to be in place too soon for conservation to be a reasonable alternative.[14]

This is not a feasible alternative given that an unrealistic amount of conservation would have to be achieved in the project area to meet the needs that would otherwise be met by the proposed project.

4.3 Purchased Power

Another alternative generally reviewed in a Certificate of Need case is whether the Applicant could purchase power to meet the increased load growth in the area. Typically, this would be more relevant in a power plant application. In this transmission application, purchased power would not solve any system inadequacies in the area. Power, produced or purchased, would have to be transferred and delivered along an arguably inadequate transmission system.

[14] "Environmental Assessment: Glencoe-Waconia Transmission Project," PUC Dockets CN-09-1390 and TL-10-249, July 2011, at 18-19

This is not a feasible alternative as there would still be voltage support issues in the area and it is likely that GRE would have to upgrade the transmission line in order to deliver purchased power to the area.

4.4 Facilities of a Different Size or Type

Size in the context of the certificate of need application refers to the quantity of power transfers that the transmission infrastructure improvements enable, while type refers to the transformer nominal voltages, rated capacity, surge impedance loading, and nature (AC or DC) of power transported.

Transmission lines of other voltages will not serve the need for this area; 69 kV lines will not meet the future load growth needs in the area; 161 kV lines would require new 115/161 kV transformers to be able to connect them to the existing transmission system, a significantly more expensive option when compared to 115 kV; 230 kV and 345 kV lines are generally used for transferring large amount of power over long distances or providing a back bone for 161 kV or 115 kV transmission systems and are therefore not appropriate options.

Use of a DC design is not a realistic option for short, low voltage transmission lines. DC transmission is used generally to move electricity long distances, and doesn't have local substation support that is required to meet the local need.

The Applicant addressed several configurations including analysis of various start and endpoints before deciding on the current proposal. These are discussed in detail in its "New Prague Area Load Serving Study" completed in March 2013.[15]

4.5 Upgrading Existing Transmission Lines

The proposed Project utilizes this approach in part, upgrading the existing 69 kV to 115 kV. The Applicant considered updating these 69 kV lines, which would be a temporary solution as GRE anticipates the load growth in the area would require a 115 kV upgrade within 15 years or less. GRE also considered upgrading the Scott-Faribault System but determined that option would be insufficient to address Project area transmission deficiencies.

4.6 Generation Alternatives

Any generation alternative to the transmission line would be required to generate approximately 37 MW of capacity for delivery to the area. It is unlikely that new generation could totally eliminate the need for rebuilding the existing 69 kV system. In order to reduce or minimize the need for the proposed upgrades to the transmission system, the generation would have to be local or distributed generation (DG). This DG would require multiple units placed strategically to mitigate specific overloads and low voltages.

[15] Application at Appendix H

Distributed generation is not a feasible alternative to the proposed Project. The alternative would be somewhat less reliable without additional generation units being implemented to account for the lower reliability of generation when compared to transmission; and the alternative likely would be less adaptable to high growth due to reliance on the existing 69 kV system rather than 115 kV transmission.

Part of the area is a heavily residential area. There would be significant environmental and human impacts in siting generation plants, along with the requisite gas or oil infrastructure and interconnection facilities in the locations where the output would be required.

Renewable Generation Alternative

The transmission line in question will not interconnect any particular generation resource. Moreover, the transmission line is not needed to interconnect or transmit power from a new generation resource. Rather, the line will transmit electricity from the existing grid generally to the local area. Therefore, the renewable preference statutes (Minnesota Statutes 216B.243, subd. 3a and Minnesota Statutes 216B.2422, subd. 4) do not apply.

The renewable generation alternative could also be evaluated in the sense of how it could serve as distributed generation using renewable energy sources, such as local, small solar energy installations. This solution would have the same limits as other DG solutions with the inherent difficulties in replacing 37 MW in a small Project area.

5.0 Potential Impacts of the Proposed Route

The construction of a transmission line involves both short and long-term impacts. An impact is a change in the status of the existing environment as a direct or indirect result of the proposed action. Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and occur later or are further removed in distance, but are still reasonably foreseeable.

Impacts may be negative or positive and temporary or permanent or long-lasting. Short-term impacts are generally associated with the construction phase of the project and can include crop damage, soil compaction, and noise. Long-term impacts can exist for the life of the project and may include land use restrictions or modifications. Measures that would be implemented to reduce, minimize, or eliminate potential impacts are discussed under the appropriate topic and highlighted as necessary in this section.

It may be possible to mitigate potential impacts by adjusting the proposed route, selecting a different type of structure or pole, using different construction methods, or implementing any number of post-construction practices. The Commission can require route permit applicant to use specific techniques to mitigate impacts or require certain mitigation thresholds or standards to be met through permit conditions.

There are a number of potential impacts associated with HVTLs that must be taken into account on any transmission line project. Minnesota Rule 7850.4100 identifies 14 factors that the Commission must consider when designating a route for an HVTL (see **Figure 3** below).

5.1 Description of Environmental Setting

The project area is part of the “Big Woods” hardwood forests in central Minnesota. This is a subsection of the Eastern Broadleaf Forest Province as defined in the Ecological Classification System developed by the Minnesota Department of National Resources and the United States Forest Service. The landscape is distinguished by "circular, level topped hills bounded by smooth side slopes. Broad level areas between the hills are interspersed with closed depressions containing lakes and peat bogs." [16]

While the landform has remained much the same over time, the vegetation and land use have been altered over time. Much of the land in the north project area has been developed for residential and commercial use, with only small portions of forest or wetlands remaining. However, there are two major areas within the northern section where the line runs along preserved areas that maintain the original complexion of the setting. The Cleary Lake Regional Park and the Murphy-Hanrahan Park Reserve are protected forest and wetland areas. The southern section of the project for the majority has been converted into cropland. However, the area also retains a limited amount of grassland, shrub land, wetlands and some forested areas.

[16] For more information on this subsection, see http://www.dnr.state.mn.us/ecs/222Mb/index.html.

Figure 3. Factors Considered by the Commission in Issuing a Route

7850.4100 FACTORS CONSIDERED.

In determining whether to issue a permit for a large electric power generating plant or a high voltage transmission line, the commission shall consider the following:

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

B. effects on public health and safety;

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

D. effects on archaeological and historic resources;

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

F. effects on rare and unique natural resources;

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

H. use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries;

I. use of existing large electric power generating plant sites;

J. use of existing transportation, pipeline, and electrical transmission systems or rights-of-way;

K. electrical system reliability;

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

M. adverse human and natural environmental effects which cannot be avoided; and

N. irreversible and irretrievable commitments of resources.

Statutory Authority: *MS s 116C.66; 216E.16*

History: *27 SR 1295; L 2005 c 97 art 3 s 19*

Posted: *September 18, 2009*

5.2 Socioeconomic

Population in the Project area increased by 33 percent between 2000 and 2012. According to U.S. Census Bureau American Community Survey data, only one city in the area, Savage, has a minority population exceeding the state percentage. The cities and townships in the areas have significantly higher median household incomes than the state as a whole, and in all cases, higher than the county of which they are a part. All the cities and townships in the areas have significantly lower poverty rates than the state as a whole. The data in **Table 5** below suggest the proposed route does not contain disproportionately high minority or low-income populations.

Table 5. Population and Economic Profile

Location	Population 2000[17]	Population 2012[18]	Percent Change 2000-2012	Minority Population (Percent) [19]	Median Household Income (Dollars)[20]	Poverty Level (Percent)[21]
Minnesota	4,919,492	5,368,972	9.1	17.0	59,126	11.2
Scott County	89,498	133,326	49.0	15.6	84,571	5.2
Rice Couty	56,665	64,747	14.3	15.2	60,438	11.0
North Area						
Savage	21,115	27,552	30.5	19.0	90,916	3.7
Credit River Twn.	3,895	5,231	34.3	4.4	121,806	1.8
Spring Lake Twn.	3,681	3,665	-0.4	8.6	106,290	1.2
South Area						
New Market Twn.	3,057	3,469	13.5	2.8	89,762	5.8
Elko New Market	472	4,285	807.8	4.7	86,987	1.6
Cedar Lake Twn.	2,197	2,811	27.9	3.8	95,417	3.9
Wheatland Twn.	1,358	1,237	-8.9	4.2	73,382	3.3
Webster Twn.	1,825	1,770	-3.0	1.6	80,750	4.1

[17] 2000 U.S. Census
[18] Minnesota State Demographer 2012 Population Estimates
[19] U.S. Census Bureau 2008-2012American Community Survey 5-Year Estimates (Minority population includes all persons excluding non-Hispanic white.)
[20] Id.
[21] Id.

Economic Impacts

Approximately 15 to 20 workers would be required for construction of the transmission line. The transmission crews are expected to spend approximately one year (between spring 2015 and spring 2016) constructing the project. GRE does not anticipate that additional permanent jobs would be created by the project.

The construction activities may provide a small influx of economic activity into the communities during the construction phase, and materials such as concrete may be purchased from local vendors. Long-term beneficial impacts from the project include increased local tax base resulting from the incremental increase in revenues from utility property taxes. Indirect impact may occur through the increased capability of the applicant to supply energy to commercial and industrial users, which would contribute to the economic growth of the region.

Property Values

One of the first concerns of many residents near existing or proposed transmission lines is how that proximity could affect the value of their property. Because property values are influenced by a complex interaction between factors specific to each individual piece of real estate as well as local and national market conditions, the effect of one particular project on the value of one particular property is difficult to determine.

In the Final Environmental Impact Statement on the Arrowhead-Weston Electric Transmission Line Project, the Wisconsin Public Service Commission addressed the issue of property value changes associated with high voltage transmission lines[22]. This document looked at approximately 30 papers, articles and court cases covering the period from 1987 through 1999.

> *In general there are two types of property value impacts that can be experienced by property owners affected by a new transmission line. The first is a potential economic impact associated with the amount paid by a utility for a right-of-way (ROW) easement. The second is the potential economic impact involving the future marketability of the property.*
>
> *However, substantial differences may exist between people's perceptions about how they would behave and their actual behavior when confronted with the purchase of property supporting a power line.*
>
> *The presence of a power line may not affect some individual's perceptions of a property's value at all. These people tend to view power lines as necessary infrastructure on the landscape, similar to roads, water towers and antenna. They generally do not notice the lines nor do they have strong feelings about them.*

[22] Final Environmental Impact Statement , Arrowhead –Weston Electric Transmission Line Project, Volume I, Public Service Commission of Wisconsin Docket 05-CE-113, October 2000, pg 212-215

The Final EIS provides six general observations from the studies it evaluated. These are:

- The potential reduction in sale price for single family homes may range from zero to 14 per cent.
- Adverse effects on the sale price of smaller properties could be greater than effects on the sale price of larger properties.
- Other amenities, such as proximity to schools or jobs, lot size, square footage of a house and neighborhood characteristics, tend to have a much greater effect on sale price than the presence of a power line.
- The adverse effects appear to diminish over time.
- Effects on sale price are most often observed for property crossed by or immediately adjacent to a power line, but effects have also been observed for properties farther away from the line.
- The value of agricultural property is likely to decrease if the power line poles are placed in an area that inhibits farm operations.

Later, the Final EIS stated, "In coastal states, such as California and Florida, the decrease in property values can be quite dramatic; in states within the Midwest (Minnesota, Wisconsin and the Upper Peninsula of Michigan), the average decrease appears to be between 4 and 7 percent."

Interviews with residents along existing transmission lines show that a high proportion of residents were aware of the lines at the time they purchased their home and between one-half and three-fourths expressed concerns about the lines. The concerns were related to health effects, aesthetics and effects on property values. Despite the concerns expressed, 67 to 80 percent of survey respondents with negative feelings about transmission lines reported that their decision to purchase the property and the price they offered to pay was not affected by the lines.[23]

Although studies have not been able to provide a basis for accurately predicting the effect of a particular transmission line on a particular property, researchers have attributed the effects of HVTLs on property values to an interaction between five factors:

- Proximity to the transmission towers and lines
- The view of the towers and lines
- Size and type of HVTL structures
- Appearance of easement landscaping
- Surrounding topography[24]

[23] Chalmers, James A. and Frank A. Voorvaart. "High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects." *The Appraisal Journal.* Summer, 2009.
http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/2009_HVTLs_and_Property_Values.pdf

[24] Pitts, Jennifer M. and Thomas O. Jackson. 2007. "Power Lines and Property Values Revisited." *The Appraisal Journal. Fall, 2007.*

A possible concern associated with transmission lines includes potential effects on mortgage loans insured by the Federal Housing Administration (FHA), as well as the availability of Housing and Urban Development (HUD) backed mortgages for development of high density residential or mixed use developments. FHA guidelines, as specified in the Housing and Urban Development Handbook, prohibit mortgage support for homes in the easement within the fall zone (tower height) of high voltage transmission (60 kV or above) towers. (HUD, 2009). For single family and multi-family homes, the eligibility standards to qualify for an FHA-insured mortgage were recently clarified in a fact sheet issued by FHA (November 2010). This fact sheet states that a *living unit located outside the easement* of a high voltage transmission line *is eligible for FHA financing*.

FHA does require appraisers to review properties under consideration for FHA loans for presence of utility easements. The US Department of Housing and Economic Development has provided the following guidance:

- *The appraiser must indicate whether the dwelling or related property improvements is located within the easement serving a high-voltage transmission line, radio/TV transmission tower, cell phone tower, microwave relay dish or tower, or satellite dish (radio, TV cable, etc).*

- *If the dwelling or related property improvement is located within such an easement, the DE Underwriter must obtain a letter from the owner or operator of the tower indicating that the dwelling and its related property improvements are not located within the tower's (engineered) fall distance in order to waive this requirement.*

- *If the dwelling and related property improvements are located outside the easement, the property is considered eligible and no further action is necessary. The appraiser, however, is instructed to note and comment on the effect on marketability resulting from the proximity to such site hazards and nuisances*.[25]

Potential Impacts and Mitigations

Socioeconomic impacts resulting from the project would be primarily positive. Mitigative measures are not necessary. In the matter of property values, potential impact would typically be a negotiated settlement in an easement agreement between the Applicant and the landowner. In this case, the incremental differences between properties with the existing 69 kV and the same properties with the proposed 115 kV HVTL would be difficult to discern.

[25] U.S. Department of Housing and Urban Development. "*Is a Property eligible for FHA if there are overhead or high voltage power lines nearby?*"
http://portalapps.hud.gov/FHAFAQ/controllerServlet?method=showPopup&faqId=1-6KT-2009

5.3 Displacement

The proposed project maximizes the use of an existing transmission line route – the proposed upgrade anticipates using existing transmission rights-of-way for much of its length. In new construction areas, no homes or businesses would need to be removed to construct the transmission line. There are a number of residences that have encroached on the existing ROW; however none of those structures should fail NESC safety codes.

Potential Impacts and Mitigations

Displacement of residential homes or businesses is not anticipated. However, it can be noted that the residences within the existing ROW could be impacted by the FHA issues discussed above, if the residence itself actually is within the "fall zone" of a structure. It may be possible for the Permittee to work with landowners to discuss advantageous placement of the new poles.

5.4 Anticipated Noise Impacts

Noise is measured in units of decibels (“dB”) on a logarithmic scale. The A weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. For example, a noise level change of 3 dBA is barely perceptible to average human hearing while a 10 dBA change in noise level is perceived as doubling the loudness. Two sources of noise would be associated with the completed Project: conductors and substations.

Land use activities associated with residential, commercial, and industrial land are grouped together into Noise Area Classifications (NAC). Residences, which are typically considered sensitive to noise, are classified as NAC 1. Each NAC is assigned both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) noise limits for land use activities within the NAC. **Table 6** shows the Minnesota Pollution Control Agency (MPCA) daytime and nighttime limits in dBA for each NAC as established in Minn. Rule 7030.0040, subp. 2. The limits are expressed as a range of permissible dBA within a 1-hour period; L50 is the dBA that may be exceeded 50 percent of the time within an hour, while L10 is the dBA that may be exceeded 10 percent of the time within one hour.

Table 6. MPCA Daytime and Nighttime Noise Limits

Noise Area Classification	Daytime		Nighttime	
	L_{50}	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

Typical noise sensitive receptors along the route would include residences, businesses and schools. Typical ambient noise levels of 50 to 60 dBA would be expected near roadways, urban areas and commercial and industrial properties. Conductor and substation noise would comply with state noise standards.

Noise issues associated with the Project may be related to both the construction and operation of the transmission system. Construction noise is expected to occur during daytime hours as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction personnel to and from the work area. Any exceedences of the MPCA daytime noise limits would be temporary in nature and no exceedences of the MPCA nighttime noise limits are expected for this project.

Noise associated with the transmission conductors may produce audible noise under certain operational conditions. The level of noise depends on conductor conditions, voltage level and weather conditions. Noise emission from a transmission line occurs during heavy rain and wet conductor conditions. In foggy, damp or rainy weather conditions, transmission lines can create a subtle crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain, the general background noise level is usually greater than the noise from a transmission line, and few people are in close proximity to the transmission line in these conditions. For these reasons, audible noise is not noticeable during heavy rain. During light rain, dense fog, snow and other times when there is moisture in the air, the proposed transmission lines may produce audible noise. During dry weather, audible noise from transmission lines is an imperceptible, sporadic crackling sound.

However, noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. Computer software produced by the Bonneville Power Administration (BPA) was employed by Xcel Energy in an earlier project to model the expected noise level on similar proposed structures and conductors. **Table 7** below measures expected noise under the worst case wet conditions scenario at the edge of a 75-foot-wide right-of-way (37.5 feet from the centerline).

Potential Impacts and Mitigations

Noise levels produced by 115 kV transmission lines are usually not audible. Additionally, much of the project is located adjacent to roadways, and traffic noise would overpower any project-related noise emissions. Noise impacts from the transmission are not anticipated. The Applicant has stated that in an effort to mitigate noise levels associated with construction activities, work would be limited to daytime hours between 7 a.m. and 10 p.m. on weekdays, with occasional construction outside of these hours to work around customer schedules, line outages, or other significant events. Heavy equipment would also be equipped with sound attenuation devices such as mufflers to minimize the daytime noise levels.

Table 7. Predicted Audible Noise from 115 kV Transmission[26]

Structure Type	A-weighted Decibels at 37.5 ft. from Centerline (at One Meter Above the Ground)	
	L_5	L_{50}
Horizontal Post 115 kV Single circuit	22.2	18.7
H-Frame 115 kV Single circuit	17.9	14.4
Braced Post 115 kV Single circuit With 13.8 kV Distribution Underbuild	22.7	20.7
Davit Arm 115 kV/115 kV Double circuit	20.1	16.6

5.5 Radio and Television Interference

Corona on transmission line conductors can generate electromagnetic noise at frequencies at which radio and television signals are transmitted. This noise can cause interference (primarily with AM radio stations and the video portion of TV signals) with the reception of these signals depending on the frequency and strength of the radio and television signal. However, this interference is often due to weak broadcast signals or poor receiving equipment.

The most significant factor with respect to radio and television interference is not the magnitude of the transmission line induced noise, but how the transmission line induced noise compares with the strength of the broadcast signal. Very few radio noise problems have resulted from existing 115 kV transmission lines, as broadcast signal strength within a radio station's primary coverage area is great enough that adequate signal to noise ratios are maintained.

If radio interference from transmission line corona does occur with AM radio stations presently providing good reception, satisfactory reception can be obtained by appropriate modification of (or addition to) the receiving antenna system.

Interference with FM broadcast station reception is generally not a problem because:

- corona generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88-108 megahertz (MHz)), and
- the excellent interference rejection properties inherent in FM radio systems make them virtually immune to amplitude type disturbances.

[26] Environmental Assessment, Scott County to Westgate 69-115 kV Upgrade Project, EERA, February 2013, eDocket no. 20132-84076-01

A two-way mobile radio located immediately adjacent to and behind a large metallic structure (such as a steel tower) may experience interference because of signal blocking effects. Movement of either mobile unit so that the metallic structure is not immediately between the two units should restore communications. This would generally require a movement of less than 50 feet by the mobile unit adjacent to a metallic tower. Noise in the frequency range of cellular type phones is almost non-existent and the technology used by these devices is superior to that used in two-way mobile radio.

As is the case with AM radio interference, corona-generated noise could cause interference with TV picture reception because the picture is broadcast as an AM signal. The level of interference depends on the TV signal strength for a particular channel (TV audio is an FM signal that is typically not impacted by transmission line radio frequency noise).

Due to the higher frequencies of the TV broadcast signal (54 MHz and above), 115 kV transmission lines seldom result in reception problems within a station's primary coverage area. The proposed transmission line would rarely cause TV interference within a broadcast station's primary coverage area where good reception is presently obtained. Usually any reception problem can be corrected with the addition of an outside antenna.

Potential Impacts and Mitigations

No interference issues are anticipated with this project. However, should such interferences be identified, they can usually be resolved by repairing loose or damaged transmission facilities. The Applicant would be required to resolve problems caused by the Project as a condition of the HVTL Route Permit.

5.6 Aesthetics

Much of the proposed Project would follow an existing 69 kV transmission line route and would have nominal, incremental effects on the visual and aesthetic character of the area. The proposed structures for the new 115 kV lines (see **Table 3**) would be about 52 to 92 feet tall generally, with 350 to 400 foot spans for post structures and 600 to 1000 foot for H-frame structures. This spacing is appropriate to keep the conductor within existing rights-of-way. Poles would be toward the taller end with shorter spans where the single circuit 115 kV transmission would have the 69 kV or distribution line built underneath on the same pole. Generally, the proposed structures would be slightly taller than the existing poles and the spacing greater, resulting in fewer poles. The proposed poles would be generally wood, but some steel poles could be used where necessary. The existing transmission line structures in this area are generally wood.

Like the existing 69 kV transmission line, the new 115 kV transmission line will be visible to area residents. The visual effect will depend largely on the perceptions of the observer. The transmission and substations that already exist in the project area will limit the degree to which the new installations can be viewed as a disruption to the area's scenic integrity. For the new 115 kV build out, the lines would be placed along existing road ROW.

Potential Impacts and Mitigations

Although the transmission line would be visible throughout most of its length, it would be only incrementally different from the existing transmission line that currently runs along the public transportation corridors and residential and commercial development in the area. Mitigation could include specific vegetation planting for high visibility areas.

A potential mitigation for the aesthetic impact of transmission lines would be to underground the line. This is not a practical solution for the project as a whole, as it would create a financially impractical system alternative. The same facility placed underground could cost up to eight to 10 times as much.[27]

The predominant environmental impact from the construction, operation, and maintenance of underground transmission lines arises from the need to obtain and maintain completely cleared ROWs. Overhead transmission lines support non-interfering vegetation in the ROW. Underground transmission may require less ROW, but the entire ROW must be completely cleared for construction activities, with very limited vegetation types allowed ongoing.

5.7 Public Health and Safety, including EMF

Proper safeguards would need to be implemented for construction and operation of the facility. The project would be designed to comply with local, state and NESC standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials and ROW widths. GRE construction crews and contract crews would also need to comply with local, state and NESC standards regarding installation of facilities and standard construction practices. Established GRE and industry safety procedures would be followed during and after installation of the transmission line. This would include clear signage during all construction activities. The transmission line would be equipped with protective devices to safeguard the public from the transmission line if an accident occurs and a structure or conductor falls to the ground. The protective devices are breakers and relays located where the transmission line connects to the substation. The protective equipment would de-energize the transmission line, should such an event occur. In addition, the substation facilities would be fenced and access limited to authorized personnel.

Electric and Magnetic Fields

Voltage transmitted through any conductor produces both an electric field and a magnetic field in the area surrounding the wire. The electric field associated with HVTLs extends from the energized conductors to other nearby objects. The magnetic field associated with HVTLs surrounds the conductor. Together, these fields are generally referred to as electromagnetic fields, or EMF. These effects decrease rapidly as the distance from the conductor increases.

[27] Application at 6-8

Electric Fields

Voltage on any wire (conductor) produces an electric field in the area surrounding the wire. The electric field associated with a high voltage transmission line extends from the energized conductors to other nearby objects such as the ground, towers, vegetation, buildings and vehicles. The electric field from a transmission line gets weaker as one moves away from the transmission line. Nearby trees and building material also greatly reduce the strength of transmission line electric fields.

The intensity of electric fields is associated with the voltage of the transmission line and is measured in kilovolts per meter (kV/M). Transmission line electric fields near ground are designated by the difference in voltage between two points (usually 1 meter). **Table 8** provides the electric fields at maximum conductor voltage for the proposed transmission lines. Maximum conductor voltage is defined as the nominal voltage plus 5 percent.

Table 8. Calculated Electric Fields (kV/m) at One Meter above Ground[28]

Structure Type	Maximum Operating Voltage (kV)	Distance from Centerline (Feet)						
		-100	-50	-25	0	25	50	100
Proposed 115 kV Configurations								
115/115 kV Double Circuit	121/121	0.092	0.088	0.686	2.639	0.686	0.088	0.092
115 kV with 69 kV Underbuild	121/72.5	0.081	0.294	0.586	1.069	0.811	0.269	0.067
115 kV Single Circuit	121	0.062	0.237	0.541	1.487	0.71	0.21	0.07
Existing 69 kV Configuration								
69 kV Single Circuit	72.5	0.022	0.106	0.385	0.405	0.353	0.130	0.028

There is no federal standard for transmission line electric fields. In Minnesota, however, the Commission imposes a condition with a maximum limit of 8 kV/m in all HVTL permits. The Commission standard was designed to prevent serious hazard from shocks when touching large objects parked under high voltage transmission lines of 345 kV or greater. The maximum electric field associated with this project, measured at one meter above ground, would be 2.64 kV/m under the double circuit 115kV line.

[28] GRE Calculations, February 11, 2014.

Magnetic Fields

Current passing through any conductor, including a wire, produces a magnetic field in the area around the wire. The magnetic field associated with a high voltage transmission line surrounds the conductor and decreases rapidly with increasing distance from the conductor. The magnetic field is expressed in units of magnetic flux density, expressed as milligauss (mG).

The magnetic fields for the proposed transmission line structure and conductor configurations being considered for the project are shown below in **Table 9.** Magnetic fields were calculated for each configuration within the Project, since each would have a unique flow. The fields represent peak and average current flows as projected for the year 2030 under normal conditions. The magnetic field values are calculated for a point directly under the transmission line where the conductor is closest to the ground. The same method is used to calculate the magnetic field at the edge of the right-of-way. As is evident in the table, magnetic field levels decrease rapidly as the distance from the centerline increases (inversely proportional to the square of the distance from the line).

Table 9. Calculated Magnetic Flux Density (milligauss) at One Meter above Ground[29]

Structure Type	System Condition	Current (Amps)	Distance from Centerline (Feet)						
			-100	-50	-25	0	25	50	100
Proposed 115 kV Configuration									
115/115 kV Double Circuit	Peak	552.8/344	8.26	26.35	59.44	105.11	64.98	28.32	8.63
	Average	368/229	5.50	17.55	39.59	70.00	43.28	18.86	5.75
115 kV with 69 kV Underbuild	Peak	480.5/124.6	4.81	13.51	26.28	49.70	33.41	16.36	5.40
	Average	320/83	3.20	9.00	17.50	33.10	22.25	10.90	3.60
115 kV Single Circuit	Peak	619	6.25	19.96	45.95	92.78	54.73	22.83	6.78
	Average	412	4.16	13.29	30.60	61.79	36.45	15.21	4.51
Existing 69 kV Configuration									
69 kV Single Circuit	Peak	530.5	4.25	15.09	40.07	70.23	34.37	13.56	4.00
	Average	353	2.83	10.05	26.68	46.77	22.89	9.03	2.66

[29] Id.

Table 10. Magnetic Fields (milligauss) from Common Home and Business Appliances[30]

Source	Distance from Source			
	.5 foot	1 foot	2 feet	4 feet
Baby Monitor	6	1	-	-
Computer Displays	14	5	2	-
Fluorescent Lights	40	6	2	-
Copy Machines	90	20	7	1
Microwave Ovens	200	4	10	2
Electric Pencil Sharpeners	200	70	20	2
Vacuum Cleaner	300	60	10	1
Can Opener	600	150	20	2
Color Televisions	NA	7	2	-

It can be noted that magnetic fields are not singularly associated with power lines. Every person has exposure to these fields to a greater or lesser extent throughout each day, whether at home or in schools, offices and automobiles. **Table 10** above contains field readings for a number of selected, commonly encountered items. These readings represent median readings, meaning one might expect to find an equal number of readings above and below these levels.

Stray Voltage

Stray voltage encompasses two phenomena: Neutral to Earth Voltage and Induced Voltage. In general, stray voltage describes any case of elevated potential, but more precise terminology gives an indication of the source of the voltage.

Neutral to Earth Voltage (NEV) refers to a condition that can occur at the electric service entrances to structures, that is, where distribution lines enter structures. It is the phenomena most commonly referred to as "stray voltage." NEV is an extraneous voltage that appears on metal surfaces in buildings, barns and other structures, which are grounded to earth. NEV can be experienced, for example, by livestock who simultaneously come into contact with two metal objects (e.g., feeders, waterers, stalls). If there is a voltage between these objects, a small current will flow through the livestock. The fact that both objects are grounded to the same place (earth) would seem to prevent any voltage from existing between the objects. However, this is not the case – a number of factors determine whether an object is, in fact, grounded. These include wire size and length, the quality of connections, the number and resistance of ground rods, and the current being grounded.[31]

[30] National Institutes of Health. National Institute of Environmental Health Sciences (NIEHS). 2002. *EMF Electric and Magnetic Fields Associated with the use of Electrical Power.*

[31] Stray Voltage, NDSU Extension Publication #108, http://www.ag.ndsu.edu/extension-aben/epq/files/epq108.pdf.

Neutral to Earth Voltage can result from damaged, corroded or poorly connected wiring or damaged insulation. Thus, NEV can exist at any business, house or farm which uses electricity, independent of whether there is a transmission line nearby. NEV is largely an issue associated with electrical distribution lines and electrical service at a residence or on a farm. Transmission lines do not create NEV as they do not directly connect to businesses, residences or farms.

NEV can be reduced in three ways: reducing the current flow on the neutral wire entering a home or building, reducing the resistance of the neutral system, or improving the grounding of the neutral system. Making good electrical connections and making sure that these connections have the proper wiring materials for wet and corrosive locations will reduce the resistance of grounded neutral system and thereby reduce NEV levels.

Induced Voltage refers to situations where an electric field extends to a nearby conductive object, thereby "inducing" a voltage on the object. The electric field from a transmission line in some instances can reach a nearby conductive object, such as a vehicle or a metal fence, which is in close proximity to the transmission line. This may induce a voltage on the object, which is dependent on many factors, including the weather conditions, object shape, size, orientation, capacitance and location along the right-of-way. If these objects are insulated or semi-insulated from the ground and a person touches them, a small current would pass through the person's body to the ground. This touch may be accompanied by a mild shock, similar to what can occur when a person walks across a carpet and touches a grounded object or another person.

The major concern with induced voltage is the current that flows through a person to the ground when touching the object, not the level of the induced voltage. Most shocks from induced current are considered more of a nuisance than a danger, but to ensure the safety of persons in the proximity of high-voltage transmission lines, the NESC requires that any discharge be less than 5 milliAmperes. In addition, the Commission's electric field limit of 8 kV/m was designed to prevent serious hazard from shocks due to induced voltage under high-voltage transmission lines. Proper grounding of metal objects under and adjacent to the transmission line is the best method of avoiding these shocks.

While transmission lines do not, by themselves, create NEV because they do not connect to businesses or residences, they can induce voltage on a distribution circuit that is parallel and immediately under the transmission line. However, this induced voltage only occurs in the immediate vicinity of the distribution circuit; it does not travel along the transmission or distribution line. Standard industrial designs can mitigate potential for stray voltage to impact distribution lines.

Induced voltage can be reduced or eliminated using cancellation, separation or enhanced grounding. Cancellation can be achieved by configuring the conductors of the transmission line to minimize EMF levels. Separation literally increases the distance between the transmission and distribution lines by physically placing the lines in different locations or by increasing the vertical distance between transmission and distribution lines collocated on the same poles. Enhanced grounding connects counterpoises to the distribution neutral wire and the transmission shield wire.

Potential Impacts and Mitigations

The effect of EMF on human health has been the subject of study for over 25 years. Of particular concern is the link between EMF exposure and cancer. Numerous panels of experts have convened to review research data on whether EMF is associated with adverse health effects. Studies have been conducted by the National Institute of Environmental Health Sciences (NIEHS), the USEPA, the World Health Organization (WHO), and the Minnesota State Interagency Working Group (MSIWG) on EMF issues.

Potential Impacts

Studies regarding EMF exposure and childhood leukemia and other cancer risks have had mixed results. Some organizations have determined that a link between EMF and cancer exists while others have found this link to be weak or nonexistent.

In 1992, Congress initiated U.S. EMF Research and Public Information Dissemination (EMF RAPID). EMF RAPID program studied whether exposure to electric and magnetic fields produced by the generation, transmission, or use of electric power posed a risk to human health.

Program conclusions were presented to Congress on May 4, 1999 as follows:

- The scientific evidence suggesting that [extremely low frequency] ELF-EMF exposures pose any health risk is weak.

- Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent positive findings in animals or mechanistic studies weakens the belief that this association is actually due to ELF-EMFs, but it cannot completely discount the epidemiological findings.

- The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern (NIEHS, 1999).

In October 1996, a National Research Council Committee of the National Academy of Sciences released a report which corroborated the findings of EMF RAPID. The report concluded:

> *Based on comprehensive evaluation of published studies relating to the effects of power-frequency electric and magnetic fields on cells, tissues, and organisms (including humans), the conclusion of the committee is that the current body of evidence does not show that exposure to these fields presents a human-health hazard.*

Currently the USEPA states the following viewpoint of the associated health effects of EMF on its website (USEPA: Electric and Magnetic Fields (EMF) Radiation form Power Lines, 2009):

> *Much of the research about power lines and potential health effects is inconclusive. Despite more than two decades of research to determine whether elevated EMF exposure, principally due to magnetic fields, is related to an increased risk of childhood leukemia, there is still no definitive answer. The general scientific consensus is that, thus far, the evidence available is weak and is not sufficient to establish a definitive cause-effect relationship (USEPA, 2009).*

In 2001, the World Health Organization (WHO) International Agency for Research on Cancer classified power-frequency EMF as a "possible carcinogenic to humans." Currently the WHO states the following viewpoint of the associated health effects of EMF on its website:

> *Extensive research has been conducted into possible health effects of exposure to many parts of the frequency spectrum. All reviews conducted so far have indicated that exposures below the limits recommended in the INNIRP (1998) EMF guidelines, covering the full frequency range from 0-300 GHz, do not produce any known adverse health effect. However, there are gaps in knowledge still needing to be filled before better health risk assessments can be made (WHO, 2009).*

In September of 2002, the MSIWG on EMF Issues, published "A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options," referred to as the "White Paper." The MSIWG was formed to examine the potential health impacts of EMFs and to provide useful, science-based information to policy makers in Minnesota. Work Group members included representatives from the Department of Commerce, the Department of Health, the Pollution Control Agency, the Public Utilities Commission, and the Environmental Quality Board (MSIWG, 2002). The White Paper concluded the following findings:

- Some epidemiological results do show a weak but consistent association between childhood leukemia and increasing exposure to EMF (see the conclusion of IARC and NIEHS). However, epidemiological studies alone are considered insufficient for concluding that a cause and effect relationship exists, and the association must be supported by data from laboratory studies.

- Existing laboratory studies have not substantiated this relationship (see NTP, 1999; Takebe et al., 2001), nor have scientists been able to understand the biological mechanism of how EMF could cause adverse effects. In addition, epidemiological studies of various other diseases, in both children and adults, have failed to show any consistent pattern of harm from EMF.

- The Minnesota Department of Health concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health effects. However, as with many other environmental health issues, the possibility of a health risk from EMF cannot be dismissed. Construction of new generation and transmission facilities to meet increasing electrical needs in the State is likely to increase exposure to EMF and public concern regarding potential adverse health effects.

- Based upon its review, the Work Group believes the most appropriate public health policy is to take a prudent avoidance approach to regulating EMF. Based upon this approach, policy recommendations of the Work Group include: apply low-cost EMF mitigation options in electric infrastructure construction projects; encourage conservation; encourage distributed generation; continue to monitor EMF research; encourage utilities to work with customers on household EMF issues; and provide public education on EMF issues (MSIWG, 2002).

In a 2007 report the World Health Organization (WHO) concluded that, although some studies have noted a weak statistical link between exposure to EMF and incidence of childhood leukemia, laboratory evidence does not support these findings and that a similar link has not been noted with other types of cancer:

> *… epidemiological evidence is weakened by methodological problems, such as potential selection bias. In addition, there are no accepted biophysical mechanisms that would suggest that low-level exposures are involved in cancer development. … Additionally, animal studies have been largely negative. Thus, on balance, the evidence related to childhood leukaemia is not strong enough to be considered causal. … Regarding long-term effects, given the weakness of the evidence for a link between exposure to ELF [extremely low frequency] magnetic fields and childhood leukaemia, the benefits of exposure reduction on health are unclear.*[32]

As noted above, research has not been able to establish a cause and effect relationship between exposure to EMFs and adverse health effects. However, a general consensus has been formed to continue research on the health effects of EMFs. At this time, there are no federal standards in the United States to limit EMF exposure.

EMF as it relates to public health and safety continues to be researched and reviewed.

[32] World Health Organization (WHO). 2007. *Electromagnetic Fields and Public Health: Exposure to Extremely Low Frequency Fields. Fact Sheet No. 322*. http://www.who.int/mediacentre/factsheets/fs322/en/index.html

Potential Mitigations

There are no federal or Minnesota state regulations for the permitted strength of a magnetic field on a transmission line; however both Florida and New York have standards ranging from 150 to 250 mG. **Table 11** summarizes current international and state guidelines for EMF.

Table 11. ELF EMF International and State Guidelines

ELF-EMF Guidelines Established by Health & Safety Organizations		
Organization		**Magnetic Field**
American Conference of Governmental and Industrial Hygienists (ACGIH) (Occupational)		10,000 mG (for general worker) 1,000 mG (for workers with cardiac pacemakers)
International Commission on Non-Ionizing Radiation Protection (ICNIRP) (General Public, Continuous Exposure)		2000 mG
Non-Ionizing Radiation Committee of the American Industrial Hygiene Association		4,170 mG
Institute of Electrical and Electronics Engineers (IEEE) Standard C95.6 (General Public, Continuous Exposure)		9,040 mG
U.K., National Radiological Protection Board (NRPB)		833 mG
Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)		3,000 mG
State Standards and Guidelines		
State	**Line Voltage**	**Magnetic Field (Edge of ROW)**
Florida	69-230 kV	150 mG
	230-500 kV	200 mG
	>500 mG	250 mG
Massachusetts		85 mG
New York		200 mG

As **Table 9** above portrays, the calculated mG for the Project are a fraction of the existing standards. Still, as per the MDH White Paper recommendations concerning "prudent avoidance," utilities routinely provide information on the issue to the public, interested customers and employees. This information contains references to studies and provides data to help explain the relative impact of transmission line exposure to other EMF exposures most people experience throughout the day at home or at work. GRE can provide measurements for landowners, customers and employees who request them. In addition, the utility could use structure designs that minimize magnetic field levels and, where practicable, site facilities in locations affecting the fewest number of people.

For stray voltage, concerns have been raised on some dairy farms because it can impact operations and milk production. Problems are usually related to the distribution and service lines directly serving the farm or the wiring on a farm. In those instances when transmission lines have been shown to contribute to stray voltage, it was found that the electric distribution system directly serving the farm or the facilities themselves were directly under and parallel to the transmission line. These circumstances are considered in modern day routing/installing of transmission lines and can be readily avoided.

5.8 Recreation

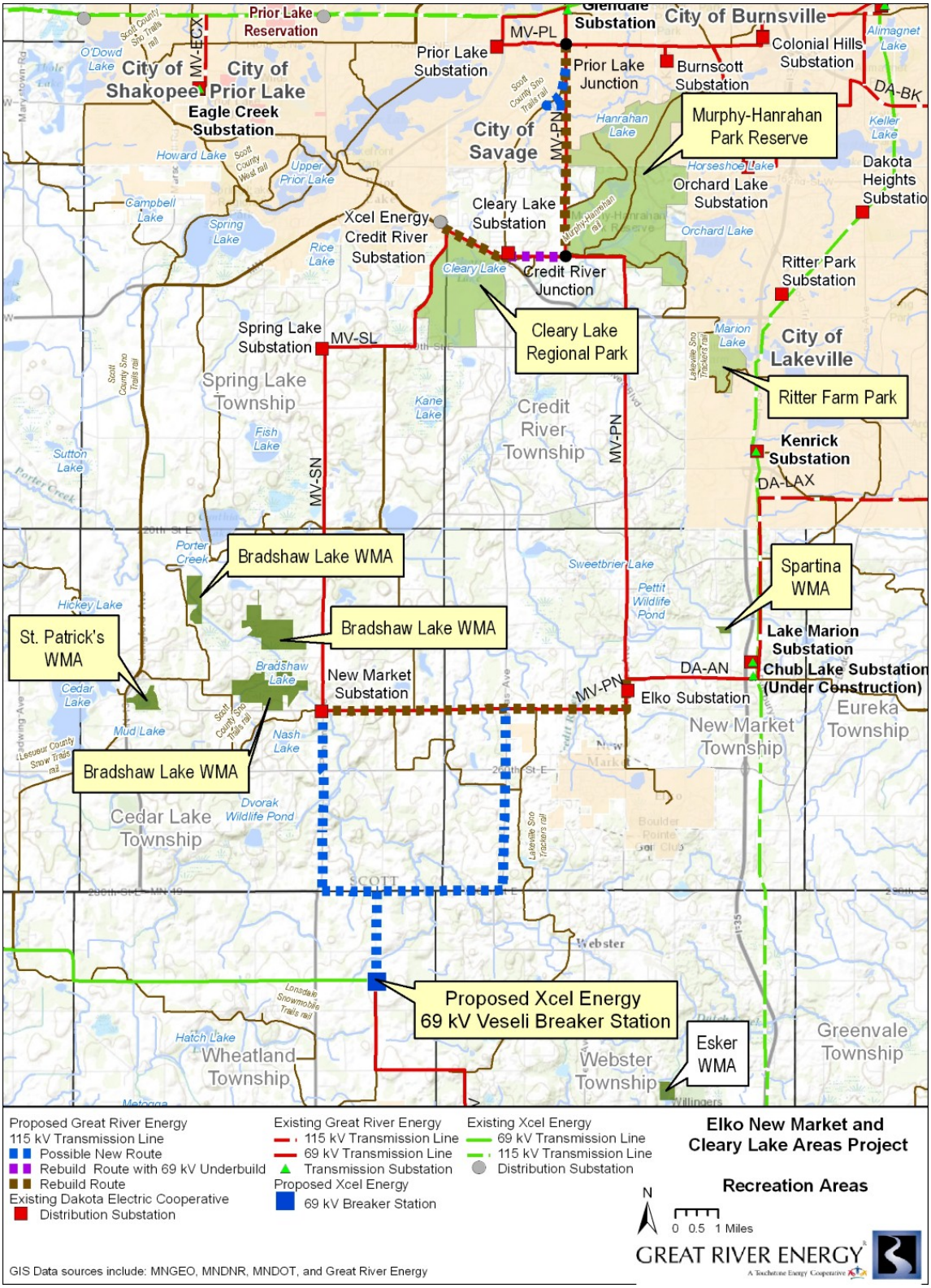
Parts of the existing 69 kV line to be rebuilt occupy easements through the edges of Cleary Lake Regional Park and Murphy-Hanrehan Park Reserve. These parks are under the auspices of Three Rivers Park District (TRPD)[33] and are co-managed with Scott County. Cleary Lake Regional Park is a year-round recreation spot, with amenities including a golf course, campground, picnic area, cross-country ski trails and swimming beach. Murphy-Hanrehan Park Reserve features glacial ridges, hilly terrain and extensive forest. The Reserve features areas for cross-country skiers and mountain bikers. With the exception of the trails, the park reserve remains undeveloped and has been designated an Important Bird Area by the National Audubon Society.

In scoping comments,[34] TRPD also mentioned Doyle-Kennefick Regional Park, being developed along County 23 north of Lennon Lake in Scott County, and Scott County West Trail, which is under development between Cleary Lake Regional Park and a new regional park planned near Spring Lake to the west. Doyle-Kennefick Regional Park will be located over one mile north of 250th Street, which is the path of the northernmost rebuild of the south area of the Project. Therefore, the park will not be impacted by the upgrade. Xcel Energy's Credit River Substation is north of Cleary Lake Regional Park and is the westernmost terminus of the Project. The trail to the west of that area should not be impacted by the rebuild in the north area of the Project.

The lines are also situated between the Spartina and Bradshaw Wildlife Management Areas (WMA), which are wetland and grassland preserves set aside for wildlife hunting and viewing. Both these areas will be outside the construction zone (See **Figure 4**).

[33] http://www.threeriversparks.org/parks.aspx
[34] Three Rivers Park District Scoping Comments, October 14, 2013, eDocket no. 201310-92747-02

Figure 4. Recreational Areas



Potential Impacts and Mitigations

The regional parks already experience an impact from the existing 69 kV transmission line, since the easement is within park land along its perimeter. In general, GRE has a 60-65 foot easement in these areas (the rebuilt 115 kV lines in the Project call for a 70 foot ROW). TRPD believes its directives do not allow for granting GRE addition easement area through the parks. In its comments, TRPD lays out its reasoning:[35]

- Conversion of regional park land from its intended purpose is in direct conflict with the Three Rivers Park District's and Metropolitan Regional Park System's mission as defined by the State of Minnesota;
- Conversion of regional park land is in conflict with Metropolitan Council restrictive covenants that limit the use of regional parkland to regional recreation and open space in perpetuity;
- Conversion of regional park land to other uses is contrary to Three Rivers Park District's policies and practices; and
- Loss of regional park land threatens to adversely impact Cleary Lake Regional Park and Murphy-Hanrehan.

This would mean GRE would need to design its structures and access points to work within the smaller than anticipated ROW. GRE also should develop a vegetation management plan for the area to minimize disruption of park lands. This could potentially be done in consultation with TRPD. GRE believes it can limit removal of trees and shrubs to specific pole replacement areas within the park easements.

5.9 Land-based Economies

Agriculture

Generally, the land along the transmission lines in the Project area is zoned either Residential or Agricultural. Much of the northern area of the Project is residential, while most of the southern area is agricultural, though a mix occurs along the lines in each area. The agricultural areas are mostly cropland. Land in farms for both Scott and Rice counties is over 80 percent cropland.[36] The transmission lines would cross approximately 16 miles of agricultural land, with seven of those miles crossing prime farmland.[37]

Construction of new transmission structures and removal of existing structures will require repeated access to structure locations to install foundations, structures and conductors. Equipment used in this process includes drill rigs, concrete trucks, backhoes, cranes, boom trucks and assorted small vehicles.

[35] Id.

[36] USDA Census of Agriculture, 2007 (County level 2012 data were not yet available at the time of this publication.), http://www.agcensus.usda.gov/Publications/2007/Full_Report/Census_by_State/

[37] Application at 9-17

Potential Impacts and Mitigations

No long-term impacts are anticipated to the agricultural economy from the Project. However, during construction, temporary impacts such as soil compaction and crop damages within the ROW may occur. The greatest area of impact surrounds the pole itself (approximately 20 square feet). The majority of the ROW easement will remain available for agricultural use.

When possible, spring-time construction would be avoided. Construction mats may also be used to minimize impacts on the access paths and in construction areas. GRE has stated in its Application that construction teams will work with the property owner, right-of-way agent, and transmission line engineers to minimize the impact on property.

The Route Permit would require GRE to compensate landowners for any crop damage and soil compaction that occurs as a result of the Project.

Forestry

The route does not impact any forests managed for harvest or any nurseries. No privately-owned forest production industry would be affected by the project. The transmission line would impact approximate one-tenth of a mile of forested land, nearly all of which is along the edge of Cleary Lake Regional Park.[38]

Potential Impacts and Mitigations

Because the route follows existing ROW for much of its length, and follows roads for almost all of the new ROW, clearing of trees would be minimal. Impacts to forested areas and shelterbelts along the rebuild portion of the route would be incidental, and would be limited to the amount necessary to permit safe and reliable operation of the transmission line. Due to safety concerns, any trees that would grow taller than 15 feet within the ROW would need to be removed beneath overhead lines. Additionally, a 10-foot radius around each structure would be kept free of woody vegetation.

Consistent with the standard HVTL Route Permit conditions, the construction staging areas will be located and arranged in a manner to preserve trees and vegetation to the maximum extent practicable. The area will generally need to be re-graded, so that all surfaces drain naturally, blend with the natural terrain, and provide for proper drainage and prevent erosion. Re-seeding and weed control would be implemented as described on page 51 below.

As a standard condition of a HVTL Route Permit, clearing for access roads is limited to only those trees necessary to permit the passage of equipment. Temporary access roads must be restored to native vegetation. Native shrubs that would not interfere with the safe operation of the line would be allowed to reestablish in the ROW. However, vegetation that may interfere with the construction, operation or maintenance of the transmission line would be removed.

[38] Id. at 9-19

Mining

According to the Minnesota Department of Transportation (Mn/DOT) county pit map for Scott County, there are gravel pits, rock quarries and commercial aggregate sources in the vicinity of the project.[39] Of these, the closest are three active pits located just west, but well outside the route of the Project in the northern area. There are no active gravel pits located within one mile of the rest of the Project, including the Rice County portion.

Potential Impacts and Mitigations

Since there are no mineral resources being mined along or within the proposed Project area, the Project would have no potential impact on mineral mines. Additionally, since the Project is proposed to be rebuilt within the existing ROW for most of its length, any potential aggregate resources in the ROW would have already been impacted in terms of their availability for development. Therefore, there would be no additional impacts on potential aggregate resources in the Project area. Because no impacts are anticipated, no mitigation is required.

5.10 Commercial, Industrial, Residential Land Use

Land use in the Project area, as noted above, is primarily a mixture of residential and agricultural. The Project area is especially populated in the first segment of the rebuild line. **Table 12** displays the number of homes and businesses (only two) in the Project area in proximity to the existing line. Two homes are within 35 feet of the existing transmission line, meaning they would be located within the proposed ROW of the anticipated alignment as well.

Table 12. Residences and Businesses in Proximity to Transmission Line[40]

Transmission Line Segment	Number of Residences or Businesses within Either Side of Transmission Centerline (feet)					
	0-35	36-50	51-75	76-100	101-150	Total
Cleary Lake Area Rebuild – Existing MV-PN	2	4	14	18	15	53
Cleary Lake Area Existing MV-PN Line with Possible Deviation	0	0	6	19	37	62
Cleary Lake Area Rebuild – Existing MV-CR Line	0	0	0	1	3	4
Elko New Market Area Rebuild – Existing MV-PN Line	0	1	0	0	5	6
Elko New Market Area New Transmission Line (West Option)	0	0	1	1	3	5
Elko New Market Area New Transmission Line (East Option)	0	0	1	1	9	11

[39] http://www.dot.state.mn.us/materials/aggsource.html

[40] Application at 9-5

Potential Impacts and Mitigations

The Applicant's preferred alignment minimizes new impacts to existing land uses by following existing transmission line ROW for most of its length. The existence of a transmission line easement does restrict some possible uses for the property. Acceptable uses within the easement areas include planting crops, pasture, roadways, curbs and gutters. The two most common restrictions would include prohibiting construction of permanent structures or buildings within the easement area and restrictions on planting trees that may grow into the lines; properties with existing structures close to or within the current ROW may have restrictions placed on them.

The Project is required by permit to meet or exceed the clearance standards provided in NESC Section 232 for a 115 kV transmission line, which require a 9'1'' horizontal distance between the conductor and a building; a 15'1'' vertical distance between the conductor and a roof/balcony accessible by people; and a 20'1'' vertical distance between the conductor and a roadway or parking lot. The proposed transmission lines would be equipped with protective devices to safeguard the public from the transmission line if an accident occurs, such as a structure or conductor falling to the ground.

In general, the rebuild portions of the line would not create new impacts on existing or proposed land use. No mitigation would be necessary for the majority of the proposed rebuild other than vegetation management during and restoration after construction.. Potential impacts to those properties with existing structures very close to or within the current ROW may be mitigated through final design efforts, such as using cantilever structures to place the conductors on a single side of the towers away from a structure. However, the houses in the ROW could still be potentially impacted by FHA restrictions (see property value discussion above at 25-26).

5.11 Public Services and Transportation

The majority of properties in the Project areas are connected to wells and septic systems, except for part of the line in Savage, which does supply sewer and water service. No public utility or road improvement projects are currently planned for the area near the existing Great River Energy transmission line within Savage and GRE does not anticipate any direct impacts to public services for area residents in or outside the city.

The 2012–2021 Scott County Transportation Improvement Plan[41] indicates that in 2016, County Highway 56 (250th Street) is slated for reconstruction and paving from CH 23 (Panama Ave.) to CH 87 (Revere Ave.). GRE and Scott County are in discussions on how to resolve the county's need for easement of 50 or 60 feet either side of the road centerline and GRE's intended use of the existing ROW. Further information is expected in hearing comments.

The Project is not anticipated to have any impact on the airspace of any public, private or personal use airports, according to Mn/DOT[42]

[41] http://www.co.scott.mn.us/RoadsTransport/Roads/Pages/transplanning.aspx
[42] Application at Appendix K

Potential Impacts and Mitigations

One solution to the Scott County plan would be for GRE to obtain new easement to the south and install the upgraded line outside the wider ROW (the land use is a mix of farm land, homesteads and some wetlands). The County and GRE should provide additional information into the record on how the expansion plan is proceeding and possible resolutions between the parties. No other impacts are anticipated to public services due to construction or operation of the Project.

5.12 Archaeological and Historic Resources

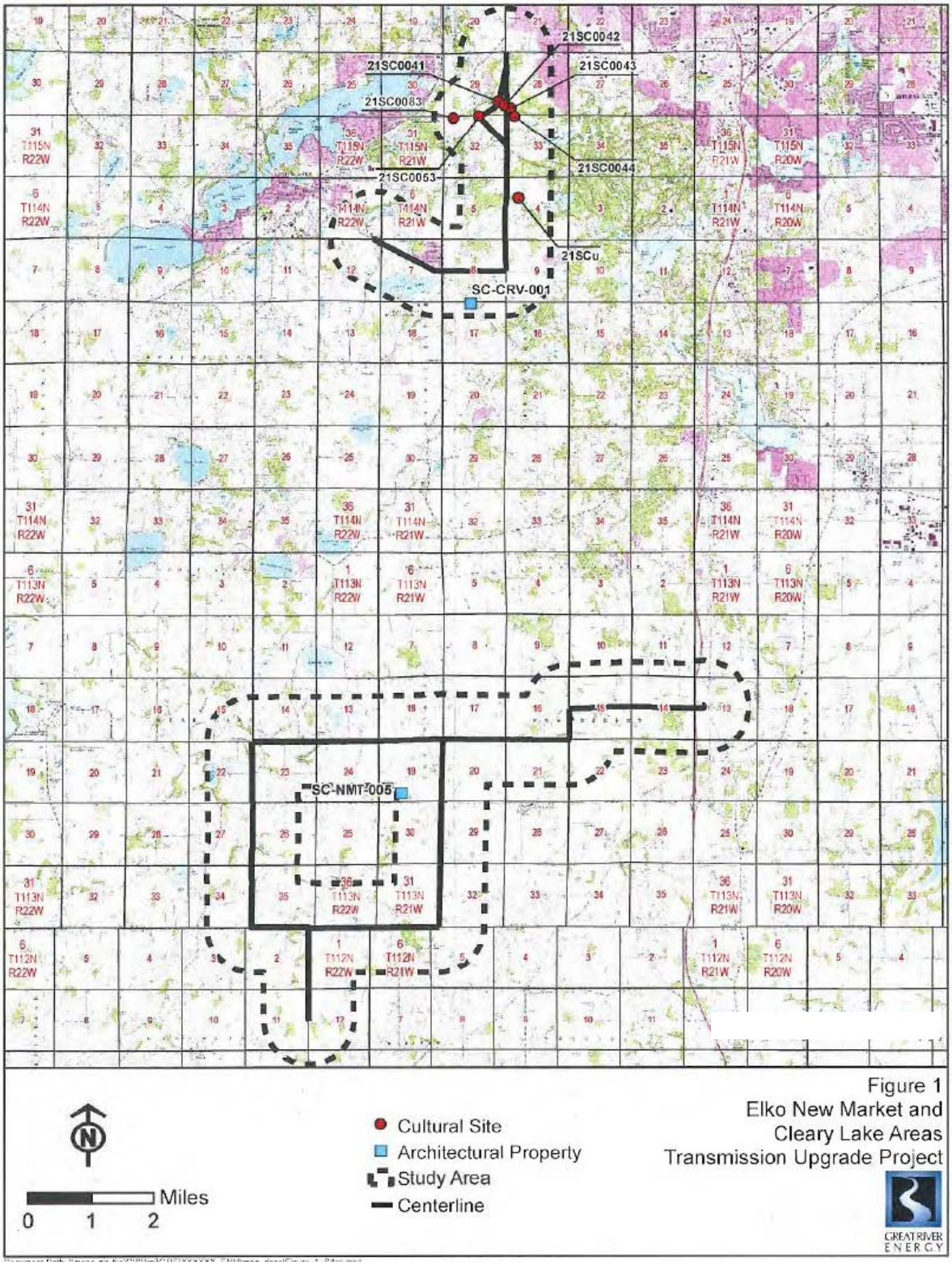
During the project's pre-planning phase, GRE contracted with HDR, Inc. to do a critical impact analysis of the Project area. The Minnesota State Historic Preservation Office (SHPO) was contacted to solicit comment regarding the potential need for cultural resource surveys. A search of the SHPO database was conducted in order to identify previously-documented sites near the Project. A buffer surrounding the existing alignment (see **Figure 5**) was used to determine the archaeological and historic resources, both identified and unidentified, that are likely to be found in the area that could be affected by the Project. Seven previously recorded archaeological sites were located within the study area (**Table 5**). Five of the sites are "precontact" sites and two are of the historic time period. The precontact sites include three isolated lithic finds and two lithic scatters. The historic sites are a sawmill and a depression with artifact scatter. Two recorded architectural properties are located within the study area, a farmhouse and a farmstead.[43]

Table 13. Archaeological and Architectural Sites in the Project Area [44]

Site Number	Township	Range	Section	Site Type	NRHP Eligibility
21SC0041	115N	21W	29	Precontact Lithic Scatter	Unevaluated
21SC0042	115N	21W	29	Precontact Isolated Lithic Find	Unevaluated
21SC0043	115N	21W	28	Precontact Isolated Lithic Find	Unevaluated
21SC0044	115N	21W	33	Precontact Lithic Scatter	Unevaluated
21SC0053	115N	21W	32	Historic Depressions and Artifact Scatter	Unevaluated
21SC0083	115N	21W	32	Precontact Isolated Lithic Find	Unevaluated
21SCu	114N	21W	4	Historic Sawmill	Unevaluated
SC-CRV-001	114N	21W	17	Farmhouse	Unevaluated
SC-NMT-005	113N	21W	19	Farmstead	Listed

[43] Application at Appendix K
[44] Id.

Figure 5. Sites of Historic Interest in the Project Area



Potential Impacts and Mitigation

The proposed Project should be able to avoid impacts to identified archaeological and historic architectural resources by rebuilding the line in place. Avoidance of archaeological and historic architectural properties is the preferred mitigative policy for construction projects. Should a specific resource impact be identified, GRE is expected to consult with SHPO on whether the resource is eligible for listing in the National Register of Historic Places (NRHP).

There may be impacts to unidentified archaeological properties in previously undisturbed portions of the project. As a standard HVTL Route Permit condition, GRE would be required to work with the USCOE and SHPO during their review process to determine what areas may require surveys for the project. GRE would be expected to carry out the appropriate field identification or construction monitoring.

There are no anticipated physical impacts to previously identified historic properties, and it is likely that physical impacts to any additional properties identified during SHPO recommended surveys can be avoided. New visual impacts to identified and unidentified historic architectural properties are not anticipated.

5.13 Natural Environment

Air Quality

There are minimal air quality impacts associated with transmission line construction and operation. The only potential air emissions from a transmission line result from corona. Corona can produce ozone and oxides of nitrogen in the air surrounding the conductor. Corona consists of the breakdown or ionization of air in a few centimeters or less immediately surrounding conductors. For 115/115 kV double circuit and 115 kV single circuit transmission lines, the conductor gradient surface is usually below the air breakdown level.

Temporary fugitive dust emissions from construction activities may occur. Along the proposed route, clearing vegetation and driving the utility poles may create exposed areas susceptible to wind erosion. In addition, tailpipe emissions may generate exhaust from the construction vehicles. Fugitive dust is considered particulate matter under air quality regulations. The concentrations of fugitive dust that is fine particulate matter (PM less than 2.5 microns or PM2.5) is generally small, or approximately three percent to ten percent of total particulate matter (USEPA's AP-42, Sections 13.2 and 11.9). Since fine particulate matter has the potential to travel further into the lungs, it is of greater concern than larger particle size ranges.

Potential Impacts and Mitigation

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The national standard is 0.08 ppm on an eight-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest eight-hour daily maximum average in one year.

Calculations using the Bonneville Power Administration (BPA) Corona and Field Effects Program Version 3 (USDOE, BPA Undated) for a standard single circuit 161 kV project, predicted the maximum concentration of 0.007 ppm near the conductor and 0.0003 ppm at one meter above ground during foul weather or worst-case conditions (rain at 4 inches per hour). During a mist rain (rain at 0.01 inch per hour), the maximum concentrations decreased to 0.0003 ppm near the conductor and 0.0001 ppm at one meter above ground level. For both cases, these calculations of ozone levels are well below the federal and state standards. Studies designed to monitor the production of ozone under transmission lines have generally been unable to detect any increase due to the transmission line facility. Given this, there would be no impacts relating to ozone for the project.

There would be limited emissions from vehicles and other construction equipment and fugitive dust from ROW clearing during construction of the transmission line and substation. Temporary air quality impacts caused by the construction-related emissions are expected to occur during this phase of activity. The magnitude of the construction emissions is influenced heavily by weather conditions and the specific construction activity occurring. Exhaust emissions from primarily diesel equipment would vary according to the phase of construction but would be minimal and temporary. Adverse impacts to the surrounding environment would be minimal because of the short and intermittent nature of the emission and dust-producing construction phases.

As a standard HVTL Permit condition, construction activities must follow best management practices (BMPs) to control air emissions (fugitive dust). Petroleum based dust suppressants may not be used. Construction vehicles with excess emissions would not be operated until repairs to the vehicle could be made. The disturbed area for each route would be minimized.

Water Quality

The Project area lies within the Minnesota River Basin, generally within the eastern edge of the Lower Minnesota River Watershed. Common stream impairments in this watershed include turbidity, bacteria and chloride. Lakes are mainly impaired for nutrients, eutrophication and biological indicators.[45]

Public waters and public waters wetlands,[46] regulated by the MnDNR,[47] and National Wetlands Inventory (NWI) wetlands, based on United States Fish and Wildlife Service (USFWS) review of aerial photography and soil surveys, are displayed on the Project route maps in **Appendix 2**. Small isolated wetlands are located throughout the project area. The only lake the transmission line comes close to is Cleary Lake; the line runs adjacent to the riparian area and approximately 384 feet from open water. The existing transmission lines cross the Credit River (northern area), an unnamed tributary to the Credit River, Porter Creek (southern area) and an unnamed tributary to Porter Creek. The East Option for the new transmission line in the south Project area would result in an additional crossing of Porter Creek. [48] **Table 14** describes the actual locations.

[45] http://www.pca.state.mn.us/index.php/water/water-types-and-programs/watersheds/lower-minnesota-river.html
[46] See Minnesota Statute 103G.005 for definitions
[47] http://www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html
[48] Application at 9-23 and at Figures 9-2A and 9-2B

Table 14. Project Affected Public Waters

Name	Type	Location
Northern Area		
Credit River (Existing Route)	River	T115N, R21W, Section 33
Credit River (Deviation)	River	T115N, R21W, Section 32
Credit River	River	T114N, R21W, Section 4
Unnamed Tributary of Credit River	Stream	T114N, R21W, Section 7
Southern Area		
Unnamed Tributary of Porter Creek	Stream	T113N, R22W, Section 19
Porter Creek	Creek	T113N, R22W, Section 23
Porter Creek (East Option)	Creek	T113N, R21W, Section 31

The wetlands that are found in the route areas are listed by type in Table 9-11 in the Route Application.[49] All the NWI wetlands in the area are Palustrine. Palustrine wetlands generally contain emergent vegetation, with some displaying a mixture of shrubs and herbaceous vegetation. Some have open water components and contain unconsolidated bottoms (commonly, these areas are shallow ponds, marshes, swamps and sloughs). The wetlands are also marked on the route maps (**Appendix 2**), along with their classification codes. These codes can be deciphered by referencing the USFWS Wetlands Code Chart or by using the Service's Wetland Code Interpreter.[50]

Potential Impacts and Mitigation

Rivers and streams will be spanned in this Project, but no transmission structures would be located in those rivers or streams. No lakes will be crossed by the Project.

During construction, there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading and construction traffic. As a standard HVTL Permit condition, the Applicant would be required to employ erosion control best management practices (BMP), as well as adherence to the terms and conditions of the National Pollution Discharge Elimination System (NPDES) and Stormwater Pollution Prevention Plan (SWPPP) permits required by MPCA. An NPDES permit is required for owners or operators for any construction activity disturbing 1) one acre or more of soil; 2) less than one acre of soil if that activity is part of a "larger common plan of development or sale" that is greater than one acre; or 3) less than one acre of soil, but the MPCA determines that the activity poses a risk to water resources.

[49] Application at 9-29 to 9-30
[50] http://www.fws.gov/wetlands/Data/Wetland-Codes.html

BMPs include maintaining sound water and soil conservation practices during construction and operation of the project to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil and stabilizing restored soil. GRE would be expected to avoid major disturbance of individual wetlands and drainage systems during construction. This would be done by spanning wetlands and drainage systems where possible. When it is not possible to span the wetland, GRE could draw on several options during construction to minimize impacts:

- When possible, schedule construction during frozen ground conditions;
- Attempt to access the wetland with the least amount of physical impact to the wetland (e.g., shortest route);
- Assemble structures on upland areas before they are brought to the site for installation; and
- When construction during winter is not possible, use plastic matting where wetlands would be impacted.

The transmission line rebuild may require waters and wetlands permits, letters of no jurisdiction, or exemptions from the USCOE and MnDNR Division of Waters. After coordination and application submission, authorization from the USCOE would likely fall under a Letter of Permission (LOP-05-MN) or the utility line discharge provision of a Regional General Permit (RGP-3-MN). The MnDNR Division of Waters requires a Public Waters Work Permit for any alteration of the course, current, or cross-section below the ordinary high water level of a Public Water or Watercourse. No such alterations are anticipated.

Scott and Rice counties would administer the Wetlands Conservation Act (WCA)[51] for Project area. It is likely that wetland impact minimization will allow the project to be eligible for a WCA *de minimis* or utilities exemption. If that is not the case, WCA permits would be required.

Minnesota Statute 84.415 requires a utility to obtain a license from the MnDNR Division of Lands and Minerals for the passage of any utility over, under, or across any state land or public waters. Therefore, GRE will be required either to confirm the applicability of existing licenses for these crossings or obtain new utility crossing licenses prior to construction.

Since the Project proposes to replace an existing line with structures that have a generally similar footprint, the project should not result in any substantial, permanent wetland impacts or changes. Minimal temporary impacts to wetlands may occur from construction activities and access to the line if these areas need to be crossed during construction of the transmission ROW. However, crossing wetlands during construction should be avoided to the greatest extent feasible. After construction, maintenance and operation activities for substation or transmission line facilities are not expected to have an adverse impact on surface water quality.

[51] The Minnesota Board of Water and Soil Resources administers the act statewide, and the Department of Natural Resources enforces it.

Flora

The Project consists of improvements to existing infrastructure; the new build will be along roadways. The significant land cover types within the Project area are residential, wetlands, some deciduous forest, and pasture and cultivated cropland. Reed canary grass, cattail, cottonwood, sandbar willow, and sedges are the primary species in wetlands. Common species in forested areas include elm, basswood, sugar maple, bur oak, ironwood, northern red oak, and aspen.[52]

Potential Impacts and Mitigation

The majority of flora within habitats in the project area is typical of what would be found in these land covers. If the Project is built along the existing 69 kV transmission line ROW, no additional impacts are anticipated to native vegetation. Additionally, no new ROW would be cleared in forested areas along the rebuild portions, resulting in minimal impacts to this resource. Temporary impacts may occur due to activities associated with pole construction, including minor vegetative clearing for excavation, leveling and heavy equipment traffic. Vegetative clearing would include felling trees along the existing transmission line route, where encroachment would present a danger to safe operation, and temporarily trimming or removing any shrubs or tall grass. Trees that would grow to taller than 15 feet would need to be removed from beneath the overhead lines.

During construction of the transmission line, impacts to forestry and vegetative resources can generally be avoided. GRE has stated it will utilize the existing ROW to upgrade. In the existing ROW, clearance requirements have been followed for many years. Even for new segments, GRE would be required by its SWPPP to maintain sound water and soil conservation practices during construction and operation of the project to protect topsoil and adjacent water resources, and minimize soil erosion. Areas disturbed due to construction activities would be restored to pre-construction contours. Additionally, GRE has committed to the following steps to minimize the introduction or spread of invasive species:[53]

- All disturbed areas will be revegetated using weed-free seed mixes. If practicable, native plant species will be used to revegetate disturbed areas. Weed-free straw or hay will be used for erosion control;
- Herbicidal or manual vegetation removal may be implemented to minimize the spread of invasive species where such removal is consistent with easement conditions or landowner restrictions;
- Construction vehicles will be cleaned and inspected to remove dirt, mud, plants, and debris from vehicles and equipment prior to arriving at, and leaving from, construction sites; and
- The Construction Field Representative will oversee BMP installation and effectiveness.

[52] Application at 9-32
[53] Id. at 9-34

Fauna

Croplands, grasslands, wetlands, and woodlands in the area provide habitat for a variety of wildlife. Wildlife and other organisms that inhabit the Project area include numerous small mammals such as mice, voles and ground squirrels; large mammals such as white-tailed deer; waterfowl and other water birds like pelicans and egrets, songbirds, raptors, upland game birds; and reptiles and amphibians such as frogs, salamanders, snakes and turtles.

Potential Impacts and Mitigation

There is minimal potential for the displacement of wildlife and loss of habitat from construction of the project. Wildlife that inhabits natural areas such as meadows, rivers and lakes could be impacted in the short-term within the immediate area of construction. The distance that animals would be displaced would depend on the species. Impacts to wildlife are anticipated to be short-term since the route primarily would be constructed along an existing transmission line ROW, and the amount of grading and clearing required is minimal.

It is anticipated that fish and mollusks that inhabit the local watercourses will not be affected by transmission line rebuild or new line. Impacts to the wooded areas along the project route would benefit from the same vegetation management discussed in the above section on flora.

Raptors, waterfowl and other bird species may also be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission line. Waterfowl are typically more susceptible to transmission line collision, especially if the line is placed between agricultural fields that serve as feeding areas, or between wetlands and open water which serve as resting areas. The electrocution of large birds, such as raptors, is more commonly associated with small distribution lines than large transmission lines. Electrocution occurs when birds with large wingspans come in contact with two conductors or a conductor and a grounding device. Modern transmission line design provides adequate spacing to limit the risk of raptor electrocution and limits potential avian impacts of the proposed project.

The USFWS has conservation easements along the West Option. They recommend specific locations for installing bird flight diverters[54] to prevent bird collisions and also placing raptor perch deterrents on top of the transmission poles. They also recommended bird flight diverters between two wetland complexes along the West Option, since there may be migratory bird movement between these locations. The USFWS also recommends diverters on the rebuild section adjacent Murphy-Hanrehan Park Reserve due to its designation as an Important Bird Area (IBA).

In most cases, the shield wire of an overhead transmission line is the most difficult part of the structure for birds to see. Utilities have successfully reduced collisions on certain transmission lines by marking shield wires with bird diverters, e.g., pre-formed spiral-shaped devices made of polyvinyl chloride that wrap around the shield wire, commonly referred to as swan diverters.

[54] Application at Appendix K

5.14 Rare and Unique Natural Resources

GRE reviewed the Natural Heritage Inventory System maintained by the MnDNR. **Table 15** lists the rare and unique species within one mile of the proposed routes found through that review. None of occurrences were within the 300 foot route width.

Table 15. Rare and Unique Resources near Proposed Routes[55]

Common Name	Number of Occurrences	Federal Status	State Status*	Habitat
Blanding's Turtle	4	None	THR	Wetland complexes and adjacent sandy uplands
Cerulean Warbler	1	None	NON	Mature, mesic deciduous forest with large trees
Henslow's Sparrow	1	None	END	Old fields, grassland parcels, native prairie
Native Community Undetermined Class	2	None	NON	Oak Woodland Brushland
Willow-dogwood Shrub	1	None	NON	Willow-Dogwood Swamp
Loggerhead Shrike	1	None	THR	Upland grasslands, sometimes agricultural areas where short grass vegetation and perching sites such as hedgerows, shrubs and small trees are found. Both native and non-native grasslands, including native prairie, pastures, old fields, shelterbelts, farmyards, and cemeteries.

*END-Endangered, THR-Threatened, NON-No Legal Status

Potential Impacts and Mitigation

In general, impacts to rare and unique natural resources would be avoided because the project is a rebuild of an existing line within an existing utility corridor, though part of the project is new construction. Environmental review is designed to identify rare species and unique natural resources so that the final design and route options avoid encroachment and effects on these items. If rare species or unique natural resources are identified that will be affected, the HVTL Route Permit will require that GRE coordinate with MnDNR and consider modifying either the construction footprint or the construction practices to minimize impacts.

[55] Application at 9-35

For example, MnDNR has identified that one of the state's 15 Blanding's Turtle priority areas is within or adjacent the proposed Project, and warns that Blanding's turtles may be encountered on site.[56] In such cases, the Route Permit would usually contain a special condition regarding methods for protecting the threatened species during construction. MnDNR has developed a fact sheet (see **Appendix B**) with information about the Blanding's turtle and BMPs which would also be attached to the permit.

[56] MnDNR Letter, Jamie Schrenzel, October 15, 2013, eDocket no. 201310-92584-01

6.0 Application of the Routing Factors

The Power Plant Siting Act requires the Commission to locate transmission lines "in an orderly manner compatible with environmental preservation and the efficient use of resources" and in a way that minimizes "adverse human and environmental impact while insuring" electric power reliability.[57] Minnesota Statute 216E.03, subd. 7(b) identifies considerations that the Commission must take into account when making its final determination on routing of HVTLs. Minnesota Rule 7850.4100 lists 14 factors to guide Commission route designations (see **Figure 3**).

In the first section below, the information gathered from the Application and the review process is balanced against these factors for the entire Project. The second section reviews specifically how the factors apply where it comes down to selecting between alternative route options in making a final routing decision.

6.1 Impacts of the Project as a Whole

Every Project holds the possibility for impacts. The EA is designed to identify probable impacts and suggest mitigation strategies that can be employed to ameliorate potential negative impacts. The applicable factors and corresponding elements that can be minimized or mitigated through the application of standard industrial practices and requirements and general and special conditions contained within an HVTL Route permit are illustrated below in **Table 16**.

Table 16. Mitigating Project Impacts

Factor	Element	General/Special Route Permit Condition[58]
Human Settlement	Noise	Section 4.2.4
	Electronic Communications	Section 4.7.3
Public Health & Safety	Stray/Induced Voltage	Section 4.7.1
	Electric Fields	Section 4.7.2
Land Based Economies	Agriculture	Agriculture Mitigation Plan
Archaeological/Historic Resources		Section 4.8.4
Natural Environment	Flora	Vegetation Mgmt. Plan
	Fauna	Avian Mitigation Plan
	Wetlands	Sections 4.2.7/8
Unique Natural Resources		Blanding's Turtle BMPs
Paralleling/Use of ROW		Section 3.1

[57] Minnesota Statute 216E.02
[58] See Appendix E, Generic Route Permit

Factors with Impacts Anticipated to be Minimal
According to this analysis, the proposed Project will have minimal impact on several of the factors considered, particularly those elements noted:

- human settlement (including socioeconomics, displacement, aesthetics, noise, property values, cultural values, recreation, electronic communications and public services);
- public health and safety (including electric and magnetic fields, stray voltage and induced voltage);
- land based economies (including agriculture, forestry, tourism and mining);
- archaeological and historic resources;
- rare and unique natural resources.

Factors with Impacts Anticipated to be Minimal to Moderate with Mitigation
Also based on information in the Application and EA, there are routing factors for which adverse impacts of the project should be minimal given the application of mitigative strategies identified in the EA and described below. In particular, these are elements associated with the effects of the Project on the natural environment, particularly water quality, flora and fauna.

Water Quality. With the implementation of Best Management Practices,[59] the construction and operation of the proposed project is not anticipated to result in adverse or significant impacts to wetlands and water bodies in the project area. The Applicant would be required to prepare a Storm Water Pollution Prevention Plan (SWPP) that outlines the BMPs for erosion prevention and sediment control. As part of the SWPP Plan, the Applicant would be required to prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan to minimize the potential for spills of hazardous materials and their transport to streams and other water bodies.

Flora. The transmission line ROW would be restored and vegetation reestablished through re-seeding and mulching. To inhibit weeds from becoming established on the new ROW, disturbed areas would be stabilized and replanted as soon as practicable with a seed mix approved by the MnDNR. Equipment and vehicles used in weed control efforts would be thoroughly cleaned before moving to non-infested areas. These precautions should be included in the HVTL Route Permit standard conditions, including deliverables such as a vegetation management plan and an invasive species control plan developed in consultation with MnDNR.

Fauna. It is unlikely that the construction, operation and maintenance of the proposed project would have a permanent effect on fauna present in the area. Wildlife that inhabits trees that may be removed for the HVTL will be displaced; however, comparable habitat is near the route, and it is likely that these organisms would only be displaced a short distance.

MnDNR has requested special consideration of the Blanding's turtle in construction practices.

[59] http://stormwater.pca.state.mn.us/index.php/Main_Page

Electrocution of avian species occurs when birds with large wingspans come in contact with two conductors or a conductor and a grounding device. GRE transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution and would minimize potential avian impacts of the proposed project.

Avian collisions with transmission lines can occur in proximity to agricultural fields that serve as feeding areas, wetlands and water features and along riparian corridors that may be used during migration. The USFWS recommended the placement of bird flight diverters in three locations of the proposed project that may serve as feeding or resting areas for migrating waterfowl and other species. Marking transmission lines with SFD can reduce the likelihood of avian collisions.

A variety of manufactured products may be used during construction projects to temporarily protect soil from erosion and facilitate establishment of vegetation Plastic netting used in these products has been found to entangle wildlife, including reptiles, amphibians, birds and small mammals. Oxo-degradable or oxo-biodegradable plastic has a chemical additive that helps speed up degradation of the plastic, as long as the necessary elements of oxygen and microorganisms are available, leaving a residue of plastic pellets in the environment. To avoid adversely impacting reptile and bird species, a permit condition could be required to use wildlife friendly erosion control materials (see **Appendix B**).

Factors with Impacts that are Met or Adequately Addressed
Some routing factors are applicable to the state's goal of ensuring electric energy security through efficient, cost-effective power supply and transmission infrastructure. The information contained in the Application and EA indicate these factors have been addressed.

Design Options. The Project area is currently served by a single circuit 69 kV line (the Cleary Lake-Elko System). The current configuration is anticipated to result in more low voltage occurrences and system overloads as the area usage continues to grow. The upgrade design, in conjunction with the new construction linking the system with the Scott-Faribault System is expected to improve access and reliability for both systems. The design is forward looking as it is proposed to be built to 115 kV specifications, providing long-term load-serving capability. The 115 kV configuration would not have significantly higher EMF fields.

Use or Paralleling of Existing ROW. All the existing 69 kV system is proposed to be upgraded in place. For nearly that entire length, the line is also anticipated to be replaced without expanding the existing ROW. However, the "deviation" in the northern area has one approximately 1700 foot stretch where the line creates unique ROW.

Use of existing infrastructure ROW. The proposed transmission lines parallel or share existing infrastructure rights-of-way (e.g., roads and existing 69 kV ROW) for the entire length of the project. The new 115 kV construction from New Market Substation to the Veseli Breaker Station shares road ROW for nearly the entire line, and distribution for the remaining short segment.

Factors with Impacts that are Unavoidable, Irreversible or Irretrievable
The final factors address natural and human effects that cannot be avoided, and irreversible or irretrievable commitments of resources.

Unavoidable Impacts. The Elko New Market Cleary Lake Areas 115 kV Transmission Upgrade Project as proposed would have few unavoidable adverse impacts. It would not have the same level of impacts that are usually associated with the construction of a new transmission line due to the fact that it is for the greater part a rebuild of an existing line. The new portion of the transmission line shares ROW with existing roadways, and mitigation measures can be incorporated into the planning, design and construction of the proposed project to substantially mitigate adverse impacts.

In some areas of consideration, adverse impacts can be reduced but not eliminated and are therefore determined to be unavoidable. Most unavoidable adverse impacts would occur during the construction phase of the proposed project and would be temporary.

Potential unavoidable impacts related to proposed project construction would last only as long as the construction period, and would include the following:

- Soil compaction, erosion and vegetation degradation
- Disturbance to wetland vegetation and soil
- Disturbance to and displacement of some species of wildlife
- Disturbance to nearby residents
- Traffic delays in some areas
- Minor air quality impacts due to fugitive dust

Potential unavoidable impacts that could last as long as the life of the project could include the following:

- The addition to the visual landscape of transmission towers and lines
- Habitat type changes and fragmentation
- Adverse impacts to wildlife and wildlife habitat due to project-related changes to wetland type (e.g., PFO to PSS) and the removal of other vegetation
- Direct adverse impacts to wildlife as a result of avian collisions

Irreversible and Irretrievable Commitments of Resources. There are few commitments of resources associated with this project that are irreversible and irretrievable, but those that do exist are primarily related to construction. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action. For the existing line, land use has already been committed to transmission ROW. New lands would be similarly restricted when employing new alternatives.

Construction resources used to construct the project include aggregate resources, concrete, steel, and hydrocarbon fuel. During construction, vehicles would be traveling to and from the site utilizing hydrocarbon fuels. For commercial properties, near a potential new transmission line, business activity could be temporarily restricted during construction.

6.2 Comparative Impacts of the Project Route Alternatives

The GRE proposal has two areas of the Project where the utility has provided two separate route alternatives. In the northern area (see **Figure 1**), GRE proposes going along the existing route at the onset in Savage, or repositioning the line to the west along Dakota Avenue (County Rd 27). In the southern area (see **Figure 2**), GRE has presented two options to connect the New Market Substation to the Veseli Substation in Rice County, one route along Panama Avenue to the west and one along Texas Avenue to the east. To date, GRE has not stated a definitive preference.

Northern Area

The proposed Project begins at Prior Lake Junction at County Rds 42 and 27, then heads directly south along a densely residential area in the southern part of Savage. The first set of maps in **Appendix A** give a close up view of the transmission line and the neighborhood. This section of line goes through the back yards of many of the residences, making construction and maintenance access difficult for line crews. Also, some of the easements through these properties are smaller than 70 feet. In a couple instances, the ROW is reduced to as little as 28 feet.

An alternative has been proposed that moves the line west along Cty Rd 27, proceeds down that road until it reaches the section line and runs directly east to where it rejoins the existing MV-PN line. The second set of maps in **Appendix A** provides a close up of this area. The diversion creates new ROW for its entire length and introduces potential impacts to 12 residences within the 300 foot route that had not been affected previously. It also creates one-third of a mile of ROW that does not parallel any existing ROW.

Table 17. Residences along Northern Area Alternatives

Residential Structures					
Alternative	Distance in Feet from Transmission Line Centerline				**Total**
	0-25	26-50	51-100	101-150	
Existing MV-PN Line Prior Lake Junction to point one mile south	2	4	34	13	**53**
Deviation along Dakota Avenue, east to MV-PN line	0	0	27	10	**37**

Table 18. Northern Area Alternatives Comparisons

Within 300 Foot Route Width	Units	Existing Line	Deviation
Length of Transmission Line	Miles	1.0	1.45
Length Parallel to Existing ROW (Roads, powerlines)	Miles	1.0	1.13
Roads Crossed	Number	4	3
Parcels Crossed (center line/300 ft.area)	Number	19/79	13/66
Residences	Number	53	37
Non-Residential Buildings	Number	4	4
Wetlands Crossed (length)	Count/Feet	9/965	12/2063
Transmission Line Distance across Lake, Stream, Drainage or Other Waterway	Count/Feet using wetland data	2/99	0/0
Mineral or Metal Mining Resources	acres	0	0
Forested Land Crossed	acres	0	0
Agricultural Land Crossed	acres	18.6	27.9
Developed Land Crossed	acres	15.6	13.5
Wetlands Crossed	acres	1.3	3.7
Open Land Crossed (grassland, lowland shrub)	acres	2.3	7.9
Parks, WPAs, WMAs, Wildlife Refuges, Prairie	acres	0	0
Number of Known Protected or Endangered Species	Number of species	0	0
Number of Archaeological and Historic Resources	Number	1	2
Cost	Dollars	-	+ $440,000*

Land data based on http://deli.dnr.state.mn.us/metadata.html?id=L390000102101
Wetland boundaries based on National Wetland Inventory Maps.
**Due to additional length, transmission structure types and new easement acquisition.*

Tables 17 and 18 present an objective comparison of each alternative based on detailed data used to compare impacts of each alternative route segment.

Over 50 homes are within the 300 foot route along the existing line. Six of these homes are within 50 feet of the existing line, and two are literally within the line ROW. This would have a direct impact on the ability of potential buyers of these two homes to obtain FHA financing if the homes are within the fall zone of the transmission structures. On the other hand, the potential impacts on homes in this option, including property value impacts, would be incremental to the ones that already exist.

The deviation route has no homes within 50 feet of the new alignment and therefore none within the ROW. The option also has 16 fewer homes within the 300 foot route. Most potential impacts would be new, as noted above. However, easement agreements are designed to compensate to a degree for some of the impacts.

Several residents communicated their interests in one route or the other during the EA scoping process.[60] Some of the comments noted the close proximities of the line in the existing alignment. Others noted the possible intrusion on Dufferin Park or the impact on views from Overlook Drive for the alternative route. The alternative would generally shift potential impacts from neighbor to neighbor, although the line should be visible to both regardless.

Table 19 reflects the comparative impacts of choosing one or the other of the route alternatives in the northern area. In general, either option would serve fairly equally as a route, with very similar environmental impacts and no disqualifying elements, such as placement in prohibited areas. The deviation would affect new landowners, but there would be fewer overall, with an overall greater setback from the transmission line.

[60] Public Scoping Comments, October 15, 2013, eDocket no. 201310-92747-08

Table 19. Assessment of Alternatives' Impacts for Northern Area

Factors Considered (Minn. Rule 7850.4100)	Relative Impacts of Existing v. Deviation
Factors with Impacts Anticipated to be Minimal	
Human Settlement	No displacement is expected. Primary impacts would be aesthetic. Potential property value impacts are either realized on the existing route or anticipated in easement contracts for deviation.
Effects on public health and safety	No impacts are anticipated.
Effects on land-based economies, including agriculture, forestry, tourism and mining	The routes are equal. Any effect the Project might have on Murphy-Hanrahan Regional Park would occur further south after the alternatives rejoin at the original route.
Effects on archeological and historic resources	No impacts are anticipated
Effects on rare and unique natural resources	All of the occurrences noted in Table 15 are located outside of the proposed routes.
Factors with Impacts Anticipated to be Minimal to Moderate with Mitigation	
Effects on the natural environment, including effects on air and water quality resources and flora and fauna	There would be short term construction impacts, which should be equivalent for either route. The deviation crosses additional wetlands (see route maps), but GRE plans to place bird diverters along that section.
Factors with Impacts that are Met or Adequately Addressed	
Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity	Both options should be essentially equal.
Use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries	Both options would parallel existing ROW or section lines.
Use of existing transportation, pipeline, and electrical transmission systems or rights-of-way	The existing route is intended to be rebuilt within the same ROW. The deviation parallels existing road ROW except for approximately 1/3 mile.
Electrical system reliability	Either route would fulfill the stated need.
Cost of constructing, operation and maintenance which are dependent on design and route	Due to its slightly longer length and design, the deviation would cost more than the existing.

Southern Area

GRE has included two options for consideration to connect the New Market Substation in Cedar Lake Township in Scott County with the Xcel Energy Veseli Breaker Station in Wheatland Township in Rice County. An "East" option would tap into the upgraded 115 kV line along 250th Street at Texas Avenue heading south, go west on Hwy 19 and turn south on Halstad Avenue down to Veseli Substation. A "West" option would head south from New Market Substation along Panama Avenue, east along Hwy 19 and then south on Halstad Avenue to the substation.

The public comments received on these options[61] included concerns about wetland preserves along the west route. USFWS also commented on these wetlands.[62] Maps of the west option in **Appendix A** display placement of SFDs along areas recommended by the USFWS. The issue noted along Texas Avenue on the east route was the constriction of the route between two farmsteads just south of 250th street. The route width was expanded in this area to give options to bypass the farms on either side of the road.[63] The West Option is approximately 5.4 and the East 6.6 miles respectively.

Tables 20 and 21 present an objective comparison of each alternative based on detailed data used to compare impacts of each alternative route segment

Table 20. Residences along Southern Area Alternatives

Residential Structures					
Alternative	Distance in Feet from Transmission Line Centerline				**Total**
	0-25	26-50	51-100	101-150	
East Option – tap with MV-PN line to Veseli Breaker Station	0	0	5	5	**10**
West Option – New Market Substation to Veseli Breaker Station	0	0	3	3	**6**

There are 10 homes spread along the east option and six along the west. Due to the difference in length of the line, these represent approximately similar sparse densities. None of these homesteads would be within the ROW of the new line. In both options, the entire ROW would be new and would require new easements. Property value impacts should be similar along either line, and easements would be negotiated to compensate for potential impacts.

[61] Public Meeting Comments, October 1, 2013, 1:00 p.m., eDocket no. 201310-92747-06
[62] Application at Appendix K
[63] See Scoping Decision at Appendix D

Table 21. Southern Area Alternatives Comparison

Within 300 Foot Route Width	Units	West Option	East Option
Length of Transmission Line	Miles	5.38	6.6
Length Parallel to Existing ROW (Roads, powerlines)	Miles	5.38	6.6
Roads Crossed	Number	4	5
Parcels Crossed (line/300 foot area)	Number/Acres	19/89	19/83
Residences	Number	6	10
Non-Residential Buildings	Number	5	15
Wetlands Crossed (length)	Count/Feet	12/14,948	5/691
Transmission Line Distance across Lake, Stream, Drainage or Other Waterway	Count/Feet using wetland data	0	0
Mineral or Metal Mining Resources	acres	0	0
Forested Land Crossed	acres	0	1.6
Agricultural Land Crossed	acres	115.7	197.6
Developed Land Crossed	acres	0	0
Wetlands Crossed	acres	8.7	3.4
Open Land Crossed (grassland, lowland shrub)	acres	73.7	263.6
Parks, WPAs, WMAs, Wildlife Refuges, Prairie	acres	0	0
Number of Known Protected or Endangered Species	Number of species	1	1
Number of Archaeological and Historic Resources	Number	0	0
Cost	Dollars	-	+ $747,000*

Land data based on http://deli.dnr.state.mn.us/metadata.html?id=L390000102101
Wetland boundaries based on National Wetland Inventory Maps
**Due to additional length.*

Table 21 reflects the comparative impacts of choosing one or the other of the route alternatives in the southern area. In general, either option would serve fairly equally as a route, with no disqualifying elements. The west option has more potential impact on wetlands. Due to its length, the east option has more potential impact on agriculture. Otherwise, both options would have very similar environmental and human impacts that could be generally mitigated in either case.

In the southern area, both options would parallel, relocate or underbuild some distribution lines along the routes. If these are relocated, GRE estimates an additional cost of $100,000 per mile[64] to do so (not noted in **Table 20**). If they are paralleled, it would push the transmission lines further out into farm fields where they would share less road ROW and may have a greater impact on agricultural activities. Underbuilding would also have an additional cost for different structures and line spacing.

[64] GRE email, Carole Schmidt, February 17, 2014

Table 22. Assessment of Alternatives' Impacts for Southern Area

Factors Considered (Minn. Rule 7850.4100)	Relative Impacts of West v. East Options
Factors with Impacts Anticipated to be Minimal	
Human Settlement	No displacement is expected. Primary impacts would be aesthetic. Potential property value impacts would be the same for either route, with redress anticipated in easement contracts.
Effects on public health and safety	No impacts are anticipated.
Effects on land-based economies, including agriculture, forestry, tourism and mining	The east has considerably more agricultural land through which the transmission would pass. However, the impact should be minimized by sharing ROW with roads
Effects on archeological and historic resources	No impacts are anticipated
Effects on rare and unique natural resources	No occurrences are within the 300 foot route width for either route.
Factors with Impacts Anticipated to be Minimal to Moderate with Mitigation	
Effects on the natural environment, including effects on air and water quality resources and flora and fauna	There would be short term construction impacts, which should be equivalent for either route. The west option has significantly more wetland areas to consider (see route maps), but GRE plans to place bird diverters along those sections. The east option crosses the Porter River where, again, GRE plans stringing bird diverters
Factors with Impacts that are Met or Adequately Addressed	
Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity	Both options should be essentially equal.
Use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries	Both options would parallel existing ROW or section lines.
Use of existing transportation, pipeline, and electrical transmission systems or rights-of-way	Both routes follow and share road ROW. The west option moves to parallel distribution lines for approximately 900 feet.
Electrical system reliability	Either route would fulfill the stated need.
Cost of constructing, operation and maintenance which are dependent on design and route	Due to its longer length, the east option would cost more than the west option.

Appendix A – Route Maps

Appendix B – MnDNR Factsheets

Appendix C – Agency Letters

Appendix D – EA Scoping Decision

Appendix E – Route Permit Template