GREAT RIVER ENERGY

APPLICATION TO THE
MINNESOTA PUBLIC UTILITIES COMMISSION
FOR A
ROUTE PERMIT

ALTERNATIVE PERMITTING PROCESS

ENTERPRISE PARK 115-kV PROJECT

Docket ET2/TL-11-915

GREAT RIVER ENERGY℠
A Touchstone Energy® Cooperative

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GLOSSARY OF TERMS

Alignment: The actual course that a transmission line and its structures will follow within a Route. The final alignment is not determined until after a Route Permit has been issued, the permitted Route has been physically surveyed, landowners are contacted, and easements are negotiated.

Blowout: The distance that a transmission line will swing outside of the vertical centerline defined between two structures.

Conductor: A wire made up of multiple aluminum strands around a steel core that together carry electricity.

Circuit: A continuous electrical path along which electricity can flow from a source, like a power plant, to where it is used, like a home. A transmission circuit consists of three phases with each phase on a separate conductor.

Distribution: Refers to the low voltage (typically less than 69 kilovolts) system and its components such as conductors, structures and substation that deliver electric energy to end consumers including homes, businesses and factories.

Easement: The legal document whereby a landowner grants the necessary rights to the utility company to build and operate the transmission line across a specified segment of the landowner's property.

Insulator: An object made of a material like glass, porcelain or composite polymer that is a poor conductor of electricity. Insulators are used to attach conductors to the transmission structure and to prevent a short circuit from happening between the conductor and the structure.

Phase: One element of a transmission circuit that has a distinct voltage and current. Each phase has maximum and minimum voltage peaks at different times than the other phases.

Route: A corridor of land within which a transmission line and its right of way will be located. The Public Utilities Commission has the authority to review, alter, and approve the final Route through the processing of a Route Permit Application.

Right of way: Land area legally acquired for a specific purpose, such as the construction and maintenance of transmission line facilities, vegetation management, etc. The underlying title ownership of the right of way remains with the landowner.

Shield wire: A wire connected directly to the top of a transmission structure to protect conductors from a direct lightning strike, minimizing the possibility of power outages.

Single circuit: A circuit with three sets of conductors.

Structures: Towers, poles, guy wires and anchors that support transmission line conductors and shield wires.

Substation: A facility that monitors and controls electrical power flows, uses high voltage circuit breakers to protect power lines and transforms voltage levels as needed to further distribute the energy into the electrical grid.

Transmission: Refers to the high voltage (typically 69 kilovolts or more) system and its components such as conductors, structures and substation that deliver large volumes of electric energy to the distribution systems. Note that Minnesota Statutes 261E.01 Subd.4. defines a High Voltage Transmission Line as those operating at 100 kilovolts or more for regulatory purposes. However, from a general operating perspective, transmission systems include lines operating at 69 kilovolts or more.

Underbuild: Refers to the attachment of distribution conductors to transmission system structures. The distribution conductor is typically attached to a transmission line pole with a cross arm below the transmission conductors.

ACRONYMS	
AC	Alternating current
ACSS	Aluminum conductor steel supported
ALJ	Administrative Law Judge
BMPs	Best Management Practices
BNSF	Burlington Northern Santa Fe
BPA	Bonneville Power Administration
CIP	Conservation Improvement Program
Commission	Minnesota Public Utilities Commission
CON	Certificate of Need
Corps	United States Army Corps of Engineers
CR	County Road
CSAH	County State Aid Highway
dBA	Decibel – A weighted
DC	Direct current
DNR	Minnesota Department of Natural Resources
DSM	Demand Side Management
EA	Environmental Assessment
EMF	Electromagnetic fields
EPA	United States Environmental Protection Agency
EQB	Minnesota Environmental Quality Board
G	Gauss

ACRONYMS	
HVDC	High voltage direct current
HVTL	High voltage transmission line
IMDs	Implantable medical devices
kV	Kilovolt
kV/m	Kilovolts per meter
LHVTL	Large High Voltage Transmission Line
mA	MilliAmperes
mG	Milligauss
MHS	Minnesota Historical Society
MISO	Midwest Independent Transmission System Operator
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MRO	Midwest Reliability Organization
MW	Megawatt
MWh	Megawatt hours
NAC	Noise area classifications
NESC	National Electrical Safety Code
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OES	Office of Energy Security
PWI	Public Waters Inventory
ROW	Right-of-Way
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area
SPCC	Spill Prevention Control and Countermeasure
SWPPP	Stormwater Pollution Prevention Plan
USFWS	United States Fish and Wildlife Service
WMA	Wildlife Management Area

1 EXECUTIVE SUMMARY

Great River Energy, Anoka Municipal Utility, Xcel Energy and Minnesota Municipal Power Agency propose a new 115-kilovolt (kV) transmission project in Anoka County, Minnesota. The project includes constructing a new 115- kV transmission line to interconnect the existing Crooked Lake Substation in Coon Rapids, Minnesota, with the existing Enterprise Park Substation in Anoka, Minnesota, attaching Anoka Municipal Utility's distribution lines to the new 115-kV line (or burying them), and modifying the Xcel Energy Crooked Lake Substation and the Anoka Municipal Utility Enterprise Park Substation (Project). Because the new transmission line is rated at greater than 100 kV, a Route Permit must be issued in accordance with Minnesota Rules (Minn. Rules) Chapter 7850 by the Minnesota Public Utilities Commission (Commission) prior to construction of the Project.

This application provides the applicable information required by Minn. Rules Chapter 7850 for the Commission to assess the Project and issue a Route Permit.

1.1 Purpose of the Project

Great River Energy has analyzed the existing power service to the region and has determined that the existing electrical network is approaching its capacity for serving new load growth. To address these deficiencies, a new transmission line is required to meet future electric load requirements and to provide relief on the existing transmission system.

In addition, the Enterprise Park Substation is currently served only by a single radial 69-kV transmission line, which increases the risk of power loss to those customers served out of the substation. The proposed new line will offer a new radial 115-kV supply service with the existing 69-kV line remaining in place as back up service, which will mitigate the risk of power loss to the customers.

The proposed project will strengthen and enhance the regional transmission system by:

- providing an additional power delivery source into the Anoka and Ramsey industrial parks,
- relieving the pressure on the existing 69-kV transmissions system, and
- backing up transmission service to the Enterprise Park Substation and the retail customers

The new line will allow new customers to interconnect to the transmission grid resulting in growth and other economic benefits to the area.

1.2 Applicants

Great River Energy is a not-for-profit generation and transmission cooperative based in Maple Grove, Minnesota. Great River Energy provides electrical energy and related services to 28 member cooperatives, including Connexus Energy, a distribution cooperative serving the northwest Metro Region that will benefit by the proposed new transmission line (Figure 1-1 in Oversized Figures Tab). Great River Energy's distribution cooperatives, in turn, supply electricity and related services to more than 645,000 residential, commercial and industrial customers in Minnesota and Wisconsin.

Great River Energy's nominal 3,300-megawatt (MW) generation system includes a mix of baseload and peaking plants, including coal-fired, refuse-derived fuel, natural gas and oil plants as well as wind generators. Great River Energy owns approximately 4,500 miles of transmission line in Minnesota, North Dakota, South Dakota and Wisconsin.

Great River Energy and Connexus Energy's mission is to provide safe, reliable, and affordably priced energy to those they serve.

Anoka Municipal Utility (Anoka Municipal Utility) is a community-owned, not-for-profit, electric supplier serving the city of Anoka, and portions of the cities of Ramsey, Coon Rapids, Champlin and Dayton. The citizens of Anoka chose to create Anoka Municipal Utility over a century ago to provide economical, reliable electric power and have local control over an essential service. Anoka Municipal Utility serves 10,500 residential, 1,300 commercial, and 15 industrial customers including several national accounts such as Pentair and Federal Cartridge (a subdivision of Alliant Tech).

Xcel Energy is a Minnesota corporation headquartered in Minneapolis, Minnesota. Xcel Energy is a wholly owned subsidiary of Xcel Energy, Inc., a utility holding company also headquartered in Minneapolis. Xcel Energy provides electricity services to approximately 1.2 million customers and natural gas services to 425,000 residential, commercial and industrial customers in Minnesota.

Minnesota Municipal Power Agency (MMPA) is a Minnesota municipal corporation. MMPA provides electricity to 11 Minnesota municipal utility members, including Anoka. The Agency is owned by member cities, and is governed by a board of directors. Each MMPA member owns its electric distribution system. Together, the 11 members provide electricity to over 57,000 households and businesses. MMPA

generates electricity from owned generators and also purchases electricity from other utilities and from the Midwest Independent System Operator (MISO).

1.3 Project Description

The proposed Project includes the following components:

- Constructing approximately 5.8 miles of new overhead 115-kV transmission line between Xcel Energy's existing Crooked Lake Substation in Section 8, Township 31N, Range 24W in Coon Rapids, Minnesota and Anoka Municipal Utility's existing Enterprise Park Substation in Section 35, Township 32N, Range 25W in Anoka, Minnesota (Figure 1-2 in Oversized Figures Tab).

- Removing, rebuilding and attaching Anoka Municipal Utility's existing overhead distribution (12.5 kV) lines to the new transmission line where the proposed new overhead 115-kV transmission line overtakes the existing distribution. Alternatively, Anoka Municipal Utility may choose to bury some of the distribution lines that are overtaken by the new high voltage line.

- Modifying the Xcel Energy Crooked Lake Substation and the Anoka Municipal Utility Enterprise Park Substation to accommodate Great River Energy's new transmission line. Work within the Crooked Lake Substation will include the reconstruction of the 115-kV side to a more reliable ring bus and breaker additions. Work within the Enterprise Park Substation will include the addition of a new 115-kV/12.5-kV step down transformer and associated switch gear.

The Proposed Route was established after receiving significant input from numerous stakeholders, including city planning staff and council members, landowners, homeowners, business owners, and federal and state agencies. Input was solicited and received through 25 face-to-face meetings – including two open houses – written correspondence, and telephone calls.

The Proposed Route for the new transmission line is described below and shown in Figure 1-2 (Oversized Figures Tab). Figures 4-1 and 4-1a through 4-1J (Oversized Figures Tab) also include a conceptual alignment for the transmission line within the Proposed Route. The Project Applicants have developed this conceptual alignment based on reviews of digital images, physical tours of the Proposed Route, and best professional judgment. It is not possible to establish the final alignment until after a Route Permit is issued, additional landowner input is

obtained, landowner easements are negotiated, extensive field surveys are completed, underground utilities are located, and an engineering design is substantially completed. The conceptual alignment is provided in response to a request from Department of Commerce staff, and it is the Applicants' understanding that the Route Permit will not restrict the project to be constructed exactly as depicted in these figures.

The proposed new transmission line would exit from the north and east side of the existing Xcel Energy Crooked Lake Substation, extend over Main Street, then turn west following the north side of Main Street to the Burlington Northern Santa Fe (BNSF) railroad, where it turns and parallels the northwest side of the tracks for approximately one-quarter mile. It would then turn north to travel through industrial/commercial property and eventually turn west at the Minnesota Department of Transportation (MnDOT) southern right of way for Highway 10. It would then follow along the south side of U.S. Highway 10 up to 6th Avenue. The transmission line would turn north and cross Highway 10 at 6th Avenue, then east on Garfield Avenue, then north on 7th Avenue N., then west on Bunker Lake Road, then south along the Anoka city limits to the Enterprise Park Substation.

The Applicants prefer to construct the segment of new transmission line behind the homes on the west side of 6th Avenue between Grant Street and Garfield Avenue, on the north side of Garfield Avenue, and on the west side of 7th Avenue because there is less development along these segments and fewer homeowners would be affected.

The Applicants request the route widths shown in Figures 4-1A through 4-1J (see Oversized Figures Tab). The requested route width generally varies between 50 and 200 feet from the centerline of the roadways, except for around the Anoka High School. The requested Route widths are intended to allow flexibility to work with landowners on the alignment and to accommodate environmental concerns.

The typical right of way will be 50 to 70 feet wide, 25 to 35 feet on each side of the transmission centerline. Along public roads, the Applicants desire to locate the transmission line structures two to five feet outside of the public road rights of way, although there may be unique circumstances where structures would need to be located within public road rights of way. With much of this Project located in densely developed suburban areas, consideration of narrower right of ways will be given in those instances where existing structures or other physical features may reduce the available right of way to less than 25 feet on either side of the transmission line.

The Proposed Route takes advantage of numerous opportunities to share existing electric distribution line right of way. Depending on the outcome of the permitting process, Great River Energy and Anoka Municipal Utility will work to move the distribution lines onto the new high voltage transmission line structures. Alternatively, Anoka Municipal Utility may choose to bury some of the distribution lines.

The estimated cost to construct the new transmission line and modify the existing substations is approximately $12 million.

The transmission line will be designed to meet the National Electric Safety Code (NESC). The NESC recommends minimum safety standards for clearances over roadways, buildings, signs, light standards, and other facilities. Great River Energy has company standards that meet or exceed the NESC requirements. In some cases, greater clearances are dictated by MnDOT, railroads, or local county highway permitting. Great River Energy will work with these agencies to meet their clearance requirements.

Single pole wood structures with horizontal post insulators will be the primary structure used for the Project. Angles in the line will require guying (the use of anchors and support cables) or specialty structures. Where guying is not practicable, direct embedded laminated wood poles, or steel poles directly embedded or on drilled pillar concrete foundations will be utilized. The average span between structures without underbuild will be 300 to 400 feet and structure heights will typically range from 60 to 85 feet. With underbuild, the average span will be 250 to 300 feet and poles will averages 75 to 85 feet above ground. H-Frame design structures may be used in areas where longer spans are required to avoid or minimize impacts to wetlands or waterways. H-Frame span lengths average 600 to 700 feet, with 1,000-foot spans possible with certain topography, and structure heights typically range from 60 to 80 feet. Structures, pole heights and spans will vary depending upon topography and environmental constraints.

The Minnesota Historical Society (MHS) suggested that an archeological survey be completed for the Project. Great River Energy contracted with Westwood Environmental Services, to complete a literature review, which indicated only one potential site within the Proposed Route. The listed site was previously reviewed, determined to be ineligible for listing on the National Register of Historic Places, and was subsequently destroyed. Once a Route Permit is issued, Westwood will be contracted to conduct a windshield survey in the vicinity of the identified site and

identify areas where it would be prudent to avoid placing structures. Using this information, the transmission line alignment will be designed. The MHS will be consulted on the final transmission line alignment, and the Project Applicants will follow their recommendations on conducting any further analyses.

Pending successful avoidance of any cultural resources, the proposed Project will not result in any significant environmental impacts based on the Proposed Route, agency reviews, construction practices, and other mitigation measures outlined in this application.

2 REGULATORY REQUIREMENTS

Minn. Rules Chapter 7850 requires that project applicants provide specific information about a project. Some of the basic administrative components of the permitting requirements are provided in this section. A regulatory completeness table is also provided in Section 2.4 that specifies where all of the requirements are addressed within this application.

2.1 Certificate of Need Not Required

Minn. Stat. §216B.243, Subd. 2 (2007), states that "[n]o large energy facility shall be sited or constructed in Minnesota without the issuance of a certificate of need by the Public Utilities Commission...." A large energy facility is defined as "any high-voltage transmission line with a capacity of 100 kilovolts or more with more than ten miles of its length in Minnesota or that crosses a state line."[1] The proposed Anoka Project is less than ten miles in length; therefore, a certificate of need is not required.

2.2 Eligibility and Request for the Alternative Permitting Process

Minn. Stat. § 216E.03, subd. 2, provides that "[n]o person may construct a high voltage transmission line without a route permit from the commission." A high voltage transmission line (HVTL) is defined as "a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kilovolts or more and is greater than 1,500 feet in length."[2] Because the Enterprise Park Project includes a transmission line of 115 kV that is greater than 1,500 feet, a Route Permit is required.

The rules that apply to the review of Route Permit applications are found in Minn. Rules Chapter 7850. Minn. Rules 7850.1900, subps. 2 and 3 set forth the information that must be included in a Route Permit application.

Minn. Stat. § 216E.04, subd. 2(3) provides for an Alternative Review Process for transmission lines between 100 and 200 kilovolts. At 115 kV, this Project qualifies for alternative review. This Alternative Review Process is shorter than the process required for transmission lines over 200 kV. Under the Alternative Review Process, an applicant is not required to propose any alternative routes, but must disclose any routes that were rejected by the applicant.[3]

Further, an Environmental Impact Statement is not required under the Alternative Review Process. Instead, the Department of Commerce is required to prepare

[1] Minn. Stat. § 216B.2421, subdiv. 2(3). (2010).
[2] Minn. Stat. § 216E.01, subdiv. 4. (2010).
[3] (Minn. Stat. § 216E.04, subd. 3. (2010).

an Environmental Assessment.[4] Unlike the full route permit process for higher voltage lines, which requires a formal contested case hearing, the Commission has discretion to determine what kind of public hearing to conduct.[5]

The Applicants request that the Project be considered for review under the alternative permitting process.

2.3 Notice to the Commission

The Applicants notified the Commission by a letter dated and e-filed September 7, 2011, pursuant to Minn. Rules 7850.2800, subp. 2 of their intent to utilize the Alternative Review Process and file its Route Permit Application for the Enterprise Park Project under Minn. Rules 7850.2800 to 7850.3900. This notice complies with the requirement to notify the Commission at least ten days prior to submission of an application.[6] A copy of the Applicants' notification letter is provided in Appendix A.

2.4 Regulatory Completeness Checklist

A complete summary of the regulatory requirements are presented in Table 2-1. The table also indicates the section(s) of this application where each requirement is addressed.

Table 2-1 Alternative Process Completeness Checklist

Regulatory Citation	Regulatory Language	Where to find it in this Application
Minn. R. 7850.2800, Subp. 1(C)	Subpart 1. Eligible Projects. An applicant for a site permit or a route permit for one of the following projects may elect to follow the procedures of parts 7850.2800 to 7850.3900 instead of the full permitting procedures in parts 7850.1700 to 7850.2700 for high voltage transmission lines of between 100 and 200 kilovolts	2.2
Minn. R. 7850.2800, Subp. 2.	Subpart 2. **Notice to Commission**. An applicant for a permit for one of the qualifying projects in subpart 1, who intends to follow the procedures of parts 7850.2800 to 7850.3700, shall notify the PUC of such intent, in writing, at least 10 days before submitting an application for the project	2.3 & Appendix A

[4] Minn. Stat. § 216E.04, subd. 5. (2010).
[5] Minn. Stat. § 216E.04, subd. 6. (2010).
[6] Minn. R. 7850.2800, Subpt. 2. (2009).

Regulatory Citation	Regulatory Language	Where to find it in this Application
Minn. R. 7850.3100	**Contents of Application** (alternative permitting process) The applicant shall include in the application the same information required in part 7850.1900, except the applicant need not propose any alternative sites or routes to the preferred site or route. If the applicant has rejected alternative sites or routes, the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them	Section 4.3 Figure 4-2 (See also 7850.1900, Subp.2 below)
Minn. R. 7850.1900, subp. 2 (applicable per Minn. R. 7850.3100)	**Route Permit for HVTL** A. a statement of proposed ownership of the facility at the time of filing the application and after commercial operation	Section 1.2 Section 3.4
	B. the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated	Section 3.5
	C. at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference	Not applicable, per Minn. R. 7850.3100
	D. a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line	Sections 1.3, 3.2, 5.1 - 5.3
	E. the environmental information required under 7850.1900, Subp. 3	See Minn. R. 7850.1900, subp. 3 (A)-(H) below
	F. identification of land uses and environmental conditions along the proposed routes	Section 8
	G. the names of each owner whose property is within any of the proposed routes for the high voltage transmission line	Section 9.2 & Appendix D
	H. United States Geological Survey topographical maps or other maps acceptable to the chair showing the entire length of the high voltage transmission line on all proposed routes	Figure 1-2, 3-2, 8-1
	I. identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share right-of-way with the proposed line	Section 6.1

Regulatory Citation	Regulatory Language	Where to find it in this Application
	J. the engineering and operational design concepts for the proposed high voltage transmission line, including information on the electric and magnetic fields of the transmission line	Section 5.7 Tables 5-1 to 5-3 Figures 5-1 to 5-13
	K. cost analysis of each route, including the costs of constructing, operating and maintaining the high voltage transmission line that are dependent on design and route	Section 3.8 Table 3-2
	L. a description of possible design options to accommodate expansion of the high voltage transmission line in the future	Section 3.3, 4.1.2
	M. the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction and maintenance of the high voltage transmission line	Section 6
	O. a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required	Section 2.1 (Not Required)
Minn. R. 7850.1900, subp. 3	**Environmental Information** A. a description of the environmental setting for each site or route	Section 8.1
	B. a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation and public services	Section 8.2
	C. a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism and mining	Section 8.3
	D. a description of the effects of the facility on archaeological and historic resources	Section 8.4
	E. a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna	Sections 8.5 – 6.7
	F. a description of the effects of the facility on rare and unique natural resources	Section 8.5.4
	G. identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route	Section 8

Regulatory Citation	Regulatory Language	Where to find it in this Application
	H. a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures	Section 8
Minn. R. 7850.2100, subp. 2 (applicable per Minn. R. 7850.3300)	**Notice of Project** Notification to persons on PUC's general list, to local officials and to property owners	Will be mailed within 15 days of application submission
Minn. R. 7850.2100, subp 4	Publication of notice in a legal newspaper of general circulation in each county in which the route is proposed to be located.	Will be published within 15 days of application submission
Minn. R. 7850.2100. subp. 5	Confirmation of notice by affidavits of mailing and publication with copies of the notices	Will be submitted within 30 days of notice being mailed and published
Minn. R. 7850.4100	**Factors to be Considered in Permitting a HVTL** A. effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation and public services	Section 10
	B. effects on public health and safety	Section 10
	C. effects on land-based economies, including, but not limited to, agriculture, forestry, tourism and mining	Section 10
	D. effects on archaeological and historic resources	Section 10
	E. effects on the natural environment, including effects on air and water quality resources and flora and fauna	Section 10
	F. effects on rare and unique natural resources	Section 10
	G. application of design options that maximize energy efficiencies, mitigate adverse environmental effects and could accommodate expansion of transmission or generating capacity	Section 10
	H. use or paralleling of existing rights-of-way, survey lines, natural division lines and agricultural field boundaries	Section 10
	I. use of existing large electric power generating plant sites	Section 10
	J. use of existing transportation, pipeline and electrical transmission systems or rights-of-way	Section 10
	K. electrical system reliability	Section 10
	L. costs of constructing, operating and maintaining the facility which are dependent on design and route	Section 10
	M. adverse human and natural environmental effects which cannot be avoided	Section 10

Regulatory Citation	Regulatory Language	Where to find it in this Application
	N. irreversible and irretrievable commitments of resources	Section 10
Minn. R. 7850.4300, subps. 1 and 2	Prohibited Routes **Wilderness areas**. No high voltage transmission line may be routed through state or national wilderness areas **Parks and natural areas**. No high voltage transmission line may be routed through state or national parks or state scientific and natural areas unless the transmission line would not materially damage or impair the purpose for which the area was designated and no feasible and prudent alternative exists. Economic considerations alone do not justify use of these areas for a high voltage transmission line	Not Applicable
Minn. Stat. §216E.03, subd. 7 (applicable per Minn. Stat. §216E.04, subd. 8)	**Considerations in designating sites and routes** (1) Evaluation of research and investigations relating to the effects on land, water and air resources of large electric power generating plants and high voltage transmission lines and the effects of water and air discharges and electric and magnetic fields resulting from such facilities on public health and welfare, vegetation, animals, materials and aesthetic values, including base line studies, predictive modeling and evaluation of new or improved methods for minimizing adverse impacts of water and air discharges and other matters pertaining to the effects of power plants on the water and air environment	Sections 5.4, 5.5, 5.6
	(2) Environmental evaluation of sites and routes proposed for future development and expansion and their relationship to the land, water, air and human resources of the state	Section 10 G.
	(3) Evaluation of the effects of new electric power generation and transmission technologies and systems related to power plants designed to minimize adverse environmental effects	Not applicable
	(4) Evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants	Not applicable

Regulatory Citation	Regulatory Language	Where to find it in this Application
	(5) Analysis of the direct and indirect economic impact of proposed sites and routes including, but not limited to, productive agricultural land lost or impaired	Sections 8.3
	(6) Evaluation of adverse direct and indirect environmental effects that cannot be avoided should the proposed site and route be accepted	See all of the effects identified in Section 8 & Section 10
	(7) Evaluation of alternatives to the applicant's proposed site or route proposed pursuant to subdivisions 1 and 2	Not applicable to alternative process
	(8) Evaluation of potential routes that would use or parallel existing railroad and highway rights-of way	Sections 6.1 & 10 H.
	(9) Evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations	Not applicable
	(10) Evaluation of the future needs for additional high voltage transmission lines in the same general area as any proposed route and the advisability of ordering the construction of structures capable of expansion in transmission capacity through multiple circuiting or design modifications	Sections 3.3, 4.1.2 & 10 G.
	(11) Evaluation of irreversible and irretrievable commitments of resources should the proposed site or route be approved	Section 10 N.
	(12) When appropriate, consideration of problems raised by other state and federal agencies and local entities	Sections 8 & 9

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3 PROJECT INFORMATION

3.1 Project Purpose

The Project is being proposed to:

- Address conductor overload concerns that threaten to jeopardize the reliable electric service to consumers in the Highway 10 corridor from Anoka to Elk River (see Figure 3-1 in Oversized Figures Tab).
- Create a redundant transmission source to the Enterprise Park Substation, providing a more reliable source to the industrial loads in the area.
- Support local economic development efforts by the cities of Anoka and Ramsey.
- Provide a transmission line for a future Anoka Municipal Utility substation in the vicinity of 7th Avenue and County Road 116.
- Facilitate longer-term opportunities to further strengthen the power supply service to the area.

The existing 69-kV system, consisting of Great River Energy's "EP" line (see Figure 3-1, Oversized Figures Tab), is nearing its conductor capability, threatening the reliability of power service to the area. Furthermore, Great River Energy's long-term planning analysis indicates weakness in the existing 69-kV line, which could eventually result in brownouts due to voltage drop across the 69-kV line.

The conductor overload concerns are driven by contingency events that could occur if either of the power sources at the end of the EP line were lost. In that case, the burden of power delivery would be placed on the remaining power source, and the capability of the conductor wire could be exceeded. If the conductor capability were exceeded, either the remaining power source would need to be turned off or individual loads would need to be removed from service to prevent significant, long-term damage to equipment. In either case, power loss, or a blackout, would occur.

The power sources for the EP line are provided out of the existing 230/69-kV Bunker Lake Substation to the east and 230/69-kV Elk River Substation to the west. Loads directly served by the EP line are Connexus Energy's Ramsey Substation, Daytonport Substation, and the RDF Substation, which is technically served on a short radial line. A longer radial tap off the EP line, called the "AW" line, serves two large industrial substations (Anoka Municipal Utility's Enterprise Park Substation and Connexus Energy's Energy Park Substation).

The critical load level for the EP line is slightly less than 69 MW. At or above this load level, if one of the power sources were to be lost, the system operators would be forced to take remedial action to ensure no significant damage occurs to the line. Again, the remedial action would be to either turn off the remaining power source, which would black out all load on EP line, or to open individual distribution substations, which would black out the load served by the distribution substation.

The historical load for this system has fluctuated over the years, with a trending growth over the last decade. The recent recession appears to have slowed growth; however, summer temperatures were moderate from 2007 through 2010, making it difficult to determine the peak burden that could be placed on the system. In contrast, there have been several extended periods of high temperature in summer 2011 that offer some good indication of peak system requirements. For example on July 20, 2011 at 2:00 PM, load totaled nearly 57 MW (see Table 3-1).

Table 3-1 Area Peak Load Levels

Substation	MW Load
Daytonport	3.91
RDF	2.19
Ramsey	12.01
Energy Park	23.55
Enterprise Park	15.25
Total	**56.91**

The Energy Park and Enterprise Park loads have a combined peak load of approximately 40 MW. This load is currently served only by the single radial AW transmission line, which is not a typical or ideal design for large industrial complexes. Loss of the radial transmission line could have significant economic impacts to the industrial customers served out of the Energy Park and Enterprise Park substations including lost labor hours, product rework or even product loss. A second transmission source is desirable to mitigate the potential economic impacts to the industrial customers. Distribution backup can also help to mitigate economic risk, but distribution backup to these industrial parks is limited, making a transmission backup even more important. Connexus Energy has the ability to shift some of its Energy Park load to Enterprise Park, although this would provide

no net benefit because both substations are currently served by the same radial AW transmission line.

Load projections for the area continue to indicate growth along the Highway 10 corridor. Based on Table 3-1 above, the EP line only has the capability to serve approximately 12 MW of new load. Such a margin is small considering the type of economic developments discussed for the area, including:

- Data processing centers, which may have loads requirements far exceeding 10 MW. These facilities can be in service in less than a year after ground breaking. Lack of reliable power system is a deterrent to anybody trying to develop these facilities.

- A new distribution substation within Anoka Municipal Utility system to serve new load in the vicinity of the Anoka County Library down to the North Star Rail Station, herein referred to as the 7th Avenue Substation. This substation is envisioned to be built on the northern edge of the city near the intersection of County Road 116 and 7th Avenue. The nearest transmission line is the EP line.

- The City of Ramsey's economic development effort called "The COR," with 118 developable acres of mixed use properties.[7]

- The largely undeveloped properties in the Highway 10 corridor from Ramsey through Elk River, including some prime Mississippi River frontage. Business park, commercial and medium to high density residential housing is expected along this corridor.

The proposed Project will remove a large load, the Enterprise Park Substation, from the 69-kV system and place it on a new independent 115-kV power source emanating from the Crooked Lake Substation. This will allow at least 15 MW or more of on-peak load to be removed from the 69-kV line. Additional EP line load could be transferred by Connexus Energy from Energy Park to the proposed 115-kV service at Enterprise Park. Any load shed to the proposed 115-kV transmission line could be absorbed by economic development along the EP transmission line.

The proposed Project would bring a new 115-kV power source into the Enterprise Park Substation, and peripherally to the Energy Park Substation,

[7] http://coratramsey.com/for-developers, August 9, 2011.

which will offer load capacity to serve economic growth off those distribution systems.

The proposed Project will mitigate some of the risk of the single radial AW line serving the industrial loads. The 69-kV system at Enterprise Park will remain as an energized, although isolated, secondary source to Enterprise Park. The isolation would be through a normally open switch, which could be closed if the proposed Project sustains an event resulting in failure. This load transfer back to the 69-kV system would be viable as long as the 69-kV system is in service between the Elk River and the Bunker Lake substations.

Broader regional transmission issues also exist. These issues have been identified through NERC-required studies involving the Coon Creek and Elm Creek 345/115 kV substations, which serve the 115-kV system feeding the Crooked Lake Substation. Specifically, loss of any key 115-kV lines out of Coon Creek or Elm Creek could lead to eventual failure of all or part of the 115-kV system, which could lead to a regional blackout. The Project is designed to enable a future 345/115-kV power source to support power delivery into this region to mitigate these concerns. The future power source would emanate from the 345/115-kV source in the Elk River area and tie into the Enterprise Park Substation with a new 115-kV transmission line. Such a project would address NERC TPL-003 Category C3 concerns identified for the region.

3.2 Description of the Proposed Project

The Applicants are proposing the following transmission Project in the City of Anoka and surrounding areas (see Figure 3-2 in Oversized Figures Tab):

- Upgrade the existing Crooked Lake Substation by installing equipment to accommodate an additional 115-kV circuit out of the substation.

- Construct approximately 5.8 miles of new overhead 115-kV transmission line between Xcel Energy's existing Crooked Lake Substation in Coon Rapids, Minnesota and Anoka Municipal Utility's existing Enterprise Park Substation in Anoka, Minnesota.

- Remove, upgrade and attach to the new 115-kV transmission line structures any existing Anoka Municipal Utility overhead distribution (12.5 kV) lines that are overtaken by the new 115-kV line. Alternatively, Anoka

Municipal Utility may choose to bury some of the existing distribution that is overtaken by the new line.

- Upgrade the existing Enterprise Park Substation by installing equipment to accommodate a new high voltage115-kV circuit into the substation and step-down equipment to enable distribution out of the substation. The existing 69-kV circuit and step down distribution system will remain in place as a backup source of electrical service to the substation.

The requested route width generally varies between 50 and 200 feet from the centerline of the roadways, except for around the Anoka High School. Section 4.2 of this Application provides more detail on the route width. The typical right of way will be 50 to 70 feet wide, 25 to 35 feet on each side of the transmission centerline.

Single pole wood structures with horizontal post insulators will be the primary structure used for the Project. Angles in the line will require guying (the use of anchors and support cables) or specialty structures. Where guying is not practicable, direct embedded laminated wood poles or steel poles on drilled concrete pillar foundations will be utilized. The average span between structures without underbuild will be 300 to 400 feet and structure heights will typically range from 60 to 85 feet. With underbuild, the average span will be 250 to 300 feet and poles will averages 75 to 85 feet above ground. H-Frame design structures may be used in areas where longer spans are required to avoid or minimize impacts to wetlands or waterways. H-Frame span lengths average 600 to 700 feet, with 1,000-foot spans possible with certain topography, and structure heights typically range from 60 to 80 feet. Structures, pole heights and spans will vary depending upon topography and environmental constraints. More construction and design details are provided in Section 5.

3.3 Design Options to Accommodate Future Expansion

The Project is designed to enable construction of a future 115-kV line to Elk River. Such a project would provide a new power source into the Crooked Lake area to address concerns with losing multiple 115-kV sources out of the Coon Creek 345/115-kV Substation. A future 115-kV service to Elk River would improve the overall reliability of the regional 115-kV grid, and it would enable load expansion in the Highway 10 corridor between Anoka and Elk River above and beyond the level supported by the proposed Project.

To accommodate a future 115-kV circuit from the Enterprise Park Substation to Elk River, the proposed 115-kV equipment will be placed within the Enterprise Park Substation in a manner so that the substation footprint would not need to significantly expand for installation of the future equipment. Specifically, the proposed substation layout will enable the installation of future 115-kV buswork and an additional 115-kV distribution transformer. A future distribution transformer would further strengthen the ability to serve the nearby industrial load. No other line terminations are possible for this site without significantly expanding the size of the substation.

3.4 Proposed Ownership

Great River Energy and/or Minnesota Municipal Power Agency will own the approximately 5.8 miles of single circuit 115-kV overhead transmission line that will proceed from Xcel Energy's existing Crooked Lake Substation to Anoka Municipal Utility's existing Enterprise Park Substation. Minnesota Municipal Power Agency recently indicated an interest in purchasing all or portions of the transmission line from Great River Energy once construction and energization has been completed. At this time, it is unknown how much of the 115-kV transmission line will be owned by Great River Energy and how much will be owned by Minnesota Municipal Power Agency. Minnesota Municipal Power Agency will initially own at least the high voltage box structure inside the Enterprise Park Substation.

Great River Energy/Minnesota Municipal Power Agency will have a permanent easement for the high voltage (115-kV) transmission facilities.

Anoka Municipal Utility will own the new 115/12.5-kV stepdown transformer and generally the distribution facilities impacted by the Project. Anoka Municipal Utility will own the property upon which the Enterprise Park Substation, including a control building where metering, instrumentation, telecommunications and a battery bank is located.

Xcel Energy will own all of the improvements at the Crooked Lake Substation.

The ownership demarcation between the line and substation will be based on the final design where the line terminates within the substation. Often the ownership change occurs where the transmission attaches to the dead-end structure.

3.5 Permittees

Great River Energy, Anoka Municipal Utility, Xcel Energy, and Minnesota Municipal Power Agency will be named as permittees for this Project.

Contact information for Great River Energy is:

Permittee: Great River Energy
12300 Elm Creek Boulevard
Maple Grove, Minnesota 55369

Contact: Mark Strohfus

Phone: 763-445-5210

Fax: 763-445-5241

Email: MStrohfus@GREnergy.com

Contact information for Anoka Municipal Utility is:

Permittee: Anoka Municipal Utility
501 Pierce Street
Anoka, Minnesota 55303

Contact: Dan Voss

Phone: 763-576-2903

Email: DVoss@ci.anoka.mn.us

Contact information for Xcel Energy is:

Permittee: Xcel Energy
414 Nicollet Mall, MP-8A
Minneapolis, MN 55401

Contact: Tim Rogers

Phone: 612-330-1955

Email: Timothy.G.Rogers@xcelenergy.com

Contact information for Minnesota Municipal Power Agency is:

Permittee: Minnesota Municipal Power Agency
200 South Sixth Street, Suite 300
Minneapolis, MN 55402

Contact: Molly Weyandt

Phone: 612-259-0312

Email: Molly.Weyandt@avantenergy.com

3.6 Project Location

The proposed Project is located primarily in the city of Anoka. The proposed transmission line will pass through small portions of the cities of Coon Rapids and Ramsey (Figure 3-2 in Oversized Figures Tab). Table 3-2 identifies the geographic areas where the Project will be constructed.

Table 3-2 Geographic Areas Traversed by Project

County	City	Section(s)	Township	Range
Anoka	Coon Rapids	8	T31N	R24W
Anoka	Coon Rapids & Anoka	5	T31N	R24W
Anoka	Anoka	6	T31N	R24W
Anoka	Anoka	31, 30	T32N	R24W
Anoka	Anoka & Ramsey	25, 36, 35	T32N	R25W

3.7 Project Schedule

Construction is expected to begin on the Project in the second quarter 2012. This date may vary depending on the easement acquisition process. The Applicants hope to complete construction and have the Project in service in spring 2013.

3.8 Project Cost Analysis

Cost estimates for the proposed transmission line and substations include expenditures for permitting, surveying (land and cultural resources), right of way acquisition, right of way clearing and right of way restoration, materials, relocation or underbuild for distribution facilities, and construction for both the transmission line and substation modifications.

Transmission line costs vary depending on easement costs, permitting costs, the structure type, the number of structures per mile (i.e., span length), the height and diameter of the wood poles or steel poles, labor and hardware costs, and any modifications to existing distribution infrastructure. The line construction costs include the cost of structures, foundations, insulators, conductor, bird flight diverters where necessary, and labor as well as any costs of equipment that will be used to construct the new line and modify the existing substations.

The single-pole 115-kV transmission line costs for a 795 ACSS conductor (the conductor proposed for this Project) in a developed area are approximately $1,503,000 per mile. The estimated Project costs are shown in Table 3-3.

Table 3-3 Estimated Project Costs (2010 Dollars)

Owner	Estimated 115-kV Transmission Line Construction Costs ($)	Estimated Substation Modification Costs ($)	Total Estimated Project Cost ($)
Great River Energy/MMPA	$8,717,000	$800,000	$9,517,000
Anoka Municipal Utility	NA	$691,000	$691,000
Xcel Energy	NA	$1,500,000	$1,500,000
Total	**$8,717,000**	**$2,991,000**	**$11,708,000**

All costs for the transmission line and facilities will be borne by Great River Energy/Minnesota Municipal Power Agency. The Crooked Lake Substation modification costs will be borne by Xcel Energy, and the Enterprise Park Substation modification costs will be borne by a combination of Anoka Municipal Utility, Great River Energy, and Minnesota Municipal Power Agency.

Annual operating and maintenance costs associated with 115-kV transmission lines in Minnesota currently average about $600 per mile. Storm restoration, annual inspections and ordinary replacement costs are included in these annual operating and maintenance costs.

The estimated annual cost of right-of-way maintenance is between $500 and $750 per mile of transmission line.

Operation and maintenance costs associated with the Crooked Lake and Enterprise Park substations will be minimal. Operation and maintenance costs include weed control inside the substations.

4 ROUTING ANALYSIS

This section discusses the processes followed by the Applicants in establishing the Proposed Route for the new 115-kV transmission line.

4.1 Transmission Line Routing

Routing options for the new overhead 115-kV transmission line were reviewed during the electrical planning process by a Great River Energy team composed of transmission planning, land rights, environmental, and engineering design personnel. The team reviewed the general project area for significant routing and siting issues that might arise, as well as any electric system performance issues associated with the various Route alternatives. Route alternatives were identified using the process described below with the Proposed Route selected for this application in accordance with Minn. Rules 7850.3100 (2010).

The land between the two substations is highly developed with homes, light and heavy industry, and commercial operations. The residential areas are typically developed with relatively smaller, densely-located residential lots. To accommodate the interests of the multiple stakeholders in developing the proposed transmission line Route, Great River Energy had numerous conversations and written correspondences with the stakeholders that may be affected by the Project. Table 4-1 summarizes the early communications with stakeholders.

Table 4-1 Early Stakeholder Communications

Date	Meeting Description	Comments
August 2008	Joint Planning Meeting with Xcel Energy	Xcel Energy planned to budget for Crooked Lake Substation expansion beginning in January 2009.
September 11, 2008	Meeting with representatives of Alliant Techsystems (ATC) to discuss project details and route options	Project well received. ATC representatives preferred a route parallel with the BNSF railroad vs. a route following Round Lake Boulevard and the Highway 10 frontage road.

Date	Meeting Description	Comments
March 29, 2009	Review Enterprise Park Substation site for expansion issues	Great River Energy and City of Anoka reviewed City water, electric distribution, and sewer plans to identify potential conflicts with substation expansion.
November 19, 2009	Update to City Council on Advisory Board Meeting with Great River Energy	Summarized the benefits of the 115-kV Project.
December 17, 2009	Joint meeting with Connexus Energy staff and City of Anoka staff/ Utility Board on proposed project	Summarized need for 115-kV Project.
February 17, 2010	Meeting with the City of Anoka Staff, Utility Board, and Council representation	Great River Energy provided an overview of the Project to the City Council, including the methodologies used in identifying route options.
March 1, 2010	Windshield Tour I	Conducted a windshield tour of potential transmission line routing options with City personnel and City Council representatives.
June 29, 2010	Presentation to the Andover City Council Work Session	Great River Energy provided an overview of the Project including route options to the City Council.
July 13, 2010	Presentation to the Ramsey City Council Work Session	Great River Energy provided an overview of the Project including route options to the City Council.
July 21, 2010	Meeting with City of Coon Rapids Planning Staff	Great River Energy provided an overview of the Project including route options.

Date	Meeting Description	Comments
August 30, 2010	Presentation to the Anoka City Council Work Session	Great River Energy provided an overview of the Project including route options to the City Council and feedback from the other cities potentially affected by the Project.
October 14, 2010	Public Open House	Mailed invitations to approximately 1,000 land owners along all route options. Approximately 40 people attended. Comments were received from a couple additional people who couldn't attend the meeting.
November 2, 2010	Presentation to the Anoka County Highway Department staff.	Great River Energy provided an overview of the Project including route options, and discussed Highway Department projects along County Road 116.
November 22, 2010	Meeting with Minnesota Department of Transportation staff	Great River Energy provided an overview of the project. All participants discussed options for routing along or within existing MnDOT right of way for U.S. Highway 10.
November 29, 2010	Presentation to the Anoka City Council Work Session	Great River Energy provided an update on the project including feedback from other stakeholders and the addition of the 6th Avenue route segment.
December 8, 2010	City of Anoka Windshield Tour II	Conducted a windshield tour of updated potential transmission line routing options with City personnel and City Council representatives.

Date	Meeting Description	Comments
December 13, 2010	Attended the Anoka City Work Session	Anoka Highway Department presented updates on its County Road 116 projects. City staff presented an overview of a plan to possibly move the Castle Field baseball field complex to the Anoka High School campus. Great River Energy agreed to work with the School District and Castle Field proponents to incorporate their plans into its design process.
December 16, 2010	Presentation to the Enterprise Park Industrial Park Architectural Review Board	Great River Energy provided an overview of the project including route options, and heard Board's concerns about the Thurston Avenue Route Segment.
January 5, 2011	Presentation to Anoka Hennepin School District Representatives	Great River Energy provided an overview of the project including route options. All participants discussed potential impacts to the three District properties that would be affected by the routing options. District personnel also asked about coordination with the potential move of Castle Field to the High School Campus.
January 13, 2011	Great River Energy mailed letters and project information to property owners along the 6th Avenue Route segment.	The mailing included the project Introduction Sheet, maps and an offer to meet with landowners. Two people contacted Great River Energy about the project but nobody requested a meeting.

Date	Meeting Description	Comments
January 20, 2011	Great River Energy participated in the Lower Rum River Watershed Management Organization Meeting	Great River Energy briefly discussed the project and the Organization's role in the project.
February 8, 2011	Presentation to the Ramsey City Council Work Session	Great River Energy presented an update on the project and discussed routing options that appeared would be its preferred and alternate routing options.
March 16, 2011	Presentation at the Enterprise Park Industrial Park Annual Meeting	Great River Energy provided an overview of the project including route options and discussed routing options that appeared would be its preferred and alternate routing options.
April 18, 2011	Presentation to the Anoka City Council	Great River Energy presented an update on the project to the Anoka City Council during their televised regular City Council Meeting.
April 26, 2011	Public Open House II	Mailed invitations to approximately 1,000 land owners along all route options. Approximately 36 people registered. Comments were received from a couple additional people that did not attend the meeting.

4.1.1 Route Selection Criteria

The Great River Energy siting team analyzed the Project area using various geographic data (e.g., aerial photos, topographic maps, public water inventory maps, etc.), input from local government representatives, agencies, and input from public stakeholders gathered through multiple meetings.

Preliminary route options were then identified based on opportunities to:

- Share or overtake right of way with existing distribution lines by underbuilding where practical;
- Reduce impacts to the reliability of existing transmission systems during construction;
- Parallel roads and share right of way to help decrease the amount of new right of way required; and
- Minimize the length of the transmission line to reduce the impact area and costs for the Project.

The routes were further refined by avoiding certain areas, to the extent possible and applicable, where a transmission line could create significant impacts to:

- Existing and planned high-density residential areas;
- Areas where horizontal clearances are limited because of trees or nearby structures; and
- Environmentally sensitive sites, such as wetlands, archaeologically significant sites, areas with threatened or endangered species or species of special concern, areas of significant biological or cultural significance, and state and federal lands.

4.1.2 Consideration of Future Electrical Infrastructure Development

The routing analysis also considered future expansions to the transmission and distribution systems.

Early in the routing process, Anoka Municipal Utility indicated a need to construct and operate a new distribution substation in the future to serve currently undeveloped property in northern Anoka. These undeveloped areas are generally bound by the Rum River to the west, 7th Avenue to the east, BNSF railroad to the south, and the city limits to the north. Anoka Municipal Utility determined that the best location for its future distribution substation would be in the vicinity of 7th Avenue and County Road 116. To avoid future disruptions associated with constructing the new substation, consideration was given to locate the new high voltage service close to the substation. The proposed Project includes the installation of a 3-way switch to accommodate the installation and energization of the future substation without having to take an outage on the new 115-kV line. The Project also incorporates design options to enable a looping 115-kV service from Elk River to the Crooked Lake Substation as discussed in Section 3.3.

4.2 Proposed Route

The Proposed Route for the new transmission line is described below and shown in Figures 4-1 and 4-1a through 4-1J (Oversized Figures Tab). These figures also include a conceptual alignment for the transmission line within the Proposed Route. The Project Applicants have developed this conceptual alignment based on reviews of digital images, physical tours of the Proposed Route, and best professional judgment. It is not possible to establish the final alignment until after a Route Permit is issued, additional landowner input is obtained, landowner easements are negotiated, extensive field surveys are completed, underground utilities are located, and an engineering design is substantially completed. The conceptual alignment is provided in response to a request from Department of Commerce staff, and it is the Applicants' understanding that the Route Permit will not restrict the project to be constructed exactly as depicted in these figures.

Figures 4-1G and 4-1H include an alternate conceptual alignment. The area where the alternate conceptual alignment is located is dominated by commercial properties with narrow boulevards that are occupied by existing utilities, including underground utilities, traffic signals and street lighting. Because of the overhead and underground utilities, Great River Energy could not determine if one side of the road is better for construction of the new line than the other. Accordingly, we have indicated that the both sides of the road should be considered for the conceptual alignment.

The proposed new transmission line would exit from the north and east side of the existing Xcel Energy Crooked Lake Substation, cross north over Anoka County Highway 14 (Main Street), then continue west 0.15 miles along the north side of Main Street to the Burlington Northern Santa Fe (BNSF) railroad right of way. The Route continues northwesterly 0.38 miles along the northeast side of the BNSF railway corridor, at which point it deflects to the north a distance of 0.19 miles across private property to the frontage road located on the south side of U.S. Highway 10. The Route turns to the west along the frontage road approximately 0.25 miles and crosses over to the southwest side of the BNSF railway corridor. The Route continues westerly along the south side of U.S. Highway 10 approximately 0.25 miles to Anoka County Highway 7 (7th Avenue). The Route crosses 7th Avenue and continues westerly 0.13 miles along the south side of U.S. Highway 10 to the northwest corner of the Rudy Johnson Park property. The Route turns north across U.S. Highway 10 and continues along 6th Avenue a distance of 0.40 miles to Grant Street. The Route turns west along Grant Street a distance of less than 200 feet, then turns north a distance of 0.16 miles, following behind 10 homes located on the west side of 6th Avenue. The

Route turns east and follows along the north side of Garfield Street a distance of 0.15 miles to the west side of 7th Avenue. The Route turns north along the west side of 7th Avenue a distance of 1.0 mile to the south side of the Anoka Ice Arena property. The Route turns west and continues 0.37 miles to the south side of Anoka County Highway 116 (Bunker Lake Boulevard), in the general proximity of the Anoka Municipal Utility's wind generator. The Route continues westerly along the north side of Bunker Lake Boulevard a distance of 0.55 miles to State Highway 47.

The Route continues along the south side of Bunker Lake Boulevard a distance of 1.0 mile to a point where Bunker Lake Boulevard curves to the northwest and the Route continues straight west for a distance of 0.16 miles to the municipal boundary line common to the cities of Anoka and Ramsey. The Route turns south along the municipal boundary line between Anoka and Ramsey for a distance of 0.40 miles to the north side of the Enterprise Park Substation property. The Route then turns east along the north side of the Enterprise Park Substation a distance of 0.1 miles, then turns south to enter into the east side of the Enterprise Park Substation facility.

Great River Energy prefers an alignment for the new transmission line behind the homes located on the west side of 6th Avenue between Grant Street and Garfield Street, on the north side of Garfield Street, and on the west side of 7th Avenue because these segments are much less developed and would impact the fewest number of homeowners. Many other areas of the Proposed Route are rather constrained by existing development, and Great River Energy seeks a route width that provides enough flexibility in selecting an alignment that minimizes impacts to the property owners.

4.2.1 Route Width Requested

The Applicants request the route widths shown in Figures 4-1A through 4-1J (see Oversized Figures Tab). The requested route width varies between 50 and 200 feet from the centerline of the roadways. A larger area is requested around the Anoka High School campus to allow us to develop an alignment for the transmission line that would work with the School District, City of Anoka, and Anoka County Highway Department's development plans for this area. The requested Route widths are intended to allow flexibility to work with landowners on the alignment and to accommodate environmental concerns. The rights of way, which will be negotiated after permitting, will typically be 25 to 35 feet from the centerline of the transmission line. In special circumstances, wider rights of

way may be needed. More discussion about easements and right of ways is provided in Section 6.

4.3 Alternative Routes Considered and Rejected

Minnesota permitting rules require that if any alternative routes or sites have been rejected "… the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them."[8]

Alternatives to the Proposed Route that were evaluated by the Applicants are described below and shown on Figure 4-2.

The alternative routes evaluated and eventually rejected were reviewed and analyzed both in the field and using aerial photography showing the built infrastructure and land-based maps showing natural features such as lakes, streams and wetlands.

4.3.1 Highway 10 Route (Rejected Route Segment 1)

This rejected route generally follows the existing U.S. Highway 10 corridor from 11th Avenue and continues westerly approximately three miles to the west side of the Anoka Technical College. From this point the route would continue to the north a short distance across the railroad tracks to the Enterprise Park Substation (see Figure 4-2).

This particular route option is quite congested and heavily developed with older residential neighborhoods, cemeteries, and a broad mix of retail, commercial, and industrial properties. The current U.S. Highway 10 alignment was relocated from its original Main Street alignment around 1960. Numerous residential and business properties were acquired and removed at that time to accommodate the new Highway 10 alignment. The existing Highway 10 right of way provides very limited space between the right of way fence and several homes and businesses, particularly in the area between 4th and 6th Avenues.

Representatives of Great River Energy met with MnDOT representatives on November 22, 2010. In this meeting, MnDOT staff emphasized that U.S. Highway 10 is designated as a "freeway corridor" east of Fair Oak Avenue, which effectively precludes locating utilities anywhere within its right of way. MnDOT provided further clarification in a letter to Great River Energy dated January 19, 2011 (Appendix B), whereby MnDOT states its policy of not allowing longitudinal

[8] Minn. R. 7850.3100 (2010).

utility installations within in its right of way, but would typically allow perpendicular crossings.

Using a variety of aerial imagery and field investigations, Great River Energy identified the Highway 10 corridor between 4th Avenue and 6th Avenue as an insurmountable, prohibitive pinch point for locating the transmission line. On the south side of U.S. Highway 10, the MnDOT right of way fence is located only a few feet from several residential buildings, leaving little space for a high voltage transmission line to be safely installed and operated. On the north side of the highway, the MnDOT right of way fence is within a few feet of Front Street, and the homes along the north side of Front Street are situated too close to the street to allow for the safe operation of a proposed high voltage power line. Other streets in this neighborhood are also densely congested with homes, so any attempt to avoid this area by shifting north or south of this pinch point would be infeasible and impracticable.

Finally, a transmission alignment that would follow Highway 10 does not provide an effective or efficient route for delivering future transmission service to Anoka Municipal Utility's anticipated distribution substation to be located in the vicinity of 7th Avenue and County Road 116.

4.3.2 BNSF Railroad Route (Rejected Route Segment 2)

This rejected route option generally follows the BNSF double-track corridor from Main Street to the Enterprise Park Substation (see Figure 4-2). The railroad right of way is relatively narrow along its three-mile length from the Crooked Lake Substation to the Enterprise Park Substation, ranging between 100 to 125 feet in total width. The right of way supports two mainline tracks along with several spur lines that allow for rail shipping to and from several Anoka-area businesses. The City of Anoka and Metro Transit recently constructed a public train station located at 4th Avenue, providing daily rail service for commuters traveling between Big Lake, Minnesota, and Minneapolis aboard the Northstar commuter train.

The horizontal separation of the two mainline tracks varies between 17 and 40 feet as measured from center to center of the tracks. Over several decades, several businesses have constructed loading docks or other physical constraints within the outer edges of the railroad right of way. Among these are Alliant Techsystems (formerly Federal Cartridge), Hoffman Engineering (a Pentair Company), Alter Metal Recycling (formerly Max Schwartzman's Recycling), and PALF, LLP (formerly AME Ready Mix). As an example of one such encroachment, the Alter Metal Recycling business maintains a 25 foot tall sheet-

pile wall encroaching 48 feet into the railroad right of way, providing only 16 feet of separation between the sheet-pile wall and the center of the northerly railroad track.

In early March 2011, Great River Energy submitted project information to BNSF officials. A written response from BNSF officials (Appendix C) indicated a general concern and a lack of support for a transmission line route that follows along the railroad right of way. Among several issues cited by BNSF, its signal department representative characterized the interference issues as follows:

> *Depending on the distance from the track, a main area of concern from the BNSF Signal Department perspective is the power line has the potential to cause interference to the BNSF Signal system, highway-grade crossing warning systems, and safety issues transmission lines present general to railroad operations*.

BNSF added:

> *With other lines, BNSF has experienced rail-to-rail and rail-to-ground voltage high enough to result in:*
>
> - *Interference with crossing control equipment and signal equipment*
> - *Temporary mitigation measures requiring a speed restrictions on crossings (train and motorist delay)*
> - *Unsafe touch potential rail-to-ground, rail-to-rail, and to other metal objects*
> - *Damaged equipment (train and motorist delay)*.

In conclusion, given the limited space provided by the railroad corridor for the safe operation of the proposed transmission line as well as the BNSF railroad operations, along with the adverse impacts to several business that operate in very close proximity of the railroad tracks, this route was rejected.

4.3.3 11th Avenue Route (Rejected Route Segment 3)

This rejected route segment is approximately 2.5 miles in length and generally follows a straight north-south alignment along 11th Avenue north of U.S. Highway 10 and continues north through Sunny Acres Park and the east side of Wilson Elementary School to the north-south segment of Anoka County Highway 116 (Bunker Lake Boulevard). The route continues approximately one mile westerly, crossing Anoka County Highway 7 (7th Avenue) to a point where it would intersect the Proposed Route just east of the Rum River. An existing overhead

Anoka Municipal Utility distribution line extends along 1-1/2 miles of the north-south segment of this rejected route.

Great River Energy and Anoka Municipal Utility hosted a project open house meeting on October 14, 2010, at the Anoka Technical College located in western Anoka. The meeting was well represented by residents living in single family neighborhoods around Sunny Acres Park and Wilson Elementary School. The overwhelming consensus of these residents was opposition to this particular route segment. Their concerns were primarily regarding EMF, health issues, tree loss, and adverse impacts to the neighborhoods along this route.

Anoka County intends to reconstruct the north-south segment of County Road 116 (Bunker Lake Boulevard) in 2012, expanding it from a two-lane undivided roadway to a divided four-lane configuration. Unsuitable organic soils exist in some areas where the road will be widened, and consequently, the construction limits for soil correction work may extend outside of the permanent road right of way. The timing of the County highway project and the extended limits of construction would be problematic in coordinating the two projects simultaneously.

While at least half of this route segment consists of parks, playfields, and wetland areas, it was rejected primarily based on public response, probable issues surrounding the route's relative close proximity to Wilson Elementary School, and the challenges of coordinating the transmission line construction with the County highway construction.

4.3.4 Round Lake Boulevard Segment (Rejected Route Segment 4)

This rejected route segment is approximately 1-1/3 miles in length, and follows a straight north-south alignment along Round Lake Boulevard from the Crooked Lake Substation to the east-west segment of Anoka County Highway 116 (Bunker Lake Boulevard). From this point the route follows Bunker Lake Boulevard westerly to its intersection with other rejected route segments as well as the Proposed Route.
This route segment is problematic for a number of reasons:

- The U.S. Highway 10/Round Lake Boulevard interchange has elevated bridges and other roadway features, making it difficult to cross U.S. Highway 10 while maintaining acceptable clearances over the roadway, bridges, and freeway lighting structures.

- U.S. Highway 10 is classified as an urban freeway, and MnDOT policy does not permit transmission line structures to be located within any "infield" areas situated between the interchange ramps and loops. With this restriction, it would require a span length of approximately 1200 feet to cross over the full width of the U.S. Highway 10 interchange right of way. This span length would require very tall steel monopole structures, which is less practicable for a 115-kV transmission line unless no other route options are available.
- Continuing northerly along Round Lake Boulevard north of U.S. Highway 10, the route would be directly adjacent to a heavily developed retail shopping district within the City of Coon Rapids. Continuing northerly along Round Lake Boulevard the land use changes to medium-density and single-family residential neighborhoods. These residential dwellings generally front on other local streets with Round Lake Boulevard representing the side or back yards of these homes. The most northern segment of this route along Round Lake Boulevard again consists of retail and commercial improvements.

This route option was discussed with Planning Department staff at the City of Coon Rapids. Information on the project was also provided to the City Council by the Planning Department staff. The feedback received from the City of Coon Rapids was to avoid Round Lake Boulevard due to its limited available space between the roadway, trails and businesses. The City indicated it would not support the Round Lake Boulevard route segment, and for that reason, along with the design challenges of spanning over the U.S. Highway 10 interchange, it was rejected.

4.3.5 Southern 7th Avenue Segment (Rejected Route Segment 5)

This rejected route segment extends approximately one-half mile along 7th Avenue from U.S. Highway 10 north to Garfield Street (see Figure 4-2). This route segment is heavily developed with older single family homes on both sides of 7th Avenue. The southern portion of this route segment is occupied by several commercial and industrial businesses situated relatively close to the 7th Avenue right of way line. The BNSF railroad operates and maintains an elevated rail crossing over 7th Avenue just north of U.S. Highway 10.

There are nearly 30 residential homes situated on both sides of 7th Avenue, with most having less than 45 feet of setback from the outer edges of the street. These homes provide even less separation from the 7th Avenue right of way line,

with some as close as 20 feet. Large shade trees are common in many front yards of these homes.

Due to the large number and relative close proximity of homes and other buildings along 7th Avenue, this route was rejected.

4.3.6 Grant Street Crossover Segment (Rejected Route Segment 6)

This rejected route segment is approximately one-half mile in length extending along Grant Street between 7th Avenue and 11th Avenue (see Figure 4-2).The easterly half of this segment borders on the southerly boundary of Sunny Acres Park. It includes nearly 40 single-family residential homes situated with very short setbacks (most less than 40 feet) from the street. Typical of older neighborhoods, many of these properties have large trees growing in close proximity to the street.

This neighborhood was well represented at the project open house meeting in October 2010. Public comments received at that meeting were consistent, and the message was this route would cause a dramatic negative impact to their property, their neighborhood, and their quality of life.

Due to the large number and relative close proximity of homes along Grant Street, this route was rejected.

4.3.7 41st Avenue Segment (Rejected Route Segment 7)

This rejected route segment is approximately one-half mile in length extending east-west between 7th Avenue and Anoka County Highway 116 (Bunker Lake Road), as depicted in Figure 4-2. This rejected route segment is the westerly extension of two rejected route segments described above, 11th Avenue (Section 4.3.3) and Round Lake Boulevard (Section 4.3.4). The outer boundary of this route segment extends to the south beyond 41st Avenue and to the north beyond Bunker Lake Road.

Property on the north side of this route segment is located within the municipal boundary of the City of Andover, while property on the south side is located within the City of Anoka. The north side of this route segment is predominantly undeveloped, containing wetlands and a single residence in the eastern half and agricultural fields and a single auto repair business in the western half. The south side of this route segment consists of 15 single family homes and a wetland in the easternmost portion of the segment. As with most older residential neighborhoods in Anoka, these homes are also situated in relative close

proximity to the street, typically less than 50 feet from the curb. Comments expressing opposition to route segment have been provided by several residents along 41st Avenue.

Based on field observations and information received from staff from the Anoka County Highway Department, it is apparent that unsuitable soils exist in the wetland area of this route. Special transmission structure foundations in these unsuitable wetland soils would result in increased design and construction costs.

Because the 11th Avenue and the Round Lake Boulevard route segments previously described above were rejected along with the issues of unsuitable wetland soils and public opposition, this route segment was rejected.

4.3.8 North River Bend Park Crossover Segment (Rejected Route Segment 8)

This route segment is approximately one mile in length, extending westerly from Anoka County Highway 116 (Bunker Lake Boulevard) over the Rum River, and continuing westerly through River Bend Park and 142nd Avenue to the west side of Trunk Highway 47 (St. Francis Boulevard). From this point, this route segment extends south along the easterly edge of a radio transmitter tower property to Anoka County Highway 116, where it would intersect the Proposed Route (see Figure 4-2).

This route segment was considered as a solution to avoid possible constraints associated with commercial developments on each of the four corners at the intersection of Anoka County Highway 116 and Trunk Highway 47. This route segment includes some areas that are open and/or undeveloped, particularly the property east of the Rum River and the River Bend Park property. Challenges of this route segment include floodplain issues and unsuitable soil issues in the River Bend Park property, impacts to residential properties along 142nd Avenue, and the diagonal alignment across undeveloped property located east of the Rum River. This diagonal alignment across the undeveloped parcel would not follow any field lines or boundary lines, making it undesirable when other alternate alignments are possible. This route segment contains numerous angles and consequently would result in increased project costs for materials and construction.

This route segment was rejected primarily because the City of Ramsey and its park staff have indicated support for the Proposed Route provided the transmission line would be aligned along the north side of Anoka County Highway 116 through its city-owned River Bend Park property.

4.3.9 Thurston Avenue Segment (Rejected Route Segment 9)

This rejected route segment is slightly less than one mile in length and follows Thurston Avenue south from Anoka County Highway 116 (Bunker Lake Boulevard) to McKinley Street. From this point the route segment continues westerly along McKinley Street to the Enterprise Park Substation (see Figure 4-2).

This route segment is located entirely within the Anoka Enterprise Park business park development. The business park has been successfully developed within the past 20 years, and every parcel along this route segment supports a variety of offices, manufacturing, and warehouse facilities.

Great River Energy met directly with representatives of the Anoka Enterprise Park business park owners on two separate occasions. The first meeting occurred on December 16, 2010, in which the project was presented to the Anoka Enterprise Park architectural committee members, and representatives of the Anoka City Council and city staff. The second meeting occurred on March 16, 2011, at the Anoka Enterprise Park annual business meeting. Representatives of the Anoka County Commissioners, Anoka City Council, and city staff also attended. Maps illustrating the Proposed Route as well as rejected routes were presented to the attendees. Feedback received at both of these meetings indicated very favorable support for the Proposed Route and strong opposition to the Thurston Avenue segment.

Because the Thurston Avenue route segment is curvilinear along most of its length, it would require numerous angle structures that would have to be supported with guy wires and anchors, or be constructed with costlier deep-set self-supporting structures.

City representatives and business owners in the Anoka Enterprise Park development are strongly opposed to the Thurston Avenue segment, primarily due to adverse aesthetic impacts, including significant tree loss. For this reason, this route segment was rejected.

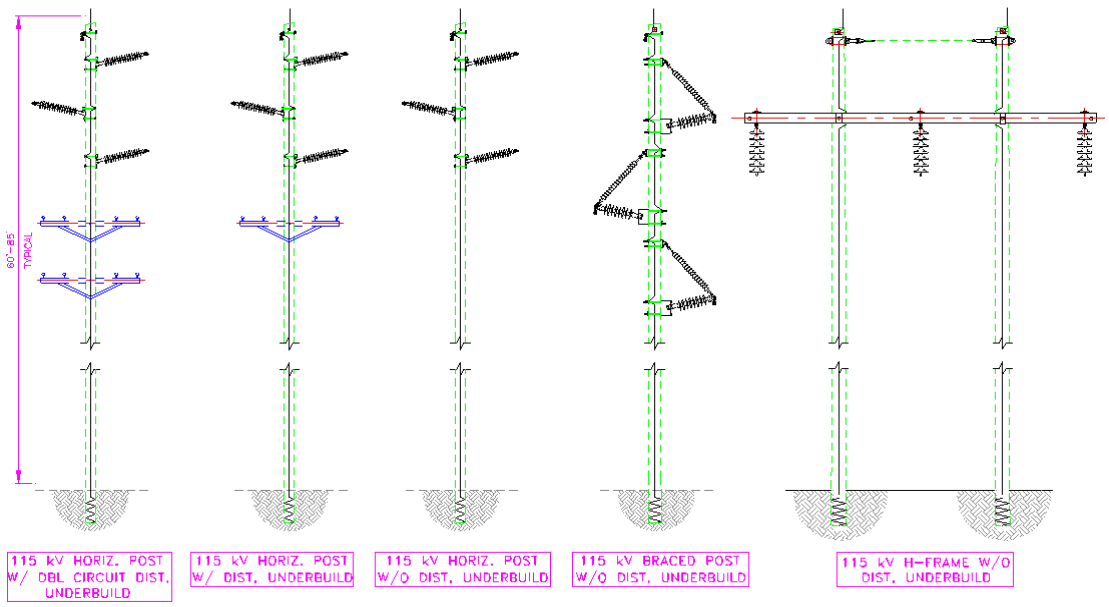
5 ENGINEERING AND OPERATIONAL DESIGN OF THE PROPOSED HVTL AND SUBSTATION

5.1 Transmission Structures

Design voltage of the proposed transmission line is 115 kV. The Project will have a total length of approximately 5.8 miles, with slight variations depending on the exact route chosen. The entire line and associated facilities will be within Anoka County, Minnesota.

Typical structure types to be used for this Project are shown in Figure 5-1.

Figure 5-1 Schematic Diagrams of Typical Great River Energy Structures



Single pole wood structures with horizontal post insulators will be the primary structure used for the Project. In some instances the topography may require longer spans beyond the capability of the horizontal post insulators, in which case a braced post design will be utilized to accommodate the increased loadings. Angles in the line will require guying (the use of anchors and support cables) or specialty structures. Where guying is not practicable, direct embedded laminated wood poles or steel poles on drilled concrete pillar foundations will be utilized.

The single circuit structures will have three single-conductor phase wires (not bundled) and one shield wire. The phase wires will be 795 ACSS 26/7 (Aluminum Conductor Steel Supported with 7 steel core strands and 26 outer aluminum strands). The shield wire will be 0.528 optical ground wire (OPGW). The average span between structures without underbuild will be 300-400 feet and structure heights will range from 60 to 85 feet. The diameter of wood poles at ground level ranges between 15 and 22 inches. Rectangular laminated poles are buried in steel culverts typically four to six feet in diameter that are filled with crushed rock. Steel poles are mounted on concrete pillar foundations with diameters ranging from four to eight feet in diameter with the pole slightly smaller than the concrete pillar. Structures, pole heights and spans will vary depending upon topography and environmental constraints (such as highway crossings, water crossings, and required angle structures).

Single pole with underbuild design will be used in areas where the new transmission line overtakes one of the various distribution providers along the Proposed Route. The advantage of this design (over two separate parallel lines) is that less right of way is required. However, these structures will be taller because the higher voltage circuit is stacked on top of the lower voltage circuit, resulting in a pole that averages 75 to 85 feet in height above ground. Span lengths will average 250 to 300 feet. While not the preferred method, there are several locations along the Proposed Route where the distribution may be buried underground due to physical constraints or for aesthetic reasons.

H-Frame design structures may be used in areas where longer spans are required to avoid or minimize impacts to wetlands or waterways. Span lengths average 600 to 700 feet, with 1,000-foot spans possible with certain topography. H-Frame structure heights range from 60 to 80 feet with taller structures required for exceptionally long spans and in circumstances requiring additional vertical clearance exceeding National Electrical Safety Code (NESC) and other agency requirements.

The transmission line will be designed to meet the NESC and the Institute of Electrical and Electronics Engineers standards. The NESC recommends minimum safety standards for clearances over roadways, buildings, signs, light standards, and other facilities.

Great River Energy has company standards that meet or exceed the NESC requirements. In most instances, Great River Energy’s height standard over highways and roadways exceeds the 20.1-feet minimum clearance recommended by the NESC. In some cases, greater clearances are dictated by

MnDOT or local county highway permitting. Great River Energy will work with these agencies to meet their clearance requirements.

Although the existing standards give recommended clearances over buildings, Great River Energy generally does not locate transmission lines directly over a building unless it cannot be avoided. Horizontal clearances to buildings, signs, light standards, and other installations will be determined by calculating the blowout of the wire, structure deflection, and safe electrical clearance from the line.

5.2 Crooked Lake Substation

The proposed Project involves modifications to the existing Crooked Lake 115-kV Substation as discussed in Section 3.2. Xcel Energy will own all common substation facilities (land, fence, etc.).

The scope of the substation modifications will initially include:

- Installing a new breaker ring bus configuration.
- Modifying the high side structures to accommodate the new 115-kV transmission line.
- Grading, fencing, constructing a control building, and erecting steel structures.

The new 115-kV transmission line will exit the Crooked Lake Substation from the east side of the substation and extend north over Main Street. Great River Energy/Minnesota Municipal Power Agency will have a permanent easement for its facilities on the east portion of the substation, and will own and operate all the high voltage 115-kV facilities.

5.3 Enterprise Park Substation

The proposed Project involves modifications to the existing Enterprise Park 69-kV Substation as discussed in Section 3.2. Anoka Municipal Utility will own all common substation facilities (land, fence, etc.) and will operate the low voltage distribution facilities.

The primary modifications of the existing Enterprise Park substation will include:

- Installing one 115/12.47-kV transformer to receive the new 115-kV service and step it down to 12.47 kV for distribution.
- Installing one box structure, a 115-kV switch with associated bus work and

one 115-kV transrupter to accommodate the 115-kV transmission line termination. Portions of the high side structure will be owned by Minnesota Municipal Power Agency and Anoka Municipal Utility.

- Grading, fencing, constructing a control building, and erecting steel structures.

The new 115-kV transmission line will enter the Enterprise Park Substation on its east side. Great River Energy/Minnesota Municipal Power Agency will have a permanent easement for its facilities on the east portion of the existing Enterprise Park Substation, and will own and operate all the high voltage 115-kV facilities.

5.4 Electric and Magnetic Fields

As it pertains to the Project, the term “EMF” refers to the extremely low frequency decoupled electric and magnetic fields that are present around any electrical device, whether the device is located indoors or outdoors. Electric fields are the result of electric charge, or voltage, on a conductor. The intensity of an electric field is related to the magnitude of the voltage on the conductor. Magnetic fields are the result of the flow of electricity, or current, traveling through a conductor. The intensity of a magnetic field is related to magnitude of the current flow through the conductor. Among other places, energized conductors with associated electric and magnetic fields can be found in transmission lines, local distribution lines, substation transformers, household electrical wiring, and common household appliances.

5.4.1 Health and Environmental Effects

Considerable research has been conducted in recent decades to determine whether exposure to power-frequency (60 hertz) electric and magnetic fields can cause biological responses and adverse health effects. The multitude of epidemiological and toxicological studies has shown at most a weak association (i.e., no statistically significant association) between EMF exposure and health risks.

In 1999, the National Institute of Environmental Health Sciences (NIEHS) issued its final report on “Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields” in response to the Energy Policy Act of 1992. In the report, the NIEHS concluded that the scientific evidence linking EMF exposures with health risks is weak and that this finding does not warrant aggressive regulatory concern. However, in light of the weak scientific evidence supporting some association between EMF and health effects and the fact that exposure to electrical systems is common in the United States, the NIEHS stated that passive

regulatory action, such as providing public education on reducing exposures, is warranted.[9]

The United States Environmental Protection Agency (EPA) comes to a similar conclusion about the link between adverse health effects, specifically childhood leukemia, and power-frequency EMF exposure. On its website, the EPA states:

> *Many people are concerned about potential adverse health effects. 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 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.*[10]

Minnesota, California, and Wisconsin have each conducted their own literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group to evaluate the research and develop policy recommendations to protect the public health from any potential problems arising from EMF effects associated with HVTLs. The Minnesota Department of Health published the Working Group's findings in *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options*. The Working Group summarized its findings as follows:

> *Research on the health effects of EMF has been carried out since the 1970s. Epidemiological studies have mixed results – some have shown no statistically significant association between exposure to EMF and health effects, some have shown a weak association. More recently, laboratory studies have failed to show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer. A number of scientific panels convened by national and international health agencies and the United States Congress have reviewed the research carried out to date. Most researchers concluded that there is insufficient evidence to prove an association between EMF and health effects; however many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe.*[11]

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[9] Report is available at http://www.niehs.nih.gov/health/topics/agents/emf/
[10] http://www.epa.gov/radtown/power-lines.html
[11] Minnesota Department of Health. 2002. *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options*

Based on findings like those of the Working Group and NIEHS, the Minnesota Public Utilities Commission has consistently found that "there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects."[12] This conclusion was further justified in the recent Route Permit proceedings for the Brookings County – Hampton 345 kV Project ("Brookings Project"). In the Brookings Project Route Permit proceedings, the Applicants (Great River Energy and Xcel Energy) and one of the intervening parties both provided expert evidence on the potential impacts of electric and magnetic fields on human health. The administrative law judge (ALJ) in that proceeding evaluated written submissions and a day-and-a-half of testimony from the two expert witnesses. The ALJ concluded: "there is no demonstrated impact on human health and safety that is not adequately addressed by the existing State standards for [EMF] exposure."[13] The Commission adopted this finding on July 15, 2010.[14]

5.4.2 Electric Fields

Voltage on a wire produces an electric field in the area surrounding the wire. The voltage on the conductors of a transmission line generates an electric field extending from the energized conductors to other nearby objects, such as the ground, towers, vegetation, buildings, and vehicles. The intensity of transmission line electric fields is measured in kilovolts per meter (kV/m), and the magnitude of the electric field rapidly decreases with distance from the transmission line conductors. The presence of trees, buildings, or other solid structures nearby can also significantly reduce the magnitude of the electric field. Because the magnitude of the voltage on a transmission line is near-constant (ideally within ±5 percent of nominal design voltage), the magnitude of the electric field will be near-constant for each of the proposed configurations, regardless of the power flowing on the line.

Although there is no state or federal standard for transmission line electric field exposures, the PUC has limited electric fields 8 kV/m at one meter above ground

[12] See, for example, *In the Matter of the Application for a HVTL Route Permit for the Tower Transmission Line Project*, Docket No. ET-2, E015/TL-06-1624, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Minnesota Power and Great River Energy for the Tower Transmission Line Project and Associated Facilities (August 1, 2007).

[13] *In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, ALJ Findings of Fact, Conclusions and Recommendation at Finding 216 (April 22, 2010 and amended April 30, 2010).

[14] *In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, Order Granting Route Permit (September 14, 2010).

in some Route Permits[15]. The Applicants have calculated the approximate electric field for the Project's transmission configurations and expect the peak magnitude of electric field density among all possible configurations to be approximately 1.39 kV/m underneath the conductors, one meter (3.28 feet) above ground. The calculated electric fields for the proposed Project are summarized in Table 5-1 and graphically depicted in Figures 5-2 through 5-7.

Table 5-1 Calculated Electric Fields (kV/m) for the Proposed Project[16]

Scenario	Distance to Proposed Centerline										
	-300'	-200'	-100'	-50'	-25'	Max.	25'	50'	100'	200'	300'
Horizontal Post Operation No Distribution Underbuild Average Load	0.01	0.02	0.06	0.22	0.49	1.39	0.67	0.20	0.07	0.02	0.01
Horizontal Post Operation No Distribution Underbuild Peak Load	0.01	0.02	0.06	0.22	0.49	1.39	0.67	0.20	0.07	0.02	0.01
Horizontal Post Operation with Single Circuit Distribution Underbuild Average Load	0.01	0.02	0.07	0.21	0.30	0.38	0.42	0.18	0.07	0.02	0.01
Horizontal Post Operation with Single Circuit Distribution Underbuild Peak Load	0.01	0.02	0.07	0.21	0.30	0.38	0.42	0.18	0.07	0.02	0.01
Horizontal Post Operation with Double Circuit Distribution Underbuild Average Load	0.01	0.02	0.07	0.18	0.20	0.31	0.30	0.15	0.07	0.02	0.01
Horizontal Post Operation with Double Circuit Distribution Underbuild Peak Load	0.01	0.02	0.07	0.18	0.20	0.31	0.30	0.15	0.07	0.02	0.01

Note: The maximum electric field in the Applicants' proposal is 1.39 kV/m at a 5-foot offset from centerline, which is well under the maximum limit of 8 kV/m that has been a permit condition imposed by the PUC in other transmission line routing proceedings.

[15] *Ibid*.
[16] Calculations are based on a maximum voltage of 121 kV.

Figure 5-2 Electric Field without distribution, underbuild (average load)

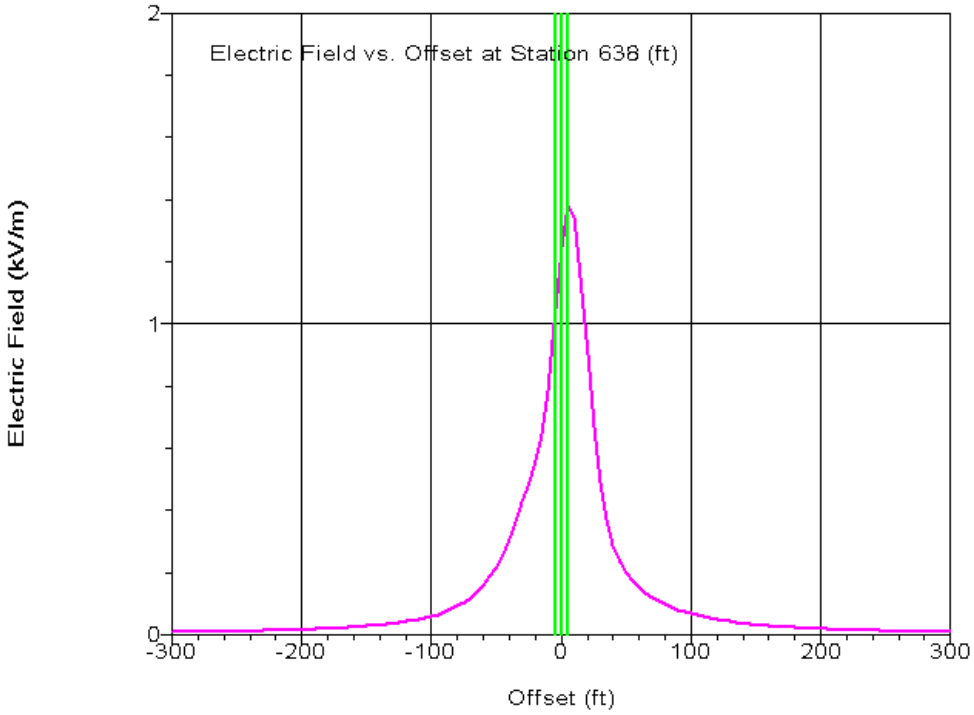


Figure 5-3 Electric Field without distribution, underbuild maximum (peak) load

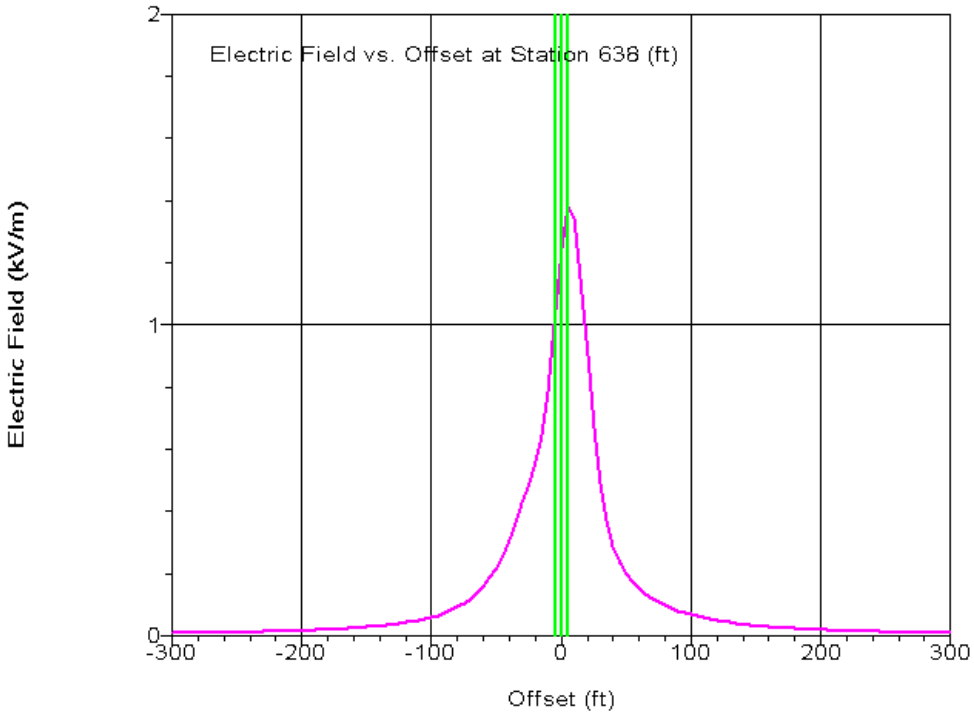


Figure 5-4 Electric Field with single circuit distribution underbuild, average load

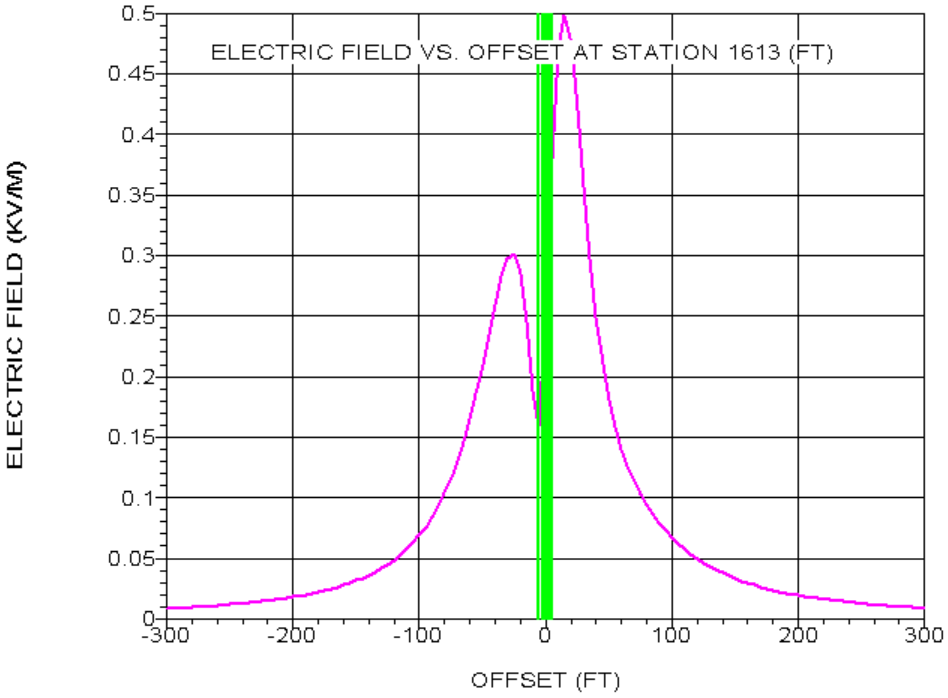


Figure 5-5 Electric Field with single circuit distribution underbuild, peak load

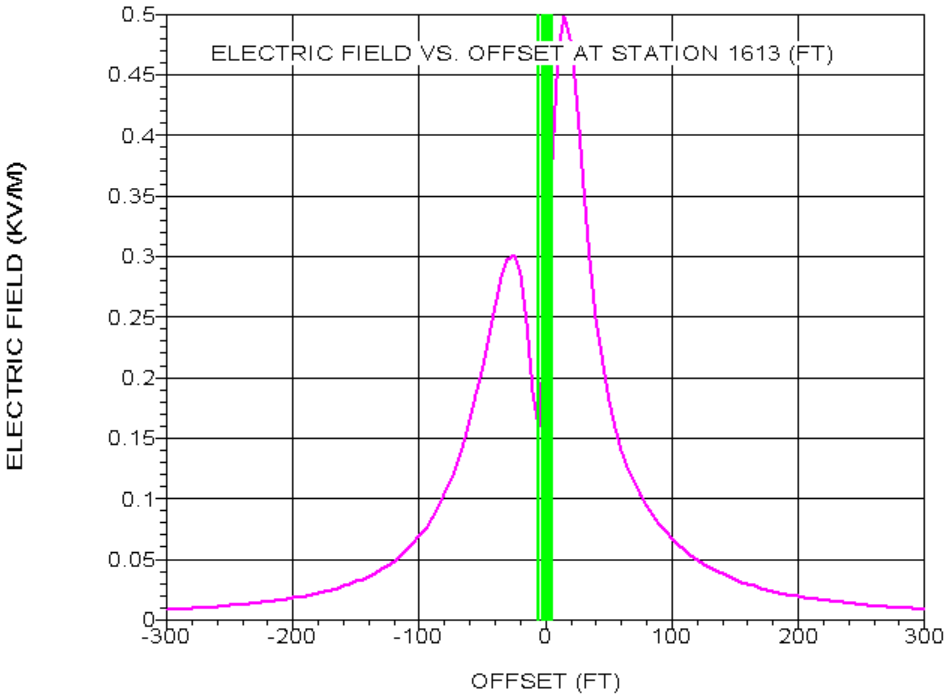


Figure 5-6 Electric Field with double circuit distribution underbuild, average load

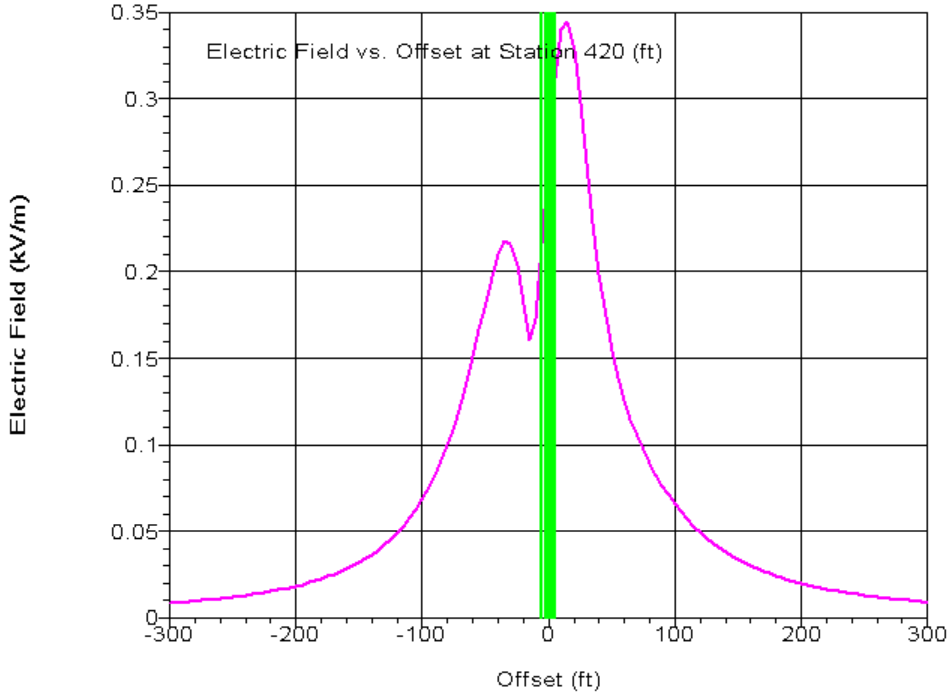
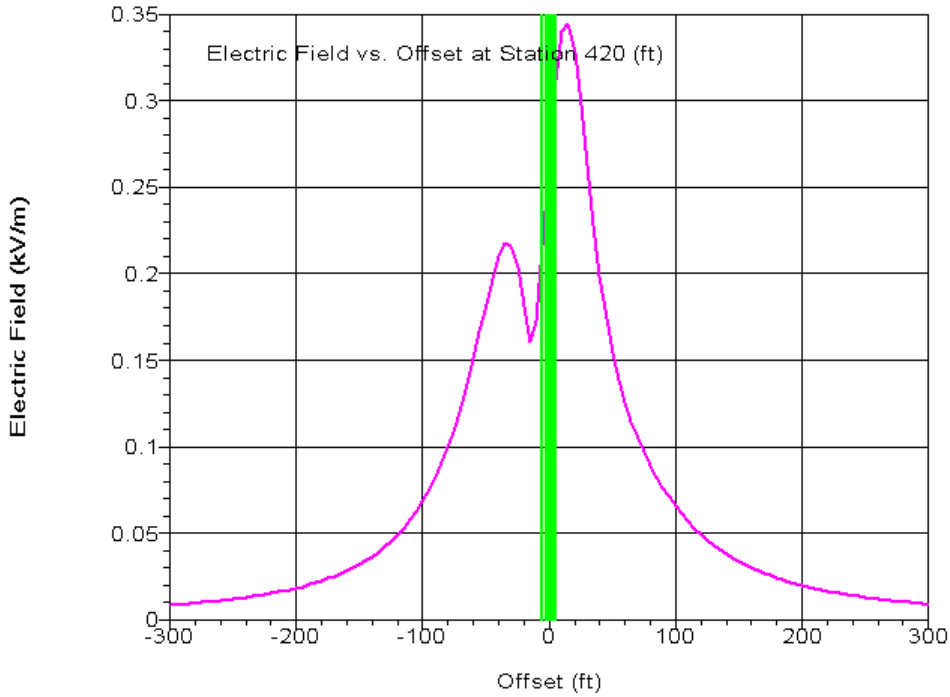


Figure 5-7 Electric Field with double circuit distribution underbuild, peak load



Induced Voltage

When an electric field reaches a nearby conductive object, such as a vehicle or a metal fence, it induces a voltage on the object. The magnitude of this voltage is dependent on many factors, including the object's capacitance, shape, size, orientation and location, resistance with respect to ground, and the weather conditions. If the object is insulated or semi-insulated from the ground and a person touches it, a small current would pass through the person's body to the ground. This might be accompanied by a spark discharge and mild shock, similar to what can occur when a person walks across a carpet and touches an object or person.

The main concern with induced voltage is not the magnitude of the voltage induced, but the current that would flow through a person to the ground should the person touch the object. To ensure the safety of persons in the proximity of high voltage transmission lines, the NESC requires that any discharge be less than five (5) milliAmperes (mA).

Implantable Medical Devices

High intensity EMF can in rare cases have adverse impacts on the operation of implantable medical devices (IMDs) such as pacemakers and defibrillators. While research has shown that the magnetic fields associated with high voltage transmission lines do not reach levels at which they could cause interference with such devices, it is possible that the electric fields associated with some high voltage transmission lines could reach levels high enough to induce sufficient body currents to cause interference. However, modern "bipolar" cardiac devices are much less susceptible to interactions with electric fields. Medtronic and Guidant, manufacturers of pacemakers and other IMDs, have indicated that electric fields below 6 kV/m are unlikely to cause interactions affecting operation of most of their devices. The older "unipolar" designs of cardiac devices are more susceptible to interference from electric fields. Research from the early 1990s indicates that the earliest evidence of interference was in electric fields ranging from 1.2 to 1.7 kV/m.

Table 5-1 and Figures 5-2 through 5-7 show that the electric fields for all of the Project's structure alternatives are well below the 6-kV/m level at which modern bipolar devices are susceptible to interaction with the fields. For older style unipolar designs, the electric fields may exceed levels that research from the 1990s has indicated may produce interference. However, recent research conducted in 2005 concluded that the risk of interference inhibition of unipolar cardiac devices from high voltage power lines in everyday life is small. In 2007,

Minnesota Power and Xcel Energy conducted studies with Medtronic, Inc. under 115-kV, 230-kV, 345-kV, and 500-kV transmission lines to confirm these 2005 findings. The analysis was based on real life public exposure levels under actual transmission lines in Minnesota and found no adverse interaction with pacemakers or IMDs. The analysis concluded that although interference may be possible in unique situations, device interference as a result of typical public exposure would be rare.[17]

In the unlikely event that a pacemaker is impacted, the effect is typically a temporary asynchronous pacing (commonly referred to as reversion mode or fixed rate pacing). The pacemaker would return to its normal operation when the person moves away from the source of the interference.

5.4.3 Magnetic Fields

Current passing through any conductor, including a wire, produces a magnetic field in the area around the wire. The current flowing through the conductors of a transmission line generates a magnetic field that, in similar fashion to the electric field, extends from the energized conductors to other nearby objects. The intensity of the magnetic field associated with a transmission line is proportional to the amount of current flowing through the line's conductors, and the magnitude of the magnetic field rapidly decreases with the distance from the conductors. Unlike electric fields, magnetic fields are not significantly affected by the presence of trees, buildings, or other solid structures nearby. The value of the magnetic field density is expressed in the unit of gauss (G) or milligauss (mG).

Magnetic field levels associated with some common electric appliances are provided in Table 5-2.

There are no federal or Minnesota exposure standards for magnetic fields. The EQB and the Commission have recognized that Florida and New York have the only state standards in the country (150 mG and 200 mG, respectively). Recent studies of the health effects from power frequency fields conclude that the evidence of health risk is weak.[18]

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[17] 2007 Minnesota Power Systems Conference Proceedings (University of Minnesota), *Electromagnetic Compatibility of Active Implantable Medical Devices (AIMD) and Their Interaction with High Voltage Power Lines*, at 23.

[18] Minnesota Department of Health. *EMF White Paper on Electric and Magnetic Field* (EMF) Policy and Mitigation Options. 2002; National Research Council. *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields*. 1997; www.niehs.nih.gov/health/topics/agents/emf/.

Table 5-2 Magnetic Fields of Common Electric Appliances (mG)[19]

Appliance	Distance from Source		
	6 inches	1 foot	2 feet
Hair Dryer	300	1	--
Electric Shaver	100	20	--
Can Opener	600	150	20
Electric Stove	30	8	2
Television	NA	7	2
Portable Heater	100	20	4
Vacuum Cleaner	300	60	10
Copy Machine	90	20	7
Computer	14	5	2

Table 5-3 summarizes the magnetic fields calculated for each of the Project's proposed transmission line configurations with power flow at the expected 2014-2015 winter peak loading and at the line's thermal limit. The magnetic field calculations are also graphically depicted in Figures 5-8 through 5-13. Because none of the Project's transmission lines will ever be loaded beyond its thermal limit, those results represent the maximum possible magnetic field associated with each line. Out of all the possible transmission line configurations, the estimated maximum possible magnetic field is 87.35 mG.

Because the actual power flow on a transmission line could potentially vary widely throughout the day depending on electric demand, the actual magnetic field level could also vary widely from hour to hour. In any case, the typical magnitude of the magnetic field associated with the Project's transmission lines is expected to be well below the calculated intensity at the expected peak loading.

[19] *EMF In Your Environment* (EPA 1992)

Table 5-3 Calculated Magnetic Fields (mG) for the Proposed Project[20]

Scenario	Distance to Proposed Centerline										
	-300'	-200'	-100'	-50'	-25'	Max.	25'	50'	100'	200'	300'
Horizontal Post Operation No Distribution Underbuild Average Load	0.12	0.27	0.98	3.10	7.00	13.62	8.24	3.53	1.06	0.28	0.12
Horizontal Post Operation No Distribution Underbuild Peak Load	0.72	1.59	5.89	18.59	41.97	81.71	49.44	21.16	6.37	1.66	0.74
Horizontal Post Operation with Single Circuit Distribution Underbuild Average Load	0.21	0.45	1.61	5.17	14.18	39.67	19.62	7.46	2.10	0.52	0.23
Horizontal Post Operation with Single Circuit Distribution Underbuild Peak Load	0.78	1.69	5.83	16.11	32.82	87.35	53.42	23.76	7.33	1.90	0.85
Horizontal Post Operation with Double Circuit Distribution Underbuild Average Load	0.22	0.50	1.84	6.00	14.64	25.39	14.64	6.19	1.93	0.51	0.23
Horizontal Post Operation with Double Circuit Distribution Underbuild Peak Load	0.83	1.82	6.42	18.44	37.73	59.02	39.21	19.98	6.92	1.90	0.86

Note: The maximum magnetic field for the Enterprise Park 115-kV Project is 87.35 mG at a 5 foot offset from the centerline within the horizontal post operation with single circuit distribution underbuild peak load scenario.

[20] Calculations are based on a maximum voltage of 121 kV.

Figure 5-8 Magnetic Field without distribution underbuild, average load

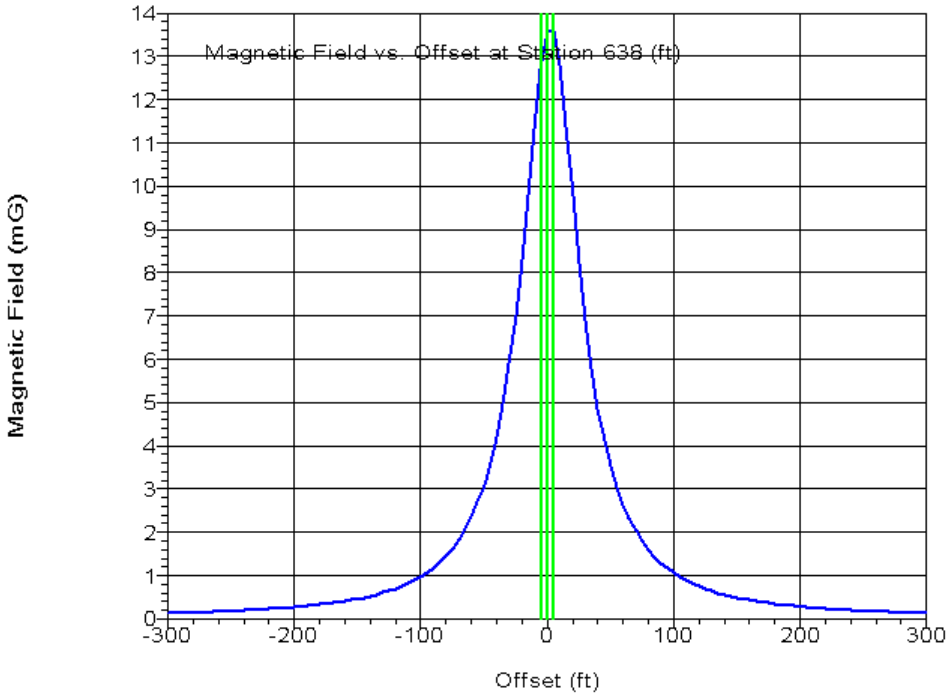


Figure 5-9 Magnetic Field without distribution underbuild, maximum (peak) load

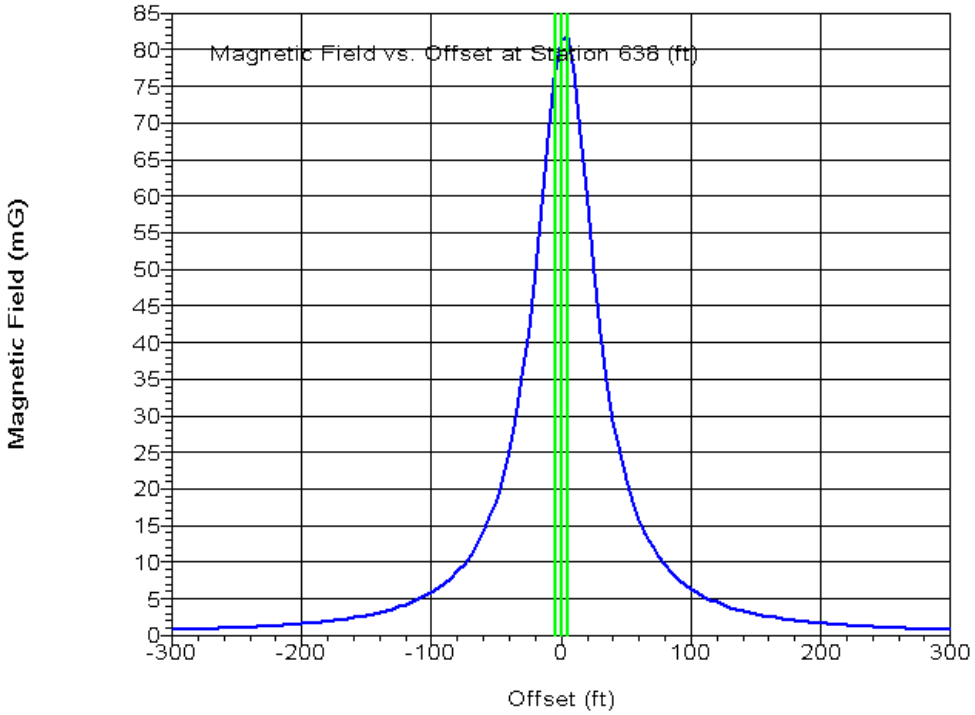


Figure 5-10 Magnetic Field with single circuit distribution underbuild, average load

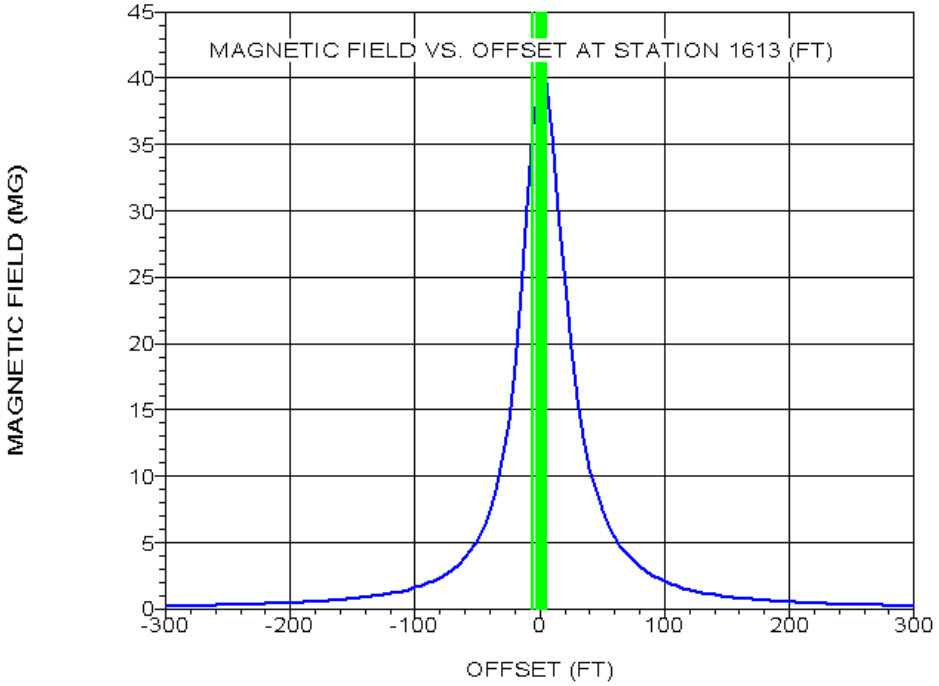


Figure 5-11 Magnetic Field with single circuit distribution underbuild, peak load

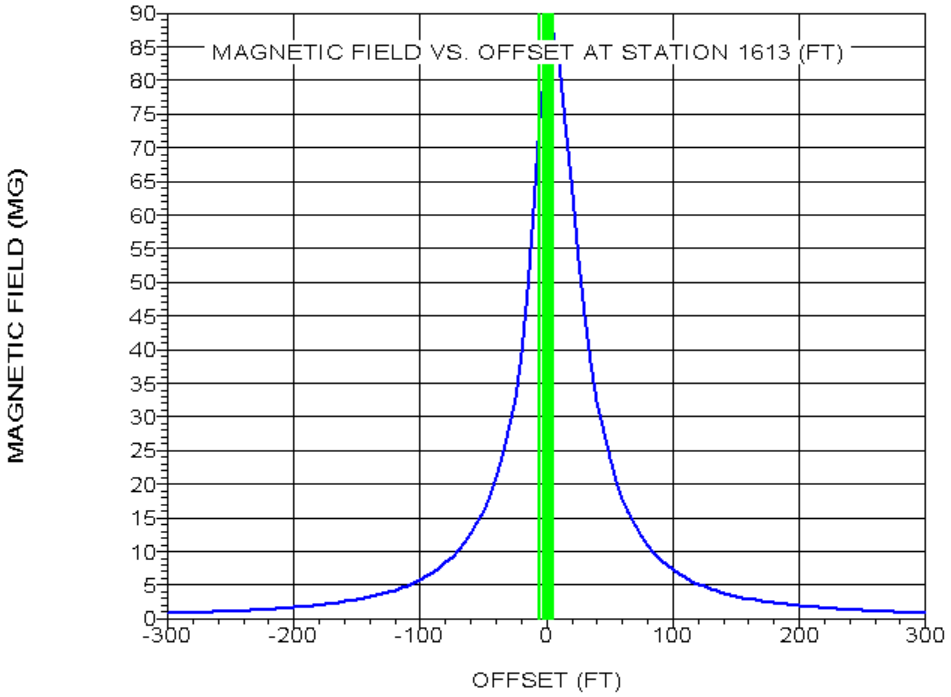


Figure 5-12 Magnetic Field with double circuit distribution underbuild, average load

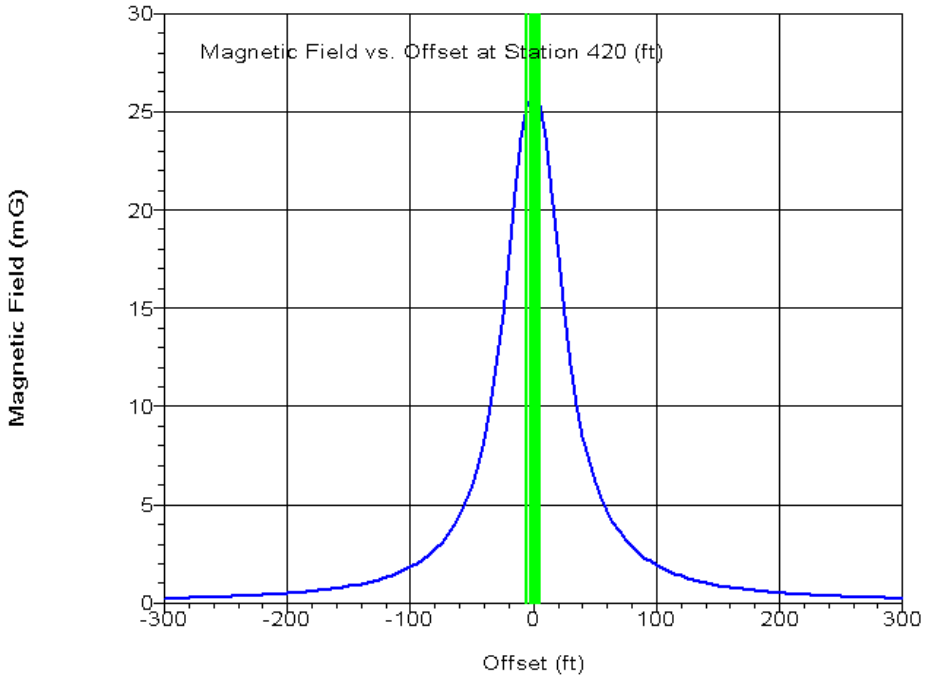
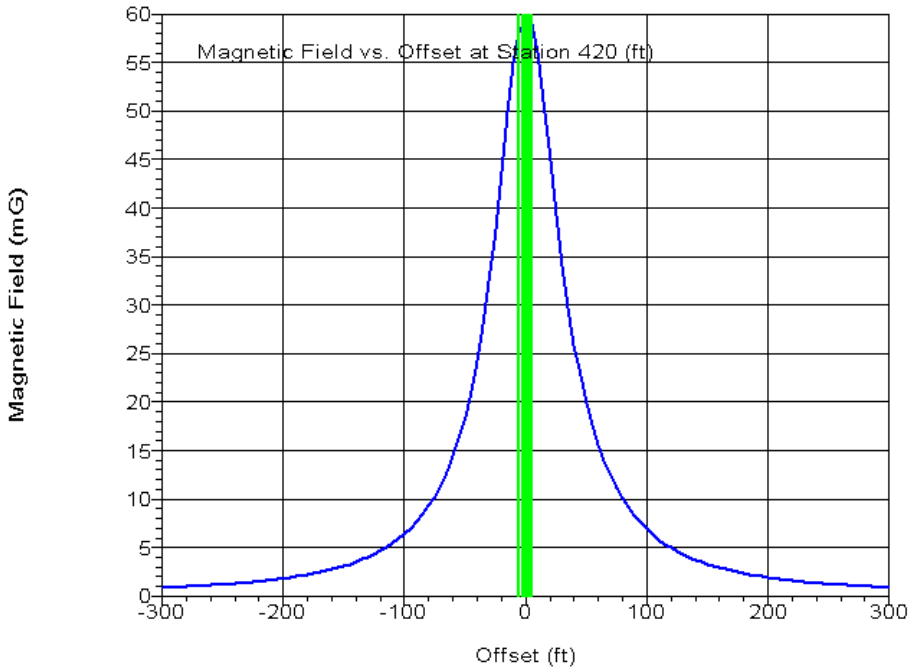


Figure 5-13 Magnetic Field with double circuit distribution underbuild, peak load



5.5 Stray Voltage

"Stray voltage" is a condition that can occur on the electric service entrances to structures from distribution lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings such as barns and milking parlors.

Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses and residences. Transmission lines can, however, induce stray voltage on a distribution circuit that is parallel and immediately under the transmission line. Appropriate measures would be taken to prevent stray voltage problems when the proposed Project parallels or crosses distributions lines.

5.6 Corona

Under certain conditions, the localized electric fields near an energized transmission line conductor can produce small electric discharges, ionizing nearby air. This is commonly referred to as the "corona" effect. Most often, corona formation is related to irregularities on the conductor, such as scratches or nicks, dust buildup, or water droplets. The air ionization caused by corona discharges can result in the formation of audible noise and radio frequency noise. If the discharges are excessive, the audible noise can reach annoyance levels and the radio frequency discharges can cause interference with radio and television reception. The potential for radio and television signal interference, however, is largely dependent on the magnitude of the corona-induced radio frequency noise relative *to* the strength of the broadcast signals.

Corona formation is a function of the conductor radius, surface condition, line geometry, weather condition, and most importantly, the operating voltage of the line. Corona-induced audible noise and radio and television interference are typically not a concern for power lines with operating voltages below 161 kV because the electric field intensity is too low to produce significant corona. The expected electric field intensity from to the Project's transmission lines is provided in Section 5.4.2.

5.6.1 Radio and Television Interference

Because the likelihood of significant corona formation on the Project's 115-kV line is minimal, the likelihood of radio and television interference due to corona discharges associated with the Project is also minimal. The Applicants are unaware of any complaints related to radio or television interference resulting from the operation of existing 115-kV facilities in the Project area and do not

expect radio and television interference to be an issue along the Proposed Route.

5.6.2 Audible Noise

Transmission lines can cause audible noise due to corona discharges from the conductors. This noise, which resembles a crackling sound, is typically only within the threshold of human hearing during rainy or foggy conditions, and even then is largely imperceptible due to background noise. The impacts and mitigation of audible noise from to the Project are discussed further in Section 8.2.3.

5.6.3 Ozone and Nitrogen Oxide Emissions

In addition to potentially causing audible and radio frequency noise, corona can also produce ozone and oxides of nitrogen in the air surrounding the conductor. Ozone is a very reactive form of oxygen molecule that combines readily with other elements and compounds in the atmosphere, making it relatively short lived. Ozone forms naturally in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants such as hydrocarbons from auto emissions. The natural production rate of ozone is directly proportional to temperature and sunlight, and inversely proportional to humidity. Thus the conditions that are most likely to cause corona formation on a transmission line – humid, rainy, or foggy conditions – actually inhibit the production of ozone.

Like audible and radio frequency noise, corona-induced ozone and nitrogen oxides are typically not a concern for power lines with operating voltages below 161 kV because the electric field intensity is too low to produce significant corona. Therefore, the Applicants expect ozone and nitrogen oxide concentrations associated with the Project to be negligible, and well below all federal and state standards.

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6 PROPERTY/RIGHT OF WAY ACQUISITION AND RESTORATION

6.1 Identification of Existing Utility and Public Rights of Way

6.1.1 Existing Utility Rights of Way

There are approximately 4.4 miles of existing overhead electric distribution lines located within the 5.8-mile Proposed Route. These existing distribution lines are owned, operated and maintained by Anoka Municipal Utility. In most instances, there will likely be some element of physical conflict with the new transmission line, making it necessary to remove, bury, or upgrade the distribution line by attaching it as underbuild on the new transmission line poles. In fewer instances where the new transmission line would not be in conflict with the existing distribution line, the distribution line will be left in its current location.

6.1.2 Existing Public Road and Railroad Rights of Way

Approximately 4.2 miles of the 5.8-mile Proposed Route would parallel public road and railroad rights of way (approximately 0.65 miles adjacent to Trunk Highway 10, 2.7 miles along Anoka County Roads 7,14 and 116, 0.35 miles adjacent to the BNSF railroad; and 0.54 miles along Anoka city streets). This parallel alignment adjacent to public road and railroad rights of way represents approximately seventy-two percent (72%) of the total Route length of 5.8 miles.

6.2 Right of Way Requirements

The typical right of way will be 50 to 70 feet wide, 25 to 35 feet on each side of the transmission centerline. Along public roads, the Applicants desire to locate the transmission line structures two to five feet outside of the public road rights of way, although there may be unique circumstances where structures would need to be located within public road rights of way. With much of this Project located in densely developed suburban areas, consideration of narrower right of ways will be given in those instances where existing structures or other physical features may reduce the available right of way to less than 25 feet on either side of the transmission line.

In rare cases, a right of way width exceeding 70 feet may be required for unusually long spans (such as the Rum River crossing) or special design requirements based on final design survey results. The minimum right of way width is largely dependent upon the extent of conductor blowout and recommended clearances from physical obstructions along the Route.

6.3 Property/Right of Way Acquisition Procedures

Once a route permit is approved and issued by the Commission, an engineering design survey will be completed and a centerline location of the transmission line will be established. Right of way negotiations will commence shortly thereafter. As a general practice, landowners or other interested parties will be contacted to review project details and to discuss the initial phases of the transmission project, including survey and soil investigation.

During the right of way acquisition process, each landowner or other interested party is provided with an acquisition package generally consisting of a copy of the Route Permit, easement documents, deeds, structure locations, typical structure photos, an offer of compensation and a project plan depicting the proposed transmission line or facility relative to each landowner's property. Additional information will be provided to each landowner or interested party explaining power line safety, easement acquisition procedures, damage settlement procedures, and a complaint reporting form. In addition to permanent easements necessary for the construction, operation and maintenance of the transmission line, there may be other special negotiations with certain landowners for temporary easements or agreements for construction access rights and staging areas for storage of poles and conductor, equipment, vehicles, or other construction-related materials. Landowners will be sufficiently notified in the event that site access is needed for soil investigation activities.

6.3.1 Transmission Line Easement Acquisition

Great River Energy will be responsible for acquiring the necessary easement rights for the new 115-kV transmission line. Representatives of Great River Energy will be available to discuss easement issues with all property owners and interested parties.

6.3.2 Crooked Lake Substation Property

Xcel Energy is fee owner of the 4.76-acre Crooked Lake Substation property. No additional property acquisition is anticipated for the modifications proposed at this substation facility.

6.3.3 Enterprise Park Substation Property

The City of Anoka is fee owner of the existing 2.33-acre Enterprise Park Substation property. In addition to the electric substation facility, the City operates and maintains an elevated municipal water storage tank situated on the easterly portion of the property in close proximity to the substation facility. A 0.69-acre parcel of land located westerly and immediately adjacent to the Enterprise

Park Substation property is being considered by Great River Energy for purchase in fee title or by easement for the purpose of improving access to the substation both during construction of the Project and any future expansion of the 115-kV components of the substation.

6.4 Tree Clearing and Staking

After all necessary easements and permits have been acquired, landowners and other interested parties will be notified by Great River Energy (or its agents) of the initial construction phases of the Project including the construction schedule, ingress to and egress from the Project area, tree and vegetation removal, damage mitigation, and other construction-related activities.

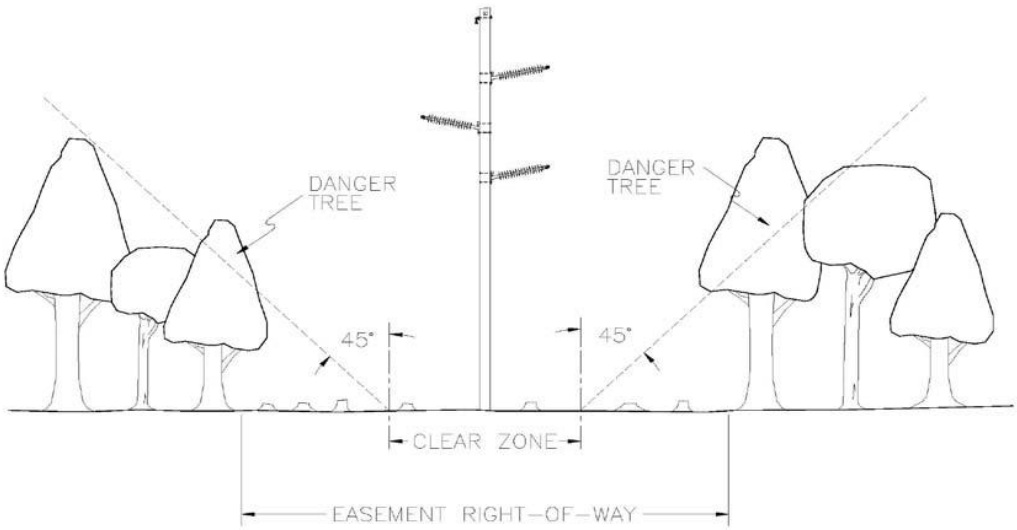
The first phase of construction will consist of staking the centerline of the new transmission line, followed by removal of trees and other vegetation from the right of way. As a general practice, lower-height trees and brush may be allowed along the outer portion of the easement area. Taller tree species that endanger the safe and reliable operation of the transmission facility are removed. In urban developed areas and to the extent practical, existing low growing vegetation that will not pose a threat to the transmission facility or impede construction may remain in the easement area, as agreed upon during easement negotiations.

To ensure the safe and reliable operation of high voltage transmission lines, minimum tree removal and trimming requirements are guided by the National Electric Safety Code (NESC). The NESC states that “trees that may interfere with ungrounded supply conductors should be trimmed or removed.”[21] Trees beyond the easement area that are in danger of falling into the energized transmission line may be removed or trimmed to eliminate the hazard as shown in Figure 6-1. In special circumstances, reduced tree trimming limits may be considered by Great River Energy based on negotiations with landowners and interested parties.

The second phase of construction will involve staking the location of structures, followed by structure installation and stringing of conductor wires.

[21] National Electric Safety Council, Rule 218A1.

Figure 6-1 Standard Tree Removal Practices



6.5 Right of Way Restoration

Upon the completion of **c**onstruction, property owners and interested parties will be contacted by Great River Energy to determine the extent of construction damages, if any. Personal property and real estate that may have sustained construction-related damage will be restored or replaced by Great River Energy/Minnesota Municipal Power Agency to its pre-construction condition or better. Property owners and other interested parties will again be notified by Great River Energy upon the completion of the restoration and cleanup, and will be directed to report any outstanding construction issues that have not been addressed. Once construction cleanup is complete and construction damages have been successfully mitigated, landowners will be sent a final notification advising them of the completion of the Project.

7 CONSTRUCTION PRACTICES AND OPERATION AND MAINTENANCE OF THE HVTL AND ASSOCIATED SUBSTATIONS

7.1 Construction Practices

7.1.1 Transmission Line

Great River Energy designs and constructs transmission lines using the most cost-effective methods based on past experiences and practices, and in compliance with the latest industry standards, as well as environmental and other permit conditions. Great River Energy adheres to NESC standards regarding clearances to ground, clearance to crossing utilities, clearance to buildings, right of way widths, erecting power poles, and stringing of transmission line conductors.

Great River Energy typically utilizes outside contractors for construction activities on large transmission line projects. The contractor is required to construct the line in accordance with specifications developed by Great River Energy's Engineering and Project Management Department. A copy of Great River Energy's easement restriction list, environmental restriction lists, and any required local permits are given to the awarded contractor prior to construction.

The proposed 115-kV transmission line would be constructed at existing grade elevations. Therefore, no pole locations would require grading, unless it is necessary to provide a level area for construction access and activities.

Typical tangent structures will be wood, laminated wood, or steel direct-embedded poles. The structures will require a hole dug 10 to 15 feet deep and 3 to 4 feet in diameter for each pole. Any excavated soil that is not backfilled will be thin spread or removed from the site as required. The poles may be backfilled with native soils, crushed rock or concrete depending on design conditions. In lowland areas, a galvanized steel culvert may be also inserted for pole stability if soil capacity is poor.

Due to the congested development throughout the Proposed Route, angle structures will typically be self supported and attached to a drilled concrete pillar foundation. The pillar will typically have a diameter of 4 to 8 feet. The hole may require a depth of 15 to 30 feet depending on design requirements. The pillar will be poured onsite with concrete delivered to the site via concrete trucks from a local batch plant.

Poles may be delivered to the staked location or to a designated marshalling yard depending on delivery and contractor availability. If the poles are delivered to a staked site, they are placed on the right of way out of the clear zone of any adjacent highways or designed pathways. The poles are typically framed with insulators and hardware on the ground and then lifted and placed in the hole via a bucket truck or a crane depending on the weight of the structure.

Once the structures have been erected, conductors are installed by establishing stringing setup areas within the right of way. These stringing setup areas are typically located every two miles along the project route. The conductors are pulled with a rope lead that connects to every structure through a dolly attached at the insulator location. Temporary guard or clearance poles are installed at crossings to provide adequate clearance over other utilities, streets, roads, highways, railroads, or other obstructions after any necessary notifications are made or permit requirements met to mitigate any concerns with traffic flow or operations of other utilities.

In lowland areas, construction activities may occur during the winter season to mitigate any damage to wetland areas or other sensitive areas, or to comply with required crossing permits. A pre-construction conference will outline any special requirements for the contractor prior to the start of any construction activities.

During construction, when temporary removal or relocation of fences needs to occur, installation of temporary or permanent gates may be required. Great River Energy land right agents will coordinate with the landowners on replacement of fences and gates. As part of easement restriction lists, the contractor will work around cultivated areas until harvest has occurred.

7.1.2 Substations

All construction will be completed in accordance with state, NESC, Great River Energy, Anoka Municipal Utility and Xcel Energy construction standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, right of way widths, erection of power poles (to connect the line to the substation), and stringing of transmission line conductors.

Modifications to the Enterprise Park and Crooked Lake 115-kV substations will begin once permits are received and the final design is complete. A detailed construction schedule will be developed based upon availability of crews, outage restrictions for any transmission lines that may be affected, weather conditions,

spring load restrictions on roads, and any restrictions placed on certain areas for minimizing impacts from construction.

Less than one acre of land is expected to be disturbed in the modifications of each substation. Some grading of the substations will be needed followed by pouring concrete foundations to support the substation equipment and control house.

Because less than one acre of land is expected to be disturbed during modification of the substations, a National Pollutant Discharge Elimination System (NPDES) construction stormwater permit will not be needed from the Minnesota Pollution Control Agency (MPCA). Each respective Applicant will re-evaluate the need for a stormwater permit as the substation designs are further refined.

Upon completion of construction activities, Great River Energy, Anoka Municipal Utility, and Xcel Energy will restore the sites. Post-construction reclamation activities include the removing and disposing of debris, dismantling all temporary facilities (including staging areas), employing appropriate erosion control measures, and reseeding areas disturbed by construction activities with vegetation similar to that which was removed.

7.2 Operation and Maintenance

Great River Energy/Minnesota Municipal Power Agency will periodically use the transmission line right of way to perform inspections, maintain equipment, and repair damage. Regular maintenance and inspections will be performed over the life of the facility to ensure a reliable system. Annual inspections will be done by foot, All-Terrain Vehicles, pickup truck, or by aerial means. These inspections will be limited to the acquired right of way and areas where obstructions or terrain require access off the easement. An aerial inspection of each transmission line is conducted monthly to ensure reliable operation.

Great River Energy’s Transmission Construction & Maintenance Department will conduct vegetation surveys and remove undesired vegetation that will interfere with the operation of the transmission line. Frequency of vegetation maintenance is on a three- to seven-year cycle. Right of way clearing practices include a combination of mechanical and hand clearing, along with an application of herbicides where allowed.

Anoka Municipal Utility, Great River Energy, Minnesota Municipal Power Agency and/or Xcel Energy will perform periodic inspections, maintain equipment, and make repairs over the life of the substations. Anoka Municipal Utility and Xcel Energy will also conduct routine maintenance as required to remove undesired vegetation that may interfere with the safe and reliable operation of the substations.

7.3 Work Force Requirements

It is estimated that 15 to 20 workers will be employed during construction of the Project. It is not expected that additional permanent jobs will be created by this project. Construction activities will provide seasonal influx of additional revenue into the communities during the construction phase, and materials may be purchased locally.

8 ENVIRONMENTAL INFORMATION – PROPOSED PROJECT

This portion of the Application provides a description of the land use and environmental resources in the Project area, potential impacts from the Project and proposed mitigative measures.

The Project has been reviewed by a number of state and federal agencies. All agency environmental review correspondences related to the proposed Project are provided in Appendix B.

8.1 Description of Environmental Setting

The Applicants are proposing to construct a 115-kV transmission line connecting Xcel Energy's existing Crooked Lake Substation to Anoka Municipal Utility's existing Enterprise Park Substation in Anoka County, Minnesota. The total length of the proposed 115-kV transmission line is approximately 5.8 miles, with portions of the Proposed Route located in the cities of Coon Rapids, Anoka and Ramsey as shown in Figure 4-1 (see Oversized Figures Tab).

The Project area is a highly developed Twin Cities metropolitan suburb with residential, commercial and industrial properties throughout the Proposed Route. Significant roadway infrastructure typical of a suburban area has been developed throughout the Project area.

Hydrologic features in close proximity to the proposed transmission line include:

- The Rum River, which would be crossed by the transmission line in Sections 25 and 36 of Township 32N Range 25W.
- Minnesota Department of Natural Resources (DNR) Public Water Wetland (115W) located in Sections 25 and 36 of Township 32N Range 25W.
- DNR Public Water Wetland (116W) located in Sections 26 and 35 of Township 32N Range 25W.

A mix of suburban type groundcover, consisting primarily of turf grasses on developed lots and voluntary weed growth on undeveloped lots, is present along the Proposed Route.

The physiographic features (topography, soils, geology and farmland) are typical of this area and do not preclude the development of this Project.

Blanding's turtles and creek heelsplitters (mussels) are both found in the vicinity of the Project. Blanding's turtles have a Minnesota status of "threatened" and

creek heelsplitters have a Minnesota status of “special concern.” Neither species is indicated as having a federal status.

Land use in the Project area is mainly residential, commercial, and industrial. The residential areas are primarily high density single-family homes. Open space areas, located primarily along the west side of 7th Avenue, are currently larger lots that have not been fully developed.

The Anoka High School campus is located along the Proposed Route near the intersection of 7th Avenue and Anoka County Highway 116.

Information on environmental resources in both the Project area and along the Proposed Route is provided in this section.

8.2 Effects on Human Settlement

8.2.1 Public Health and Safety

Proper safeguards will be implemented for construction and operation of the transmission facilities. The Project will be designed in compliance with local, state, NESC and the Applicants’ standards regarding clearance to the ground, clearance to crossing utilities, strength of materials and right-of-way widths. Construction crews and/or contract crews will comply with local, state and NESC standards regarding installation of facilities and standard construction practices. The Applicants’ established safety procedures as well as industry safety procedures will be followed during and after construction of the transmission line and modifications of the substations, including clear signage during all construction activities.

The Project will be equipped with protective devices to safeguard the public if an accident occurs and causes a structure or conductor to fall to the ground. The Crooked Lake and Enterprise Park substations are already equipped with breakers and relays located where existing transmission lines connect to the substations. Additional safety equipment will be installed to ensure safe operation of the new transmission line. The protective equipment is designed to de-energize the transmission line should an accident occur.

The Minnesota Department of Transportation (MnDOT), Office of Aeronautics was contacted requesting information on the possible effects of the proposed Project on airports or airstrips in the Project area. In a letter dated March 1, 2011 (Appendix B), the MnDOT stated that they “do not anticipate any effect on the

operation of publicly-owned airports; therefore the Mn/DOT Office of Aeronautics has no objection to the proposed project."

Impacts and Mitigation

No impacts to public health and safety are anticipated as a result of the Project. The Applicants will ensure that safety requirements are met during the construction and operation of the facility. Additionally, when crossing roads or railroads during stringing operations, guard structures will be utilized to eliminate traffic delays and provide safeguards for the public. With implementation of these safeguards and protective measures, no additional mitigation is proposed.

8.2.2 Displacement

The transmission line will be designed to avoid displacement of existing residences or businesses.

8.2.3 Noise

There are two potential sources of audible noise from the Project: the conductors on the transmission line and the equipment located within each of the substations.

Noise Measurement

Noise levels are measured on a logarithmic scale in units of decibels. Because human hearing is not equally sensitive to all frequencies of sound, it is customary to apply a weighting factor so the overall measured sound pressure level will relate as closely as possible to the ear's perception of the sound. The A-weighting network is typically used and the measured sound level is expressed in units of decibels A-weighted (dBA). In general terms, a noise level change of 3 dBA or less is imperceptible to human hearing. A 5-dBA or more change in noise level is clearly noticeable. A 10-dBA change in noise level is perceived as a doubling of noise loudness.[22]

Noise Regulations

Minnesota's Noise Pollution Control Rules (Minn. Rules Chapter 7030) states that noise levels must meet specific standards based on Noise Area Classifications (NAC) established in the rule. The standards are summarized in Table 8-1.

[22] *A Guide to Noise control in Minnesota*, Minnesota Pollution Control Agency (1999). http://www.pca.state.mn.us/waste/pubs/noise.pdf

Table 8-1 Noise Area Classifications & Standards[23]

NAC	Day (07:00-22:00)		Night (22:00-7:00)	
	L50	L10	L50	L10
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

The NAC is based on land use activity at the location of the receiver.[24] For example, household units are defined under NAC 1, bus passenger terminals are defined under NAC 2, and transportation right of way is defined under NAC 3.[25] NAC 1 also includes other noise-sensitive areas such as medical and other health services, religious services, educational services and camping areas.[26]

Minnesota's Noise Pollution Control Rules use the A-weighting scale and apply statistical sound levels (L-Level Descriptors) to account for changes in sound levels over a period time as shown in Table 8-1. The L10 is defined as the noise level exceeded 10 percent of the time, or for six minutes in an hour. The L50 is the noise level exceeded 50 percent of the time, or for thirty minutes in an hour. The L5 is the noise level exceeded five percent of the time, or for three minutes in an hour.

Conductor Noise

Audible noise from electrical conductors is due to point source corona (minor breakdown of air insulating a conductor) and is a function of conductor voltage gradient. Noise emission from a transmission line occurs during heavy rain and wet conductor conditions. In foggy, damp, or rainy weather conditions, power lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires. During dry weather, audible noise from transmission lines is barely perceptible. The phenomenon of corona is discussed further in Section 5.6.

During heavy rain, the background noise level produced from the rainfall and wind is usually greater than the noise from the transmission line. Also, few people are outdoors and often windows are closed, which help to mitigate the

[23] Minn. R. 7030.0040 (2003).
[24] Minn. R. 7030.0050 (2003).
[25] Minn. R. 7030.0050 (2003).
[26] Minn. R. 7030.0050 (2003).

level of noise to which a person is subjected. As a result, people do not normally notice audible noise from a transmission line during heavy rain.

Table 8-2 summarizes the expected noise level from a 115-kV transmission line when it is exposed to heavy rain conditions (one inch per hour). These estimates are based on results from the Bonneville Power Administration Corona and Field Effects Program version 3 (U.S. Department of Energy, Bonneville Power Administration (BPA), Undated).

Table 8-2 Conductor Noise Estimates – Heavy Rain Case

Measurement Location	L5	L50
Edge of right of way	17.7 dBA	14.2 dBA
Directly under the line	18.8 dBA	15.3 dBA

BPA developed general guidelines based upon public response to alternating current (AC) transmission line audible noise. The guideline indicates that numerous complaints can be expected if the line noise exceeds approximately 58.5 dBA and that few complaints should be expected if audible noise is limited to 52.5 dBA, values relatively consistent with the Minnesota noise rules. The calculated values for the proposed transmission lines are well below the state's standards and BPA's guidelines. The audible noise will be barely perceptible during fair weather.

Substation Noise

Noise associated with substations includes the operation of transformers and switchgear. The transformers produce a constant low-frequency humming noise, while the switchgear produces an impulsive or short duration noise during infrequent activation of the circuit breakers. Due to the infrequent operation of the switchgear, the noise generated will be considered temporary in nature and not predicted to exceed the MPCA Noise Limits.

Modifications at the Crooked Lake Substation will not include the installation of a new transformer. Accordingly, the only new noise source will be from new switchgear.

Modifications at the Enterprise Park Substation will include the installation of a new 115-kV step-down transformer. A typical transformer of this type would

have vendor noise level guarantees measured one meter from the equipment of 75 dBA when the fans are running. To conservatively predict future noise levels and compliance with the 50-dBA limit, the 75-dBA noise level was treated as a point source at the transformer and modeled to determine the distance where the noise levels would be reduced to 50 dBA.

A simplified, conservative model[27] was created to determine the distance at which the noise would attenuate to 50 dBA (the NAC 1 nighttime L_{50} noise standard). Noise propagation through the outdoor atmosphere typically decreases in level with increasing distance between the source and the receiver. The noise attenuation is the result of several mechanisms, including geometrical spreading of the sound waves, shielding provided by physical structures, atmospheric absorption of the acoustic energy and ground effects on the sound waves. In general, the noise or sound pressure levels emitted from a substation will decrease approximately 6 dB for each doubling of distance from the source to the receiver. The simplified model was prepared based on this 6-dB reduction with a doubling of distance. The model is conservative in that it does not factor in geometric spreading or any attenuation from shielding or ground effects.

Based on the model, substation noise level from the Enterprise Park Substation will attenuate to 50 dBA at a distance of approximately 51 feet from the transformer. The nearest NAC 1 receptor will be the Anoka Technical College, which is approximately 450 feet from the Enterprise Park Substation, and at this distance, the noise level will be approximately 31 dBA. Noise levels will be significantly lower inside the buildings where the educational services occur.

<u>Impacts and Mitigation</u>

The calculated noise impacts for the proposed Project are well below the Minnesota regulatory limits. No significant noise impacts are anticipated from the planning, construction and operation of the Project; therefore, no mitigation is proposed.

8.2.4 Aesthetics

The majority of the 115-kV single circuit line will be constructed using single pole wood structures with horizontal post insulators. The average height will be between 60 and 85 feet, with an average span of 250 to 400 feet. The

[27] The simplified model is based off the following formula: S2 = S1 - 20 * Log(d2/d1). S2 = Noise level at distance d2 (dBA), S1 = Measured sound level at d1 (dBA), D1 = Distance from noise source to S1 noise measurement, e.g., vendor guarantee (ft), and D2 = Distance from noise source at which S2 is calculated (ft).

transmission line will generally be designed with a narrow profile that is less intrusive than other types of structures.

Because of the highly developed nature of the Project area, the viewshed is congested with manmade structures and is relatively short, both of which makes the transmission line less apparent to the casual observer. The transmission line will nevertheless be visible along the roads that it parallels. In some areas it will replace an existing distribution line, which may be attached to the new poles. Homes within 500 feet of the Proposed Route alignment will be the most likely to have their viewshed affected by the construction of a transmission line.

Property types within varying distances of the road centerlines along the Proposed Route are summarized in Table 8-3 and shown on Figure 8-1 (see Oversized Figures Tab). The buildings were counted on both sides of the road.

Table 8-3 Estimate of Property Types In and Near Proposed Route

Property Type Classification	Within the Conceptual Alignment's 70-foot Right of Way	Within Requested Route Plus 100 Feet of Conceptual Alignment	Within Requested Route Plus 300 Feet of Conceptual Alignment
Business/Commercial/Industrial	40	52	85
Exempt	32	35	44
Multi Family Residential	0	3	12
Single Family Residential	17	74	237
Grand Total	**91**	**165**	**382**

Impacts and Mitigation

While the new transmission line will be a visual contrast to surrounding land uses, the Applicants will work with landowners to indentify concerns related to the proposed transmission line and upgraded substations. In general, mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Mitigation will include, to the extent practicable and within sound engineering practices, the following:

- Locating structures, right of way and other disturbed areas after considering input from landowners or land management agencies to minimize visual impacts.

- Taking care to preserve the natural landscape by constructing and operating the line to prevent any unnecessary destruction of the natural surroundings.
- Paralleling or sharing existing transmission lines and other rights of way, wherever such actions do not violate sound engineering principles or system reliability criteria.
- Placing structures at the maximum feasible distance from highway, trail and water crossings.
- Compensating landowners for removal of any mature yard trees, either through easement negotiations or on a separate basis.

8.2.5 Socioeconomics

Demographics

U.S. Census Quick Facts[28] were reviewed to determine key demographic data for the Project area.

The estimated population of Anoka County in 2009 was 331,582 with an 11.2 percent increase in population from 2000 through 2009 (see Table 8-4). The number of persons per square mile (population density) in 2000 was 703.0. The total number of housing units in 2009 was 125,496. The home ownership rate in 2000 was 83.4 percent and housing units in multi-unit structures was 15.5 percent.

Table 8-4 Population Characteristics[29]

Location	Population 2000	Population 2009 (est.)	Percent Change 2000-2008
Minnesota	4,919,492	5,266,214	7.0
Anoka County	298,086	331,582	11.2

The population in Anoka County was 89.5 percent white. All minority populations had some presence and no one minority population dominated (see Table 8-5). Females accounted for 49.5 percent of the population. The age group composition was 6.8 percent under five years old, 25.5 percent under 18 years old, and 9.4 percent 65 years and older.

[28] US Census Bureau, 2010 Website, http://quickfacts.census.gov/qfd/states/27/27003.html
[29] US Census Bureau, 2010 Website, http://quickfacts.census.gov/qfd/states/27/27057.html

Anoka County is generally as racially and ethnically diverse as the state of Minnesota (Table 8-5). Neither racial nor ethnic minorities will be disproportionately affected by the Project.

Table 8-5 Race/Ethnicity Characteristics[30]

Place	Population	Percentage of Population						
		White	Black/ African-American	American Indian	Asian/ Pacific Islander	Other Race	More than One Race	Hispanic/ Latino
Minnesota	5,266,214	88.6	4.7	1.3	3.8	--	1.6	4.3
Anoka County	331,582	89.5	4.0	0.8	3.9	--	1.8	2.9

The 2008 median household income for Anoka County was $69,981 with 5.8 percent of people living below the poverty level (see Table 8-6).

Table 8-6 Household Economic Characteristics, 2010[31]

Place	Median Household Income	Home Ownership Rate	Median Value of Owner Occupied Housing	Persons per household	Percentage Below Poverty Level Individuals
Minnesota	$57,318	74.6	$122,400	2.52	9.6
Anoka County	$69,981	83.4	$131,300	2.77	5.8

Impacts and Mitigation

Any adverse impacts to socioeconomic conditions or factors associated with the Project will be short-term; therefore, no mitigation is proposed.

Construction of the Project should result in short-term positive economic impacts in the form of increased spending for lodging, meals and other consumer goods and services. The Project will not likely create new permanent jobs, but it will create temporary construction jobs that will provide a one-time influx of income to the area.

Expenditures for equipment, energy, fuel, operating supplies and other products and services benefit businesses in the county where the Project is located. Indirect impacts may occur through the increased capability of the electric system to supply energy to commercial and industrial users, which will contribute to the economic growth of the region.

[30] US Census Bureau, 2010 Website, http://quickfacts.census.gov/qfd/states/27/27057.html
[31] US Census Bureau, 2010 Website, http://quickfacts.census.gov/qfd/states/27/27057.html

There will also be some long-term beneficial impacts from the new transmission lines, including an increase to the county's tax base resulting with incremental increase in revenue from utility property taxes. The availability of reliable power in the area will have a positive effect on local businesses and residents.

8.2.6 Cultural Values

Cultural values include those perceived community beliefs or attitudes in a given area that provide a framework for that community's unity. The communities in the vicinity of the Project include the cities of Anoka, Coon Rapids, Ramsey and Andover. Local community ties relate to recreation, work, worship, celebration and economic growth. All the communities have strong cultural ties to recreation, with the diversity of trails, parks, and lakes present in the area. The communities value nearby shopping and entertainment districts, local employment opportunities, and easy access to Minneapolis and St. Paul. Development of new industry, business, homes and recreational opportunities are strongly supported by the local units of government.

Impacts and Mitigation

No negative impacts to cultural values are anticipated from the planning, construction and operation of the Project; therefore, no mitigation is proposed.

8.2.7 Public Services

Public services provided in the vicinity of the Project (e.g., police, fire protection, waste collection, etc.) will not be affected by the proposed transmission project.

Impacts and Mitigation

No negative impacts to public services are anticipated from the planning, construction and operation of the Project; therefore, no mitigation is proposed.

8.3 Effects on Land-Based Economies

8.3.1 Agriculture

There are no agricultural lands along the Proposed Route.

8.3.2 Forestry

There are no forested lands along the Proposed Route that are harvested for forest products. There is forested land in and around River Bend Park, through which the transmission line will cross.

Impacts and Mitigation

The entire width of the transmission line right of way (in general, 50 to 70 feet) will need to be cleared of vegetation that could potentially grow into the conductors. Great River Energy has begun discussions with the City of Ramsey park staff and will continue to work with them to minimize and mitigate the impacts of any tree clearing in the park.

8.3.3 Tourism

Tourism in the Anoka County consists primarily of antique shopping, golfing, fishing, boating, and participating in local festivals. The proposed transmission line Route is dominated by industrial and commercial facilities with some adjacent residential properties. The transmission line will cross the Rum River at River Bend Park in the City of Ramsey, which is primarily used by the local population for short-term recreational activities.

Impacts and Mitigation

No negative impacts to tourism activities are anticipated from the planning, construction and operation of the Project; therefore, no mitigation is proposed. The Applicants will work with the City of Ramsey parks staff to locate and construct the transmission line to minimize visual impacts to River Bend Park and avoid limiting activities within the park.

8.3.4 Mineable Resources

There are no mining resources in the vicinity of the Proposed Route.

8.4 Cultural Resources

The Minnesota Historical Society (MHS) was contacted requesting information on the possible effects of the proposed Project on historic properties in the Project area. MHS indicated that the proposed Project was reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act. A copy of the MHS correspondences is included in Appendix B.

MHS responded:

> *Due to the nature of the proposed project, we recommend that an archaeological survey be completed. The survey must meet the requirements of the Secretary of the Interior's Standards for identification and Evaluation, and should include an evaluation of National Register eligibility for any properties that are identified. We note that there is a known archaeological site in the project area, 21AN0129. The*

archaeological survey should also assess any effects that the project may have on this site.

Great River Energy contracted with Westwood Professional Services (Westwood) to conduct an archeological literature review. In their review, Westwood indentified 14 previously recorded archaeological sites within the study area, which included the Proposed Route and a one-mile buffer. Of these 14 sites, only one is located directly in the Proposed Route; the remainder are located within the one-mile buffer. The sites are summarized in Table 8-7, and a copy of Westwood's letter and recommendations is included in Appendix B.

Table 8-7 Previously Recorded Archaeological Sites

Site Number	Site Name	Site Type	Location	Project/Buffer
21ANf	n/a	Mound	T31N, R25W, Sec. 12	Buffer
21Ang	Belanger Fur Post	Historic Documentation	T31N, R25W, Sec. 12	Buffer
21Anh	Trading Post 3	Historic Documentation	T32N, R25W, Sec. 35	Buffer
21ANj	Anoka Lumber Company (Mill)	Historic Documentation	T31N, R24W, Sec. 6	Buffer
21ANk	St. Paul Lumber Company (Mill)	Historic Documentation	T31N, R25W, Sec. 1	Buffer
21ANl	Washburn Anoka Mill	Historic Documentation	T31N, R25W, Sec. 1	Buffer
21ANm	Mill	Historic Documentation	T31N, R25W, Sec. 1	Buffer
21AN129	River's Bend Park	Artifact Scatter	T32N, R25W, Sec.36	Project
21AN144	n/a	Artifact Scatter	T32N, R25W, Sec.25	Buffer
21AN145	n/a	Artifact Scatter	T32N, R25W, Sec.25	Buffer
21AN146	n/a	Artifact Scatter	T32N, R25W, Sec.25	Buffer
21AN150	Page Bros. & Stimson Planing Mill	Artifact Scatter	T31N, R24W, Sec. 6	Buffer
21AN163	Anoka State Hospital Farm	Artifact Scatter/Structural Ruin	T31N, R24W, Sec. 31	Buffer
21AN169	W.D.Washburn Sawmill	Artifact Scatter/Structural Ruin	T31N, R25W, Sec. 1	Buffer

Key: Site Number = site designation applied by State Archaeologist; Site Name = name given to site; Site Type = defined site use type; Location = amended legal description of recorded property; Project/Buffer = location of site within defined project area (Project) or within a one-mile buffer (Buffer).

The previously recorded site within the Proposed Route is located in the vicinity of River Bend Park. When the site was identified in 1989, it was deemed to be non-eligible for registration on the National Register of Historic Properties, and it was subsequently filled over during construction of the County Road 116 bridge over the Rum River.

Westwood recommended:

> *The project area has a high potential for cultural resources due to its proximity to the Mississippi and Rum Rivers; however, the area is within a highly modified urban area. Limited locations within the proposed project area have undisturbed soils which could still contain intact cultural resources. One location with undisturbed soils is the island within the Rum River which contains River's Bend Park. Although portions of the island remain undisturbed, the island was previously surveyed by Harrison in 1989. The one archaeological site on that island, which is also the only known site intersecting with the proposed transmission line route, was determined to be ineligible for listing on the NRHP and has since been destroyed.*
>
> *Due to the high potential for cultural resources, a Phase I Archaeological Reconnaissance Survey is recommended should construction plans involve ground disturbance of previously undisturbed areas. It would be advised that a windshield survey with limited soil testing precede the Phase I survey to ascertain which if any locations are undisturbed and would require additional archaeological survey.*

<u>Impacts and Mitigation</u>

One recorded historical site was identified within the Proposed Route. Although additional sites have been recorded within one mile of the Proposed Route, the Project will have negligible impacts on these sites, and then only from a visual perspective. Great River Energy will follow the recommendation of Westwood to conduct a windshield survey of previously undisturbed areas. When the Route is surveyed and pole locations identified, recommendations from the windshield survey will be taken into consideration. After pole locations are identified, Great River Energy will consult with Westwood and the MHS to determine if any additional survey work needs to be conducted.

If any archaeological sites are identified during placement of the poles along the permitted Route, construction work will be stopped and MHS staff consulted as to how to proceed.

8.5 Natural Environment

8.5.1 Air Quality

The only potential air emissions from a transmission line result from corona, which may produce ozone and oxides of nitrogen. This can occur when the electric field intensity exceeds the breakdown strength of the air. For a 115-kV transmission line, the conductor surface gradient is typically below the air breakdown level. As such, it is unlikely that any measurable emissions will occur from the conductor surface. The phenomenon of corona discharge is discussed further in Section 5.6.

Impacts and Mitigation

No impacts to air quality are anticipated due to the operation of the transmission line.

Temporary air quality impacts caused by construction vehicle emissions and fugitive dust from right of way clearing and construction are expected to occur. Exhaust emissions from diesel equipment will vary during construction, but will be minimal and temporary. The magnitude of emissions is influenced heavily by weather conditions and the specific construction activity taking place. Appropriate dust control measures will be implemented during earth work activities.

8.5.2 Water Resources

Hydrologic features in the Project area and along the Proposed Route are shown in Figure 8-2 (see Oversized Figures Tab).

Ground Water

The DNR divides Minnesota into six groundwater provinces. All of Anoka County falls within the Metro Province, which is described as sand aquifers in generally thick sandy and clayey glacial drift overlaying Precambrian and Paleozoic sandstones, limestone and dolostone aquifers.[32]

[32] http://files.dnr.state.mn.us/natural_resources/water/groundwater/provinces/gwprov.pdf (2009)

Surface Water

The Project area lies within the Rum River to Mille Lacs Watershed Planning Unit of the Upper Mississippi River Basin.[33]

The Project will require a United States Army Corps of Engineers (Corps) permit under Section 10 of the Rivers and Harbors Act because the transmission line will cross the Rum River, a navigable water of the United States.

The Corps was contacted requesting information on the possible effects of the proposed Project on floodplains, waters, and wetlands in the Project area and along the Proposed Route. The Corps typically only provides a general response on a project until it receives a jurisdictional determination request and/or a permit application. The Corps response, which addressed its regulatory jurisdiction and permitting requirements, is provided in Appendix B.

Lakes

There are no lakes within the Proposed Route.

Rivers, Streams and Ditches

The transmission line will cross over the Rum River.

Riparian Areas

Riparian areas are ecosystems that occur along watercourses or at the fringe of water bodies. For purposes of this Application, the riparian areas are defined as the land within 300 feet of streams and within 1,000 feet of lakes. These distances were selected because they are consistent with the definition of shoreland in the DNR Statewide Standards. These statewide standards set guidelines for the use and development of shoreland (riparian) property around all lakes greater than 25 acres (10 acres in municipalities) and rivers with a drainage area of two miles or greater.

The Proposed Route crosses riparian areas associated with the Rum River (Figure 8-2). There are no lakes greater than 10 acres in the vicinity of the Project, so there are no riparian areas associated with lakes.

[33] http://www.pca.state.mn.us/water/basins/uppermiss/index.html (2009)

Public Waters

Public Waters are wetlands, water basins and watercourses of significant recreational or natural resource value in Minnesota as defined in Minnesota Statutes Section 103G.005. The DNR has regulatory jurisdiction over these waters.

The Public Water Inventory (PWI) shows the Rum River, which will be crossed by the proposed transmission line, and two wetlands adjacent to the line (116W in T32N R25W, Sections 26 and 35 and 115W in T32N R25W, Sections 25 and 36). The public waters are shown on Figure 8-2.

Impaired Waters

Section 303(D) of the Federal Clean Water Act requires states to publish, every two years, a list of streams and lakes that are not meeting their designated uses because of excess pollutants (impaired waters). The list, known as the 303(d) list, is based on violations of water quality standards. In Minnesota, the MPCA has jurisdiction over determining 303(d) waters. These waters are described as "impaired." The Rum River is listed as impaired for mercury in the MPCA's draft 2010 list of impaired waters.[34]

Floodplains

The transmission line will cross the Rum River floodplain.

Wetlands

Wetlands are important resources for flood abatement, wildlife habitat, and water quality. Wetlands that are hydrologically connected to the nation's navigable rivers are protected federally under Section 404 of the Clean Water Act. In Minnesota, wetlands are also protected under the Wetland Conservation Act (WCA).

The United States Fish and Wildlife Service (USFWS) produced maps of wetlands based on aerial photographs and NRCS soil surveys starting in the 1970s. These wetlands are known as the National Wetland Inventory (NWI).

[34] http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/assessment-and-listing/303d-list-of-impaired-waters.html

Wetlands listed on the NWI may be inconsistent with current wetland conditions; however, NWIs are the most accurate and readily available database of wetland resources within the Project area and were therefore used to identify wetlands along the Proposed Route.

There are several NWI wetlands in the Project area, which are summarized in Table 8-8. Except for those wetlands in the Rum River floodplain, these wetlands will be adjacent to the proposed transmission line rather than crossed by it.

Table 8-8 Wetland Types along the Proposed Route (NWI)

Location	Cowardin Type
T 31N R 24W Section 5	PEMF, PEMC, PFO1C
T 32N R 24W Section 31	PEMCd
T 32N R 24W Sections 30 & 31 T 32N R 25W Sections 25 & 36	PSS1C, PUBG, PEMF, R2UBH, PFO/SS1CPEMC
T 32N R 25W Section 36	PEMC, PUBF
T 32N R 25W Section 35	PUBG, PEMC

Note: The wetland types are classified using the Cowardin[35] system that defines the habitat system, vegetative and sediment class and water regime. The wetland classification system is hierarchical, with wetlands and deepwater habitats divided among five major systems at the broadest level. The five systems include Marine (open ocean and associated coastline), Estuarine (salt marshes and brackish tidal water), Riverine (rivers, creeks, and streams), Lacustrine (lakes and deep ponds), and Palustrine (shallow ponds, marshes, swamps, sloughs). Systems are further subdivided into subsystems that reflect hydrologic conditions. Below the subsystem is the class that describes the appearance of the wetland in terms of vegetation or substrate. Each class is further subdivided into subclasses; vegetated subclasses are described in terms of life form, and substrate subclasses in terms of composition. The classification system also includes modifiers to describe hydrology (water regime), soils, water chemistry (pH, salinity), and special modifiers relating to man's activities (e.g., impounded, partly drained).

Some common symbols used in the wetland classification system include:

SYSTEM:	P – Palustrine	L – Lacustrine
CLASS:	RB – Rock Bottom EM – Emergent FO – Forested	UB – Unconsolidated Bottom SS – Scrub-Shrub OW – Open Water
MODIFIERS:	A – Temporarily flooded C – Seasonally flooded E – Seasonally saturated G – Intermittently flooded	B – Saturated D – Seasonally well drained F – Semipermanently flooded H – Permanently flooded
SPECIAL MODIFIERS:	b – beaver f – farmed x – excavated	d- partially drained/ditched s – spoil

[35] Cowardin et. al. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. US Department of the Interior, USFWS, Washington D.C.

Impacts and Mitigation

No impacts to groundwater in the vicinity of the Project are anticipated.

The Proposed Route of the transmission line avoids wetlands except for those near the Rum River. Great River Energy will apply to the DNR for a license to cross the Rum River and to the Corps for a Section 10 permit once sufficient design details are available. Great River Energy will follow any recommendations from the DNR and Corps to minimize erosion and other impacts.

The proposed transmission line will span the Rum River and no support structures will be located within the river. Accordingly, no direct impacts to the river are anticipated. Indirect impacts could include sediment reaching surface waters during construction due to ground disturbance by excavation, grading, construction traffic, and dewatering of holes drilled for transmission structures. This could temporarily degrade water quality due to turbidity. These impacts will be avoided or minimized using appropriate sediment control practices and best management practices (BMPs).

Sound water and soil conservation practices will be maintained during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. These practices may include:

- Containing stockpiled material away from river banks and wetland boundaries.
- Stockpiling and re-spreading topsoil.
- Implementing erosion and sediment controls.
- Locating structures and disturbed areas as far away from rivers and wetlands as practicable.
- Reseeding and re-vegetating disturbed areas.

Once the Project is completed, there will be no significant impact on surface water quality because wetland impacts will be minimized and mitigated, disturbed soil will be restored to previous conditions or better, and the amount of land area converted to an impervious surface will be small.

The Project should have no impact on the impairment status of the waters in the Project area. There is potential to increase turbidity due to increased sediment

loading from construction activities; however, appropriate erosion and sediment control measures will be implemented to avoid or minimize such impacts.

Potential impacts to riparian areas along the Route will be limited to ground disturbances due to pole placement. Due to the flexibility to avoid placing poles in sensitive areas, the anticipated impacts to the riparian areas along the Route are minimal.

Construction of the transmission line is not expected to alter existing water drainage patterns or floodplain elevations due to the small cross section per pole and their relatively wide spacing. Also, modifications at the existing Crooked Lake and Enterprise Park substations will not substantively change the size of impermeable surfaces. The small area of impermeable surfaces created by the pole structures and breaker station outbuildings or foundations will not cause an increase in susceptibility of flooding in the region.

Temporary impacts to wetlands may occur if they need to be crossed during construction of the transmission line. No staging or stringing setup areas will be placed within or adjacent to water resources as practicable. Wetland impact avoidance measures that will be implemented during design and construction of the transmission line include spacing and placing the power poles at variable distances to span and avoid wetlands where possible. When it is not possible to span the wetland, several measures will be utilized to minimize impacts during construction:

- When possible, construction will be scheduled during frozen ground conditions.
- Construction crews will attempt to access the wetland with the least amount of physical impact to the wetland (e.g., shortest route) and will access poles near/in wetlands from roadways whenever possible to minimize travel through wetland areas.
- The structures will be assembled on upland areas before they are brought to the site for installation, when practicable.
- When construction during winter is not possible, construction mats (wooden mats or those similar to the Dura-Base Composite Mat System) will be used to protect wetland vegetation. Additionally, all-terrain construction vehicles may be used, which are designed to minimize impact to soils in damp areas.

Permanent impacts to wetlands occur where structures must be located within wetland boundaries. In such cases where a wetland cannot be avoided, approximately 20 square feet of permanent impacts (i.e., fill) will occur for each structure in the wetland. Wetland vegetation will be restored in the disturbed areas following construction.

In the event that impacts to hydrologic features are unavoidable, the Applicants will work with the jurisdictional agencies to determine the best ways to minimize the impacts and implement appropriate mitigation measures.

Vegetation maintenance procedures under transmission lines prohibit trees from establishing. Existing trees must be removed throughout the entire right of way, including forested wetlands. If these wetlands undergo permanent vegetative changes within the right of way, mitigation may be required by the Corps for the conversion of forested wetlands to emergent and shrub/scrub wetlands.

8.5.3 Natural Vegetation

The Project is located in a highly developed suburban area. Most of the Project area has been planted with turf grasses. Voluntary grasses and noxious plants have become established in some of the lesser developed areas.

Property owners have planted non-native vegetation, gardens, and trees as part of their individual landscaping efforts.

There are some forested areas around River Bend Park.

Little to no natural vegetation remains, and no rare fauna have been indentified in agency databases.

<u>Impacts and Mitigation</u>
No impacts to native vegetation are anticipated. If native vegetation areas are later identified, pole placement in those areas will be avoided.

The entire width of the transmission line right of way will need to be cleared of vegetation that could potentially grow into the conductors.

Great River Energy will replace or compensate landowners for any impacts to landscaping (lawn, gardens, trees, etc.) through negotiations with each individual landowner.

Great River Energy has begun discussions with the City of Ramsey park staff and will continue to work with them to minimize and mitigate the impacts of any tree clearing in River Bend Park.

8.5.4 Wildlife/Rare and Unique Natural Resources

Wildlife

The USFWS website does not indicate any threatened or endangered species in Anoka County.[36] The USFWS was contacted by letter and their response (Appendix B) agreed that no threatened or endangered species were located in the Project area. They also indicated, "[g]iven that the line crosses this designated corridor, we recommend working with Minnesota Department of Natural Resources to ensure that all requirements pertaining to this law are met. If the proposed route is allowable under the Minnesota Wild and Scenic Rivers Act, we recommend that bird flight diverters be installed on the shield wire of the transmission line that crosses the Rum River."

Rare and Unique Features

Rare and unique natural features include federal and state protected and rare species, remnant areas of native vegetation, significant natural resource sites, and significant natural features. Rare features are depicted in Figure 8-3 (see Oversized Figures Tab).

The DNR was contacted (Appendix B) requesting information on the possible effects of the proposed Project on rare and unique features in the Project area. Based on the DNR public database, Great River Energy had determined that the Blanding's turtle and creek heelsplitter are both found in the vicinity of the Project. Information on the Blanding's turtle and creek heelsplitter is included in the Minnesota Department of Natural Resources (DNR) Natural Heritage Program database (http://www.dnr.state.mn.us/rsg/index.html). The Blanding's turtle has a Minnesota status of "threatened" and the creek heelsplitter has a Minnesota status of "special concern." Neither species are indicated as having a federal status.

The DNR's response email (Appendix B) concurred with Great River Energy's analysis that the Blanding's turtles (Emydoidea blandingii) have been reported in the vicinity of the Project. These occurrences are shown on Figure 8-3. The DNR response did not include any comments on the creek heelsplitter.

[36] US Fish and Wildlife Webpage Endangered Species; http://www.fws.gov/Midwest/Endangered/LISTS/minnesot-cty.html

Impacts and Mitigation

There is a potential for the temporary displacement of urban wildlife and loss of habitat with the new transmission line. Wildlife could be impacted within the immediate area of construction. The distance that animals will be displaced will depend on the species. Impacts to wildlife are anticipated to be short-term, as the transmission line will be constructed parallel to existing rights of way.

Additionally, these animals will be typical of those found in urban settings, and have adapted to the changing landscape and habitat. When possible, impacts to wooded areas along the Proposed Route will be avoided.

Construction team members and contractors will be instructed on the potential to encounter Blanding's turtles and will be provided copies of the DNR's guidelines on minimizing impacts to the turtle's population.

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 and could potentially increase as a result of the proposed line. Waterfowl are typically more susceptible to transmission line collision, especially if the line is placed between agricultural fields that serve as resting areas or along major migration flyways.

Additionally, large birds, such as raptors are sometimes impacted by power lines through electrocution. This is generally an electric distribution issue, as electrocution may occur when birds with large wingspans come in contact with either two conductors, or a conductor and grounding device. Great River Energy's 115-kV transmission line designs for this Project will create greater separation between conductors and grounding devices to minimize electrocution hazards.

The Applicants will address other avian issues by working with the USFWS to identify any areas that may require marking transmission line shield wires to reduce the likelihood of collisions.

8.6 Physiographic Features

8.6.1 Topography

The topography of Anoka County is the result of glacial deposition. The area is characterized as level to gently rolling. The elevation ranges from approximately 829 to 899 feet mean sea level. The topography of the Proposed Route is nearly

level except for some elevated road crossings and the floodplain of the Rum River.

Impacts and Mitigation
Construction of the Project will not alter the topography along the Route; therefore, no mitigation is proposed.

8.6.2 Geology

The Anoka Sand Plane Subsection has exposed bedrock in the St. Cloud area. In other areas, surface deposits are generally less than 200 feet deep. Bedrock consists of Cambrian and Ordovician dolomite, sandstone, and shale.

Impacts and Mitigation
Construction of the Project will not alter the geology along the Route; therefore, no mitigation is proposed.

8.6.3 Soils

The Hubbard-Nymore formation makes up a large portion of the Proposed Route. Soil types in the vicinity of the Project are shown in Figure 8-4 (see Oversized Figures Tab).

According to Anoka Natural Resources[37], "[t]his soil association is mainly a nearly level to gently sloping outwash plain that is dissected by drainageways and pitted by large depressions. Steeper slopes occur next to these larger depressions and drainageways. Hubbard soils have a black and very dark grayish-brown coarse sandy surface layer about 20 inches thick. The subsoil is dark-brown and yellowish-brown coarse sand. The underlying material at a depth of about 44 inches is yellowish-brown sand. Nymore soils typically have a surface layer of very dark gray and black to very dark grayish-brown loamy sand about 2-8 inches thick. The subsoil is dark-brown loamy sand. The underlying material at a depth of about 26 inches is yellowish-brown sand."

Impacts and Mitigation
Potential impacts of construction are compaction of the soil and exposing the soils to wind and water erosion. Impacts to physiographic features should be minimal during and after installation of the transmission line structures and

[37] http://www.anokanaturalresources.com/soil/soil_associations/hubbard_nymore.htm

substation modifications, and these impacts will be short term. There should be no long-term impacts resulting from this Project.

Soils will be re-vegetated as soon as possible to minimize erosion or some other method used during construction to prevent soil erosion.

If over an acre of soil will be disturbed during the construction of the transmission line, Great River Energy will obtain a NPDES construction stormwater permit from the MPCA and will prepare a (Stormwater Pollution Prevention Plan (SWPPP). Erosion control methods and BMPs will be utilized to minimize runoff during line construction.

8.7 Land Use

Land use along the Proposed Route consists mainly of suburban commercial, industrial and residential (Figure 8-5 in Oversized Figures Tab)[38]. There are no cultivated lands along the Proposed Route and only a small section of forested land in the area of River Bend Park, which is discussed in Section 8.3.2. Wetlands are discussed in Section 8.5.2.

Undeveloped land exists primarily west of 7th Avenue and along the boundary line between the cities of Anoka and Ramsey.

Impacts and Mitigation

Impacts to undeveloped land will be limited to the area of the footprint of the poles. After construction of the Project is complete, disturbed soils in these areas will be stabilized with appropriate vegetation as soon as possible and use of these lands will be minimally impacted. Where undeveloped land is crossed by the transmission line, Great River Energy will work with the cities and property owners to locate the transmission line to avoid limiting opportunities to construct within a particular parcel of land.

8.7.1 Public Lands and Recreational Areas

The Proposed Route traverses two public sites. Rudy Johnson Park is south of and adjacent to U.S. Highway 10 between 6th and 7th Avenue. River Bend Park is located along Bunker Lake Road (County Road 116) in the City of Ramsey.

[38] The data for the land use figures is from 1991 – 1993. Some areas shown on the map as cropland are not currently being used as cropland.

Rudy Johnson Park is a recreational park with an ice skating rink in the winter and a baseball field in the summer. A few trees are scattered mostly along the western side of the park.

The proposed transmission line Route traverses River Bend Park. River Bend Park includes a baseball field, tennis courts, a playground and picnic areas.

Impacts and Mitigation

The transmission line will cross through Rudy Johnson Park. Great River Energy believes the best alignment for the transmission line through the park will be to place the transmission line as close as possible to the U.S. Highway 10 easement, which will minimize impacts to the park.

The transmission line will cross through River Bend Park. In a letter dated April 26, 2011, from Tim Gladhill to Mark Strohfus (Appendix B), park staff suggested the transmission line will have fewer impacts if it were to follow along the north side of County Road 116. Great River Energy has begun discussions with the City of Ramsey park staff and will continue to work with them to minimize and mitigate impacts in the park.

8.7.2 Zoning

A zoning map of the Project area is provided in Figure 8-6 (see Oversized Figures Tab). The Proposed Route crosses areas designated under city and county zoning jurisdictions. However, a Route Permit issued by the Commission supersedes any local zoning, building and land use regulations.[39]

Impacts and Mitigation

Potential land use impacts along the Proposed Route due to the 115-kV transmission line will be limited. The Proposed Route for the 115-kV transmission line will be approximately 5.8 miles long and will overtake existing distribution line right of way and parallel road right of way as much as possible. The new 115-kV transmission line does not represent an incompatible land use with those that exist in the area. Therefore, anticipated impacts of the proposed Project on land use are minimal and no mitigation measures are proposed.

[39] Minn. Stat. §216E.10, subdiv. 1.

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9 AGENCY INVOLVEMENT, PUBLIC PARTICIPATION, PERMITS AND APPROVALS REQUIRED

9.1 Agency Contacts/Public Participation

Great River Energy contacted the following agencies for input on the proposed project:

- Minnesota Department of Transportation – Office of Aeronautics
- Minnesota Department of Transportation – Transportation Department (Highway Issues)
- Minnesota Historical Society
- US Army Corps of Engineers
- Minnesota Department of Natural Resources
- United States Fish and Wildlife Service
- Anoka County Highway Department
- Lower Rum River Watershed Management Organization

Correspondence to and from most of these agencies is provided in Appendix B. Great River Energy attended city council work sessions in Anoka, Ramsey, and Andover and described the proposed Project to the council members and audience. All of the city councils understand the need for additional electrical capacity in the area.

Great River Energy met with Scott Harlicker, planner for the City of Coon Rapids, and explained the Project. Mr. Harlicker felt the impacts to the City of Coon Rapids were negligible enough that a meeting with council members was unnecessary. Instead, he provided a packet of information on the Project to the council members.

Great River Energy also held two public information open houses. The first open house on October 14, 2010, was intended to introduce the Project to all landowners along all of the routes being considered for the Project and to solicit input on the Project. Over 1,000 invitations were mailed to the landowners on record with the county. Advertisements were also published two times prior to the meeting in three separate local newspapers: the Coon Rapids Herald (October 1 and 8, 2010), the Anoka County Union (October 1 and 8, 2010), and the Anoka County Shopper (October 6 and 13, 2010). Approximately 43 people from the

signed in at the open house. Copies of the invitations and newspaper advertisements are provided in Appendix C.

The second open house was held on April 26, 2011. This open house was intended to inform the public about which transmission route option was the Applicant's preferred route, announce that the Applicant's had elected to use the State permitting process, and explain to the public how they can stay involved and influence the Project. The same mailing list was used in sending out over 1,000 invitations, plus 23 more invitations to landowners along 6th Avenue, to the open house meeting. Advertisements were again published two times prior to the meeting in two separate local newspapers: the Anoka County Union (April 15, 2011), and the Anoka County Shopper (April 20, 2011). The Coon Rapids Herald also published an article about the open house in their April 22, 2011 edition. Approximately 36 people from the public signed in at the open house. Copies of the invitations and newspaper advertisements are provided in Appendix C.

9.2 Identification of Landowners

The names of each owner whose property is within the Proposed Route (Minnesota Rules part 7850.1900, subp. 2G) are provided in Appendix D.

9.3 Required Permits and Approvals

A list of permits and other approvals that may be required for the Project in addition to a Minnesota Route Permit is presented in Table 9-1.

Table 9-1 Potential Permits Required

Permit	Jurisdiction
Federal Approvals	
Section 404 Permit, Clean Water Act (Local/State/Federal Application for Water/Wetland Projects, for discharge of fill due to placement of poles in wetlands) Section 106 Review	Corps of Engineers Section 10 Permit
Part 7460 review (to ensure compliance with 7460)	FAA
Spill Prevention, Control and Countermeasure (SPCC) Plan (Xcel Energy for modifications to the Crooked Lake Substation and Anoka Municipal Utility for modification at the Enterprise Park Substation)	EPA
Minnesota State Approvals	
License to Cross Public Waters or State Lands	DNR – Lands and Minerals
Utility Permit (Road Crossing Permits to cross or occupy state trunk highway road right of way)	MnDOT
NPDES Construction Stormwater Permit (Xcel Energy for modification at Crooked Lake Substation and Anoka Municipal Utility for modifications at Enterprise Park Substation) **NPDES Construction Stormwater Permit** (Great River Energy, for line construction)	MPCA
Minnesota Local Approvals	
Land Permits, including road crossing/right of way permits (may be required to occupy lands such as parklands, watershed districts, and other publicly-owned land)	County, Township
Minnesota Wetland Conservation Act Exemption	County, Board of Water and Soil Resources
Road Crossing Permits	County, Township
Overwidth Loads Permits	County, Township
Driveway/Access Permits	County, Township

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10 SUMMARY OF FACTORS TO BE CONSIDERED IN EVALUATING THIS APPLICATION

The Applicants have applied for a Route Permit for a 115-kV HVTL. The Project will allow the Applicants to maintain necessary voltage and reliability requirements in the northwest Metro Region. The HVTL's two endpoints will be the existing Xcel Energy Crooked Lake Substation on the east and the existing Anoka Municipal Utility Enterprise Park Substation on the west.

The role of the Commission is to determine the best route to follow to accomplish those requirements, and to determine what mitigation efforts Great River Energy should employ to reduce any human settlement or environmental consequences. Minnesota Rules part 7850.4100 lists 14 factors to consider in determining whether to issue a permit for the Proposed Route. Those factors are discussed briefly below.

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

Effects of the proposed Project on human settlement are discussed in Section 8.2 of this Application. The Project will not result in displacement of existing residences. The noise from the HVTL and modified substations will be minimal (Section 8.2.3).

The majority of the Proposed Route is along existing distribution lines and roadway corridors and will have minimal aesthetic effects. The proposed HVTL and associated substations will have no impact on cultural values, recreation, or public services. Impacts to socioeconomics will be primarily of a short-term, beneficial nature.

The existing Anoka Municipal Utility overhead distribution lines along the Route will be removed and placed on the same poles as the new transmission line. Alternatively, Anoka Municipal Utility may choose to bury some of the distribution lines. Along roads, the centerline will be approximately two to five feet outside of the road right of way.

B. Effects on public health and safety.

The proposed Project will be constructed to comply with NESC standards. Questions often arise about electric and magnetic fields (EMF), which are

invisible lines of force that surround any electrical device. The term EMF refers to electric and magnetic fields and includes natural sources such as earth's magnetic field or fields produced during thunder storms, as well as manmade fields produced by electric transmission lines, radio/TV stations, etc. The electric and magnetic fields associated with the proposed Project are discussed in Section 5.4 of this Application, summarized in Tables 5-1 and 5-3, and shown graphically on Figures 5-2 to 5-13.

Electric field intensity is proportional to the voltage of the line and is measured in kilovolts per meter (kV/m). Electrical fields are blocked by physical barriers, such as trees, buildings, etc.

The proposed 115-kV line will have a maximum magnitude of electric field density of approximately 1.39 kV/m underneath the conductors at one meter above ground level, which is well below the EQB standard of a maximum electric field limit of 8 kV/m at one meter above ground. That standard was implemented to mitigate serious hazard from shocks when touching large objects parked under transmission lines with voltage of 500 kV or greater.

Magnetic fields result from the flow of electricity (current) in the transmission line. Recent studies of the health effects from power frequency fields conclude that the evidence of health risk related to magnetic fields is weak.

Because the magnetic field strength is dependent on current flow, it will continually change as electric demand increases or decreases. Typically the magnetic field will increase over time because the current flowing on the line increases as load growth occurs. The maximum magnetic field for the Project as proposed will be limited by the conductors.

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

The Proposed Route for the HVTL do not significantly impact any prime agricultural, forestry or mining property. Impacts on tourism should be minimal (Section 8.3).

D. Effects on archaeological and historic resources.

Once a Route Permit is issued, Westwood will be contracted to conduct a windshield survey in the vicinity of the identified site and identify areas where it

would be prudent to avoid placing structures. Using this information, the transmission line alignment will be designed. The MHS will be consulted on the final transmission line alignment, and the Project Applicants will follow their recommendations on conducting any further analyses (Section 8.4).

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

Effects of the proposed Project on the natural environment are discussed in Sections 8.5 to 8.7 of this Application.

No significant impacts to air quality will result from the proposed Project.

Short-term impacts to water quality resources could occur due to soil disturbance during construction. There is the possibility of sediment reaching surface waters during construction, as the ground is disturbed by grading (primarily at the substation site) and construction traffic. The Applicants will implement BMPs such as silt fences to prevent sediment from entering surface waters.

Impacts to native, undisturbed flora will be avoided and/or minimized. Only trees and shrubs that could interfere with the safe operation of the line will be removed.

There is minimal potential for the displacement of fauna and loss of habitat from construction of the proposed Project. Wildlife that inhabits natural areas could be impacted in the short-term within the immediate area of construction. This impact will be temporary because there is similar habitat adjacent to the sites.

F. Effects on rare and unique natural resources.

The DNR database indicated that the Blanding's turtle may be present in the vicinity of the Project. Because the Proposed Route will utilize existing electric system alignments and parallel existing roads, impacts to habitat will be minimized. The Applicants will adhere to DNR recommendations to minimize impacts (Section 8.5.4; Appendix B).

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

The Project is designed to enable construction of a future 115-kV line to Elk River (Section 3.3). It is also designed accommodate the construction of a future Anoka Municipal Utility distribution substation in the vicinity of 7th Avenue and County Road 116 (Section 4.1.2).

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

The Proposed Route follows existing roads (approximately 4.2 miles, Section 6.1.2), existing transmission and distribution line rights of way (approximately 4.4 miles, Section 6.1.1), and natural division lines for the majority of its length.

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

This criterion is not applicable.

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

See the comments under part H above.

K. Electrical system reliability.

The Project is being proposed to:

- Address conductor overload concerns that threaten to jeopardize the reliable electric service to consumers in the Highway 10 corridor from Anoka to Elk River.
- Create a redundant transmission source to the Enterprise Park Substation providing a more reliable source to the industrial loads in the area.
- Facilitate longer-term opportunities to further strengthen the power supply service to the area.

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

The cost of constructing, operating, and maintaining the facility along the Proposed Route are no higher, and are likely to be lower than along rejected alternative routes. The Proposed Route parallels existing rights of way to the

extent technically and economically feasible. This reduces the cost of acquiring easements and right of way preparation.

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

The only identified environmental effects that cannot be avoided are primarily short-term during the construction of the line and the upgrade of the substations. If any archaeological sites are identified during placement of the poles along the Proposed Route, work will be stopped and the MHS will be consulted. Vegetation within the Proposed Route that is compatible with the operation and maintenance of the transmission line will be maintained.

Soils will be re-vegetated as soon as possible to minimize erosion or some other method will be used during construction to prevent soil erosion. During construction, temporary guard or clearance poles will be installed at crossings to provide adequate clearance over other utilities, streets, roads, highways, railroads, or other obstructions after any necessary notifications are made or permit requirements met to mitigate any concerns with traffic flow or operations of other utilities.

N. Irreversible and irretrievable commitments of resources.

The Project does not require any irreversible or irretrievable commitment of resources. Should the line and/or substations be abandoned and removed at some time in the future, there is nothing related to their earlier placement that would prevent or require a different use of resources in the future.

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APPENDIX A

COMMISSION CORRESPONDENCE

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APPENDIX B

AGENCY CORRESPONDENCE

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APPENDIX C

STAKEHOLDER CORRESPONDENCE

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APPENDIX D

NAMES OF PROPERTY OWNERS ALONG THE PROPOSED ROUTE

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OVERSIZED FIGURES

Figure 1-1 Project Applicants' Service Territories
Figure 1-2 Proposed Route
Figure 3-1 Regional Transmission System
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Figure 8-1 Residences and Businesses within the Project Area
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Figure 8-3 Rare Features
Figure 8-4 Soils
Figure 8-5 Land Use
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