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ENVIRONMENTAL ASSESSMENT

In the Matter of the Great River Energy and Minnesota Power Route Permit Application for the Southdale to Scearcyville 115 Kilovolt Transmission Line Project

PUC Docket No. E-T2/TL-08-712
January 2009

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ABSTRACT

Pursuant to the provisions of Minnesota Statutes, chapter 216E, Great River Energy and Minnesota Power filed a route permit application with the Minnesota Public Utilities Commission (the Commission) on July 17, 2008, for the proposed Southdale to Scearcyville 115 kilovolt (kV) high-voltage transmission line and new Scearcyville breaker station.

Great River Energy and Minnesota Power propose to construct an approximate 9.3 mile 115 kV high-voltage transmission line and 115 kV breaker station in the city of Baxter and Sylvan Township in Crow Wing and Cass counties, Minnesota.

The project is being evaluated in conformance with the alternative review process (Minnesota Rules 7849.5500). The Office of Energy Security is the responsible government unit for preparing the environmental assessment required for a route permit under this process. An applicant is not required to propose any alternative routes or sites to the preferred under the alternative review process. The Commission has six months to reach a final decision on the route permit starting the date the Commission determined the route permit application complete.

Persons interested in these matters can register their names on the project docket webpage at http://energyfacilities.puc.state.mn.us/Docket.html?Id=19661 or by contacting: Scott Ek, Office of Energy Security, Energy Facilities Permitting, 85 7th Place East, Suite 500, St. Paul, Minnesota 55101 651.296.8813, scott.ek@state.mn.us.

Additional documents pertaining to this project can be found at the above website or by going to the following: https://www.edockets.state.mn.us/EFiling/search.jsp and entering docket number "08-712" under search criteria.

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1.0 INTRODUCTION

Great River Energy (GRE) and Minnesota Power (MP) have made application to the Minnesota Public Utilities Commission (PUC or the Commission) for a route permit under the alternative permitting process of the Power Plant Siting Act.

The permit application is for the construction, operation, and maintenance of a 9.3-mile 115 kilovolt (kV) transmission line and breaker station (Scearcyville breaker station). The applicants propose a transmission line route that would run between GRE's existing "CW-BS" 115 kV transmission line exiting the Southdale substation to a newly proposed Scearcyville substation. GRE will own and maintain the 115 kV transmission line and MP will own and maintain the underbuilt section of 34.5 kV distribution line and the new Scearcyville breaker station.

The applicants indicate that the addition of new electrical loads and an increase in demand from existing services are causing reliability/delivery concerns in the project area and the existing electrical systems (transmission lines, substations, etc.) are approaching their maximum electrical capacity. The proposed project would add a second 115 kV source to the area, providing for a more reliable transmission system.

Minnesota Office of Energy Security (OES) Energy Facility Permitting (EFP) is tasked with conducting environmental review of applications for 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.

This environmental assessment (EA) covers the required environmental review of the project and route permit application. Section 2 describes the proposed project, including location, route description, and right-of-way requirements. Section 3 provides information about the proposed engineering and operation design of the project. Section 4 describes the proposed construction and maintenance procedures. Section 5 provides information on the high voltage transmission line regulatory framework and route permit process. Section 6 summarizes the proposed routes affected environment. Section 7 identifies the human and environmental impacts of the proposed route. Section 8 describes the alternatives proposed during the scoping process and their impacts as compared to the proposed route. Section 9 identifies other permits and approvals required for the proposed project.

2.0 PROJECT DESCRIPTION

The applicants propose to construct approximately 9.3 miles of new 115 kV transmission line and build a new 115 kV breaker station (Scearcyville breaker station) to be located in Crow Wing and Cass counties, Minnesota. The proposed project would extend from the west side of Baxter to the north end of Sylvan Township and would parallel existing utility and county/state highway rights-of-way for approximately 95 percent of the project (Figure 1). The criteria used by the applicant in selecting the preferred route are as follows:

- Sharing existing road and utility rights-of-way;
- Overall length of transmission line route (area of impact and cost);
- Electric system performance issues (i.e. reliability issues and double circuit construction);
- Existing and future high-density residential areas;
- Limited horizontal clearance (trees and structures);
- Agricultural property with center pivot irrigation; and
- Environmentally sensitive areas: wetlands, state/federal lands, cultural/archaeological significant sites, endangered/special concern species.

2.1 PROJECT LOCATION

The proposed project is located in Cass and Crow Wing counties, Minnesota. The proposed transmission line route starts at the existing GRE "CW-BS" transmission line in the city of Baxter and would end at a newly proposed breaker station to be located in northern Sylvan Township.

Townships, ranges, and sections for the project are shown below in Table 1. A detailed depiction of the proposed project is presented on Figure 1.

Table 1: Project Location Data

County	City/Township	Township	Range	Section
Cass	Sylvan Township	133N	29W	5, 6, 7, 8, 16, 17, 18, 21
Crow Wing	Baxter	133N	29W	22, 23, 24

2.2 ROUTE DESCRIPTION

The transmission line route is broken down into three segments for purpose of analysis. A description of the proposed route by segment is provided below and is shown on Figures 2-4.

Segment 1

The proposed Southdale-Scearcyville transmission line route starts in the west Baxter area and connects with GRE's existing "CW-BS" 115 kV line approximately 1.5 miles south of where it exits the Southdale substation.

The proposed 115 kV line would proceed west for 3.3 miles following within the same right-of-way as MP's existing 34.5 kV distribution line. The new 115 kV structures would be designed to support an underbuild of the existing MP 34.5 kV distribution line (Figure 2).

Segment 2

Upon reaching County Road (CR) 36 the proposed 115 kV line would cease carrying MP's 34.5 kV distribution line and continue north along CR 36 for 1.6 miles. From CR 36 the route heads west across MP property crossing at a location approximately 50 feet south of the north property line for a distance of 0.5 miles. The line turns north at Little Pine Road and runs north approximately 0.3 miles to State Highway 210 and the Burlington Northern Santa Fe (BNSF) railroad (Figure 3).

Segment 3

The proposed transmission line would continue west following Highway 210 and the BNSF right-of-way for approximately one mile to CR 18. Upon reaching CR 18 the transmission line would turn north and again overtake an existing MP distribution line co-locating it on new 115 kV structures for 1.9 miles to MP's existing transmission right-of-way (230 KV, 115 kV, and 34.5 kV transmission lines). The proposed transmission line would turn northeast and parallel the existing MP transmission right-of-way for 0.6 miles connecting to the proposed Scearcyville breaker station. The newly proposed breaker station would be connected to MP's existing "24" line via two new 115 kV transmission line segments totaling 0.1 miles in length (Figure 4).

2.3 ROUTE WIDTH

The applicants are requesting a route of varying widths in order to allow for alignment of the transmission line and location of the breaker station that minimizes potential human and/or environmental impacts. The route widths are shown on Figures 2-4 and are described below.

A 100 foot route width is requested for all of Segment 1 with the exception of two locations. The 100 foot width is requested to allow for the potential relocation and underbuild of MP's existing 34.5 kV alignment to instead follow property lines in areas where it currently bisects property. Relocations would only be done if requested, reviewed, approved by the landowner. The 100 foot right-of-way is also requested to meet reliability and access issues with the new 115 kV line. MP currently has a 100 foot easement along the existing 34.5 kV line.

The two areas of Segment 1 where a route width greater than 100 feet is requested are a triangle-shaped area in the northeast quarter of the southeast quarter of Section 22, T133N, R29W (700 foot width) and the area from the Cass/Crow Wing border to CR 36, Section 21, T133N, R29W (450-650 foot width). Similar to the above, these larger route widths are requested so the new 115 kV with the 34.5 kV underbuild could be relocated from the existing alignment to follow property lines instead of bisecting property near Island Lake and through Potlatch Corporation.

There have been no formal requests to relocate the current 34.5 kV alignment, however the applicants request the larger route width to allow for the opportunity to relocate the alignment, if all parties agree. Should the new 115 kV line with the 34.5 kV underbuild be relocated in the proposed areas, the total overall distance of the project would increase to 9.5 miles and cost would increase to $7,658,000.

The applicants request a 200 foot route width, 100 feet on either side of the road centerline for the portion of Segment 2 that would run along CR 36. The 200 foot width is requested to allow for flexible alignment of the transmission line on either side of the road to minimize potential landowner and environmental impacts.

The area where the new line would traverse MP owned property between CR 36 and Little Pine Road, the applicants request a 100 foot route width for transmission design, tree clearance, and safety purposes.

To allow for flexible alignment of the transmission line on either side of the road, the applicants request a 140 foot route width, 70 feet on either side of the road centerline, along the portion of Segment 2 that would follow along Little Pine Road.

A 535 foot route width is requested by the applicants for the section of Segment 3 that would follow Highway 210. This width is requested to allow for flexibility during final alignment to accommodate potential issues arising from the existing BNSF railroad, Highway 210, and landowner concerns.

The applicants indicate that the portion of Segment 3 that would run along CR 18 would utilize existing road rights-of-way. To minimize potential landowner and environmental concerns the applicants request a route width of 180 feet along this portion of Segment 3 (90 feet on either side of CR 18 centerline), allowing for flexible alignment of the transmission line on either side of the road.

To accommodate reliability and safety concerns related to construction for the final section of Segment 3, the applicants are requesting a 400 foot route width centered on the existing MP transmission right-of-way to proposed substation. GRE and MP line and planning engineers have not decided where the new 115 kV line would be placed within the existing transmission right-of-way. Where the new line gets placed within this section of Segment 3 will depend on the final design conditions and location of the proposed breaker station. Because an exact location of the breaker station site is not known, it is unclear where the location of the 115 kV line will need to be to accommodate electrical safety considerations.

2.4 RIGHTS-OF-WAY

The right-of-way (easement) width requirement for the entire 115 kV transmission line project would range from 70 to 100 feet in width depending on reliability, safety, and structure design types. The 100 foot right-of-way may be needed in some areas of the route to accommodate longer spans or other special design requirements identified during the final survey and depends on conductor blowout and the recommended clearances to obstructions along the proposed route.

The portions of the proposed transmission alignment that would parallel CR 36, Little Pine Road, Highway 210, and CR 18 would be centered within a 70 foot right-of-way. The transmission line would be centered on a 100 foot right-of-way in Segment 1 where the new transmission line carries the MP 34.5 kV distribution line and follows the existing alignment and also the section of Segment 2 where the alignment crosses from CR 36 to Little Pine Road on MP owned property.

When the transmission alignment is adjacent to a Public Waters Inventory (PWI) water body, the right-of-way will be limited to 70 feet when within 100 feet of the PWI. H-frame structures, if used, would also require at least a 100 foot wide right-of-way.

2.5 PROPERTY/RIGHT-OF-WAY ACQUISITION

Should a route permit be issued, the applicants would commence the easement acquisition process. Typically, landowners are contacted to discuss the project details and initial site access for survey, staking, and soil investigation activities. Upon completion of preliminary design and survey, easement negotiations would ensue. The applicants would purchase easement rights from landowners for the transmission line right-of-way and secure fee interest from landowners for the breaker station. The easements would give GRE and MP the right to construct, operate, and maintain the transmission line within the defined right-of-way. The applicants work with landowners to negotiate the terms of new and existing easements that are acceptable to the landowner and the applicants. Landowners are provided with information regarding initial construction, powerline safety, damage mitigation and settlement, site access, vegetation removal, and other pertinent information.

3.0 Engineering and Operation Design

This section describes the transmission line and structures, capacity, and associated structures.

3.1 Transmission Line & Structures

High voltage transmission line circuits generally consist of three phases, each at the end of a separate insulator, and physically supported by structures. A phase consists of one or more conductors (single, double, or bundled). A typical conductor is a cable consisting of aluminum wires stranded around a core of steel wires. There may also be shield wires strung above the phases to prevent damage from potential lightning strikes. The shield wire could also include a fiber optic cable that allows for substation protection equipment to communicate with other terminals one the line. Transmission structures and line details are summarized in Table 2.

Conductors

The three phases for this project would each consist of one 795 steel supported aluminum conductor or ACSS. The ACSS conductors are 795,000 circular mils or approximately 1.1 inches in diameter and compromised of seven steel wires in the center surrounded by 26 aluminum strands. While similar to conventional aluminum conductor steel reinforced (ACSR), the ACSS conductor has increased conductivity, can operate at a higher temperature, and has less sag. Ultimately, the proposed 115 kV transmission line would be a single circuit three-phase, 60 Hz (hertz), alternating current line with a 34.5 kV distribution underbuild in up to two sections (Segment 1 and the existing 34.5 kV distribution line from CR 18 to the proposed Scearcyville breaker station).

Poles

The transmission line will be supported by single pole wood or steel structures with horizontal post insulators, which will be approximately two to four feet in diameter, span 300 to 400 feet in length, and range from 65 to 80 feet in height. In cases where longer spans are required, a braced post insulator design may be utilized. Areas where existing distribution lines are present the structures will be designed to accommodate the distribution lines in a stacked configuration below the 115 kV circuit (Figure 5) and will be slightly higher (75 to 90 feet). Anchors and support cables or specialty structures will be required where the transmission line alignment angles or turns.

In circumstances where exceptionally long spans are required to avoid wetlands and waterways or where topography is uneven, an H-frame structure design may be used. An H-frame structure would likely range from 60 to 80 feet in height and would allow for spans between 600 to 700 feet or more in length.

Table 2: Transmission Line Structure Design [1]

Line Voltage (kV)	Structure Type	Pole Type	Pole Diameter	Conductor	Foundation	Single- or Double-Circuit	Average Height (feet)
115	Horizontal Post or Braced Post	Wood or Steel (galvanized or weathered finish)	Wood ~ 2' Steel ~ 4'	ACSS 795 kcmil 26/7	Direct Embed or Concrete, if required	Single	65-80
115/34.5	115: Horizontal Post or Braced Post 34.5: Wood Crossarm	Wood or Steel (galvanized or weathered finish)	Wood ~ 2' Steel ~ 4'	115: ACSS 795 kcmil 26/7 34.5: ACSR 336.4 kcmil 18/1 full neut	Direct Embed or Concrete, if required	Single	75-90

3.2 Associated Facilities

MP is proposing to purchase approximately 10 acres of property for the new 115 kV Scearcyville breaker station. The breaker station would be constructed near the existing MP "24" transmission line and Pine Beach distribution station in northern Sylvan Township (Figure 1).

The breaker station will serve as the termination point for the proposed 115 kV transmission line and would be connected to MP's existing 115 kV "24" transmission line by two new 115 kV lines approximately 0.1 miles in length total.

A "lattice box" or low-profile structure design will be used for the construction of the breaker station, with the 115 kV transmission line termination towers being the tallest structure at 45 feet above grade. The proposed 280 foot by 290 foot fenced-in enclosure would house 115 kV switch structures, capacitors, breakers, and a control building. An effort will be made to construct the breaker station in an area on the property that is as far out of view from neighboring properties as possible.

[1] Great River Energy, Email message to OES, November 30, 2008.

4.0 Construction

Project construction would begin after the appropriate federal, state, and local permits and approvals are issued. The applicants will also need to acquire property rights-of-way, complete soil investigations, and develop the final detailed design.

GRE and MP typically use outside contractors for construction of large transmission line projects. The projects specifications, easement restrictions and environmental restrictions are given to the contractor prior to construction activities.

4.1 Transmission Line

Construction of the transmission line will include installation of new single pole wood or steel structures, removal of existing wood distribution line poles, installation/removal of safety structures at road and other utility crossings, and stringing of new conductor for the 115 kV circuit. In addition, construction will require the acquisition and preparation of rights-of-way required for the transmission line, establishment of work and staging areas, and stringing setup sites. In some cases, temporary lay down areas may be required due to problematic structure location. Should the temporary lay down areas fall outside the right-of-way, temporary easements would be arranged with the affected landowner.

The transmission line structures are typically designed for the specific site location at which they are to be constructed; therefore, grading will not be required except to provide a level area for access and construction activities. Structures are loaded from a designated staging area and delivered to the determined field location for installation. Generally, structures are assembled on the ground within the right-of-way at the respective location and a bucket truck or crane is used to lift the poles into place. The structures are erected by directly embedding the pole 10 to 15 feet into an excavation roughly three to four feet greater than the pole diameter. The excavation is backfilled with native soils, gravel/crushed rock, or concrete depending on design specifications. In areas of poor soil strength a galvanized steel culvert may also be inserted for additional stability. Support cables (guying) will typically be used for angle structures. In some cases an angle structure may require a pier foundation drilled approximately 15 to 30 feet below grade and backfilled with concrete.

Once structures have been erected, conductors are installed by establishing stringing setup areas within the rights-of-way approximately every two miles. The conductors are pulled with a rope. Conductor stringing operations require brief access to each structure to secure the conductor wire to the insulators or to shield wire clamps once final sag is established. During this stage, avian flight diverters would be installed according to Minnesota Department of Natural Resources license requirements. Temporary guards or clearance poles are installed at crossings to provide adequate clearance over other utilities including streets, roads/highways, and railroads.

Transmission line, associated structures, and other related construction materials are delivered, sorted, and stored at the staging locations throughout the duration of the project. Typical construction equipment consists of cranes, backhoes, digger-derrick line trucks, concrete trucks, bulldozers, front end loaders, dump trucks, and flatbed tractor-trailers to name a few.

The proposed breaker station will be constructed on approximately 10 acres of land and enclosed by a perimeter fence for security. The site location will likely require grading prior to construction. A construction schedule will be developed and based on permit requirements, existing transmission line outage restrictions, weather, road restrictions, and mitigation or impact minimization.

4.2 Cleanup and Restoration

Practices to mitigate potential construction impacts will follow permit requirements and be based on construction schedules, geology and topography, maintenance guidelines, inspection procedures, and presence of sensitive environments or species.

Construction and mitigation best practices have been developed by GRE and MP from experience with past projects, consultation with respective federal, state, and local agencies, and affected property owners. The best practices include, but are not limited to, right-of-way clearance, staging locations, installing structures, and stringing transmission line. Modifications are made throughout the construction process to ensure that potential impacts are minimized to the greatest extent.

Post-construction reclamation activities include but are not limited to removing and disposing of debris, dismantling staging areas and temporary workspace, employing erosion control, and reseeding disturbed areas with native vegetation.

Landowners will be contacted at the close of construction activities to determine whether damages due to transmission line construction have occurred. Areas damaged during construction activities will be restored to their pre-construction condition, to the extent possible. Upon completion of construction cleanup and restoration of damaged areas, landowners will be sent a final letter requesting notification of any outstanding construction damage that has not been remedied.

4.3 Maintenance Procedures

Transmission lines and substations typically require only moderate maintenance, and are designed to operate for decades. However, regular maintenance and inspections are performed over the life of the facility to ensure its continued integrity. Annual inspections of the transmission facilities are usually done by foot, snowmobile, all-terrain vehicles, or by aerial means. Periodic access to the transmission line rights-of-way and substation will be required to perform on-ground inspections and conduct routine maintenance or repair. Inspections will be limited to the acquired right-of-way and/or areas where obstructions or terrain require access off the easement.

In addition, the transmission line rights-of-way are managed to remove vegetation that have the potential to interfere with the operation and maintenance of the line. The applicants will conduct vegetation surveys and remove undesired vegetation that will interfere with the operation of the transmission line. Typical vegetation maintenance for a 115 kV transmission line is on a three to seven year cycle. Vegetation management typically includes a combination of mechanical and hand clearing, along with herbicide application to remove or control the growth of vegetation in some areas.

5.0 Regulatory Framework

No person may construct a high-voltage transmission line without a route permit from the PUC under Minnesota Statute 216E.03, subdivision 2. A high-voltage transmission line is defined as any conductor of electric energy and associated facilities designed for and capable of operating at a voltage of 100 kV or more and is greater than 1,500 feet in length. Associated facilities include, but are not be limited to, insulators, towers, substations, and terminals.

5.1 Certificate of Need

The proposed project is less than 10 miles in length and does not cross state borders; therefore, it does not qualify as a "large energy facility" under Minnesota Statute 216B.2421, subdivision 2(3) and a certificate of need is not required.

5.2 Route Permit

The project is eligible for consideration under the alternative permitting process (Minnesota Rule 7849.5500) of the Power Plant Siting Act (Minnesota Statute 216E.04). The alternative permitting process is shorter than the full permitting procedures and does not require the applicant to propose any alternative sites or routes to the preferred site or route, but does require the applicant to disclose rejected route alternatives and an explanation of why they were rejected. Under the Alternative Permitting Process, the Commission has six months to issue a route permit from the date a route permit application is deemed complete.

The applicants filed a route permit application with the Commission for the Southdale-Scearcyville project on July 17, 2008. The Commission accepted the route permit application as complete on August 15, 2008.

5.3 Scoping & Environmental Assessment

The process EFP staff must follow in preparing the environmental assessment is described in Minnesota Rule 7849.5700. This process requires at least one public meeting in the area of the proposed project.

A public meeting was held on September 23, 2008, to provide information to the public about the Southdale-Scearcyville 115 kV transmission line project, to answer questions, and to provide the public an opportunity to participate in the scoping of the environmental issues and alternative routes to be contained in the assessment. Comments on the scope of the environmental assessment were accepted until October 6, 2008. An additional focus group meeting was held on October 7, 2008, to further solicit public input on the scope of the EA.

EFP staff held a teleconference with the applicants on October 21, 2008, to provide them the opportunity to comment on the planned inclusion of Alternatives A through F in the scope of the EA. The applicants agreed the Alternatives A through F should be evaluated in the EA.

The scope of the EA was issued on October 22, 2008, by the Director of the OES. The EA scoping decision document is included in Appendix A.

Upon completion of this EA, continuing procedural steps include: providing notice on the availability of the EA, scheduling and providing notice of a public hearing in the area where the project is located, and bringing the matter or final record to the Commission for a final decision.

Copies of the route permit application and other documents relevant to the process are available for viewing and download on the PUC website at: http://energyfacilities.puc.state.mn.us/Docket.html?Id=19634 or eDockets at https://www.edockets.state.mn.us/EFiling/search.jsp (Docket 08-712) or can be obtained by contacting the EFP project manager.

6.0 Affected Environment

The project is located within the Pine Moraines and Outwash Plains Ecological Subsection of the Laurentian Mixed Forest Ecological Province. This heavily forested subsection contains hundreds of lakes and wetlands. Forest composition is a diverse mix of northern hardwoods and pine. Historically vegetation consisted mainly of white pine, red pine, and jack pine with some spruce and fir and grasslands. Aspen, birch and scrub red oak have replaced many original species.

Located in the Central Groundwater Province, the area is comprised of very thick unconsolidated sand and gravel glacial drift overlying Precambrian and Cretaceous bedrock varying in depth between 200 and 600 feet below ground surface.[2] The soil is primarily coarse to moderately coarse sands and sandy loams originating from outwash plains and large glacial moraines with areas of poorly drained organic soils. Groundwater resources are abundant in this area with levels typically at 30-35 feet below ground surface. The surficial sand and gravel aquifers are generally utilized for local water supplies.

The area is situated within the Mississippi River – Brainerd and the Crow Wing River watersheds of the Upper Mississippi River Basin. This area of Minnesota is covered with numerous lakes and wetlands. Surface water in the immediate area generally flows south toward the Crow Wing River which flows into the Mississippi River. Very near the geographic center of Minnesota, the topography of the project area is flat with a average elevation of 1,200 feet above mean sea level.

Tourism and forestry are the predominant land uses in this subsection, with tourism having a significant impact in and around the cities of Brainerd and Baxter. In fact, the communities within a 30-mile radius of Brainerd can expect a tenfold increase in population during summer weekends.[3]

The project lies within the city of Baxter and Sylvan Township in Cass and Crow Wing counties, respectively. The general area surrounding the project is semi-rural and consists of a number of small clustered residential areas, agriculture land, county administered land, and commercially managed forest land. Agricultural lands comprise approximately 4 percent of the land the proposed project would cross. The principal crops in this area are small grains, hay, and corn with cattle as the major livestock.

Recreational opportunities in the area include fishing, boating, camping, ATV use, swimming, horseback riding, hunting, and nature observation. Pillsbury State Forest is located approximately one mile to the northwest of the project area and Crow Wing State Park approximately one mile southeast. Camp Ripley Military Reservation is located to the southwest of the project site and is closed to the public. There are no national forests, national wildlife refuges, scientific and natural areas, wildlife management areas, federal waterfowl production areas, state parks or state forests present within the proposed project area.

[2] Minnesota Department of Natural Resources, Groundwater Provinces, <http://www.dnr.state.mn.us/groundwater/provinces/index.html> (accessed December 2008).
[3] Minnesota Department of Natural Resources, Ecological Classification System, <http://www.dnr.state.mn.us/ecs/212Nc/index.html> (accessed December 2008).

7.0 Assessment of Impacts and Mitigative Measures

The construction of a transmission facility involves both short- and long-term impacts. An impact is a change to the pre-construction environment as a direct or indirect result of the proposed action and may be positive or negative. 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 in time or are farther removed in distance, but are still reasonably foreseeable.

This section describes the potential impacts on resources and the possible mitigation measures intended to minimize impacts caused by the construction and future operation and maintenance of the proposed transmission facility.

7.1 HUMAN SETTLEMENT

Located in Crow Wing and Cass counties, the transmission line runs west from Baxter through Sylvan Township. The main thoroughfares in the area of the project are Highway 371, Highway 210, CR 18 and CR 36.

The estimated population of Baxter, the largest city in the project area, was 7,758 in 2007.[4] The total land area of Baxter is 20.3 square miles in size which equates to a population density of approximately 382 people per square mile, relatively low when compared to other population centers. The 1999 median annual household income in Baxter was $52,289; above the reported state median of $47,111. The percentage of people living at or below poverty is similar to other county and statewide levels.[5]

The estimated population of Sylvan Township was 2,451 in 2007. The township is 34.7 square miles in size, 3.9 square miles of which is open water. This correlates to a population density of approximately 71 people per square mile, comparatively higher than other Minnesota townships. The 1999 median annual household income in Sylvan Township was $43,173; below the overall state median. The percentage of people living at or below poverty is similar to other county and statewide levels.[5]

It is important to note that population density in this area of Minnesota fluctuates greatly due to the tourism industry and can temporarily increase tenfold during summer months. For example, 34 percent of private land parcels in Cass County are classified as "seasonal recreational" indicating the significant role tourism plays in this area.[6]

Construction of the project 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 will create new permanent jobs, but it will create temporary construction jobs that will provide a one-time influx of income to the area.

[4] Minnesota State Demographic Center and the Metropolitan Council, Annual Estimates of City and Township Population, Households and Persons Per Household, 2000-2007 (July 28, 2008).
[5] U.S. Census Bureau, <http://factfinder.census.gov> (accessed December 2008).
[6] Cass County, Minnesota, *Cass County Comprehensive Plan*.

There will also be some long-term beneficial impacts from the new transmission facilities. These benefits include an increase to the county's tax base resulting from the incremental increase in revenue from utility property taxes. The availability of reliable power in the area will have a positive effect on local businesses and the quality of services provided to the general public.

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

Displacement

Siting and construction of the transmission line and structures will not necessitate the displacement of persons from their residences or businesses. Mitigative measures are not necessary.

Noise

Noise is measured in units of decibels (dB), or sound pressure level. The sound pressure level for purposes of human hearing is measured with the A-weighted decibel scale or dB(A). Potential noise associated with the proposed project include sources associated with initial construction and long-term operation of the proposed project.

Short-term exceedance of daytime noise standards would be intermittent and temporary in nature. Impacts from general construction noise are 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.

Long-term operational noise would be associated with the insulators, transmission conductor hardware, and transformers at the substations. The level of noise is dependent upon the conductor conditions, voltage levels and weather conditions. Conductors and transformers may create subtle crackling noise due to the electric ionization of moist air near the wires when it is rainy, damp, or foggy (i.e. corona effect, see Sections 7.8 and 7.13). Under the worst conditions (rain greater than one inch per hour) the L_5† noise level would only approach a maximum of 18 dB(A) directly under the conductors and 14 dB(A) at the edge of the right-of-way.[7] The most stringent noise standard in Minnesota is the residential nighttime standard of 50 dB(A) L_{10}. A library setting is a common referenced equivalent for 50 dB(A).[8]

The Scearcyville breaker station is not expected to generate significant noise impacts, as the station will not house any transformers.

† L_5 is the dB(A) that may be exceeded 5 percent of the time within one hour. L_{10} is the dB(A) that may be exceeded 10 percent of the time within one hour.

[7] Great River Energy and Minnesota Power, *Southdale to Scearcyville 115 kV High Voltage Transmission Line and Breaker Station Route Permit Application* (July 17, 2008).

[8] Minnesota Pollution Control Agency, *A Guide to Noise Control in Minnesota, Acoustical Properties, Measurement, Analysis and Regulation* (2008).

Mitigative Measures

Potential noise impacts will be mitigated by using standard sound reduction equipment and by implementing responsible construction procedures. Construction activities will be limited to daytime working hours, therefore the nighttime noise level standards will not be exceeded. The breaker station will also be located in area surrounded by forest and agricultural lands.

The typical operating noise level of a transmission line is minimal and well below the state noise standards. Long-term noise impacts from the project are not anticipated.

Aesthetics - Visual Impacts

Aesthetics refer to the natural and human modified landscape features or visual resources that contribute to the public's experience and appreciation of the environment. Wetlands, surface waters, landforms, forests and vegetation patterns are among the natural landscape features that define an area's visual character, whereas buildings, roads, bridges and other structures reflect human modifications to the landscape. The level of impact to visual resources generally depends on the sensitivity and exposure of a particular viewer and can vary greatly from one individual to the next. It is, therefore, difficult to predict whether a transmission line project would alter the perceived visual character of the environment and constitute a negative visual impact.

Replacing the existing 34.5 kV distribution line along Segment 1 of the project route with a double-circuit line in the existing utility right-of-way would have an incremental impact on visual resources since an existing distribution line already occupies the area. The portion of Segment 3 that follows within the CR 18 right-of-way and replaces existing distribution lines with larger 115 kV/distribution underbuild structures would likewise have an incremental impact.

The portion of the route designated as Segment 2 that would track within the right-of-way of CR 36 and Little Pine Road to Highway 210 would likely have a high visual impact. The proposed transmission line structures will be visible to residents living near the route and to drivers using public roads adjacent to the route. There are approximately 85 homes/businesses located within 500 feet of the proposed transmission alignment, as indicated by the applicant.

A section of Segment 3 would span the Gull River where it crosses beneath Highway 210. Recreationalists utilizing the river for boating and fishing could view the transmission line structures in addition to the existing highway and railroad crossings.

The final portion of the transmission line and substation would be located within or adjacent to the existing MP transmission line right-of-way in a fairly unpopulated area with a low number of residences.

Mitigative Measures

The proposed transmission line and structures will add to the changing landscape of the area.

In an effort to mitigate the potential visual impacts from the transmission project the applicants are proposing to use existing road and utility rights-of-way and maximize setbacks from homes to the greatest extent practicable. Potential mitigation measures include:

- Input pertaining to visual impacts from landowners or land management agencies will be considered prior to final location of structures, rights-of-way, and other areas with the potential for visual disturbance.
- Care will be used to preserve the natural landscape and prevent any unnecessary destruction of the natural surroundings in the vicinity of the project during construction and maintenance.
- To the extent practicable, wetlands, lakes, and surface flows will be crossed in the same location as existing transmission lines.
- New structures will be designed to support the underbuild of existing distribution lines, thereby allowing the use of existing alignments where feasible and will share existing road rights-of-way to the extent that such actions do not violate sound engineering principles or system reliability criteria.
- Landowners will be compensated for the removal of mature yard trees through easement negotiations.
- Structures will be placed at the maximum feasible distance from intersecting roads, highway, or trail crossings and could cross roads to minimize or avoid impacts.
- Effort will be made to construct the breaker station in an area on the property that is as far out of view from neighboring properties as possible.
- A low-profile structure design will be utilized for the construction of the breaker station.

In addition, the Commission could require, as a permit condition, that GRE and MP work with landowners to identify issues related to the transmission line such as distance from existing structures, tree clearing, and other aesthetic concerns, should a route permit be issued for the proposed project. The final alignment of the transmission line could cross the public roads along the route several times in order to avoid identified concerns. An example of a route permit is presented in Appendix B.

7.2 Public Health and Safety

The transmission line and associated facilities will be designed to meet or exceed all relevant local and state codes, the National Electric Safety Code (NESC), and GRE and MP standards. Standards will be met for, but not limited to, clearance to ground, clearance to crossing utilities, clearance to buildings, right-of-way widths, erection of power poles, and stringing of transmission line conductors. All applicable safety procedures will be followed during and after installation.

The proposed transmission lines will be equipped with protective devices to safeguard the public from the transmission lines if an accident occurs and a structure or conductor falls to the ground. The protective equipment would de-energize the line should an event occur. In addition, the substation facilities will be fenced and access limited to authorized personnel.

Electric and Magnetic Fields

Electric and magnetic fields arise from the voltage and the flow of electricity (current) through a conductor (wire or transmission line). The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the electric current. The electric field associated with high voltage transmission lines "extend" from the energized conductors to other nearby objects whereas the magnetic field "surrounds" the conductor. Together, these fields are generally referred to electric and magnetic fields or EMF. A summary of electric and magnetic properties is summarized below in Table 3.

This section of the EA specifically addresses electric and magnetic fields produced through transmission of electric power at 60 Hz (cycles per second), also referred to as power frequency EMF. Transmission lines, household appliances and electric equipment, lighting and wiring all create electric and magnetic fields.

Table 3: Summary of Electric and Magnetic Field Properties [9]

Electric Fields	Magnetic Fields
Electric fields arise from voltage.	Magnetic fields arise from current flows.
Their strength is measured in volts per meter (V/m).	Their strength is measured in amperes per meter (A/m). Commonly, EMF investigators use a related measure, flux density (in microtesla (µT) or millitesla (mT) instead.
An electric field can be present even when a device is switched off.	Magnetic fields exist as soon as a device is switched on and current flows.
Field strength decreases with distance from the source.	Field strength decreases with distance from the source.
Most building materials shield electric fields to some extent.	Magnetic fields are not attenuated by most materials.

Electric Fields

Electrical fields are created by voltage. Voltage can be described as the potential difference between two points and will always try to drive an electric current. The voltage on any conductor produces an electric field that extends from the wire in all directions. The intensity of electric fields is associated with the voltage of the transmission line and is measured in kilovolts per meter (kV/m). Some typical electric field strengths measured near common household appliances are presented in Table 4.

[9] World Health Organization, "What are Electromagnetic Fields?", *Health and Environment Briefing Pamphlet*, Series 32 (1999).

Table 4: Typical Electric Fields (V/m) from Common Home and Business Appliances [10]

Source	Electric Filed Strength (at a distance of 30 cm)
Iron	120
Refrigerator	120
Toaster	80
Coffee machine	60
Vacuum cleaner	50

Transmission line electric field levels are typically greatest near the center of the line right-of-way with levels decreasing as one moves away from the central alignment. The electric field associated with a high voltage transmission line may extend from the energized conductors to other nearby objects such as the ground, towers, vegetation, buildings, and vehicles. These objects are commonly referred to as "screeners". The screening effect associated with these and other objects reduce the strength of transmission line electric fields.

Electrical fields at maximum conductor voltage for the proposed project are presented in Table 5. Maximum conductor voltage is defined as the nominal voltage plus 5 percent, or 121 kV.

Table 5: Calculated Electric Fields (kV/m) for Proposed Single Circuit 115 kV Transmission Line (one meter above ground) [11]

Structure Type	Nominal Voltage	Distance to Proposed Centerline (feet)											
		-200	-150	-100	-50	-37.5	0	12.5	37.5	50	100	150	200
Steel Pole Davit Arm	121 kV	.014	.024	.055	.214	.334	1.186	1.227	.326	.189	.062	.029	.016
Steel Pole Davit Arm w/ 34.5 kV Distribution Underbuild	121 kV	.017	.030	.065	.181	.222	.251	.481	.305	.193	.053	.029	.017

[10] Ibid.
[11] Great River Energy, email message to OES, December 14, 2008.

The applicants have stated that the proposed 115 kV transmission line would have an electric field density of approximately 1.186 kV/m at centerline, one meter above the ground and a maximum electric field of 1.227 kV/m approximately 12.5 feet from center, one meter above the ground. The 115 kV transmission line carrying the 34.5 kV distribution would have and electric field density of 0.251 kV/m at centerline, one meter above the ground and a maximum electric field of 0.481 kV/m approximately 12.5 feet from center, one meter above the ground.

The maximum electric field of 1.227 kV/m is approximately 85 percent less than the 8 kV/m guideline historically recommended by the Minnesota Environmental Quality Board (EQB) and PUC in other route permit proceedings. The 8 kV/m guideline was designed to prevent serious hazard from shocks when touching large objects like a bus or combine parked under high voltage transmission lines, usually of 345 kV or greater.

Magnetic Fields

Electric current passing through a conductor produces a magnetic field in the area surrounding the wire. Similar to electric fields, magnetic fields are strongest near the conductor and diminish with distance. Magnetic fields however, are not shielded by most common materials and easily pass through them. The magnetic field may also be called magnetic flux density (or magnetic induction) and is measured in units of milligauss or microtesla.

The estimated magnetic fields based on the proposed line and structure designs are presented in Table 6. The expected magnetic fields for the structure type and voltage have been calculated at various distances from the centerline.

Table 6: Calculated Magnetic Flux Density in Milligauss (mG) for Proposed Single Circuit 115 kV Transmission Line (one meter above ground) [12]

100-foot Structure Type	System Condition	Current (Amps)	Distance to Proposed Centerline (feet)										
			200	-150	-100	-50	-37.5	0	37.5	50	100	150	200
Single Circuit 115 kV Steel Pole Davit Arm	Peak	201	.74	1.18	2.31	6.80	7.39	28.42	10.53	7.49	2.28	1.09	0.66
	Average	76	.28	.45	.87	2.57	3.79	10.74	4.33	2.83	.86	.41	0.25
Steel Pole Davit Arm w/ 34.5 kV Distribution Underbuild	Peak	201	.77	1.20	2.25	5.60	7.45	11.78	6.96	5.27	2.00	1.01	0.62
	Average	76	.31	.48	.91	2.32	3.14	4.74	2.23	1.73	0.68	.34	0.21

Magnetic fields are not singularly associated with transmission lines. People are exposed to varying magnetic fields to a greater or lesser extent throughout each day whether at home or in schools and offices. A U.S. government study conducted by EMF Research and Public Information Dissemination Program determined that most people in the United States on average are exposed to magnetic fields of 2 mG or less daily, and varies by individual. Median magnetic field reading for a select number of common home and business appliances are presented in Table 7.

Table 7: Typical Magnetic Fields (milligauss) from Common Appliances [13]

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

[12] Great River Energy, email message to OES, December 14, 2008.
[13] The National Institute of Environmental Health Science. *Electric and Magnetic Fields Associated with the Use of Electric Power*, (June 2002): 34-36.

There are currently no state or federal exposure standards for magnetic fields. Florida and New York are the only two states in the country that have set standards for magnetic field exposure (150 mG limit in Florida and 200 mG limit in New York). These exposure limits were not based on scientific analysis, but in response to maintaining transmission systems within historic levels. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has developed occupational and residential guidelines for EMF exposure (see Table 8 below). They have also concluded that available data regarding potential long-term effects, such as increased risk of cancer are insufficient to provide a basis for setting exposure restrictions.

The maximum estimated electric field generated by the project is 1.227 kV/m. This level is approximately 71 percent less than the 4.2 kV/m ICNIRP developed guidelines for the general public. The maximum peak estimated magnetic field generated by this project is 28.42 mG which is approximately 97 percent less than the 833 mG ICNIRP developed guidelines for the general public.

Table 8: Voluntary Exposure Guidelines for EMF ICNIRP Guidelines for 60 Hz EMF Exposure[14]

Exposure	Electric Field (kV/m)	Magnetic Field (mG)
Occupational	8.3	4,200
General Public	4.2	833

Mitigative Measures

Research on the effects of electric and magnetic fields to human health have been studied and debated since the 1970's. Conclusions have ranged from no significant association between exposure to EMF and health effects to a weak association between the two. A number of national and international health agencies (The Minnesota Department of Health, The World Health Organization, The National Institute of Environmental Health Sciences) have generally concluded in their research that there is insufficient evidence to prove a connection between EMF exposure and health effects. Research has not been able to establish a cause and effect relationship between exposure to magnetic fields and human disease, nor a plausible biological mechanism by which exposure to EMF could cause disease.

In Fact Sheet, WHO/322, *Electromagnetic Fields and Public Health: Exposure to Extremely Low Frequency Fields*, June 2007, The World Health Organization provided an update. In many studies, a weak, statistical link between exposure to EMF and incidence of childhood leukemia has been noted. Additionally, some epidemiologic studies making a regression analysis of leukemia cases have found a statistical association. A similar link has not been noted with other types of cancer. In its report, after reviewing recent studies, The World Health Organization concludes that laboratory evidence does not support these findings:

[14] Ibid. 13: 47.

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

Although scientists are still debating whether EMF is a hazard to health, at the current time in the United States, there are no federal standards for occupational or residential exposure to 60-Hz EMF.

The following resource provides additional information regarding electric and magnetic fields: *Electric and Magnetic Fields Associated with the Use of Electric Power*, The National Institute of Environmental Health Sciences, June 2002, and can be found on the internet at: http://www.niehs.nih.gov/health/topics/agents/emf/docs/emf2002.pdf.

To assist the public in understanding this issue, GRE and MP will provide information to the public, interested customers and employees. The information may references studies and provide data to help explain the relative impact of transmission line exposure to other common EMF exposures, and allow individuals to make informed decisions regarding EMF.

GRE and MP will provide measurements (i.e. distances from transmission lines, substations, and associated equipment) for landowners, customers and employees who request them. In addition, the applicants will use structure designs that minimize magnetic field levels and where practicable, locate facilities in areas affecting the fewest number of people. Access to the proposed substation will be restricted by fences or barriers.

Pacemakers

Research has established that EMF can potentially interfere with cardiac pacemakers and implantable cardioverter defibrillators under certain circumstances. Electric and magnetic fields may interfere with an implanted cardiac device's ability to sense normal electrical activity in the heart if the electric field intensity is high enough to induce body currents strong enough to cause interaction. Modern bipolar devices are much less susceptible to interactions with electric fields. Medtronic and Guidant, manufacturers of pacemakers and implantable cardioverter defibrillators, have indicated that electric fields below 6 kV/m are unlikely to cause interactions affecting operation of most of their devices. Older unipolar designs are more susceptible to interference from electric fields. Research suggests that the earliest evidence of interference occurred in electric fields ranging from 1.2 to 1.7 kV/m.

Mitigative Measures

The estimated electric fields for this project (Table 5) are below levels at which modern bipolar and older unipolar devices are susceptible to interaction. In the unlikely event a pacemaker is impacted, the effect is typically a temporary asynchronous pacing (commonly referred to as reversion mode or fixed rate pacing). The pacemaker would return to its normal operation when the person moves away from the source of the interference. Individuals using such devices should consult with their doctor regarding recommended precautions or avoidance. The interference of a cardiac pacemaker implant by high voltage transmission line electric and magnetic fields cannot be excluded, but the risk of the interference inhibition in everyday life is small. No mitigation is necessary.

Stray Voltage

Electrical supply systems delivering power to farms, homes, and businesses are grounded to the earth to make them safe and to ensure their reliability. Grounding of these electrical supply systems results in a small amount of current moving through the earth. A small voltage called neutral-to-earth voltage may develop at each point where the electrical system is grounded. When neutral-to-earth voltage is found near animal contact points at levels considered to have potential impact on animals, it is often called stray voltage. Stray voltage is the difference in voltage measured between two points contacted simultaneously by a person or animal (typically less than 10 volts).

Stray voltage arises from poor electrical connections, deteriorated insulation, or faulty equipment. Some sources of stray voltage are cathodic protection systems, telephone systems, and direct current power lines. Stray voltage has been raised as a concern on some dairy farms because of the potential for dairy cows to come into contact with two points and provide a conducting path for current to flow, thereby impacting operations and milk production.

Mitigative Measures

In instances when transmission lines have been shown to contribute to stray voltage, the electric distribution system directly serving the farm/structure was directly under and/or parallel to the transmission line. These circumstances are considered when installing transmission lines and can be readily mitigated. Appropriate measures will be taken during transmission line detailed design and construction to prevent the potential for any stray voltage problems for this project. GRE and MP will promptly address and rectify any stray voltage problems that arise during transmission line operation.

7.3 RECREATION

Recreational opportunities in the area includes fishing, boating, camping, ATV use, swimming, horseback riding, hunting, and nature observation. Pillsbury State Forest is located approximately one mile to the northwest of the project area and Crow Wing State Park approximately one mile southeast. Camp Ripley Military Reservation is located to the southwest of the project site and is closed to the public. There are no national forests, national wildlife refuges, scientific and natural areas, wildlife management areas, federal waterfowl production areas, state parks or state forests present within the proposed project area.

The proposed transmission line would span the Gull River where it crosses beneath Highway 210 and the BNSF railroad. Recreationalists use this area of the river for boating, fishing, and bird watching. A regional snowmobile trail also runs parallel to Highway 210. As stated earlier, visual impact to recreationalists from the transmission line crossing would be minimal, as a state highway and railroad already cross the river at this location.

An active resort situated on Jensen's Bay of the Gull River attracts tourists throughout the year and is located adjacent to the proposed route along Little Pine Road (Segment 2). It would be possible for visitors of the resort to view the proposed transmission line and structures from certain areas of the resort.

Mitigative Measures

There are no designated public lands along the proposed transmission line route with the exception of the Gull River. Impacts to the Gull River would be minimal. No mitigation is necessary. See also Aesthetics – Visual Impacts under Section 7.1.

7.4 TRANSPORTATION

Throughout the construction phase of the project local motorists may be temporarily inconvenienced by the increase in construction vehicles on the roadways and minimal delays in traffic. Construction will not impact the community's emergency public infrastructure that is provided by Cass and Crow Wing counties.

Mitigative Measures

Impacts to transportation would be localized and short term. Conductors and overhead wire stringing operations would use guard structures to eliminate potential delays. When appropriate, lead vehicles would accompany the movement of heavy equipment. Traffic control barriers and warning devices would be used when appropriate.

All necessary provisions would be made to conform to safety requirements for maintaining the flow of public traffic. Construction operations would be conducted to offer the least possible obstruction and inconvenience to public traffic. The construction contractor would be required to plan and execute delivery of heavy equipment in such a manner that would avoid traffic congestion and reduce the likelihood of dangerous situations along local roadways. GRE and MP would work closely with Minnesota Department of Transportation (MnDOT) and the counties/municipalities along the route in order to minimize disruption to area traffic.

7.5 Soils and Geology

Nominal disturbance and/or compaction of soils will likely result in the areas where the transmission line structures and substation would be placed. In addition, soils exposed during construction may be vulnerable to erosion until stabilized. It is not anticipated that bedrock will be encountered during the construction of the project. There may be prime and statewide important farmland along CR 18 (Segment 3), but the limited placement of overhead lines and structures are not considered farmland conversion.

Mitigative Measures

Soil erosion control best management practices will be employed to minimize loss of topsoil. Areas disturbed will be returned to their pre-construction condition. Transmission line route permits generally require use of soil erosion controls and require soils compacted by construction activities to be restored to pre-construction condition upon project completion. If dewatering due to groundwater intrusion is necessary, dewatered groundwater will be properly stored and sediments will be settled out and removed before the water is discharged.

GRE and MP will implement best management practices during construction in an effort to reduce dust, erosion, and minimize compaction. Methods commonly used to control soil erosion and assist re-establishing vegetation may include prompt seeding, silt fences, construction during frozen conditions where practicable, and erosion control blankets. No permanent impacts to the soil or geology within the proposed project area are anticipated.

Larger disturbed areas of one acre or more (proposed Scearcyville breaker station) will be regulated by a National Pollution Discharge Elimination System (NPDES) permit and Stormwater Pollution Prevention Plan (SWPPP) prepared for the project. Mitigation under the NPDES includes implementation of the SWPPP with the appropriate erosion control methods developed specifically for the site. The Minnesota Pollution Control Agency (MPCA) issues combined NPDES/State Disposal System permits for construction sites, industrial facilities and municipal separate storm sewer systems. Compliance with the MPCA stormwater program would be a condition of the route permit.

7.6 LAND USE

Zoning maps indicate the proposed transmission line route crosses land designated as low density residential, special residential/cluster, and commercial forestry in the city of Baxter and rural residential, shoreland residential, commercial, agriculture/forestry in Cass County.

Land used for agriculture purposes and undeveloped land occur sporadically throughout the northern portion of the proposed route consisting mainly of pasture lands and meadows.

Potlatch Corporation currently owns the land that is bisected by the existing MP 34.5 distribution line. The area is zoned for both industrial use and commercial forestry.

There are no state/federal parks or recreational areas located within the proposed route. There are no state-owned lands within the proposed transmission line route. Cass County administers a portion of land along the existing MP 34.5 kV distribution line or proposed Segment 1.

The Brainerd Regional Airport and the East Gull Lake Municipal Airport are located within the vicinity of the project. The applicants contacted the MnDOT Office of Aeronautics for information on potential effects the project could have on the airports. MnDOT indicated that the project would not impact the existing airports. However, the applicants should review the current airport zoning documents or ordinances to ensure that structures comply with airport safety zones and ordinances upon completion of line design.

Mitigative Measures

The transmission line project does not appear to be in conflict with any of the designated land uses in the project area. The proposed 115 kV transmission line structures would be designed in some areas to allow the underbuild of MP's existing 34. 5 kV distribution line and would also parallel road and existing utility rights-of-way to the greatest extent possible.

Temporary driveways may be constructed between the roadway and the structures to minimize impact by using the shortest route possible. Construction mats may also be used to minimize impacts on access paths and construction areas. Furthermore, transmission line route permits generally require project related land impacts to be restored to pre-construction condition upon project completion.

The Applicants will compensate landowners for any yard/landscape, crop damage or soil compaction that may occur during construction and, as a condition of the route permit, and will work with landowners to minimize impacts to farming operations along the proposed route. Impacts can be minimized by aligning the transmission line along existing transmission and roadway corridors.

7.7 ARCHAEOLOGICAL AND HISTORIC FEATURES

At the request of the applicants, the Minnesota Historical Society (MHS) State Historic preservation Office (SHPO) reviewed the proposed project area and determined there was a good probability that unreported archaeological properties may be present within the project area and recommended a survey be completed.

The applicants completed a Phase 1a Cultural Resources Report of the project area in June 2008. A literature review of records located at the SHPO, MHS, and Minnesota Office of the State Archaeologist identified 23 archaeological sites and two historic structures previously recorded within one mile of the project area. Located within one mile of the project site is the Chippewa Agency National Register Historic District, Hole-in-the-Day Cabin Historic Site. Of the previously identified sites, one (the Village of Gull River) is located adjacent to the proposed project route. The Village of Gull River site is a historic village complex platted in 1876 and was associated with the railroad and lumber industries and is thought to encompass unknown burial locations attributed to a diphtheria outbreak. A site field visit was conducted in the area of the historic village complex revealing no human remains or other evidence of burials.

Located to the west of CR 36 in an area along the Gull River is the Hole-in-the-Day Cabin Historic Site. Although south of where the route would cross MP land to Little Pine Road, there is the potential for encountering historic resources along this section of the route due to the proximity of the Gull River and the historic nature of the area.

The project area should be considered medium to high potential for cultural resources because most of the project area is located near the Mississippi, Gull, and Crow Wing rivers, several large lakes and is also in close proximity to other previously recorded sites.

Mitigative Measures

The applicants will conduct a phase 1 survey of the project area prior to commencing construction activities. Particular attention will be given to the Village of Gull River archaeological site. Should the construction plans for the proposed project have the potential of disturbing known but unidentified burial areas, monitoring by qualified personnel would be reasonable. In the event that a resource is encountered, the SHPO should be contacted and consulted; the nature of the resource should be identified; and a determination should be made on the eligibility for listing in the National Registry of Historic Places. It is anticipated that a historic or cultural resource, if encountered, could more than likely be avoided by design modification (movement of planned structures) or data recovery by selective excavation, depending on the extent of the resource. This requirement would be carried over as a condition of the route permit if granted by the PUC.

7.8 AIR QUALITY RESOURCES

There are minimal air quality impacts associated with transmission line construction and operation. The only potentially direct air quality issue associated with transmission lines is the production of ozone and nitrogen oxides resulting from the corona effect. The corona effect is the ionization of air in the electric field at the surface of a transmission line and may be a contributing source of audible noise, electromagnetic radiation, and chemical reactions. In this case, the chemical reactions that take place when corona is present result in minute amounts of ozone and nitrogen oxides being produced. Ozone comprises approximately 90 percent of the oxidants produced, with the remaining 10 percent composed principally of nitrogen oxides.

Corona is an undesirable occurrence for electric transmission line facilities, as it is oftentimes caused by imperfect conductor support hardware and/or faulty insulators or cracks and separations in the line. The corona effect is cumulative, in that its presence contributes to increased deterioration of the transmission facility components and could reduce electric transmission reliability if left unchecked.

The Clean Air Act, National Ambient Air Quality Primary Standard (2008) for ozone in an area is 0.075 parts per million (ppm). Studies designed to monitor the production of ozone under transmission lines have essentially been unable to detect a significant increase in ozone from a 115 kV transmission line. Calculations referenced from the Bonneville Power Administration (BPA), *Corona and Field Effects Program Ver. 3* (U.S. Department of Energy, BPA, Undated) for a standard single circuit 115 kV transmission line project predicted the maximum ozone concentration of 0.008 ppm near the conductor and 0.003 ppm at one meter above ground during foul weather or worst case conditions.

During a mist (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. In both instances the detectable ozone levels were well below Environmental Protection Agency standards. Given this, there are no anticipated impacts relating to ozone for the proposed project.

During project construction there will be emissions and fugitive dust from vehicles and other construction related equipment. The magnitude of the construction emissions is influenced heavily by weather conditions and the specific construction activity occurring. Adverse impacts to the surrounding environment would be minimal due to the short and intermittent nature of project construction.

<u>Mitigative Measures</u>

There will be no significant impacts to air quality; therefore, no mitigation is necessary. Temporary impacts due to construction would be minimized by using best management practices to reduce dust emissions.

7.9 SURFACE WATER AND WETLANDS

Minnesota public waters are protected lakes, wetlands, and watercourses defined in Minnesota Statute 103G and regulated by the Minnesota Department of Natural Resources (DNR). The proposed route will cross three different public waters as identified on Public Waters Inventory (PWI) maps. The route would cross the Gull River along Highway 210 and the BNSF railroad crossing and a small unnamed stream located east of Island Lake currently spanned by the existing MP 34.5 kV distribution line. Also positioned within the proposed route is a PWI wetland (779W) that will be crossed in two areas. A license from the DNR is required for the passage of any utility over, under or across any state land or public waters. The applicants will apply for a license to cross public lands and waters and will abide by the conditions established in Minnesota Rule 6135. Because the Gull River will be crossed and is considered a navigable water, the applicants will also need to apply to the Army Corps of Engineers (Corps) for a permit under Section 10 of the River and Harbors Act.

There are no lakes in direct conflict within the alignment of the proposed transmission route. The proposed route would however overtake the MP 34.5 kV distribution line and utilize the existing right-of-way which currently passes within approximately 100 feet north of Island Lake.

The proposed route will cross approximately 12 wetlands identified in the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI). The wetland types are palustrine and lacustrine and include: bog, wooded swamp, shrub swamp, shallow marsh, and shallow open water (ponds and reservoirs). The wetlands are located sporadically along all segments of the proposed transmission line route. GRE and MP estimate a total of 10 or less transmission line structures will be placed in wetlands, equaling a total permanent impact of approximately 125 square feet.

In Minnesota wetlands are regulated by the Corps under Section 404 of the Clean Water Act. Therefore should a route permit be issued, the applicants will need to consult with Corps upon completion of final design and prior to construction to determine whether a Section 404 permit would be required for placement of transmission structures.

Land that forms the transition from aquatic to terrestrial ecosystems along streams, lakes, and open water wetlands are known as riparian areas. The applicants indicate the proposed line would cross approximately five 200-foot riparian zones as designated by the DNR. These riparian zones are associated with the previously identified wetlands and water courses.

The proposed route that crosses through Crow Wing County is located in areas determined by Federal Emergency Management Area (FEMA) to be outside the 500 year floodplain or where no base flood elevation data has been determined.[15] The project area in Cass County has not been mapped by FEMA for flood plains at this time. Due to their small footprint area, water drainage or floodplain elevations will not be altered by the transmission line structures. Construction of the substation will require grading and a negligible increase in impermeable surfaces from the control house structure and footings; water drainage or floodplain elevations will not be altered by the transmission line structures.

[15] Federal Emergency Management Agency, City of Baxter, Minnesota, Flood Insurance Rate Map (May 15, 1991).

Potential impacts to wetlands and water resources will be limited to ground disturbance related to construction traffic and placement of transmission line structures. Because of the small area that will be disturbed and the flexibility to avoid structure placement in sensitive areas the potential impacts will be limited. Minimal grading of areas around pole locations may be required to accommodate construction vehicles and equipment.

Mitigative Measures

GRE and MP will use wooden mats or the DURA-BASE® composite mat system or construction during frozen conditions to minimize disturbance and compaction of wetlands and riparian areas during construction. In consultation with the DNR, best management practices will be used when placing poles in or near the Gull River riparian area. Soil excavated from the wetlands and riparian areas will be contained and not placed back into the wetland or riparian area. Silt fencing or other erosion control measures will be used to prevent sedimentation when working near wetlands and watercourses. Areas disturbed by construction activities will be restored to pre-construction conditions (soil horizons, contours, vegetation, etc.).

In addition, conditions provided in the Corps Section 404 and Section 10 permits, the MPCA NPDES permit, and the DNR license to cross public lands and waters will be followed.

7.10 FLORA

The project is located in the Pine Moraines and Outwash Plains subsection of the Laurentian Mixed Forest Province. This area is characterized by extensive conifer forest, mixed hardwood and conifer forests, and conifer bogs/swamps complimented by lake and wetland plant communities. Specific forest species include sugar maple, basswood, paper birch, quaking aspen, and northern red oak. Historically, forests and woodlands of jack pine and red pine were very common and now occur less frequently.[16]

There may be impacts to trees along the proposed route should they be located in the proposed right-of-way. Large trees would be removed due to the potential for collapsing and contact impacts they could have on the safe and reliable operation of the transmission line facility. In addition, there may be a limited number of aged or unstable trees located outside the right-of-way that may need to be removed due to the potential for falling into the transmission line.

Mitigative Measures

This historically dominant wooded area has been largely converted to residential, industrial and agricultural uses. Moreover, approximately 95 percent of the route utilizes existing utility or road rights-of-way. There are no listed native plant communities or areas of high biodiversity located within or near the project area; therefore, no impacts are anticipated.

[16] Minnesota Department of Natural Resources, *Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife*. Comprehensive Wildlife Conservation Strategy (January 2006).

7.11 FAUNA

The numerous prairie wetlands, grasslands, and shallow lakes in the area provide important habitat for numerous species of waterfowl, water birds, shorebirds, and grassland birds. Featured wildlife includes bald eagles, gray wolves, black bear, sharp-tailed grouse, sandhill cranes, upland sandpipers, common terns, yellow rails, red-necked grebes, trumpeter swans, common loons, least darters, eastern hognose snakes, and various species of ground squirrels and other small rodents.

There are at least 29 federal or state endangered, threatened, or special concern animal species know or predicted to occur in the Pine Moraines and Outwash Plains subsection. The greatest factor contributing to the vulnerability of these animal species in this areas is habitat loss and degradation.[17]

The DNR has identified this as one of the most important areas in the state for red-shouldered hawks.[16] The applicants indicate there is an active Osprey nest located on one of the MP "24" line transmission structures east of CR 18.

There is a potential for temporary displacement of wildlife during construction of the proposed project. The habitat that would be affected is limited to trees that require removal and fringe areas of agriculture plots. Wildlife species that may be displaced are considered "common" in Minnesota, and their displacement would not be detrimental to their populations. Displaced wildlife would likely re-establish itself in closely located and comparable habitats within the project area. Displacement of fauna will be minor and temporary in nature. No long-term effects related to displacement are anticipated; therefore, no mitigation measures are necessary.

Mitigation Measures

The principal impact posed by the transmission line project to wildlife is avian collision once the transmission lines have been constructed and are operational. The applicant's will evaluate mitigative measures in cooperation with the USFWS and DNR in areas of the project where the chance of avian collision or electrocution is higher. Bird flight diverters will be incorporated into the transmission line design for the portion of line that would span the Gull River at Highway 210. The Gull River is a known water bird habitat associated with the Camp Ripley-Pillsbury-Lake Alexander Important Bird Area recognized by Minnesota Audubon.

Due to the areas importance to Osprey, Red-shouldered hawks, and other raptors, standard transmission design will incorporate adequate spacing of conductor(s) and grounding devices. This is intended to eliminate the risk of electrocution to raptors with larger wingspans that may simultaneously come in contact with a conductor and grounding devices.

The applicants will work with the DNR to ensure construction activities are scheduled so as not to impact Osprey nesting.

[17] Ibid 16.

7.12 Rare and Unique Natural Resources

The DNR's, Natural Heritage and Nongame Research Program and the USFWS were consulted by the applicants for listed endangered, threatened, and special concern species in addition to any unique native plant communities within or near the proposed project area.

The DNR indicated occurrences of Blanding's turtles near the project area. The Blanding's turtle is considered a species in greatest need of conservation in Minnesota. The USFWS indicated the project would not impact any federally-listed threatened and endangered species or listed critical habitats (see Appendix A of the Route Permit Application).

Mitigative Measures

The applicants will use silt fencing or other erosion control measures when working near waterways and wetlands to prevent sedimentation and disturbance of these areas. Construction and maintenance personnel will be made aware of the Blanding's turtle and their habitat during pre-construction meetings in effort to minimize possible disturbance.

7.13 Radio, Television, and Cellular Phone Interference

The corona effect on transmission line conductors in rare circumstances can produce electromagnetic interference or high frequency (~120 Hz) electric noise that can potentially cause radio, television, and communication system interference. Radio interference is limited to amplitude modulation broadcast bandwidths and typically does not impact frequency modulation broadcasts. Television interference caused by corona usually occurs during foul weather when the conditions for corona are ideal. Corona-related television interference is rare and generally only a concern for conventional receivers within approximately 600 feet from the transmission line. Satellite and cable receivers are not affected by corona-generated electromagnetic interference.

Mitigative Measures

This phenomena is generally associated with transmission lines that are operating at 345 kV or greater. No impacts are anticipated therefore no mitigation is necessary.

8.0 Alternatives

Comments received at the public meeting and during the scoping period for this project indicated opposition to the proposed route and preference for several alternatives. This section evaluates six previously rejected route alternatives to determine each alternative's impact when compared to the impact of the proposed route. The six alternative routes (A though F) were identified by the applicant's in the route permit. The alternative routes all share at least one segment with the proposed route, therefore impacts from the proposed route and route alternatives evaluated in this EA are quite similar. Impacts with respect to public health and safety, recreation, transportation, soils and geology, air quality, fauna, rare and unique natural resources, and radio/television/cellular phone interference are anticipated to be the same for all alternatives evaluated. Areas of potential differences are discussed in this section.

The route alternatives are described below and depicted in Figures 6 through 11. A comparison of potential impacts of the proposed route and each alternative is summarized in Table 9. Tables 10 through 12 provide approximate counts of homes to the proposed transmission centerline at 50, 100, and 200 feet for segments of the proposed and alternative routes.

Alternative A

Alternative A would follow north along Highway 371 to Highway 210 where the route would turn west and proceed along Highway 210 connecting with Segment 2 of the proposed route at the CR 36 and Highway 210 intersection.

In a letter dated September 19, 2008, MnDOT indicates that there are long range plans to expand the Highway 210 corridor from CR 18 to Baxter and that the expansion could potentially impact a 300 foot wide corridor in that area.

This alternative would impact the greatest number of land parcels (252) when compared with the proposed and other alternative routes. The number of homes and businesses within 500 feet of the transmission alignment, although not calculated, would far exceed that of the proposed and other alternatives. In addition, there is high density industrial and residential development along the length of Highway 210, particularly near the city of Baxter.

The total length of this alternative is 10.1 miles and would therefore require a certificate of need in addition to the route permit. The total estimated cost for this route would exceed the costs of the proposed route by $890,000.

Table 9: Summary of Impacts by Route Alternative [18,19]

	Proposed and Alternative Routes						
	Proposed	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Route Length (miles)	9.3	10.1	8.2	9.3	9.5	11.1	11.5
Certificate of Need Required	No	Yes	No	No	No	Yes	Yes
Parcels Along Route	107	252	127	100	119	79	102
Structures within 500 feet of Transmission Centerline	85	NA	91	78	99	85	100
Estimated Tree Clearing (acres)	16.59	NA	29.59	36.24	16.38	25.51	22.27
Total Project Cost	$7,580,000	$8,470,000	$6,860,000	$7,750,000	$7,750,000	$9,830,000	$9,990,000
Shared Existing Road and Utility Right-of-Way (%)	95	100	100	81	100	100	100
New Right-of-Way (%)	5	0	0	19	0	0	0
PWI Waters	4	7	4	4	4	5	5
Historic Resource Sites	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes:
Structure may be an occupied home, business or farm.
Parcel is land as identified on a legal plat map.
Shared right of way includes road rights-of-way or underbuild of existing lines and following right-of-way.
New right-of-way consists of cross-country runs or areas following section and field lines.

[18] Ibid 7.
[19] Great River Energy, Email message to OES, January 2, 2009.

Table 10: Approximated Number of Structures Located within 50 feet of the Transmission Centerline [20]

Location of Transmission Centerline	Proposed and Alternative Routes					
	Proposed	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Segment 1 following existing MP 34.5 kV distribution centerline	0	0	0	0	0	0
North along Cass County and Crow Wing County border	---	---	1	---	---	---
East side of CR 36/11th Avenue	0	0	0	0	---	---
West side of CR 36/11th Avenue	1	0	---	1	---	---
North side of Mapleton Road	---	3	---	---	---	---
South side of Mapleton Road	---	3	---	---	---	---
Following existing MP 34.5 kV distribution centerline near Sylvan Dam area	---	---	---	---	0	0
North side of E-W section of CR 36	---	---	---	---	1	1
South side of E-W section of CR 36	---	---	---	---	0	0
MP property between CR 36 and Little Pine Road	0	0	---	0	---	---
East side of CR 36/21st Avenue	---	---	---	---	0	0
West side of CR 36/21st Avenue	---	---	---	---	0	0
East side of Upper Sylvan Road	---	---	---	---	2	---
West side of Upper Sylvan Road	---	---	---	---	1	---
East side of CR 18	1	1	1	1	---	1
West side of CR 18	1	1	1	1	---	1
Upper Sylvan Road to existing MP transmission right-of-way	---	---	---	---	0	---

[20] Ibid 19.

Table 11: Approximated Number of Structures Located within 100 feet of the Transmission Centerline [21]

Location of Transmission	Proposed and Alternative Routes					
	Proposed	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Segment 1 following existing MP 34.5 kV distribution centerline	0	---	0	0	0	0
North along Cass County and Crow Wing County border	---	---	2	---	---	---
East side of CR 36/11th Avenue	5	5	0	8	---	---
West side of CR 36/11th Avenue	6	0	---	2	---	---
North side of Mapleton Road	---	7	---	---	---	---
South side of Mapleton Road	---	9	---	---	---	---
Following existing MP 34.5 kV distribution centerline near Sylvan Dam area	---	---	---	---	2	2
North side of E-W section of CR 36	---	---	---	---	2	2
South side of E-W section of CR 36	---	---	---	---	0	0
MP property between CR 36 and Little Pine Road	0	0	---	0	---	---
East side of CR 36/21st Avenue	---	---	---	---	3	3
West side of CR 36/21st Avenue	---	---	---	---	0	0
East side of Upper Sylvan Road	---	---	---	---	5	---
West side of Upper Sylvan Road	---	---	---	---	4	---
East side of CR 18	1	1	1	1	---	1
West side of CR 18	2	2	2	2	---	2
Upper Sylvan Road to existing MP transmission right-of-way	---	---	---	---	0	---

[21] Ibid 19.

Table 12: Approximated Number of Structures Located within 200 feet of the Transmission Centerline [22]

Location of Transmission	Proposed and Alternative Routes					
	Proposed	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Segment 1 following existing MP 34.5 kV distribution centerline	0	---	0	0	0	0
North along Cass County and Crow Wing County border	---	---	7	---	---	---
East side of CR 36/11th Avenue	15	10	---	19	---	---
West side of CR 36/11th Avenue	6	5	---	11	---	---
North side of Mapleton Road	---	7	---	---	---	---
South side of Mapleton Road	---	14	---	---	---	---
Following existing MP 34.5 kV distribution centerline near Sylvan Dam area	---	---	---	---	6	6
North side of E-W section of CR 36	---	---	---	---	6	6
South side of E-W section of CR 36	---	---	---	---	2	2
MP property between CR 36 and Little Pine Road	1	1	---	1	---	---
East side of CR 36/21st Avenue	---	---	---	---	3	3
West side of CR 36/21st Avenue	---	---	---	---	6	6
East side of Upper Sylvan Road	---	---	---	---	11	---
West side of Upper Sylvan Road	---	---	---	---	12	---
East side of CR 18	8	8	8	8	---	8
West side of CR 18	5	5	5	5	---	5
Upper Sylvan Road to existing MP transmission right-of-way	---	---	---	---	0	---

[22] Ibid 19.

Alternative B

Alternative B would run west along Mapleton Road instead of overtaking and sharing the existing MP 34.5 distribution line (Segment 1). This alternative would tie into Segment 2 of the proposed route at the Mapleton Road/County 36 intersection.

The route would impact several residential dwellings not already impacted by an existing line and would also run past a public school and recreational trail. The applicants indicate that the number of land parcels impacted by this route alternative would be 107.

Information provided by the applicants indicates the minimum number of structures along this route located within 50, 100, and 200 feet of the transmission centerline would be 4, 8, and 18, respectively, and depends on which side of each road this alternative is located. A total of approximately 91 structures would be located within 500 feet of the transmission centerline. Several comments were received by residents voicing their opposition to this route alternative.

As indicted by the applicant's in the route permit application, the Crow Wing County Highway Department has plans to upgrade and widen Mapleton Road in the future; however, an immediate construction timeline is not available.

Alternative C

Alternative C follows the initial alignment of the proposed route, overtaking and sharing the existing MP 34.5 kV distribution line. At approximately 2.3 miles west of its starting point the route would veer north and travel along the Cass/Crow Wing County border (50 feet on each side) to Highway 210 and head west. The route proceeds west along Highway 210, tying into Segment 3 of the proposed route at the intersection of Little Pine Road and Highway 210.

This alternative would entail the creation of approximately 1.75 miles of new right-of-way on property owned by Potlatch and other landowners. The area, owned by Potlatch, once commercially logged, is now partially wooded and zoned for both industrial and commercial forestry use. A Draft Alternative Urban Area Review (AUAR) document prepared by Potlatch proposes future development of the northwest ¼ of Section 15 (~160 acres) as an industrial park consisting of corporate headquarters, single tenant office buildings, research and development centers and business park support services such as banks, savings and loan institutions, and professional offices.[23]

The expected tree clearing requirements for Alternative C would amount to approximately 36.24 acres due to crossing Potlatch property along the Crow Wing County border and private land along the Cass County border. However, future tree removal for the Potlatch proposed industrial park in this area would be expected. The total cost for this alternative would be slightly higher than the proposed, exceeding the cost by $170,000.

[23] Potlatch Corporation, *DRAFT Potlatch West Baxter Alternative Urban Area Review* (May 2008).

Information provided by the applicants indicates the minimum number of structures along this route located within 50, 100, and 200 feet of the transmission centerline would be 2, 3, and 12, respectively, and depends on which side of each road this alternative is located. The applicants estimate the number of structures within 500 feet of transmission centerline to be 78.

Although this alternative would create the need for added tree clearing and new right-of-way, the total length of Alternative C is equal to the proposed and would avoid the much contested Segment 2 of the proposed route along CR 36 and Little Pine Road. Citizens attending the October 7, 2008, focus group meeting expressed support for this route over the proposed route and the five other alternatives.

Alternative D

Alternative D is similar to the proposed route except that it would avoid traveling across MP property and Little Pine Road at the north end of CR 36. The route instead proceeds north along CR 36 to Highway 210 and heads west on 210 tying into the proposed route at the Little Pine Road intersection.

The total cost and length of Alternative D increases slightly by $170,000 and 0.2 miles over the proposed route, respectively. This alternative would avoid one residential dwellings and resort located near or along Little Pine Road.

The applicants indicate the minimum number of structures along this route located within 50, 100, and 200 feet of the transmission centerline would be 1, 3, and 17, respectively, and depends on which side of each road this alternative is located. The applicants estimate the number of structures within 500 feet of transmission centerline to be 99.

Alternative E

Alternative E would underbuild the MP 34.5 kV distribution line and share the existing alignment in its entirety. The route follows Segment 1 of the proposed and instead of continuing along Segment 2, veers toward the Sylvan Dam and then north along 21st Avenue to Highway 210. The route crosses Highway 210 and then continues along Upper Sylvan Road and on to the existing MP transmission line right-of-way.

The applicants indicate the costs would exceed the proposed by $2,250,000 due to the need for total double-circuit construction. The total length of this alternative is 11.1 miles and would therefore require a certificate of need in addition to the route permit. The applicants have stated that this alternative would not meet their identified reliability or future expansion needs.

Citizens expressed concern in comment letters regarding the issue of tree clearing along the Upper Sylvan Road segment of this route. The area is known for its “untouched” tree lined street. This route would necessitate the need for tree clearing in this area.

The applicants indicate the minimum number of structures along this route located within 50, 100, and 200 feet of the transmission centerline would be 2, 6, and 22, respectively, and depends on which side of each road this alternative is located. The applicants estimate the number of structures within 500 feet of transmission centerline to be 85. At least 18 comments were received by residents voicing their concern and opposition to this route alternative.

The route also has several environmental and archaeological issues associated with it. The area of the route near the Sylvan Dam and the Gull and Crow Wing rivers has been identified by the DNR as an import bird migration route and the DNR is concerned over the potential for increased avian collision. The area has historically been utilized by recreationalists for fishing, boating, and bird watching. The DNR also has some concern that the route is closer to Crow Wing State Park statutory boundaries.

The area surrounding the Gull and Crow Wing rivers is recognized for a number of significant archaeological sites both listed and eligible for listing on the National Register of Historic Places; most notable is the Chippewa Agency Historic District site. The applicants conducted a Phase Ia survey of the area and identified 17 previously submitted reports referencing investigations involving recorded archaeological sites in the proposed project area, specifically in the area surrounding the confluence of the Gull and Crow Wing rivers. The presence of sensitive historical and environmental resources along this alternative creates numerous construction, access, and maintenance issues.

Alternative F

Alternative F follows the same route as Alternative E up to Highway 210 where the route breaks from the MP distribution line right-of-way and heads east along Highway 210 tying into Segment 3 of the proposed route at CR 18.

Because this alternative route follows the same alignment as alternative E, it would encounter the same historic and environmental issues. The total length of this alternative is 11.5 miles and would therefore require a certificate of need in addition to the route permit. This alternative would cost an estimated $9,990,000.

The applicants indicate the minimum number of structures along this route located within 50, 100, and 200 feet of the transmission centerline would be 2, 3, and 16, respectively, and depends on which side of each road this alternative is located. The applicants estimate the number of structures within 500 feet of transmission centerline to be 100.

9.0 Permits and Approvals Required

Federal, state and local permits for the proposed project are listed below in Table 13.

Table 13: Potentially Required Permits

Permit	Authority
Route Permit	Minnesota Public Utilities Commission
Utility Crossing Permit	State, County, Township, City
Lands Permit	State, County, Township, City
Over-Width Load Permit	State, County, Township, City
Driveway/Access Permit	County, Township, City
Wetland Conservation Act	State, County
License to Cross Public Waters	Minnesota Department of Natural Resources
Railroad Utility License	Burlington Northern Santa Fe
State Section 401 Water Quality Certification	Minnesota Pollution Control Agency
National Pollution Discharge Elimination System Permit	Minnesota Pollution Control Agency
Section 404 Approval	U.S. Army Corps of Engineers
Section 10 Permit	U.S. Army Corps of Engineers
Approval to Cross Minnesota Power Land	Federal Electric Regulatory Commission

10.0 References

Much of the information contained within this document was provided by the applicant or the applicant's representatives in the *Southdale to Scearcyville 115kV High Voltage Transmission Line and Breaker Station Route Permit Application*, July 17, 2008 (available for viewing at: <http://energyfacilities.puc.state.mn.us/Docket.html?Id=19661>).

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