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Abstract

Northern States Power Company d/b/a Xcel Energy (Xcel) and Great River Energy (GRE) submitted applications to the Minnesota Public Utilities Commission for a Certificate of Need (CN) and for a high voltage transmission line (HVTL) Route Permit to construct approximately 2.4 miles of new 115 kV transmission line, to upgrade approximately 6.1 miles of existing 69 kV transmission line to 115 kV capacity, and to change the operating voltage of approximately 2.9 miles of an existing GRE 69 kV transmission line to operate at 115 kV.

Two separate approvals from the Minnesota Public Utilities Commission are required for the construction/operation of the SWTC Chaska Area HVTL project – a certificate of need (CN) and a route permit.

Xcel and GRE (Applicants) submitted a CN application to the Commission on May 15, 2012. The application was accepted as complete by the Commission on August 21, 2012. The docket number for the CN proceedings is E002/CN-11-826.

The Applicants submitted a HVTL route permit application to the Commission on July 10, 2012. The route permit application was accepted as complete by the Commission on September 11, 2012. The docket number for the HVTL Route Permit proceedings is E002/TL-12-401.

The Energy Facility Permitting staff of the Department of Commerce has elected to combine its environmental review responsibilities under the Certificate of Need process with the environmental review procedures under the HVTL Route Permit procedures (Minnesota Rule 7849.1900, Subpart 1). The result is a single environmental review document, an Environmental Assessment.

The environmental assessment addresses the issues required in Minnesota Rules 7849.1500, subpart 1 and Minnesota Rules, 7850.3700, subpart 4, and as determined in the Scoping Decision of November 19, 2012.

Documents of interest can be found on the Project Docket webpage at:

http://energyfacilities.puc.state.mn.us/Docket.html?Id=32771 or by going to https://www.edockets.state.mn.us/EFiling/search.jsp and entering "09" and "1390" for the CN docket and "10" and "249" for the HVTL Route docket as the year and project identification search criteria.

Following the release of this Environmental Assessment, a Public Hearing will be held in the project area.

Acronyms, Abbreviations and Definitions

ALJ	Administrative Law Judge
CEF	Considered Eligible Findings
Commission	Minnesota Public Utilities Commission
CN	Certificate of Need
dBA	A-weighted sound level recorded in units of decibels
DG	Distributed Generation
DNR	Department of Natural Resources
DOC/Department	Department of Commerce
EA	Environmental Assessment
EFP	Department of Commerce Energy Facilities Permitting
EMF	electromagnetic field
EQB	Environmental Quality Board
ER	Environmental Report
FEMA	Federal Emergency Management Agency
FHA	Federal Housing Administration
GRE	Great River Energy
HVTL	high voltage transmission line
kV	kilovolt
MDH	Minnesota Department of Health
mG	milligauss
mg/L	milligrams per liter – equivalent to parts per million (ppm)
MnDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MSIWG	Minnesota State Interagency Working Group
MW	Mega Watt
NAC	noise area classification
NESC	National Electrical Safety Code
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PWI	Public Waters Inventory
RAPID	U.S. EMF Research and Public Information Dissemination
ROW	Right-of-Way
SHPO	State Historic Preservation Office
SWPPP	Stormwater Pollution Prevention Plan
USCOE	United States Corp of Engineers
USFWS	United States Fish and Wildlife Service
WHO	World Health Organization

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1.0 Introduction

Xcel Energy and Great River Energy (Applicants) have made a joint application to the Minnesota Public Utilities Commission (Commission) for a Certificate of Need (CN) for the construction of a new 115 kV transmission line, as well as upgrades to the existing 69 kV system in the Chaska area pursuant to Minnesota Statute Section 216B.243 and Minnesota Rules 7849.0020 – 7849.0400.

The HVTL Route Permit application for the construction of the SWTC Chaska Area transmission line project was made pursuant to Minnesota Statutes Section 216E and Minnesota Rules Chapter 7850.

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

This document meets the environmental review requirements of both the certificate of need procedures and the HVTL route permit process by a) providing information in Section 2 on the regulatory framework, certificate of need and route permit processes; b) describing in Section 3 the proposed project; c) discussing the alternatives means of meeting the stated need in Section 4, while Section 5 describes the alternatives to the proposed route; d) summarizing in Section 6 the potential effects on people and the environment of the proposed route; e) comparing the potential impacts of the alternatives to the proposed HVTL in Section 7; and f) describing the unavoidable impacts in Section 8.

1.1 Project Description

The proposed project covers a total of approximately 12.75 miles (**Figure 1**), contains six segments, and primarily follows existing transmission line rights-of-way (ROW). The Applicants propose to:

- Upgrade approximately 6.1 miles of existing single circuit 69 kilovolt (kV) transmission line (Line #0740) to a single circuit 115 kV transmission line **(Segments 1 , 4, & 6)**;
- Change the operating voltage of approximately 2.9 miles of existing Great River Energy 69 kV transmission line to operate at 115 kV **(Segment 2)**;
- Construct two segments of new 115 kV single circuit transmission line totaling approximately 2.4 miles **(Segments 3 & 5)**;
- Abandon in place (de-energized under normal conditions) approximately 1.0 mile of existing 69 kV transmission line **(Segment 3a)**; and

- Remove approximately 0.39 miles of existing 69 kV transmission line through the middle of the city of Chaska **(Segment 5a).**
- Modify five substations (Scott County, Chaska, West Creek, Victoria and Augusta Substations).

1.2 Project Location

The project is located in eastern Carver County and northern Scott County near and within the city of Chaska, and through Laketown, Dahlgren, and Jackson townships. The western end of the project area is located in Dahlgren Township, Carver County, west of Aue Lake at existing structure #142. The project extends north along the existing Great River Energy MV-VTT line through Laketown Township, and east through f Chaska. The project route continues across the Minnesota River into Jackson Township in Scott County to the eastern terminus of the project at the Scott County Substation. (See Figure 1)

Table 1 below summarizes the proposed project location.

Table 1. Project Location

County/Township/City	PLS Township (N)	PLS Range (W)	PLS Sections
Carver / Dahlgren TWP	115	24	1-4, 9-12
Carver / Laketown TWP	116	24	25 and 36
Carver / City of Chaska	116	23	31
Carver/City of Chaska	115	23	4, 6-9
Scott/Jackson TWP	115	23	10, 15

PLS – Public Land Survey System

1.3 Project Purpose

The need for the proposed project was identified in the *Southwest Twin Cities Load Serving Study Review (Highway 212 Corridor 115 kV Conversion)* dated August 8, 2011, prepared by Xcel Energy Services Inc. The study was conducted to address the growing demand for electric power in the southwest Twin Cities area due, in part, to the proposed construction of a new 190,000 square-foot data center[1] in Chaska, Minnesota, that will add 20 megawatts of additional load to the area when it is fully operational.

The study[2] was prepared to identify the problems associated with reliability that may occur on the current transmission system, if as expected, the electrical demand increases by 30 percent over the current area load (20 megawatts) in Chaska as a result of the new data center.

[1] UnitedHealth plans 2nd Twin Cities data center, Minneapolis | St. Paul Business Journal, http://www.bizjournals.com/twincities/stories/2010/03/22/story1.html?page=all (March 21, 2010).
[2] CN Application, Appendix B, May 15, 2012

The study states that a large electrical demand addition would result in the Scott County Substation transformers exceeding their emergency rating when certain transmission lines are out of service. Operating substation transformers above their emergency rating has the potential to shorten the lifespan of these transformers and increases the risk of a transformer failure. Absent construction of the project, when the 69 kilovolt line from the Scott County Substation to Chaska Substation is out of service, transmission line overloads in the area of the project are anticipated and possible low voltage conditions may occur.

Overloading of a transmission system can result in outages for residential, retail, commercial and industrial customers. Outages can be extremely costly and inconvenient. Low voltage conditions can damage equipment such as process controls, motor drive controls, electronics and automated machines.

According to the Applicants, without the proposed transmission upgrades found in the proposed project, overloading and low voltage conditions will worsen as the area experiences continued growth and development.[3]

1.4 Sources of Information

Much of the information used in this Environmental Assessment is derived from documents prepared by Xcel Energy. These include the Certificate of Need Application, May 15, 2012, and the HVTL Route Permit Application, July 11, 2012. Discussion of Electromagnetic Field (EMF) issues came primarily from the white paper developed by the Interagency Task Force led by the Minnesota Health Department, the National Institute for Environmental Health, and the World Health Organization. Additional information comes from earlier Energy Facility Permitting environmental review documents in similar dockets, other state agencies, such as the Department of Natural Resources, and additional research. First hand information was gathered by site visits along the proposed line.

[3] Route Permit Application (RPA) at 13

2.0 Regulatory Framework

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

2.1 Certificate of Need

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

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

http://energyfacilities.puc.state.mn.us/Docket.html?Id=32771

The Energy Facility Permitting staff is responsible for administering the environmental review process. The Commission is responsible for determining if the transmission lines proposed are needed.

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

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

2.2 Route Permit

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

The Applicants submitted the HVTL route permit application for the proposed SWTC Chaska Area transmission line pursuant to the provisions of the Alternative Permitting Process outlined in Minnesota Rules 7849.2900. The alternative permitting process includes environmental review and public hearings, and typically takes six months.

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

http://energyfacilities.puc.state.mn.us/Docket.html?Id=32771

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

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

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

2.3 Combining Processes

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

As two concurrent environmental reviews are required – one for the CN application and one for the route permit application – Department staff elected to combine the environmental review for the two applications (Minn. Rules 7849.1900). Thus, this environmental assessment (EA) has been prepared to meet the requirements of both review processes.

2.4 Scoping Process

On September 7, 2011, the Department of Commerce (Department) Energy Facility Permit (EFP) staff sent notice of the place, date and times of the Initial Public Information and Scoping

meeting to those persons on the General List maintained by the Department, the agency technical representatives list and the project contact list.[4]

Additionally, mailed notices were sent to those persons on Xcel Energy's property owners list and to local units of government. Notice of the public meeting was also published in local newspapers.

On Wednesday, September 26, 2012, the EFP held two public information/scoping meetings at the Chaska City Hall in Chaska. The meetings included two sessions, one starting at 2:00 pm and another starting at 6:00 pm. The purpose of the meeting was to provide information to the public about the proposed project, to answer questions, and to allow the public an opportunity to suggest alternatives and impacts (i.e., scope) that should be considered during preparation of the environmental review document.

Approximately 10 people attended the public information and scoping meetings; 5 individuals took the opportunity to speak on the record. A court reporter was present to document oral statements.[5]

A variety of questions were asked and answered during the oral discussion. Topics included: specifics on which lines and poles will be removed, and design/construction of any new poles; specifics on the proposed alignment; the concepts of route width and right-of-way/easement width; sources of power generation for this project; health and safety issues; property values; compensation for easements; and flexibility in siting the final alignment.

Written comments were due no later than Friday, October 12, 2012.[6]

Three written comments were received: two from state agencies (Department of Natural Resources and Department of Transportation) and one from a local resident (Mr. Gene Ernst).[7]

The Department of Natural Resources (MnDNR) in its comment letter discuss the use of swan flight diverters and wildlife friendly erosion control mats; and issues associated with vegetation management, the crossing of public land and water. MnDNR also made a request to receive the GIS Shapefiles for the project.

The Department of Transportation (MnDOT) in its letter discussed the various permits that the project may require, referenced MnDOT's Utility Accommodation Policy as a useful guide, and expressed the desire that the environmental review document adequately address the potential impacts associated with construction of the Chaska Area HVTL project and the US 169 Interregional Corridor Management Plan.

[4] Notice of Public Information/Scoping Meeting, eDocket No. 20129-78455-01
[5] Oral and Written Comments Received During Scoping, eDocket No. 201210-79620-01
[6] Oral and Written Comments Received During Scoping, eDocket No. 201210-79620-01
[7] Oral and Written Comments Received During Scoping, eDocket No. 201210-79620-01

These items and issues, along with the typical HVTL routing impacts, were incorporated into the EFP staff's recommendation to the Department's Deputy Commissioner on the Environmental Assessment Scoping Decision.

The process for individuals to request that specific alternative routes, alternative route segments, and/or alignment modifications be included in the scope of the environmental review document was discussed at the public meeting. One such request (Mr. Gene Ernst letter) was submitted during the comment period.

Proposed Alternatives

In his written comments and supporting material, Mr. Gene Ernst put forth one alternative route segment and two alignment modifications (described in detail in Section 5) for evaluation in the environmental review document. Mr. Ernst's suggested alterations are to Segment 4 of Xcel Energy's proposed rebuild project.

Mr. Ernst concern is the impact that the rebuilt transmission line would have on his historic building (the Andrew Riedele House) located at 3250 Chaska Boulevard (north side of road) and potential loss of trees on that property.

Public Utilities Commission's Consideration of Alternatives

Under Minn. Rules, part 7850.3700, subp. 3, the scope of the environmental assessment must be determined by the Department within 10 days after close of the public comment period (October 12, 2012, in this case).

However, Minn. Stat. § 216E.04, subd. 5, anticipates Commission input into the identification of routes, in addition to the applicant's proposed route, for inclusion in the environmental review of a project. Since the rules' 10-day timeline for determining the scope of the environmental assessment after the close of the public comment period constrains the Commission's ability to provide input, the Commission varied the 10-day timeline. The Commission extended the 10-day timeline to 40 days (which would be November 21, 2012), subject to the Executive Secretary's authority to seek additional time from the Commission

On October 31, 2012, EFP staff submitted its comments and recommendations outlying the scoping process and suggested alternatives received during that process to the Commission.[8]

On November 19, 2012, the Commission at its regularly scheduled meeting considered what action, if any, the Commission should take in regards to the alternatives put forth during the scoping process; the Commission elected to take no action in this matter.

There was no Advisory Task Force established for this routing docket.

[8] EFP Comments and Recommendations, Routes Alternatives, eDocket Document ID 201210-80165-01

After consideration of the comments, the Deputy Commissioner issued his Scoping Decision on November 19, 2012. A copy of this order is attached in the **Appendix A**. These items and issues, along with the typical HVTL routing impacts, were incorporated into the Scoping Decision.

The Commission's obligation is to choose routes that minimize adverse human and environmental impacts while insuring continuing electric power system reliability and integrity, and also while insuring that electric energy needs are met and fulfilled in an orderly and timely fashion. Route permits contain conditions specifying construction and system operation standards (see a sample Route Permit in **Appendix B**).

2.5 Public Hearing

The Commission is required by Minn. Rule 7849.5710 subp 1, and Minn. Rule 7850.3800 subp 1, to hold a public hearing once the EA has been completed. It is anticipated that this hearing will be held in late May 2013, in the project area, and will be conducted by an Administrative Law Judge (ALJ).

The hearing will be noticed separately and details can be found online at http://energyfacilities.puc.state.mn.us/Docket.html?Id=30371. Interested persons may comment on the EA at the public hearing. Persons may testify at the hearing without being first sworn under oath. The ALJ will ensure that the record created at the hearing is preserved and will provide the Commission with a report setting forth findings, conclusions, and recommendations on the merits of the proposed transmission line project applying the routing criteria set forth in statute and rule.

Comments received on the Environmental Assessment become part of the record in the proceeding, but EFP staff is not required to revise or supplement the EA document. A final decision on the CN and route permit will be made by the Commission at an open meeting following the public hearing and filing of the ALJ's report.

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

2.6 Other Permits

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

Table 2. Potential Required Permits

Federal Permits	Jurisdiction
Clean Waters Act Section 404 Permit	USACE
Section 10	USACE
State Permits	**Jurisdiction**
License to Cross Public Waters	MnDNR Divison of Land and Minerals
Utility Crossing Permit	MnDOT
Construction Stormwater Permit	MPCA
Minnesota Wetland Conservation Act Certification	Carver County, City of Chaska, and Jackson Township in Scott County
Local Permits	**Jurisdiction**
County Road Permit	Carver and Scott Counties

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

2.7 Applicable Codes

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

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

The NESC is a voluntary utility developed set of standards intended to ensure that the public is protected. The NESC covers electric supply stations and overhead and underground electric

supply and communication lines, and is applicable only to systems and equipment operated by utilities or similar systems on industrial premises. For more information, go to standards.ieee.org/faqs/NESCFAQ.html#q1. The Rural Utilities Service provides leadership and capital to "upgrade, expand, maintain, and replace America's vast rural electric infrastructure." For more information, go to http://www.usda.gov/rus/electric/index.htm.

2.8 Issues Outside the Scope of the EA

The EA will also not consider the following:

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

3.0 Proposed Project

The project is located in Carver and Scott counties near and within the city of Chaska, and through Laketown, Dahlgren, and Jackson townships located southwest of the Twin Cities metro area.

The project includes the construct new 115 kV transmission lines, the upgrading of existing 69 kV transmission lines to 115 kV, changing the operating voltage on an existing GRE 69 kV transmission line to 115 kV, abandoning in place and removal of portions of the existing 69 kV system, and modification of five substations.

3.1 Project Segments

The SWTC Chaska Area HVTL project as described in the certificate of need and HVTL route permit applications submitted by Xcel and GRE covers a total of approximately 12.75 miles, contains six segments, and primarily follows existing transmission line rights-of-way (ROW).

Figures 2 through 8 illustrate the proposed HVTL on aerial photographs.

The proposed route segments, as laid out in the RPA, are described in detail as follows:

- **Segment 1:** Upgrade approximately 2.82 miles of existing 69 kV transmission line (Line #0740) to a 115 kV single circuit transmission line between existing structure #142 west of Aue Lake to an interconnection with an existing 69 kV Great River Energy transmission line (MV-VTT) in the southwest quadrant of the intersection of County Road 140 and Guernsey Ave. This Proposed Route will proceed along the south side of County Road 140 within existing right-of-way.

- **Segment 2**: Convert approximately 2.94 miles of the operating voltage from 69 kV to 115 kV on the Great River Energy Victoria tap line (MV-VTT) from the intersection of County Road 140 and Guernsey Avenue to the Victoria Substation. This line was originally constructed using 115 kV structures, but is currently not capable of operating at 115 kV due to the 69 kV switch structure in place located at the intersection of County Road 140 and Guernsey Avenue. The proposed Project involves replacing the existing 69 kV switch with a 115 kV switch structure. No additional physical work or right-of-way is required on this segment of line to change the operating voltage of the line to 115 kV.

- **Segment 3:** Construct approximately 1.78 miles of new 115 kV single circuit transmission line along the west side of Highway 212 from the intersection with County Road 140 extending north approximately 0.71 miles to the south side of Creek Road, then northwesterly to the intersection with Wetzel Lane. At this point, the Proposed Route

extends north approximately 0.61 miles to the south side of Engler Blvd. The Proposed Route then extends west for approximately 0.24 miles then turns north and extends approximately 0.22 miles to terminate at the city of Chaska's West Creek Substation.

- **Segment 3a:** Abandon in place approximately 1.0 mile of existing 69 kV transmission line along the south side of County Road 140 between the intersection of County Road 140 and Guernsey Ave and the intersection of County Road 140 and Highway 212.

- **Segment 4:** Upgrade approximately 1.79 miles of existing 69 kV transmission line to a 115 kV single circuit transmission line along the south side of County Road 140 from the intersection with Highway 212 to the intersection of E. 6th Street and N. Oak Street. This segment terminus is located at the site of the current Chaska Substation, which is scheduled to be retired prior to the completion of the proposed Project. This segment of the Proposed Route extends from the Highway 212/County Road 140 intersection to the east/southeast for approximately 0.7 miles and then continues east approximately 0.7 miles to a structure east of the intersection of Creek Lane and Creek Road. The Proposed Route then follows Creek Road south to Chaska Blvd. for a short distance (West 6th Street) where it then follows the north side of Chaska Blvd. eastward approximately 0.3 miles to the intersection of Chaska Blvd. and Walnut Street. At that point the Proposed Route crosses to the south side of Chaska Blvd., and then extends east to the intersection of E. 6th Street and N. Oak Street.

- **Segment 5:** Construct approximately 0.58 miles of new 115 kV single circuit transmission line within the city of Chaska. From the Chaska Substation, the Proposed Route extends northeast, parallel to the south side of the railroad tracks along Chaska Blvd. The Proposed Route then extends south then east along the east side of Maple Street. From there the Proposed Route crosses east Chaska Creek and then extends south along the east side of Beech Street to 2nd Street where the Proposed Route intersects Segments 5a and 6.

- **Segment 5a:** Remove approximately 0.39 miles of existing 69 kV transmission line in the city of Chaska from the existing Chaska Substation to 2nd Street and Beech Street. The existing 69 kV line currently extends south along North Oak Street to East 5th Street where it then extends southeast to the intersection of East 2nd Street and Beech Street. Where Segment 5a has underbuilt distribution lines, the existing poles will be cut above the distribution lines and the top portion of the pole and transmission conductor will be removed. The existing easement in these areas will remain unchanged.

- **Segment 6:** Upgrade approximately 1.46 miles of existing 69 kV transmission line to a single circuit 115 kV transmission line. This segment of the Proposed Route begins at Structure #12 south of the intersection of East 2nd Street and Beech Street and extends southeast across the Minnesota River to terminate at the Scott County Substation located 1,600 feet southeast of Fern Lane Terrace along the west edge of US Highway 169.

3.2 Right-of-Way Requirements

The Applicants are requesting a right-of-way (ROW) width up to 75 feet wide. Applicants, however, have stated that for those portions of the project which involve the rebuild of existing transmission lines they will stay within the existing 50-foot right-of-way wherever reasonably possible.[9] When the line is parallel to a roadway, poles would generally be placed approximately five feet outside the public right-of-way. Therefore, a little less than half of the line right-of-way would share the existing road right-of-way, resulting in an easement of lesser width required from the adjacent landowners.

Approximately 2.36 miles of new 75-foot-wide right-of-way will need to be acquired for the project as proposed; this occurs along Segment 3 (1.77 miles) and Segment 5 (0.58 miles).

For the proposed project, approximately 10 miles of the project (87 percent) will be parallel to existing roadways, and approximately 1.5 miles (13 percent) will be cross country (Segment 6 across the Minnesota River).

Figures 9 illustrate the pole dimensions and general ROW requirements.

Right-of-Way Acquisition

Because Applicants intend to rebuild the transmission line within the existing 50-foot right-of-way, the need for new right-of-way acquisition would be limited. All existing easements would be evaluated to determine if the project can be built without obtaining additional land rights. If an easement would accommodate the project, the right-of-way agent would still work with the landowner in order to address any construction needs, impacts, damages, or restoration issues. To the extent new right-of-way acquisition is necessary, the evaluation and acquisition process would include title examination, initial owner contacts, survey work, document preparation and purchase. Most of the time, utilities are able to work with the landowners to address their concerns and an agreement is reached for the utilities' purchase of land rights.

In some instances, a negotiated settlement cannot be reached and the landowner may choose to have an independent third party determine the value of the rights taken. Such valuation is made through the utility's exercise of the right of eminent domain pursuant to Minn. Statute 117.

[9] RPA at 35

Table 3. Summary of Transmission Structures

Line Type	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Foundation	Foundation Diameter (feet)	Span Between Structures (feet)
115 kV Single Circuit	Single pole, horizontal or braced post insulator	Galvanized or weathering steel	75	60-90	Direct embedded for tangents and self-supporting for angle/ dead-end structures	Direct embedded in 4 foot diameter culvert or 5 to 8 foot concrete	300 to 400
115 kV Single Circuit	H-frame or Y-frame	Galvanized or weathering steel	75	60-105	Direct embedded for tangents and self-supporting for angle/dead-end structures	Direct embedded in 4 foot diameter culvert or 5 to 8 foot concrete	600-1,400

3.3 Project Construction and Maintenance

Steel poles with horizontal braced post insulators are proposed to be used for the 115 kV single circuit transmission lines. Steel poles with davit arms are proposed for the 69/115 kV double circuit transmission line (see **Table 3** above). Direct embedded weathering steel poles with davit arms are proposed to be used for the tangent structures if soil conditions warrant. Rock-filled culvert foundations may be required in areas with poor soils. Self-supporting weathering steel poles with davit arms on drilled pier concrete foundations are proposed to be used for all long span, angle and dead-end structures.

Pictures of the proposed structure types are shown below in **Figure 10.**

The single pole steel structures will be approximately 60 to 90 feet tall with spans of approximately 300 to 400 feet to keep the conductor within existing rights-of-way where applicable. The H-frame or Y-Frame steel structures will be approximately 60 to 105 feet tall with spans of approximately 600 to 1400 feet. The proposed transmission line will be designed to meet or surpass relevant local and state codes including the National Electric Safety Code, North American Electric Reliability Corporation and Company standards. Appropriate standards will be met for construction and installation, and applicable safety procedures will be followed during and after installation.

The 115 kV conductor proposed for the project will be 795 kcmil 26/7 Aluminum Core Steel Supported.

Construction

Construction would begin after federal, state and local approvals are obtained, property and rights-of-way are acquired, soil conditions are established and design is completed. The precise timing of construction would take into account various requirements that may be in place due to permit conditions, system loading issues, available workforce and materials. Actual construction would follow standard construction and mitigation practices, addressing right-of-way clearance, staging, erecting transmission line structures and stringing transmission lines. Construction and mitigation practices to minimize impacts would be based on the proposed schedule for activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain and other practices. Some construction restrictions and requirements will be reviewed in discussion concerning mitigation later in this document.

Vegetation Removal and Management

The purpose of vegetation removal and management is to keep transmission facilities clear of tall growing trees, brush, and other vegetation that could grow close to the conductors, and to allow for construction vehicle access to and between structures.

Xcel Energy utilizes what it terms as the *wire-zone/border-zone* approach to vegetation clearing and management.[10] The concept allows for different, yet compatible, vegetation types in these separate zones. The wire zone is that area directly beneath the conductors and allows for low growing forbs and grasses. The border zone is that area outside the edge of the wire zone and extends to the border of the easement. This zone may contain additional low-growing woody plants and trees. Xcel Energy has stated that it will attempt to limit vegetation removal along the existing corridors to the extent that it has historically been cut to maintain the existing 69 kV line.

In addition to the wire-zone/border-zone concept, Xcel will seek to maintain a *Hazard Tree Clearing Area* on either side of the right-of-way.[11] Along with the rights to trim or remove vegetation from within the right-of-way, the easement language will include provisions for removal of trees outside of and immediately adjacent to the right-of-way, which due to their location, height, and condition (i.e., typically dead or dying trees) have the potential to contact or endanger the transmission line by falling on the line. When tree removal is necessary from within the Hazard Tree Clearing Area, Xcel Energy vegetation management personnel will notify the landowner to arrange access and scheduling.

A schematic of Xcel's vegetation management program is illustrated in **Figure 11.**

Maintenance

The principal operating and maintenance cost for transmission facilities is the cost of inspections, usually done monthly by air. Annual operating and maintenance costs for transmission lines in Minnesota and the surrounding states vary. However, past experience shows that for voltages from 69 kV through 345 kV, costs are approximately $300 to $500 per mile. Actual line-specific

[10] RPA at 40
[11] Ibid

maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used and the age of the line.

3.4 Project Implementation

The Applicants anticipate a spring 2014 in-service date. Construction would be expected to begin in late 2013. This schedule is based on information known as of the date of the application filing and upon planning assumptions that balance the timing of implementation with the availability of crews, material and other practical considerations. This schedule may be subject to adjustment and revision as further information is developed.

Project Costs

The Applicants have estimated that the transmission line and substation improvements would cost approximately $18.2 million, as outlined below on **Table 4**.

Table 4. Project Costs

Project Portion	Cost in Million $
Substation Upgrades	**$10.9**
Transmission Line Upgrades	**$7.3**
Total Cost Estimate	**$18.2**

4.0 Alternatives to the Proposed Project

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

- The no-build alternative
- Demand side management
- Purchased power
- Facilities of a different size or using a different energy source than the source proposed by the applicant
- Generation rather than transmission
- Renewable energy sources

The following section discusses the feasibility and availability of potential alternatives to the transmission line which could eliminate the need for the proposed project. None were found to be a feasible alternative to the proposed project.

Renewable Generation Alternative

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

4.1 No Build Alternative

Under the no build alternative none of the existing 69 kV system (i.e., structures and/or conductors) would be replaced and the transmission line would continue to be operated at 69 kV. There would be no construction of the new 115 kV line, nor would improvement to the existing substations be completed.

Under this alternative, peak-demand periods could result in localized voltage collapse or damage to equipment. The Applicants state they would need several hours to restore electric service to customers in the area under such a scenario, and once service was restored the company may need to institute rotating blackouts to insure that voltage would not collapse again. Furthermore, it is likely that there would be a negative effect on the local economy due to the unreliable electrical service in the area.

Without the project, low voltage and overloading conditions will arise throughout the study region after 2015; the initial overloads in the near term occur on the Scott County Substation transformers #1 and #2 and the 69 kilovolt line between the Scott County Substation and the

Chaska Substation.[12] As the load increases in the area, the overloads and low voltages progressively get worse.

There would be little if any impact on existing generation and transmission facilities under a no-facility alternative. The likely consequence of a no-facility scenario would be to shed load.

This is not a feasible alternative. This alternative does not address the voltage support issues that are being experienced in the area. Under this alternative it is likely that there would be an unacceptable negative effect on the local economy due to the unreliable electrical service in the area.

4.2 Conservation alternative

This alternative would seek to address the forecasted need of 76 MW (2014) to 94 MW (2020) with Demand Side Management. The alternative would entail a slate of energy conservation measures that would ultimately reduce load in the area to a level allowing the current system to operate in a reliable manner. This conservation effort would need to be phased in, and would be above and beyond the companies' current efforts.

On June 1, 2009, Xcel filed its 2010-2012 Conservation Improvement Program (CIP) to the Minnesota Department of Commerce under docket number E,G002/CIP-09-198[13] in accordance with Minnesota Statute §216B.241, subd. 2(a). In that proposal, Xcel put forth a budget of over $240 million, with energy savings of 1,116 gigawatt hours and demand savings of 315 megawatts over the three years.

In 2010, Great River Energy and its member cooperatives invested more than $25 million in the delivery of energy efficiency, conservation and demand side management programs. In 2010, these efforts resulted in over 219 million kilowatt-hours of savings throughout Great River Energy's system.[14]

Xcel Energy has obtained significant energy savings from various conservations programs, including the CIP as required by Minnesota Statutes 216B.241. While the company anticipates futures savings from the continuation of these efforts, Xcel has stated that conservation alone will not be sufficient to address the significant reliability issue that exists in the area.[15]

In comments on the Certificate of Need Application, Department analyst Dr. Steve Rakow[16] states the following:

[12] CN Application, Section 3.11
[13] 2010-2012 Triennial Plan, Docket No. E,G002/CIP-09-198.
[14] CN Application, Section 3.9
[15] Ibid
[16] Comments of the Minnesota Department of Commerce, Division of Energy Resources, Docket No. E002/CN-11-826

> *On page 65 of the Petition the Applicants stated that energy conservation and load management are "not a feasible alternative to the proposed transmission upgrades because the additional 20 megawatts of load from the new data center will increase load well beyond projected energy reductions realized from the Applicants' conservation and load management programs." Page 16 of the Petition indicated that 20 MW represents an increase of about 30 percent for the local area load (by contrast applying growth rates of 1 percent and 2 percent to the existing demand results in demand growth of 2.8 MW and 5.6 MW after five years.). This 20 MW load increase is the main driver for several reliability issues that were identified by the Applicants' transmission analysis using a 2015 base case model. Since the 2015 base case model essentially represents the system as it is today (recognizing up to 5 MW of demand growth in the local area would have been reflected in the model), conservation would have to actually decrease existing loads by significant amounts rather than just reducing the rate of growth.*
>
> *Thus, the Department agrees with the Applicants that, while energy conservation is a tool to help in meeting future needs, it will not be able to actually reduce demand levels in such a small geographic area.*

and,

> *In summary, while energy conservation is an effective alternative for meeting future needs, it will not be able to address issues related to reducing existing demand levels as indicated by the Applicants. Therefore, Department concludes that this criterion has been met.*

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

4.3 Purchased Power

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

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

4.4 Facilities of a Different Size or Type

Size in the context of the certificate of need application refers to the quantity of power transfers that the transmission infrastructure improvements enable, while type refers to the transformer

nominal voltages, rated capacity, surge impedance loading, and nature (AC or DC) of power transported.

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

In comments on the Certificate of Need Application, Department analyst Dr. Steve Rakow[17] states:

> *Regarding the use of non-CN transmission, this would consist of rebuilding the 69 kV system to a higher capacity without increasing the voltage. The Applicants stated that such an alternative would be able to serve less new load and not be able to meet the needs of the area in the long term. Thus, when that lesser incremental load serving capacity is exceeded either the 69 kV rebuild would have to be retired (perhaps pre-maturely) or a new 115 kV line on new right-ofway would have to be constructed. To verify this claim the Department worked with the Applicants to develop a 69 kV rebuild alternative through Department Information Request Nos. 9 and 10. A comparison of the 69 kV Rebuild alternative to the proposed Project indicates that the proposed Project is clearly superior. In economic terms, considering internal costs only, the proposed Project is cheaper than the 69 kV Rebuild alternative under only one of the three measures explored by the Department:*
>
> > *1. initial capital costs (in 2014)—$18.5 million for the proposed Project versus $6.8 million for the 69 kV Rebuild alternative (2011 dollars);*
> > *2. net present value (NPV) over the period analyzed3—$19.1 million versus $12.1 million; and*
> > *3. NPV per MW served—$0.17 million versus $0.40 million.*
>
> *The Department's preferred metric for evaluating transmission system alternatives is NPV per MW served as long as the MW served are not excessive.*
>
> *In engineering terms, the proposed Project performs slightly better because it:*
> > *1. has lower line losses;*
> > *2. higher incremental load-serving capability (111 MW versus 30 MW);*
> > *3. better meets a N-2 contingencies on the 115 kV system; and*
> > *4. enables future large loads to be easily served.*

[17] Comments of the Minnesota Department of Commerce, Division of Energy Resources, Docket No. E002/CN-11-826

> *Thus, the Department concludes that the proposed Project is superior to non-CN transmission, both under economic and engineering criteria.*

Additionally, in regards to the size, type, and timing of the proposed project Department analyst Dr. Steve Rakow[18] states:

> *the Department concludes that the Applicants' proposed size is reasonable. The Applicants' response to Department Information Request No. 10 indicated that the incremental load serving capacity of the proposed Project is about 111 MW. Table 9 of the Petition shows that local load is forecasted to grow three to four MW per year. Thus, the proposed project would provide for between 25 and 40 years of load growth if no substantial spot loads are added (such as additional data centers). The 40-year estimate would be about equal to the expected life of a transmission facility.*

and,

> *the Department concludes that the Applicants' proposed type is reasonable. Regarding nominal voltages, 115 kV is the Applicants' standard load serving voltage in the metro area. Regarding the nature of power transported, alternating current (AC) is appropriate for the relatively short distances involved with the proposed Project. By contrast, direct current (DC) is appropriate for moving larger quantities of power longer distances with no substations in between the beginning and the end.*

and,

> *the Department concludes that the Applicants' proposed timing is reasonable. Chapter 2 of the Petition shows analysis of the existing system in 2015 under different potential configurations regarding lines being operated normally open (to reduce the exposure of loads to faults on any single section of line) and demonstrated that there are issues that need to be addressed in the near future. Thus, some transmission improvements need to be implemented as soon as possible and additional load growth needs to be addressed in the future. The proposed Project puts transmission improvements in place as soon as is reasonably expected and enables further transmission system improvements to address future load growth in a timely manner.*

4.5 Upgrading Existing Transmission Lines

The proposed project involves upgrading the existing 69 kV transmission lines to 115 kV between structure #142 on Xcel's #0740 line and the Scott County Substation, and converts the GRE MV-VTT 69 kV line to 115 kV between Xcel's #0740 line and the Victoria Substation.

[18] Ibid

The new construction portions of the project are to allow for the relocation of the existing #0740 line from downtown Chaska and to provide a second 115 kV source to the West Creek Substation from the Chaska Substation.

4.6 Generation Alternatives

Any generation alternative to the transmission line would be required to generate approximately 51.6 MW (2012 forecast) to 94 MW (2020 forecast) of capacity for delivery to the area. The proposed project (i.e., transmission alternative) provides approximately 50 MW of incremental load-serving capability at the cost of $20 to 25 million.[19]

It is unlikely that new generation could totally eliminate the need for rebuilding the existing 69 kV system. In order to reduce or minimize the need for the proposed upgrades to the transmission system, the generation would have to be local or distributed generation (DG). This DG would have to be placed strategically to mitigate specific overloads and low voltages.

Distributed generation is not an alternative to the SWTC Chaska Area 115 kV project as the reliability of the 69 kV line would not be improved from installation of the generation (due to age and condition of the line). Therefore, rebuilding of the 69 kV line would be needed in addition to the distributed generation in the area. A DG plus limited rebuild alternative would not address the needs identified by the Chaska Municipal Service (i.e., United Health Group data center, biotechnology park) in their letter dated March 23, 2011.

The Department Division of Energy Resources, Energy Regulation and Planning (ERP) unit addressed four alternatives in detail in its comments on the Certificate of Need Application, dated January 28, 2013.[20] Two of the alternatives were put forth by the Applicants in the application (the proposed project and the 115 kV alternatives). A third alternative, the 69 kV Rebuild, was developed by the Department and the Applicants during discovery, and a fourth (the DG alternative) was developed by the Department independently.

In ranking these alternatives the ERP first considered internal cost, including the initial capital cost, the Net Present Value (NPV), and the NPV per MW served. The DG alternative was inferior under all three measures. Next, the ERP ranked these alternatives on a societal cost basis using the same three cost values (capital cost, NPV, and NPV/MW) but in terms of societal costs rather than internal costs. The least cost alternative, by a significant margin, was the proposed project.

Regarding the DG alternative, Department analyst Dr. Steve Rakow states:

> *the Department concludes that, as long as the initial capital cost of the proposed Project does not increase by more than $8.1 million, (all else equal) the societal cost of the*

[19] CN Application, Section 3.6.1.2
[20] Comments of the Minnesota Department of Commerce, Division of Energy Resources, Docket No. E002/CN-11-826

proposed Project and the societal cost of energy to be supplied by the proposed Project are less than the alternatives.

5.0 Alternative Routes and Route Segments

Alternative routes, alternative route segments and modifications to the Applicant's proposed alignment were discussed during the scoping meeting and in comments received during the scoping comment period. Three of these alternatives, as described below, were incorporated in the scope of this EA and are evaluated herein.

In his written comments and supporting material, Mr. Gene Ernst put forth one alternative route segment and two alignment modifications for evaluation in the environmental review document (**Figure 12**). Mr. Ernst's suggested alterations are to Segment 4 of Applicant's proposed rebuild project. Mr. Ernst's concern is the impact that the rebuilt transmission line would have on his historic building (the Andrew Riedele House) located at 3250 Chaska Boulevard (north side of road) and potential loss of trees on that property. This structure currently sits 39 feet from the existing 69 kV line.

Ernst alternative route segment
The Ernst Alternative Route Segment departs from the existing 69 kV line (and Applicant's proposed route) at the intersection of Creek Road and Chaska Boulevard. The existing 69 kV line (and Applicant's proposed route) turns east at this intersection and runs along the north side of Chaska Boulevard, crossing to the south side of Chaska Boulevard at North Walnut Street, just prior to entering the existing Chaska Substation.

The Ernst Alternative Route Segment continues south through the intersection of Creek Road and Chaska Boulevard for approximately 700 feet (along the Chaska Creek water course diversion) to intersect with the "abandoned" Union Pacific Railroad right-of-way (ROW), at this point the route turns east and follows the railroad ROW for approximately 2,100 feet to the existing Chaska Substation.

This alternative route segment was incorporated into the scoping decision.

Ernst alternative alignment - 1
The Ernst Alignment Modification-1 moves the alignment of the new 115 kV line to the south side of Chaska Boulevard between Creek Road and a point approximately 100 feet west of North Chestnut Street, where the alignment would cross back to the north side of Chaska Boulevard to rejoin Applicant's proposed alignment.

This alternative alignment was incorporated into the scoping decision.

Ernst alternative alignment – 2
The Ernst Alignment Modification-2 maintains the transmission line in its current alignment, but would relocate the structure which is currently in front of the Andrew Riedele House approximately 80 feet to the west.

This alternative alignment was incorporated into the scoping decision.

6.0 Potential Impacts of the Proposed Route

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

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

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

There are a number of potential impacts associate with HVTLs that must be taken into account on any transmission line project. Minnesota Rule 7850.4100, A through N, identifies 14 factors that the Commission must consider when designating a route for a HVTL:

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

b. *effects on public health and safety;*

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

d. *effects on archaeological and historic resources;*

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

f. *effects on rare and unique natural resources;*

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

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

i. *use of existing large electric power generating plant sites;*

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

k. electrical system reliability;

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

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

n. irreversible and irretrievable commitments of resources.

6.1 Description of Environmental Setting

Much of the project area follows what was once part of the famed "Big Woods" hardwood forests in central Minnesota. However, much of the wooded habitat has been cleared for agricultural purposes. The current day landscape is a mixture of row crops (primarily corn and soybeans), lakes, scattered woodlands, small towns and a growing number of housing developments. The dominant landscape features in the general area are described as level topped hills bounded by smooth side slopes. There are broad level areas between these hills that contain lakes and wetlands, with the area's drainage controlled by the level of these lakes.

The proposed transmission line rebuild is primarily located in agricultural areas. The portion of the existing 69 kV line being decommissioned is located in the city of Chaska. This is the only area along the route that is considered urban.

Portions of Segment 6, through the Minnesota River valley, retain significant attributes of its original pre-settlement condition.

6.2 Socioeconomic

According to 2010 Census data, Carver County is 92.8 percent Caucasian, while Scott County is 77 percent Caucasian. In the vicinity of the proposed route, minority groups constitute a range of 1.6 percent to 34.22 percent of the total population.

Within the townships intersected by the proposed route, the per capita incomes are slightly lower when compared to Carver and Scott counties on a whole. The vicinity of the proposed route does not contain disproportionately high minority populations or low-income populations.

Approximately 8 to 12 workers will be required by Xcel Energy for transmission line construction.

The proposed route does not contain disproportionately high minority populations or low-income populations. Population and economic characteristics based on the 2010 U.S. Census are presented in **Table 5.**

Table 5. Population and Economic Profile, 2010

Location	Population	Minority Population (Percent)	Caucasian Population (Percent)	Per Capita Income	Percentage of Individuals Below Poverty Level
State of Minnesota	5,303,925	14.7	85.3	$29,582	10.6
Carver County	91,042	7.2	92.8	$35,807	4.7
City of Chanhassen	22,952	7.5	92.5	$44,080	2.9
City of Chaska	23770	11.9	88.1	$33,600	7.5
Dahlgren Township	1,331	1.6	98.4	$36,468	4.9
Carver City	3,724	11.5	88.5	$35,381	5.0
Laketown Township	2,243	7.0	93.0	$39,218	3.9
Scott County	129,928	13.6	86.4	$33,612	4.7
Jackson Township	1,464	34.22	65.78	$27,372	3.6
Shakopee City	37,076	23.0	77.0	$30,908	6.3

Source: RPA

There will be short-term impacts to community services as a result of construction activity and an influx of contractor employees during construction of the various segments of the project. Both utility personnel and contractors will be used for construction activities. The communities near the project should experience short-term positive economic impacts through the use of the hotels, restaurants and other services by the various workers.

It is not expected that additional permanent jobs will be created by the project. The construction activities will provide a seasonal influx of economic activity into the communities during the construction phase, and materials such as concrete may be purchased from local vendors. Long-term beneficial impacts from the project include increased local tax base resulting from the incremental increase in revenues from utility property taxes.

Potential Impacts

Socioeconomic impacts resulting from the project will be primarily positive with an influx of wages and expenditures made at local businesses during the construction of the project, increased tax revenue and increased opportunities for business development.

Short-term impacts to existing socioeconomic resources would be relatively minor. The construction, operation and maintenance of the transmission line would not have a significant effect on agricultural operations. The project construction would not cause permanent impacts to leading industries within the project area.

The relatively short-term nature of the project construction and the number of workers who would be hired from outside of the project area should result in short-term positive economic impacts in the form of increased spending on lodging, meals and other consumer goods and services. It is not anticipated that the project would create new permanent jobs during construction, but would create temporary jobs that would provide a short-term influx of income to the area.

If local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in Scott and Carver counties would contribute to the total personal income of the region. Additional personal income would be generated for residents in the county and the state by circulation and recirculation of dollars paid out by the applicants as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies and other products and services would benefit businesses in the counties and the state. Indirect impact may occur through the increased capability of the applicants to supply energy to commercial and industrial users, which would contribute to the economic growth of the region. There is no indication that any minority or low-income population is concentrated in any one area of the project, or that the transmission line would cross through an area occupied primarily by any minority group.

Long-term beneficial impacts to the county's tax base, as a result of the construction and operation of the transmission line, would be the incremental increase in revenue from utility property taxes which is based on the value of the project. The availability of reliable power in the area would have a positive effect on local businesses and the quality of service provided to the general public.

Property Values

Large electric generation facilities have the potential to impact property values. Because property values are influenced by a complex interaction between factors specific to each individual piece of real estate as well as local and national market conditions, the effect of one particular project on the value of one particular property is difficult to determine.

One of the first concerns of many residents near existing or proposed transmission lines is how the proximity to the line could affect the value of their property. Research on this issue does not

identify a clear cause and effect relationship between the two. Rather, the presence of a transmission line becomes one of several factors that interact to affect the value of a particular property.

In the Final Environmental Impact Statement (EIS) on the Arrowhead-Weston Electric Transmission Line Project, the Wisconsin Public Service Commission addressed the issue of property value changes associated with high voltage transmission lines[21]. This document looked at approximately 30 papers, articles and court cases covering the period from 1987 through 1999.

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

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

- The potential reduction in sale price for single family homes may range from 0 to 14 per cent.
- Adverse effects on the sale price of smaller properties could be greater than effects on the sale price of larger properties.
- Other amenities, such as proximity to schools or jobs, lot size, square footage of a house and neighborhood characteristics, tend to have a much greater effect on sale price than the presence of a power line.
- The adverse effects appear to diminish over time.
- Effects on sale price are most often observed for property crossed by or immediately adjacent to a power line, but effects have also been observed for properties farther away from the line.
- The value of agricultural property is likely to decrease if the power line poles are placed in an area that inhibits farm operations.

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

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

Finally, the EIS succinctly summarizes the dilemma in its closing paragraph which stated, "It is very difficult to make predictions about how a specific transmission line will affect the value of specific properties."

Based on the research that has been ongoing since at least the 1950s, several generalizations about the effect of transmission lines on property values can be made:

- Studies have found a potential reduction of sale price for single-family homes of between 0 to 14 percent. Studies conducted in the upper Midwest (Minnesota, Wisconsin, and the Upper Peninsula of Michigan) have shown an average decrease of 4 to 7 percent.
- Although proximity to a transmission line does not appear to affect appreciation of a property, it can sometimes result in increased selling time.
- Property characteristics such as the neighborhood, proximity to schools, lot size, square footage of the house, and other amenities, tend to exert a greater effect on sales place than the presence of a power line.
- High-value properties are more likely than lower-value properties to experience a reduction in sales price.
- The sales price of smaller properties could be more adversely affected than for larger properties.
- For upgrade projects, the level of opposition may affect the size and duration of any reduction in sales price.
- Adverse effects on property prices tend to be greatest immediately after a new transmission line is built and diminish over time.
- The sales price for properties crossed by or immediately adjacent to a transmission line appear to be more adversely affected than prices for homes that are not adjacent to the transmission line right-of-way or are greater than 200 feet from the transmission line right-of-way.
- Mitigation measures such as setback distance, landscaping and integration of the right-of-way into the neighborhood, and visual and noise shielding have been shown to reduce or eliminate the impact of transmission structures on sales price.
- Impacts to the value of agricultural property can be reduced by placing structures to minimize disruption to farm operations.[22]
- Interviews with residents along existing transmission lines show that a high proportion of residents were aware of the lines at the time they purchased their home and between one-half and three-fourths expressed concerns about the lines. The concerns were related to health effects, aesthetics, and effects on property values. Despite the concerns expressed,

[22] Adapted from Wisconsin Public Service Commission, June 2001. *Environmental Impacts of Transmission Lines.* http://psc.wi.gov/thelibrary/publications/electric/electric10.pdf, p. 17.

67 to 80 percent of survey respondents with negative feelings about transmission lines reported that their decision to purchase the property and the price they offered to pay was not affected by the lines.[23]

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

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

Federal Housing Administration Regulations

The Federal Housing Administration, (FHA) provides mortgage insurance on home loans made by FHA-approved lenders throughout the United States. In order to qualify for FHA mortgage insurance, a property must go through an appraisal and property condition assessment performed by an FHA-qualified appraiser. FHA qualified underwriters and appraisers are responsible for adhering to current the policies contained in the FHA's *Homeownership Center (HOC) Reference Guide*. With respect to overhead HVTLs, FHA guidance requires appraisers to review properties under consideration for FHA loans for presence of utility easements. The US Department of Housing and Economic Development provides the following guidance:

- *The appraiser must indicate whether the dwelling or related property improvements is located within the easement serving a high-voltage transmission line, radio/TV transmission tower, cell phone tower, microwave relay dish or tower, or satellite dish (radio, TV cable, etc).*
- *If the dwelling or related property improvement is located within such an easement, the DE Underwriter must obtain a letter from the owner or operator of the tower indicating that the dwelling and its related property improvements are not located within the tower's (engineered) fall distance in order to waive this requirement.*
- *If the dwelling and related property improvements are located outside the easement, the property is considered eligible and no further action is necessary. The appraiser, however, is instructed to note and comment on the effect on marketability resulting from the proximity to such site hazards and nuisances.*[25]

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

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

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

Mitigative Measures

Socioeconomic impacts resulting from construction activities associated with the project would be primarily positive with an influx of wages and expenditures made at local businesses during the project construction. Mitigative measures are not necessary.

In the matter of property values (for those properties receiving an easement) potential impact would typically be a negotiated settlement in an easement agreement between the Applicants and the landowner. In the case where a 69 kV easement already exists, the incremental differences between properties with the existing 69 kV and the same properties with the proposed 115 kV HVTL may be difficult to discern.

Locating the line away from homes to the extent possible and using line design and landscaping to minimize visual intrusions from the line can be used to minimize impacts to property values from the transmission line.

The presence of an HVTL easement on a property does not preclude qualification for FHA mortgage insurance, although the location of an easement on the property does require further documentation than would be required on properties without such easements.

6.3 Displacement

The proposed project maximizes the use of existing transmission line corridors – the proposed route uses existing transmission rights-of-way for all but approximately 2.4 miles of its length. Due to the use of existing transmission line ROWs for the majority of the proposed route, the Applicants do not anticipate that any existing structures along the proposed alignment would fail to meet the NESC safety codes.

Potential Impacts

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

Mitigative Measures

Since no relocations would occur, no mitigative measures are required. It may be possible for the Permittee to work with landowners to discuss advantageous placement of the new poles if it is found that a residence lies within the previous mentioned fall zone.

6.4 Anticipated Noise Impacts

Noise is measured in units of decibels (dB) on a logarithmic scale. The A weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. For example, a noise level

change of 3 dBA is barely perceptible to average human hearing while a 5 dBA change in noise level is noticeable. Two sources of noise would be associated with the completed Project: conductors and substations.

Land use activities associated with residential, commercial, and industrial land are grouped together into Noise Area Classifications (NAC). Residences, which are typically considered sensitive to noise, are classified as NAC 1. Each NAC is assigned both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) noise limits for land use activities within the NAC. Table 8 shows the Minnesota Pollution Control Agency (MPCA) daytime and nighttime limits in dBA for each NAC (**Table 6**). The limits are expressed as a range of permissible dBA within a 1-hour period; L50 is the dBA that may be exceeded 50 percent of the time within an hour, while L10 is the dBA that may be exceeded 10 percent of the time within 1 hour.

Typical noise sensitive receptors along the route would include residences, churches, and schools; however, most of the land use along the route is rural agricultural land. Current average noise levels in these areas are typically in the 30 to 40 dBA range and are considered acceptable for residential land use activities. Ambient noise in rural areas is commonly made up of rustling vegetation and infrequent vehicle pass-bys. Higher ambient noise levels, typically 50 to 60 dBA, would be expected near roadways, urban areas and commercial and industrial properties in the project area. Conductor and substation noise would comply with state noise standards.

Table 6. MPCA Daytime and Nighttime Noise Limits

Noise Area Classification	Daytime		Nightime	
	L50	L10	L50	L10
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

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

Operational noise would be associated with the transmission conductors and transformers at substations that may produce audible noise under certain operational conditions. The level of noise depends on conductor conditions, voltage level and weather conditions. Noise emission from a transmission line occurs during heavy rain and wet conductor conditions. In foggy, damp or rainy weather conditions, transmission lines can create a subtle crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain, the general background noise level is usually greater than the noise from a transmission line and few people are in close proximity to the transmission line in these conditions. For these reasons, audible

noise is not noticeable during heavy rain. During light rain, dense fog, snow and other times when there is moisture in the air, the proposed transmission lines may produce audible noise higher than rural background levels. During dry weather, audible noise from transmission lines is an imperceptible, sporadic crackling sound.

Approximately 94 residences and businesses are located within 200 feet of the proposed route. Of these structures, 31 are located along new construction portions of the project (Segments 3 and 5) and 63 are located along upgrade and conversion segments of the project (Segments 1, 2, 4, and 6). The closest distance that a residence is located to the proposed new 115 kV line construction is approximately 54 feet (Segment 5). The closest distance that a residence is located to a proposed transmission line upgrade is approximately 39 feet (Segment 4). Both are located within Chaska.

Noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. Additionally, noise levels from the proposed 115/69 kV double circuit transmission lines are expected to be only slightly higher than the existing 69 kV transmission lines in the project Area. Therefore, noise levels from the new line and double circuit line should not be noticeably greater than existing levels.

The EPRI "Transmission Line Reference Book, 345kV and Above", Chapter 6, provides empirically-derived formula for predicting audible noise from overhead transmission lines. Computer software produced by the Bonneville Power Administration (BPA)(BPA, 1977) is also frequently used to predict the level of audible noise from power transmission lines that is associated with corona discharge. Audible noise is predicted for dry and wet conditions, with wet conditions representing a worst case. These procedures are considered to be reliable and represent International best practice.

The project consists of new and rebuild segments of 115 kV single circuit transmission line. Computer modeling performed by Xcel Energy using the BPA 1977 software under the worst case wet conditions scenario indicated that the audible L5 and L50 noise levels (discussed below) measured at the edge of the 75-foot-wide right-of-way (37.5 feet from centerline) would be at 22.2 and 18.7 dBA, respectively, well below the MPCA nighttime L50 limit of 50 dBA for Noise Area Classification 1.

These findings are shown in **Table 7**.

Table 7. Predicted Audible Noise from HVTL

Structure Type	Noise L5 (37.5 Feet From Centerline) (Decibels A- weighted)	Noise L50 (37.5 feet From Centerline) (Decibels A-weighted)
Horizontal or Braced Post 115kV Steel Pole Single Circuit	22.2	18.7

Y-Frame or H-Frame 115kV Steel Pole Single Circuit	17.9	14.4
Horizontal or Braced Post 115kV Steel Pole Single Circuit (Operated at 69kV)	4.6	1.1

Transformer Substation Noise

Transformer "hum" is the dominant noise source at substations. Transformer hum is caused by magnetostrictive forces within the core of the transformer. These magnetic forces cause the core laminations to expand and contract, creating vibration and sound at a frequency of 100Hz (twice the a.c. mains frequency), and at multiples of 100Hz (harmonics). Typically, the noise level does not vary with transformer load, as the core is magnetically saturated and cannot produce any more noise.

The nearest occupied home and the nearest non-residential structure to the Augusta Substation are located 215 feet and over one mile from the substation, respectively. The nearest occupied home to the Victoria Substation is located approximately 715 feet to the southeast. The nearest non-residential structure to the Victoria Substation is located greater than one mile from the substation.

The specifications for the new transformer at these locations will result in noise levels equal to or less than what exists today.

The structural features closest to the Scott County Substation are a gravel pit 900 feet to the west and a mobile home park approximately 380 feet to the southeast (across Highway 169).

It would be very unlikely that substation noise would be audible at these locations.

The Applicants have stated that the substations will be designed and constructed to comply with state noise standards established by the Minnesota Pollution Control Agency (MPCA).

Potential Impacts

Noise levels produced by 115 kV transmission lines and substations are usually not audible and have not been demonstrated to approach even the most stringent state standards. Additionally, the majority of the project is located adjacent to roadways, and traffic noise would overpower any project-related noise emissions. Noise impacts from the project are not anticipated.

Mitigative Measures

The Applicants have stated that in an effort to mitigate noise levels associated with construction activities, work would be limited to daytime hours between 7 a.m. and 10 p.m. on weekdays. Occasionally there may be construction outside of these hours or on a weekend if the company is required to work around customer schedules, line outages, or has been significantly impacted due

to other factors. Heavy equipment would also be equipped with sound attenuation devices such as mufflers to minimize the daytime noise levels.

No mitigation measures are required for the operational phase of the line as operational noise levels are not predicted to exceed the state noise limits.

6.5 Radio and Television Interference

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

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

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

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

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

A two-way mobile radio located immediately adjacent to and behind a large metallic structure (such as a steel tower) may experience interference because of signal blocking effects. Movement of either mobile unit so that the metallic structure is not immediately between the two units should restore communications. This would generally require a movement of less than 50 feet by the mobile unit adjacent to a metallic tower. Noise in the frequency range of cellular type phones is almost non-existent and the technology used by these devices is superior to that used in two-way mobile radio.
As in the case with AM radio interference, corona-generated noise could cause interference with TV picture reception because the picture is broadcast as an AM signal. The level of interference depends on the TV signal strength for a particular channel (TV audio is an FM signal that is typically not impacted by transmission line radio frequency noise).

Due to the higher frequencies of the TV broadcast signal (54 MHz and above), 115 kV transmission lines seldom result in reception problems within a station's primary coverage area. In the rare situation that the proposed transmission line would cause TV interference within a broadcast station's primary coverage area where good reception is presently obtained, Xcel Energy has stated that it would work with the affected party to correct the problem. Usually any reception problem can be corrected with the addition of an outside antenna.

Mitigative Measures

No interference issues are anticipated with this project, however, should such interferences be identified, the Applicants would be required to resolve the problem as a condition of the HVTL Route Permit.

6.6 Aesthetics

Because the proposed project will mainly follow existing 69 kV transmission line routes, the project will have nominal effects on the visual and aesthetic character of the area. The existing 69 kV structures are primarily wood pole structures with heights ranging from 50 feet to 90 feet with an approximate average height of 60 feet.

All existing 69 kV structures along the proposed route will be replaced with new steel 115 kV structures, with the exception of the existing wood pole structures along the Great River Energy MV-VTT line which will remain in place.

The new structures will be about 60 to 105 feet tall and will have an average span of 325 feet. A maximum span of 400 feet will be used between the structures, which will still keep the conductor within the right-of-way under blowout conditions. The usual right-of-way required for these types of structures is 75 feet wide. The overall spacing of the poles will be comparable to the current layout, which varies greatly by engineering and land use constraints.

The finish of the proposed poles will be self-weathering steel. The existing transmission line structures in this area are wood poles, and some of the existing poles are of H-frame construction. The proposed steel poles will give the new transmission line a somewhat cleaner and more modern appearance.

Like the existing 69 kV transmission line, the new transmission line will be visible to area residents. The majority of the landscape in the project area is agricultural. The visual effect will depend largely on the perceptions of the observers. The visual contrast added by the transmission structures and lines may be perceived as a visual disruption or as points of visual interest. The transmission lines and substations that already exist in the project area will limit the extent to which the new line and substation are viewed as a disruption it the area's scenic integrity.

Potential Impacts

Although the transmission line would be visible throughout most of its length, it is not incompatible with its setting amongst existing transmission lines, public transportation corridors and residential development along the route.

Mitigative Measures

Xcel Energy will work with landowners to identify concerns related to the transmission line aesthetics and will attempt to mitigate (structure placement/location) these concerns, to the greatest extent practicable, while adhering to the route and alignment conditions of the HVTL Route Permit.

6.7 Public Health and Safety Including EMF

Proper safeguards would need to be implemented for construction and operation of the facility. The project would be designed to comply with local, state, NESC and Xcel Energy standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials and ROW widths. Xcel Energy construction crews and/or contract crews would comply with local, state, NESC and Xcel Energy standards regarding installation of facilities and standard construction practices. Established Xcel Energy and industry safety procedures would be followed during and after installation of the transmission line. This would include clear signage during all construction activities.

The transmission line would be equipped with protective devices to safeguard the public from the transmission line if an accident occurs and a structure or conductor falls to the ground. The protective devices are breakers and relays located where the transmission line connects to the substation. The protective equipment would de-energize the transmission line, should such an event occur. In addition, the substation facilities would be fenced and access limited to authorized personnel. The underground portion of the line would be properly marked, and manhole covers would be heavy enough to prevent unauthorized access. The costs associated with these measures have not been tabulated separately from the overall project costs since these measures are standard practice for Xcel Energy.

Electric and Magnetic Fields

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

Electric Fields

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

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

The maximum electric field, measured at one meter above ground, associated with the project is calculated to be 1.19 kV/m (115 kV single circuit).

Table 8. Calculated Electric Fields (kV/m)

Structure Type	Maximum Operating Voltage (kV)	Distance to Proposed Centerline										
		-300'	-200'	-100'	-50'	-25'	0'	25'	50'	100'	200'	300'
Horizontal Post 115kV Steel Pole Single Circuit	121	0.01	0.01	0.04	0.15	0.39	1.13	0.51	0.15	0.05	0.01	0.01
Braced Post 115 kV Steel Pole Single Circuit	121	0.01	0.02	0.06	0.19	0.63	1.19	0.49	0.21	0.05	0.01	0.01
H-Frame or Y-Frame 115kV Steel Pole Single Circuit	121	0.00	0.01	0.09	0.52	1.48	0.68	1.48	0.52	0.09	0.01	0.00
Horizontal or Braced Post 115kV Steel Pole Single Circuit (Operated at 69kV)	72.5	0.00	0.01	0.03	0.10	0.23	0.66	0.30	0.10	0.03	0.01	0.00
Source - RPA												

There is no federal standard for transmission line electric fields. The Commission, however, has imposed a maximum electric field limit of 8 kV/m measured at one meter above the ground. *In the Matter of the Route Permit Application 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 (*adopting* ALJ Findings of Fact, Conclusions and Recommendation at Finding 194 (April 22, 2010 and amended April 30, 2010)) (September 14, 2010). The standard was

designed to prevent serious hazards from shocks when touching large objects parked under AC transmission lines of 500 kV or greater.

Magnetic Fields

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

Table 9. Calculated Magnetic Flux Density (milligauss)

Segment	System Condition	Current (Amps)	Distance to Proposed Centerline										
			-300'	-200'	-100'	-50'	-25'	0'	25'	50'	100'	200'	300'
Segment 1: West Waconia to Augusta 115kV Single Circuit	Peak	102	0.15	0.29	0.89	2.65	5.92	11.31	6.27	2.55	0.72	0.19	0.09
	Average	61.2	0.09	0.17	0.54	1.59	3.55	6.78	3.76	1.53	0.43	0.11	0.06
Segments 1 & 2: Augusta to MV-VTT 115kV Single Circuit	Peak	86	0.13	0.24	0.75	2.23	5.00	9.53	5.29	2.15	0.61	0.16	0.08
	Average	51.6	0.08	0.14	0.45	1.34	3.00	5.72	3.17	1.29	0.37	0.10	0.05
Segments 3, 4, 5, & 6: West Creek to Scott County 115kV Single Circuit Horizontal Post	Average	130	0.24	0.53	2.07	7.62	20.22	33.41	20.48	7.80	2.17	0.58	0.27
	Peak	78	0.14	0.32	1.24	4.57	12.13	20.04	12.29	4.68	1.30	0.35	0.16
Segments 3, 4, 5, & 6: West Creek to Scott County 115kV Single Circuit Braced Post	Peak	130	0.14	0.28	1.12	3.96	9.63	16.60	8.92	4.10	1.41	0.46	0.25
	Average	78	0.08	0.17	0.67	2.38	5.78	9.96	5.35	2.46	0.85	0.28	0.15
Source - RPA													

The magnetic field profiles around the proposed transmission lines for each structure and conductor configuration being considered for the project is shown in **Table 9.** Magnetic fields were calculated for each section of the project under three system conditions: the expected peak and average current flows as projected for the year 2015 under normal (system intact) conditions and peak current flow for the year 2025 under normal (system intact) conditions. The peak magnetic field values are calculated at a point directly under the transmission line and where the conductor is closest to the ground. The same method is used to calculate the magnetic field at the edge of the right-of-way. The magnetic field profile data show that magnetic field levels

decrease rapidly as the distance from the centerline increases (proportional to the inverse square of the distance from source).

The magnetic field produced by the transmission line is dependent on the current flowing on its conductors. Therefore, the actual magnetic field when the project is placed in service is typically less than shown in the charts. This is because the charts represent the magnetic field with current flow at expected normal peak based on projected regional load growth through 2025, the maximum load projection timeline available. Actual current flow on the line will vary, so magnetic fields will be less than peak levels during most hours of the year.

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

Table 10. Magnetic Fields (milligauss) From Common Home and Business Appliances

Type	Distance From Source in Feet			
	0.5	1	2	4
Computer Display	14	5	2	-
Fluorescent Lights	40	6	2	-
Hairdryer	300	1	-	-
Vacuum Cleaners	300	60	10	1
Microwave Oven	200	40	10	2
Conventional Electric Blanket	39.4 peak 21.8 average			
Low EMF Electric Blanket	2.7 peak .09 average			

Source: EMF In Your Environment, EPA 1992

Stray Voltage

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

Neutral to Earth Voltage (NEV) refers to a condition that can occur at the electric service entrances to structures, that is, where distribution lines enter structures. It is the phenomena most commonly referred to as "stray voltage." NEV is an extraneous voltage that appears on metal surfaces in buildings, barns and other structures, which are grounded to earth. NEV can be experienced, for example, by livestock who simultaneously come into contact with two metal objects (e.g., feeders, waterers, stalls). If there is a voltage between these objects, a small current will flow through the livestock. The fact that both objects are grounded to the same place (earth) would seem to prevent any voltage from existing between the objects. However, this is not the case – a number of factors determine whether an object is, in fact, grounded. These include wire size and length, the quality of connections, the number and resistance of ground rods, and the current being grounded.[26]

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

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

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

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

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

lines. Proper grounding of metal objects under and adjacent to the transmission line is the best method of avoiding these shocks.

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

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

Potential Impacts

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

Table 11. ELF EMF International and State Guidelines

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

Massachusetts	85 mG
New York	200 mG

Source: EPRI, 2003; Union of the Electric Industry – EUROELECTRIC, 2003.

The effect of EMF on human health has been the subject of study for over 25 years. Of particular concern is the link between EMF exposure and cancer. Numerous panels of experts have convened to review research data on whether EMF is associated with adverse health effects. The studies have been conducted by the National Institute of Environmental Health Sciences (NIEHS), the USEPA, the World Health Organization (WHO), and the Minnesota State Interagency Working Group (MSIWG) on EMF issues. Studies regarding EMF exposure and childhood leukemia and other cancer risks have had mixed results. Some organizations have determined that a link between EMF and cancer exists while others have found this link to be weak or nonexistent.

In 1992, Congress initiated U.S. EMF Research and Public Information Dissemination (EMF RAPID). EMF RAPID program studied whether exposure to electric and magnetic fields produced by the generation, transmission, or use of electric power posed a risk to human health. Program conclusions were presented to Congress on May 4, 1999 as follows:

- The scientific evidence suggesting that EMF-EMF exposures pose any health risk is weak.
- Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent positive findings in animals or mechanistic studies weakens the belief that this association is actually due to ELF-EMFs, but it cannot completely discount the epidemiological findings.
- The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the Unite States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern (NIEHS, 1999).

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

> *Based on comprehensive evaluation of published studies relating to the effects of power-frequency electric and magnetic fields on cells, tissues, and organisms (including*

humans), the conclusion of the committee is that the current body of evidence does not show that exposure to these fields presents a human-health hazard.

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

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

In 2001, the World Health Organization (WHO) International Agency for Research on Cancer classified power-frequency EMF as a "possible carcinogenic to humans." Currently the WHO states the following viewpoint of the associated health effects of EMF on its website (WHO, 2009):

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

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

- Some epidemiological results do show a weak but consistent association between childhood leukemia and increasing exposure to EMF (see the conclusion of IARC and NIEHS). However, epidemiological studies alone are considered insufficient for concluding that a cause and effect relationship exists, and the association must be supported by data from laboratory studies. Existing laboratory studies have not substantiated this relationship (see NTP, 1999; Takebe et al., 2001), nor have scientists been able to understand the biological mechanism of how EMF could cause adverse effects. In addition, epidemiological studies of various other diseases, in both children and adults, have failed to show any consistent pattern of harm from EMF.
- The Minnesota Department of Health concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health

effects. However, as with many other environmental health issues, the possibility of a health risk from EMF cannot be dismissed. Construction of new generation and transmission facilities to meet increasing electrical needs in the State is likely to increase exposure to EMF and public concern regarding potential adverse health effects.

- Based upon its review, the Work Group believes the most appropriate public health policy is to take a prudent avoidance approach to regulating EMF. Based upon this approach, policy recommendations of the Work Group include:

    - Apply low-cost EMF mitigation options in electric infrastructure construction projects;
    - Encourage conservation;
    - Encourage distributed generation;
    - Continue to monitor EMF research;
    - Encourage utilities to work with customers on household EMF issues; and
    - Provide public education on EMF issues (MSIWG, 2002).

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

Continued Research

It is important to note that although expert panels and agencies, such as the ones discussed above, have not yet identified any viable cause and effect relationships between exposure to EMFs and adverse health effects, hypotheses have existed and continue to be researched.

For example, Dr. David O. Carpenter during the recent public hearing proceedings for the proposed 345 kV transmission line from Brookings County, South Dakota, to Hampton, Minnesota, provided pre-filed direct testimony regarding his findings on health effects associated with EMF. Dr. Carpenter is a public health physician and Director of the Institute for Health and the Environment at the University of Albany, SUNY. He researched and wrote a document titled, *Setting Prudent Public Health Policy for Electromagnetic Field Exposures*. Carpenter concludes "there is strong scientific evidence that exposure to magnetic fields from power lines greater than 4 milligauss (mG) is associated with an elevated risk of childhood leukemia" and that some studies have indicated that there is scientific evidence to suggest that exposures above 2 mG could increase leukemia risks. Carpenter goes on to suggest that "lifetime exposure to magnetic fields in excess of 2 mG is associated with an increased risk of neurodegenerative diseases in adults, including Alzheimer's disease and amyotrophic lateral sclerosis (ALS)."
Additionally, during his recent testimony on the proposed 345 kV HVTL in response to whether EMF similar to power line exposure can affect biological tissue, he states the following:

> *Any one of these actions [actions that alter cell tissue] might be responsible for the carcinogenic and/or neurodegenerative actions of EMFs. As with many environmental*

> *agents, however, assuming that only one mechanism of action exists would be a mistake, particularly where more than one disease is involved. It is more likely that multiple mechanisms of action would contribute to disease.*

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

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

Mitigative Measures

As per the MDH White Paper recommendations concerning "prudent avoidance," utilities routinely provide information on the issue to the public, interested customers and employees.

This information contains references to studies, and provides data to help explain the relative impact of transmission line exposure to other EMF exposures most people experience throughout the day at home or at work. Xcel Energy also provides measurements for landowners, customers and employees who request them. In addition, Xcel Energy stated in its application that it would use structure designs that minimize magnetic field levels and, where practicable, site facilities in locations affecting the fewest number of people.

6.8 Recreation

Recreational opportunities in Scott and Carver counties include hiking, biking, canoeing, boating, fishing, camping, equestrian riding, swimming, hunting, snowmobiling and nature observation.

There are four municipalities that are traversed by the proposed route: Dahlgren Township, Laketown Township, and Chaska, within Carver County; and Jackson Township within Scott County.

The proposed route intersects or is adjacent to five parks; the requested route width is 100 feet on each side of the route centerline of the existing 69 kV facilities (200 feet total width), and a route width of 400 feet for areas of new transmission line construction. The five identified parks are summarized in **Table 12**.

Table 12. Parks Located With Request Route

Park	Municipality	Park Amenities

		Trail Access	Shelter	Picnic Areas	Restrooms	Public Swimming	Fishing	Boat Access	Play Equipment	Ball Fields	Tennis Courts	Volleyball	Basketball	Horseshoes	Skating & Hockey
Schimelpenig Park	Chaska	X	X	X	X		X		X			X	X	X	
Firemans Park I	Chaska	X	X	X	X	X	X		X	X		X			
Firemans Park II	Chaska			X					X						X
Highland Park	Chaska								X						
Minnesota Valley State Recreational Area	Jackson Township	X		X	X		X	X							

Construction associated with the project near these parks consists of upgrades to an existing transmission line, which is already located in established, cleared rights-of-way; with the exception of Fireman's Park II no additional vegetation removal or use restrictions are anticipated in these areas.

Fireman's Park II is located in Segment 5 where the new 115 kV transmission line deviates from the existing 69 kV line easement/alignment; Segment 5a as proposed involves the removal of approximately 0.39 miles of the existing 69 kV line to be replaced with the construction of 0.58 miles of new 115 kV transmission line in Segment 5 (See Section 3.1 Project Segments). This change in alignments stemmed from requests made by Chaska early in Xcel Energy's planning process.

The proposed route width for the portion of the 115 kV new line that passes through Chaska (Segment 5) encompasses Fireman's Park II; the proposed alignment of which would be located along the east side of North Maple Street (**Figure 13**). The construction of the new line along this alignment will require significant trimming and/or removal of trees along the park's western border, which will result in an aesthetic change for the park.

Parks, recreational areas, and preserves located within one mile of the Proposed Route were also identified and are summarized in **Table 13**

Table 13. Recreation Areas Located Within One Mile

Municipality	Area Name

Dahlgren Township	Augusta Ball Club
City of Carver	Minnesota Valley National Wildlife Refuge
City of Chaska	Athletic Park, Chaska Town Course, City Square Park, Community Center Park, Community Park, Firemen's Park I, Firemen's Park II, Friendship Park, Griep Park, Hickory Park, Highland Park, Kelzer Park, Lions Park, Meadow Park, Minnesota Valley National Wildlife Refuge, Schalow Park, Schimelpfenig Park, Winkel Park, and 33 areas of Open Space
Jackson Township	Minnesota Valley State Recreation Area, Nyssen's Lake Unit
City of Shakopee	Tahpah Park

Source - RPA

A total of 15 bikeways intersect the proposed route along its length. In general, bikeways are a combination of established roadways and paved recreational trails. Dedicated recreational trails include the Minnesota Valley State Trail which intersects the east end of the proposed route approximately ½ mile north of the Scott County Substation. There are two proposed regional trails near the proposed route: the Twin Cities & Western trail and the Chaska-Victoria trail. The proposed route intersects these proposed regional trails at two locations: one within Chaska near the intersection of 6th Street and Chestnut Street (Segment 4), and another in Laketown Township along Guernsey Avenue north of Engler Blvd. (Segment 2).

Potential Impacts

With the exception of Fireman's Park II, an incremental increase in visual impacts would be the only potential impact to the aforementioned public lands. There should be minimal new visual impacts to recreationalists from the rebuilt transmission line.

With regard to Fireman's Park II and the proposed alignment, it is probable that the construction of the new 115 kV transmission line will result in loss of the tree row along the park's western border.

Impacts to the existing bike trails or any of the proposed trails are anticipated to be limited to temporary access issues associated with construction activities. Physical impacts derived from construction activities will be restored to pre-construction state as a standard condition (site restoration) of any HVTL Route Permit issued to the Applicant.

Mitigative Measures

The HVTL will be visible from Aue Lake, Fireman's Clayhole, Courthouse Clayhole, and the Minnesota River; however direct impact to these resources is not expected. For the rebuild portions of the project, the transmission line would not impact any new areas not already affected by existing transmission lines along designated public lands and therefore no mitigation is necessary.

The requested route width of 400 feet for new construction spans the entire breadth of Fireman's Park II and may allow for alignment modifications that would preserve the aforementioned stand of trees. **Figure 14** illustrates a suggested alignment modification proposed by the city of Chaska that would place the alignment down the center of the park in an area clear of trees.

In an effort to avoid the public recreating directing beneath the transmission line, the alignment option could be placed along the eastern edge of Fireman's Park II and the playground equipment relocated to the west side of the park.

Language could be included in the HVTL Route Permit, as a special condition, that preserves this stand of trees while maintaining the flexibility (i.e., 400 foot wide route) for the city of Chaska and Xcel Energy to select an appropriate alignment through the park.

6.9 Land-based Economies

Agriculture

Carver County has strong economic ties to agricultural production. According to the 2007 United States Department of Agriculture (USDA) Census of Agriculture, Carver County has 800 individual farms, marking a 2 percent decrease in total number of farms over the previous five years.

Agricultural lands cover 169,367 acres, representing over 70 percent of all lands in Carver County with an average farm size of 212 acres. Carver County ranks among the top 20 counties in the production of agricultural products: fruits, tree nuts, and berries (ranking 15th statewide); nursery, greenhouse, floriculture, and sod (ranking 10th statewide); and milk and other bovine dairy products (ranking 13th statewide).

Nearly $93 million was generated from both crop and livestock sales in 2007.

Scott County has moderate economic dependence on agricultural production. According to the 2007 USDA Census of Agriculture, Scott County has 795 individual farms, marking a 21 percent decrease in total number of farms over the previous five years. Agricultural lands cover 117,551 acres, representing over 51 percent of all land in Scott County with an average farm size of 148 acres. Scott County ranks among the top 20 counties (by value of sales) in production of fruits, tree nuts, and berries (ranking 5th statewide); cut Christmas trees and short rotation woody crops (ranking 6th statewide); and horses, ponies, mules, burros, and donkeys (ranking 13th statewide). Over $63 million was generated from both crop and livestock sales in 2007.

Construction activities associated with the project will temporarily access an area of agricultural; the exact acreage potentially impacted will depend on the final design. Construction of new transmission structures and removal of existing structures will require repeated access to structure locations to install foundations, structures and conductors. Equipment used in this

process includes drill rigs, concrete trucks, backhoes, cranes, boom trucks and assorted small vehicles.

Potential Impacts

No long-term impacts are anticipated to the agricultural economy from the project. During construction, temporary impacts such as soil compaction and crop damages within the ROW may occur.

Mitigative Measures

Landowners will be compensated for the use of their land through easement payments. Additionally, to minimize loss of farmland and rural properties and to ensure reasonable access to the land near the poles, Xcel Energy intends to place the poles approximately five feet from and overhang the roadway right-of-way. When possible, Xcel Energy has stated that it will attempt to rebuild the transmission lines before crops are planted or following harvest.

The Applicants have stated that its construction teams will work with the property owner, right-of-way agent, and transmission line engineers to minimize the impact on property through use of the owner's knowledge of the property.

Forestry

The route does not impact any managed forests or nurseries. No privately-owned forest production industry would be affected by the project.

Potential Impacts

Because the route follows existing ROW for much of its length, clearing of trees would be minimal. Impacts to forested areas and shelterbelts along the rebuild portion of the route would be incidental, and would be limited to the amount necessary to permit safe and reliable operation of the transmission line. Due to safety concerns, any trees that would grow taller than 16 to 20 feet within the ROW would need to be removed beneath overhead lines. Additionally, a 10-foot radius around each structure would be kept free of woody vegetation.

Mitigative Measures

Consist with the standard HVTL Route Permit conditions, the construction staging areas will be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. The area will be re-graded, as required, so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that would facilitate natural re-vegetation and provide for proper drainage and prevent erosion.

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

Mining

According to the Minnesota Department of Transportation (MnDOT) county pit maps for Carver and Scott counties, there are gravel pits, rock quarries and commercial aggregate sources in the vicinity of the project. Of these, the closest is an inactive aggregate source located north of Engler Blvd. on Segment 2 and an active gravel pit and rock quarry located near Segment 6, approximately 0.35 miles from the eastern terminus of the project in Scott County. Three active aggregate sources and four inactive sources are located within one mile of the project. Four inactive gravel pits are within one mile of the project.

Unknown resources that may exist along the proposed route would be situated in close proximity to existing utility and roadway ROW, making development unlikely.

Potential Impacts

Since there are no mineral mining or "known but undeveloped resources" along the proposed route, the project has no potential impact on mineral mines.

Additionally, the majority of the project would be constructed in the existing ROW and the number of transmission line poles may be reduced. Any potential aggregate resources in the ROW would have already been impacted in terms of their availability for development. Therefore, there would be no additional impacts on potential aggregate resources in the project area.

Mitigative Measures

Because no impacts are anticipated, no mitigation is required.

6.10 Commercial, Industrial, Residential Land Use

Land uses in Segments 1 through 3, and the western portion of Segment 4 of the proposed route are primarily agriculture and undeveloped/open-space.

The eastern portion of Segment 4 and all of Segment 5 include the developed urban residential and commercial areas of Chaska.

Segment 6 transects the Minnesota River valley and is primarily undeveloped with the exception of some private land parcels in Scott County where agriculture and mining have occurred.

There are currently 24 residences or farmsteads and one business within 100 feet of the existing 69 kV line; the closest commercial structure to the existing 69 kV line is approximately 32 feet from the line (Segment 4) near the intersection of Chestnut Street and 6th Street (Chaska Boulevard) in the city of Chaska. The closest residence is also within Segment 4 (at 404 Creek Lane) and is located 39 feet from the existing 69 kV line and is on the north side of Chaska Boulevard, west of the intersection with Chestnut Street.

The numbers of structures located within various distances from the project are shown in **Table 14**.

Table 14. Distance to Structures

Segment	Number of Farmsteads or Residences within 0-25' of Anticipated Alignment	Number of Commercial Operations within 0-25' of Anticipated Alignment	Number of Farmsteads or Residences within 26-50' of Anticipated Alignment	Number of Commercial Operations within 26-50' of Anticipated Alignment	Number of Farmsteads or Residences within 51-100' of Anticipated Alignment	Number of Commercial Operations within 51-100' of Anticipated Alignment	Number of Farmsteads or Residences within 101-200' of Anticipated Alignment	Number of Commercial Operations within 101-200' of Anticipated Alignment
1	0	0	0	0	1	0	9	0
2	0	0	0	0	2	0	2	1
3	0	0	0	0	1	0	0	0
4	1	1	10	2	11	3	28	9
5	0	0	0	0	12	1	13	5
6	0	0	0	0	0	0	0	1
Total	**1**	**1**	**10**	**2**	**27**	**4**	**52**	**12**

Potential Impacts

The Applicant's preferred alignment minimizes new impacts to existing land uses by following existing transmission line ROW for much of its length.
As discussed in Section 3.2 Right-of-Way Requirements, the Applicant will need to acquire new or up-date existing easements for the HVTL right-of-way if a route permit is granted.

An easement is an interest in land purchased by a utility, which permits the use of that land for a specific purpose. In this case, Xcel Energy's easement would permit construction, operation and maintenance of an overhead transmission power line. The easement also permits the trimming and removal of trees within the easement to prevent them from touching the line.

The existence of a transmission line easement restricts some possible uses for the property. Acceptable uses within the easement areas include planting crops, pasture, roadways, curbs and gutters. The two most common restrictions would include prohibiting construction of permanent structures or buildings within the easement area and restrictions on planting trees that may grow into the lines; properties with existing structures very close to or within the current ROW may have further restrictions placed on them.

The project would be design to meet or exceed the clearance standards provided in NESC Section 232 for a 115 kV transmission line, which require a 9' 1'' horizontal distance between the conductor and a building; a 15' 1'' vertical distance between the conductor and a roof/balcony accessible by people; and a 20' 1'' vertical distance between the conductor and a roadway or parking lot.

Another concern associated with transmission lines includes potential effects on the availability of federal assistance mortgage loan insured by the Federal Housing Administration (FHA) as well as the availability of the Housing and Urban Development (HUD) backed mortgages for development of high density residential and/or mixed use developments. See *Section 6.2 Socioeconomics*, for a detailed discussion on this matter.

Impacts of the new HVTL ROW are expected to be minimal because the line is adjacent to roadways through these areas.

Mitigative Measures

In general, the rebuild portions of the line would not create new impacts on existing or proposed land use; therefore, no mitigation would be necessary for the majority of the proposed rebuild portions (Segments 1, 2, 4, and 6). However, potential impacts to those properties with existing structures very close to or within the current ROW (Segment 4) may require mitigative measures.

Regarding the property at 404 Creek Lane (Segment 4), the proposed realignment shifts the existing alignment approximately 20 to 25 feet south and tapers back to the existing alignment to the east and west to increase the distance between the transmission line and the residential structures at 404 Creek Lane. Existing easements would need to be modified on two parcels to accommodate this proposed realignment.[27]

Chris Rogers, Xcel Energy Land Agent, has been in contact with the landowner at 404 Creek Lane and the landowner has expressed agreement with regard to the proposed realignment.[28]

These measures would be developed through final design efforts such as placing the conductors on a single side of the support towers, adjustments in final alignment within the proposed route,

[27] Xcel Energy correspondence with DOC EFP, March 22, 2013
[28] Ibid

ROW sharing/overlap with existing infrastructure, and selection of span width and tower placement. Such measures may be specified as a condition of the HVTL Route Permit.

Xcel Energy stated in the application that it would work with Scott and Carver counties, city staff and business owners to ensure that impacts to land use from the construction of the line are minimized and addressed.

6.11 Public Services and Transportation

The city of Chaska provides water, sewer and electrical service to its residents. Outside the city limits, along the transmission route, private wells and septic systems are common. Based on comments provided by city staff, the city supports the need for a new substation and transmission to serve the United Health Data Center and the area.

No public utility or road improvement projects are currently planned for the area near the existing 69 kV transmission line within Chaska.

The city of Chaska is also working with the Minnesota Department of Transportation on the development of an interchange at State Trunk Highway 212 (TH 212) and County Road 140 (CR 140). Portions of the proposed transmission line cross and/or directly abut TH 212 starting at Creek Road and running south to CR 140.

That portion of TH 212 is a control-of-access freeway; Minnesota Rules 8810.3300, Subp. 4, requires that utilities such as Xcel shall be located outside the control-of-access lines when paralleling such highways. MnDOT has adopted a formal policy and procedures for accommodation of utilities on the highway rights-of-way (Utility Accommodation Policy). A copy of MnDOT's policy can be found at:

http://www.dot.state.mn.us/utiIity/files/pdflappendix·b.pdf

Potential Impacts

Ongoing and future road projects within the general area are not anticipated to affect the planning or construction of the proposed transmission line upgrade project. No impacts are anticipated to public services due to construction or operation of the proposed project.

Mitigative Measures

Minimal to no impacts to public services are anticipated to occur as a result of the proposed project. Xcel Energy has stated that it will work with Carver County to coordinate structure placement with the reconstruction project proposed for CSAH 11 between CSAH 61 and CSAH 10 (Engler Blvd.) Based on the proposed CSAH 11 project, no significant conflicts with the project are anticipated. Future planning for state highway improvement or re-alignments is

expected to be negotiated under MnDOT's Accommodation Policy. Transmission line planning will be conducted in accordance with MnDOT policies.

6.12 Archaeological and Historic Resources

During the applicant's pre-planning phase, the Minnesota State Historic Preservation Office (SHPO) was contacted to solicit comment regarding the potential need for cultural resource surveys. A search of the SHPO database was conducted in order to identify previously-documented sites within one mile of the project. A radius of one mile was used in order to determine the types of archaeological and historic resources, both identified and unidentified, that are likely to be found in the area that could be affected by the project.[29]

Twenty archaeological sites and 273 inventoried historic architectural properties located within one mile of the project. Of the 20 archaeological sites, nine consist of prehistoric artifacts scatters, two are single artifact finds, five are a historical documentation records, and four are earthworks. One of the archaeological sites (Site 21CR0002- an earthwork) has been listed on the National Register of Historic Places (NRHP). Of the 273 historic architectural resources identified in the records review, 32 are listed on the National Register of Historic Places (NRHP) and three are Considered Eligible Findings (CEF) by the SHPO.[30]

Forty-three of the 293 cultural resources that were identified to be within one mile of the proposed project are located within the requested route widths of 200-feet (rebuild portion) and 400-feet (new construction). Of the 43 properties located within the requested route width, none have been formally evaluated or considered for eligibility for listing on the National Register of Historic Places. None of the historic architectural resources will be directly impacted by construction of the project. Three of the archaeological sites (21CR0101, 21SC0026, and 21SC0091) are within the requested route width but lie outside the anticipated alignment/ROW.

A summary of the inventoried archaeological and architectural sites is provided in **Table 15**.

Table 15. Previously Identified Archaeological Properties

Property Name	Inventory Number	Description	Status
	21CR0002	Earthwork	NRHP
Gestach	21CR0020	Lithis Scatter	unevaluated
	21CR0070	Single Artifact	unevaluated
	21CR0087	Lithic Scatter	unevaluated
	21CR0094	Earthwork	unevaluated
Hutchinson	21CR0101	Lithic Scatter	unevaluated
	21CR0102	Lithic Scatter	unevaluated
Engler Boulevard West	21CR0135	Single Artifact	unevaluated

[29] RPA, Appendix I
[30] RPA, Appendix I

Property Name	Inventory Number	Description	Status
Chaska Heights	21CR0138	Lithic Scatter	unevaluated
Chaska Heights II	21CR0139	Lithic Scatter	unevaluated
	21CR0151	Lithic Scatter	unevaluated
Augusta	21CRd	Historic Documentation	unevaluated
Oliver Faribault Post	21CRv	Historic Documentation	unevaluated
Thomas Holmes Post	21CRw	Historic Documentation	unevaluated
Mission of St. Francis Xavier	21CRx	Historic Documentation	unevaluated
Chaska Ferry	21Cry	Historic Documentation	unevaluated
	21CRap	Earthwork	unevaluated
Malkerson	21SC0026	Earthwork	unevaluated
Malkerson	21SC0064	Artifact Scatter	unevaluated
Highway 42 Trail	21SC0091	Lithic Scatter	unevaluated

A list of the 273 inventoried historic architectural properties can be found in Appendix I.2 of the Route Permit Application.

Potential Impacts

All of the 293 cultural resource properties identified are located outside the anticipated 75 foot transmission line right-of-way and will not experience direct impacts resulting from the construction of this project.

Further, the existing and proposed transmission route in proximity to the listed or eligible properties will consist of transmission line rebuild. The proposed construction will constitute the replacement of pre-existing features and not create new indirect visual impacts.

Mitigative Measures

Avoidance of archaeological and historic architectural properties is the preferred mitigative policy which Xcel Energy follows for all of its construction projects.

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

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

6.13 Natural Environment

Air Quality

There are minimal air quality impacts associated with transmission line construction and operation. The only potential air emissions from a transmission line result from corona. Corona can produce ozone and oxides of nitrogen in the air surrounding the conductor. Corona consists of the breakdown or ionization of air in a few centimeters or less immediately surrounding conductors. For 115/115 kV double-circuit, 115 kV single-circuit and 161 kV single-circuit transmission lines, the conductor gradient surface is usually below the air breakdown level.

Calculations done for a 345 kV project showed that the maximum one hour concentration during foul weather (worst case) would be 0.0007 ppm ozone. This is well below both the federal (0.075 ppm 8 hour) and state standards (0.08 ppm 8 hour) for ozone.

The Henshaw Effect is a theory that fine particulates already present in the air surrounding HVTLs may become ionized from HVTL corona. Ionization of the particulates is believed by Dr. Denis Henshaw, HH Wills Physics Laboratory, University of Bristol, United Kingdom, to increase the deposition of the fine particulates within the lungs. Fine particulates may be comprised of polycyclic aromatic hydrocarbons. The increased deposition may lead to increased lung disease and cancer rates.

Temporary fugitive dust emissions from construction activities may occur. Along the proposed route, clearing vegetation and driving the utility poles may create exposed areas susceptible to wind erosion. In addition, tailpipe emissions may generate exhaust from the construction vehicles.

Fugitive dust is considered particulate matter under air quality regulations. The concentrations of fugitive dust that is fine particulate matter (PM less than 2.5 microns or PM2.5) is generally small, or approximately three percent to ten percent of total particulate matter (USEPA's AP-42, Sections 13.2 and 11.9). Since fine particulate matter has the potential to travel further into the lungs, it is of greater concern than larger particle size ranges.

Potential Impacts

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The national standard is 0.08 ppm on an eight-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest eight-hour daily maximum average in one year. Calculations using the Bonneville Power Administration (BPA) Corona and Field Effects Program Version 3 (USDOE, BPA Undated) for a standard single-circuit 161 kV project, predicted the maximum concentration of 0.007 ppm near the conductor and 0.0003 ppm at one meter above ground during foul weather or worst-case conditions (rain at 4 inches per hour). During a mist rain (rain at 0.01 inch per hour), the maximum concentrations decreased to 0.0003 ppm near the conductor and 0.0001 ppm at one

meter above ground level. For both cases, these calculations of ozone levels are well below the federal and state standards. Studies designed to monitor the production of ozone under transmission lines have generally been unable to detect any increase due to the transmission line facility. Given this, there would be no impacts relating to ozone for the project.

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

Mitigative Measures

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

There would be no significant impacts to air quality; therefore, no mitigation beyond BMPs would be necessary.

Water Quality

Surface Water and Wetlands

According to FEMA Flood Insurance Rate Maps (FEMA, 1992), the proposed route crosses the 100-year floodplains of Chaska Creek and the Minnesota River, and the 500-year floodplain of the Minnesota River.

The floodplain crossings of Chaska Creek and its tributaries (Segments 1 to 3a) occur primarily in agricultural land and in conjunction with existing roadways. The Minnesota River floodplain crossing occurs primarily in residential areas near downtown Chaska (Segments 4 to 5a), with the remainder of the floodplain crossing (Segment 6) parallel to an existing utility as it extends through the undeveloped portion of the Minnesota River forested floodplain. Overall, there are a total of 71 acres of 100 year floodplain and 13 acres of 500-year FEMA floodplain within the requested route width. Floodplain crossings within the proposed route are listed in **Table 16**.

Various large wetland complexes and small isolated wetlands are located along the proposed route; these wetlands tend to be associated with major water features (i.e., Aue Lake, Chaska Creek and its tributaries, and the Minnesota River).

Table 16. Floodplain Crossings by Segment

Segment ID	500-yr[1]		100-yr	
	Occurrence	Length (ft)	Occurrence	Length (ft)
Segment 1	0	0	2	1600
Segment 2	0	0	1	761
Segment 3	0	0	1	1102
Segment 3a	0	0	1	103
Segment 4	1	2435	1	2391
Segment 5	2	574	1	3069
Segment 5a	1	1325	2	760
Segment 6 Carver	0	0	1	3250
Segment 6 Scott	NA	NA	1	1051
Total	**4**	**4,334**	**11**	**14,087**

[1]500-year flood plain information is not available for Scott County.

The applicant, in preparation of the RPA, utilized GIS data from the National Wetlands Inventory (NWI) to determine the wetlands within the request route widths (200' and 400') for the project; upon receipt of a HVTL Route Permit field verification may be necessary in some areas along the specified route.

A total of 26 individual wetlands were identified within the requested route. These wetlands consisted of 14 different classifications; all but two were classified as Palustrine (marsh) type wetlands. The other wetlands were classified as Lacustrine (associated with lake systems) and Riverine (associated with river systems).

Overall, the proposed route is approximately 12.75 miles long with a route width that encompasses approximately 334 acres, of which 24.29 acres (7.3 percent) are wetlands.

Most potential effects on surface waters will be related to reconstruction of the transmission line across wetlands proximal to the existing transmission corridor. The project could require wetland and water resource approvals from the U.S. Army Corps of Engineers (USCOE), MnDNR, Carver County, and Scott County. These agencies administer regulatory programs of the federal Clean Water Act and Rivers and Harbors Act, the Minnesota Public Water Resources Act and Utility Crossing Licenses, and the Minnesota Wetland Conservation Act (WCA).

Wetlands that were identified through the NWI system as being located within the requested route width are listed in **Table 17** and shown in Figures 2 through 8.

The MnDNR Public Waters Inventory (PWI) identifies Public Wetlands, Waters and Watercourses. The route width of the proposed project intersects two Public Waters, and two Watercourses (Chaska Creek and its tributaries and the Minnesota River and its tributaries).

Table 17. Wetlands Identified within the Requested Route Width of the Project

County	Wetland Classification	Count	Approx. Area (Acres)
Carver	L1UBH	1	2.40
Carver	PEMA	2	4.54
Carver	PEM/SS1C	1	0.84
Carver	PEM/SS1Cd	1	2.97
Carver	PEMC	7	0.89
Carver	PEMCd	4	5.53
Carver	PFO1C	2	4.01
Carver	PSS1C	1	0.11
Carver	PUBG	1	0.14
Carver	PUBGd	1	1.36
Carver	PUBGx	1	0.01
Carver and Scott	R2UBH	1	0.81
Scott	PUB/EMF	1	0.19
Scott	PEMC	1	0.49
Total		**26**	**24.29**

P – Palustrine, L – Lacustrine, R – Riverine. In 1979, a comprehensive classification system of wetlands and deepwater habitats was developed for the U.S. Fish and Wildlife Service (Cowardin et al. 1979).

There are five intersects with unnamed tributaries to Chaska Creek, five intersects of Chaska Creek, two intersects with tributaries to the Minnesota River (also referred to as Chaska Creek East), and one intersect with the Minnesota River.

Potential Impacts

The majority of the project proposes to replace an existing line with structures that have a similar footprint; therefore, the project would not result in any substantial, permanent wetland impacts or changes. Minimal temporary impacts to wetlands may occur from construction activities and access to the line. Minimal temporary impacts to wetlands may occur if these areas need to be crossed during construction of the transmission ROW. However, the crossing wetlands during construction will be avoided to the greatest extent feasible.

During construction, there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading and construction traffic. As a standard HVTL Permit condition, the Applicant would be required to employ erosion control BMPs; as well as, adherence to the terms and conditions of the National Pollution Discharge Elimination System (NPDES) permits and Stormwater Pollution Prevention Plan (SWPPP).

After construction, maintenance and operation activities for substation or transmission line facilities are not expected to have an adverse impact on surface water quality. The small

increase in impermeable surface area, resulting from construction and expansion of the project substations, could increase the likelihood of sediment in runoff reaching surface water features. However, the majority of the substation areas would remain as permeable surfaces. BMPs would be employed and erosion potential is not expected to be higher than under the existing land use at the sites.

Mitigative Measures

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

- When possible, construction would be scheduled during frozen ground conditions.
- Crews would attempt to access the wetland with the least amount of physical impact to the wetland (e.g., shortest route).
- The structures would be assembled on upland areas before they are brought to the site for installation.
- When construction during winter is not possible, plastic mats would be used where wetlands would be impacted.

The transmission line rebuild may require waters and wetlands permits, letters of no jurisdiction, or exemptions from the USCOE, MnDNR Division of Waters, and Carver or Scott counties. Wetland and surface water impacts will be avoided and minimized to the extent practicable. After coordination and application submission, authorization from the USCOE would likely fall under a Letter of Permission (LOP-05-MN) or the utility line discharge provision of a Regional General Permit (RGP-3-MN). The MnDNR Division of Waters requires a Public Waters Work Permit for any alteration of the course, current, or cross-section below the ordinary high water level of a Public Water or Watercourse. No such alterations are anticipated. Carver and Scott counties administer the WCA in the project area. It is likely that wetland impact minimization will allow the project to be eligible for a WCA de minimis or utilities exemption. If that is not the case, WCA permits will be required.

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

The MPCA regulates construction activities that may impact storm water under the Clean Water Act. It is anticipated that a National Pollution Discharge Elimination System (NPDES) construction storm water permit and Stormwater Pollution Prevention Plan (SWPPP) will be required for the project; as a standard HVTL Permit condition Xcel Energy will obtain the permit and develop a SWPPP as needed. An NPDES permit is required for owners or operators for any construction activity disturbing: 1) one acre or more of soil; 2) less than one acre of soil if that activity is part of a "larger common plan of development or sale" that is greater than one acre; or 3) less than one acre of soil, but the MPCA determines that the activity poses a risk to water resources.

Flora

Land cover in the project area consists of cropland, grassland, wetland, and small areas of woodland and residential/industrial development. Cropland consists of primarily corn and soybeans. Grasslands are dominated primarily by smooth brome, Kentucky bluegrass, red clover, alfalfa, and goldenrod. Reed canary grass, cattail, cottonwood, sandbar willow, and sedges are the primary species in wetlands. Native grassland is relatively scarce in the project area. Transmission line construction impacts to trees and woodlands will be minimized because the transmission line rebuild will follow existing right-of-way.

New transmission line ROW will be created in Segments 3 and 5; the land use within proposed route Segment 3 is primarily agricultural. The proposed route within Segment 5 lies within the city of Chaska; the anticipated alignment in this segment extends northeast, from the Chaska Substation, parallel to the south side of the railroad tracks along Chaska Blvd. From here the anticipated alignment extends south then east along the east side of Maple Street (adjacent to Firemen's Park II), crosses east Chaska Creek and then extends south along the east side of Beech Street to 2nd Street where it rejoins the existing 69 kV ROW (i.e., proposed route Segment 6).

Potential Impacts

The majority of flora within habitats in the project area is typical of what will be found in agricultural and rural settings. Since the project would be built along the existing 69 kV transmission line ROW and new construction would be in agricultural areas (Segments 3) or within the city of Chaska (Segment and 5) of the project, no additional impacts are anticipated to native vegetation.

There is potential for significant tree clearing along the western boundary of Firemen's Park II; see *Section 6.8 Recreation* for a detailed discuss of these impacts.

Permanent impacts would be minor since the transmission line would be constructed on an existing utility ROW. Additionally, no new ROW would be cleared in forested areas along the rebuild portions, resulting in minimal impacts to this resource. Temporary impacts may occur due to activities associated with pole construction, including minor vegetative clearing for excavation, leveling and heavy equipment traffic. Vegetative clearing would include felling

trees along the existing transmission line route and temporarily trimming or removing any shrubs or tall grass. Similar to existing maintenance practices, trees that would grow to taller than 15 feet would be removed beneath the overhead lines.

Mitigative Measures

During construction of the transmission line, impacts to forestry and vegetative resources would be avoided whenever possible. Xcel Energy intends to utilize the existing ROW where clearance requirements have been followed for many years. Additionally, Xcel Energy would maintain sound water and soil conservation practices during construction and operation of the project to protect topsoil and adjacent water resources, and minimize soil erosion. Areas disturbed due to construction activities would be restored to pre-construction contours. In non-cultivated areas, reseeding would occur in a timely manner using a seed mix certified to be free of noxious weeds, if acceptable to the affected landowner.

Fauna

There are no Wildlife Management Areas (WMA), Waterfowl Production Areas or Game Refuges within one mile of the requested route. The Minnesota Valley National Wildlife Refuge (Chaska Unit) is located approximately 0.5 miles south of the requested route along the west bank of the Minnesota River. The Chaska Unit occupies a bend in the Minnesota River stretching between the towns of Chaska and Carver. It consists of about 600 acres of lake, marsh, old fields, and river bottom hardwood forest. There are ample opportunities for observing waterfowl, shorebirds and other waders during spring, late summer, and fall. The fields are being restored to floodplain forest. A two mile (3 km) trail runs through these habitats. There is parking at either end, at the Chaska Ballpark and Riverside Park in Carver

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

Wildlife that resides within the construction zone will be temporarily displaced to adjacent habitats during the construction process. It is anticipated that fish and mollusks that inhabit the local watercourses will not be affected by transmission line rebuild or new lines.

The reconstructed transmission line may affect raptors, waterfowl and other bird species. Birds have the potential to collide with all elevated structures, including power lines. Avian collisions with transmission lines can occur in proximity to agricultural fields that serve as feeding areas, wetlands and water features, and along riparian corridors that may be used during migration.

The electrocution of large birds, such as raptors, is more commonly associated with small distribution lines than large transmission lines. Electrocution occurs when birds with large

wingspans come in contact with two conductors or a conductor and a grounding device. Utility transmission and distribution line design standards provide adequate spacing to eliminate the risk of raptor electrocution and will minimize potential avian impacts of the proposed project.

In 2002, Xcel Energy, entered into a voluntary with the U.S. Fish and Wildlife Service (USFWS) to address avian issues throughout its service territories. The memorandum of understanding sets forth standard reporting methods and the development of Avian Protection Plans (APP) for each state that Xcel Energy serves. APPs include designs and other measures aimed at preventing or minimizing avian impacts.

In an email dated April 25, 2011, from Andrew Horton, USFWS Fish and Wildlife Biologist, Mr. Horton stated that according to USFWS records, there were no federally listed or proposed species and/or designated or proposed critical habitat within the requested route. The USFWS did recommend that bird flight diverters be installed on the shield wire of the transmission line crossing the Minnesota River to minimize avian strikes.

Potential Impacts

There is minimal potential for the displacement of wildlife and loss of habitat from construction of the project. Wildlife that inhabits natural areas such as meadows, rivers and lakes could be impacted in the short-term within the immediate area of construction. The distance that animals would be displaced would depend on the species. Impacts to wildlife are anticipated to be short-term since the route primarily would be constructed along an existing transmission line ROW, and the amount of grading and clearing required is minimal. Additionally, the animals in the areas where new construction would occur would be typical of those found in agricultural and rural settings. The new construction should not affect these animals because rural agricultural habitat would remain in the immediate vicinity. Impacts to the wooded areas along the project route would be avoided when possible.

Raptors, waterfowl and other bird species may also be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission line. Waterfowl are typically more susceptible to transmission line collision, especially if the line is placed between agricultural fields that serve as feeding areas, or between wetlands and open water which serve as resting areas.

The shield wire of an overhead transmission line is the most difficult part of the structure for birds to distinguish. Xcel Energy has successfully reduced collisions on certain transmission lines by marking the shield wires with Swan Flight Diverters (SFD), which are pre-formed spiral shaped devices made of polyvinyl chloride that are wrapped around the shield wire. Xcel Energy has reviewed the proposed route for areas with potential avian issues and has identified areas where SFDs might be warranted.[31] These areas include the portion of the transmission line rebuild that crosses over the Minnesota River and Aue Lake.

[31] RPA Appendix B-1 Environmental Features Maps

Mitigative Measures

Xcel Energy has been working with various state and federal agencies over the past 20 years to address avian issues. In 2002, Xcel Energy Inc.'s operating companies entered into a voluntary memorandum of understanding to work together to address avian issues through its territory.

As discussed above, the Applicants will install SFDs in this area as recommended by the USFWS and the Minnesota DNR. Xcel Energy will work closely with the MnDNR and USFWS regarding the location of bird flight diverters once the line design is complete.

With regard to other wildlife species, it is anticipated that any habitat displacement resulting from the proposed project will be temporary. Therefore, no wildlife mitigation measures are proposed.

6.14 Rare and Unique Natural Resources

There are thirty-two known occurrences of rare or unique resources identified within 1.5 miles of the project area **Table 18**. These resources were identified using the MnDNR Natural Heritage Database.

These occurrences include three (3) vertebrate species, thirteen (13) invertebrate species, six (6) native plant communities of undetermined class, one (1) Northern Poor Fen Class, two (2) vascular plant species, and one (1) bat colony. Eleven (11) of the thirty-two records are located within 0.5 miles of the requested route and include: Rock Pocketbook (2 records), Yellow Sandshell, Shovelnose Sturgeon (2 records), Wartyback, Mucket, Sessile-flowered Cress, one poor fen, and two native plant communities of an undetermined class. One native plant community consists of Oak Forest (Big Woods) Mesic Subtype and is located approximately 0.25 miles southwest of the west end of the project. The other is a Red-White Oak (Sugar Maple) Forest Type and is located approximately 0.50 miles west of Segment 2.

Table 18. Rare and Unique Resources in the Vicinity of the Project

Common Name	Scientific Name	Type	MN Status [1]	Federal Status	Last Obs.	Proximity (Miles)
Bald Eagle	*Haliaeetus leucocephalus*	Vertebrate Animal	SC		2007	1.0-1.5
Paddlefish	*Polyodon spathula*	Vertebrate Animal	THR		12/04/2001	0.5-1.0
Shovelnose Sturgeon	*Scaphirhynchus platorynchus*	Vertebrate Animal	NON		08/26/1982	1.0-1.5
Shovelnose Sturgeon	*Scaphirhynchus platorynchus*	Vertebrate Animal	NON		06/05/1987	0.0-0.5

Common Name	Scientific Name	Type	MN Status [1]	Federal Status	Last Obs.	Proximity (Miles)
Shovelnose Sturgeon	*Scaphirhynchus platorynchus*	Vertebrate Animal	NON		9/30/1999	0.0-0.5
Shovelnose Sturgeon	*Scaphirhynchus platorynchus*	Vertebrate Animal	NON		08/19/1982	1.0-1.5
Shovelnose Sturgeon	*Scaphirhynchus platorynchus*	Vertebrate Animal	NON		08/14/1998	1.0-1.5
Bat Concentration	*Bat Colony*	Animal Assemblage			06/08/2000	0.5-1.00
Pistolgrip	*Tritogonia verrucosa*	Invertebrate Animal	THR		08/17/1989	1.0-1.5
Rock Pocketbook	*Arcidens confragosus*	Invertebrate Animal	END		Pre-1989	0.0-0.5
Rock Pocketbook	*Arcidens confragosus*	Invertebrate Animal	END		Pre-1989	0.0-0.5
Round Pigtoe	*Pleurobema coccineum*	Invertebrate Animal	THR		08/16/1989	1.0-1.5
Wartyback	*Quadrula nodulata*	Invertebrate Animal	END		09/20/2000	0.0-0.5
Yellow Sandshell	*Lampsilis teres*	Invertebrate Animal	END		10/09/1989	0.0-0.5
Black Sandshell	*Ligumia recta*	Invertebrate Animal	SC		08/17/1989	1.0-1.5
Ebonyshell	*Fusconaia ebena*	Invertebrate Animal	END		08/17/1989	1.0-1.5
Elktoe	*Alasmidonta marginata*	Invertebrate Animal	THR		08/16/1989	1.0-1.5
Fluted-shell	*Lasmigona costata*	Invertebrate Animal	SC		08/17/1989	1.0-1.5
Hickorynut	*Obovaria olivaria*	Invertebrate Animal	SC		08/16/1989	1.0-1.5
Higgins Eye	*Lampsilis higginsi*	Invertebrate Animal	END	LE	PRE-1989	1.0-1.5
Monkeyface	*Quadrula metanevra*	Invertebrate Animal	THR		08/17/1989	1.0-1.5
Mucket	*Actinonaias ligamentina*	Invertebrate Animal	THR		08/17/1989	0.0-0.5
Mucket	*Actinonaias ligamentina*	Invertebrate Animal	THR		08/17/1989	1.0-1.5
American Ginseng	*Panax quinquefolius*	Vascular Plant	SC		06/06/1995	1.0-1.5
Sessile-flowered Cress	*Rorippa sessiliflora*	Vascular Plant	SC		07/1891	0.0-0.5
Native Plant Community, Undet. Class	*Not Applicable*	Community			06/06/1995	0.5-1.0
Native Plant Community, Undet. Class	*Not Applicable*	Community			9/14/1995	0.0-0.5

Common Name	Scientific Name	Type	MN Status [1]	Federal Status	Last Obs.	Proximity (Miles)
Native Plant Community, Undet. Class	*Not Applicable*	Community			06/06/1995	1.0-1.5
Native Plant Community, Undet. Class	*Not Applicable*	Community			06/06/1995	0.0-0.5
Native Plant Community, Undet. Class	*Not Applicable*	Community			06/06/1995	0.5-1.0
Native Plant Community, Undet.	*Not Applicable*	Community			06/06/1995	1.0-1.5
Northern Poor Fen	*Northern Poor Fen Class*	Community			07/08/1998	0.0-0.5

Source - RPA

Potential Impacts

In general, impacts to rare and unique natural resources would be avoided because the project is a rebuild of an existing line along most of the route. The area of new HVTL construction would occur in an agricultural area where native species are not likely to occur.

Mitigative Measures

The environmental review process is designed to identify rare species and unique natural resources so that the various routing options can be designed to avoid encroachment and effects on these items to the greatest extent practicable. If through environmental review, rare species or unique natural resources are identified that will be affected, the HVTL Route Permit will require that Xcel Energy coordinate with the MnDNR and consider modifying either the construction footprint or the construction practices to minimize impacts.

7.0 Potential Impacts Comparison of Alternate Routes

In the Alternative Routing Process, applicants are not required to provide any routes for review other than their proposed, preferred route. However, alternatives are often brought forward during the scoping processes by concerned citizens or local governments. In this case, three alternatives were developed through the scoping process and carried forward into the *Scoping Decision* for further consideration. Descriptions of these alternatives are presented in Section 5; potential impacts are discussed below.

7.1 Ernst Alternatives

In his written comments and supporting material, Mr. Gene Ernst put forth one alternative route segment and two alignment modifications for evaluation in the environmental review document (Figure 12). Mr. Ernst's suggested alterations are to Segment 4 of Xcel Energy's proposed rebuild project.

The Ernst Alternative Route Segment departs from the existing 69 kV line (and Xcel Energy's proposed route) at the intersection of Creek Road and Chaska Boulevard. The existing 69 kV line (and Xcel Energy's proposed route) turns east at this intersection and runs along the north side of Chaska Boulevard, crossing to the south side of Chaska Boulevard at North Walnut Street, just prior to entering the existing Chaska Substation.

The Ernst Alternative Route Segment continues south, along the east bank of Chaska Creek (water course diversion), through the intersection of Creek Road and Chaska Boulevard for approximately 700 feet to intersect with the "abandoned" Union Pacific Railroad right-of-way (ROW), at this point the route turns east and follows the railroad ROW for approximately 2,100 feet to the existing Chaska Substation.

For this alternative route segment a 200 foot wide route is being considered, incorporating ROW sharing and a cantilever structure design (i.e., conductors and davit arms on one side of the transmission line poles away from residences and buildings) along the Chaska Creek (water course diversion) and the railroad ROW; evaluating a route width wider than the actual ROW (75 feet) needed yields the flexibility to make alignment adjustments to work with landowners, avoid sensitive natural resource or cultural resource areas, and to manage construction constraints. The assessment of potential impacts utilized an alignment running along the west side of the Chaska Creek (watercourse diversion) and beginning on the north side of the abandoned railroad ROW, crossing to the south side at Pine Street (Figure 12).

The Ernst Alignment Modification-1 moves the alignment of the new 115 kV line to the south side of Chaska Boulevard between Creek Road and a point approximately 100 feet west of North Chestnut Street, where the alignment would cross back to the north side of Chaska Boulevard to rejoin Xcel Energy's proposed alignment.

The Ernst Alignment Modification-2 maintains the transmission line in its current alignment, but would relocate the structure which is currently in front of the Andrew Riedele House approximately 80 feet to the west

Xcel Energy has stated[32] that it can design the transmission line to move the existing pole off of the Ernst property as requested. Additionally, Xcel has stated that it may be possible to design the transmission line with cantilevers structures, which would place all of the conductors and davit arms on one side of the transmission line poles (i.e., the road side), potentially minimizing Xcel Energy's tree trimming and clearing needs on the Ernst property.

However, it should be noted that the existing 69 kV line along Chaska Boulevard has distribution under-build used by the city of Chaska to serve properties along Chaska Boulevard, including the Ernst property. The city has stated that it has no plans to relocate the distribution line in this location. Because the distribution line would continue to be located in front of the Ernst property regardless of the alignment or design of the proposed project, some tree trimming would continue to be required to meet the city's distribution line clearance requirements.

The following assessment corresponds to the Ernst Alternative Route Segment (relocate route south to the railroad right-of-way) and the Ernst Alignment Modification-1 (relocate the alignment to south side of Chaska Boulevard). As such, the assessment provides a comparison to the original Segment 4 route/alignment as proposed in the Route Permit application.

Rare and Unique Resources

There are 46 records of rare species, communities, or features within two miles of each of the proposed or alternate routes. Because the Original Segment 4 and the two alternates around the Ernst property are in close proximity to each other, the same 46 records occur within two miles of all three alternatives. Of the 46 records, 37 are invertebrate animal records from a statewide mussel survey site on the Minnesota River. The only known record within a half mile of each of the alternatives is a historic plant record from the late 1800s.

Public Waters

The same four wetlands occur along all three alternatives and cover the same area. The wetlands occur along the route west of the Ernst property (**Table 19**).

Chaska Creek (watercourse diversion) and Fireman's Clayhole (basin) are public waters that occur within 200 feet of each of the likely alternative centerlines. Each of the routes crosses Chaska Creek while Fireman's Clayhole is adjacent to and within the 200-foot route width of all of the potential alternatives.

[32] Letter from Xcel Energy to DOC, Supplemental Information for EA, January 24, 2013

Table 19. Comparison of Impacts – Public Waters

Public Water Inventory Type	Public Water Name	Public Water ID	Intersect ROW		
			Original Segment 4	Ernst Alternative Route Segment	Ernst Alignment Modification -1
Watercourse	Chaska Creek	-	Yes	Yes	Yes
Basin	Fireman's Clayhole	10-226 P	Yes	Yes	Yes

Public waters within the 200-foot route width (100' from either side of the likely centerline of the transmission line).

All three routing options cross a small section of 500-year floodplain associated with Chaska Creek (**Table 20**). The routes also cross 100-year floodplain associated with both Chaska Creek and the Minnesota River. Ernst Alternative Route Segment crosses the most floodplain, mostly as a function of it being a longer route.

Table 20. Comparison of Impacts – Public Waters - Floodplains

Segment	500-yr		100-yr	
	Occurrence	Length (ft)	Occurrence	Length (ft)
Original Segment 4	1	44	1	2391
Ernst Alternative Route Segment	1	44	1	3366
Ernst Alignment Modification -1	1	44	1	2464

Land Use

All three alternatives have similar land cover with *pasture/hay/cropland* and *developed/low intensity* ranking one and two, respectively. However, Ernst Alternative Route Segment has slightly more *developed/medium intensity* than the proposed Segment 4 or Ernst Alignment Modification -1 (**Table 21**).

Table 21. Comparison of Impacts – Land Cover

Cover Type	Approx Area (Acres)		
	Original Segment 4	Ernst Alternative Route Segment	Ernst Alignment Modification -1
Forest/Shrub land	12.45	12.45	12.45
Developed/High Intensity	9.45	10.19	9.43
Developed/Low Intensity	15.87	19.52	16.00

Cover Type			
Developed/Medium Intensity	9.26	12.75	9.77
Developed/Open Space	5.30	5.59	5.37
Herbaceous & Woody Wetlands	0.78	0.78	0.78
Open Water	0.22	0.22	0.22
Pasture/Hay/Cropland	36.70	36.70	36.70
TOTAL	**90.25**	**98.42**	**90.94**

National Agricultural Statistics Service (NASS) Classification within the 200-foot route width (100' from either side of the likely centerline of the transmission line).

All three alternatives have two inactive and one prospected aggregate source within one mile. Additionally, Ernst Alternative Route Segment has one active aggregate source within one mile (**Table 22**).

Table 22. Comparison of Impacts – Land Based Economies

Segment	Aggregate Source Status		
	Active Aggregate Source	Inactive Aggregate Source	Prospected Aggregate Source
Original Segment 4	0	2	1
Ernst Alternative Route Segment	1	2	1
Ernst Alignment Modification -1	0	2	1

Number of documented aggregate resources located up to one mile from either side of the route centerline.

All three alternative have residential and commercial properties along and adjacent to their respective alignments (**Table 23**); the Ernst Alternative Route Segment has the highest structure counts in each of the three distance categories of 50 feet, 100 feet, and 200 feet.

The method of determining the number of residential and commercial structures within a given distance from the anticipated centerline of the proposed route and alternative route segment is somewhat subjective in that there are several variables that may affect the structure counts.

The data was collected and assemble (by Xcel Energy and/or its consultants) using desktop GIS tools and available aerial imagery, rather than from actual survey data or in the field confirmation of structure locations. The aerial imagery/GIS desktop methodology does not account for elevation or topographic variations.

Additionally, structure counts are subject to variability based on differences in aerial imagery used for the analysis (dates, source, etc.). In some circumstances, judgment must be made as to whether or not to count a structure as being in or out of a given distance category. For purposes of calculating and developing Table 14 and Table 23, a conservative approach to tabulating structures was used. Specifically, if the line fell on or very near any portion of a structure on any

given property (i.e., house, commercial structure, garage, outbuilding), the residential or commercial structure was included to be within the closer distance category. For example, if a house is located 52 feet from the transmission line, but the garage is located 48 feet from the transmission line, that residential structure would included under the 26'-50' distance category.

While there is some subjectivity involved in the methodology and the exact counts, the overview map (**Figure 15**) gives a clear visual indication of the development density along each of the three segments analyzed in Table 23 (i.e., Original Segment 4, Ernst Alternative Segment, and Ernst Modification).

A detailed illustration of residential and commercial properties and their respective distances to the anticipated alignment of the Ernst Alternative Route Segment is presented in **Figure 16**.

Table 23. Comparison of Impacts – Proximity to Structures

	Number of Residences within 0-25' of Anticipated Alignment	Number of Commercial Operations within 0-25' of Anticipated Alignment	Number of Residences within 26-50' of Anticipated Alignment	Number of Commercial Operations within 26-50' of Anticipated Alignment	Number of Residences within 51-100' of Anticipated Alignment	Number of Commercial Operations within 51-100' of Anticipated Alignment	Number of Residences within 101-200' of Anticipated Alignment	Number of Commercial Operations within 101-200' of Anticipated Alignment
Original Segment 4	1	1	10	2	11	3	28	9
Ernst Alternative Route Segment	1	0	16	6	18	4	36	11
Ernst Alignment Modification -1	2	0	10	2	14	4	27	8

Recreation

All three alternatives are within 200 feet of three Chaska City Parks: Highland Park, Schimelpfening Park, and Fireman's Park I (**Table 24**).

Table 24. Comparison of Impacts – Recreation

Park	Municipality	Park Amenities																	
		Playfield	Picnic Shelter	Tennis Courts	Play Structure	Hard Courts	Picnic Area	Walking Trails	Biking Trails	Outdoor Hockey	Warming House	Parking	Fishing	Nature Area	Restrooms	Handicap Access	Garden	Boat Access	Skate Park	Volleyball Court
Original Segment 4																				
Highland Park	Chaska				X															
Schimelpfening Park	Chaska		X		X	X	X	X				X	X		X					X
Fireman's Park I	Chaska	X	X		X		X	X				X	X		X			X		X
Ernst Alternative Route Segment																				
Highland Park	Chaska				X															
Schimelpfening Park	Chaska		X		X	X	X	X				X	X		X					X
Fireman's Park I	Chaska	X	X		X		X	X				X	X		X			X		X
Ernst Alignment Modification -1																				
Highland Park	Chaska				X															
Schimelpfening Park	Chaska		X		X	X	X	X				X	X		X					X
Fireman's Park I	Chaska	X	X		X		X	X				X	X		X			X		X

Parks, Recreation Areas, and Preserves within the 200-foot route width (100' from either side of the centerline of the transmission line).

Cultural Resources

All three alternative have listed archaeological, considered eligible finding (CEF), and national register of historic places (NRHP) sites identified within 1 mile of the anticipated alignment (**Table 25**); there are no anticipated physical impacts to previously identified historic/cultural properties from any of the suggested alternatives.

New visual impacts to identified and unidentified historic architectural/cultural properties are not anticipated on any rebuild portions of the proposed route.

Table 25. Comparison of Impacts – Cultural Resources

	Number of Archaeological sites within 200' Route Width	Number of Archaeological sites within 1 Mile of Anticipated Alignment	Number of CEF Structures within 200' Route Width	Number of CEF Structures within 1 Mile of Anticipated Alignment	Number of NRHP Structures within 200' Route Width	Number of NRHP Structures within 1 Mile of Anticipated Alignment
Original Segment 4	0	7	0	1	0	8
Ernst Alternative Route Segment	0	4	0	1	0	8
Ernst Alignment Modification -1	0	4	0	1	0	8

Archaeological sites and inventoried historic structures within the 200-foot route width (100' on either side of transmission line) and 1 mile of the anticipated alignment.

8.0 Unavoidable Impacts

The rebuild portions (Segment 1, 2, 4, and 6) of the Chaska Area Transmission line project would have no significant unavoidable adverse impacts. It would not have the same level of impacts that are usually associated with the construction of new transmission line due to the fact that it is a rebuild of an existing line. As the project is a mostly a rebuild, the bulk of the new impacts would be related to those short term impacts that are associated with the construction of the transmission line project. The long term impacts of the transmission line, those related to land and visual impacts have already largely been realized with the existing line. As the majority of the proposed line would be located in essentially the same place as the existing line, the incremental long term impacts of changing out the structures would not result in significant changes.

The new construction portions (Segments 3 and 5) of the project would have similarly nominal unavoidable impacts.

Operating the transmission line at the higher voltage level of 115 kV would also not result in a significant environmental impact. In addition, the significant ROW sharing associated with this project would further mitigate the direct impacts associated with the construction of the new line.

In addition, there are few commitments of resources associated with this project that are irreversible and irretrievable, but those that do exist are primarily related to construction. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action.

Construction resources that would be used include aggregate resources, concrete, steel, and hydrocarbon fuel. These resources would be used to construct the project. During construction, vehicles would be traveling to and from the site utilizing hydrocarbon fuels.

Figures

Appendix A – Scoping Decision

Appendix B – Sample Route Permit