Environmental Assessment

Motley Area 115 kV Transmission Line Project

In the Matter of the Application of Great River Energy and Minnesota Power for a Certificate of Need and a Route Permit for the Motley Area 115 kV Transmission Line Project in Morrison, Cass, and Todd Counties, Minnesota

Docket Nos. ET2, E015/CN-14-853 and ET2, E015/TL-15-204

Minnesota Department of Commerce
Energy Environmental Review and Analysis
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Abstract

On March 19, 2015, Great River Energy and Minnesota Power (applicants) filed a joint certificate of need and route permit application with the Minnesota Public Utilities Commission (Commission) for the Motley Area 115 kV transmission line project. The applicants indicate in their application that the project is needed to relieve overloads on the existing 34.5 kV transmission system near the city of Motley, Minnesota, and to serve a proposed, new oil pumping station in the area.

The applicants propose to construct approximately 15.5 to 16.5 miles of new 115 kilovolt (kV) transmission line and associated facilities in the Minnesota counties of Morrison, Cass, and Todd. The project includes the construction of one new substation and modifications and upgrades to three existing substations.

Two separate approvals from the Commission are required for the construction of the project – a certificate of need (CN) and a route permit. Department of Commerce, Energy Environmental Review and Analysis (EERA) staff is responsible for conducting environment review for CN and route permit applications submitted to the Commission. As two concurrent environmental reviews are required – one for the CN and one for the route permit – the Department has elected to combine these reviews in one document. Thus, this environmental assessment (EA) has been prepared to meet the requirements of both review processes.

This EA addresses the issues required in Minnesota Rules 7849.1500 and 7850.3700 and those identified in the Department's scoping decision of July 14, 2015.

Following release of this EA, a public hearing will be held in the project area. The hearing will be presided over by an administrative law judge from the Office of Administrative Hearings. Upon completion of the environmental review and hearing process, the record compiled on the joint certificate of need and route permit application will be presented to the Commission for final decisions. Commission decisions on the joint application are anticipated in February 2016.

Persons interested in this project can place their names on the project mailing list by contacting Tracy Smetana, the Commission's public advisor, by email: consumer.puc@state.mn.us, or by phone: 651-296-0406 (toll free: 1-800-657-3782). Documents of interest for this project can be found on the State of

Minnesota's eDockets system: https://www.edockets.state.mn.us/EFiling/search.jsp. Enter the year "14" and the number "853" (for the CN docket) or enter the year "15" and the number "204" (for the route permit docket). Documents of interest can also be found on the Department's website at: http://mn.gov/commerce/energyfacilities/Docket.html?Id=34095.

List of Preparers

Rich Davis, Environmental Review Manager
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Acronyms, Abbreviations, and Definitions

ACSR	Aluminum Core Steel Reinforced
ALJ	Administrative Law Judge
Commission	Minnesota Public Utilities Commission
CN	Certificate of Need
CSAH	County State Aid Highway
dB	Decibels
dBA	A-weighted Sound Level Recorded in Decibels
DNR	Minnesota Department of Natural Resources
Department	Minnesota Department of Commerce
EA	Environmental Assessment
EERA	Department of Commerce Energy Environmental Review and Analysis
EMF	Electromagnetic Field
ESRI	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
HVTL	High Voltage Transmission Line
Hz	Hertz
kV	Kilovolt
kV/M	Kilovolt per Meter
mA	milliAmperes
mG	milliGauss
MHz	Megahertz
MnDOT	Minnesota Department of Transportation
MnGEO	Minnesota Geospatial Information Office
MPCA	Minnesota Pollution Control Agency
MSIWG	Minnesota State Interagency Working Group
MVA	Megavolt Amperes
MW	Megawatt
NAC	Noise Area Classification
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NEV	Neutral-to-Earth Voltage
NIEHS	National Institute of Environmental Health Sciences
NLEB	Northern Long-Eared Bat
NPDES	National Pollutant Discharge Elimination System
ppm	Parts per Million
ROW	Right-of-Way
SHPO	State Historic Preservation Office
USACE	United States Army Corp of Engineers
USFWS	United States Fish and Wildlife Service
WCA	Minnesota Wetland Conservation Act
WMA	Wildlife Management Area

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Summary

Great River Energy and Minnesota Power (applicants) propose to construct approximately 15.5 to 16.5 miles of new single circuit 115 kV transmission line from the existing Minnesota Power "24 Line" transmission line, south to the new Fish Trap Lake substation, near the city of Motley. The project also proposes the following, convert the existing Motley substation from 34.5 kV to 115 kV service, add a three way switch to the existing Motley substation, construct the new Fish Trap Lake substation, add breakers to the existing Dog Lake substation, construct a one-half mile transmission line to connect the Dog Lake substation and the Minnesota Power "24 Line," and install a three way switch for the anticipated future construction of the Shamineau substation.

In order to construct the proposed transmission line, the Applicants must obtain two approvals from the Minnesota Public Utilities Commission (Commission) – a certificate of need (CN) and a route permit. The Commission's docket numbers for these approvals are ET2, E015/CN-14-853 and ET2, E015/TL-15-204. In addition to these approvals from the Commission, the project will require approvals (e.g., permits, licenses) from other state agencies, federal agencies, and local units of government.

With the Applicants' joint CN and route permit application, the Commission has two considerations before it – (1) whether the project is needed, or whether some other project would be more appropriate for the State of Minnesota, and (2) if the project is needed, where it is best located. To aid the Commission in these considerations, the Commission gets assistance from several state agencies, including the Department of Commerce (Department) and the Office of Administrative Hearings (OAH).

Department Energy Environmental Review and Analysis (EERA) staff is responsible for conducting environmental review for CN and route permit applications submitted to the Commission. The intent of this review is to ensure that citizens, local governments, agencies, and the Commission are aware of the potential human and environmental impacts of the project and that the Commission can consider these impacts when determining whether the project is needed and where it should be located.

State Review Process
EERA staff has prepared this environmental assessment (EA) for the Commission and for other agencies and entities that have permitting authority related to the project. This EA is also intended to assist citizens in providing guidance to the Commission and other decision-makers regarding the project. This EA evaluates the potential human and environmental impacts of the applicants' proposed project and possible mitigation measures, including route and site alternatives. It also evaluates potential alternatives to the project itself.

The EA does not advocate or state a preference for a specific route or site alternative, or for an alternative to the project itself. The EA analyzes and compares potential impacts and mitigation measures, including routes and site alternatives, such that citizens, local governments, agencies, and the Commission can work from a common set of facts.

EERA staff initiated work on this EA by soliciting comments on (1) the issues and impacts that should be evaluated in the EA, (2) the mitigation measures to study, including route alternatives, and (3) alternatives to the project itself that should be studied. This process of soliciting comments on the contents of the EA is known as "scoping." EERA solicited comments through a public meeting in May 2015 and a public comment period that ended June 3, 2015.

Based on the scoping comments received, the Department issued the scoping decision for this EA on July 14, 2015. The scoping decision includes four alternatives that are evaluated in this EA. All of the alternatives are analyzed in this EA with same level of detail and analysis, and evaluated against the routing factors of Minnesota Rule 7850.4100.

After issuance of this EA, an administrative law judge (ALJ) will hold a public hearing for the project. The hearing will be held in the project area. Interested persons will have an opportunity at the hearing to ask questions, provide comments, submit evidence, and advocate for the routes and sites that they believe are most appropriate for the project. The ALJ will submit a report to the Commission. Based on the ALJ's report, the EA, and the entire record, the Commission will decide whether to grant a CN and route permit for the project.

Project Need and System Alternatives

The proposed Project is needed by 2017 to address potential circuit overload issues that currently exist on the Dog Lake-Baxter 34.5 kV system, and to alleviate capacity issues that have been identified on the lines between Dog Lake and Baxter. Additionally, the proposed project is needed to meet the in-service date of the proposed Minnesota Pipeline Company Fish Trap oil pump station, which will be served by the new Crow Wing Power Fish Trap Lake Substation.

The system alternatives examined in this EA are those noted in Minnesota Rule 7849.1500. Alternatives considered and analyzed included, no-build, demand side management, purchasing power, a different size facility, using different project end points, power generation, upgrading existing facilities, and renewable energy sources. No alternative were determined to be feasible, available and meet the stated need for the project.

Potential Impacts of Proposed Project

The construction of a transmission line involves both short and long-term impacts. Some impacts may be avoidable; some may be unavoidable but can be mitigated; others may be unavoidable and unable to be mitigated. In general, impacts can be avoided and mitigated by prudent routing – i.e., by placing the transmission line away from human and environmental resources – and by design and construction measures.

Impacts to human settlements as a result of the project are anticipated to be minimal to moderate. Aesthetic impacts due to the project are unavoidable, and are anticipated to be minimal to moderate. The project has the potential to impact three residences within the Project right-of-way, but these impacts can be minimized by prudent pole placement. Impacts to public health and safety and to public services are anticipated to be minimal. Impacts to known archaeological and historic resources are anticipated to be minimal. However, there is potential to impact unknown archaeological resources during construction of the project.

Impacts to land-based economies are anticipated to be minimal; however, impacts to trees and forestry are anticipated to be moderate. Impacts to trees are unavoidable, as the project area includes substantial amounts of forest. Impacts to trees can be minimized by prudent placement of the transmission line alignment and poles, particularly through right-of-way sharing with existing infrastructure.

Impacts to water resources and soils are anticipated to be minimal; such impacts can be mitigated by construction best management practices. Impacts to fauna are anticipated to be minimal. Impacts to

avian species can be avoided or minimized by the use of mitigation strategies such as bird flight diverters and development of an Avian Mitigation Plan.

Impacts to rare and unique natural resources are anticipated to be minimal, provided that best management practices are employed. The project will impact trees that could be used as roosting habitat by the Northern Long-Eared Bat, a threatened species. The U.S. Fish and Wildlife Service (USFWS) has noted that an incidental take permit may be necessary for the project. The take permit may impose conditions to mitigate potential impacts to this bat species.

Application of Routing Factors to Proposed Project

The Commission is charged with locating transmission lines in a manner that is "compatible with environmental preservation and the efficient use of resources" and that minimizes "adverse human and environmental impact[s]" while ensuring electric power reliability.[1] Minnesota Rule 7850.4100 lists 14 factors for the Commission to consider in its route permitting decisions.

Many of the impacts of the project, relative to the routing factors of Minnesota Rule 7850.4100, are anticipated to be minimal and mitigated by (1) the general conditions in section 5.0 of the Commission's generic route permit template, (2) prudent pole placement and placement of the alignment within the permitted route, and (3) the requirements of downstream permits. The selection of certain routing options could also minimize and mitigate these impacts (discussed below).

Routing factors and elements of routing factors where special conditions in a Commission route permit are likely required to mitigate impacts include:

- **Human Settlements – Aesthetics.** The construction of a transmission line will cause general aesthetic impacts within the project area. However, the Applicants' anticipated alignment would place three residences within the alignment right-of-way, which could be greatly impacted aesthetically by the placement of structures. Impacts to aesthetics can be mitigated by the Applicants working directly with landowners to determine final project structure placement.

- **Archaeological and Historic Resources.** Impacts to known archaeological and historic resources are anticipated to be minimal as a result of the project. However, because there is a moderate to high potential that the proposed route will impact unrecorded archaeological sites, the Minnesota State Historic Preservation Office recommends that a Phase I archaeological survey be conducted for the project.

- **Land-Based Economies – Forestry.** Impacts to local forestry are anticipated to be moderate as a result of the project. The project will impact approximately 50 to 60 acres of forested land, depending on which route option is selected. Impacts of the project are avoided and mitigated by the proposed route's use of existing roadway and transmission line ROW. Impacts to trees can be further mitigated by prudent placement of the transmission line alignment and of specific structures to avoid forested areas. However, because of the prevalence of trees in the project area, impacts cannot be completely avoided or mitigated.

[1] Minnesota Statute 216E.02.

- **Natural Environment – Flora.** Impacts to flora are anticipated to be minimal with the exception of impacts to trees. Impacts to trees are anticipated to be moderate – the project will impact approximately 50 to 60 acres of trees. Impacts to flora can be mitigated by prudent placement of the transmission line alignment and specific structures to avoid flora, particularly trees.

- **Natural Environment – Fauna.** Impacts to fauna are anticipated to be minimal as a result of the project. However, impacts to avian species could range from minimal to moderate. Avian species can collide with transmission lines causing death or injury. Additionally, avian species with relatively larger wing spans may also be impacted by electrocution. Impacts to avian species can be mitigated by the use of bird flight diverters. There may be specific areas within the project where the Minnesota Department of Natural Resources (MN DNR) and USFWS would recommend the use of bird flight diverters.

- **Rare and Unique Resources.** Impacts to rare and unique resources due to the project are anticipated to be minimal. However there are resources that could be impacted by the project and for which mitigation measures have been recommended by the MN DNR and USFWS, including Site of Biodiversity Significance, Native Plant Communities, the Blanding's turtle (state threatened species), and the Northern Long-Eared Bat (federal threatened species).

Potential Impacts of Alignment Alternatives
In general, impacts of the route and site alternatives are similar to those of the proposed project and to each other. In some instances, the alternatives offer a means to avoid or mitigate potential impacts. In doing do, the alternatives offer tradeoffs.

The East of Highway 10 Alternative (Common Route from Azalea Road to Holt Road) and the East of Highway 10 Alternative (Common Route from Ridge Road to Holt Road) do reduce the number of residences that would be located within the project ROW, and both alternatives also utilize one more mile of existing utility ROW than the proposed anticipated alignment. However, both of the alternatives will result in additional potential impacts to recreation and tourism, forested lands, rare and unique resources, and result in project cost increases.

The MP Land East River Crossing Alternative would shift the proposed alignment further from residences, and utilize land owned by one of the Applicants. However, in utilizing this alternative there is less utilization of existing ROWs and additional project costs when compared to the proposed alignment.

The Old Tree Avoidance Alternative is specific to the avoidance of a large native elm tree directly south of Azalea Road. In comparing this alternative to the proposed alignment the tradeoffs are potential cultural impacts, utilization of existing utility ROW, and additional project costs associated with utilizing the alternative.

Relative Merits of Alignment Alternatives
As with the applicants' proposed route, many of the impacts of the route and site alternatives, relative to the routing factors of Minnesota Rule 7850.4100, are anticipated to be minimal and mitigated by the conditions in the Commission's generic route permit template, prudent pole placement, and the requirements of downstream permits.

1.0 Introduction

This document is an environmental assessment (EA) that has been prepared for the Motley Area 115 kV transmission line project proposed by Great River Energy (GRE) and Minnesota Power (MP) (applicants). This EA evaluates the potential human and environmental impacts of the applicants' proposed project and possible mitigation measures, including route and site alternatives. Additionally, this EA evaluates potential alternatives to the project itself.

The EA is intended to facilitate informed decision-making by state agencies, particularly with respect to the goals of the Minnesota Environmental Policy Act – "to create and maintain conditions under which human beings and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of the state's people."[2]

1.1 Proposed Project

The applicants propose to construct approximately 15.5 to 16.5 miles of new single circuit 115 kV transmission line from the existing Minnesota Power "24 Line" transmission line, south to the new Fish Trap Lake substation, near the city of Motley, Minnesota. The project also proposes the following, convert the existing Motley substation from 34.5 kV to 115 kV service, add a three way switch to the existing Motley substation, construct the new Fish Trap Lake substation, add breakers to the existing Dog Lake substation, construct a one-half mile transmission line to connect the Dog Lake substation and the Minnesota Power "24 Line," and install a three way switch for the anticipated future construction of the Shamineau substation.

Applicants are requesting a variable route width between 250 to 995 feet, depending on the existing land us on the adjacent properties. Applicants indicate that the new 115 kV line will require a permanent right-of-way (easement) of 100 feet. Transmission line structures for the new 115 kV line will be 60 to 90 feet in height, with the spans between structures in the range of 500 to 900 feet. Applicants indicate that construction on the project is anticipated to commence in fall 2016, and line energization is anticipated to occur in the summer of 2017.

Refer to **Figure 1**, the Project Overview Map.

Project Location

The proposed project is located in the Minnesota counties of Morrison, Cass, and Todd. A portion of the Applicants' proposed project occurs in Becker Township in Cass County, at and south of, the existing Dog Lake Substation. Both the east and west route options proposed by the Applicants travel south through May Township in Cass County, and into Motley Township in Morrison County. The Applicants' proposed route than goes south, following to the east of the Morrison and Todd County line, going through Scandia Valley Township in Morrison County. The proposed route crosses into Fawn Lake Township in Todd County just north of the proposed Fish Trap Lake Substation.

[2] Minnesota Statute 116D.02.

1.2 Project Need

The proposed Project is needed by 2017 to address potential circuit overload issues that currently exist on the Dog Lake-Baxter 34.5 kV system, and to alleviate capacity issues that have been identified on the lines between Dog Lake and Baxter. Additionally, the proposed project is needed to meet the in-service date of the proposed Minnesota Pipeline Company (MPL) Fish Trap oil pump station, which will be served by the new Crow Wing Power (CWP) Fish Trap Lake Substation.[3]

1.3 State of Minnesota Review Process

In order to construct the proposed project, applicants must obtain two approvals from the Minnesota Public Utilities Commission (the Commission) – a certificate of need (CN) and a route permit. The Commission's docket numbers for these approvals are ET2, E015/CN-14-853 and ET2, E015/TL-15-204. The applicants submitted a joint CN and route permit application to the Commission on March 19, 2015. In addition to these approvals from the Commission, the project will require approvals (e.g., permits, licenses) from other state agencies, federal agencies and local units of government (see Section 2.3).

With the applicants' joint CN and route permit application, the Commission has before it two distinct considerations: (1) whether the proposed project is needed, or whether some other project would be more appropriate for the State of Minnesota, for example, a project of a different type or size, or a project that is not needed until further into the future; and (2) if the proposed project is needed, where it is best located. To aid the Commission in these considerations, the Commission gets assistance from several state agencies, including the Department of Commerce (Department) and the Office of Administrative Hearings (OAH).

The Department's Energy Regulation and Planning (ERP) staff provides testimony on the need for proposed energy projects. ERP staff represents the public interest and ensures that ratepayers' and the State of Minnesota's long-term interests are represented.

Department Energy Environmental Review and Analysis (EERA) staff is responsible for conducting environmental review for CN and route permit applications submitted to the Commission. The intent of this review is to ensure that citizens, local governments, agencies and the Commission are aware of the potential human and environmental impacts of a proposed project and that the Commission can consider these impacts when determining whether a project is needed and where it should be located.

The OAH, at the request of the Commission, provides an administrative law judge (ALJ) to conduct a public hearing for a proposed project. The ALJ facilitates the hearing to gather input (advocacy) on whether projects are needed and where they should be located. The ALJ submits a report to the Commission which summarizes the input received during the hearing.

Environmental Review

EERA staff has prepared this EA for the Commission, which has before it the applicants' joint CN and router permit application, and for other agencies and entities that have permitting authority related to the project. Additionally, this EA has been prepared to assist citizens in providing guidance to the Commission and other decision-makers regarding the project. The EA evaluates the potential human

[3] Application to the Minnesota Public Utilities Commission for a Certificate of Need and Route Permit, Motley Area 115 kV Project, March 19, 2015, eDocket # 20153-108405-02

and environmental impacts of the project and possible mitigation measures, including route and site alternatives.

Additionally, the EA evaluates potential alternatives to the project itself. The EA does not advocate or state a preference for a specific route or for an alternative to the project itself. The EA analyzes and compares potential impacts and mitigation measures, including route and site alternatives, such that citizens, local governments, agencies and the Commission can work form a common set of facts.

EERA staff initiated work on this EA by soliciting comments on: (1) the issues and impacts that should be evaluated in the EA; (2) the mitigation measures to study, including route and site alternatives; and (3) alternatives to the project itself that should be studied. This process of soliciting comments on the contents of the EA is known as "scoping." EERA solicited comments through a public meeting on May 19, 2015, and a public comment period that ended June 4, 2015.

Based on the scoping comments received, the Department issued the scoping decision for this EA on July 15, 2015 (**Appendix A**). The scoping decision includes those alternatives that are evaluated in this EA – including alternatives beyond those proposed by the applicants. All of the alternatives are analyzed in this EA with same level of detail and analysis, and evaluated against the routing factors of Minnesota Rule 7850.4100.

Once completed and issued, the EA will be entered in the records for these proceedings, so that it can be used by the ALJ and the Commission in making decisions about the project.

Public Hearing

After the EA is issued, an ALJ will conduct a public hearing for the project. The hearing will be held in the project area. Interested persons will have an opportunity at the hearing to ask questions, provide comments, and advocate for the route(s) and mitigation measures that they believe are most appropriate for the project.

The ALJ will submit a report to the Commission which summarizes the input received during the public hearing. The Commission will use the ALJ report, the EA, and the entire record in deciding whether to grant a CN and route permit for the project.

1.4 Organization of the Environmental Assessment

This EA addresses the issues required in Minnesota Rules 7849.1500 and 7850.3700 and those identified in the Department's scoping decision July 15, 2015 (**Appendix A**), and is organized as follows:

Section 1.0	**Introduction**	The introduction provides an overview of the proposed project, the State of Minnesota's review process, and this EA.
Section 2.0	**Regulatory Framework**	Section 2.0 describes the regulatory framework associated with the project, including the Commission's certificate of need and route permitting processes and other permits and approvals required for the project.

Section 3.0	**Proposed Project and Route and Site Alternatives**	Section 3.0 describes the Motley Area 115 kV project as proposed by the applicants. It also describes the route and site alternatives analyzed in this EA. This section also describes the engineering and construction of the project
Section 4.0	**Alternatives to the Proposed Project**	Section 4.0 describes the feasibility, availability, and potential impacts of alternatives to the proposed project.
Section 5.0	**Potential Impacts of the Proposed Project**	Section 5.0 details the potential impacts of the proposed project to human and natural resources and identifies measures that could be implemented to avoid, minimize, or mitigate these impacts. This section also discusses the relative merits of the proposed project with respect to the routing factors of Minnesota Rule 7850.4100.
Section 6.0	**Potential Impacts of Route and Site Alternatives**	Section 6.0 describes the potential impacts of route and site alternatives to human and natural resources and measures to avoid, minimize, or mitigate these impacts. This section also discusses the relative merits of the alternatives with respect to the routing factors of Minnesota Rule 7850.4100.

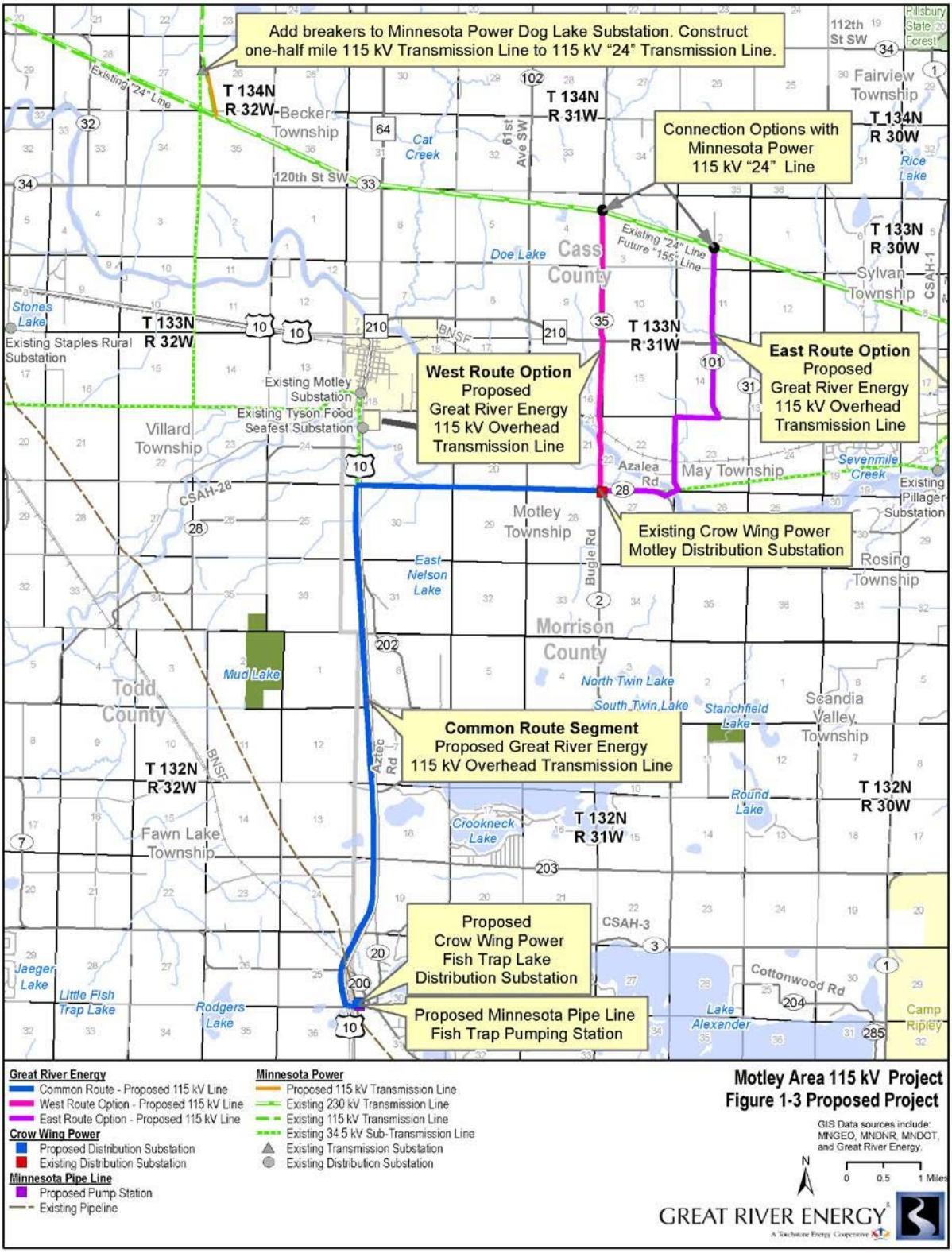
1.5 Sources of Information

The primary source of information for this EA is the joint CN and route permit application submitted by Great River Energy and Minnesota Power. Additional sources of information are indicated in footnotes. New and additional data has been included from the Applicants. Information from prior EERA environmental review documents and other state agencies is included. Information was also gathered by making multiple site visits.

Spatial Data Sources

A number of spatial data sources, which describe the resources in the project area, were used in preparing this EA. These date sources are noted in the applicants' CN and route permit application. Spatial data from these sources can be imported into geographic information system (GIS) software, where the date can be analyzed and potential impacts of the project quantified, e.g., acres of forested wetlands within the anticipated project right-of-way. Data sources used for this EA are noted in **Appendix F**.

Figure 1. Project Overview Map



2.0 Regulatory Framework

The Motley Area 115 kV project requires two approvals from the Minnesota Public Utilities Commission (Commission) – a certificate of need (CN) and a route permit. Additionally, the project will require approvals from other state and federal agencies with permitting authority for actions related to the project.

2.1 Certificate of Need

No person may construct a large energy facility in Minnesota without a certificate of need from the Commission.[4] A high voltage transmission line is a large energy facility if it (1) has a capacity of 200 kV or more and is greater than 1,500 feet in length, or (2) has a capacity of 100 kV or more with more than 10 miles of its length in Minnesota, or (3) has a capacity of 100 kV or more and crosses a state line.[5]

The proposed project, a 115 kV transmission line with a length of approximately 15.5 to 16.5 miles, qualifies as a large energy facility and thus requires a CN. The applicants submitted a joint CN and route permit application to the Commission on March 19, 2015. After accepting the application as complete, the Commission referred the application to the Office of Administrative Hearings (OAH) for a public hearing, to be conducted jointly with the hearing for the route permit application (discussed below).

Environmental Review

CN applications to the Commission are subject to environmental review by Department of Commerce (Department) Energy Environmental Review and Analysis (EERA) staff.[6] EERA staff is required to prepare an environmental report (ER) for high voltage transmission lines (HVTLs) needing a CN. An ER is a document which describes the potential human and environmental impacts of the project, particularly those impacts associated with the size, type and timing of the project. The ER also addresses alternatives to the project, commonly referred to as "system alternatives." Minnesota Rule 7849.1500 lists system alternatives that are required to be evaluated in an ER.

When there are two approvals before the Commission for a single transmission line project – a CN and a route permit application – the Department may elect to combine the environmental reviews required for each approval. In this instance, the Department may prepare an environmental assessment (EA) in lieu of an ER.[7] For the applicants' proposed project, the Department has elected to combine the environmental reviews required for the project and issue one EA to address the CN and route permit approvals.

EERA staff solicited public comments on alternatives to project to study in the EA. Commission staff and EERA staff held a joint public information and EA scoping meeting on May 19, 2015 in the city of Motley. A comment period, ending on June 3, 2015, provided the public an opportunity to propose system alternatives for consideration in the scope of the EA.

[4] Minnesota Statute 216B.243.
[5] Minnesota Statute 216B.2421.
[6] Minnesota Rule 7849.1200.
[7] Minnesota Rule 7849.1900.

There was no system alternatives suggested during the EA scoping process for the proposed project. Route and alignment alternatives were suggested during the EA scoping process, and these alternatives will be covered later in this EA.

Accordingly, the system alternatives evaluated in this EA are those required by Minnesota Rule 7849.1500 (see **Appendix A**).

Public Hearing

Upon completion of the EA, a public hearing will be held in the project area. The hearing will be presided over by an administrative law judge (ALJ) from the OAH. In accordance with the Commission's order in this matter, the hearing on the CN will be held jointly with the hearing for the route permit (discussed below). At the public hearing, citizens will have an opportunity to submit comments, present evidence and ask questions. After the public hearing, the ALJ will submit a report to the Commission that summarizes the hearing proceedings and comments. The ALJ's report, the EA, and the entire record will be presented to the Commission for a final decision. A Commission decision on a CN is anticipated in early 2016.

Certificate of Need Decision

In making a CN decision, the Commission must determine whether the applicant's proposed project is needed, or whether some other project would be more appropriate for the State of Minnesota, e.g., a project of a different type or size. The Commission must consider whether the need for the project can be better met through conservation measures or through the use of renewable resources.[8] Minnesota Rule 7849.0120 provides the following criteria that must be met in order for a CN to be granted for the project:

A. The probable result of denial would be an adverse effect upon the future adequacy, reliability or efficiency of energy supply to the applicant, to the applicant's customers or to the people of Minnesota and neighboring states;

B. A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record;

C. By a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health; and

D. The record does not demonstrate that the design, construction or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules and regulations of other state and federal agencies and local governments.

Within 12 months of the submission of an application, the Commission must approve or deny a CN for the proposed project.[9] The Commission may extend this time for good cause.

[8] Minnesota Statutes 216B.2422 and 216B.243.
[9] Minnesota Statute 216B.243.

2.2 Route Permit

In Minnesota, no person may construct a high voltage transmission line without a route permit from the Commission.[10] A high voltage transmission line is defined as a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kV or more and greater than 1,500 feet in length.[11] Associated facilities of a transmission line may include substations, buildings, equipment, and other physical structures that are necessary to the operation of a high voltage transmission line.

The proposed project will consist of approximately 15.5 to 16.5 miles of new 115 kV transmission line and therefore requires a route permit from the Commission. The applicants submitted a joint CN and route permit application to the Commission on March 19, 2015. The application was accepted as complete by the Commission on April 30, 2015. The applicants have indicated their intention to utilize the Power Plant Siting Act's alternative permitting process for the project. Because the project will operate at voltage of 115 kV, the project is eligible for this process.[12] The alternative permitting process includes environmental review and a public hearing, and typically takes six to nine months to complete.

Environmental Review

Applications to the Commission for high voltage transmission line route permits are subject to environmental review conducted by EERA staff.[13] Projects proceeding under the alternative permitting process require the preparation of an environmental assessment (EA).[14] An EA is a document which describes the potential human and environmental impacts of the proposed project and potential mitigation measures. The Department of Commerce determines the scope of the EA. The Department may include alternative routes and sites suggested by the public in the scope of the EA if such alternatives will assist in the Commission's decision on the route permit. The EA must be completed and made available prior to the public hearing for the project.

On May 19, 2015, Commission staff and EERA staff held a joint public information and EA scoping meeting in the city of Motley. The purpose of the meeting was to provide information to the public about the proposed project, to answer questions, and to allow the public an opportunity to suggest impacts and alternatives that should be considered in the EA for the project. Approximately 50 people attended the meeting. Comments were received from several persons at the meeting. Comments included impacts and mitigation measures to study in the EA, including specific route alternatives. Specific impacts suggested for study included impacts to property values, livestock farms, rare plants, and wildlife.

A comment period followed the public meeting and was open through June 3, 2015. Comments were received from 11 persons, three state agencies and one federal agency. These comments included impacts and mitigation measures to study in the EA, including specific alternatives.

Commenters noted potential impacts to property values, rare plants, livestock farms, aesthetics and wildlife.

[10] Minnesota Statute 216E.03.
[11] Minnesota Statute 216E.01.
[12] Minnesota Statute 216E.04, Subd. 1.
[13] Minnesota Statute 216E.04, Subd. 5.
[14] Id.

The Minnesota Department of Transportation (MnDOT) noted its accommodation policy for the placement of utilities along and across highway rights-of-way.[15] MnDOT indicated that the applicants' proposed route along U.S. Highway 10, south of the city of Motley may occupy a portion of the highway ROW.[16] MnDOT indicated that the soils along U.S. Highway 10 have a high sand composition and erode easily. Erosion control measures will need to comply with MnDOT'S Application for Utility Permit on Trunk Highway Right of Way (Form TP-2525) Special Provision II.[17] Further, MnDOT noted that areas of significant tree coverage exists along U.S. Highway 10, and that MnDOT's roadside vegetation management unit will need to review potential impacts to native plant communities, threatened and endangered plant species, specimen trees, and other woody vegetation along the U.S. Highway 10 ROW.[18]

Minnesota Department of Natural Resources (DNR) recommended that cumulative total impacts be evaluated for the proposed Crow Wing River crossings along with the currently existing transmission line river crossings.[19] The DNR also recommends that Minnesota's Species Wildlife Action Plan (SWAP), Ecological Classification System (ECS), Native Plant Community (NPC), and Minnesota Biological Survey (MBS) data be utilized in the development of and the analyses completed in the EA.[20] DNR also requested that the EA evaluate Public Water crossing impacts, and potential avian collision risk posed by the proposed project.[21] DNR also identified that DNR Land and Water Crossing Licenses may be necessary for portions of the proposed project, and coordination with the DNR Division of Lands and Minerals will be necessary to acquire these permits.[22]

The Minnesota Pollution Control Agency (MPCA) indicated that the project applicants must obtain a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS), and some erosion control impact and mitigation measures identified by the applicant should be considered required rather than optional.[23] MPCA also noted that any contaminated soils or groundwater encountered during construction must be managed by the applicants, even if they are not responsible for the contamination.[24] MPCA would like to see the potential cumulative noise impacts evaluated if the proposed Fish Trap Lake substation and the proposed Fish Trap Lake pump station will be located close to each other.[25] Further, MPCA recommended that the applicants consider alternatives that cross fewer large expanses of wetlands, and also that the applicants consider utilizing creative approaches to erosion and sediment control in difficult areas as the project progresses.[26]

The U.S. Fish and Wildlife Service (USFWS) provided comments clarifying that the Application has incorrectly stated that the northern long-eared bat tree clearing restrictions are shorter than the April 1

[15] Minnesota Department of Transportation Comments, May 29, 2015, eDockets Number 20155-110935-01
[16] Minnesota Department of Transportation Comments, May 29, 2015, eDockets Number 20155-110935-01
[17] Minnesota Department of Transportation Comments, May 29, 2015, eDockets Number 20155-110935-01
[18] Minnesota Department of Transportation Comments, May 29, 2015, eDockets Number 20155-110935-01
[19] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[20] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[21] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[22] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[23] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[24] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[25] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[26] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01

to September 30.[27] USFWS comments also provided clarification with regard to the Endangered Species Act, specifically interim 4(d) Rules, exemptions, and the Incidental Take Statement.[28]

On June 22, 2015, EERA staff provided a summary of the scoping process to the Commission and an opportunity for Commission comment on the alternatives to study in the EA. The Commission did not suggest any additional alternatives to be studied in this EA.

After consideration of the joint CN and route permit application, public comments received, and the Commission's review of the scoping process, the deputy commissioner of the Department of Commerce issued a scoping decision on July 14, 2015 (**Appendix A**). The scoping decision identifies the route and site alternatives that are evaluated in this EA and those alternatives that were not carried forward for evaluation. EERA staff provided notice of the scoping decision to those persons on the project mailing list and to all landowners along alternatives newly proposed during the scoping process.

Public Hearing

Upon completion of the EA, a public hearing will be held in the project area.[29] The hearing will be presided over by an administrative law judge (ALJ) from the Office of Administrative Hearings. Members of the public will have an opportunity to speak at the hearing, present evidence, ask questions, and submit comments. The ALJ will provide a report to the Commission that summarizes the hearing proceedings and comments.

Comments received during the hearing on the EA become part of the record in the proceeding. EERA staff will respond to comments on the EA during the hearing comment period, but staff is not required to revise or supplement the EA document. Upon completion of the environmental review and hearing process, the record will be presented to the Commission for a final decision. A decision by the Commission on a route permit for the project is anticipated in early 2016.

Permit Decision

The Commission is charged with selecting routes that minimize adverse human and environmental impacts while ensuring continuing electric power system reliability and integrity.[30] Route permits issued by the Commission include a permitted route and anticipated alignment, as well as conditions specifying construction and operation standards. The Commission's generic route permit template is included in **Appendix B**.[31] An example route permit previously issued by the Commission is included in **Appendix C**.

Minnesota Statute Section 216E.03, subdivision 7(b) identifies 12 considerations that the Commission must take into account when designating transmission lines routes.[32] Minnesota Rule 7850.4100 lists 14 factors for the Commission to consider when making a decision on a route permit:[33]

[27] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[28] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[29] Minnesota Statute 216E.04, Subd. 6.
[30] Minnesota Statute 216E.02.
[31] Generic Route Permit Template for a High Voltage Transmission Line, Minnesota Public Utilities Commission, July 2, 2015, eDockets Number 20157-112081-01.
[32] Minnesota Statute 216E.03, Subd. 7.
[33] Minnesota Rule 7850.4100.

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

B. Effects on public health and safety;

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

D. Effects on archaeological and historic resources

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

F. Effects on rare and unique natural resources;

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

H. Use or paralleling of existing right-of-way, survey lines, natural divisions lines, and agricultural field boundaries;

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

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

K. Electrical systems reliability;

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

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

N. Irreversible and irretrievable commitments of resources.

The Commission must make specific findings that it has considered locating a route for a new high voltage transmission line along an existing high voltage transmission line route or parallel to existing highway right-of-way and, to the extent these are not used for the route, the Commission must state the reasons why.[34] At the time the Commission makes a final decision on a route permit, the Commission must determine whether the EA and the record created at the public hearing address the issues identified in the scoping decision.[35]

The Commission is charged with make a final decision on a route permit within 60 days after receipt of the ALJ's report.[36] A final decision must be made within six months after the Commission's determination that an application is complete. The Commission may extend this time limit for up to three months for just cause or upon agreement of the applicant.[37]

[34] Minnesota Statute 216E.03, Subd. 7.
[35] Minnesota Rule 7850.3900.
[36] Id.
[37] Id.

If issued a route permit by the Commission, the applicants may exercise the power of eminent domain to acquire land for the project.[38]

2.3 Other Permits and Approvals

A route permit from the Commission is the only state permit required for the routing of the project. The Commission's route permit supersedes local planning and zoning and binds state agencies.[39] Thus, state agencies are required to participate in the Commission's permitting process to aid the Commission's decision-making and to indicate routes that are not permittable.[40]

This said, various federal, state, and local permits may be required for activities related to the construction and operation of the project. All permits subsequent to the Commission's issuance of a route permit and necessary for the project (commonly referred to as "downstream permits") must be obtained by a permittee. **Table 1** includes a list of downstream permits that may be required for the project.

Table 1. Potential Permits and Approvals[41]

Jurisdiction	Approval/Permit
Federal Approvals	
U.S. Army Corps of Engineers	Section 10 Permit, Section 404 Permit
U.S. Fish and Wildlife Service	Endangered Species Consultation (Section 7 and Section 10)
State of Minnesota Approvals	
Department of Natural Resources	License to Cross Public Waters and Lands, Endangered Species Consultation
Minnesota Pollution Control Agency	NPDES/SDS Stormwater Construction Permit
Minnesota Department of Transportation	Utility Crossing Permit
Board of Water and Soil Resources	Wetland Conservation Act
Local Approvals	
County, Township, City	Road Crossing Permit, Overwidth Load Permit, Driveway Permit, Land or Building Permit

[38] Minnesota Statute 216E.12.
[39] Minnesota Statute 216E.10.
[40] Id.
[41] CN and Route Permit Application, Section 2.5.

Federal Approvals

The United State Army Corps of Engineers (USACE) regulates potential impacts to waters of the United States. Dredged or fill material, including material that moves from construction sites into these waters, could impact the quality of the waters. The USACE requires permits for projects that may cause such impacts.

The U.S. Fish and Wildlife Service (USFWS) requires permits for the taking of threatened or endangered species.[42] The USFWS encourages consultation with project proposers to ascertain a project's potential to impact these species and to identify mitigation measures for the project generally.

State Approvals

The Minnesota Department of Natural Resource (DNR) regulates potential impacts to Minnesota's public lands and waters. DNR requires a license to cross public lands and waters; licenses may require mitigation measures. Similar to USFWS, DNR encourages consultation with project proposers to ascertain a project's potential to impact state-listed threatened and endangered species and possible mitigation measures.

A general national pollutant discharge elimination system / sanitary disposal system (NPDES/SDS) construction stormwater permit from the Minnesota Pollution Control Agency (MPCA) is required for stormwater discharges from construction sites. A permit is required if a project disturbs one acre or more of land. The general NPDES/SDS permit requires (1) use of best management practices, (2) a stormwater pollution prevention plan, and (3) adequate stormwater treatment capacity once the project is constructed.

The Minnesota Board of Soil and Water Resources (BWSR) oversees implementation of Minnesota's Wetland Conservation Act (WCA). The WCA is implemented by local units of government (LGUs). For linear projects that cross multiple LGUs, BWSR typically coordinates the review of potential wetland impacts among the affected LGUs. The WCA requires anyone proposing to impact a wetland to first try to avoid the impact; second, to try to minimize any unavoidable impacts; and, finally, to replace any lost wetland functions.

A permit from the Minnesota Department of Transportation (MnDOT) is required for transmission lines that are adjacent to or cross over Minnesota trunk highway rights-of-way. MnDOT's utility accommodation policy generally allows utilities to occupy portions of highway rights-of-way where such occupation does not put the safety of the traveling public or highway workers at risk or unduly impair the public's investment in the transportation system.[43]

Local Approvals

The Commission's route permit supersedes local planning and zoning regulations and ordinances.[44] However, permittees must obtain local approvals necessary for proper local government functioning – e.g., the safe use of local roads; the inclusion of transmission line infrastructure on LGU maps.

[42] U.S. Fish and Wildlife Service, Endangered Species, http://www.fws.gov/ENDANGERED/permits/index.html.
[43] Minnesota Department of Transportation, Utility Accommodation on Highway Right of Way, http://www.dot.state.mn.us/policy/operations/op002.html#6.
[44] Minnesota Statute 216E.10.

2.4 Applicable Codes

The applicant's proposed project must meet the requirements of the National Electrical Safety Code (NESC).[45] The code is designed to protect human health and the environment. It also ensures that the transmission line and all associated structures are built from high quality materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided that routine maintenance is performed.

Utilities must also comply with North American Electric Reliability Corporation (NERC) standards.[46] NERC standards define the reliability requirements for planning and operation the electrical transmission grid in North America.

2.5 Issues Outside the Scope of the Environmental Assessment

In accordance with the scoping decision for this EA (**Appendix A**), the following topics are not addressed in this document:

- Any route or site alternative not specifically identified for study in the scoping decision.
- Any system alternative not specifically identified for study in the scoping decision.
- Policy issues concerning whether utilities or local governments should be liable for the cost to relocate utility poles when roadways are widened.
- The manner in which landowners are paid for transmission right-of-way easements.

[45] Minnesota Statute 326B.35 (requiring utilities to comply with the most recent edition of the NESC when constructing new facilities or reinvesting capital in existing facilities); see also Appendix B, Section 5.4.1, Generic Route Permit Template (requiring compliance with NESC standards).
[46] Appendix B, Section 5.4.1 of Generic Route Permit Template (requiring compliance with NERC standards).

3.0 Proposed Project and Alignment Alternatives

The Applicants propose to build approximately 15.5 to 16.5 miles of new 115 kV transmission line in central Minnesota. This section describes the Applicants' proposed project including the proposed routes, structures, facilities, and how the project will be constructed. This section also describes route and site alternatives that could be used for the project.

3.1 Applicant's Proposed Route

The applicants propose to construct approximately 15.5 to 16.5 miles of new 115 kV transmission line upgrading three existing substations, and the construction of one new substation (see **Figure 1** and route maps in **Appendix D**).[47] The proposed project includes:

- Upgrading Minnesota Power's (MP) existing Dog Lake Substation by converting the substation to a more reliable ring bus design. A new one-half mile segment of 115 kV transmission line will be constructed to connect the MP "24 Line" into and out of the upgraded Dog Lake Substation. The Dog Lake Substation is located to the northwest of Motley, Minnesota.

- New 115 kV transmission line will be connected to the MP "24 Line" using a motor-operated three-way switch, and the new line will be constructed to the south extending to the existing Crow Wing Power (CWP) Motley Substation. Two route options have been proposed to complete this portion of the project, the West Route Option would construct approximately four miles of new transmission line, and the East Route Option would construct approximately five miles of new transmission line. Both the West and East Route Options are located generally to the east of Motley, Minnesota.

- The CWP Motley Substation will be upgraded from 34.5 kV to 115 kV service with the installation of a manual three-way switch. The existing Motley Substation is located southeast of Motley, Minnesota.

- New single circuit 115 kV transmission line will be constructed from the upgraded Motley Substation west and then south along U.S. Highway 10 to the proposed Fish Trap Lake Substation. The section of the new 115 kV transmission line is referred to as the Common Route as it is proposed to be along the same route if the West Option Route or East Option Route is selected to the north of the Motley Substation. The Common Route will be approximately 10.5 miles long, and will be located south of Motley, Minnesota.

- Construction of the new CWP Fish Trap Lake 115 kV Substation south of Motley, Minnesota, which will provide service to the Minnesota Pipe Line Company's (MPL) proposed Fish Trap oil pump station.

- Future plans in the project area include the construction of the Shamineau Substation, which will be constructed along U.S. Highway 10 south of Motley, Minnesota. To facilitate the future interconnection of the Shamineau Substation to the proposed 115 kV transmission line a manual three-way tap switch will be installed along the proposed 115 kV transmission line. The

[47] CN and Route Permit Application, Section 1.5.

tap switch will allow the future Shamineau Substation to be connected to the 115 kV transmission line without having to take a power outage.

3.2 Route Width and Right-of-Way

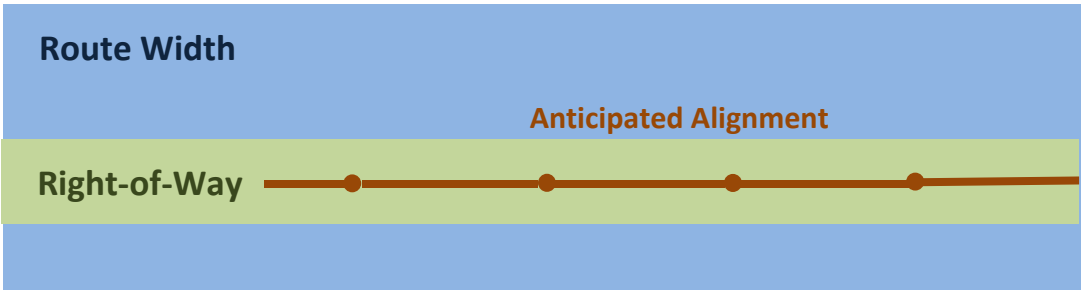
When it issues a route permit, the Commission designates a route, a route width, and an anticipated alignment within that route width (**Figure 2**). The transmission line must be constructed within the Commission's designated route.[48] The route width is typically larger than the actual right-of-way needed for the transmission line. This extra width provides flexibility in constructing the line, yet is not of such an extent that the placement of the line is undetermined. The route width and anticipated alignment are intended to provide flexibility and predictability.

The applicants have requested a route width varying between 250 and 995 feet for the new 115 kV transmission line with the following specifications[49]:

- Where the route crosses open land with no existing roadways to follow, a 250 foot wide route is requested.
- Where the route follows a rural road or county highway, a 300 foot wide route is requested. The route will extend 150 feet in each direction perpendicular to the road centerline.
- Where the route follows U.S. Highway 10, the requested route extends 250 feet east and west out from the outside road edge of the north and south bound lanes, respectively, of U.S. Highway 10, and includes both lanes of U.S. Highway 10 and the entire highway median. This portion of the route will have a width range of 975 to 995 feet due to variability in the highway median width.
- Additional route width is also being requested in the following areas:
    1. Interconnect point of the new transmission line with existing Minnesota Power "24 Line,"
    2. Crossing of the Crow Wing River,
    3. Near the Motley Substation to accommodate interconnection,
    4. Near a large American elm tree located on the south side of Azalea Road in the NW of Section 30, T133N, R31W, Motley Township in Morrison County,
    5. Along the East Route Option at the intersection of Cass County Road 31 (51st Ave SW) and 132nd Street SW,
    6. Near the proposed MPL Fish Trap pump station and the FishTrap Lake Substation,
    7. In areas where guy wires will be used.

[48] Appendix B, Generic Route Permit Template.
[49] CN and Route Permit Application, Section 4.1.1.

Figure 2. Route Width and Right-of-Way Illustration[50]



Right-of-Way

The right-of-way (ROW) for a specific transmission line is determined by the Commission in its route permit. The ROW is that specific area required for the safe construction and operation of the transmission line, where such safety is defined by NESC and NERC standards (see Section 2.4). The applicants indicate that a 100 foot right-of-way (ROW) will be needed for the project (50 feet on either side of the transmission line).[51] In restrictive or physically limiting areas a reduced ROW may be considered by the applicants, which could reduce the ROW to 70 feet (35 feet on each side of the transmission centerline. In areas where the transmission line follows existing distribution lines or parallels existing roadways, a portion of the transmission ROW will overlap and be common with the existing distribution line ROW and/or road ROW. Applicants will seek easements from landowners for this ROW (see Section 3.6, below). The ROW may be slightly wider in some areas to accommodate guy wires and anchors.

The applicants indicate that a 100 foot ROW is Great River Energy's standard ROW for a 115 kV line.[52] Applicants note that a 100 foot ROW ensures that the conductors will – under all circumstances, including high winds, commonly referred to as blow out – remain at a safe distance from objects within and near the transmission line ROW.

Applicants indicate that new transmission line poles will generally be placed two to five feet outside of existing road rights-of-way (**Figure 3-A**).[53] Where there are other utilities adjacent to a roadway, e.g., a natural gas line, the new transmission poles will be placed outside of ROW for these utilities (**Figure 3-B**). This placement may be modified to mitigate potential impacts identified during the route permitting process or to accommodate landowner requests. In some instances existing transmission or distribution lines may need to be moved or removed yet remain in service until the new 115 kV line is energized. In these instances, the existing lines may be leaned over to accommodate construction of the new 115 kV line. Distribution lines can be placed back on the new transmission line structures (as process known as "underbuilding") or placed underground.

[50] Illustration is not to scale.
[51] CN and Route Permit Application, Section 4.1.1.
[52] Id.
[53] CN and Route Permit Application, Section 8.2.

Figure 3-A. Schematic of Right-of-Way Sharing with Roadway[54]

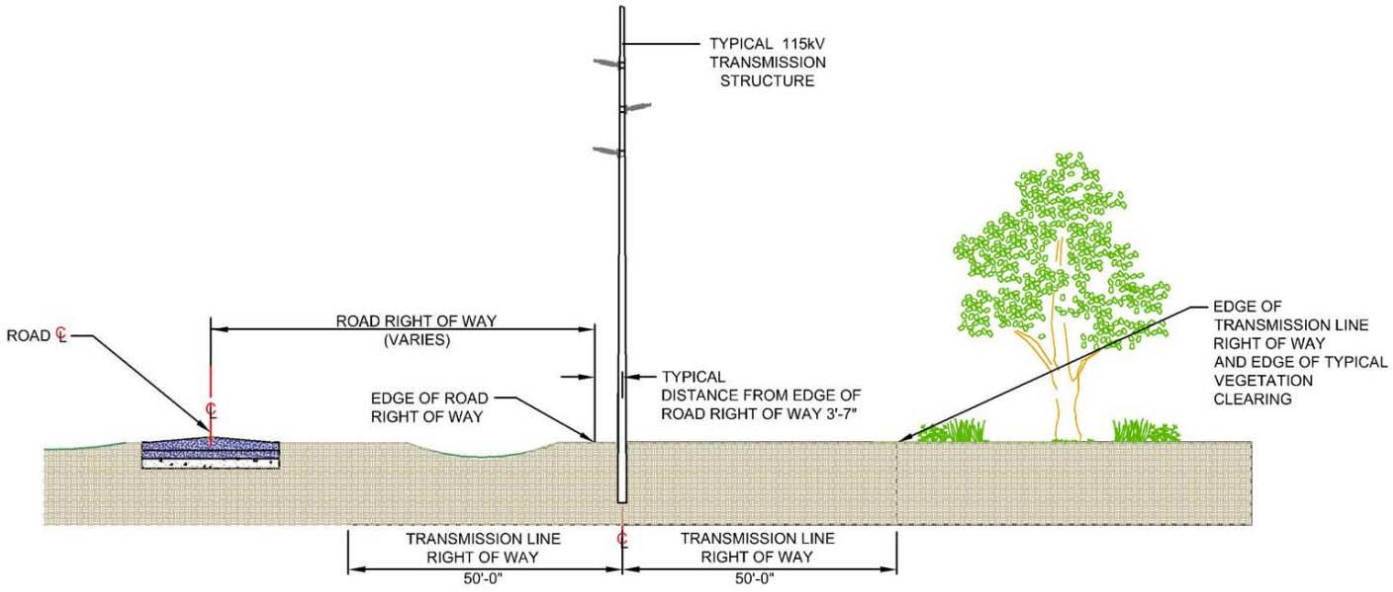
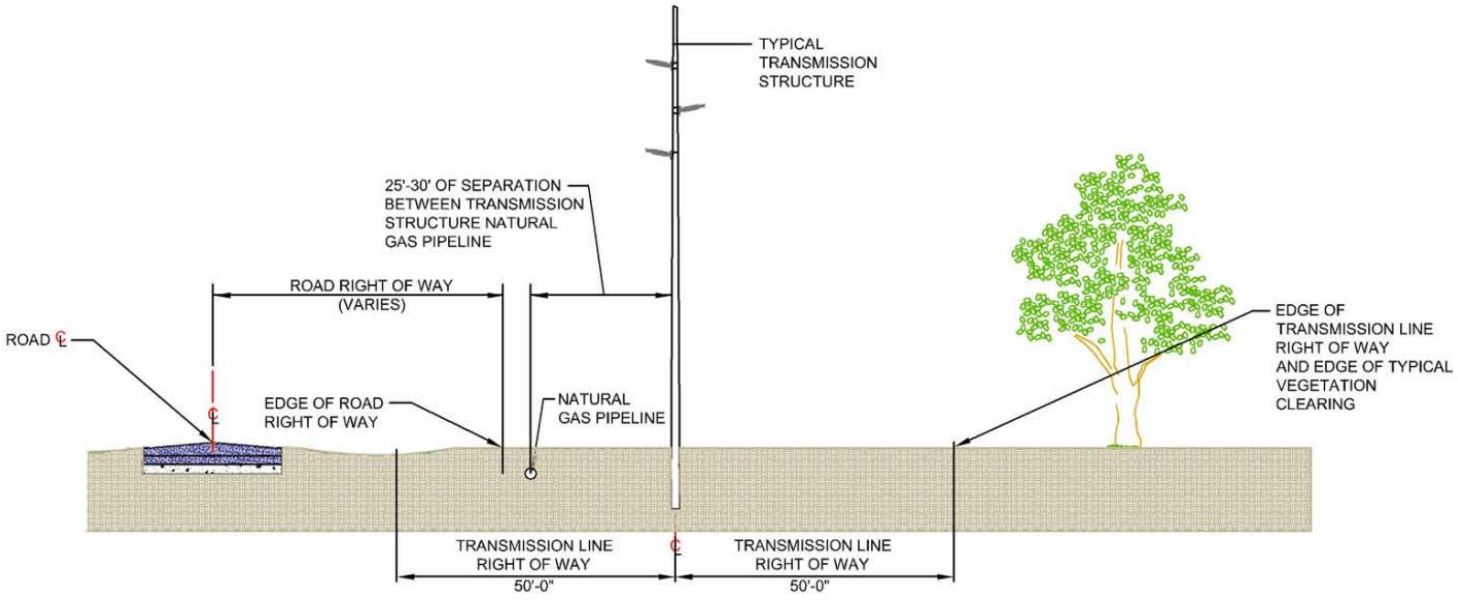


Figure 3-B. Schematic of Right-of-Way Sharing with Roadway and Utilities[55]



[54] Schematic is not to scale.
[55] Schematic is not to scale.

3.3 Substations

The proposed project includes the construction of one new substation – the Fish Trap Lake Substation; and upgrading of the existing Dog Lake and Motley Substations.

Fish Trap Lake Substation (Crow Wing Power)

The Fish Trap Lake Substation has been proposed to be constructed in the SW ¼ of Section 30, T132N, R31W, Scandia Valley Township, Morrison County (see **Figure 4**). The proposed Fish Trap Lake Substation will be constructed on property owned by MPL on the east side of U.S. Highway 10 approximately eight miles south of the city of Motley. The Fish Trap Pump Station, a pumping station for MPL's crude oil pipeline will be constructed directly adjacent to the Fish Trap Lake Substation. Once constructed, the Fish Trap Lake Substation will provide power to support the motor loads at the Fish Trap Pump Station. The fenced area of the Fish Trap Lake Substation is anticipated to be approximately 125 feet by 125 feet.[56] The substation will include a 115/4.16 kV transformer and associated switches, communications, and metering equipment.[57]

Figure 4. Location of the Proposed Fish Trap Lake Substation[58]

Motley Substation (Crow Wing Power)

The existing Motley Substation is located southeast of the city of Motley in the NW ¼ of Section 27, T133N, R31W, Motley Township, Morrison County (see **Figure 5**). The existing Motley Substation will be

[56] CN and Route Permit Application, Section 4.1.2.
[57] Id.
[58] View looking north from CR-200.

converted from 34.5 kV to 115 kV voltage. To minimize outages to customers the 115 kV substation upgrade will be constructed directly adjacent to the existing 34.5 kv substation.

The Motley Substation upgrade will include a 115/12.47 kV transformer, a three-way manual switch, associated buses, breakers, communications, and metering equipment.[59]

Figure 5. Existing Motley Substation[60]

Dog Lake Substation (Minnesota Power)

The existing Dog Lake Substation is located northwest of the city of Motley in the NW ¼ of Section 26, T134N, R32W, Becker Township, Cass County (see **Figure 6**). The Dog Lake Substation breaker upgrades and the addition of a ring bus system will allow for greater regional transmission reliability once the proposed Fish Trap Pump Station comes on line. The fenced area of the existing Dog Lake Substation is anticipated to be expanded by approximately 50 feet to the south and 50 feet to the east.[61] The substation upgrades will include a ring bus structure, a three-way 115 kV motor operated switches, and a new one-half mile tap line.[62]

[59] Id.
[60] View looking southeast from Bugle Road, south of the intersection of Bugle Road and Azalea Road.
[61] Id.
[62] Id.

Figure 6. Dog Lake Substation[63]

3.4 Alignment Alternatives

The Applicants have proposed a route, an anticipated alignment and a substation site for the project (discussed above). Based on comments received during the scoping process and on the EA scoping decision (**Appendix A**), this EA evaluates alignment alternatives beyond those proposed by the applicants. Any of these alternatives could be selected by the Commission for the project. The alternatives are briefly discussed here; the potential impacts and relative merits of the alternatives are discussed in Section 6.

East of Highway 10 Alternative

The proposed project's common route to follow MN Highway 10 south of the City of Motley currently extends to the west and east of MN Highway 10, and the applicants' proposed alignment would place the line on the west side of MN Highway 10. A comment was received to consider placing the transmission line on the east side of MN Highway 10.[64] Along with the recommended alignment alternative to be considered the comment received provided additional information, and indicated that currently there are 19 landowners with driveway access along the west side of MN Highway 10 that would be impacted by the proposed project. However, if the proposed line was moved to the east side of MN Highway 10 there is currently only five landowners with driveway access to Highway 10 that would be impacted.

[63] View looking northeast from the substation access road.
[64] Motley Area Written Public Comments, eDockets Number 20156-111508-01

Additionally, the comments received stated that more areas have already been cut for transmission line placement on the east side of MN Highway 10 when compared to the west side. The commenter anticipates that with the existing degree of tree clearing completed on the east side of MN Highway 10 placement of the proposed transmission line on the east side will result in reduced vegetation clearing costs and reduced loss of trees.

MP Land East River Crossing Alternative

The proposed east option route would follow Azalea Road (Highway 26) slightly to the southeast in section 27 of Motley Township and then cross the Crow Wing River to the east to section 26 of Motley Township and then the proposed route would travel north. A comment was received during the EA Scoping comment period that the land to the east of Crow Wing River is owned by Minnesota Power Company. Additionally, the comment recommended that if the east option route be selected an alternative alignment be utilized to cross the Crow Wing River approximately 100 to 200 yards south of the proposed crossing. The proposed alternative would keep the transmission line on property owned by one of the applicants, and it is anticipated that aesthetic impacts to the residents directly north of the Crow Wing River crossing would be minimized by shifting the alignment further south.[65]

Based on review of Cass County, Minnesota Interactive Mapping website, EERA staff has identified property to the east of the Crow Wing River owned by the Minnesota Power and Light Company, which could potentially be utilized if the MP Land East River Crossing alternative were to be selected.[66]

Old Tree Avoidance Alternative

The proposed Old Tree Avoidance Alternative would utilize the existing MP 34.5 kV sub-transmission line ROW, which was constructed to avoid the large American elm (*Ulmus americana*), located within the Applicants' proposed route. The tree is located approximately a half mile east of MN Highway 10 on the south side of Azalea Road in the NW of Section 30, T133N, R31W, Motley Township in Morrison County (see **Figure 7**). The Old Tree Avoidance alternative would shift the applicants' proposed alignment south of the old large American elm tree, which would avoid impacts to the large tree during construction and maintenance of the proposed project.

[65] Motley Area Written Public Comments, eDockets Number 20156-111508-01
[66] Cass County, Minnesota, Interactive Web Mapping, http://www.co.cass.mn.us/link/jsfe/index.aspx?defaultRole=Public

Figure 7. Large American Elm south of Azalea Road[67]

[67] Looking southeast from the shoulder of Azalea Road. Note existing MP 34.5 sub-transmission line south of the large American elm.

Figure 8. Common Route East of Highway 10 Alternatives

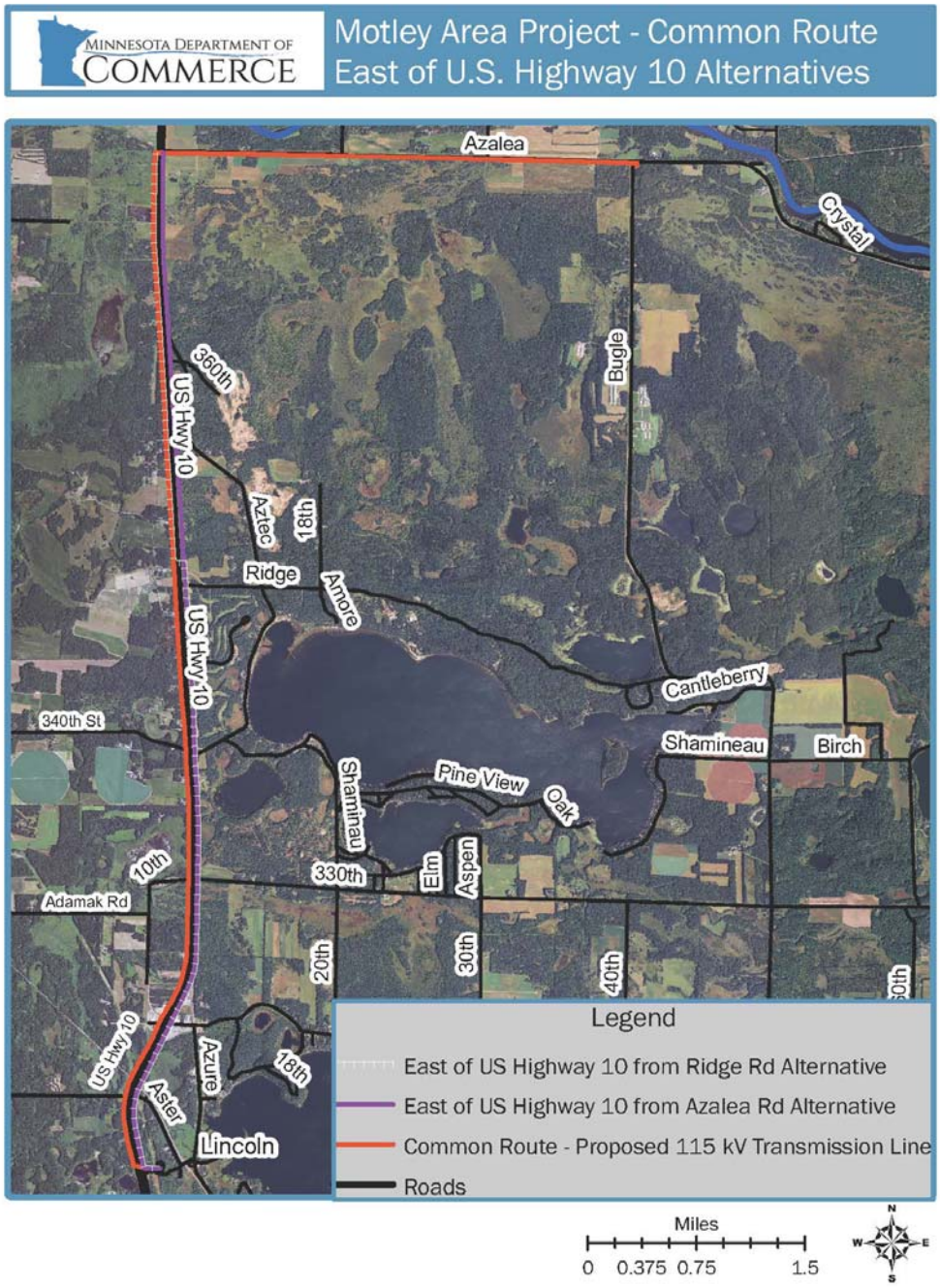


Figure 9. MP Land East River Crossing Alternative

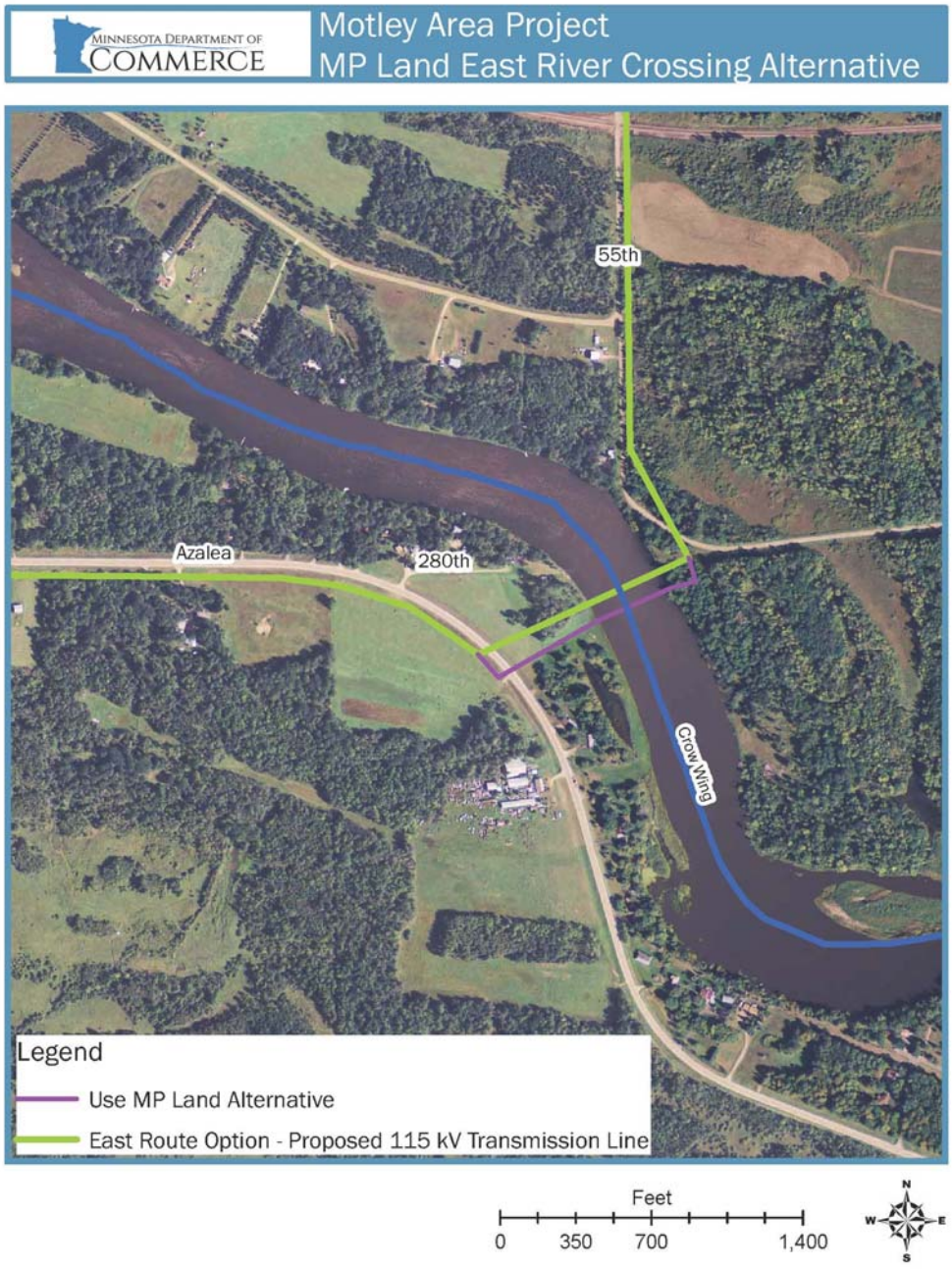


Figure 10. Old Tree Avoidance Alternative

3.5 Structures and Conductors

The applicants propose to use single pole wood structures ranging in height from 60 to 90 feet for the project (**Figure 9**).[68] Structure height depends on several factors including terrain and environmental constraints.[69] Structures that facilitate a change in route direction, e.g., turning a corner, are typically larger in size in order to maintain proper tension on the transmission line. Such structures are known as "angle" or "dead end" structures. Additionally, some segments of the proposed transmission line will have distribution lines attached under the transmission line on the transmission pole structures, which is referred to as underbuild.

Spans for single circuit structures will generally average 250 to 400 feet.[70] When underbuild is present within a segment of transmission line the span between pole structures will be approximately 250 to 350 feet. The average diameter of wood structures at ground level is 20 inches.[71]

For areas of the project with rugged terrain or where longer spans are required, e.g., to avoid impacts to streams or wetlands, the applicants propose to use H-frame structures (**Figure 9**).[72] These structures are approximately the same height as single pole structures (60 to 90 feet), but can allow for average span distances of 600 to 800 feet, with possible span distances up to 1,000 feet with the appropriate topography.[73]

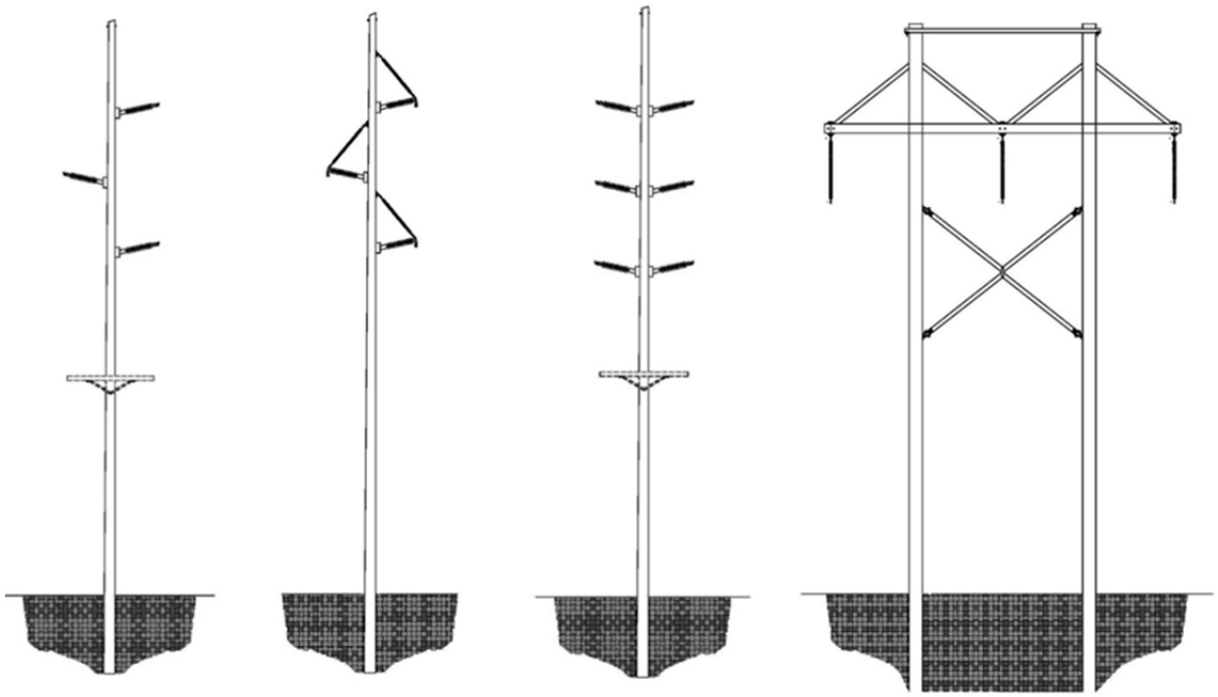
The new segment of line to be constructed by Minnesota Power from their Dog Lake Substation to the existing "24 line" will be H-frame structures ranging in height from 60 to 90 feet, and span distances ranging from 500 to 900 feet.

GRE has proposed single circuit structures will carry three conductor wires and a shield wire.[74] It is anticipated that the phase wires will be 477 thousand circular mil aluminum conductor steel supported (ACSR) with seven steel core strands and twenty six outer aluminum strands. The shield wire will be 0.528 optical ground wire. If circumstances exist that would require the use of an H-frame structure, three conductor phase wires and two shield wires would be utilized.[75]

Minnesota Power's single circuit structures will utilize a three conductor wires and two shield wire design. Conductor wires are anticipated to be 636ACSR with seven steel core strands and 24 outer aluminum strands.[76] The shield wires will be 0.528 optical ground wire.[77]

[68] CN and Route Permit Application, Section 4.1.1.
[69] Id.
[70] Id.
[71] Id.
[72] Id.
[73] Id.
[74] CN and Route Permit Application, Section 4.1.1.
[75] Additional information provided by the Applicants.
[76] CN and Route Permit Application, Section 4.1.1.
[77] Additional information provided by the Applicants.

Figure 11. Transmission Line Structure Types



Single Circuit Horizontal Post | Single Circuit Braced Post | Double Circuit Horizontal Post | Single Circuit H-Frame

Existing Structures and Conductors

In locations where the new 115 kV line will displace an existing distribution line, the distribution line will be underbuilt on the new line or placed underground.[78] As proposed, the West Route Option will have approximately 5.8 miles of underbuild, and the East Route Option will have approximately 6.2 miles of underbuild. Existing distribution lines to be overtaken by the proposed project may be temporarily leaned over or moved to allow construction of the new 115 kV line.[79]

The proposed West Route Option would overtake approximately 0.75 miles of an existing Crow Wing Power distribution line running north and south between the Motley Substation and the Crow Wing River. The proposed East Route Option would overtake a Minnesota Power 34.5 kV sub-transmission line at the point of crossing the Crow Wing River, and continue to follow the same 34.5 kV sub-transmission line for approximately 0.8 miles if the proposed alignment on the south side of Azalea Road is utilized.

The proposed Common Route and alignment travel along the south side of Azalea Road and will overtake approximately four miles of the existing Minnesota Power 34.5 kV sub-transmission line.

[78] CN and Route Permit Application, Section 8.2.
[79] CN and Route Permit Application, Section 8.2.

The new 115 kV line is proposed to connect to the existing MP "24 Line" 115 kV line in Section 4 or Section 2 of May Township in Cass County with either the West Route Option or East Route Option, respectively(**Appendix D**, Map Sheets AA). With either the West Route Option or the East Route Option, the new 115 kV transmission line will be connected to the existing MP "24 Line" using a three way single pole switch structure.

3.6 Construction and Maintenance

Construction of the project would not begin until all federal, state, and local approvals have been obtained. Construction is anticipated to begin in the fall of 2016; however, the construction timeline is dependent upon a number of factors including the receipt of all approvals, weather, and the availability of labor and materials.[80]

Right-of-Way Acquisition

Upon issuance of a route permit by the Commission, the applicants will conduct a design survey to establish a transmission line centerline and right-of-way (ROW) that is consistent with the Commission's permit. This work will be followed by easement acquisition for the required ROW. The applicants indicate that they will obtain new easements for the entire length of the project.[81] MP will obtain the easements necessary for the proposed new line segment from Dog Lake Substation to the existing MP existing "24 Line," and GRE will obtain the easements necessary for the remainder of the proposed project.[82] Minnesota Power or Crow Wing Power may hold existing easements in areas where the new 115 kV line may overtake the existing transmission or distribution lines.[83]

During the easement acquisition process, landowners will be provided a number of documents, including a copy of the route permit, a draft transmission line easement and offer of compensation, and information about the project schedule, vegetation removal plans, construction practices, and damage settlements. Landowners and utilities typically negotiate easement terms that reduce negative impacts to a landowner's property and provide just compensation for the utility's use of the easement.[84] In addition to permanent easements for the operation of the transmission line, agreements for the use of temporary work space (marshalling yard agreements) may be obtained from some landowners – e.g., to stage or store structures, vehicles, and supplies. If property access is necessary to complete soil borings, to add in project design, landowners will be notified prior to accessing the property.[85]

If a negotiated agreement for an easement cannot be reached, the applicants may use the eminent domain process to reach a settlement.[86] In the eminent domain process, three court-appointed commissioners determine the value of the easement, and both the landowner and applicants are bound by this determination. If the eminent domain process is used, the applicants must obtain at least one appraisal for the property proposed to be acquired.[87]

[80] CN and Route Permit Application, Section 1.1.
[81] CN and Route Permit Application, Section 8.3.
[82] CN and Route Permit Application, Section 8.3.
[83] Id.
[84] Id.
[85] Id.
[86] Minnesota Statute 117.
[87] Minnesota Statute 117.036.

Construction

Construction of the project would not begin until approvals are obtained and all land rights secured. Applicants indicate that they will notify all landowners prior to the start of construction and provide an update on the project schedule and construction activities.[88]

Vegetation Removal

The initial phase of construction is right-of-way (ROW) clearance. As a general practice, all tall growing vegetation is removed from the ROW. Low growing vegetation at the outer edges of the ROW is allowable.[89] Low growing vegetation within the ROW, provided it does not pose a threat to the operation or maintenance of the line, may remain in the ROW, consistent with easement agreements.[90] The primary concern regarding vegetation is the potential for vegetation to interfere with the safe and reliable operation of the transmission line.

The applicants may, if such language is included in an easement agreement, trim or remove trees immediately adjacent to the transmission line ROW that have the potential to endanger the line by falling on it (commonly known as "hazard trees" or "danger trees").[91] In some circumstances tree trimming agreements may be considered to minimize tree removal, and will be developed on an individual landowner basis. All cleared vegetation will chipped in the ROW, stacked in the ROW for use by the property owner, or otherwise disposed of in accordance with the property owner's easement agreement.[92]

Standard Commission route permit conditions require permittees to minimize tree removal and preserve windbreaks, shelterbelts and vegetation generally (**Appendix B**).

Structure Placement

The new 115 kV line will be constructed at or near the existing grade along the proposed route; therefore, structure sites will not be graded or leveled unless necessary for construction activities. Structures would be placed directly in the ground after excavating a hole at least seven feet deep, and the average structure depth for a 70-foot long pole would generally be nine feet, depending on soil conditions.[93] Structures are then set and the holes backfilled. In poor soil conditions the vertical placement of a galvanized steel culvert is necessary, and then the pole structure would be set inside the culvert. In some locations and for specific structures, drilled pier concrete foundations may be necessary, and concrete foundations are generally four to eight feet in diameter. Concrete will be provided to necessary foundation location using concrete trucks, which will haul the concrete from a local batch plant.[94]

Once structures have been erected for the line, conductors are strung. Stringing setup areas will be located approximately every two miles along the route, and will occupy approximately 15,000 square feet of land. It can be challenging for construction equipment to be kept within the route at turn

[88] CN and Route Permit Application, Section 8.4.
[89] Id.
[90] Id.
[91] Id.
[92] CN and Route Permit Application, Section 8.4.
[93] CN and Route Permit Application, Section 8.4.
[94] Id.

locations along the transmission line. If construction equipment does go outside of the route it will be temporary in nature and any impacts to landscaping or property will be repaired to the owner's satisfaction prior to completion of project construction.[95] During this process, temporary guard or clearance structures will be used at crossings to provide adequate clearance over roads, existing lines, and other potential obstructions. Stringing activities will commence only after notifications have been provided and permits obtained such that potential impacts to traffic flow and other activities in the project area are minimized.[96]

The applicants indicate that they will use best management practices to minimize and mitigate impacts related to structure placement and the stringing of conductors.[97] The applicants note that the new 115 kV line will cross several wetlands and waterways, which will include spanning four or five Public Watercourses identified on the Public Waters Inventory. The applicants indicate that no construction equipment will be allowed to be driven across any waterways, and crossings of these water resources in order to place poles and string conductors will be limited and undertaken only after discussion with resources agencies.[98] Where waterways must be crossed, the applicants indicate they will minimize potential impacts by crossing by foot, using boats, or crossing across ice during winter conditions.[99] BMPs will be implemented to help prevent soil erosion where construction will occur to water resources, and maintain fueling and lubricating equipment in areas located away from waterways.[100] Standard Commission route permit conditions require permittees to minimize impacts to wetland and water resources (**Appendix B**).

Restoration

Restoration includes the removal all debris and all temporary facilities, employing erosion control measures, reseeding with appropriate seed mixes – free of noxious and invasive weeds – and restoring the project area to its original condition to the extent practicable.[101] In areas where soil compaction has occurred, applicants indicate that they will alleviate the compaction by any of several methods, in consultation with the landowner.[102] Restoration requirements and measures are standard route permit conditions (see **Appendices B** and **C**).

A right-of-way agent will contact landowners to determine if restoration has been completed to their satisfaction and whether damage has occurred during construction of the project.[103] Applicants indicate that they will restore damaged property as near as possible to its original condition and/or fairly compensate landowners for damages.[104]

Operations and Maintenance

Applicants will use the transmission line ROW to perform inspections, maintenance, and repairs. Regular inspections of transmission lines are required to ensure reliable electrical performance.

[95] Additional information provided by the Applicants.
[96] CN and Route Permit Application, Section 8.4.
[97] Id.
[98] Id.
[99] Id.
[100] Id.
[101] CN and Route Permit Application, Section 8.5
[102] Id.
[103] Id.
[104] Id.

Applicants anticipate inspecting the new 115 kV line annually. Off-ROW access may be necessary if there is an obstruction or damaged equipment within the ROW. Any property damage identified during inspections will be restored, or the landowner will be reasonably compensated.[105]

Applicants indicate that they will conduct vegetation surveys every two years and will remove, in accordance with applicable easement agreements, vegetation that would interfere with the operation of the transmission line. Right-of-way clearing practices include mechanical and hand clearing, along with the use of herbicides (where allowed and in accord with applicable easement agreements). Native plants that will not interfere with the safe operation of or access to the transmission line will be allowed to reestablish in the ROW.

Substations

Substation construction will begin with the installation of environmental controls (silt fences, bio rolls, etc.), followed by the removal of vegetation (as needed).[106] Grading is necessary to prepare the site for foundation and fencing installation.[107] Substation equipment – e.g., control house, breakers, switches, transformers.[108] Once equipment is installed, transmission lines would be connected.[109] Substation relays and controls are tested, and the substation is energized once it is ready to go in-service.[110] When construction is complete, the substation site would be restored as indicated above.

3.7 Project Costs

The estimated total cost for the project is approximately $16 to $17 million, depending on which route option is approved by the Commission.[111] These costs are divided between GRE and MP. Estimated costs for GRE's portion of the project are approximately $12 to $13 million (**Table 2A**).[112] GRE's project cost breakdown identified in Table 3A includes the planning, design, procurement, construction, and close out phases of the project. Estimated costs for MP's portion of the project are approximately $4 million dollars (**Table 2B**).[113]

Annual operation and maintenance costs for a 115 kV line in the Great River Energy system, including ROW maintenance, are approximately $2,000 dollars per mile of transmission line.[114]

[105] CN and Route Permit Application, Section 8.6
[106] Additional information from the Applicants.
[107] Id.
[108] Id.
[109] Id.
[110] Id.
[111] CN and Route Permit Application, Section 4.2.
[112] CN and Route Permit Application, Section 4.2.
[113] Id.
[114] Id.

Table 2. Estimated Project Costs – Great River Energy[115]

Project Item	Estimated Cost (dollars)
Great River Energy Costs	
115 kV Transmission Line	$9,079,000 (west route) to $10,101,000 (east route)
Switches, Meter	$960,000
Motley Substation Upgrade	$1,000,000
Fish Trap Substation	$1,000,000
Great River Total Costs	**$12,039,000 (west route) to $13,061,000 (east route)**

Table 3. Estimated Project Costs – Minnesota Power[116]

Project Item	Estimated Cost (dollars)
Minnesota Power Costs	
115 kV Transmission Line(Dog Lake Substation to "24 Line")	$1,140,000
Dog Lake Substation Upgrade	$2,680,000
Distribution	$100,000
Communications	$10,000
Minnesota Power Total Costs	**$3,930,000**

[115] CN and Route Permit Application, Section 4.2, Tables 4-2 and 4-3.
[116] CN and Route Permit Application, Section 4.2, Table 4-4.

4.0 Alternatives to the Proposed Project

The Commission's certificate of need (CN) proceedings evaluate whether a proposed project is needed, or whether there is some other project that would be more appropriate for the State of Minnesota – e.g., a project of a different type or size, or a project that is not needed until further into the future. Environmental review in a CN proceeding provides the Commission and the public with information on the potential human and environmental impacts of a proposed project and those alternatives that could meet the stated need.

In accordance with the scoping decision (**Appendix A**), this EA analyses those alternatives to the project listed in Minnesota Rule 7849.1500. This analysis includes discussion of whether the alternatives are feasible and available, and, if so, whether they can meet the need for the project. Additionally, included here is discussion of the potential human and environmental impacts of the alternatives. Analysis of the specific impacts and potential mitigation measures for the applicants' proposed project is provided in Section 5. The alternatives discussed here are:

- No-build alternative
- Demand side management
- Purchased power
- Transmission line of a different size, including upgrading an existing transmission line
- Generation rather than transmission
- Use of renewable energy resources

Of these, as discussed further below, a transmission line with different endpoints is the only alternative that is feasible and available and that could meet the stated need for the project. However, based on analysis by the applicants, this alternative is less effective in meeting the need than the applicants' proposed project.

4.1 Need for the Project

Applicants indicate in their application that the proposed project is needed to: (1) relieve potential overloads on the existing 34.5 kV transmission system in the project area, particularly overloads related to the largest electrical load in the area, the city of Motley, and (2) to serve a proposed, new Minnesota Pipeline Company (MPL) oil pumping station in the area.[117]

System Overloads

The applicants indicate that several factors are responsible for an increased risk of transmission system overloads in the project area, including growth of peak electrical demand in the project area and the age and length of the existing 34.5 kV transmission network in the area.[118] Applicants note that an outage on the existing 34.5 kV system between the Dog Lake and Baxter substations would lead to a thermal overload of the system and loss of electrical power in the project area.[119] The applicants indicate that

[117] CN and Route Permit Application, Section 5.1.
[118] Id.
[119] Id.

the project would improve reliability of the electrical system in the project area, including the cities of Motley, Pillager, Ward, Staples, and Baxter, as well as outlying areas.[120]

New Oil Pumping Station

MPL is proposing to increase the throughput of its existing Line 4 oil pipeline.[121] In order to so, MPL must add pumping stations to the existing line. MPL is proposing to add a new pumping station (Fish Trap pumping station) approximately eight miles south of the city of Motley to the east of Highway 10, in Scandia Valley Township, Morrison County. Pumping stations use relatively large electrical motors that draw substantial amounts of electrical energy.

The applicants indicate that a new oil pumping station could not be served by the existing 34.5 kV transmission system in the project area. The applicants note that a higher voltage line, one capable of meeting the electrical energy needs of a pumping station is required. The new 115 kV line is capable of meeting the energy needs of the proposed Fish Trap pumping station. The pumping station is anticipated to receive its electrical energy from the proposed Fish Trap Lake substation, at the southern terminus of the project.

4.2 No-Build Alternative

Under the no-build alternative, the applicants' proposed project would not be constructed and all other electrical transmission facilities in the project area would remain as is.

The no-build alternative is feasible and available, but would not meet the need for the project. This alternative would not relieve overloads on the existing 34.5 kV transmission system nor would it accommodate a new oil pumping station. The existing 34.5 kV system would remain insufficient for growing electrical demand in the project area and incapable of reliable service should there be a single outage on the system (e.g., temporary loss of a transmission line or substation). The no-build alternative would be unable to supply power to a new oil pumping station and thus would frustrate a Commission determination that a greater throughput for MPL's Line 4 is needed by the state.[122]

The no-build alternative would have no direct human or environmental impacts. It would, however, adversely affect the local transmission system and reduce electrical reliability. In addition, it would impede greater use of MPL's existing Line 4 oil pipeline and the benefits associated with this use.[123]

4.3 Demand Side Management

Demand side management is the industry term for a suite of measures designed to reduce and manage demand for electrical energy, particularly peak loads. The applicants indicate that they are implementing, with Commission approval, such measures throughout their service areas. GRE implements interruptible demand programs, off-peak storage, and Conservation Improvement Program (CIP), and MP utilizes CIP along with dual fuel, controlled access, and interruptible rates as part of their DSM program. [124]

[120] CN and Route Permit Application, Section 5.1.
[121] Id. The Commission's docket number for MPL's certificate of need application is: PL-5/CN-14-320.
[122] Commission Order Granting CN for MPL Line 4 Pump Station Increases, August 31, 2015. eDocket # 20158-113640-01
[123] Id.
[124] CN and Route Permit Application, Section 5.8.

DSM is feasible and available, but would not meet the need for the project. Applicants note that even if they were to meet all Commission-approved conservation goals, the reductions in energy use would not be sufficient to offset projected load growth in the project area.[125] Additionally, applicants indicate that conservation measures would not transform the existing 34.5 kV transmission system such that it could meet the electrical energy needs of a new oil pumping station.[126] Applicants note that conservation measures will continue to be implemented in the project area, but that these measures are not sufficient to address the inadequacies of the existing 34.5 kV system.[127]

Demand side management would have few direct human or environmental impacts. However, attempting to meet the need for the project with demand side management would adversely affect the local transmission system and reduce electrical reliability. In addition, it would prevent greater use of MPL's existing Line 4 oil pipeline.

4.4 Purchased Power

Under a purchased power alternative, power would be purchased from existing sources, rather than generated by a new electric generating plant. This alternative is more relevant to a site permit application for a large electric power generating plant than a route permit for a transmission line project.

As discussed below (Section 4.6), the applicants estimate that approximately 13.25 megawatts (MW) of new electrical generation would need to be purchased in order to provide a load-serving capability equivalent to that of the proposed project.[128] This additional electrical energy, once purchased, would need to be transmitted – through existing lines and substations or through new facilities – to the project area.

A purchased power alternative may be feasible and available, but it would not meet the need for the project. Purchasing power would not improve the reliability of the existing 34.5 kV transmission system, nor would it make the system less susceptible to a single outage. Unless the purchased power was delivered at or very near the proposed Fish Trap Lake substation, the power would not be reliably available for the proposed Fish Trap pumping station.

The human and environmental impacts of purchased power would vary, depending on how the power was produced and how it was transmitted to the project area. Attempting to meet the need for the project with purchased power would adversely affect the local transmission system, reduce electrical reliability, and prevent expanded use of MPL's existing Line 4 oil pipeline.

4.5 Transmission Line of a Different Size

Under this alternative, the need for the project would be met by a transmission line of a different size – such as a line with a different voltage, different amperage, or with different endpoints. A transmission line with a different voltage is not considered a reasonable alternative. A transmission line with different amperage (i.e., an upgraded conductor) is available, but would not be as feasible as the

[125] Id.
[126] CN and Route Permit Application, Section 6.10.1.
[127] Id.
[128] CN and Route Permit Application, Section 6.2.

proposed project. A transmission line alternative with different endpoints is available, but it would not be as feasible as the proposed project and it would not meet the needs of the project.

Transmission Line with a Different Voltage

The existing transmission system in the project area, the Dog Lake-Baxter system, operates at a voltage of 34.5 kV. The applicants considered meeting the need for the project with voltages less than and greater than 34.5 kV.[129]

Voltages less than 34.5 kV are classified as distribution voltages – i.e., they are voltages used to distribute electrical energy rather than transmit energy. It is possible, in some instances, to relieve specific electrical overloads by moving the overload from one distribution system to another. However, this solution works only where the distribution systems are served by independent transmission networks.[130] This solution is not available for the Dog Lake-Baxter system. The Dog Lake-Baxter system is an interconnected 34.5 kV system with several distribution substations. None of the substations are served by an independent transmission network such that a distribution load can be moved off of the Dog Lake-Baxter system, and to provide additional support to the Dog Lake-Baxter system from another independent system would require the construction of lengthy distribution line to transfer loads.[131] Accordingly, the applicants concluded that a distribution voltage solution was not a reasonable alternative for the project.[132]

Applicants considered use of higher voltages for the project, but determined that a 115 kV line would address all overload and reliability issues and meet electrical energy needs for the foreseeable future.[133] The applicants considered use of 161 kV line for the project. However, there are no 161 kV lines in the project area and introduction of this voltage would require substantial reworking of substation facilities to accommodate the voltage. The applicants also considered use of a 230 kV line. This voltage is designed for transmitting electrical energy over long distances and is not well suited to local transmission. Thus, applicants concluded that a higher voltage transmission line was not considered a reasonable alternative for the project.[134]

The human and environmental impacts of transmission line with a different voltage would be similar to those for the proposed project (Section 5). If a higher voltage line were utilized, taller structures would be required leading to relatively greater aesthetic impacts.

Transmission Line with a Different Amperage – Upgrading Existing 34.5 kV Facilities

The amount of electrical energy that can be carried by a transmission line is a function of the amperage that can be carried on the line and the voltage of the line. The amperage of a transmission line is dependent on the physical size of the conductor – in general, the larger the conductor, the larger the amperage it can commute. It would be possible to slightly increase the voltage of the existing 34.5 kV Dog Lake - Baxter system by increasing the size of the existing conductors with larger, higher amperage conductors, but that increase would not be significant at the substations within the system.[135]

[129] CN and Route Permit Application, Section 6.4.
[130] Id.
[131] Id.
[132] Id.
[133] Id.
[134] Id.
[135] Additional information provided by the Applicants.

The existing Dog Lake – Baxter system is not limited by conductor size, but rather it is limited by low voltage and the existing system currently has the maximum number of reactive devices present to increase the system voltage. The existing 34.5 kV system is at its maximum load serving capacity, and to further increase capacity the system needs to be increased from 34.5 kV to 115 kV.

The human and environmental impacts of transmission line with different amperage would be minimal. Impacts would be limited to construction impacts due to restringing of the existing 34.5 kV system with a new conductors and equipment replacement at the existing system substations.

Transmission Line with Different Endpoints

Applicants indicate that they selected the proposed project, with endpoints at MP "24 Line" and Fish Trap Lake Substation, because it is the least cost alternative and the system performance will address many system needs.[136] The proposed Project will best facilitate serving the proposed Fish Trap pump station, provide incremental load capabilities for future load growth in the affected load area, and additionally will help meet needs in the Project area.[137] However, the applicants did study a transmission alternative that utilized different endpoints referred to as the "47 Line" Interconnection.[138] This project would tap the existing MP "47 Line" (Wing River – Long Prairie) 115 kV line in Section 5 of Eagle Valley Township, Todd County, proceed eastward to the Todd-Wadena Ward Substation, which would need to be upgraded to handle 115 kv service, continuing east ultimately terminating at the proposed Fish Trap Lake substation (see **Figure 12**).[139]

The "47 Line" Interconnection alternative is approximately 20 miles long, which would be approximately 3.5 to 4.5 miles longer than the proposed Project. Applicants indicate that the cost of the alternative would be greater than the proposed project, due to the additional transmission line length and the anticipated need to underbuild approximately 34.5 kV 3-phase sub-transmission line along the "47 Line" Interconnection Alternative route.[140] Additionally, the Applicants indicate that the "47 Line" Interconnection Alternative would not facilitate the stated Project needs of upgrading the existing CWP Motley substation from 34.5 kV to 115 kV, and construction activities to facilitate the future Shamineau substation.[141] Thus, the Applicants concluded that the "47 Line" Interconnection alternative does not meet the stated need for Project as well as the proposed Project.[142]

Because of the additional length, and a second river crossing, over the Long Prairie River the human and environmental impacts of the "47 Line" Interconnection alternative would potentially be greater than those of the proposed Project.

The Applicants considered and rejected two other route alternatives to the proposed Project (see **Figure 12**).[143] The Dog Lake Substation – Fish Trap Lake Substation alternative would begin at the existing Dog Lake Substation, extend south to MP 34.5 kV "503 Line," travel east to the U.S. Highway 10, and then

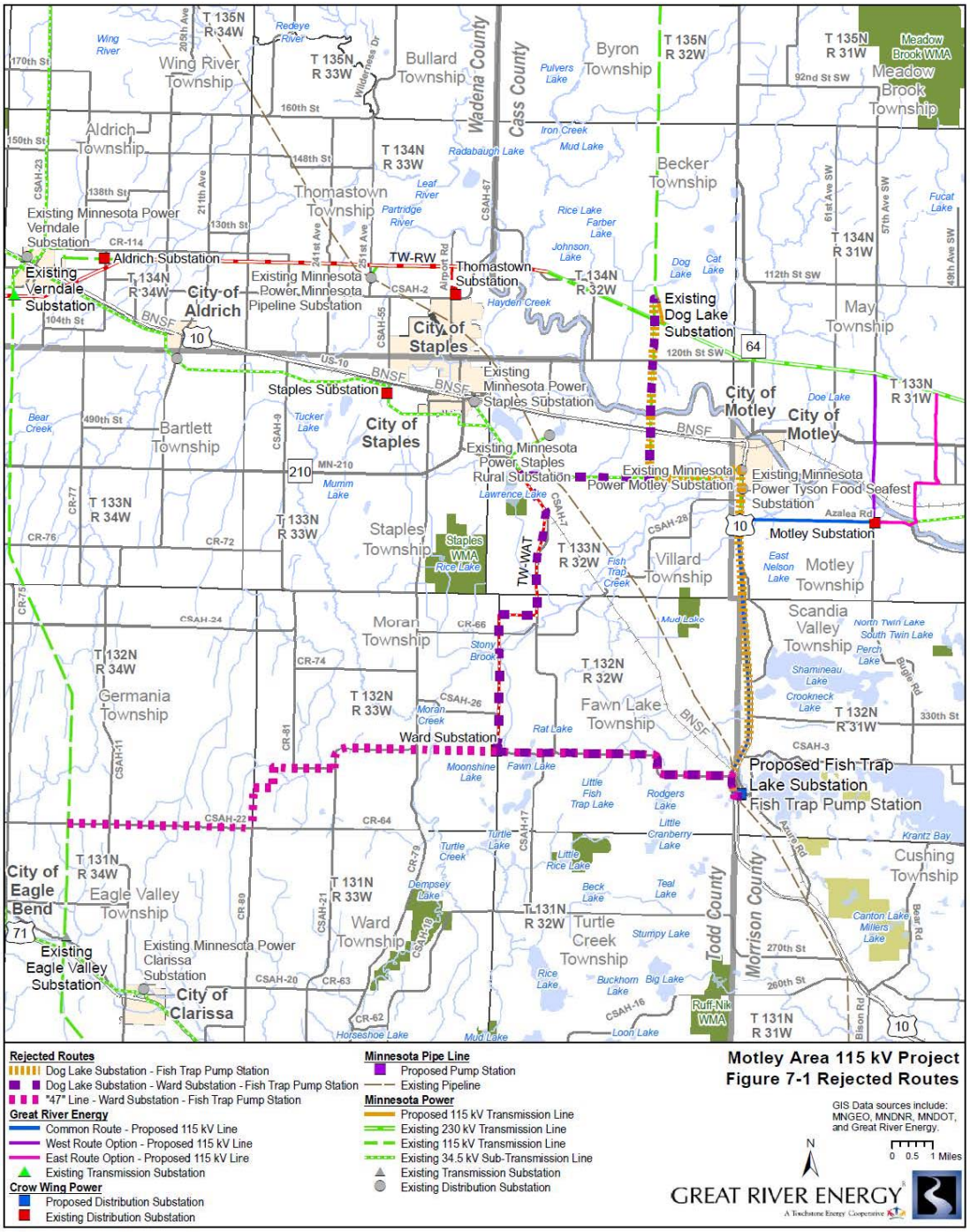
[136] CN and Route Permit Application, Section 6.6.
[137] Id.
[138] CN and Route Permit Application, Section 6.6.
[139] CN And Route Permit Application, Section 7.2.3.
[140] Id.
[141] Id.
[142] Id.
[143] CN and Route Permit Application, Section 7.2.

extending south terminating at the proposed Fish Trap Lake Substation location.[144] The Dog Lake Substation – Fish Trap Lake substation alternative was rejected due to concerns of impacts that would occur in the City of Motley, extended outages to the MP 34.5 kV "503 Line" to allow construction, and it does not facilitate stated Project need of upgrading the existing CWP Motley Substation from 34.5 kV to 115 kV.[145]

The Dog Lake Substation – Ward Substation – Fish Trap Lake Substation alternative would begin at the existing Dog Lake Substation, extending south to the existing MP 34.5 kV "29 Line," travel west to Todd County Road 7 and the BNSF railroad corridor, turning south and continuing south along the existing "TW-WAT" 34.5 KV sub-transmission line, and terminating at the existing Todd-Wadena Ward Substation.[146] The Dog Lake Substation – Ward Substation – Fish Trap Lake Substation alternative was rejected due to the additional 6.5 to 7.5 miles of transmission line length, anticipated 16 miles of 34.5 kV sub-transmission line underbuild needed, a second river crossing at the Long Prairie River, and it does not facilitate the stated Project need to upgrade the existing CWP Motley Substation from 34.5 kV to 115 kV.[147]

[144] CN and Route Permit Application, Section 7.2.1.
[145] Id.
[146] CN and Route Permit Application, Section 7.2.2.
[147] CN and Route Permit Application, Section 7.2.2.

Figure 12. Transmission Alternatives with Different Endpoints



4.6 Generation Rather than Transmission

Under a generation alternative, new electrical generation would be added to the existing 34.5 kV system in lieu of the proposed new 115 kV line. The applicants estimate that approximately 13.25 MW of new electrical generation at the Motley pump station would be needed in order to provide a load-serving

capability equivalent to that of the proposed project.[148] Applicants studied the use of several small generators (1.5 to 2 MW) that would be used in combination to meet the needed MW availability, and determined the installation of diesel generators to meet the projected need would be approximately $14,000,000.

The applicants concluded that a generation alternative was not feasible because (1) it would not improve the reliability of the existing 34.5 kV transmission system, (2) the costs of installation, operation, and maintenance are higher than the proposed project, and (3) generation is relatively less reliable than transmission.[149]

The human and environmental impacts of a generation alternative would depend on how the power was produced, e.g., diesel or natural gas fueled generators. Generators would create aesthetic, air quality, and noise impacts; however, these impacts would be concentrated near the generation site. In contrast, impacts for the proposed project are distributed along the length of the project.

4.7 Use of Renewable Energy Resources

Under a renewable energy alternative, new electrical energy – generated by renewable resources – would be added to the existing 34.5 kV system in lieu of the proposed new 115 kV line. The applicants considered wind and solar generation as renewable resources that might meet the need for the project.[150] Applicants concluded that these resources are not feasible and would not meet the need for the project.[151] Residential loads in the project area peak between 4 p.m. and 6 p.m.[152] Wind and solar generation, if available, are typically decreasing during this time period.[153] Additionally, as with generation of any type (discussed above), use of renewable energy resources does not improve the reliability of the existing 34.5 kV system.

The human and environmental impacts of a renewable energy alternative would depend on how the power was produced, e.g., wind or solar, and where these facilities were located. Wind and solar facilities create aesthetic impacts and these impacts could be distributed throughout the project area.

[148] CN and Route Permit Application, Section 6.2.
[149] Id.
[150] Id.
[151] Id.
[152] Id.
[153] Id.

5.0 Potential Impacts of the Proposed Project

The construction of a transmission line involves both short and long-term impacts. Some impacts may be avoidable; some may be unavoidable but can be mitigated; others may be unavoidable and unable to be mitigated. In general, impacts can be avoided and mitigated by prudent routing – i.e., by placing the transmission line away from human and environmental resources – and by design and construction measures.

Short-term impacts of the project are anticipated to be similar to those of a construction project – noise, dust, soil disturbance and compaction, clearing of vegetation. The project would require the use of equipment to clear land, place structures, and string conductors. The impacts of this equipment use are anticipated to be fairly independent of the route selected for the project. They would occur wherever the project is located; thus, they are not mitigated by prudent routing. However, these impacts can be mitigated by construction measures, for example using best management practices (BMPs) to control soil erosion and minimizing the removal of vegetation.

Long-term impacts can exist for the life of the project and may include aesthetic impacts, health impacts, economic impacts, land use restrictions and impacts to flora and fauna. Long-term impacts are generally not well mitigated by construction measures – these impacts do not come from how the project is constructed but rather where it is placed and its operational characteristics over time. Long-term impacts can be mitigated by prudent routing and design measures. Thus, long-term impacts can be avoided or mitigated, to a greater or lesser extent, based on the route, alignment, and pole placements for the project.

This section discusses the resources, potential impacts, and mitigation measures associated with the proposed Motley Area 115 kV project. Section 6 of this EA discusses the potential impacts and mitigation measures associated with route and site alternatives identified in the scoping decision (**Appendix A**).

Potential Impacts and Regions of Influence

Potential impacts to human and environmental resources are analyzed in this EA within specific spatial bounds or regions of influence (ROI). The ROI for each resource is the geographic area within which the project may exert some influence; it is used in this EA as the basis for assessing the potential impacts to each resource as a result of the project. Regions of influence vary with the resource being analyzed and the potential impact. The ROI for resources analyzed in this EA are summarized in **Table 4**.

The ROI for most human and environmental resources is the transmission line ROW and the permanent footprint of the substations. Resources within the ROW and footprint could be impacted by the construction and operation of the project. For example, soils could be compacted; trees could be removed. Other resources may be impacted at a greater distance from the project. In this EA, the following ROI will be used for these resources:

- **250 Feet from the Anticipate Alignment**. A distance of 250 feet on either side of the anticipated alignment for the project will be used as the ROI for analyzing potential aesthetic, noise, property value, land use, and electric and magnetic field impacts. These are all potential impacts to human settlements or human health. These impacts may extend outside of the

transmission line ROW, but are anticipated to diminish relatively quickly such that potential impacts outside of the route width would be minimal.

- **One mile**. A distance of one mile from the project will be used as the ROI for analyzing potential impacts to archaeological and historic resources and to rare and unique species.

  Direct impacts to archaeological and historic resources are anticipated to occur, if at all, within the ROW. However, indirect impacts may extend beyond the ROW and the route width. For example, a historic resource may be impacted by a transmission line near, but not directly next to, the resource. Direct impacts to rare habitats are anticipated to occur, if they occur, within the ROW. However, indirect impacts to rare and unique species may extend beyond the ROW and route width, particularly for wildlife species. Wildlife may move throughout a project area and may be impacted by limitations on their movement and their ability to access cover, food, and water.

- **Project area / counties**. A project area, defined generally as the counties through which the project passes, will be used as the ROI for analyzing potential impacts to cultural values, socioeconomics, public utilities, airports, air quality, and emergency services. These are resources for which impacts may extend throughout communities in the project area.

Table 4. Regions of Influence for Human and Environmental Resources

Type of Resource	Specific Resource / Potential Impact to Resource	Region of Influence (ROI)
Human Settlements	Displacement	Right-of-Way[154]
	Aesthetics, Noise, Property Values, Electronic Interference, Zoning and Land Use Compatibility	250 feet on either side of the Anticipated Alignment
	Socioeconomics, Cultural Values, Public Utilities, Airports, Emergency Services	Project Area
Public Health and Safety	Electric and Magnetic Fields, Implantable Medical Devices, Stray Voltage, Induced Voltage	250 feet on either side of the Anticipated Alignment
	Air Quality	Project Area
Land-Based Economies	Agriculture, Forestry, Mining	Right-of-Way
	Tourism and Recreation	Project Area

[154] Right-of-way includes the transmission line ROW and the permanent footprint of all associated facilities, e.g., substations.

Type of Resource	Specific Resource / Potential Impact to Resource	Region of Influence (ROI)
Archaeological and Historic Resources	---	One Mile
Natural Environment	Water Resources, Soils, Flora, Fauna	Right-of-Way[155]
Rare and Unique Species	---	One Mile

Summary of Potential Impacts of the Proposed Project

Potential impacts to human settlements and activities are avoided, to a great extent, by the location of the majority of the project being within existing transmission line corridors and road ROW. Thus, impacts to human settlements, public health, public services, and land-based economies are anticipated to be minimal. Aesthetic impacts – i.e., impacts resulting from taller structures and more conductors in the project area – are anticipated to be incremental and minimal.

Because the project will be located in a highly developed urban area, impacts to water resources, soils, flora, fauna, and rare and unique natural resources are anticipated to be minimal. Impacts to water resources and soils can be mitigated by construction best management practices. Potential impacts to the one identified rare species in the project area – the Blanding's Turtle – can be mitigated by several strategies.

The Commission, when it issues a route permit for the project, can require the applicants to follow a specific route and alignment for the project and to use specific mitigation measures or require that certain mitigation thresholds or standards be met through permit conditions (see **Appendices B** and **C**).

5.1 Environmental Setting

The Motley project area lies within the Pine Moraines and Outwash Plains Subsection of the Laurentian Mixed Forest Province in northern Minnesota.[156] The Laurentian Mixed Forest Province is generally characterized by large areas dominated by conifer forests, hardwood and conifer mixed forest, and conifer bogs and swamps. The province ranges from a lake-dotted terrain with thin deposits of glacial till over bedrock, to hummocky or undulating plains with deep glacial deposits, to large and poorly drained flat peatlands.[157] The Pine Moraines and Outwash Plains Subsection is characterized by outwash plains, end moraines, drumlin fields, and till plains. Forest communities located on end moraines and till plains are dominated by red and white pine. Jack pine can dominate well drained sites, and Black spruce, tamarack, white cedar, and black ash are prominent on poorly drained soils.[158]

[155] Avian species can easily move throughout the project area and are susceptible to collision with transmission line conductors. Thus, impacts to avian species will be considered and discussed with a ROI larger than the right-of-way.

[156] Pine Moraines & Outwash Plains Subsection, http://www.dnr.state.mn.us/ecs/212Nc/index.html; see also CN and Route Permit Application, Section 9.1.

[157] Laurentian Mixed Forest Province, http://dnr.state.mn.us/ecs/212/index.html

[158] Pine Moraines & Outwash Plains Subsection, http://www.dnr.state.mn.us/ecs/212Nc/index.html.

Kettle lakes and associated drainages and wetlands are common in the area, and the project area includes the Crow Wing River, which is one of the largest rivers in the Pine Moraines and Outwash Plains Subsection.[159] Lakes in the project area include Fish Trap Lake, Rodgers Lake, Shamineau Lake, Crookneck Lake, Cass County Lake, Lena Lake, East Nelson Lake and Dog Lake. Because of the area's forest and lakes, forestry and tourism are important economic activities.[160] Agriculture is common on well-drained soils that can be irrigated and includes crops and forages.[161]

Built infrastructure in the project area includes the city of Motley, rural residences, highway commercial development, commercial resorts, roads, and utilities. The city of Motley is the largest community in the project area and had a population of 652 residents in 2013.[162] The primary road in the project area is U.S. Highway 10, which runs north-south in the area and passes through the city of Motley. State Highway 210 runs generally in an east-west fashion and also passes through Motley.

5.2 Socioeconomic Setting

According to 2013 census data, the project area has a median household income less than the median for the State of Minnesota (see **Table 5**). The percentage of the population below the poverty level is higher in the project area than in the state as a whole (see **Table 5**).

Table 5. Socioeconomic Characteristics of Project Area[163]

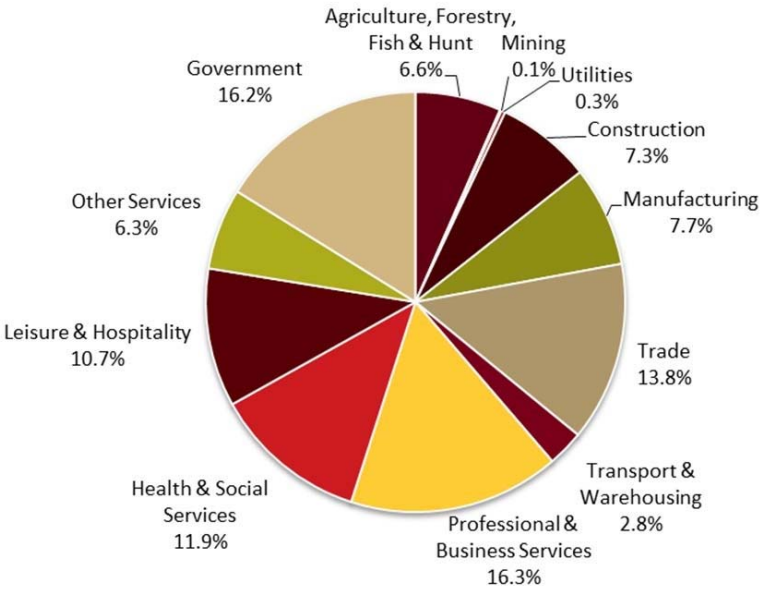
Location	Population (2013)	Median Household Income (dollars)	Population Below Poverty Level (percent)
Minnesota	5,420,380	$59,836	11.5
Cass County	28,555	$45,045	16.4
Morrison County	32,872	$47,649	12.6
Todd County	24,382	$45,000	15.7

The economy in north central Minnesota, including the project area, is relatively diverse with the three largest industries, by employment, being professional and business services, government, and trade (see **Figure 11**).[164] In 2012, north central Minnesota produced approximately $10.6 billion dollars in goods

[159] Id.
[160] Id.
[161] Id.
[162] City-data.com, http://www.city-data.com/city/Motley-Minnesota.html.
[163] Additional information provided by Applicants.
[164] Economic Composition of North Central Minnesota: Industries and Performance, www.extension.umn.edu/community/economic-impact-analysis/reports/docs/2014-North-Central-MN.pdf. For this report, north central Minnesota is defined as the five counties represented by the Region Five Development Commission – Wadena, Todd, Cass, Crow Wing, and Morrison.

and services, accounting for about two percent of Minnesota's 567.8 billion dollar economy.[165] The two largest industries, by economic output, are professional and businesses services and manufacturing.[166]

Figure 13. Employment by Industry in North Central Minnesota[167]



5.3 Human Settlements

Transmission lines have the potential to negatively impact human settlements through a variety of means. Transmission structures could change the aesthetics of the project area, introduce new noise sources, lower property values, and interfere with electronic communications.

Impacts to human settlements resulting from the Motley Area 115 kV project are anticipated to be minimal to moderate. No residences or businesses will be displaced by the project; property values impacts are anticipated to be minimal. Aesthetic impacts resulting from the project are anticipated to be primarily incremental and minimal due to the transmission lines, distribution lines, substations, and general development that currently exist in the project area.[168]

The proposed West Route Option has a greater potential to have a visual impact when compared to the East Route Option. The West Route Option will require the construction of a new river crossing on the Crow Wing River, which will occur in a relatively undisturbed portion of the river.[169] The project will introduce new and relatively taller structures and more conductors into the project area, but these introductions will minimally impact investments and expectations related to aesthetics in the area. Impacts related to construction of the project are anticipated to be minimal and temporary.

[165] Id.
[166] Id.
[167] Id.
[168] CN and Route Permit Application, Section 9.2.4.
[169] CN and Route Permit Application, Section 9.2.4.

Impacts to human settlements can be minimized by prudent routing – by choosing routes and alignments that avoid residences and businesses, and by utilizing existing transmission line and road right-of-way. Impacts can also be mitigated by limiting the project's aesthetic impacts to structures, and by the use of structures which are, to the extent possible, harmonious with human settlements and activities.

Aesthetics

Aesthetic and visual resources include the physical features of a landscape such as land, water, vegetation, animals, and manmade structures. The relative value of these visual resources in a given area depends on what individuals perceive as being beautiful or aesthetically pleasing. Viewers' perceptions are based on their psychological connection to the viewing area and their physical relationship to the view, including distance to physical features, perspective, and duration of the view. Landscapes which are, for the average person, harmonious in form and use are generally perceived as having greater aesthetic value. Infrastructure which is not harmonious with a landscape or negatively impacts existing features of a landscape could negatively affect the aesthetics of an area.

The landscape in the project area includes rural residences, commercial highway development, forested areas, agricultural lands, wetlands, and lakes.[170] The city of Motley is the largest community in the area and includes commercial and residential development. Manmade infrastructure in the project area includes highways and roads, electric transmission and distribution lines, and docks and piers on lakes. The topography of the project area is shaped by glaciation and is gently rolling, with drumlins and moraines. Because of the topography and interspersed forested areas, viewsheds in the project area are relatively limited in extent except along natural corridors (e.g., lakes, rivers) and manmade corridors (e.g., roads).

The applicant's proposed route for the project generally utilizes existing transmission line and roadway right-of-way, but there will be segments of the project will result in new transmission line ROW construction. From the existing Dog Lake substation to the existing MP "24 Line" 115 kV transmission line, the proposed 115 kV line will follow directly adjacent to an existing MP 115 kV transmission line for approximately one-half mile.[171]

The West Route Option will extend south from its connection with the MP "24 Line" 115 kV transmission line to the existing Burlington Northern Santa Fe (BNSF) railroad, and the proposed route will follow directly adjacent to the 57th Avenue SW ROW. From the BNSF railroad the West Route Option will continue south creating approximately one-half mile of new transmission line corridor ultimately crossing the Crow Wing River. South of the Crow Wing River the West Route Option will overtake an existing Crow Wing Power three phase distribution line, which will be underbuilt on the proposed 115 kV transmission line structure.[172] The West Route Option will extend south to the Motley substation.

The East Route Option will extend south directly adjacent to the 51st Avenue SW ROW from its interconnection with the existing MP "24 Line" to the intersection of 51st Avenue SW and 132nd St SW. At this intersection the East Route Option will turn to go west directly adjacent to 51st Avenue SW for approximately one-half mile at which point the East Route Option will turn to the south and follow

[170] CN and Route Permit Application, Section 9.2.4.
[171] CN and Route Permit Application, Section 4.1.1.

[172] CN and Route Permit Application, Section 4.1.1.

directly adjacent to the 53rd Avenue SW ROW. The East Route Option will follow 53rd Avenue SW until it intersects the existing MP 34.5 kV sub-transmission line at which point the East Route Option will turn west approaching it's crossing of the Crow Wing River. The East Route Option is proposed to cross the Crow Wing River to the south of the existing MP 34.5 kV sub-transmission line river crossing. The existing MP 34.5 kV sub-transmission line will be relocated and attached to the proposed East Route Option structures as underbuild.[173] After crossing the Crow Wing River the East Route Option will travel west to the Motley substation, directly adjacent to the Morrison County Road 28/Azalea Road ROW.

The proposed Common Route will begin at the Motley substation, traveling west adjacent to the Morrison County Road 28/Azalea Road ROW to the intersection with U.S. Highway 10. If the Common Route alignment is constructed south of Morrison County Road 28/Azalea Road it will overtake the existing MP 34.5 kV sub-transmission line, and the MP 34.5 KV sub-transmission line will be attached to the Motley 115 kV structures as underbuild.[174] Once at the intersection of Morrison County Road 28/Azalea Road and U.S. Highway 10 the proposed Common Route of the Motley 115 kv transmission line will travel south directly adjacent to the U.S. Highway 10 ROW to the intersection with Holt Road. The proposed Common Route will than travel east directly adjacent to the Holt Road ROW for a short distance terminating at the proposed Fish Trap Lake substation.[175]

The new segment of transmission line to be constructed by MP from the MP Dog Lake substation to the MP "24 Line" will use H – Frame design, and the structures will range from 60 to 90 feet above the ground with typical span lengths of 500 to 900 feet.[176]The applicants propose to primarily utilize single pole wood structures for the remainder of the proposed project transmission line construction. Single pole structures typically range in height from 60 to 90 feet above the ground with span lengths of between 250 to 400 feet. However, if underbuild is necessary span lengths between single pole structures will not exceed 350 feet. In rugged terrain is encountered or if longer span lengths are necessary H-Frame design may be utilized.[177](see **Figure 9** in Section 3.5)

There are no residences, non-residential buildings, or commercial buildings within 250 feet, on either side, of the anticipated alignment for the proposed 115 kv transmission line to connect the MP Dog Lake substation and MP "24 Line," as proposed by the applicants.

There are eight (8) residences and eight (8) non-residential buildings within 250 feet, on either side, of the anticipated alignment for the proposed West Route Option of 115 kV transmission line. There are 16 residences and 29 non-residential buildings within 250 feet, on either side, of the anticipated alignment for the proposed East Route Option of 115 kV transmission line. There are 15 residences and 34 non-residential buildings within 250 feet, on either side, of the anticipated alignment for the proposed Common Route of 115 kV transmission line. There is one commercial building within 250 feet, on either side, of the anticipated alignment proposed for the Common Route Option **(Table 6)**. There are no commercial buildings within 250 feet, on either side, of the anticipated alignments of the West Route Option or East Route Option (**Table 6**). There are three residences and seven non-residential buildings within the anticipated right-of-way for the proposed Common Route, i.e., within 50 feet of the

[173] CN and Route Permit Application, Section 4.1.1.
[174] CN and Route Permit Application, Section 4.1.1.
[175] CN and Route Permit Application, Section 4.1.1.
[176] CN and Route Permit Application, Section 4.1.1.
[177] CN and Route Permit Application, Section 4.1.1.

anticipated alignment. There are no residences or non-residential buildings within the anticipated rights-of-way for the proposed West Route Option or East Route Option.

Table 6. Distance of Buildings from Anticipated Alignment

Building Type	Distance from Anticipated Alignment (Feet)	West Route Option	East Route Option	Common Route
Residential	0-50	0	0	3
	51-100	2	1	6
	101-150	2	7	3
	151-250	4	8	2
Non-Residential	0-50	0	0	7
Non-Residential	51-250	8	29	27
Commercial	0-50	0	0	1
Commercial	51-250	0	0	0

The proposed MP Dog Lake Substation expansion will occur on the east and south sides of the existing substation. There are no residences within the proposed route on either the east or south sides of the existing substation. The proposed CWP Motley Substation expansion will occur within the existing substation footprint, and there are no residences within the proposed route near the Motley Substation. The proposed Fish Trap Lake Substation will be constructed in area that is currently a mix of grassland, shrubland, and forested area, and adjacent to the existing MPL Line 4 petroleum pipeline. There are no residences within the proposed route near the proposed Fish Trap Lake Substation location.

Potential Impacts

Aesthetic impacts due to the project are anticipated to be minimal to moderate. There are three residences within 50 feet of the anticipated alignment of the line for the proposed Common Route. However, the majority of residences (11) are 50 feet or more from the anticipated alignment of the proposed Common Route (**Table 6**). The proposed East Route Option has one residence within 100 feet of the proposed alignment, but the majority of residences (15) are greater than 100 feet from the anticipated alignment. The proposed West Route Option has two residences within 100 feet of the anticipated alignment, but the majority of residences (6) are greater than 100 feet from the anticipated alignment.

For that segment of the Common Route between the proposed Fish Trap substation and Azalea Road, along U.S. Highway 10, the new 115 kV line will occasionally overtake existing power distribution lines. Along the segment of the Common Route between the Azalea Road/U.S. Highway 10 intersection and the existing Motley substation the proposed 115 kV transmission line will overtake the existing MP 34.5 kV sub-transmission line. The new structures will be in the range of 15 to 45 feet taller. Thus, aesthetic impacts due to the project are anticipated to be minimal as they will be incremental. The proposed project will introduce more conductors into the Common Route between the proposed Fish Trap Lake substation and the existing Motley substation (three new 115 kV conductors). There are three residences within the anticipated ROW, but do to the proximity of the residences to the developed U.S. Highway 10 aesthetic impacts caused by the proposed Project are anticipated to incremental and minimal.

The proposed East Route Option will overtake the existing MP 34.5 kV sub-transmission line for the existing Motley substation extending east until crossing the Crow Wing River. The East Route Option will then extend north along 51st Ave SW until its connection with the MP "24 Line". The East Route Option will occasionally overtake existing distribution power lines along 51st Ave SW. The new pole structures will range from 15 to 45 feet taller than existing power poles in the area, and the new 115 kV conductor lines will potentially impact aesthetics in the area. The new structures and conductors will result in minimal and incremental impacts as the proposed East Route Option currently has power lines, power pole structures, existing road ROWs, and a power line crossing over the Crow Wing River.

The proposed West Route Option will extend north from the existing Motley substation, and will overtake and existing CWP 3-phase distribution line for approximately 0.5 miles. The West Route Option will create a new utility corridor between the end of the CWP 3-phase distribution line and the BNSF railroad to the north of the Crow Wing River. The new utility corridor created by the West Route Option will create a new crossing over the Crow Wing River. The new pole structures will range from 15 to 45 feet taller than existing power poles in the area, and the new 115 kV conductor lines will potentially impact aesthetics in the area. The new structures and conductors will result in minimal to moderate impacts as the majority of the proposed West Route Option currently has power lines, power pole structures, and existing road ROWs.

The aesthetic impacts for the proposed upgrades to the existing Dog Lake substation and the existing Motley substation are anticipated to be minimal as the substation structures currently exist in the associated landscape. Additionally, there are no residences within 250 of the existing Dog Lake substation or the existing Motley substation, and the proposed upgrades to the existing substations will not encroach within 250 feet of any residences. The proposed new Fish Trap Lake substation will be a new addition to the landscape, and will create aesthetic impacts. Although there will be vegetative clearing to construct the new Fish Trap Lake substation vegetation will remain adjacent to the Fish Trap Lake substation, which will partially reduce the facility's visibility. The Fish Trap Lake substation is planned to be in close proximity to existing MPL Line 4 petroleum pipeline corridor, so pipeline corridor maintenance in the area currently results in vegetative clearing activities.

Mitigation

Aesthetic impacts resulting from the project are anticipated to be minimal to moderate depending on which portion of the Project is being considered. The primary strategy for minimizing aesthetic impacts is prudent routing, i.e., choosing routes and alignments that are most harmonious with the landscape. Aesthetic impacts of the project can be minimized by: (1) utilizing existing transmission line and roadway ROW, i.e., putting like with like, and (2) avoiding residences by placing the alignment of the transmission line away from residences, e.g., moving the line across the road. To a great extent, the applicants' proposed route and anticipated alignment implement these strategies. The route follows existing transmission line and roadway ROW for approximately 98 to 99 percent of its length. The Applicants' anticipated alignment is located along ROWs away from most residences. Three residences are within the anticipated ROW, and the Applicants have stated that additional efforts will be made to insure the residents' aesthetic concerns are addressed during structure placement that must occur on these properties. Alternatives that may minimize aesthetic impacts of the project are discussed in Section 6.

Adverse impacts can also be mitigated by ensuring that the aesthetic impacts of the project are limited to project structures and facilities. Thus, impacts can be mitigated by ensuring that damage to natural landscapes during construction is minimized, e.g., minimizing vegetation removal. The applicants indicate that they will work with landowners to best locate structures and to minimize damage to

vegetation and natural landscapes.[178] Commission route permits require permittees to minimize vegetation removal in constructing the line and to consider landowner input in locating structures (**Appendices B** and **C**). Aesthetic impacts can also be mitigated by plantings that minimize visual exposure of structures and substation facilities. Finally, aesthetic impacts can be mitigated through inclusion of specific conditions in individual easement agreements with landowners along the route, e.g., compensation or new plantings / landscaping. Many mitigation options for aesthetic impacts will not be available to residences within the ROW

Noise

Noise can be defined as unwanted sound. Noise is measured in units of decibels (dB) on a logarithmic scale. The A weighted decibel scale (dBA) corresponds to the sensitivity range for human hearing. A noise level change of 3 dBA is barely perceptible to average human hearing while a 5 dBA change in noise level is noticeable.[179]

All noises produced by the project must be within Minnesota noise standards (**Table 7**). These standards are promulgated by the Minnesota Pollution Control Agency (MPCA). The standards are organized by the type of environment where the noise occurs (Noise Area Classification, NAC) and the time of day. The noise standards are expressed as a range of permissible dBA within a 1-hour period; L50 is the dBA that may be exceeded 50 percent of the time within an hour, while L10 is the dBA that may be exceeded 10 percent of the time within 1 hour.

The primary noise receptors in the project area would be residences. Residences are in noise area classification one (NAC 1). Noise receptors could also include citizens working outside or using recreational facilities in the project area. The more rural parts of the project area will have ambient noise levels typically in the range of 30 to 40 dBA, with temporary higher noise levels associated with wind, vehicular traffic, and the use of gas-powered equipment, e.g., tractors, chain saws.[180] Higher ambient noise levels will consistently be higher, approximately 50to 60 Dba, in parts of the project area that are in closer proximity to more frequently used roadways (U.S. Highway 10 and Morrison County Road 28/Azalea Road with respect to this Project), urban areas, and commercial and industrial properties.[181]

Potential Impacts

Potential noise impacts from the project can be grouped into three categories: (1) noise due to construction, and noise due to operation of the (2) transmission line and (3) substations. For each of these categories, noise impacts are anticipated to be minimal.

Construction Noise

Construction noise is expected to occur during daytime hours as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction personnel and supplies.[182] Any exceedances of the MPCA daytime noise limits would be temporary in nature and no exceedances of the MPCA nighttime noise limits are expected for the project.

[178] CN and Route Permit Application, Section 9.2.4.
[179] CN and Route Permit Application, Section 9.2.3.
[180] CN and Route Permit Application, Section 9.2.3.
[181] CN and Route Permit Application, Section 9.2.3.
[182] CN and Route Permit Application, Section 9.2.3.

Table 7. Minnesota Noise Standards[183]

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

Transmission Line Noise

Noise from transmission lines (electrical conductors) is due to small electrical discharges which ionize surrounding air molecules.[184] This phenomenon is known as corona. The level of noise from these discharges depends on conductor conditions, voltage levels, and weather conditions. Noise emissions are greatest during heavy rains, when conductors are consistently wet. However, during heavy rains, the background noise level is usually greater than the noise from the transmission line and few people are in close proximity to the transmission line in these conditions.[185] As a result, audible noise is not noticeable during heavy rains.

In foggy, damp, or light rain conditions, transmission line may produce audible noise higher than background levels. The applicants modeled and estimated noise levels for the project's transmission line (**Table 8**).[186] This modeling indicates that the noise level from the new 115 kV line will be approximately 18 dBA at the edge of the transmission line ROW and 19 dBA directly under the line. These noise levels are within Minnesota noise standards (i.e., < 50 dBA), and likely less than ambient noise levels in the project area.

Table 8. Estimated Transmission Line Noise Levels[187]

Location	L_5 (dBA)	L_{50} (dBA)
Edge of Right-of-Way	17.7	14.2
Directly Under the Line	18.8	15.3

Substation Noise

Noises associated with a substation result from the operation of transformers and switchgear. Transformers produce a consistent humming sound, resulting from magnetic forces within the

[183] Minnesota Rules 7030.0040, https://www.revisor.leg.state.mn.us/rules/?id=7030.0040. Standards expressed in dBA. Day time is 7:00 a.m. – 10:00 p.m.; night time is 10:00 p.m. – 7:00 a.m.
[184] CN and Route Permit Application, Section 9.2.3.
[185] CN and Route Permit Application, Section 9.2.3.
[186] CN and Route Permit Application, Section 9.2.3.
[187] CN and Route Permit Application, Section 9.2.3, Table 9-4. Estimates are for corona-generated noise during worst case conditions (heavy rain).

transformer core. This sound does not vary with transformer load. Switchgear produces short-term noises during activation of circuit breakers. These activations are infrequent.

The project includes three substations (Dog Lake, Motley, and Fish Trap Lake), Motley and Fish Trap Lake substations will have additional or new transformers, respectively, which will add new noise producing facility structures.[188] Dog Lake substation will not have any new noise producing structures added to the facility as part of the proposed Project, so no additional noise generation is anticipated at the Dog Lake substation once construction activities are complete. A simplified conservative model was used by the applicants to determine the distance at which the noise produced by the Motley and Fish Trap Lake substations would attenuate to 50 dBA.[189] The applicants modeling indicated that the noise levels should comply with the state noise standard of 50 dba at distances greater than 40 feet from the transformers at the substations. The closest residence to the Motley substation is approximately 500 feet away, and the predicted noise level at this residence is 29 dba.[190] The closest residence to the new Fish Trap Lake substation is approximately 300 feet away, and the predicted noise level at this residence is 33 dba when only considering the noise generated by the new substation.[191] Noise modeling has not been completed for the Dog Lake substation, as no additional noise generation is anticipated.[192](**Table 9**) The noise level at the nearest residence to each of the substations is estimated to be 33 dBA or less.[193] This noise level is within Minnesota noise standards (i.e., < 50 dBA).

The proposed Fish Trap Lake Substation and the MPL Line 4 Fish Trap pump station will be constructed in close proximity to each other, and the two facilities could potentially result in cumulative noise levels during operations. The pump to be utilized at the MPL Line 4 Fish Trap pump station has a predicted noise level of 100 dba, and would be considered the primary source of noise when compared to the Fish Trap Lake substation.[194] As part of the MPL Reliability Project, which includes the Fish Trap pump station, ambient noise monitoring was conducted at one of the proposed pump station locations to determine existing background noise, which was followed up with noise modeling efforts for each of the proposed pump stations.[195] This noise modeling data is currently being used in the design process for the Fish Trap pump station, and once operational the noise levels will be monitored on-site to validate the noise modeling results.[196]

[188] CN and Route Permit Application, Section 9.2.3.
[189] CN and Route Permit Application, Section 9.2.3.
[190] CN and Route Permit Application, Section 9.2.3.
[191] CN and Route Permit Application, Section 9.2.3., with confirmed correction provided by the applicant. CN and Route Permit Application stated the residence was 30 feet, the applicant confirmed this is a typo, and should read 300 feet.
[192] Additional information provided by the Applicants
[193] CN and Route Permit Application, Section 9.2.3.
[194] Additional information provided by Koch Pipeline Company.
[195] Id.
[196] Id.

Table 9. Estimated Substation Noise Level at Nearest Residence[197]

Substation	Noise Level (dBA)
Dog Lake	NA
Motley	29
Fish Trap Lake	33

Mitigation

Noise impacts from the project are anticipated to be minimal and within Minnesota noise standards. Commission permits require compliance with these standards (**Appendices B** and **C**). However, this does not mean that noise impacts would not occur. Operation of the transmission line and of the substations will introduce new noises to the project area. Even if noise levels are within state standards, in certain situations (e.g., a person walking near a substation on a calm evening) these noises may be heard by residents in the project area. The primary means of mitigating noise impacts is routing to avoid areas where residents live, work, and congregate. Noise impacts associated with substations can be mitigated by natural or built sound barriers, e.g., berms, plantings.

The noise generated by the MPL Line 4 Fish Trap pump station will be monitored during operation to confirm noise modeling efforts.[198] If the noise levels are greater than State of Minnesota Noise Standards, mitigation measured will be instituted to reduce noise impacts on nearby residents.[199]

Displacement

Displacement is the removal of a residence or building to facilitate the operation of a transmission line. In general, no residences or buildings are allowed within the ROW for a transmission line. The ROW is established to ensure safe operation of the line.[200] Displacements are relatively rare and are more likely to occur in densely populated areas.

Potential Impacts

There are three residences, seven non-residential buildings, and one commercial building within the anticipated ROW for the proposed Common Route segment of the Project, i.e., within 50 feet of the anticipated alignment (**Table 6**). The Project Applicants have been in contact or attempted to make contact with the three resident owners, and those that reside at the residences have indicated that they are aware that the Project will place transmission lines and potentially pole structures close to their residences. Residential displacement is not anticipated along the proposed Common Route of the Project.

[197] CN and Route Permit Application, Section 9.2.3.
[198] Additional information provided by Koch Pipeline Company.
[199] Id.
[200] CN and Route Permit Application, Section 9.2.2.

There are no residences, non-residential buildings, or commercial buildings within the anticipated ROWs of the West Route Option, East Route Option, or the proposed transmission line segment from the Dog Lake substation to the MP "24 Line." Residential displacement is not anticipated to occur along the proposed West Route Option, East Route Option, or the Dog Lake substation to the MP "24 Line" transmission line segment of the Project.

Mitigation

With three residential buildings within the proposed Common Route segment of the proposed Project the Applicants will be in contact with and work with the residents at the three residences to insure all pole structure placement is in a desirable location for the residents. The Applicants insure the proposed Project will meet the requirements of the NESC.[201] This code insures transmission line projects are designed to protect human health and the environment, and also ensures that the transmission line and all associated structures are built from high quality materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided that routine maintenance is performed. Utilities must also comply with NERC standards, which define the reliability requirements for planning and operation of the electrical transmission grid in North America.[202]

Property Values

The placement of infrastructure near human settlements has the potential to impact property values. The impacts can be positive and negative. The type and extent of impacts depends on the relative location of the infrastructure and existing land uses in the project area. For example, a new highway may increase the value of properties anticipated to be used for commercial purposes, but decrease the value of nearby residential properties.

Potential impacts to property values due to transmission lines are related to three main concerns: (1) potential aesthetic impacts of the line, (2) concern over potential health effects from electric and magnetic fields (EMF), and (3) potential interference with agriculture or other land uses. Research on the relationship between property values and proximity to transmission lines has not identified a clear cause and effect relationship. Rather, the presence of a transmission line is one of many factors that affect the value of a specific property. The research has revealed trends which are generally applicable to properties near transmission lines:[203]

- When negative impacts on property values occur, the potential reduction in property values is in the range of 1 to 10 per cent.
- Impacts on property values decrease with distance from the line. Thus, impacts on the sale price of smaller properties are usually greater than impacts on the sale price of larger properties.
- Other amenities, such as proximity to schools or jobs, lot size, square footage of a house and neighborhood characteristics, tend to have a much greater effect on sale price than the presence of a power line.

[201] Minnesota Statute 326B.35 (requiring utilities to comply with the most recent edition of the NESC when constructing new facilities or reinvesting capital in existing facilities); see also Appendix B, Section 5.4.1, Generic Route Permit Template (requiring compliance with NESC standards).
[202] Appendix B, Section 5.4.1 of Generic Route Permit Template (requiring compliance with NERC standards).
[203] Final Environmental Impact Statement, Arrowhead–Weston Electric Transmission Line Project, Volume I, Public Service Commission of Wisconsin Docket 05-CE-113, October 2000, p. 212-215.

- Negative impacts appear to diminish over time.
- The value of agricultural property is likely to decrease if the power line poles are placed in an area that inhibits farming operations.

A recent literature review examined 17 studies on the relationship between transmission lines and property values.[204] The reviewers concluded that the studies indicate small or no effects on the sale price of properties due to the presence of transmission lines.[205]

Potential Impacts

Impacts to property values due to the project are anticipated to be minimal. For that segment of the project from the MP Dog Lake substation to the existing MP "24 Line", any property value impacts from the proposed project would be incremental. There is currently an existing transmission line that will be adjacently paralleled by the proposed 115 kV transmission line. The addition of the new 115 kV line will result in a wider utility corridor than currently exists, and this will slightly change the aesthetics in the project area. It is not anticipated that this change in aesthetics will appreciably impact property values.

The proposed West Route Option is approximately four miles long, and all but 0.75 miles of this route will parallel existing road ROW. Of the 0.75 miles of the West Route Option that does not parallel a road ROW, approximately 0.19 miles (1,000 feet) of that will create a new utility ROW as the route crosses the Crow Wing River, and the remaining 0.56 miles of the West Route Option will overtake the existing Crow Wing Power three phase distribution line.

The proposed East Route Option is approximately five miles long, and will run parallel to road ROW for its entire segment from the existing MP "24 Line" to the existing MP 34.5 kV sun-transmission line near the proposed crossing of the Crow Wing River. At the Crow Wing River Crossing the proposed East Route Option will relocate the existing MP 34.5 kV sub-transmission line and the lines will share a utility corridor across the Crow Wing River extending to the Motley Substation. The shared utility ROW will parallel the Morrison County 28/Azalea Road ROW to the Motley Substation.

The proposed Common Route from the Motley substation to the proposed Fish Trap Lake substation is approximately 10.5 miles. The Common Route traveling west from the Motley substation will be located directly adjacent to Morrison County Road 28/Azalea Road ROW, and if the Applicants' anticipated alignment is utilized the proposed transmission line would be located on the south side of Morrison County Road 28/Azalea Road and overtake the existing MP 34.5 kV sub-transmission line. The existing MP 34.5 kV sub-transmission line would be incorporated into the Common Route construction for the 3.3 mile segment from the Motley substation to the intersection of Morrison County Road 28/Azalea Road and U.S. Highway 10. The Common Route 115 kV transmission line will then travel south directly adjacent to the U.S. Highway 10 ROW to the intersection of U.S. Highway 10 and Holt Road, which is approximately seven (7) miles. Depending on the final alignment selected for the Common Route 115 kV transmission line, additional existing distribution lines will be overtaken and will be underbuilt during construction of the Motley 115 kV transmission line. From the intersection of U.S. Highway 10 and Holt Road the Common Route transmission line will travel easterly adjacent to the Holt Road ROW for 0.2 miles, and ultimately terminate at the proposed Fish Trap Lake substation.

[204] The Effects of Transmission Lines on Property Values: A Literature Review, Journal of Real Estate Literature, 2010, www.real-analytics.com/Transmission Lines Lit Review.pdf.
[205] Id.

As stated above the proposed West Route Option, East Route Option, and Common Route will be located adjacent to existing road ROWs for the majority of the project length, and some existing distribution and sub-transmission lines will be overtaken by the proposed 115 kV transmission line resulting in shared utility ROWs. This use of existing road and utility ROWs minimizes aesthetic impacts and impacts to property values. However, residences are often times constructed near or along roadways, and the proximity of a residence to a transmission line is a factor in potential property value impacts. Thus, though property value impacts may be minimized by use of existing ROW, they may still occur.

There are currently three residences that will be within the anticipated alignment ROW of the proposed Common Route. Being within the ROW may affect the property value, but additionally it can directly affect the mortgage loan options that would be available to any future buyers of a residence located within a transmission line ROW. Properties with dwellings, structures, or other property improvements within the power line ROW are not eligible for Federal Housing Administration (FHA) insured loans financing.[206]

Mitigation

Impacts to property values can be mitigated by reducing aesthetic impacts, perceived EMF health risks, and agricultural impacts. Selecting routes and alignments that place the transmission line away from residences and out of agricultural fields could address these concerns, thus minimizing impacts to property values. Use of existing ROW minimizes aesthetic impacts and impacts to property values. Property value impacts can also be mitigated through inclusion of specific conditions in individual easement agreements with landowners along the route.

Should a dwelling, structure, or other property improvement be located under a transmission line, relocation of the power line is the only mitigation that can be completed to make the property eligible for FHA insured financing.[207]

Economics

The Motley Area Project is anticipated to take approximately eight (8) months to construct, construction commencing late 2016 and being completed early fall 2017.[208] The proposed Project is anticipated to employ 15 to 20 temporary workers during construction; no additional permanent jobs will be created by the proposed Project.[209]

Potential Impacts

Economic impacts resulting from the project will be primarily positive with an influx of wages and expenditures at local businesses during the construction of the project. Communities near the project will likely experience short-term positive economic impacts through the use of hotels, restaurants, and other services by the various workers.[210] Expenditures for equipment, fuel, and other supplies and

[206] Federal Housing Administration(FHA) Single Family Housing Policy Handbook, http://portal.hud.gov/hudportal/documents/huddoc?id=SFH_POLI_APPR_PROP.pdf.
[207] Id.
[208] CN and Route Permit Application, Section 4.4.
[209] CN and Route Permit Application, Section 4.8.
[210] CN and Route Permit Application, Section 4.8.

services will benefit businesses in the project area. Indirect positive impacts will accrue due to the improved reliability and load-serving capability of the electrical system.[211]

Potential negative economic impacts are anticipated to be minimal. Disruptions of local business due to construction of the project are anticipated to be minimal. Though the population below the poverty level in the counties where the project will occur, as a percentage of residents, is greater than the state average (**Table 10**), no low-income or minority population are anticipated to be negatively and differentially impacted by the project.

Table 10. Socioeconomic Characteristics within the Project Area[212]

LOCATION	POPULATION 2010	POPULATION 2013	CHANGE (%)	MEDIAN HOUSEHOLD INCOME	POPULATION BELOW POVERTY LEVEL (%)
State of Minnesota	5,303,925	5,420,380	2.2%	$59,836 (2009-2013)	11.5% (2009-2013)
Cass County	28,567	28,555	<0.0%	$45,045 (2009-2013)	16.4% (2009-2013)
Morrison County	33,198	32,872	-1.0%	$47,649 (2009-2013)	12.6% (2009-2013)
Todd County	24,895	24,382	-2.1%	$45,000 (2009-2013)	15.7% (2009-2013)

Mitigation
Socioeconomic impacts resulting from the project are anticipated to be primarily positive; thus, no mitigation measures are proposed.

Cultural Values
Cultural values are those community beliefs and attitudes which provide a framework for community unity and animate community actions. Cultural values are informed, in part, by ethnic heritage. Residents in the project area are comprised primarily of Norwegian, Swedish, and English heritage.[213] Cultural values are also informed by the work and recreation (e.g., logging and hunting) of residents and by geographical features (e.g., river, lakes). Seasonal events, holidays, and municipal events in the Project area appear to represent the cultural values of the local communities.[214]

Potential Impacts
No impacts to cultural values are anticipated as a result of the project. The project will not adversely impact the work or recreation of residents in the project area that underlie the area's cultural values.

[211] CN and Route Permit Application, Section 9.2.5.
[212] United States Census Bureau, http://quickfacts.census.gov/qfd/maps/minnesota_map.html
[213] CN and Route Permit Application, Section 9.2.6.
[214] Id.

Nor will it adversely impact geographical features that inform these values. The project will provide a more stable power source to the area, and is anticipated to support the local way of life.[215]

Mitigation
No impacts to cultural values are anticipated as a result of the project; thus, no mitigation measures are proposed.

Electronic Interference
Transmission lines have the potential to interfere with the normal operation of electronic devices. Interference can result from electromagnetic noise created by the ionization of air molecules surrounding conductors. This ionization is commonly known as corona.[216] Interference can also result from transmission line poles which block line-of-sight communications.

No impacts to electronic devices are anticipated as a result of the project. Interference due to electromagnetic noise is not anticipated. Interference due to line-of-sight obstruction is not anticipated and can be mitigated. In situations where a transmission line does cause electronic interference, Commission route permits require permittees to take those actions which are feasible to restore or provide reception equivalent to reception levels before construction of the line (**Appendices B** and **C**).

Radio Interference
Corona from transmission line conductors can generate electromagnetic noise in the radio frequency range (**Figure 14**). Corona induced radio interference is typically not a concern for transmission lines operating below 161 kV. The proposed Motley 115 kV transmission line will have a max operating load of 121 Kv, so the corona production is not anticipated to be significant.[217]

Two-way radios used for emergency services typically operate at frequencies greater than 150 MHz.[218] Minnesota is currently moving to a statewide emergency communications system that operates at 800 MHz.[219] Corona-generated electromagnetic noises are minimal at these frequencies (**Figure 14**).

Potential Impacts
Impacts to radios due to the project are anticipated to be minimal.

Mitigation
Any impacts to AM radio reception can be mitigated by distance and antenna modifications.

Television
Potential interference with television broadcasts depends on how broadcasts are transmitted and received, e.g., analog, digital, satellite, cable.

Analog and digital television transmissions occur at frequencies greater than 54 MHz.[220] These frequencies are high enough to avoid interference with corona-generated electromagnetic noise (**Figure**

[215] Id.
[216] CN and Route Permit Application, Section 8.9.
[217] CN and Route Permit Application, Sections 8.9 and 8.9.1.
[218] Emergency Medical Services Regulatory Board, EMS Radio Project, http://www.emsrb.state.mn.us/comm.asp.
[219] Id.

14). Additionally, digital transmissions are not dependent on waveforms to transfer broadcast content, but rather on packets of binary information, which, in general, are less susceptible to corruption and can be corrected for errors. Analog transmissions can be subject to multipath reflections that result in a ghosting effect. Digital transmissions are susceptible to freezing and pixelation due to multipath reflections and/or low signal strength.

Satellite television is transmitted in the K_u band of radio frequency (12-18 GHz) and is not susceptible to corona-generated noise.[221] Satellite television is susceptible to line-of-sight obstruction. Even minor obstructions, e.g., rain, can cause loss of signal. If the obstruction is removed, the signal interference will be removed and the broadcast unaffected.

Cable is a redistributed form of satellite broadcast and is generally not susceptible to interference due to the use of shielded coaxial cable. Cable broadcasts can suffer interference if the satellite broadcast suffers interference, e.g., line-of-sight obstruction.

Potential Impacts
Impacts to television broadcasts due to the project are anticipated to be minimal. Transmission frequencies are higher than those of corona-generated noise, which makes interference highly unlikely. Multipath reflections due to the wooden structures of the project are unlikely. Line-of-sight obstructions could occur if a transmission line pole was directly in the path of a transmission signal (e.g., satellite signal)

Mitigation
Potential impacts to television broadcasts can be mitigated through several means. Use of a different antenna or moving an antenna / satellite dish will typically resolve any impacts. Commission permits requires permittees to mitigate impacts and to restore reception to pre-project quality (**Appendices B** and **C**).

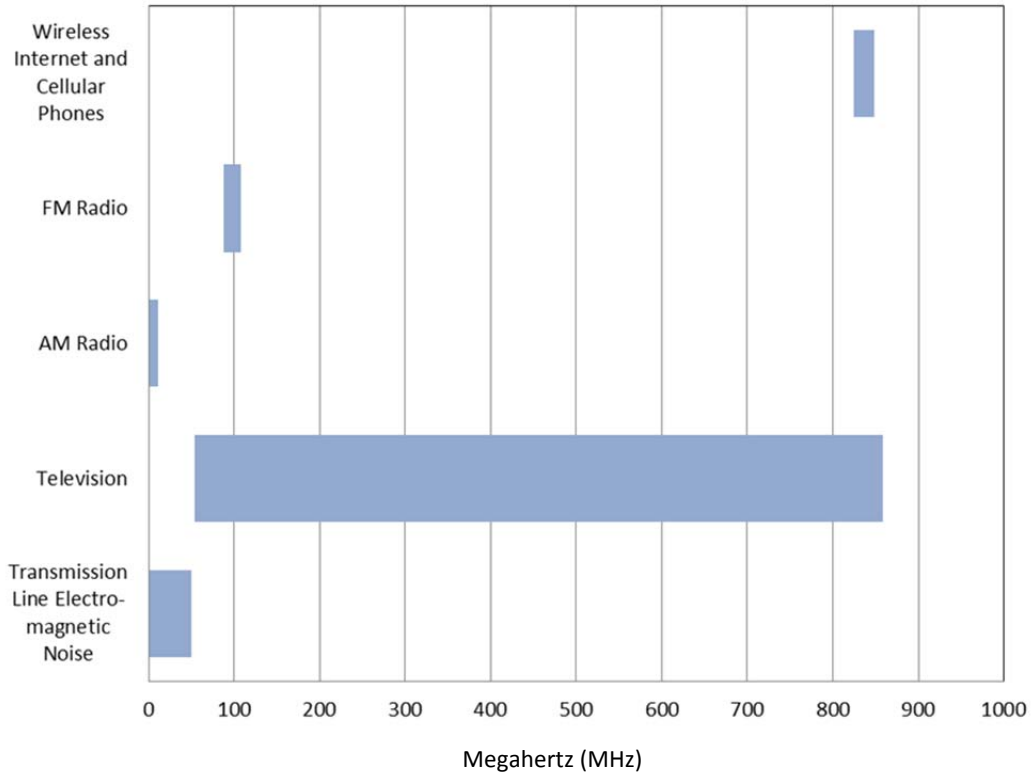
Internet and Cellular Phones
Wireless internet and cellular phones use frequencies in the ultra-high frequency range (900 MHz and greater). The specific UHF frequency used for a cellular phone would depend on the phone service provider's technology. UHF radio frequencies are high enough that the impacts of corona-generated noise would be negligible (**Figure 14**).

Potential Impacts
Impacts to wireless internet and cellular phones are not anticipated to be caused by the proposed Project.

Mitigation
Due to no anticipated impacts, no mitigation measures are proposed.

[220] North American Broadcast Television Frequencies, http://en.wikipedia.org/wiki/North_American_broadcast_television_frequencies.
[221] Satellite Television, http://en.wikipedia.org/wiki/Satellite_television.

Figure 14. Frequencies of Electronic Communications Compared with Frequencies of Transmission Line Electromagnetic Noise[222]



Zoning and Land Use Compatibility

Transmission lines have the potential to adversely impact existing land uses and to be incompatible with future land uses. Impacts to existing and future land uses as a result of the project are anticipated to be minimal.

Land types in the project area include rural residential, highway commercial, cropland, forest, wetlands, lakes, and rivers (**Appendix E,** Map E1). Because of the area's forest and lakes, forestry and tourism are important economic activities. Agriculture is present in the project area, but only approximately 6.5 miles of the proposed 15.5 to 16.5 mile new transmission line will cross lands used for agricultural purposes.[223] Built infrastructure in the project area includes cities, roads, and utilities. Most residences are single family dwellings; residences and farmsteads are generally scattered throughout the project area along county roads and highways.[224] The greatest amount of growth has occurred within and around the cities found in Morrison County, and also along the shorelines of large lakes, specifically Shamineau and Fish Trap, which are near the project area.[225]

[222] High Voltage and Electrical Insulation Engineering, Arora and Mosch, 2011; How the Radio Spectrum Works, http://www.howstuffworks.com/radio-spectrum1.htm.
[223] CN and Route Permit Application, Section 9.4.1.
[224] Morrison County Comprehensive Plan, 2005, http://morrisonmn.govoffice3.com/vertical/Sites/%7BC8FCCAFF-AECD-45DC-91B1-016A998EB4A8%7D/uploads/%7B77B3A859-82C4-4E06-AC2D-04350EE16357%7D.PDF .
[225] Id.

The Project area near the Dog Lake substation in Cass County is generally zoned for Commercial/Industrial/Public Utility, Agricultural, Rural Vacant, and Residential Homestead.[226], The portion of the proposed Project area within Morrison County is zoned as Agricultural, Residential, Seasonal Recreational, Residential Non-Homestead single unit, Qualifying Golf Course, and Commercial.[227] The portion of the Project area within Todd County is zoned Agricultural/Forestry.[228] Select areas near the city of Menahga are zoned for business and suburban residence.[229] Lakes, watercourses, and riparian areas are zoned as shoreland.[230]

Potential Impacts

Impacts to existing land uses due to the project are anticipated to be minimal. The project is generally compatible with current and future land uses. The Applicants' proposed routes utilize existing transmission line and roadway ROW to minimize impacts to land uses. Some temporary impacts may occur on agricultural lands during construction as equipment accesses the ROW to install structures.[231] Temporary construction equipment impacts will likely be rutting and compaction, and permanent project impacts to agricultural lands will be limited to a four square foot area including and adjacent to the pole structures.[232]

Pole structure placement could be a potential Project impact to existing residential and commercial properties along the proposed routes.

Mitigation

GRE will work with landowners to determine pole structure placement and construction timing that will minimize Project impacts to agricultural lands and farming operations.[233] Landowners will be compensated for any crop damage/loss and soil compaction resulting from construction of the Project.[234]

GRE will work with landowners to determine pole structure placement on residential and commercial properties to minimize potential Project impacts to existing structures and property access.[235]

5.4 Public Health and Safety

Transmission line projects have the potential to negatively impact public health and safety – during construction and operation of the project. As with any project involving heavy equipment and high voltage transmission lines, there are safety issues to consider during construction. Potential health and safety impacts include injuries due to falls, equipment use, and electrocution. Potential health impacts related to the operation of the project include health impacts from electric and magnetic fields (EMF), stray voltage, ozone emissions, and electrocution.

[226] CN and Route Permit Application, Section 9.3.
[227] Id.
[228] Id.
[229] Id.
[230] Id.
[231] Id.
[232] Id.
[233] CN and Route Permit Application, Section 9.3.
[234] Id.
[235] Additional information provided by GRE.

Impacts to public health and safety resulting from the Motley Area 115 kV project are anticipated to be minimal. No adverse health impacts due to EMF, stray voltage, or air emissions are anticipated. The new 115 kV line will have protective devices to safeguard the public from the line if an accident occurred and a structure or conductor fell to the ground.[236] These protective devices are circuit breakers and relays located within the existing Dog Lake and Motley substations, and will be included in the construction of the new Fish Trap Lake substation.[237] The protective equipment would de-energize the transmission line, should such an event occur.[238]

Electric and Magnetic Fields (EMF)

Electric and magnetic fields (EMF) are invisible regions of force resulting from the presence of electricity. Naturally occurring EMF are caused by the earth's weather and geomagnetic field. Man-made EMF are caused by any electrical device and found wherever people use electricity (**Table 11**). EMF are characterized and distinguished by their frequencies, i.e., the rate at which the fields change direction each second. All electrical lines in the United States have a frequency of 60 cycles per second or 60 Hertz (Hz). EMF at this frequency level are known as extremely low frequency EMF (ELF-EMF).

Electric fields are created by the electric charge (i.e., voltage) on a transmission line. Electric fields are solely dependent upon the voltage of a line (volts), not the current (amps). Electric field strength is measured in kilovolts per meter (kV/m). The strength of an electric field decreases rapidly as the distance from the source increases. Electric fields are easily shielded or weakened by most objects and materials, such as trees and buildings.

Magnetic fields are created by the electrical current moving through a transmission line. The magnetic field strength is proportional to the electrical current (amps). Magnetic field strength is typically measured in milliGauss (mG). Similar to electric fields, the strength of a magnetic field decreases rapidly as the distance from the source increases. However, unlike electric fields, magnetic fields are not easily shielded or weakened by objects or materials.

[236] CN and Route Permit Application, Section 9.2.1.
[237] Id.
[238] Id.

Table 11. Typical Magnetic Fields (milliGauss, mG) of Common Appliances[239]

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
Vacuum Cleaner	300	60	10	1

Health Studies

A concern related to EMF is the potential for adverse health effects due to EMF exposure. In the 1970s, epidemiological studies indicated a possible association between childhood leukemia and EMF levels.[240] Since then, various types of research have been conducted to examine EMF and potential health effects including animal studies, epidemiological studies, clinical studies, and cellular studies. Scientific panels and commissions have reviewed and studied this research data. These studies have been conducted by, among others, the National Institute of Environmental Health Sciences,[241] the World Health Organization,[242] the Scientific Committee on Emerging and Newly Identified Health Risks,[243] and the Minnesota State Interagency Working Group on EMF Issues (MSIWG).[244] In general, these studies concur that:

- Based on epidemiological studies, there is an association between childhood leukemia and EMF exposure. There is no consistent association between EMF exposure and other diseases in children or adults.

- Laboratory, animal, and cellular studies fail to show a cause and effect relationship between disease and EMF exposure at common EMF levels. A biological mechanism for how EMF might cause disease has not been established.

[239] EMF Electric and Magnetic Fields Associated with the Use of Electric Power, National Institute of Environmental Health Sciences, 2002, http://www.niehs.nih.gov/health/assets/docs_p_z/results_of_emf_research_emf_questions_answers_booklet.pdf.
[240] EMF Electric and Magnetic Fields Associated with the Use of Electric Power, National Institute of Environmental Health Sciences, 2002, [hereinafter NIEHS 2002 Summary] http://www.niehs.nih.gov/health/assets/docs_p_z/results_of_emf_research_emf_questions_answers_booklet.pdf.
[241] National Institute of Environmental Health Sciences, Electric and Magnetic Fields, http://www.niehs.nih.gov/health/topics/agents/emf/.
[242] World Health Organization, Electromagnetic Fields, http://www.who.int/peh-emf/en/.
[243] Scientific Committee on Emerging and Newly Identified Health Risks, http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf.
[244] A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options, Minnesota State Interagency Working Group on EMF Issues, http://mn.gov/commerce/energyfacilities/documents/EMF%20White%20Paper%20-%20MN%20Workgroup%20Sep%202002.pdf [hereinafter MSIWG White Paper on EMF Issues].

- Because a cause and effect relationship cannot be established, and yet an association between childhood leukemia and EMF exposure has been shown, there is:

  (1) Uncertainty as to the potential health effects of EMF,
  (2) No methodology for estimating health effects based on EMF exposure,
  (3) A need for further study of the potential health effects of EMF,
  (4) A need for a prudent avoidance approach in the design and use of all electrical devices, including transmission lines.

Regulations and Guidelines

There are currently no federal regulations regarding allowable electric or magnetic fields produced by transmission lines in the United States. A number of states have developed state-specific regulations for electric and magnetic fields due to transmission lines (**Table 12**). Additionally, a number of international organizations have adopted standards for electric and magnetic fields (**Table 13**).

The Minnesota Public Utilities Commission has established a standard that limits the maximum electric field under transmission lines to eight (8) kV/m. All transmission lines in Minnesota must meet this standard. The Commission has not adopted a magnetic field standard for transmission lines. However, the Commission has adopted a prudent avoidance approach in routing transmission lines and, on a case-by-case basis considers and may require (through permits) mitigation strategies for minimizing EMF exposure levels associated with transmission lines.

Potential Impacts

No adverse health impacts from electric or magnetic fields are expected for persons living or working near the project. The Applicants have modeled and calculated the electric and magnetic fields associated with the project. The calculated maximum electric field for project is 1.33 kV/m at the transmission line centerline and 0.21 kV/m at the edge of the transmission line ROW (**Table 14**)[245]. These calculated electric fields are less than the standard prescribed by the Commission (8 kV/m). Electric fields where there is underbuilding of an existing distribution line or sub-transmission line the electrical field would be lower than what is found below a single circuit 115 kV line with no underbuild present (**Table 14**).[246]

The calculated maximum magnetic field for the project with an average electrical load is 10.02 mG at the transmission line centerline, and 2.58 mG at the edge of the transmission line ROW (**Table 15**)[247]. Electrical loads vary throughout the day and throughout the year; thus, magnetic fields will also vary. Loads are highest in the project area between November and March, and July is the summer peak.[248] A peak electric load can be estimated by examining current electrical demand variation and trends. The calculated magnetic field for the project with a peak electrical load is 13.04 mG at the transmission line centerline, and 3.36 mG at the edge of the transmission line ROW (**Table 15**).[249] Magnetic fields where there is underbuilding of an existing distribution line or sub-transmission line the magnetic field would be lower than what is found below a single circuit 115 kV line (**Table 15**).[250]

[245] CN and Route Permit Application, Section 8.7.1, Table 8-1.
[246] Additional information provided by the Applicants.
[247] CN and Route Permit Application, Section 8.7.2, Table 8-3.
[248] CN and Route Permit Application, Section 5.5.1, Table 5-3.
[249] CN and Route Permit Application, Section 8.7.2, Table 8-3.
[250] Additional information provided by the Applicants.

The calculated magnetic fields for the project, for all transmission line configurations and loading scenarios, are less than 30 mG directly under the transmission line and less than 8 mG at the edge of the transmission line ROW. These fields are below all state and international standards that have been developed for magnetic fields. Accordingly, based on the scientific evidence to date, no adverse health impacts from electric or magnetic fields are expected for persons living or working near the project.

Table 12. State Electric and Magnetic Field Standards[251]

State	Electric Field (kV/m)		Magnetic Field (mG)
	Within Right-of-Way	Edge of Right-of-Way	Edge of Right-of-Way
Florida	8[a]	2	150[a] (max load)
	10[b]	---	200[b] (max load)
	---	---	250[c] (max load)
Massachusetts	---	---	85[g]
Minnesota	8	---	---
Montana	7[d]	1[e]	---
New Jersey	---	3	---
New York	11.8	1.6	200 (max load)
	11[f]	---	---
	7[d]	---	---
Oregon	9	---	---

[a] 69 kV to 230 kV transmission lines
[b] 500 kV transmission lines
[c] 500 kV transmission lines on certain existing ROW
[d] Maximum for highway crossing
[e] May be waived by the landowner
[f] Maximum for private road crossings
[g] A level above 85 mG is not prohibited, but may trigger a more extensive review of alternatives.

[251] NIEHS, Electric and Magnetic Fields Associated with the Use of Electric Power, Questions and Answers, p. 46, http://www.niehs.nih.gov/health/assets/docs_p_z/results_of_emf_research_emf_questions_answers_booklet.pdf

Table 13. International Electric and Magnetic Field Guidelines[252]

Organization	Electric Field (kV/m)		Magnetic Field (mG)	
	General Public	Occupational	General Public	Occupational
IEEE	5	20	9,040	27,100
ICNIRP	4.2	8.3	2,000	4,200
ACGIH	---	25	---	10,000/1,000[a]
NRPB	4.2	---	830	4,200

IEEE – Institute of Electrical and Electronics Engineers, ICNIRP – International Commission on Non-Ionizing Radiation Protection, ACGIH – American Conference of Industrial Hygienists, NRPB – National Radiological Protection Board
[a] for persons with cardiac pacemakers or other medical electronic devices.

Mitigation

No health impacts due to EMF are anticipated from the Motley Area 115 kV project; thus, no mitigation measures are proposed. However, consistent with the Commission's prudent avoidance approach to potential EMF impacts, basic mitigation measures are prudent. Electric and magnetic fields diminish with distance from a conductor. Thus, EMF exposure levels can be minimized by routing transmission lines away from residences and other locations where citizens congregate. EMF exposure levels can also be minimized by conductor configurations that facilitate phase cancellation between circuits.[253]

The Applicants' proposed Project will be designed and constructed in compliance with all local, state, NESC, and GRE standards.[254] Alternatives that may place the line relatively farther away from residences, thus further lowering EMF exposure levels, are discussed in Section 6.

Table 14. Calculated Electric Fields (kV/m)[255]
(3.28 feet above ground)

Transmission Line	Distance from Centerline (feet)								
	-300	-100	-50	-25	0	25	50	100	300
Single Circuit 115 kV Line (At max operating 121 kV)	0.007	0.059	0.211	0.468	1.327	0.636	0.191	0.066	0.008

[252] Id.; ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz – 100kHv), 2010, http://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf; NRPB guidelines are the 1998 ICNIRP guidelines. The NRPB became the Health Protection Agency (HPA) in 2004, ACGIH, Documentation of the Threshold Limit Values for Physical Agents, 7th Edition.
[253] MSIWG White Paper on EMF Issues.
[254] CN and Route Permit Application, Section 9.2.1.
[255] CN and Route Permit Application, Section 8.7.1, Table 8-1.

Table 15. Calculated Magnetic Fields (mG)[256]
(3.28 feet above ground)

Transmission Line / Loading	Current (amps)	Distance from Centerline (feet)								
		-300	-100	-50	-25	0	25	50	100	300
Single Circuit 115 kV Line / Average Load (at max operating 121 kV)	73	0.09	0.72	2.27	5.13	10.02	6.04	2.58	0.78	0.09
Single Circuit 115 kV Line / Peak Load (at max opereating 121 kV)	95	0.11	0.93	2.95	6.67	13.04	7.86	3.36	1.01	0.12

Implantable Medical Devices

Implantable medical devices such as pacemakers, defibrillators, neurostimulators, and insulin pumps are electromechanical devices and may be subject to interference from electric and magnetic fields. Most of the research on electromagnetic interference and medical devices is related to pacemakers. Implantable cardiac devices (pacemakers) are more sensitive to electric fields than to magnetic fields.[257] In laboratory tests, the earliest interference from magnetic fields in pacemakers was observed at 1,000 mG, a field strength greater than that associated with high voltage transmission lines.[258] Therefore, the focus of research has been on electric field impacts.

Electric fields may interfere with an implanted cardiac device's ability to sense normal electrical activity in the heart. 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 returns to its normal operation when the person moves away from the source of the interference.

Medtronic and Guidant, manufacturers of pacemakers and implantable cardioverters/ defibrillators, have indicated that electric fields less than 6 kV/m are unlikely to cause interactions affecting operation of modern bipolar devices. Older unipolar designs, however, are more susceptible to interference from electric fields, with research suggesting that the earliest evidence of interference occurred in electric fields ranging from 1.2 to 1.7 kV/m.[259]

Potential Impacts

The calculated maximum electric field strength for the project is 1.327 kV/m.[260] This field strength is below the 6 kV/m interaction level for modern, bipolar pacemakers, but slightly above the range of interaction for older, unipolar pacemakers. The user of a unipolar pacemaker would have to be directly

[256] CN and Route Permit Application, Section 8.7.2, Table 8-3.

[257] Electric Power Research Institute (EPRI), 2004, Electromagnetic Interference with Implanted Medical Devices.
[258] Id.
[259] Toivonen, L., J. Valjus, M. Hongisto, and M. Ritta, 1991, The Influence of Elevated 50 Hz Electric and Magnetic Fields on Implanted Cardiac Pacemakers: The Role of the Lead Configuration and Programming of the Sensitivity, Blackwell Publishing Ltd., Helsinki, Finland.
[260] CN and Route Permit Application, Section 8.7.1, Table 8-1.

under the centerline of the transmission line to be within a potentially interfering electrical field, which would than not have an effect on the individual once they move a short distance from the centerline.[261] Electric fields decrease with distance and the calculated maximum field strength at the edge of the transmission line ROW is 0.211 kV/m.[262] This field strength is below the range of interaction for older, unipolar pacemakers. Accordingly, impacts to implantable medical devices and their users resulting from the project are anticipated to be minimal.

Mitigation
No impacts to implantable medical devices and persons using these devices are anticipated from the project; thus, no mitigation measures are proposed.

Stray Voltage
Stray voltage is an extraneous voltage that appears on metal surfaces in buildings, barns and other structures, which are grounded to earth. This voltage is also called a neutral-to-earth voltage (NEV). Stray voltage is typically experienced by livestock who come into contact with one or more metal objects on a farm (e.g., feeders, waterers, stalls). Livestock, by virtue of standing on the ground, are grounded to earth. Metal objects on a farm are grounded to earth through electrical connections. If there is a voltage between the livestock and these objects, a small current will flow through the livestock.

The fact that the livestock and the metal objects are grounded to the same place (earth) would seem to prevent any voltage from existing between them. However, this is not the case – a number of factors determine whether a metal object is, in fact, grounded. These include wire size and length, the quality of connections, the number and resistance of ground rods, and the current being grounded.[263] Likewise, a number of factors also determine the extent to which livestock are grounded, e.g., standing on wet versus dry ground, the electrical resistance of the livestock.[264] Because stray voltage results from a difference in the effectiveness of grounding and on the resulting electrical currents, it can exist at any business, house, or farm which uses electricity, independent of whether there is a transmission line nearby.

Stray voltage, if prevalent in an agricultural operation, can affect livestock health. Stray voltage has primarily been raised as a concern on dairy farms because of its potential to affect milk production and quality. Stray voltage is by and large an issue associated with electrical distribution lines and electrical service at a residence or on a farm. Transmission lines do not create stray voltage as they do not directly connect to businesses, residences, or farms.

Potential Impacts
No impacts due to stray voltage are anticipated from the project. The project is a 115 kV transmission line that does not directly connect to businesses or residences in the project area, and does not change local electrical service. However, transmission lines, where they parallel distribution lines can, in the immediate area of the paralleling, cause current to flow on these lines (additional current, as the distribution lines already carry current). For distribution lines and electrical service that are properly wired and grounded, these additional currents are of no matter. However, for distribution lines and

[261] Additional information provided by the Applicants.
[262] CN and Route Permit Application, Section 8.7.1, Table 8-1.
[263] Stray Voltage, NDSU Extension Publication #108, http://www.ag.ndsu.edu/extension-aben/epq/files/epq108.pdf.
[264] Id.

electrical service that are not properly wired and grounded, these additional currents could create stray voltage impacts.

The new 115 kV line will, in some areas of the project, parallel existing distribution lines. This arrangement could create additional currents on the distribution line in the immediate area of the paralleling. These currents are not anticipated to cause any stray voltage issues in the project area. If, however, there is not proper grounding or wiring on the distribution system or currents could point up this insufficiency.at a nearby residence, business, or farm, stray voltage could be generated by the additional current.

Mitigation
Stray voltage impacts due to the project are not anticipated. However, in those areas where the new 115 kV line could induce currents on inadequately grounded distribution circuits, mitigation measures may be required. Mitigation measures for stray voltage tend to be site specific but include phase cancellation, transmission-to-distribution separation, isolation of the end-user neutral, and improved grounding. The Applicants indicate that if any person has a question or concern about stray voltage on their property they should contact their electrical service provider to discuss the situation and the possibility of an on-site investigation.[265]

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

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

Potential Impacts
No impacts due to induced voltage are anticipated from the project. The new 115 kV line may induce a voltage on insulated metal objects near the transmission line ROW. However, this voltage and associated electrical current are limited by Commission route permits. Commission permits require that transmission lines be constructed and operated to meet NESC standards and the Commission's electric field limit of 8 kV/m (**Appendices B** and **C**). Accordingly, impacts due to inducted voltage are not anticipated.

[265] CN and Route Permit Application, Section 8.8.

Mitigation
No impacts due to induced voltage are anticipated from the project; thus no mitigation measures are proposed. Any potential impacts will be mitigated by Commission permit requirements regarding grounding, NESC discharge limits, and the Commission's electric field limit of 8 kV/m (**Appendices B** and **C**).

Air Quality

Overall air quality in Minnesota has improved over the last 20 years, but current levels of air pollution still contribute to health impacts.[266] Air quality in the project area is relatively better than more populated areas of the state, e.g., Minneapolis and St. Paul.[267] Potential air quality impacts due to the project are of three types: (1) emissions of ozone and nitrous oxide during operation, (2) dust generation by construction activities, and (3) exhaust generated by construction equipment.

Ozone and Nitrous Oxide
Transmission lines have the potential to produce small amounts of ozone (O_3) and nitrous oxide (NO_X). These compounds are created by the ionization of air molecules surrounding the conductor. Ozone production from a conductor is proportional to temperature and sunlight and inversely proportional to humidity.[268]

Ozone and nitrous oxide are reactive compounds that contribute to smog and can have adverse impacts on human respiratory systems.[269] Accordingly, these compounds are regulated and have permissible concentration limits. The State of Minnesota has an ozone limit of 0.08 parts per million (ppm).[270] The federal ozone limit is 0.070 ppm.[271] Ozone and nitrous oxide emissions from the new 115 kV line are anticipated to be well below these limits.[272]

Construction Dust and Equipment Exhaust
Construction of the project will create dust and cause emissions from construction vehicles, i.e., diesel exhaust. The magnitude of emissions is dependent on weather conditions and the specific construction activity taking place. Any adverse impacts are anticipated to be temporary.

Potential Impacts
No significant impacts to air quality are anticipated from the project. Ozone and nitrous oxide emissions along transmission line are generally directly linked to corona production. Transmission lines below 161 kV are generally operating at too low of a voltage to produce significant amounts of corona.[273] The Motley Area Project transmission lines will operate at a maximum of 121 kV, which is anticipated to produce minimal corona under normal operating conditions. Ozone and nitrous oxide emissions are anticipated to be less than state and federal standards. Emissions of these compounds will increase

[266] Air Quality in Minnesota, 2015 Report to the Legislature, http://www.pca.state.mn.us/index.php/about-mpca/legislative-resources/legislative-reports/air-quality-in-minnesota-reports-to-the-legislature.html.
[267] AirCompare – County Comparisons, http://www.epa.gov/aircompare/compare.htm.
[268] CN and Route Permit Application, Section 8.9.3.
[269] Ozone and Ozone Standards: The Basics, U.S. Environmental Protection Agency, http://www3.epa.gov/ozonepollution/pdfs/20151001basicsfs.pdf.
[270] Minnesota Rules 7009.0800, https://www.revisor.mn.gov/rules/?id=7009.0080.
[271] Air Quality Standards for Ground-level Ozone, U.S. Environmental Protection Agency, http://www3.epa.gov/ozonepollution/pdfs/20151001overviewfs.pdf.
[272] CN and Route Permit Application, Section 9.6.1.
[273] CN and Route Permit Application, Section 8.9.3.

airborne concentrations of ozone and nitrous oxide in the project area and the state; however, the impact of these emissions is anticipated to be relatively minor.

Impacts due to construction dust and equipment exhaust are anticipated to be minor and temporary.

Mitigation
No significant impacts to air quality are anticipated from the project; thus, no mitigation measures are proposed. The Applicants indicate they will use dust control measures to minimize dust created during the construction of the project.[274]

5.5 Public Services

Transmission line projects have the potential to negatively impact public services, e.g., roads, utilities, and emergency services. These impacts are typically temporary in nature, e.g., the inability to fully use a road or utility while construction is in process. However, impacts can be more long term if they change the project area in such a way that public service options are foreclosed or limited.

Temporary impacts to public services resulting from the project are anticipated to be minimal. Long-term impacts to public services are not anticipated.

Roads and Highways
The primary road in the project area is U.S. Highway 10, which runs roughly north-south in the project area and passes through the city of Motley. State Highway 210 runs generally in an east-west fashion and also passes through Motley. The Applicants' proposed West and East Route Options State Highway 210, and the proposed Common Route anticipated alignment will cross U.S. Highway 10 in two locations. The applicant's proposed route also parallels a number of county roads and county state aid highways. As discussed in Section 3.2, the applicants indicate that new transmission line poles will generally be placed five feet outside of existing road ROW, but the placement could range from three to seven feet outside the road ROW.

The applicants must obtain permits and approvals from the Minnesota Department of Transportation (MnDOT) for the crossings of state and federal highways (see **Table 1**). The applicants are also required to comply with MnDOT's accommodation policy for the placement of utilities along and across state highways.[275]

Potential Impacts
Impact to roads and highways due to the project are anticipated to be minimal and temporary. Minor, temporary impacts to roads may occur during construction of the project, e.g., temporary traffic redirection, temporary traffic delays.[276] No impacts to roads and highway are anticipated after the project has been constructed.

[274] CN and Route Permit Application, Section 9.6.1
[275] Minnesota Department of Transportation, Utility Agreements and Permits, http://www.dot.state.mn.us/utility/policy/index.html.
[276] CN and Route Permit Application, Section 9.2.8.

Mitigation
Impacts to roads and highways can be mitigated through coordination with roadway authorities. Impacts can also be mitigated by the selection of routes, alignments, and pole placements that minimize interference with roadways. The applicants indicate that they will place structures outside of existing road rights-of-way.[277] The applicants indicate that construction equipment will be moved in a manner that avoids traffic congestion and minimizes safety risks.[278] The applicants note that they will work with roadway authorities to minimize obstructions and inconvenience to the traveling public.[279] Where the transmission line will cross roadways, the applicants indicate they will use temporary guard structures to ensure that the lines, as they are being strung, do not interfere with traffic.[280]

Airports
There are no known airports within the project area, but he Morey's Seafood Airport is located approximately three-fourths of a mile from the project area in Motley. The MnDOT office of Aeronautics was contacted to identify potential Project impacts on local airports.[281] MnDOT determined that the proposed Project would have no significant effect on the Morey's Seafood Airport operations.[282]

Potential Impacts
No impacts to airports are anticipated as a result of the project. Transmission line structures and conductors can conflict with the safe operation of airports if they are too tall for the applicable safety zones. Different classes of airports have different safety zones depending on several characteristics including runway dimensions, classes of aircraft accommodated, and navigation systems. These characteristics determine the necessary takeoff and landing glide slopes, which in turn determine the necessary setback distances for transmission line structures. Based on the height of the project's transmission line structures (60 to 90 feet) and the distances to local airports, no impacts to airport operations are anticipated.

Mitigation
No impacts to airports are anticipated as a result of the project; thus, no mitigation measures are proposed.

Water Utilities
Potable water is provided in the project area primarily by local private wells. The city of Motley has a municipal water supply and sanitary sewer system.[283]

[277] Id.
[278] Id.
[279] Id.
[280] Id.
[281] Additional information provided by the Applicants.
[282] Id.
[283] Morrison County Comprehensive Land Use Plan 2005 -2015, Adopted October 4, 2005, http://www.co.morrison.mn.us/vertical/sites/%7BC8FCCAFF-AECD-45DC-91B1-016A998EB4A8%7D/uploads/%7B77B3A859-82C4-4E06-AC2D-04350EE16357%7D.PDF

Potential Impacts
No impacts to water utilities are anticipated due to the project. Impacts could occur if transmission line structures damaged or impeded the use of wells, water supplies, or sanitary sewers. The Applicants' proposed route proceeds primarily along roadways and is not anticipated to impact local wells. The proposed route does not enter the city of Motley, those no impacts to the city's water utilities are anticipated.

Mitigation
No impacts to water utilities are anticipated as a result of the project; thus, no mitigation measures are proposed.

Electric Utilities
Electrical service in the project area is provided by the Crow Wing Power (CWP) electric cooperative. The Motley Area 115 kV project proposes to construct a new 115 kV transmission line to relieve potential overloads on the existing 34.5 kV transmission system in the project area and to serve a proposed, new oil pumping station (Section 4.1). In locations where the new 115 kV line will displace an existing distribution line, the distribution line will be underbuilt on the new line or placed underground (Section 3.5).

Potential Impacts
The electrical transmission system in the project area will change as a result of the project, but no long term adverse impacts to electrical service are anticipated. Some distribution lines may experience temporary service outages during the construction of the proposed Project, but efforts to minimize the impact of the temporary outages will be made during construction planning.

Mitigation
No adverse long term impacts to electric utilities are anticipated due to the project; thus, no mitigation measures are proposed.

Natural Gas Utilities
Natural gas service in the project area is provided by Minnesota Energy Resources (MER).[284] The Applicants do not know of any high pressure natural gas pipelines within the proposed route.[285]

Potential Impacts
No impacts to natural gas service are anticipated as a result of the project. Applicants plan to place transmission line poles away from any identified natural gas lines in the project area. Such placement minimizes the chance that installation of the poles could impact a natural gas line.

Mitigation
No impacts to natural gas service are anticipated due to the project; thus, no mitigation measures are proposed.

[284] Minnesota Energy Resources, Areas Served, http://www.minnesotaenergyresources.com/company/area.aspx.
[285] Additional information provided by the Project Applicants.

Emergency Services

Emergency services in the project area are provided by county fire departments and rescue squads, ambulance services, and law enforcement. Impacts to emergency services in the project area could result from (1) an inability to communicate that there is an emergency or (2) an inability to respond to an emergency.

Potential Impacts

Potential impacts to electronic communication systems due to the project are discussed in Section 5.3. No impacts to communications systems are anticipated; therefore no impacts to the community's ability to communicate regarding an emergency are anticipated. During construction of the project, there may be temporary impacts to roads which could impede responses to an emergency. However, these impacts are anticipated to be minimal (see discussion above). No impacts to emergency services are anticipated once the project is operational.

Mitigation

No impacts to emergency services are anticipated due to the project; thus, no mitigation measures are proposed.

5.6 Land-Based Economies

Transmission lines have the potential to impact land-based economies. Transmission lines and poles are a physical presence on the landscape. This presence can prevent or otherwise limit use of the landscape for other purposes. In general, and for safe operation of the line, buildings and tall growing trees are not allowed in transmission line rights-of-way. This limitation can create impacts for commercial businesses and forestry. Additionally, transmission line poles take up space on the ground that could be used for other purposes, e.g., agriculture, mining.

Impacts to land-based economies due to the project are anticipated to be minimal. Land-based economies in the project area include agricultural, forestry, recreation and tourism. Impacts to these operations are anticipated to be minimal and can be mitigated. Impacts to recreation and tourism are anticipated to be minimal and limited to the aesthetic impacts of the project. Impacts to land-based economies can be minimized by prudent routing, i.e., by choosing routes and alignments that avoid such economies. Impacts can also be mitigated by the use of designs and structures which are, to the extent possible, compatible with land-based economies.

Agriculture

Agriculture is a land-based economic resource in the project area. Approximately 6.5 miles of the up to 16.5 miles of the proposed project alignment is in agricultural production.[286] Agricultural lands in the project area consist of croplands and grasslands. Crops grown in the area include corn, soybeans, hay crops, and vegetables.[287] Farms in the area raise a variety of livestock including poultry (chickens and turkeys, layer chickens, beef cattle and dairy cattle.[288]

[286] CN and Route Permit Application, Section 9.4.1.
[287] U.S. Department of Agriculture, Census of Agriculture, 2012, Minnesota Counties, http://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Minnesota.
[288] Id.

Impacts to agricultural operations due to transmission lines fall generally into two types – temporary and permanent impacts. Temporary impacts are impacts due to construction activities. These activities could temporarily limit the use of fields or could cause impacts to crops and soils, e.g., soil compaction.

Permanent agricultural impacts are impacts due to the physical presence of transmission line poles in agricultural fields. The footprint of a pole can be relatively small – e.g., the footprint of the poles for Motley Area 115 kV project is approximately four square feet.[289] However, the impact of such poles can be greater than their footprint in that they can (1) impede the use of farm equipment, (2) interfere with aerial spraying, and (3) impede the use of irrigation systems. These physical impacts can lead to financial impacts, e.g., loss of farming income, decrease in property value.

Potential Impacts

Impacts to agricultural operations as a result of project are anticipated to be minimal. The Applicants' proposed route crosses approximately 6.5 miles of agricultural land, which is about 39 to 42 percent of the length of the project, depending on if the West Route Option or the East Route Option is utilized.[290] With a right-of-way of 100 feet, the transmission line will cross approximately 79 acres of farmland. However, as agricultural land within a transmission line ROW is generally available for agricultural production, the permanent impact to agricultural operations is much less. The amount of land that will be permanently removed from agricultural production as a result of the project is approximately 392 square feet.[291]

If transmission line structures are placed along field edges, then the amount of agricultural land unavailable for cultivation will be limited to approximately 392 square feet. However, if structures are placed within fields, they can obstruct the use of farm equipment and have a more significant impact on agricultural production. Within a field, a structure that takes up 4 square feet, may obstruct an area 5 times as great. Thus, if all of the project's structures were within farm fields, approximately 1,960 square feet of agricultural land would be impacted. Structures within fields can also prevent the use of larger-scale agricultural equipment. Where this is the case, farmers may be impacted by the cost of buying equipment that is appropriately sized to work fields with transmission line structures.

Temporary impacts, such as soil compaction and crop damage, may occur during construction of the project. Construction vehicles are relatively large and can cause rutting and compaction at structure locations and along the transmission line ROW.

Mitigation

Impacts to agricultural operations can be avoided and mitigated by prudent routing – i.e., by selecting a route that avoids agricultural fields and follows existing infrastructure rights-of-way, field lines, and property lines. Where poles are placed in fields, impacts can be mitigated by not placing structures diagonally across field, but rather parallel to existing field lines.

Agricultural impacts can also be mitigated by construction and remediation measures. The Applicants indicate that they will take the following measures to mitigate agricultural impacts from the project:[292]

[289] CN and Route Permit Application, Section 9.4.1.
[290] Id.
[291] 6.5 miles x 5,280 feet/mile ÷ 350 foot span/pole x 4 square feet/pole.
[292] CN and Route Permit Application, Section 9.4.1.

- Limiting movement of crews and equipment to the transmission line ROW to the greatest extent possible.
- Repairing and restoring areas disturbed by construction to pre-construction contours so that all surface drain naturally.
- Repairing ruts and soil compaction; filling, grading, scarifying, harrowing, disking.
- Repairing damage to ditches, tile, terraces, roads, and other land features.
- Placing structures to avoid irrigation systems.
- Developing a construction schedule that will minimize affects to agricultural activities.
- Providing compensation to landowners for any crop and property damage.

Commission route permits require permittees to compensate landowners for damage to crops and drain tile (**Appendices B** and **C**).

Forestry

Forested lands are prevalent in the project area. The three counties in the project area, Cass, Morrison, and Todd, have approximately 833,000 acres, 218,000 acres, and 149,000 acres of forest lands, respectively.[293] Forest stands within the project area commonly include jack pine, northern pin oak, northern red oak, aspen, birch, red pine, and white pine. Treed windbreaks and shelter belts are common near residences and along roadways and field edges. Forested lands in the project area are routinely logged by the forestry industry and for personal use, e.g., home heating.[294]

Geographic Information Systems (GIS) data for National Forest Lands, State Forest Lands, and MN DNR Forest Stand Inventories was reviewed within the project area. Three MN DNR Forest Stand Inventory areas were identified in close proximity to the anticipated alignment of the Common Route, and the closest area is approximately 0.16 miles from the anticipated alignment. The proposed Common Route, West Route Option, East Route Option, and Dog Lake substation to MP "24 Line" segment do not cross any known federal, state, or locally identified areas of forestry interest.

Potential Impacts

Potential impacts to forested areas and forestry operations are due to the removal of trees. In general, and for safe operation of the line, tall growing trees are not allowed in transmission line rights-of-way. Removal of trees directly impacts the resource which is being used by landowners or sold by forestry operations. Impacts to forested areas and to forestry operations due to the project are anticipated to be minimal to moderate. The Applicants' anticipated alignment for the West Route Option crosses approximately 24 acres of forested land, and the Applicants' anticipated alignment for the East Route Option crosses approximately 14 acres of forested lands.[295] The Applicants' anticipated alignment for the Common Route crosses approximately 36 acres of forested lands.[296]

Impacts to the forestry industry and to local use of wood as a result of the project are uncertain as there have been no forestry impact concerns raised by local landowners at this time.

[293] CN and Route Permit Application, Section 9.4.2.
[294] CN and Route Permit Application, Section 9.4.2.
[295] CN and Route Permit Application, Section 9.4.2.
[296] Additional information provided by the Applicants.

Mitigation
The Applicants have attempted to minimize forested lands in some areas by siting the proposed route adjacent to existing utility and road ROWs. Impacts to forested areas and to forestry operations can be avoided and minimized by prudent routing and prudent placement of structures within the route – i.e., by avoiding forested areas. In the case of windbreaks comprised of vegetation that when mature does not exceed 15 feet in height, the Applicants will consider allowing vegetation to remain at the outer edge of the new 115 kV line ROW.[297] Maintaining compatible vegetation at the edges of the new ROW, and compensation for ROW vegetation removal will be negotiated with individual landowners during easement discussions.

Mining
Impacts to gravel pits, and other types of mining operations, can occur when a transmission line interferes with access to and the ability to remove gravel or other mineral resources.

Potential Impacts
There are no mining activities within the vicinity of the Project area, so no impacts to mining activities are anticipated.[298]

Mitigation
No mitigation is proposed, as no impacts to mining are anticipated to occur due to the proposed Project.

Recreation and Tourism
The project is located in a relatively rural area with a diversity of recreation and tourism resources (**Appendix E**, Map E1). The project area includes parks, a golf course, trails, lakes, rivers, streams, state wildlife management areas (WMAs), Scientific and Natural Areas (SNAs), and county and state forest lands.[299] Lakes in the vicinity of the project area include Fish Trap, Shamineau, Lena, West Nelson and Dog Lake. Additionally, the Crow Wing River pool, upstream of the existing dam, is also identified as a Protected Waters Inventory (PWI) lake. The Crow Wing River, Seven Mile Creek, Fish Trap Creek, and an unnamed tributary to the Long Prairie River are located within the proposed project area. Some of the lakes near the project area and the Crow Wing River have public accesses.

Popular outdoor activities in the project area include fishing, hunting, boating, hiking, golfing, riding ATVs and snowmobiling.[300] There are no WMAs, SNAs, or lakes within or directly adjacent to the proposed project route.

Potential Impacts
Potential impacts to recreation and tourism can occur when a transmission line interferes with natural or man-made resources designed to provide these activities. For example, a transmission line could change the aesthetic or function of a recreational destination such that the number of visitors to the destination decreases.

[297] CN and Route Permit Application, Section 9.4.2.
[298] CN and Route Permit Application, Section 9.4.4.
[299] CN and Route Permit Application, Section 9.4.3.
[300] CN and Route Permit Application, Section 9.4.3.

Impacts to recreation and tourism as a result of the project are anticipated to be minimal. Recreational resources are, generally, away from the applicants' proposed route. The proposed route does not cross, nor is it directly adjacent to, any WMAs, SNAs, State Forests, or lakes. There will be aesthetic impacts in the project area due to the structures and conductors of the project (see Section 5.3). However, these impacts are not expected to impact recreation decisions made by citizens or their enjoyment of recreational resources in the project area.

There are no areas considered to be tourist destinations within the proposed project area, and the Project will not preclude tourism activities within the vicinity of the Project. The Project will result in some tree clearing activities, which could potentially impact wildlife viewing opportunities. However most of the clearing will be adjacent to existing road and utility ROWs, which should minimize the potential impacts on wildlife viewing in the project area.

Mitigation
Impacts to recreation and tourism can be minimized by selecting routes and alignments that avoid recreational resources. Impacts could also be minimized by limiting the aesthetic impact of structures, such that impacts to recreational activities are minimized – e.g., minimizing impacts to natural landscapes during construction.

5.7 Archaeological and Historic Resources

Transmission lines have the potential to impact archaeological and historic resources. Archaeological resources can be impacted by the disruption or removal of such resources during the construction of a line. Historic resources can be impacted by the placement of a line in a manner that impairs or decreases the historic value of the resource. Impacts to known archaeological and historic resources resulting from the project are anticipated to be minimal. Impacts to unknown archaeological resources are possible and a Phase I archaeological survey is recommended for the project by the Minnesota State Historic Preservation Office.[301]

Potential Impacts
To determine potential impacts on known archaeological and historic resources, the Applicants conducted a review of records at the Minnesota State Historic Preservation Office (SHPO).[302] The review indicated that there are 24 previously recorded archaeological sites within the Applicants' review area, which included the proposed project route and a one mile buffer area around the proposed project route (refer to **Figure 1**).[303] These sites include pre-contact earthworks and artifacts.[304] The majority, 20 sites, are located along the Crow Wing River, and one of the sites (SHPO Site #21CA0247) may be within or close to the West Route Option crossing of the Crow Wing River.[305] Additionally, based on the review, there is a high potential that the proposed route will impact unrecorded archaeological sites, including artifact scatters and earthworks.[306] Because of this potential, SHPO recommends that a Phase I archaeological survey be conducted for the project.[307]

[301] CN and Route Permit Application, Section 9.5.2
[302] CN and Route Permit Application, Section 9.5.
[303] CN and Route Permit Application, Section 9.5.1, Table 9-6.
[304] Id.
[305] CN and Route Permit Application, Section 9.5.1.
[306] CN and Route Permit Application, Section 9.5.
[307] Id.

The Applicants' review of SHPO records also indicated that there are four previously recorded historic structures within one mile of the Applicants' proposed route.[308] One of the sites, structure MO-MOT-00, District 120 School House and Motley Town Hall building, is located to the north of the existing Motley substation.[309] The proposed Project is not likely to impact this resource during construction. The Project may impact the viewshed from the District School House location, but visual impacts are anticipated to incremental and minimal because there is currently an existing substation in the area.[310]

Mitigation

The primary means of mitigating impacts to archaeological and historic resources is prudent routing, i.e., by avoiding known archaeological and historic resources. Impacts can also be avoided by prudent pole placement within a route such that resources are spanned or avoided. The applicants indicate that should archaeological sites or resources be identified during construction of the project, work will be stopped and SHPO staff consulted on how to proceed.[311] Consultation with SHPO concerning archaeological resources encountered during construction is a standard Commission route permit condition (see **Appendices B** and **C**).

5.8 Water Resources

Transmission lines have the potential to impact water resources, primarily though construction activities which move, remove, or otherwise handle vegetative cover and soils. Changes in vegetative cover and soils can change runoff and water flow patterns such that surface waters, groundwater, and wetlands are adversely impacted.

Surface Waters

The project is located in the Crow Wing River watershed of the Upper Mississippi River basin.[312] There are a number of lakes in the vicinity of the project area, including Fish Trap, Shamineau, Lena, West Nelson and Dog Lake. Additionally, the Crow Wing River pool, upstream of the existing dam, is also identified as a Protected Waters Inventory (PWI) lake.[313] The project area also includes several rivers and streams, including the Crow Wing River, Seven Mile Creek, Fish Trap Creek, and an unnamed tributary to the Long Prairie River.[314] These lakes, rivers, and streams are classified by the Minnesota Department of Natural Resources (DNR) as public waters in Minnesota.[315] Public waters are waters of the state – i.e., waters which belong to the state of Minnesota as a whole. Potential impacts to these waters and their uses are regulated by the DNR.[316] To work in public waters or to cross public waters requires a permit from the DNR (see Section 2.3).

[308] Id.
[309] Additional information provided by the Applicants.
[310] Id.
[311] CN and Route Permit Application, Section 9.5.
[312] CN and Route Permit Application, Section 9.6.2.
[313] Id.
[314] Id.
[315] CN and Route Permit Application, Section 9.6.2; Definition of Public Waters, Minnesota Department of Natural Resources, http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/pw_definition.html.
[316] Public Waters Work Permit Program, Minnesota Department of Natural Resources, http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/index.html.

Potential Impacts

Although there are several lakes in the vicinity of the Project, the Applicants' proposed routes do not cross or run adjacent to any lakes. Lake impacts are not anticipated to result from the construction or operation of the proposed project.

As proposed the Project will not directly impact the water surface or channel bottoms of any of the rivers or streams in the project area. However, the transmission line will cross over various rivers and streams. The West Route Option would cross the Crow Wing River. If selected, the East Route Option will cross Seven Mile Creek and the Crow Wing River. The transmission line Common Route Segment would cross an unnamed tributary to Fish Trap Creek twice.

Because the project avoids or spans surface waters in the project area, impacts to surface waters as a result of the project are anticipated to be minimal. During construction of the project, there is potential for adverse impacts to surface waters due to vegetation clearing, ground disturbances, and construction traffic. These activities can speed water flow and expose previously undisturbed soils, increasing erosion and the potential for sediment to reach surface waters.

Mitigation

The primary means of mitigating impacts to surface waters is to select routes, alignments, and pole placements that avoid or span surface waters. The applicants' proposed route options do not avoid crossing all surface waters in the project area; however, the Applicants indicate that all surface waters that are crossed will be spanned.[317]

Disturbed soils will generally be limited to pole and substation locations; however, areas outside these locations may be disturbed by construction traffic and by removal of vegetation. Potential impacts to surface waters, caused by soil disturbance, can be mitigated by using best management practices (BMPs) for construction of the project. The Applicants indicate that they will use BMPs to prevent construction sediments from impacting surface waters.[318] Applicants also note that they will follow any DNR recommendations to minimize impacts at crossings of public waters.[319] Permittee use of BMPs to control erosion and minimize impacts to water resources is a standard Commission route permit condition (see **Appendices B** and **C**).

Construction of the project will require a number of permits from state and federal agencies, beyond a route permit from the Commission, e.g., NPDES/SDS stormwater construction permit (see Section 2.3). Many of these permits and approvals are directed at the prevention and mitigation of water resource impacts.

Floodplains

Federal Emergency Management Agency (FEMA) floodplain maps didn't provide coverage into Morrison County where the proposed West and East Route Options cross the Crow Wing River. For the preparation of and analysis completed in this EA, floodplain was assumed to be adjacent to the Crow Wing River at the locations of both the West and East Route Option river crossings. This assumption is based on the identification of flood zone A, approximate 100 year floodplain, along the Crow Wing River

[317] CN and Route Permit Application, Section 9.6.2.
[318] Id.
[319] Id.

in the FEMA floodplain maps for Todd County directly west of the proposed Project.[320] Federal and state laws require that local governments take the 100-year floodplain into consideration when planning development.[321]

Potential Impacts
Impacts to the 100-year floodplain by the proposed Project are anticipated to be minimal. The proposed Project structures are not anticipated to alter existing water drainage patterns , alter existing floodplain elevations, or increase flood susceptibility in the area.[322] Because of the relatively small cross section of proposed pole structures and their spacing, impacts to floodplains, if any, would be incremental and are anticipated to be *de minimis*.[323]

Mitigation
No impacts to the 100-year floodplain are anticipated to occur as a result of the project; thus, no mitigation measures are proposed.

Groundwater
The project is located in Minnesota's central groundwater province, which is characterized by thick sand and clay glacial drift over Precambrian and Cretaceous bedrock.[324] This province has relatively good availability of groundwater.[325] Groundwater in the province is closely linked with lakes, streams, and wetlands.[326]

Potential Impacts
Impacts to groundwater due to the project are anticipated to be minimal. Potential impacts to groundwater from the project could occur (1) through surface water impacts and (2) impacts directly to groundwater resulting from structure foundations. Impacts to surface waters can lead to impacts to groundwater.

Direct impacts to groundwater could occur as a result of the construction and placement of transmission line structures. The applicants indicate that, for most structures, concrete foundations will not be used (see Section 3.6). However, depending on the final alignment and design for the project, concrete foundations maybe be used for select structures. If and where concrete foundations are used, some portion of the soluble components of the concrete will leach into groundwater prior to the setting and hardening of the concrete. If dewatering is necessary to place the foundations, the water removed from foundation sites could contain pollutants that may be introduced into surface waters.

[320] FEMA Digital Flood Rate Insurance Maps, Minnesota, Downloaded from MN Geospatial Commons Website on October 13, 2015
[321] Minnesota Rules 6120 ("Shoreland and Floodplain Management"), https://www.revisor.mn.gov/rules/?id=6120.
[322] CN and Route Permit Application, Section 9.6.2.
[323] Id.
[324] Ground Water Provinces, http://www.dnr.state.mn.us/groundwater/provinces/index.html.
[325] Id.
[326] Where is Groundwater and is it Available for Use?, http://files.dnr.state.mn.us/waters/groundwater_section/sustainability/whereisGW.pdf.

Mitigation
Impacts to groundwater can be mitigated, in part, by utilizing measures to prevent impacts to surface waters (discussed above). Direct impacts to groundwater, i.e., leaching from concrete poured at depths where groundwater is present, are anticipated to be minimal due to the anticipated minimal use of concrete foundations for the project and the relatively low solubility of concrete components.

Wetlands

Wetlands provide valuable ecological services such as floodwater retention, nutrient assimilation, sediment entrapment, and wildlife habitat. Wetlands can be found in a variety of ecoregions and vary with soil, hydrology, and vegetation.[327] They are typically seasonal in their extent. Wetlands in Minnesota are protected federally under Section 404 of the Clean Water Act and by the State of Minnesota under the Wetland Conservation Act (WCA).

Wetlands are present throughout the project area. There are approximately 15 (East Route Option) to 17 acres (West Route Option) of wetlands within the applicants' proposed ROW for the project (**Table 16**). This includes 1.04 acres of forested wetlands.

Potential Impacts
Because most wetlands within the applicants' proposed route can be avoided or spanned, impacts to wetlands due to the project are anticipated to be minimal. Crossing a wetland does not necessarily mean that the wetland will be impacted, e.g., a wetland could be crossed by spanning it. However, where a wetland is crossed and such crossing requires construction activities within the wetland, there is a strong potential for impacts. Construction of transmission line structures typically includes vegetation clearing, movement of soils, and construction traffic. These activities could impair the functioning of wetlands. Even small changes in hydrology (e.g., periods of inundation, changes in flow, sedimentation) can impair the functioning of wetlands.

Table 16. Wetlands within Applicants' Proposed Right-of-Way[328]

Route Segment	Number of Basins	Forested Wetland Acres within Right-of-Way (100 ft.)	Total Wetland Acres within Right-of-Way (100 ft.)
Dog Lake Substation to MP "24 Line" Transmission Line	2	0	0.72
West Route Option	3	0	5.20
East Route Option	3	0	2.58
Common Route	20	1.04	11.39
Totals:	28	1.04	14.69 – 17.31

[327] Types of Wetlands, http://www.dnr.state.mn.us/wetlands/types.html.
[328] CN and Route Permit Application, Section 9.6.2, Table 9-9. Based on National Wetland Inventory (NWI) data.

Forested wetlands within the transmission line ROW would likely undergo a permanent change of vegetation type as a result of the project. Transmission lines cannot be safely or reliably operated with trees growing up and into them (see Section 3.6). Therefore, existing trees must be removed throughout the ROW, including forested wetlands.[329] The U.S. Army Corps of Engineers (USACE) may require wetland mitigation for the conversion of forested wetlands to non-forested wetlands.[330]

Mitigation
Potential impacts to wetlands can be mitigated by selecting routes, alignments, and pole placements that avoid wetlands. If wetlands cannot be avoided, impacts can be minimized by a variety of strategies including: use of construction mats, constructing during winter months when the ground is frozen, assembling structures on upland areas prior to site installation, and transporting crews and equipment, to the extent possible, over improved roads and via routes which minimize transit over wetlands.[331]

The Applicants do not anticipate that a regional general permit from the USACE, under Section 404 of the Clean Water Act, will be required for the project.[332] The Applicants indicate they will restore all wetlands in accordance with USACE requirements and with the requirements of WCA should a permit be deemed necessary (see Section 2.3).[333] Commission route permits require permittees to avoid and minimize wetland impacts (**Appendices B** and **C**).

5.9 Soils

Soils in the project area have been formed primarily by glacial and alluvial deposition.[334] The depth of glacial drift over bedrock varies from 200 to 600 feet.[335] Soils in the area are generally very deep and range from poorly to well drained.[336] Based on the United States Department of Agriculture (USDA) data there are six soil associations found throughout the proposed project route options[337];

- Menahga – Mahtomedi
- Staples – Menahga – Huntersville
- Menahga – Markey – Hubbard
- Meehan – Markey
- Zimmerman – Sartell – Rifle – Lino – Isanti
- Mahtomedi – DeMontreville – Cushing

[329] CN and Route Permit Application, Section 9.6.2.
[330] Id.
[331] Id.
[332] Id.
[333] Id.
[334] CN and Route Permit Application, Section 9.8.
[335] Id.
[336] Id.
[337] CN and Route Permit Application, Section 9.8.3.

Potential Impacts
Transmission lines have the potential to impact soils directly by moving them, or indirectly by removing vegetative cover such that they are more susceptible to movement by wind and/or water. Impacts to soils due to the project are anticipated to be minimal and temporary.

Construction activities will move and handle soils to place transmission line poles. Vegetation will be cleared to facilitate construction of the project. This clearing will temporarily expose soils to the elements, which could cause soil erosion. Loss of soils during construction could adversely impact water resources in the area. Soils could also be compacted by machinery used to construct the project.

Mitigation
Potential impacts to soils can be mitigated by using BMPs for construction of the project. The Applicants indicate that they will use variety of methods to minimize soil erosion, including the prompt revegetation of disturbed soils.[338] Common mitigation measure employed to minimize soil erosion include:

- Seeding to establish temporary and permanent vegetative cover on exposed soil.
- Using mulch to form a temporary and protective cover on exposed soils. Mulch can help retain moisture in the soil to promote vegetative growth, reduce evaporation, insulate the soil, and reduce erosion. A common mulch material used is hay or straw.
- Erecting or using sediment control fences that are intended to retard flow, filter runoff, and promote the settling of sediment out of runoff via ponding behind the sediment fence.
- Using erosion control blankets and turf reinforcement mats that are typically single or multiple layer sheets made of natural (wood) and/or synthetic materials that provide structural stability to bare surfaces and slopes.

Measures to mitigate soil erosion are standard Commission route permit conditions (see **Appendices B** and **C**). If one acre, or more, of soil will be disturbed during construction of the proposed Project will obtain a National Pollutant Discharge Elimination System (NPDES) construction stormwater permit from the MPCA and will prepare a Stormwater Pollution Prevention Plan (SWPPP).[339]

5.10 Flora

The project area lies within the Northern Minnesota Drift and Lake Plains Section of the Laurentian Mixed Forest Province in northern Minnesota.[340] This section is characterized by deep glacial deposits in outwash plains, moraines, and drumlin fields. Vegetation in the project area reflects the complex and patchy distribution of these glacial deposits.[341] More specifically the Project is located in the Pine Moraines and Outwash Plains Subsection. Forests of jack pine, basswood, paper birch, aspen, and northern red oak are common. Black spruce, tamarack, white cedar, and black ash are prominent on poorly drained soils.[342]

[338] CN and Route Permit Application, Section 9.8.3.
[339] CN and Route Permit Application, Section 9.8.3.
[340] Laurentian Mixed Forest Province, http://dnr.state.mn.us/ecs/212/index.html. See also CN and Route Permit Application, Section 9.1.
[341] Id.
[342] Pine Moraines & Outwash Plains Subsection, http://www.dnr.state.mn.us/ecs/212Nc/index.html.

Well drained, upland soils in the project area have been cleared and converted to agricultural use (see Section 5.6). Fields are commonly bordered by forested areas. Native vegetation communities include forested, shrubland, and wetland areas. Wetlands are found throughout the project area and include meadows, marshes, shrub swamps, thickets, and forested wetlands (see Section 5.8). Meadows are characterized by grasses as well as a variety of sedges and rushes.[343] Marshes are typically dominated by cattails, bulrushes, and sedges.[344] Shrub swamps include willows, ferns, forbs, and grasses.[345] Thickets include alders, elderberry, cranberry, ferns, sedges, and grasses.[346] Forested wetlands in the project area are typically dominated by black ash, black spruce, and tamarack.[347]

Potential Impacts

Transmission lines have the potential to impact flora through the removal or disturbance of vegetation during construction and later during maintenance activities. Additionally, flora may be impacted by the possible introduction of invasive species, or by changes in habitat (e.g., soils, water flows) that adversely impact plant growth. Potential impacts to flora due to the project are anticipated to be minimal to moderate. Impacts to the natural environment as a whole will result from the portion of the West Route Option that will create a new utility corridor and new Crow Wing River crossing.

Impacts to forested areas are anticipated as a result of construction of the project and maintenance of the transmission line ROW. The project is anticipated to impact approximately 50 to 60 acres of forested land (see Section 5.6). Impacts to other vegetation communities, for example agricultural fields and non-forested wetlands, are anticipated to be minimal as vegetation within these communities does not need to be cleared for ROW purposes and can, in many instances, be spanned.

Mitigation

Impacts to flora can also be mitigated by a number of strategies, including:

(1) placement of the alignment and of specific structures to avoid trees and other tall-growing species (utilization of existing utility and road ROWs)
(2) spanning low growing plant communities
(3) constructing during fall and winter months to limit plant damage
(4) leaving or replanting compatible plants at the edge of the transmission line ROW
(5) replanting on the transmission line ROW with low growing, native species
(6) avoiding the introduction of invasive species – on equipment or through seeds or mulches.

The applicants indicate that they will minimize the introduction and spread of invasive species by:[348]

- Revegetating disturbed areas using weed-free seed mixes and using weed-free straw and hay for erosion control.

[343] Wetland and Plant Communities of Minnesota and Wisconsin, 3rd Edition, Minnesota Board of Water & Soil Resources, http://www.bwsr.state.mn.us/wetlands/delineation/WPPC_MN_WI/.
[344] Id.
[345] Id.
[346] Id.
[347] Id.
[348] CN and Route Permit Application, Section 9.6.4.

- Removal of invasive species via herbicide and manual means consistent with easement conditions and landowner restrictions.

- Cleaning and inspection construction vehicles to remove dirt, mud, plant, and debris from vehicles prior to arriving at and leaving from construction sites.

Impacts to flora can be mitigated by providing compensation to individual landowners through negotiated easement agreements. Mitigation and restoration measures for impacts to flora are standard Commission route permit conditions (see **Appendices B** and **C**).

5.11 Fauna

The project area includes a variety of habitats including forested areas, grassland, agricultural fields, wetlands, lakes and streams. These habitats support a range of wildlife, including deer, bear, fox, skunks, raccoons, waterfowl, raptors, and songbirds.[349] Sandhill cranes, bald eagles, and trumpeter swans are known to utilize the project area.[350] Fish species in area lakes include black crappie, bluegill, northern pike, rock bass, yellow perch, and walleye.[351] The Crow Wing River two most common fish species are the northern redhorse and white sucker, and the river is generally not considered a good game fish river due to an overall lack of desirable cover and habitat.[352]

There are no WMAs or SNAs managed by the MN DNR within the proposed project area. Additionally, there are no Waterfowl Production Areas (WPAs) or National Wildlife Refuge lands managed by the USFWS in the proposed project area.

Potential Impacts
Transmission lines have the potential to impact fauna through a variety of means including temporary displacement, habitat loss, and, for avian species, collision with transmission line conductors. Potential impacts to fauna due to the project are anticipated to be minimal.

In general, fauna within the project area are anticipated to have the ability to remove themselves from the potential dangers of project construction and to exist while temporarily displaced from the area. Potential impacts due to construction and displacement are anticipated to be minimal. Construction of the line is not anticipated to affect any lakes or rivers in the project area; thus, impacts to fish that inhabit these waterbodies are anticipated to be minimal. The project will remove approximately 50TO 60 acres of forested habitat. This loss of habitat may cause relocation of wildlife that use this habitat, but this relocation is not anticipated to significantly impact wildlife populations.

Avian species could be impacted by project through collision with transmission line conductors.[353] Collisions are more likely for waterfowl species such as swans, geese, and ducks. Frequency of collision depends upon the number of birds crossing through the project area and the likelihood that they will utilize the area, e.g., for food, water, resting. Large avian species, primarily raptor and waterfowl

[349] CN and Route Permit Application, Section 9.6.3.
[350] Public Comments received during the May 19, 2015 Public Information and Scoping Meeting and during the Comment Period.
[351] MN DNR, 2014 Fisheries Lake Survey, Fish Trap Lake, http://www.dnr.state.mn.us/lakefind/showreport.html?downum=49013700.
[352] MN DNR, Crow Wing River, http://www.dnr.state.mn.us/watertrails/crowwingriver/more.html.
[353] CN and Route Permit Application, Section 9.6.3.

species, could also be impacted by electrocution. If the wingspan of a species is of sufficient size that the species can simultaneously contact two conductors or a conductor and a grounding wire, the species could be electrocuted.

Because of the relatively good habitat for avian species in the project area, particularly for waterfowl, raptors, and cranes, impacts to avian species could range from minimal to moderate. However, there are mitigation strategies that can be implemented to minimize these impacts; thus, impacts to avian species are anticipated to be minimal. Likewise, impacts due to electrocution could occur, but these impacts are also anticipated to be minimal, as there are common strategies which can be used to mitigate these impacts.

The Crow Wing River crossing span was specifically identified as an area of concern by MN DNR.[354] The Project has proposed two different route options that will cross the Crow Wing River, the West Route Option and the East Route Option. As proposed the West Route Option will result in the construction and maintenance of a new transmission line crossing over the Crow Wing River, which will be approximately 1,000 feet in length. The proposed East Route Option will result in the construction of co-located Crow Wing River crossing, so the proposed 115 kV transmission line will overtake and co-locate with the existing MP 34.5 sub-transmission line as the lines span the Crow Wing River. The existing Crow Wing River crossing by the MP 34.5 sub-transmission line is approximate 430 feet, and the proposed Crow Wing River crossing with the East Route Option will be approximately 365 feet.

Mitigation
Potential impacts to fauna due to the project can be mitigated through several strategies. The primary strategy for mitigating impacts is to place routes away from areas known to contain high quality habitat or which serve as migratory corridors. Use of existing rights-of-way can minimize habitat loss and fragmentation. Impacts to fauna can also be minimized by spanning habitats and minimizing the number of structures in high quality habitat through the use of specialty structures.

Avian impacts can be mitigated by diverting bird flights away from (over) transmission lines. Flights can be diverted through the use of bird flight diverters placed on the static lines above transmission line conductors. The applicants indicate that they will work with the MN DNR and USFWS to identify areas of the project where transmission line marking and /or alternate structures are needed to reduce the likelihood of collisions.[355] The MN DNR has indicated that an Avian Mitigation Plan should be developed for the proposed Project.[356]

Impacts to avian species caused by electrocution can be mitigated by the use of best practices for conductor spacing and shielding. These practices are codified in Avian Power Line Interaction Committee (APLIC) standards. Adherence to these standards is a standard Commission route permit condition (see **Appendices B** and **C**).

5.12 Rare and Unique Natural Resources

Rare and unique natural resource features within the project area consist of federal and/or state protected species and designated critical habitats, which have been listed under the federal Endangered

[354] MN DNR Comment Letter, June 3, 2015.
[355] CN and Route Permit Application, Section 9.6.3.
[356] MN DNR Comment Letter, June 3, 2015.

Species Act and/or Minnesota's Endangered Species Statue. Additionally, the habitats which federal and/or state listed and protected species rely on are also viewed as rare and unique. Habitat areas and native plant communities that have been identified by the MN DNR Minnesota Biological Survey (MBS) are also considered rare and unique resources.

Flora

A review of natural resource databases indicates that there are no federally listed plant species and three state listed plant species, beach heather, Drummond's campion, and clustered bur-reed in the vicinity of the project area (**Table 17**).[357] The Minnesota Biological Survey (MBS) has identified an area of moderate biodiversity that would be transected by the proposed West Route Option, and the proposed Common Route appears to intersect one area of high biodiversity in two locations, four areas of biodiversity ranked as below, and three areas of moderate biodiversity (**Appendix E**, Map E2).[358] The moderate biodiversity site that would be transected by the West Route Option has also been identified as a Basswood – Black Ash Forest, Native Plant Community by the MBS.[359] Additionally, portions of the high biodiversity site crossed by the proposed Common Route are identified as Native Plant Communities including, Meadow- Shrub Swamp- Marsh- West-Mesic Hardwood Complex and Basswood – Black Ash Forest, and Sedge Meadow.[360] The proposed Common Route could also intersect two Native Plant Communities that have been identified as Central Dry-Mesic Oak-Aspen Forests (**Appendix E**, Map E2).[361]

Fauna

A review of natural resource databases and consultation with MNDNR indicates that there are nine rare animal species records in the vicinity of the project area, the records include the following species, the American bittern, red-shouldered hawk, least darter, bald eagle, northern barrens tiger beetle, black sandshell, and creek heelsplitter (**Table 17**).[362] Additionally, the MN DNR indicated that Blanding's turtles, a state threatened species, have been reported in the vicinity of the proposed Project.[363]

The Northern Long-Eared Bat (NLEB) was listed by the USFWS as a federally threatened species on April 2, 2015. The primary reason for the listing is the rapid decline in NLEB populations due to white nose syndrome, a fungal disease that has quickly spread throughout the species' range.[364] Because of this disease, other possible causes of NLEB mortality may now be important factors affecting the viability of NLEB populations in the United States.[365] One such cause is the loss or degradation of summer roosting habitat. The Northern Long-Eared Bat is found throughout eastern and central North America.[366] The

[357] Additional Information provided by the Applicants. Minnesota NHIS Index Report dated March 2015. MNDNR Native Plant Communities and MCBS Sites of Biodiversity Significance Shapefiles, Downloaded from Minnesota Geospatial Commons Website.
[358] MNDNR Native Plant Communities and MCBS Sites of Biodiversity Significance Shapefiles, Downloaded from Minnesota Geospatial Commons Website.
[359] MNDNR Native Plant Communities and MCBS Sites of Biodiversity Significance Shapefiles, Downloaded from Minnesota Geospatial Commons Website.
[360] Id.
[361] Id.
[362] Additional Information provided by the Applicants. Minnesota NHIS Index Report dated March 2015.
[363] Id.
[364] Id.
[365] Id.
[366] USFWS Endangered Species, Northern Long-Eared Bat, http://www.fws.gov/midwest/endangered/mammals/nlba/.

bats hibernate in caves and mines during winter months and roost in forested areas during summer months.[367] Though there are no known occurrences of NLEB roosting in the project area, the area includes trees that may serve as roosting habitat for NLEB.

Table 17. Rare and Unique Species in Project Area[368]

Type	Common Name	Scientific Name	Number of Recorded Occurrences in Project Area	Federal Status	State Status
Plant	Beach Heather	*Hudsonia tomentosa*	1	None	Special Concern
Plant	Drummond's Campion	*Silene drummundii spp. drummundii*	1	None	Special Concern
Plant	Clustered Bur-reed	*Sparganium glomeratum*	1	None	Watchlist
Mollusc	Black Sandshell	*Ligumia recta*	1	None	Special Concern
Mollusc	Creek Heelsplitter	*Lasmigona compressa*	1	None	Special Concern
Fish	Least Darter	*Etheostoma microperca*	2	None	Special Concern
Insect	Northern Barrens Tiger Beetle	*Cicindela patruela patruela*	1	None	Special Concern
Bird	American Bittern	*Botaurus lentiginosus*	1	None	Watchlist
Bird	Red Shoulder Hawk	*Buteo lineatus*	3	None	Special Concern
Bird	Bald Eagle	*Haliaeetus leucocephalus*	2	None	Watchlist
Mammal	Northern Long-Eared Bat	*Myotis septentrionalis*	0	Threatened	Special Concern

Potential Impacts

Impacts to rare and unique natural resources (flora and fauna) from the project could result from ecosystem changes, introduction of invasive species, habitat loss, and, for avian species, collision with transmission line conductors. Potential impacts to rare and unique natural resources due to the project are anticipated to be minimal to moderate; however, mitigation measures are recommended by MN DNR and USFWS.

[367] Id.

[368] Additional Information provided by the Applicants. Minnesota NHIS Index Report dated March 2015. USFWS Endangered Species, Northern Long-Eared Bat, http://www.fws.gov/midwest/endangered/mammals/nlba/.

The Applicants' proposed Common Route, East Route Option, and Dog Lake Substation to MP "24 Line" segment are generally located away from rare communities and rare species in the project area. Where the applicants' proposed route crosses and/or is near such communities, it does so following existing rights-of-way. The proposed West Route Option transects a moderate MBS Site of Biodiversity and Native Plant Community, and the route will create a new utility ROW through the site (**Appendix E,** Map E2).

The new 115 kV line will cross the Crow Wing River in the project area. If soil erosion resulting from the construction of the project is not minimized and mitigated, this erosion could adversely affect water quality and thus the creek heelsplitter and the black sandshell mussel. The Blanding's turtle could potentially be killed or injured by Project related vehicle and equipment traffic during construction and maintenance. Construction impacts to wetland and upland habitats within the Project area could also impact the Blanding's turtle. Additionally, the Blanding's turtle is susptible to entrapment in excavated areas, and entanglement in erosion control netting and silt fencing.

Finally, though there are no known occurrences of NLEB roosting in the project area, it is possible that NLEB use trees in the area for roosting. The applicant's proposed route will impact in the range of 50 to 60 acres of forested land. The removal of these trees could limit and degrade roosting habitat for the NLEB.

Mitigation

The primary means of mitigating impacts to rare and unique natural resources is to avoid them through prudent routing. Within a route, impacts can be mitigated by placing the alignment and specific structures away from rare resources. Impacts can be mitigated by spanning rare resources. Impacts can also be mitigated by using existing, already disturbed, infrastructure rights-of-way.

The applicants indicate that they will use several strategies to minimize impacts to rare natural resources, including:[369]

- Minimizing tree and shrub removal,
- Utilizing best management practices to prevent soil erosion,
- Revegetating disturbed areas with native species and wildlife conservation species,
- Install bird flight diverters on the line at water crossings,
- Avoid impacts to undisturbed habitat to the greatest extent practicable.

For the segments of the Applicants' proposed route that contain Sites of Biodiversity and Native Plant Communities, the DNR has recommended several mitigation strategies, including:[370]

- Constructing the project within already disturbed areas,
- Minimizing vehicular disturbance,

[369] CN and Route Permit Application, Section 9.7.
[370] Additional information provided by the Applicants. MN DNR Natural Heritage Review Letter, March 30, 2015.

- Do not construct within Native Plant Communities or Sites of Biodiversity
- Avoiding equipment or supply stockpiles in the areas,
- Do not place spoil in Sites of Biodiversity, Native Plant Communities, or other sensitive areas,
- Inspecting and cleaning all equipment to prevent introduction of invasive species,
- Conducting work under frozen ground conditions,
- Using effective erosion control measures,
- Revegetating with native species and weed-free seed mixes,
- Use only weed-free mulches and topsoils.

To prevent deterioration of water quality and adverse impacts on the creek heelsplitter and black sandshell mussel, the DNR has also recommended that erosion control measures be implemented near the Crow Wing River.[371] Additionally, the river crossing should span the river completely with an overhead line or directional boring of an underground line should be considered.[372]

The MN DNR recommends the Applicants utilize the following mitigation measures to minimize the potential impacts to Blanding's turtles in the project area[373]:

- All contractors working on the Project should be provided with a Blanding's turtle flyer, which includes an illustration of the species,
- Turtles in imminent danger should be moved, by hand, to a safe location,
- Silt fencing should be used to keep turtles out of construction areas, silt fencing must be removed as soon disturbed areas have been revegetated,
- Avoid dredging or filling wetlands during project construction,
- Avoid run-off of fertilizers, pesticides, or soil into wetlands and lakes in the project area,
- Project access and maintenance roads should be minimized to reduce the potential for turtle road-kills,
- Prior to backfilling any trenches or any other excavation, all excavated areas should be check for turtles,
- Terrain in the project area should be left with as much natural contour as possible,

[371] Additional information provided by the Applicants. MN DNR Natural Heritage Review Letter, March 30, 2015.
[372] Additional information provided by the Applicants. MN DNR Natural Heritage Review Letter, March 30, 2015.
[373] Additional information provided by the Applicants. MN DNR Natural Heritage Review Letter, March 30, 2015 and MN DNR Environmental Review Fact Sheet – Blanding's Turtle, http://files.dnr.state.mn.us/natural_resources/animals/reptiles_amphibians/turtles/blandings_turtle/factsheet.pdf.

- All disturbed areas should revegetated with native grass and forb seed mixes,
- Vegetation management of areas along access roads and within the transmission line right-of-way should be completed mechanical between Oct 1st and June 1st, and no chemicals should be used,
- Erosion control netting to be used for the project should be made out of wildlife friendly materials.

The USFWS recommends minimizing the removal of trees that could be used as roosting habitat for the NLEB. Tree removal can be minimized by prudent routing – by selecting routes, alignments, and structure locations that minimize the number of trees that must be removed to accommodate the new 115 kV transmission line ROW. The USFWS indicates that an incidental take permit may be necessary for projects that result in greater than one acre of tree removal.[374] The take permit may impose conditions to mitigate potential impacts to NLEB.

5.13 Application of Routing Factors to the Proposed Project

The Power Plant Siting Act requires the Commission to locate transmission lines "in an orderly manner compatible with environmental preservation and the efficient use of resources" that minimizes "adverse human and environmental impact[s]" while ensuring electric power reliability.[375] Minnesota Statute Section 216E.03, subdivision 7(b) identifies considerations that the Commission must take into account when designating transmission lines routes.[376]

Minnesota Rule 7850.4100 lists 14 factors for the Commission to consider in its route permitting decisions, including effects on human settlements, effects on public health and safety, and effects on the natural environment (**Figure 13**).[377] In this section, the information gathered by EERA staff during the environmental review process, as presented in this EA, is applied to these factors.

The discussion here focuses on the first 12 routing factors of Minnesota Rule 7850.4`100 (factors A through L). Routing factors M and N – the unavoidable and irreversible impacts of the project – are discussed at the end of this section.

[374] USFWS Comments provided during the EA Scoping Public Comment Period, June 3, 2015. eDocket # 20156-111508-01 (eFiled June 17, 2015).
[375] Minnesota Statute 216E.02, https://www.revisor.mn.gov/statutes/?id=216E.02.
[376] Minnesota Statute 216E.03, Subd. 7, https://www.revisor.mn.gov/statutes/?id=216E.03.
[377] Minnesota Rule 7850.4100, https://www.revisor.mn.gov/rules/?id=7850.4100.

Figure 15. Factors Considered by the Commission for Transmission Line Route Permits

In determining whether to issue a route permit for a high voltage transmission line, the Commission shall consider the following factors of the Minnesota Rule 7850.4100:

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

B. Effects on public health and safety;

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

D. Effects on archaeological and historic resources

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

F. Effects on rare and unique natural resources;

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

H. Use or paralleling of existing right-of-way, survey lines, natural divisions lines, and agricultural field boundaries;

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

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

K. Electrical systems reliability;

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

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

N. Irreversible and irretrievable commitments of resources.

Routing factor I, the use of large electric generating plant sites, is not relevant to this project and is not discussed here. The only route discussed here is the applicant's proposed route. Possible alternatives for the project – the relative merits of these alternatives are discussed in Section 6.0.

Routing Factors and Elements

Some of the routing factors in Minnesota Rule 7850.4100 describe a resource in relatively succinct terms, e.g., effects on archaeological and historic resources. Other routing factors are more descriptive and include a list of factor elements, i.e., parts that make up the sum of the whole factor. For example,

the factor "effects on human settlements" includes the factor elements displacement, noise, aesthetics, cultural values, recreation, and public services. Finally, there are routing factors that are relatively succinct, but for which elements have been identified through the scoping process and analyzed in this EA. For example, the factor "public health and safety" includes the elements electric and magnetic fields, implantable medical devices, stray voltage, induced voltage, and air quality.

Routing Factors for Which Impacts are Anticipated to be Minimal

There are several routing factors, and factor elements, for which impacts are anticipated to be minimal with the general conditions in section 5.0 of the Commission's generic route permit template. These are:

- Effects on human settlements (factor A) for the factor elements – displacement, aesthetics, noise, property values, economics, cultural values, electronic interference, zoning and land use compatibility, and public services;

- Effects on public health and safety (factor B), including the factor elements – electric and magnetic fields, implantable medical devices, stray voltage, inducted voltage, and air quality;

- Effects on land-based economies (factor C) for the factor elements – agriculture, mining, and recreation and tourism;

    - Additionally, the Dog Lake Substation to MP "24 Line" segment is anticipated to have minimal impacts to land-based economy for the factor element forestry.

- Effects on the natural environment (factor E), including the factor elements flora (specific to herbaceous and shrubs), air quality, and water quality.

Routing Factors for Which Impacts are Anticipated to be Minimal to Moderate, and Which May Require Special Conditions to Mitigate

There are several routing factors, and factor elements, for which impacts are anticipated to be minimal to moderate with the general conditions in section 5.0 of the Commission's generic route permit template. These impacts may require special conditions in a route permit in order for the impacts to be mitigated. The factors and elements are:

- Effects on archaeological and historic resources (Factor D);
    - All proposed route segments could impact unidentified archaeological and historic resources.
    - The proposed West Route Option likely has the greatest potential to impact archaeological and historic resources.

- Effects on land-based economies (factor C) for the factor element - forestry;
    - The proposed West Route Option will impact approximately 24 acres of forested lands.
    - The proposed East Route Option will impact approximately 14 acres of forested lands.
    - The proposed Common Route will impact approximately 36 acres of forested lands.

- Effects on the natural environment (factor E) for the factor element flora (specific to trees)and fauna;
    - The proposed West Route Option will impact approximately 24 acres of forested lands.

  - The proposed East Route Option will impact approximately 14 acres of forested lands.
  - The proposed Common Route will impact approximately 36 acres of forested lands.
  - All proposed route segments could impact avian species in the project area.

- Effects on rare and unique resources (factor F);
  - All proposed route options could impact the state-threatened Blanding's turtle.
  - The proposed West Route Option, East Route Option, and Common Route could impact the federally threatened NLEB.
  - The proposed West Route Option and East Route Option could impact the creek heelsplitter and black sandshell mussels.
  - The proposed West Route Option would transect and impact an identified Native Plant Community (NPC) and a Site of Biodiversity Significance.

Archaeological and Historic Resources
Impacts to known archaeological and historic resources are anticipated to be minimal for the Dog Lake Substation to MP "24 Line," East Route Option, and the Common Route Option. The West Route Option likely has the greatest potential to encounter unidentified archaeological and historic resources, as the West Route Option will result in the construction of a new utility corridor and river crossing at the Crow Wing River.

Due to the moderate to high potential that the proposed route will impact unrecorded archaeological sites, SHPO recommends that a Phase I archaeological survey be conducted for the project.

Land-Based Economies – Forestry
Impacts to forested areas are anticipated to be minimal to moderate as a result of the project (see Section 5.6). The project will impact in the range of 50 to 60 acres of forested land. However, the extent to which the impacted forested lands are utilize for forestry harvest are not completely understood at this time, and no public or agency comments were received as to the forestry importance of any specific lands along the proposed route. Impacts of the project are avoided and mitigated by the proposed route's use of existing roadway and transmission line ROW. Impacts to trees can be further mitigated by prudent placement of the transmission line alignment and of specific structures to avoid forested areas. However, because of the prevalence of trees in the project area, impacts cannot be completely avoided or mitigated.

Natural Environment – Fauna
Impacts to fauna are anticipated to be minimal as a result of the project. However, avian species could be impacted by the project through collision with transmission line conductors. Because of the relatively good habitat for avian species in the project area, impacts to avian species could range from minimal to moderate. Impacts to avian species can be mitigated by the use of bird flight diverters and reduced utilization of structures requiring supporting guy wires. The MN DNR has indicated that an Avian Mitigation Plan should be developed as an avian impact risk mitigation strategy for the proposed project. The MN DNR and USFWS may recommend the use of bird flight diverters in specific areas once the final route has been selected.

Avian species with relatively larger wing spans may also be impacted by electrocution. Impacts to avian species caused by electrocution can be mitigated by the use of best practices for conductor spacing and shielding.

Rare and Unique Resources

Impacts to rare and unique resources due to the project are anticipated to be minimal. However there are resources that could be impacted by the project and for which mitigation measures have been recommended by DNR and USFWS.

Portions of the proposed Project will transect or run adjacent to Sites of Biodiversity and Native Plant Communities identified by the MN DNR – Minnesota Biological Survey (MBS), the MN DNR has recommended several mitigation strategies, including:

- Constructing the project within already disturbed areas,
- Minimizing vehicular disturbance,
- Avoiding equipment or supply stockpiles in the areas,
- Inspecting and cleaning all equipment to prevent introduction of invasive species,
- Conducting work under frozen ground conditions,
- Using effective erosion control measures,
- Revegetating with native species and weed-free seed mixes.
- Use only weed-free mulches and top soils,
- Confine construction activities to the opposite side of the road from Native Plant Communities and Sites of Biodiversity.

To prevent deterioration of water quality and adverse impacts on the creek heelsplitter and black sandshell mussels, the MN DNR has also recommended that erosion control measures be implemented near the Crow Wing River and they recommended spanning the river with an overhead line or directional boring under the river.

MN DNR has indicated that the Blanding's turtle has been reported from the vicinity of the project area, and may be adversely affected by the proposed project. However, the MN DNR provided impact avoidance and minimization recommendations which can be implemented during project construction, including:

- An illustrated flyer with a Blanding's turtle on it should be provided to all contractors working in the area,
- Turtles in imminent danger should be moved to safety by hand,
- Turtles not in imminent danger should be left undisturbed,
- Silt fencing should be put in place to keep turtles out of construction areas, and promptly removed once construction areas have been revegetated,

- Avoid dredging in wetlands, and avoid the discharge of chemicals and sediments into wetlands and lakes,
- Utility access and maintenance roads should be kept to a minimum to reduce the potential for road kill,
- Any trenches excavated during construction should be checked for turtles that may have become trapped prior to back-filling,
- The project area terrain should be left with as much natural contour as possible,
- Graded areas should be revegetated with native grasses and forbs,
- Vegetation management under power lines and along utility access roads should be done mechanically, and occur after October 1st and before June 1st.

The USFWS recommends minimizing the removal of trees that could be used as roosting habitat for the Northern Long-Eared Bat (NLEB). Tree removal can be minimized by prudent routing – by selecting routes, alignments, and structure locations that minimize the number of trees that must be removed to accommodate the new 115 kV transmission line ROW. The USFWS indicates that an incidental take permit may be necessary for projects that result in greater than one acre of tree removal. The take permit may impose conditions to mitigate potential impacts to NLEB.

Routing Factors that are Well Met

There are several routing factors that do not describe a resource or impact but rather indicate the state's interest in efficient design and use of resources, particularly the state's limited land resources. For the applicants' proposed project, these factors are well met:

- Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity (factor G);
- Use or paralleling of existing right-of-way, survey lines, natural division lines, and agricultural field boundaries (factor H);
- Use of existing transportation, pipeline, and electrical transmission systems or rights-of-way (factor J);
- Electrical system reliability (factor K).

The project is designed to improve electrical service and reliability in the project area (see Section 4.1). The project is also designed to accommodate future expansion of the transmission system in the area (see Section 3.1). The applicants' proposed route parallels or utilizes existing transmission and roadway ROW for approximately 98 to 99 percent of its length (see Section 5.3).

Unavoidable Impacts

Transmission lines are large infrastructure projects that have adverse human and environmental impacts. The character of these impacts and the ways in which they can be mitigated are discussed in this EA in Sections 5 and 6. Even with mitigation strategies, there are adverse impacts of the project

which cannot be avoided. These impacts are anticipated to occur for all routes and route and site alternatives and to vary, if at all, as discussed in Section 6.

Aesthetic impacts cannot be avoided. The project would introduce new 115 kV transmission line structures and conductors. These structures and conductors would be visible; therefore, they would have an adverse aesthetic impact. Removal of trees and other vegetation to construct the project would also create aesthetic impacts. Temporary construction-related impacts cannot be avoided. These include construction-related noise and dust generation, and disruption of traffic near construction sites.

Impacts to agriculture and forestry cannot be avoided. The project requires the construction of transmission line structures and substations in a project area that includes agricultural fields and forested areas. Agricultural soils will, to some extent, be compacted; structures may impede agricultural practices. Trees within the transmission line ROW would be removed.

Finally, impacts to the natural environment cannot be avoided. Even if impacts can be limited to the ROW for the project, construction and operation of the transmission line would require tree removal and brush trimming, as well as clearing at structure and substation sites. These are unavoidable impacts to vegetation. Unavoidable impacts to wildlife include the removal or fragmentation of habitat. Transmission line conductors adversely affect avian species by creating a risk of collision. These collisions would occur despite mitigation strategies such as the use of bird flight diverters.

Irreversible and Irretrievable Commitments of Resources

The commitment of a resource is irreversible when it is impossible or very difficult to redirect that resource to a different future use. An irretrievable commitment refers to the use or consumption of a resource such that it is not recoverable for later us by future generations. These types of commitments are anticipated to occur for all routes and route and site alternatives and not to vary significantly between routing options.

The commitment of land for a transmission line ROW is likely an irreversible commitment. In general, lands in the ROWs for large infrastructure projects such as railroads, highways and transmission lines remain committed to these projects for a relatively long period. Even in instances where a ROW is abandoned, the land within the ROW is typically repurposed for a different infrastructure use, such as a rails-to-trails program, and is not returned to a previous land use. For transmission lines, however, abandoned ROWs can be returned to an existing or previous use (e.g., row crop, pasture) in certain circumstances.

There are few commitments of resources associated with the project that are irretrievable. These commitments include the steel, concrete and hydrocarbon resources committed to the project, though it is possible that the steel could be recycled at some point in the future. Labor and fiscal resources required for the project are also irretrievable commitments.

West Route Option and East Route Option Comparison

The Applicants have proposed two route options, the West Route Option and the East Route Option, which will connect the MP “24 Line” to the CWP Motley Substation. This section is intended to provide a comparison of the relative merits of the West Route Option and the East Route Option.

The proposed West Route Option will extend south from its connection with the MP "24 Line" 115 kV transmission line to the existing Burlington Northern Santa Fe (BNSF) railroad, and the proposed route will follow directly adjacent to the 57th Avenue SW ROW. From the BNSF railroad the West Route Option will continue south creating approximately one-half mile of new transmission line corridor ultimately crossing the Crow Wing River. South of the Crow Wing River the West Route Option will overtake an existing Crow Wing Power three phase distribution line, which will be underbuilt on the proposed 115 kV transmission line structure.[378] The West Route Option will extend south terminating at the CWP Motley substation.

The East Route Option will extend south directly adjacent to the 51st Avenue SW ROW from its interconnection with the existing MP "24 Line" to the intersection of 51st Avenue SW and 132nd St SW. At this intersection the East Route Option will turn to go west directly adjacent to 51st Avenue SW for approximately one-half mile at which point the East Route Option will turn to the south and follow directly adjacent to the 53rd Avenue SW ROW. The East Route Option will follow 53rd Avenue SW until it intersects the existing MP 34.5 kV sub-transmission line at which point the East Route Option will turn west approaching it's crossing of the Crow Wing River. The East Route Option is proposed to cross the Crow Wing River to the south of the existing MP 34.5 kV sub-transmission line river crossing. The existing MP 34.5 kV sub-transmission line will be relocated and attached to the proposed East Route Option structures as underbuild.[379] After crossing the Crow Wing River the East Route Option will travel west to the CWP Motley substation, directly adjacent to the Morrison County Road 28/Azalea Road ROW and utilizing the existing MP sub-transmission line ROW.

Human Settlements

Impacts to human settlements are impacts related to: aesthetics, noise, displacement, property values, economics, cultural values, electronic interference, and zoning and land use compatibility (see Section 5.3). Impacts to human settlements along the West Route Option and the East Route Option are anticipated to be similar along the proposed route options, and impacts are anticipated to be minimal.

As proposed the West Route Option would have eight total residences between 51 feet and 250 feet of the anticipated alignment, and the East Route Option would have 16 total residences between 51 feet and 250 feet of the anticipate alignment (refer to **Table 6**). There would be no residences within the anticipated alignment ROWs for either route option as they have been proposed.

Public Health and Safety

Impacts to public health and safety along the proposed West Route Option are anticipated to be similar to those along the proposed East Route Option (see Section 5.4).

Public Services

Impacts to public services along the proposed West Route Option are anticipated to be similar to those along the proposed East Route Option (see Section 5.5).

Land-Based Economies

Impacts to land-based economies are impacts to agriculture, forestry, mining and recreation and tourism (see Section 5.6). Impacts to mining, agriculture, recreation, and tourism along the proposed

[378] CN and Route Permit Application, Section 4.1.1.
[379] CN and Route Permit Application, Section 4.1.1.

West Route Option are anticipated to be similar to those along the proposed East Route Option and minimal.

The West Route Option would result in the clearing of approximately 24 acres of forested lands within the anticipated alignment ROW, and the East Route Option would result in the clearing of approximately 14 acres of forested lands within the anticipated alignment ROW. The forestry impacts of the proposed Project are anticipated to be minimized to a greater extent by utilizing the East Route Option.

Archaeological and Historic Resources

Potential impacts to archaeological and historic resources along the proposed West Route Option are anticipated to be higher than those along the proposed East Route Option (see Section 5.7). The new Crow Wing River crossing associated with the West Route Option would have the greatest likelihood of encountering or impacting previously non-recorded archaeological sites, so the archaeological and historic resource impacts of the proposed Project are anticipated to be minimized to the a greater extent by utilizing the East Route Option.

Water Resources

Impacts to water resources are impacts to surface waters, floodplains, groundwater, and wetlands (see Section 5.8). Impacts to water resources for the proposed West Route Option are anticipated to be similar to those along the proposed East Route Option and minimal.

Soils

Impacts to soils along the along the proposed West Route Option are anticipated to be similar to those along the proposed East Route Option and minimal (see Section 5.9).

Natural Environment

The West Route Option would result in greater impacts to the natural environment as it will require the construction of a new crossing over the Crow Wing River, and directly south of the Crow Wing River crossing the West Route Option would clear and construct a new utility ROW. The general natural environment impacts of the proposed Project are anticipated to be minimized to a greater extent by utilizing the East Route Option.

Flora

Impacts to herbaceous and shrub flora is anticipated to be minimal for the proposed West Route Option and the proposed East Route Option.

The potential flora impacts, specific to trees, for the West Route Option are slightly greater, approximately 24 acres, when compared to the proposed East Route Option, which is approximately 14 acres. The flora impacts, specific to trees, for the proposed Project are anticipated to be minimized to a greater extent by utilizing the East Route Option.

Fauna

Impacts to fauna along the along the proposed West Route Option are anticipated to be similar to those along the proposed East Route Option and minimal (see Section 5.11). Because of the relatively good habitat for avian species in the project area, impacts to avian species could range from minimal to moderate. However, these impacts can be mitigated through the use of bird flight diverters.

The proposed West Route Option will result in a new Crow Wing River crossing, which is approximately 1,000 feet longer than the proposed East Route Option Crow Wing River crossing. Transmission line river crossings can pose greater risks to avian species, as river corridors tend to concentrate flight, which leads to a greater potential for transmission line collisions. Although the proposed East Route Option would have a shorter river crossing, the total length of the East Route Option is approximately one mile longer than the proposed West Route Option.

Rare and Unique Natural Resources

Impacts to rare and unique natural resources along the proposed West Route Option are anticipated to be greater to those along the proposed East Route Option (see Section 5.12).

Potential impacts to Blanding's turtle, creek heelsplitter mussel, and black sandshell mussel are anticipated to be similar for the West Route Option when compared to the proposed East Route Option. Impacts of the proposed West Route Option and the proposed East Route Option are anticipated to be minimal for the Blanding's turtle, creek heelsplitter mussel, and the black sandshell mussel.

Though there are no known occurrences of NLEB roosting in the project area, these trees may serve as roosting habitat for NLEB. The USFWS recommends minimizing the removal of trees that could be used as roosting habitat for the NLEB. The USFWS has indicated that an incidental take permit may be necessary for projects that result in greater than one acre of tree removal. Thus the proposed Project has the potential to moderately impact the NLEB due to tree removal during project construction and maintenance. The proposed West Route Option will result in the removal of approximately 24 acres of forested lands, versus the removal of approximately 14 acres of forested lands with the proposed East Route Option. Potential impacts to NLEB are anticipated to be minimized to a greater extent by utilizing the East Route Option.

The proposed West Route Option has greater potential to impact Sites of Biodiversity and Native Plant Communities (NPCs) than the proposed East Route Option. The proposed West Route Option will potentially impact approximately 1.9 acres of lands identified by the MN DNR as Sites of Biodiversity, and approximately 0.2 acres of lands identified by the MN DNR as a NPC. The proposed East Route Option does not impact any identified Sites of Biodiversity or NPCs. Potential impacts to Sites of Biodiversity and NPCs are anticipated to be minimized to a greater extent by utilizing the East Route Option.

Use of Existing Rights-of-Way

The proposed West Route Option will parallel or utilize existing ROWs for approximately 94% of the anticipated alignment, and the proposed East Route Option will parallel or utilize existing ROWs for approximately 97% of the anticipated alignment.

Paralleling and utilization of existing ROWs is relatively similar for the proposed West Route Option and the proposed East Route Option.

Costs that are Dependent on Design and Route

The cost of the proposed West Route Option is estimated to be $1,992,000 for transmission line construction, and the proposed East Route Option is estimated to be $2,490,000 for transmission line construction. Additional costs to accommodate the underbuild of existing distribution and sub-transmission lines are not included in the estimated costs listed above.

The total proposed project cost is estimated at $16 to $17 million depending on the route option approved and construction. The estimated costs necessary to construct the East Route Option versus the West Route Option would likely result in an overall budget increase of approximately 3%, so the estimated budget increase to accommodate the East Route Option versus the West Route Option is not considered to be significant.

Relative Merits of the West Route Option and the East Route Option

This section utilizes the routing factors of Minnesota Rule 7850.4100 and factor elements to analyze the relative merits of the West Route Option and the East Route Option as proposed by the Applicants (see Section 5.13 and **Figure 15**).

The discussion in this section (and in Sections 6.2 and 6.3) uses text and a graphic to describe the relative merits of specific routing options (**Figure 16**). For routing factors where impacts are anticipated to vary with routing options, the graphic represents these anticipated impacts and compares them across these options. For routing factors that express the State of Minnesota's interest in the efficient use of resources (for example, the use and paralleling of existing rights-of-way), the graphic represents the consistency of routing options with these interests and compares them one to the other.

The discussion here focuses first of the first 12 routing factors of Minnesota Rule 7850.4100 (factors A through L). Routing factors M and N – the unavoidable and irreversible impacts of the project – are discussed in Section 5.13.

Figure 16. Guide to Relative Merits of Routing / Siting Options

Anticipated Impact or Consistency with Routing Factor	Color / Shape
Impacts are anticipated to be minimal with the general conditions in section 5.0 of the Commission's generic route permit template – OR – routing/siting option is very consistent with routing factor.	
Impacts are anticipated to be minimal to moderate with general conditions in section 5.0 of the Commission's generic route permit template; impacts may require special conditions or selection of a specific routing option to mitigate – OR – routing/siting option is consistent with routing factor but less so than other options in this area.	
Impacts are anticipated to be moderate and unable to be mitigated – OR – routing/siting option is not consistent with routing factor or consistent only in part.	

Routing factor I, the use of large electric generating plan sites, is not relevant to this project and is not discussed here. For purposes of discussion here, and with respect to routing factor G, it is assumed all routing and siting options are equal with regard to maximizing energy efficiencies and accommodating expansion of transmission capacity. With respect to environmental impacts, the examination of such impacts suggested by routing factor G is included in the discussion of other routing factors and elements

that more specifically address an environmental impact (e.g., effects on the natural environment, routing factor E). Thus, factor G is not discussed further here.

Routing factors H and J address similar issues, the use or paralleling of existing ROWs. Routing factor H relates to the use or paralleling of existing ROWs, but also includes items that do not have a ROW – survey lines, natural division lines and agricultural field boundaries. Routing factor J relates to the use of existing transportation, pipeline and electrical transmission ROWs.

Routing Factors for Which Impacts are Not Anticipated to Vary between Routing Options
There are several routing factors, and factor elements, for which impacts are not anticipated to vary significantly between routing options. These are:

- Effects on human settlements (factor A) for the factor elements – aesthetics, noise, displacement, property values, economics, cultural values, electronic interference, zoning and land use compatibility, and public services;
- Effects on public health and safety (factor B), including the factor elements – electric and magnetic fields, implantable medical devices, stray voltage, inducted voltage, and air quality;
- Effects on land-based economies (factor C) for the factor elements – mining, agriculture, recreation, and tourism
- Effects on the natural environments (factor E), for the factor elements – fauna, water quality and air quality;
- The use of or paralleling existing ROWs (factor H)
- Use of existing rights-of-way (factors J);
- Electrical systems reliability (factor K).

Routing Factors for Which Impacts are Anticipated to Vary between Routing Options
There are several routing factors, and factor elements, for which impacts are anticipated to vary between routing options. These are:

- Effects on land-based economies (factor C) for the factor element – forestry;
- Effects on archaeological and historic resources (factor D);
- Effects on natural environment (factor E), for the factor element – flora;
- Effects on rare and unique natural resources (factor F);
- Costs which are dependent on design and route (factor L).

Figure 17. West Route Option and East Route Option Comparison

Routing Factor / Element	Applicants' Proposed – West Route Option	Applicants' Proposed – East Route Option	Summary
Factor C Land-based Economies/ Element Forestry			The West Route Option will impact approximately 10 more acres of forested lands.
Factor D Archaeological and Historic Resources			The West Route Option has a greater potential to impact non-recorded archaeological sites due to the new river crossing location.
Factor E Natural Environment/Element Flora			The West Route Option will impact approximately 10 more acres of forested lands. Additionally, the new Crow Wing River crossing will negatively impact the natural environment.
Factor F Rare and Unique Natural Resources			The West Route Option will impact approximately 1.9 acres of land identified as a Site of Biodiversity, and approximately 0.2 acres of lands with NPC. The East Route Option does not impact any lands identified as Sites of Biodiversity or NPCs.
Factor L Project Costs			The West Route Option costs an estimated $498,000 less than the East Route Option.

6.0 Potential Impacts of Alignment Alternatives

This section discusses the potential impacts and mitigation measures associated with proposed alternatives identified in the scoping decision (**Appendix A**). These alternatives may provide a means to avoid or mitigate potential impacts of the project.

Resources and potential impacts are discussed here in the order that they are discussed in Section 5. Some impacts are relatively independent of the route or site selected for the project. For these impacts, the reader is referred to the discussion in Section 5. However, for some resources, impacts vary among alternatives and/or between the alternative and the proposed project. These impacts are discussed here.

Summary of Potential Impacts of Proposed Alternatives

In general, impacts of the route and site alternatives are similar to those of the proposed project and to each other. In some instances, the alternatives offer a means to avoid or mitigate potential impacts. In doing do, the alternatives offer tradeoffs.

The East of Highway 10 Alternative (Common Route from Azalea Road to Holt Road) and the East of Highway 10 Alternative (Common Route from Ridge Road to Holt Road) do reduce the number of residences that would be located within the project ROW, and both alternatives also utilize one more mile of existing utility ROW than the proposed anticipated alignment. However, both of the alternatives will result in additional potential impacts to recreation and tourism and rare and unique resources.

The MP Land East River Crossing Alternative would shift the proposed alignment to utilize land owned by one of the Applicants. However, in utilizing this alternative there is less utilization of existing ROWs.

The Old Tree Avoidance Alternative is specific to the avoidance of a large native elm tree directly south of Azalea Road. In comparing this alternative to the proposed alignment the Old Tree Avoidance Alternative would allow preservation of a large native elm tree of local cultural significance and utilize the existing utility ROW in place.

6.1 Common Route - East of U.S. Highway 10 Alignment Alternatives

There are two alignment alternatives that could be utilized to extend the Project's proposed Common Route along the east side of U.S. Highway 10 from Azalea Road to Holt Road: East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment (refer to **Figure 8**). These alternatives would be used in place of the Applicants' anticipated alignment for the portion of the Common Route extending south from Azalea Road to Holt Road, which was proposed on the west side of the U.S. Highway 10 ROW(refer to **Figure 1**).

The discussion here compares the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment to the comparable segment of the Applicants' proposed anticipated alignment – that portion of the Common Route from Azalea Road to Holt Road on the west side of the U.S. Highway 10 ROW.

Human Settlements

Impacts to human settlements are impacts related to: aesthetics, noise, displacement, property values, economics, cultural values, electronic interference, and zoning and land use compatibility (see Section 5.3). Impacts to human settlements along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) are anticipated to be similar to those along the proposed route – they are anticipated to be minimal.

Though impacts are anticipated to be minimal, three elements of human settlements, aesthetics, displacement, and property values are where impacts could potentially vary between the East of U.S. Highway 10 alternative (Common Route from Azalea Road to Holt Road) alignment, the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment, and the proposed anticipate alignment.

Aesthetics

As discussed in Section 5.3, the primary strategy for minimizing aesthetic impacts is prudent routing, i.e., choosing routes and alignments that are most harmonious with the landscape. Aesthetic impacts of the project can generally be minimized by placing the project away from residences. The East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment have relatively fewer residences, five and two, respectively, within 250 feet of the alternative alignment compared with the proposed anticipated alignment, which has 10.

Additional aspects of the current project area landscape to consider when analyzing potential aesthetic impacts is the high proportion of forested lands and the existing U.S. Highway 10 ROW. Forested lands can serve as visual buffers from developed areas for residences in the project area. The U.S. Highway 10 ROW is an existing developed feature on the landscape, and the addition of a transmission line alignment adjacent to such a developed feature would likely have little if any aesthetic impact to an individual that currently has an existing view of U.S. Highway 10.

When further analyzing the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment, the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment, and the proposed anticipated alignment, there would be three residences, two residences, or two residences, respectively, that would likely experience a direct aesthetic impact by the construction of a 115 kV transmission line between the residence and U.S. Highway 10.

The East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment, the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment, and the proposed anticipated alignment will require the removal of trees (see Section 5.6 and below). However, the simple act of removing trees may not impact an individual's aesthetic experience, i.e. residents that will still have forested lands located between their residences and the transmission line ROW or residents that currently have an unobstructed view of U.S. Highway 10 from their residences.

The East of Highway 10 alternative (Common Route from Azalea Road to Holt Road) alignment and the East of Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment have similar aesthetic impacts to those along the proposed anticipated alignment and are minimal.

Displacement

The East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment have no residences within 50 feet of alternative alignments, versus two residences within 50 feet, of the comparable portion of the Common Route segment proposed anticipated alignment.

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

The East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are not anticipated to result in any human displacement. The Applicants' proposed anticipated alignment has the potential to displace two residences that would be located within the anticipated alignment ROW. However, the proposed anticipated alignment can be constructed in this location, and meet NESC standards.

Property Values

The property values of the two residences within the anticipated alignment ROW of the proposed Common Route along the west side of U.S. Highway may be affected by the presence of an overhead transmission line in close proximity. Additionally, it can directly affect the mortgage loan options that would be available to any future buyers of a residence located within a transmission line ROW. Properties with dwellings, structures, or other property improvements within the power line ROW are not eligible for Federal Housing Administration (FHA) insured loans financing.[380]

Public Health and Safety

Impacts to public health and safety along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.4).

Public Services

Impacts to public services along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.5).

Land-Based Economies

Impacts to land-based economies are impacts to agriculture, forestry, mining and recreation and tourism (see Section 5.6). Impacts to mining, agriculture, and forestry along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10

[380] Federal Housing Administration(FHA) Single Family Housing Policy Handbook, http://portal.hud.gov/hudportal/documents/huddoc?id=SFH_POLI_APPR_PROP.pdf.

Alternative (Common Route from Ridge Road) alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal.

The East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment would place the transmission line ROW on the Pine Ridge Golf Club property. Clearing of the ROW to construct the 115 kV transmission line would result in the clearing of approximately 6.4 acres of forested areas along the west edge of the Pine Ridge Golf Club property, which currently provides screening between the property and U.S. Highway 10. Clearing of trees on the Pine Ridge Golf Club property could potentially reduce the attractiveness of the property to potential customers, as U.S. Highway 10 would be highly visible if the forested areas were removed, and the presence of a large transmission line may also make the property less attractive to potential customers. Thus the recreation and tourism impacts along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are anticipated to be moderate.

Archaeological and Historic Resources

Impacts to archaeological and historic resources along the along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.7).

Water Resources

Impacts to water resources are impacts to surface waters, floodplains, groundwater, and wetlands (see Section 5.8). Impacts to water resources for the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal.

Soils

Impacts to soils along the along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.9).

Flora

Impacts to flora along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal to moderate (see Section 5.10).

Impacts to herbaceous and shrub flora is anticipated to be minimal for the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment, the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment, and the proposed anticipated alignment.

The potential flora impacts, specific to trees, for the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) are approximately 33 acres and 31 acres, respectively. The proposed anticipated alignment will impact approximately 31 acres forested areas. The flora impacts, specific to trees, for the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are anticipated to be similar to those along the proposed anticipated alignment and moderate.

Fauna

Impacts to fauna along the along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.11). Because of the relatively good habitat for avian species in the project area, impacts to avian species could range from minimal to moderate. However, these impacts can be mitigated through the use of bird flight diverters.

Rare and Unique Natural Resources

Impacts to rare and unique natural resources along the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are anticipated to be greater to those along the proposed anticipated alignment (see Section 5.12).

Potential impacts to Blanding's turtle, creek heelsplitter mussel, black sandshell mussel, and NLEB are anticipated be similar for the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment when compared to the proposed anticipated alignment. Impacts of the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment, the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road), and the proposed anticipated alignment are anticipated to be minimal for the Blanding's turtle, creek heelsplitter mussel, and the black sandshell mussel, but the potential impacts to the NLEB are anticipated to be moderate.

Though there are no known occurrences of NLEB roosting in the project area, these trees may serve as roosting habitat for NLEB. The USFWS recommends minimizing the removal of trees that could be used as roosting habitat for the NLEB. The USFWS has indicated that an incidental take permit may be necessary for projects that result in greater than one acre of tree removal.

The primary difference in rare and unique natural resource impacts between the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment, the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road), and the proposed anticipated alignment are the potential impacts to Sites of Biodiversity and Native Plant Communities (NPCs). The East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment will potentially impact 18.5 acres of lands identified by the MN DNR as Sites of Biodiversity, and approximately 0.8 acres of lands identified by the MN DNR as NPCs. The East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment will potentially impact 1.54 acres of lands identified as Sites of Biodiversity, and no lands identified as NPCs. The proposed anticipated alignment to the west of the U.S. Highway 10 ROW will potentially impact approximately 0.3 acres of Sites of Biodiversity lands and approximately 0.13 of NPCs lands.

The East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment have the potential for greater impacts to rare and unique natural resources when compared to the proposed anticipated alignment.

Use of Existing Rights-of-Way

The East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) will parallel the same amount of ROW to the east of U.S. Highway 10 ROW as the proposed anticipated alignment will parallel to the west of the U.S. Highway 10 ROW.

The East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment and the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment will result in the ROW sharing and underbuild of approximately one additional mile of distribution power lines when compared to the proposed anticipated alignment.[381]

Costs that are Dependent on Design and Route

The cost of the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment is estimated to be $172,000 more than the proposed anticipated alignment.[382] Additional costs for the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment are related to the estimated costs necessary to accommodate one more mile of underbuilding existing distribution power lines that will share the alignment.

The cost of the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment is estimated to be $215,000 more than the proposed anticipated alignment.[383]Additional costs for the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment are related to the estimated costs necessary to accommodate one more mile of underbuilding existing distribution power lines that will share the alignment, and the additional structures needed to turn the transmission line and cross from the west to the east side of U.S. Highway 10 at Ridge Road.

The total proposed project cost is estimated at $16 to $17 million depending on the route option approved and construction. The estimated costs necessary to constructed the two alignment alternatives east of U.S. Highway 10 would result in an overall budget increase of less than 2 %, so the estimated budget increases to accommodate these alternative alignments are not considered to be significant.

Relative Merits of Common Route - East of U.S. Highway 10 Alternative Alignments

This section utilizes the routing factors of Minnesota Rule 7850.4100 and factor elements to analyze the relative merits of the East of U.S. Highway 10 Alternative (Common Route from Azalea Road to Holt Road) alignment, the East of U.S. Highway 10 Alternative (Common Route from Ridge Road to Holt Road) alignment, and the comparable segment of the Applicants' proposed anticipated alignment along the Common Route (see Section 5.13 and **Figure 8**).

[381] Additional information provided by the Applicants.
[382] Additional information provided by the Applicants.
[383] Additional information provided by the Applicants.

The discussion in this section (and in Sections 6.2 and 6.3) uses text and a graphic to describe the relative merits of specific routing options (**Figure 18**). For routing factors where impacts are anticipated to vary with alignment options, the graphic represents these anticipated impacts and compares them across these options. For routing factors that express the State of Minnesota's interest in the efficient use of resources (for example, the use and paralleling of existing rights-of-way), the graphic represents the consistency of alignment options with these interests and compares them one to the other.

The discussion here focuses first of the first 12 routing factors of Minnesota Rule 7850.4`100 (factors A through L). Routing factors M and N – the unavoidable and irreversible impacts of the project – are discussed in Section 5.13.

Routing factor I, the use of large electric generating plan sites, is not relevant to this project and is not discussed here. For purposes of discussion here, and with respect to routing factor G, it is assumed all routing and siting options are equal with regard to maximizing energy efficiencies and accommodating expansion of transmission capacity. With respect to environmental impacts, the examination of such impacts suggested by routing factor G is included in the discussion of other routing factors and elements that more specifically address an environmental impact (e.g., effects on the natural environment, routing factor E). Thus, factor G is not discussed further here.

Routing factors H and J address similar issues, the use or paralleling of existing ROWs. Routing factor H relates to the use or paralleling of existing ROWs, but also includes items that do not have a ROW – survey lines, natural division lines and agricultural field boundaries. Routing factor J relates to the use of existing transportation, pipeline and electrical transmission ROWs.

Routing Factors for Which Impacts are Not Anticipated to Vary Between Routing Options
There are several routing factors, and factor elements, for which impacts are not anticipated to vary significantly between routing options. These are:

- Effects on human settlements (factor A) for the factor elements – noise, property values, economics, cultural values, electronic interference, zoning and land use compatibility, and public services;
- Effects on public health and safety (factor B), including the factor elements – electric and magnetic fields, implantable medical devices, stray voltage, inducted voltage, and air quality;
- Effects on land-based economies (factor C) for the factor elements – mining, agriculture, and forestry
- Effects on archaeological and historic resources (factor D);
- Effects on the natural environments (factor E), for the factor elements – flora, fauna, water quality and air quality;
- The use of or paralleling existing ROWs (factor H)
- Electrical systems reliability (factor K);

Routing Factors for Which Impacts are Anticipated to Vary Between Routing Options

There are several routing factors, and factor elements, for which impacts are anticipated to vary between routing options. These are:

- Effects on human settlements (factor A) for the factor elements – aesthetics and displacement
- Effects on land-based economies (factor C) for the factor elements– recreation and tourism;
- Effects on rare and unique natural resources (factor F);
- Costs which are dependent on design and route (factor L);
- Use of existing rights-of-way (factors J).

Figure 18. Common Route - East of U.S. Highway 10 Alternative Alignments

Routing Factor / Element	Applicants' Proposed Anticipated Alignment (West of U.S. Highway 10)	East of U.S. Highway 10 Alternative (Azalea Road to Holt Road) Alignment	East of U.S. Highway 10 Alternative (Ridge Road to Holt Road) Alignment	Summary
Factor A Human Settlement/ Element Aesthetics				The proposed anticipated alignment and the Alternative Alignments east of U.S. Highway 10 are likely to cause an aesthetic impact to a similar number of residence within the project area.
Factor A Human Settlement/ Element Displacement				The proposed anticipated alignment, on the west side of U.S. Highway 10 will have two residences within the ROW, so there is the potential for displacement. However, as proposed, the anticipated alignment can be constructed within NECS code.
Factor A Human Settlement/ Element Property Value				The proposed anticipated alignment would place two residences within the ROW. Potentially negatively affecting the property values, and eligibility in certain loan programs.
Factor C Land-based Economies/ Elements Recreation and Tourism				The Alternative Alignments east of U.S. Highway 10 may result in the removal of approximately 6.4 acres of forested area on the Pine Ridge Golf Club property, which may potentially reduce the facility's attractiveness to customers.

Factor F Rare and Unique Natural Resources				East of U.S. Highway 10 (Azalea Road to Holt Road) Alternative will likely impact the most land identified as Sites of Biodiversity and Native Plant Communities (NPCs). East of U.S. Highway 10 (Ridge Road to Holt Road) will likely impact more Sites of Biodiversity land, but less NPCs, than the proposed Anticipated Alignment.
Factor L Project Costs				The Alternative Alignments, east of U.S. Highway 10 from Azalea Road to Holt Road and from Ridge Road to Holt Road will cost an estimated $172,000 and $215,000, respectively, more than the Applicants' proposed anticipated alignment.
Factor J Use of Existing ROW				The Alternative Alignments east of U.S. Highway 10 will use approximately one more mile of existing distribution power line ROW than the Applicants' proposed anticipate alignment.

6.2 MP Land East River Crossing Alternative

The proposed East Route Option would follow Azalea Road (Highway 26) traveling slightly to the southeast in section 27 of Motley Township, then turning east to cross the Crow Wing River in section 26 of Motley Township, and then the proposed route would turn and travel north. The MP Land East River Crossing Alternative would push the East Route Option Crow Wing River crossing further south than the Applicants' proposed crossing location, which would place the proposed East Route Option on land currently owned by Minnesota Power Company, one of the Applicants, once the Crow Wing River crossing is completed. The MP Land East River Crossing Alternative would turn north on MP's land and rejoin the Applicants' proposed East Route Option.

Based on review of Cass County, Minnesota Interactive Mapping website, EERA staff has identified property to the east of the Crow Wing River owned by the Minnesota Power and Light Company, which could potentially be utilized if the MP Land East River Crossing alternative were to be selected.[384]

Human Settlements

Impacts to human settlements are impacts related to: aesthetics, noise, displacement, property values, economics, cultural values, electronic interference, and zoning and land use compatibility (see Section 5.3). Impacts to human settlements along MP Land East River Crossing Alternative are anticipated to be similar to those along the proposed route – they are anticipated to be minimal.

[384] Cass County, Minnesota, Interactive Web Mapping, http://www.co.cass.mn.us/link/jsfe/index.aspx?defaultRole=Public

Though impacts are anticipated to be minimal, the one element of human settlements where impacts could potentially vary between the MP Land East River Crossing Alternative and the proposed anticipate alignment is aesthetics. As discussed in Section 5.3, the primary strategy for minimizing aesthetic impacts is prudent routing, i.e., choosing routes and alignments that are most harmonious with the landscape. Aesthetic impacts of the project can generally be minimized by placing the project away from residences. The MP Land East River Crossing Alternative would be approximately 250 feet from the nearest residence, and the proposed anticipated alignment is located further north and is approximately 150 feet away from that same residence.

Additionally, it should be noted that the proposed East Route Option will overtake the existing MP 34.5 kV sub-transmission line, ultimately relocating the existing sub-transmission line further south to the west of the location where the two lines cross the Crow Wing River. Relocating and underbuilding the existing sub-transmission line onto the proposed 115 kV transmission line structure will shift the existing sub-transmission line approximately 250 feet to the south-southeast of its existing location. The relocation of the existing sub-transmission line would place the line approximately 275 feet from one residence that it is currently directly adjacent to the line, and 150 feet away from the residence previously mentioned, which is currently approximately 75 feet away from the existing sub-transmission line.

Aesthetic impacts can be mitigated by limiting damage to natural landscapes during construction, e.g., clearing of trees from the ROW. Both MP Land East River Crossing Alternative and the proposed anticipated alignment will require the removal of trees (see Section 5.6 and below). The tree removal for the MP Land East River Crossing Alternative would be on the east side of the Crow Wing River, across the river from the residence, and the Applicants' proposed anticipated alignment would clear trees directly south of the residence. However, it does appear that there will be trees remaining between the residence and the Applicants' proposed anticipated alignment and the associated ROW clearing, which could, in part, potentially reduce the visual impacts of the Applicants' proposed anticipated alignment on the residence.

The MP Land East River Crossing Alternative alignment is anticipated to have similar aesthetic impacts to the proposed anticipated alignment.

Public Health and Safety

Impacts to public health and safety along the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.4).

Public Services

Impacts to public services along the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.5).

Land-Based Economies

Impacts to land-based economies are impacts to agriculture, forestry, mining and recreation and tourism (see Section 5.6). Impacts to land-based economies along the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal.

Archaeological and Historic Resources

Impacts to archaeological and historic resources along the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.7).

Water Resources

Impacts to water resources are impacts to surface waters, floodplains, groundwater, and wetlands (see Section 5.8). Impacts to water resources for the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal.

Soils

Impacts to soils along the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.9).

Flora

Impacts to flora along the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal to moderate (see Section 5.10).

Impacts to herbaceous and shrub flora is anticipated to be minimal for the MP Land East River Crossing Alternative alignment and the proposed anticipated alignment.

The potential flora impacts, specific to tree clearing, for the MP Land East River Crossing Alternative alignment is approximately 0.5 acres, when compared to the proposed anticipated alignment, which is approximately 0.7 acres. The flora impacts, specific to tree clearing acreage, for the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment.

The proposed anticipated alignment the tree clearing would be completed along the edges of forested areas where tree clearing has previously occurred, and the MP Land East River Crossing Alternative would result in creating a short new utility ROW through the currently intact forested area on the MP owned land to the east of the Crow Wing River.

Fauna

Impacts to fauna along the along the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.11). Because of the relatively good habitat for avian species in the project area, impacts to avian species could range from minimal to moderate. However, these impacts can be mitigated through the use of bird flight diverters.

Rare and Unique Natural Resources

Impacts to rare and unique natural resources along the MP Land East River Crossing Alternative alignment are anticipated to be similar to those along the proposed anticipated alignment (see Section 5.12).

Use of Existing Rights-of-Way

The MP Land East River Crossing Alternative alignment and the proposed anticipated alignment will both involve a short distance of ROW creation to the west of the Crow Wing River, but this will also involve

the co-location and underbuilding of the existing MP sub-transmission line located to the north. However, the MP Land East River Crossing Alternative alignment will create approximately 250 feet of new utility ROW on the east side of the Crow Wing River, and the proposed anticipated alignment will partially utilize and partially parallel the existing MP sub-transmission line ROW on the east side of the Crow Wing River.

The MP Land East River Crossing Alternative alignment will result in the creation of approximately 250 feet of additional ROW when compared to the proposed anticipated alignment.

Costs that are Dependent on Design and Route

The cost of the MP Land East River Crossing Alternative alignment is estimated to be $120,000 more than the proposed anticipated alignment. Additional costs for the MP Land East River Crossing Alternative alignment are related to the estimated costs needed to purchase and install two additional pole structures needed to cross the Crow Wing River at the more southern location.

The total proposed project cost is estimated at $16 to $17 million depending on the route option approved and construction. The estimated costs necessary to construct the MP Land East River Crossing would likely result in an overall budget increase of less than 1%, so the estimated budget increase to accommodate this alternative alignment is not considered to be significant.

Relative Merits of the MP Land East River Crossing Alternative Alignment

This section utilizes the routing factors of Minnesota Rule 7850.4100 and factor elements to analyze the relative merits of the MP Land East River Crossing Alternative alignment and the comparable segment of the Applicants' proposed anticipated alignment along the East Rout Option (see Section 5.13 and **Figure 9**).

The discussion in this section (and in Sections 6.2 and 6.3) uses text and a graphic to describe the relative merits of specific routing options (**Figure 19**). For routing factors where impacts are anticipated to vary with routing options, the graphic represents these anticipated impacts and compares them across these options. For routing factors that express the State of Minnesota's interest in the efficient use of resources (for example, the use and paralleling of existing rights-of-way), the graphic represents the consistency of routing options with these interests and compares them one to the other.

The discussion here focuses first of the first 12 routing factors of Minnesota Rule 7850.4`100 (factors A through L). Routing factors M and N – the unavoidable and irreversible impacts of the project – are discussed in Section 5.13.

Routing factor I, the use of large electric generating plan sites, is not relevant to this project and is not discussed here. For purposes of discussion here, and with respect to routing factor G, it is assumed all routing and siting options are equal with regard to maximizing energy efficiencies and accommodating expansion of transmission capacity. With respect to environmental impacts, the examination of such impacts suggested by routing factor G is included in the discussion of other routing factors and elements that more specifically address an environmental impact (e.g., effects on the natural environment, routing factor E). Thus, factor G is not discussed further here.

Routing factors H and J address similar issues, the use or paralleling of existing ROWs. Routing factor H relates to the use or paralleling of existing ROWs, but also includes items that do not have a ROW –

survey lines, natural division lines and agricultural field boundaries. Routing factor J relates to the use of existing transportation, pipeline and electrical transmission ROWs.

Routing Factors for Which Impacts are Not Anticipated to Vary between Routing Options
There are several routing factors, and factor elements, for which impacts are not anticipated to vary significantly between routing options. These are:

- Effects on human settlements (factor A) for the factor elements – aesthetics, noise, displacement, property values, economics, cultural values, electronic interference, zoning and land use compatibility, and public services;
- Effects on public health and safety (factor B), including the factor elements – electric and magnetic fields, implantable medical devices, stray voltage, inducted voltage, and air quality;
- Effects on land-based economies (factor C) for the factor elements – mining, agriculture, forestry, recreation, and tourism;
- Effects on archaeological and historic resources (factor D);
- Effects on the natural environments (factor E), for the factor elements – flora, fauna, water quality and air quality;
- Effects on rare and unique natural resources (factor F);
- Use of existing rights-of-way (factors J);
- Electrical systems reliability (factor K);

Routing Factors for Which Impacts are Anticipated to Vary Between Routing Options
There are two routing factors, and factor elements, for which impacts are anticipated to vary between routing options. These are:

- Costs which are dependent on design and route (factor L);
- The use of or paralleling existing ROWs (factor H)

Figure 19. MP Land East River Crossing Alternative Alignment

Routing Factor / Element	Applicants' Proposed Anticipated Alignment - East Route Option	Alternative Alignment – MP Land East River Crossing	Summary
Factor L Project Costs			The Alternative Alignment, MP Land East River Crossing will cost an estimated $120,000 more than the Applicants' proposed anticipated alignment for the East Route Option.
Factor H Paralleling existing ROWs			MP Land East River Crossing Alternative alignment will create approximately 250 feet more utility ROW than the Applicants' proposed anticipate alignment for the East Route Option.

6.3 Old Tree Avoidance Alternative

Old Tree Avoidance Alternative

The common route of the proposed project extends east along the south side of Azalea Road, and an old large American elm (*Ulmus americana*) is located within the Applicants' proposed route. The tree is located approximately a half mile east of MN Highway 10 on the south side of Azalea Road in the NW ¼ of Section 30, T133N, R31W, Motley Township in Morrison County (**see Figure 10**). The Old Tree Avoidance alternative would shift the applicants' proposed alignment south of the old large American elm tree, which would void impacts to the large tree during construction and maintenance of the proposed project.

The Applicants had accounted for the potential to avoid the large tree when submitting their CN and Route Permit Application. Section 4.1.1 of the Applicants' CN and Route Permit Application specifically requests additional route width consideration near the large native elm tree south of Azalea Road.

Human Settlements

Impacts to human settlements are impacts related to: aesthetics, noise, displacement, property values, economics, cultural values, electronic interference, and zoning and land use compatibility (see Section 5.3).

Impacts to human settlements along the Old Tree Avoidance Alternative are anticipated to be similar, with the exception of cultural values, to those along the proposed route – they are anticipated to be minimal.

The residences within the project area have indicated that the large native American elm tree has local cultural value. The local value of the tree is further illustrated by the fact that during the construction of the existing 34.5 kV sub-transmission line, MP made an effort to avoid removal of the large elm tree.

Public Health and Safety

Impacts to public health and safety along the Old Tree Avoidance Alternative are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.4).

Public Services

Impacts to public services along the Old Tree Avoidance Alternative are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.5).

Land-Based Economies

Impacts to land-based economies are impacts to agriculture, forestry, mining and recreation and tourism (see Section 5.6). The Old Tree Avoidance Alternative would place additional pole structures and the utility ROW further south into what appears to be an agricultural field. However, due to the relatively small footprint of utility pole structures the amount of land removed from agricultural operations is likely to result in a minor change when compared to the proposed anticipated alignment in this portion of the proposed Common Route. Impacts to land-based economies along the Old Tree Avoidance Alternative are anticipated to be similar to those along the proposed anticipated alignment and minimal.

Archaeological and Historic Resources

Impacts to archaeological and historic resources along the Old Tree Avoidance Alternative are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.7).

Water Resources

Impacts to water resources are impacts to surface waters, floodplains, groundwater, and wetlands (see Section 5.8). Impacts to water resources for the Old Tree Avoidance Alternative are anticipated to be similar to those along the proposed anticipated alignment and minimal.

Soils

Impacts to soils along the Old Tree Avoidance Alternative are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.9).

Flora

Impacts to flora along the Old Tree Avoidance Alternative are anticipated to be similar to those along the proposed anticipated alignment and minimal to moderate (see Section 5.10). The Old Tree Avoidance Alternative would push the project alignment further south than the anticipated, and depending on the final project design, there may additional impacts to the existing forested area to the east of the large native elm tree location. The additional impacts to the existing forested area will be dependent on the distance necessary to bring the transmission line north and back into the proposed anticipated alignment to the east of the large native elm.

However, based on the existing MP sub-transmission line ROW it does appear that the Old Tree Avoidance Alignment could be designed and constructed in a manner that will not result in any additional impacts to forested areas.

Fauna

Impacts to fauna along the along the Old Tree Avoidance Alternative are anticipated to be similar to those along the proposed anticipated alignment and minimal (see Section 5.11). Because of the relatively good habitat for avian species in the project area, impacts to avian species could range from minimal to moderate. However, these impacts can be mitigated through the use of bird flight diverters.

Rare and Unique Natural Resources

Impacts to rare and unique natural resources along the Old Tree Avoidance Alternative are anticipated to be similar to those along the proposed anticipated alignment (see Section 5.12).

Use of Existing Rights-of-Way

The Old Tree Avoidance Alternative and the proposed anticipated alignment will both parallel the existing Azalea Road and overtake the existing MP sub-transmission line. It should be noted that the existing MP sub-transmission line was designed and built to travel south of the large native elm tree, and avoid impacts to the large native elm tree during project construction and project maintenance.

Costs that are Dependent on Design and Route

The cost of the Old Tree Avoidance Alternative is estimated to be approximately $240,000 more than the proposed anticipated alignment.[385] Additional costs for the Old Tree Avoidance Alternative alignment are related to the estimated costs needed to purchase and install four additional pole structures. There may also be additional easement costs associated with the Old Tree Avoidance Alternative, which are not completely known at this time.

The total proposed project cost is estimated at $16 to $17 million depending on the route option approved and construction. The estimated costs necessary to construct the Old Tree Avoidance Alternative alignment would likely result in an overall budget increase of less than 2%, so the estimated budget increases to accommodate this alternative alignment is not considered to be significant.

Relative Merits of the Old Tree Avoidance Alternative

This section utilizes the routing factors of Minnesota Rule 7850.4100 and factor elements to analyze the relative merits of the Old Tree Avoidance Alternative and the comparable segment of the Applicants' proposed anticipated alignment along the Common Route (see Section 5.13 and **Figure 10**).

The discussion in this section (and in Sections 6.2 and 6.3) uses text and a graphic to describe the relative merits of specific routing options (**Figure 20**). For routing factors where impacts are anticipated to vary with routing options, the graphic represents these anticipated impacts and compares them across these options. For routing factors that express the State of Minnesota's interest in the efficient use of resources (for example, the use and paralleling of existing rights-of-way), the graphic represents the consistency of routing options with these interests and compares them one to the other.

[385] Additional information provided by the Applicants.

The discussion here focuses first of the first 12 routing factors of Minnesota Rule 7850.4100 (factors A through L). Routing factors M and N – the unavoidable and irreversible impacts of the project – are discussed in Section 5.13.

Routing factor I, the use of large electric generating plan sites, is not relevant to this project and is not discussed here. For purposes of discussion here, and with respect to routing factor G, it is assumed all routing and siting options are equal with regard to maximizing energy efficiencies and accommodating expansion of transmission capacity. With respect to environmental impacts, the examination of such impacts suggested by routing factor G is included in the discussion of other routing factors and elements that more specifically address an environmental impact (e.g., effects on the natural environment, routing factor E). Thus, factor G is not discussed further here.

Routing factors H and J address similar issues, the use or paralleling of existing ROWs. Routing factor H relates to the use or paralleling of existing ROWs, but also includes items that do not have a ROW – survey lines, natural division lines and agricultural field boundaries. Routing factor J relates to the use of existing transportation, pipeline and electrical transmission ROWs.

Routing Factors for Which Impacts are Not Anticipated to Vary between Routing Options
There are several routing factors, and factor elements, for which impacts are not anticipated to vary significantly between routing options. These are:

- Effects on human settlements (factor A) for the factor elements – aesthetics, noise, displacement, property values, economics, electronic interference, zoning and land use compatibility, and public services;
- Effects on public health and safety (factor B), including the factor elements – electric and magnetic fields, implantable medical devices, stray voltage, inducted voltage, and air quality;
- Effects on land-based economies (factor C) for the factor elements – mining, agriculture, forestry, recreation, and tourism;
- Effects on archaeological and historic resources (factor D);
- Effects on the natural environments (factor E), for the factor elements – flora, fauna, water quality and air quality;
- Effects on rare and unique natural resources (factor F);
- Electrical systems reliability (factor K);

<u>Routing Factors for Which Impacts are Anticipated to Vary Between Routing Options</u>
There are two routing factors, and factor elements, for which impacts are anticipated to vary between routing options. These are:

- Effects on human settlement (factor A) for the factor element – cultural values
- The use of or paralleling existing ROWs (factor H)

- Use of existing rights-of-way (factor J).
- Costs which are dependent on design and route (factor L);

Figure 20. Old Tree Avoidance Alternative

Routing Factor / Element	Applicants' Proposed Anticipated Alignment - Common Option	Alternative Alignment – Old Tree Avoidance Alternative	Summary
Factor A Human Settlement/ Cultural Values			The Old Tree Avoidance Alternative alignment will avoid removal of the large native elm tree, which would be removed if the Applicants' proposed anticipated alignment is selected.
Factor H Paralleling existing ROWs			Both the proposed and alternative alignments will parallel the existing Azalea Road ROW.
Factor J Use of Existing ROWs			The Old Tree Avoidance Alternative alignment will utilize the existing MP sub-transmission line ROW.
Factor L Project Costs			The Old Tree Avoidance Alternative will cost an estimated $240,000 more than the Applicants' proposed anticipated alignment for the Common Route.

CERTIFICATE OF SERVICE

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

Minnesota Department of Commerce
Environmental Assessment

Docket No. ET2, E015/CN-14-853 and ET2, E015/TL-15-204

Dated this 16th day of November 2015

/s/Sharon Ferguson

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Appendices

Appendix A. Environmental Assessment Scoping Decision

MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Application of Great River Energy and Minnesota Power for a Certificate of Need and Route Permit for the Motley Area 115 kV Transmission Line Project in Morrison, Cass, and Todd Counties, Minnesota

ENVIRONMENTAL ASSESSMENT SCOPING DECISION

DOCKET NO. ET2, E015/CN-14-853
DOCKET NO. ET2, E015/TL-15-204

The above matter has come before the deputy commissioner of the Department of Commerce (Department) for a decision on the scope of the environmental assessment (EA) to be prepared for the Motley Area 115 kV transmission line project proposed by Great River Energy and Minnesota Power in Morrison, Cass, and Todd counties.

Project Description

Great River Energy and Minnesota Power (applicants) propose to construct approximately 15.5 to 16.5 miles of new single circuit 115 kV transmission line from the existing Minnesota Power "24 Line" transmission line, south to the new Fish Trap Lake substation, near the city of Motley, Minnesota. The project also proposes the following, convert the existing Motley substation from 34.5 kV to 115 kV service, add a three way switch to the existing Motley substation, construct the new Fish Trap Lake substation, add breakers to the existing Dog Lake substation, construct a one-half mile transmission line to connect the Dog Lake substation and the Minnesota Power "24 Line," and install a three way switch for the anticipated future construction of the Shamineau substation.

Applicants are requesting a variable route width between 250 to 995 feet, depending on the existing land us on the adjacent properties. Applicants indicate that the new 115 kV line will require a permanent right-of-way (easement) of 100 feet. Transmission line structures for the new 115 kV line will be 60 to 90 feet in height, with the spans between structures in the range of 500 to 900 feet. Applicants indicate that construction on the project is anticipated to commence in fall 2016, and line energization is anticipated to occur in the summer of 2017.

Project Purpose

Applicants indicate in their application that the proposed project is needed to relieve potential overloads on the existing 34.5 kV transmission system near the city of Motley, MN and to serve a proposed, new oil pumping station in the area.

Regulatory Background

The applicants' proposed project requires two separate approvals from the Minnesota Public Utilities Commission (Commission) – a certificate of need (CN) and a route permit. The applicants submitted a joint certificate of need and route permit application to the Commission on March 19, 2015.[1] The applicants have submitted for, and are eligible for, the alternative

[1] Motley Area 115 kV Transmission Line Joint Application for Certificate of Need and a Route Permit, March 19, 2015, eDocket Numbers 20153-108405-01 , 20153-108405-02, 20153-108406-01 , and 20153-108407-01

process, which requires the preparation of an environmental assessment (EA). The Commission accepted the application as complete May 27, 2015.

Department of Commerce, Energy Environmental Review and Analysis (EERA) staff is responsible for conducting environmental review for CN and route permit applications submitted to the Commission.[2] As two concurrent environmental reviews are required – one for the CN and one for the route permit – the Department has elected to combine the environmental review for these two approvals.[3] An EA will be prepared to meet the requirements of both review processes.

Scoping Process

Scoping is the first step in the development of the EA for the project. The scoping process has two primary purposes: (1) to gather public input as to the impacts, mitigation measures, and alternatives to study in the EA, and (2) to focus the EA on those impacts, mitigation measures, and alternatives that will aid in the Commission's decisions on the CN and route permit applications.

EERA staff gathered input on the scope of the EA through a public meeting and an associated comment period. This scoping decision identifies the impacts and mitigation measures that will be analyzed in the EA, including route and site alternatives for the project. Additionally, this scoping decision identifies alternatives to the project itself that will be analyzed in the EA.

Public Scoping Meetings

Commission staff and EERA staff held a joint public information and environmental assessment scoping meeting on May 19, 2015, in the city of Motley, MN. Approximately 50 people attended the meeting. Comments were received from several people at the meeting. Comments included impacts and mitigation measures to study in the EA, including specific preferences for the proposed east and west route options.[4] Specific impacts suggested for study included, but were not limited to, impacts to property values, aesthetics, potential wildlife impacts, and livestock.[5]

Public Comments

A comment period, ending on June 3, 2015, provided the public an opportunity to submit comments on issues and alternatives for consideration in the scope of the EA. Comments were received from 11 members of the public, three state agencies, and one federal agency.[6,7] These comments included impacts and mitigation measures to study in the EA, including specific alignment alternatives to be evaluated and considered.

Commenters noted potential impacts to property values, aesthetics, view shed, wildlife, wetlands, the river, trees, and a beef cattle operation.

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[2] Minnesota Rule 7849.1200; Minnesota Rule 7850.3700.
[3] Minnesota Rule 7849.1900.
[4] Scoping and Informational Meeting Minutes, eDockets Number 20156-111508-03.
[5] Scoping and Informational Meeting Minutes, eDockets Number 20156-111508-03.
[6] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01.
[7] Minnesota Department of Transportation Comments, May 29, 2015, eDockets Number 20155-110935-01

Of the 11 written comments received from members of the public,[8] six alternatives were proposed. These alternatives are discussed further below.

Agency Comments

The Minnesota Department of Transportation (MnDOT) noted its accommodation policy for the placement of utilities along and across highway rights-of-way.[9] MnDOT indicated that the applicants' proposed route along U.S. Highway 10, south of the city of Motley may occupy a portion of the highway ROW.[10] MnDOT indicated that the soils along U.S. Highway 10 have a high sand composition and erode easily. Erosion control measures will need to comply with MnDOT'S Application for Utility Permit on Trunk Highway Right of Way (Form TP-2525) Special Provision II.[11] Further, MnDOT noted that areas of significant tree coverage exists along U.S. Highway 10, and that MnDOT's roadside vegetation management unit will need to review potential impacts to native plant communities, threatened and endangered plant species, specimen trees, and other woody vegetation along the U.S. Highway 10 ROW.[12]

The Minnesota Pollution Control Agency (MPCA) indicated that the project applicants must obtain a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS), and some erosion control impact and mitigation measures identified by the applicant should be considered required rather than optional.[13] MPCA also noted that any contaminated soils or groundwater encountered during construction must be managed by the applicants, even if they are not responsible for the contamination.[14] MPCA would like to see the potential cumulative noise impacts evaluated if the proposed Fish Trap Lake substation and the proposed Fish Trap Lake pump station will be located close to each other.[15] Further, MPCA recommended that the applicants consider alternatives that cross fewer large expanses of wetlands, and also that the applicants consider utilizing creative approaches to erosion and sediment control in difficult areas as the project progresses.[16]

Minnesota Department of Natural Resources (DNR) recommended that cumulative total impacts be evaluated for the proposed Crow Wing River crossings along with the currently existing transmission line river crossings.[17] The DNR also recommends that Minnesota's Species Wildlife Action Plan (SWAP), Ecological Classification System (ECS), Native Plant Community (NPC), and Minnesota Biological Survey (MBS) data be utilized in the development of and the analyses completed in the EA.[18] DNR also requested that the EA evaluate Public Water crossing impacts, and potential avian collision risk posed by the proposed project.[19] DNR also identified

[8] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[9] Minnesota Department of Transportation Comments, May 29, 2015, eDockets Number 20155-110935-01
[10] Minnesota Department of Transportation Comments, May 29, 2015, eDockets Number 20155-110935-01
[11] Minnesota Department of Transportation Comments, May 29, 2015, eDockets Number 20155-110935-01
[12] Minnesota Department of Transportation Comments, May 29, 2015, eDockets Number 20155-110935-01
[13] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[14] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[15] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[16] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[17] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[18] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[19] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01

that DNR Land and Water Crossing Licenses may be necessary for portions of the proposed project, and coordination with the DNR Division of Lands and Minerals will be necessary to acquire these permits.[20]

The U.S. Fish and Wildlife Service (USFWS) provided comments clarifying that the Application has incorrectly stated that the northern long-eared bat tree clearing restrictions are shorter than the April 1 to September 30.[21] USFWS comments also provided clarification with regard to the Endangered Species Act, specifically interim 4(d) Rules, exemptions, and the Incidental Take Statement.[22]

System Alternatives to the Project
EERA received no comments recommending system alternatives to the proposed project.

Commission Review
After close of the public comment period, EERA staff conferred with the applicants on the alternatives proposed for study in the EA. On June 22, 2015, EERA staff provided the Commission with a summary of the EA scoping process.[23] The summary discussed the alternatives that were proposed during the scoping process and those alternatives that the Department intended to recommend for inclusion in the scope of the EA. On July 1, 2015, the Commission considered what action, if any, it should take with respect to the route alternatives to be considered in the EA. The Commission took no action.

HAVING REVIEWED THE MATTER, consulted with Department staff, and in accordance with Minnesota Rule 7850.3700, I hereby make the following scoping decision:

MATTERS TO BE ADDRESSED

The issues outlined below will be analyzed in the EA for the proposed Motley Area 115 kV transmission line project. The EA will describe the project and the human and environmental resources of the project area. It will provide information on the potential impacts of the project as they relate to the topics outlined in this scoping decision, including possible mitigation measures. It will identify impacts that cannot be avoided and irretrievable commitments of resources, as well as permits from other government entities that may be required for the project. The EA will discuss the relative merits of the route and site alternatives studied in the EA using the routing factors found in Minnesota Rule 7850.4100.

The EA will include a description and analysis of the human and environmental impacts of the proposed project and alternatives to the project that would have otherwise been required by

[20] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[21] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[22] Written Comments on Scope of Environmental Assessment, eDockets Number 20156-111508-01
[23] Department of Commerce, Comments and Recommendations on EA Scoping Process, June 22, 2015, eDockets Number 20156-111666-01 .

Minnesota Rule 7849.1500 in an environmental report for a certificate of need. This includes evaluating matters of size, type, and timing that would not normally be included in an EA for a route permit application.

I. GENERAL DESCRIPTION OF THE PROJECT

A. Project Description
B. Project Purpose
C. Route Description
   1. Route Width
   2. Right-of-Way
D. Substation Description
E. Project Costs

II. REGULATORY FRAMEWORK

A. Certificate of Need
B. High Voltage Transmission Line Route Permit
C. Environmental Review Process

III. ENGINEERING AND DESIGN

A. Transmission Line Structures
B. Transmission Line Conductors
C. Substations

IV. CONSTRUCTION

A. Right-of-Way Acquisition
B. Construction
   1. Transmission Line
   2. Substation
C. Restoration
D. Operation and Maintenance

V. AFFECTED ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES

The EA will include a discussion of the human and environmental resources potentially impacted by the proposed project and the alternatives described herein (Section VI). Potential impacts, both positive and negative, of the project and each alternative will be described. Based on the impacts identified, the EA will describe mitigation measures that could reasonably be implemented to reduce or eliminate the identified impacts. The EA will describe any unavoidable impacts resulting from implementation of the proposed project.

Data and analyses in the EA will be commensurate with the importance of potential impacts and the relevance of the information to a reasoned choice among alternatives and to the consideration of the need for mitigation measures.[24] EERA staff will consider the relationship between the cost of data and analyses and the relevance and importance of

[24] Minnesota Rule 4410.2300.

the information in determining the level of detail of information to be prepared for the EA. Less important material may be summarized, consolidated or simply referenced.

If relevant information cannot be obtained within timelines prescribed by statute and rule, or if the costs of obtaining such information is excessive, or the means to obtain it is not known, EERA staff will include in the EA a statement that such information is incomplete or unavailable and the relevance of the information in evaluating potential impacts or alternatives.[25]

A. Environmental Setting
B. Socioeconomics
C. Human Settlements
    1. Noise
    2. Aesthetics
    3. Displacement
    4. Property Values
    5. Public Services
        a) Roads and Highways
        b) Utilities
        c) Emergency Services
    6. Electronic Interference
        a) Radio
        b) Television
        c) Wireless Phone / Internet Services
D. Public Health and Safety
    1. Electric and Magnetic Fields
    2. Implantable Medical Devices
    3. Stray Voltage
    4. Induced Voltage
    5. Air Quality
E. Land Based Economies
    1. Agriculture
    2. Forestry
    3. Mining
    4. Recreation and Tourism
F. Archaeological and Historic Resources
G. Natural Environment
    1. Water Resources
        a) Surface Waters
        b) Groundwater
        c) Wetlands
    2. Soils
    3. Flora
    4. Fauna
H. Threatened / Endangered / Rare and Unique Natural Resources

[25] Minnesota Rule 4410.2500.

I. Zoning and Land Use Compatibility
J. Electric System Reliability
K. Operation and Maintenance Costs that are Design Dependent
L. Adverse Impacts that Cannot be Avoided
M. Irreversible and Irretrievable Commitments of Resources

VI. ROUTES AND SITES TO BE EVALUATED IN THE ENVIRONMENTAL ASSESSMENT

The EA will evaluate the route and substation sites proposed by the applicants in their joint certificate of need and route permit application.

In addition, the following alignment alternatives will be evaluated in the EA (see attached maps).

East of Highway 10 alternative
The proposed project's common route to follow MN Highway 10 south of Motley may be placed on the east or west side of MN Highway 10, and remain within the applicants' proposed route.
The EA will include review and analysis of both sides of MN Highway 10 along the project's proposed common route.[26]

MP Land East River Crossing alternative
The MP Land East River Crossing alternative would cross the Crow Wing River approximately 100 to 200 yards south of the applicants' proposed crossing. The MP Land East River Crossing alternative would follow Azalea Road (Highway 26) further to the southeast, than the applicants' proposed alignment, in section 27 of Motley Township. Then the line would cross the Crow Wing River to the east to section 26 of Motley Township onto property owned by Minnesota Power Company, one of the applicants, and then the proposed route would travel north. The MP Land East River Crossing alignment alternative is located within the applicants' proposed project route, and will be analyzed during development of the EA.[27]

Old Tree Avoidance alternative
The common route of the proposed project extending east along the south side of Azalea Road, and an old large tree is located within the applicants' proposed route. The tree is located approximately a half mile east of MN Highway 10 on the south side of Azalea Road. The Old Tree Avoidance alternative would shift the applicants' proposed alignment south of the old large tree to avoid impacts to the large tree during construction and maintenance of the proposed project. The Old Tree Avoidance alignment alternative is located within the applicants' proposed project route, and will be analyzed during development of the EA.[28]

[26] Alternatives Analyzed by DOC EERA Staff during EA Scoping, eDockets Number 20156-111732-01
[27] Alternatives Analyzed by DOC EERA Staff during EA Scoping, eDockets Number 20156-111732-01
[28] Alternatives Analyzed by DOC EERA Staff during EA Scoping, eDockets Number 20156-111732-01

VII. ALTERNATIVES TO THE PROPOSED TRANSMISSION LINE PROJECT

The EA, in accordance with Minnesota Rule 7849.1500, will describe and analyze the feasibility and availability of the following system alternatives, and the human and environmental impacts and potential mitigation measures associated with each:

A. No-build Alternative
B. Demand Side Management
C. Purchased Power
D. Transmission Line of a Different Size
E. Upgrading of Existing Facilities
F. Generation Rather Than Transmission
G. Use of Renewable Energy Sources

VIII. IDENTIFICATION OF PERMITS

The EA will include a list and description of permits from other government entities that may be required for the proposed project.

ISSUES OUTSIDE THE SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The EA for the Motley Area 115 kV transmission line project will not consider the following:

A. Any route or site alternative not specifically identified for study in this scoping decision.
B. Any system alternative (an alternative to the proposed transmission line project) not specifically identified for study in this scoping decision.
C. Policy issues concerning whether utilities or local governments should be liable for the cost to relocate utility poles when roadways are widened.
D. The manner in which land owners are paid for transmission line right-of-way easements.
E. Of the alternatives proposed during the scoping process to mitigate potential impacts of the project, three route alternatives will not be included for further study in the EA:

Todd-Wadena alternative

The Todd – Wadena route alternative would utilize the Ward Substation, located west of the proposed Fish Trap Lake Substation, and extend a transmission line from the Ward Substation to the east to the proposed Fish Trap Lake Substation.

The Todd – Wadena alternative does not meet the stated needs for the project - it does not facilitate upgrading Crow Wing Power's Motley Substation. A route utilizing the Ward Substation, located west of the proposed Fish Trap Lake Substation, was considered and

rejected in the applicants' CN and Route Permit Application. Additionally, utilizing a route from the west of the proposed Fish Trap Lake Substation would require a second river crossing at the Long Prairie River, and the additional length of a route from the west and the necessary underbuild of existing transmission lines would result in greater project costs.

MN Highway 64 and MN Highway 10 alternative

The MN Highway 64 and MN Highway 10 alternative would hook into the Minnesota Power 24 Line directly north of the city of Motley at the lines intersection with MN Highway 64. The MN Highway 64 and MN Highway 10 alternative would then travel south along highways 64 and 10 through Motley.

Although this is a more direct route to the proposed Fish Trap Lake Substation, ultimately the total proposed project length does not become shorter. To meet the stated needs of the proposed project the proposed common route extending from MN Highway 10 east along Azalea Road to the Motley Substation must be completed to facilitate proposed substation upgrades. Thus, the MN Highway 64 and MN Highway 10 alternative does not reduce the total footprint of the proposed project.

Attempting to bring the proposed route through the city of Motley is problematic. Mr. Mark Strohfus addressed the issue of bringing the proposed route through Motley during the May 19, 2015, EA Scoping and Public Information Meeting. Mr. Strohfus stated that GRE did not consider following MN Highway 10 through Motley a viable build option because the proposed project will need a 100 foot wide right-of-way, and Highway 10 through downtown Motley is simply too crowded. Transmission lines have been sited through cities, such as in the Hiawatha and Chisago projects, where options for doing so are limited or not possible. However, in this case, options for avoiding downtown Motley are available.

Further East Toward Pillager alternative

The Further East Toward Pillager alternative, suggested no specific location or explanation of the impact(s) to be mitigated beyond general concerns which would apply to any property crossed by the project.

With no specific location or explanation of the alternative EERA staff was not able to analyze the alternative further, and the Further East Toward Pillager alternative will not be considered further in the development of the EA.

SCHEDULE

The EA is anticipated to be completed and available in October 2015. A public hearing will be held in the project area after issuance of the EA and is anticipated to occur in November 2015.

Signed this 14th day of July, 2015

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE

William Grant, Deputy Commissioner

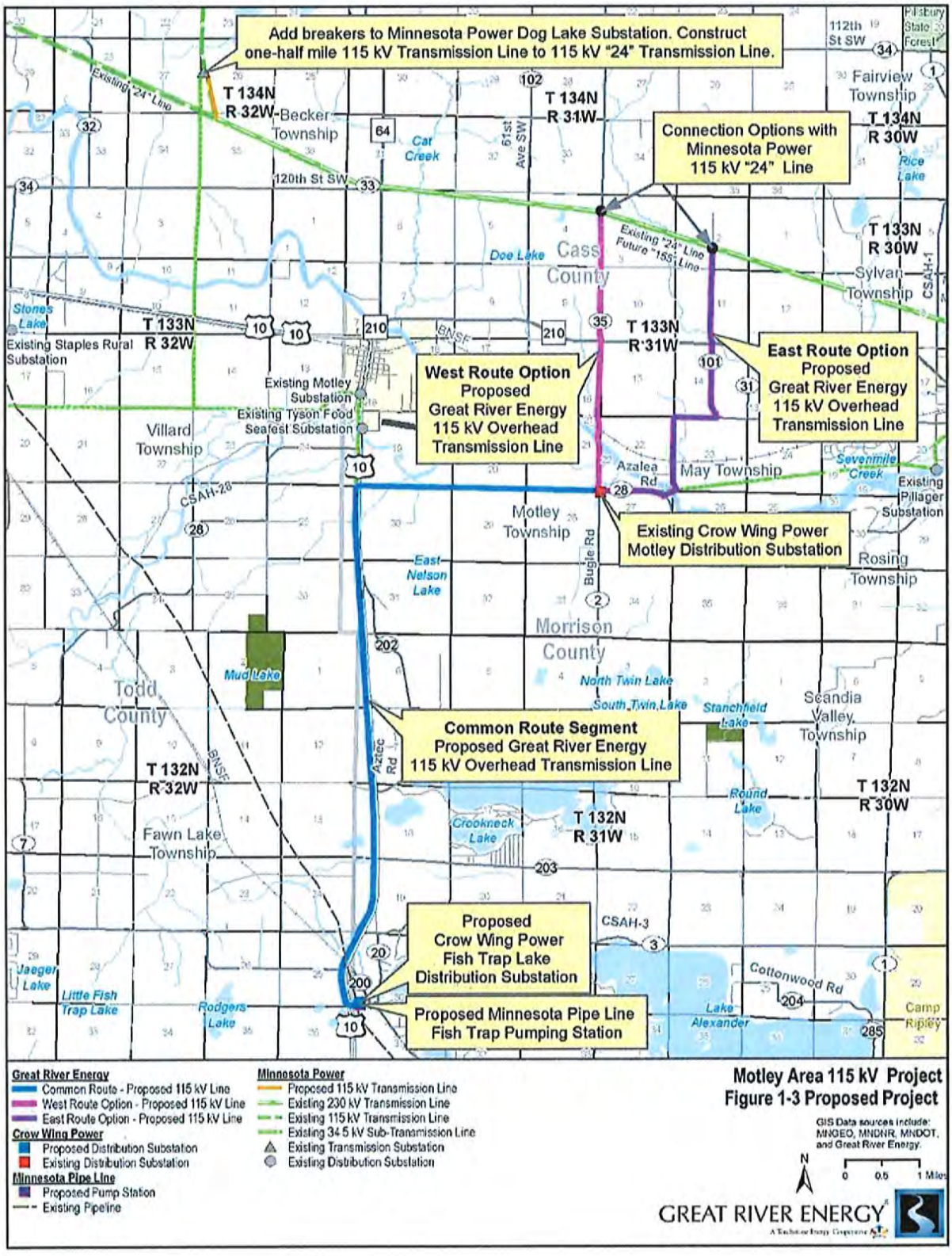
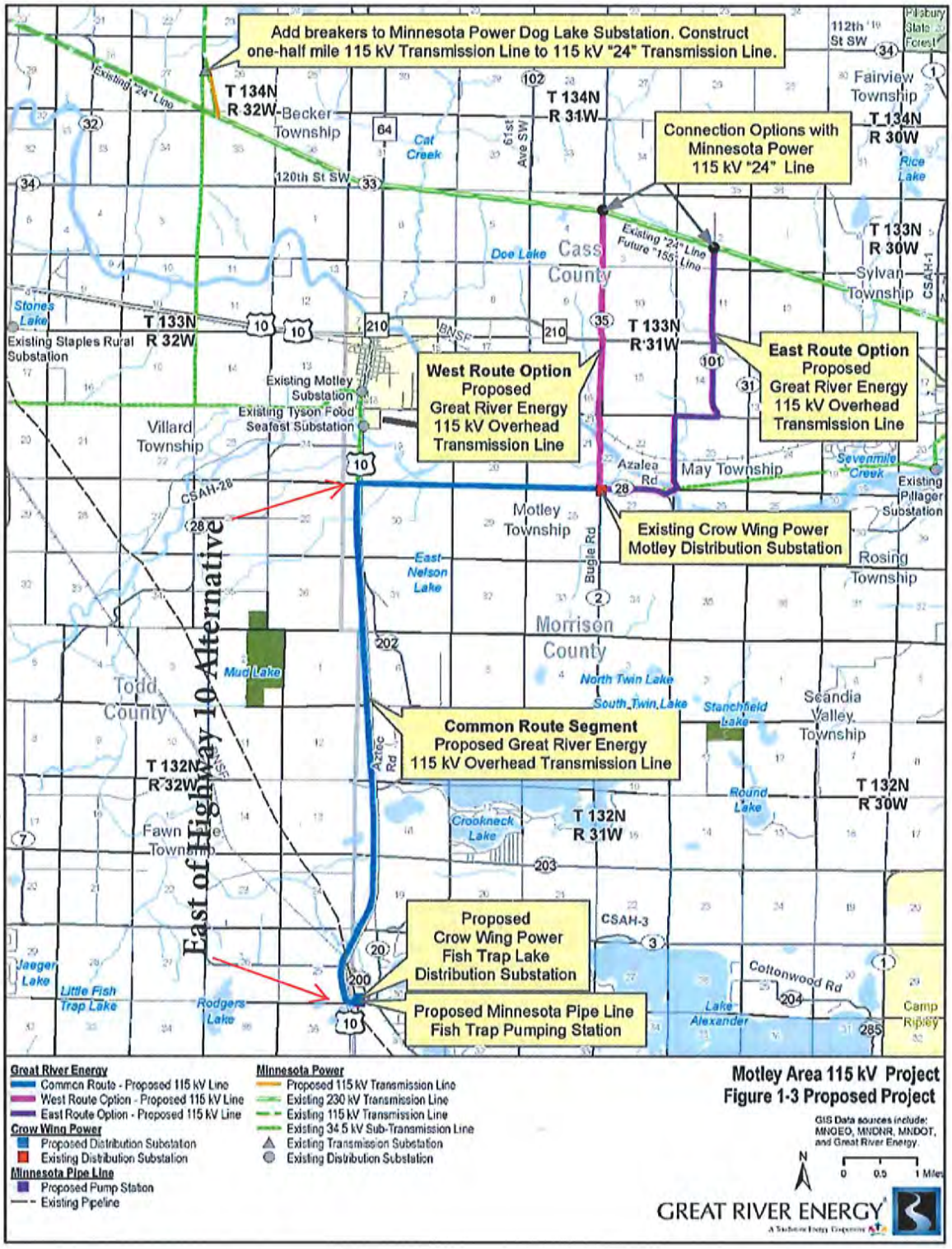
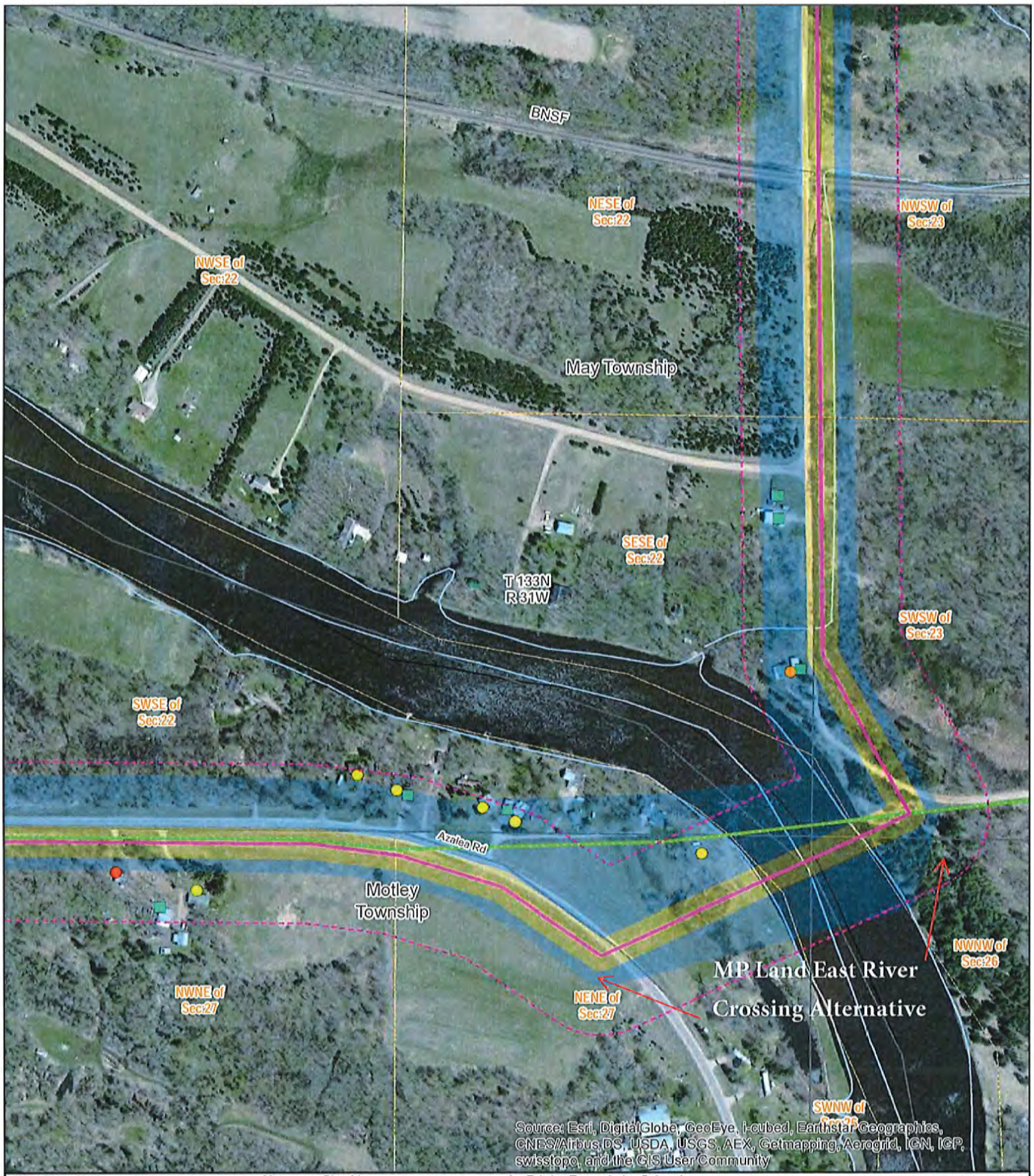

Add breakers to Minnesota Power Dog Lake Substation. Construct one-half mile 115 kV Transmission Line to 115 kV "24" Transmission Line.
Existing "24" Line
T 134N R 32W
Becker Township
T 134N R 31W
Connection Options with Minnesota Power 115 kV "24" Line
Fairview Township
T 134N R 30W
Cat Creek
61st Ave SW
120th St SW
Rice Lake
Existing "24" Line
Future "155" Line
Doe Lake
Cass County
T 133N R 30W
Sylvan Township
CSAH-1
Stones Lake
Existing Staples Rural Substation
T 133N R 32W
BNSF
T 133N R 31W
East Route Option Proposed Great River Energy 115 kV Overhead Transmission Line
West Route Option Proposed Great River Energy 115 kV Overhead Transmission Line
Existing Motley Substation
Existing Tyson Food Seafest Substation
Villard Township
Azalea Rd
May Township
Sevenmile Creek
Existing Pillager Substation
CSAH-28
Motley Township
Existing Crow Wing Power Motley Distribution Substation
Bugle Rd
East Nelson Lake
Rosing Township
Morrison County
Mud Lake
North Twin Lake
South Twin Lake
Stanchfield Lake
Scandia Valley Township
Common Route Segment Proposed Great River Energy 115 kV Overhead Transmission Line
Todd County
Aztec Rd
T 132N R 32W
T 132N R 31W
T 132N R 30W
Round Lake
Crookneck Lake
Fawn Lake Township
CSAH-3
Proposed Crow Wing Power Fish Trap Lake Distribution Substation
Jaeger Lake
Little Fish Trap Lake
Rodgers Lake
Proposed Minnesota Pipe Line Fish Trap Pumping Station
Cottonwood Rd
Lake Alexander
Camp Ripley
Great River Energy
Common Route - Proposed 115 kV Line
West Route Option - Proposed 115 kV Line
East Route Option - Proposed 115 kV Line
Crow Wing Power
Proposed Distribution Substation
Existing Distribution Substation
Minnesota Pipe Line
Proposed Pump Station
Existing Pipeline
Minnesota Power
Proposed 115 kV Transmission Line
Existing 230 kV Transmission Line
Existing 115 kV Transmission Line
Existing 34.5 kV Sub-Transmission Line
Existing Transmission Substation
Existing Distribution Substation
Motley Area 115 kV Project
Figure 1-3 Proposed Project
GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.
N
0 0.5 1 Miles
GREAT RIVER ENERGY

Figure 1-3. Proposed Project





Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (1)
- Residence 100-150' (1)
- Residence 150-250' (6)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (6)
- 250' from Alignment

Motley Area 115 kV Project
Appendix F - Detailed Route Maps
Map Sheet 14 of 31

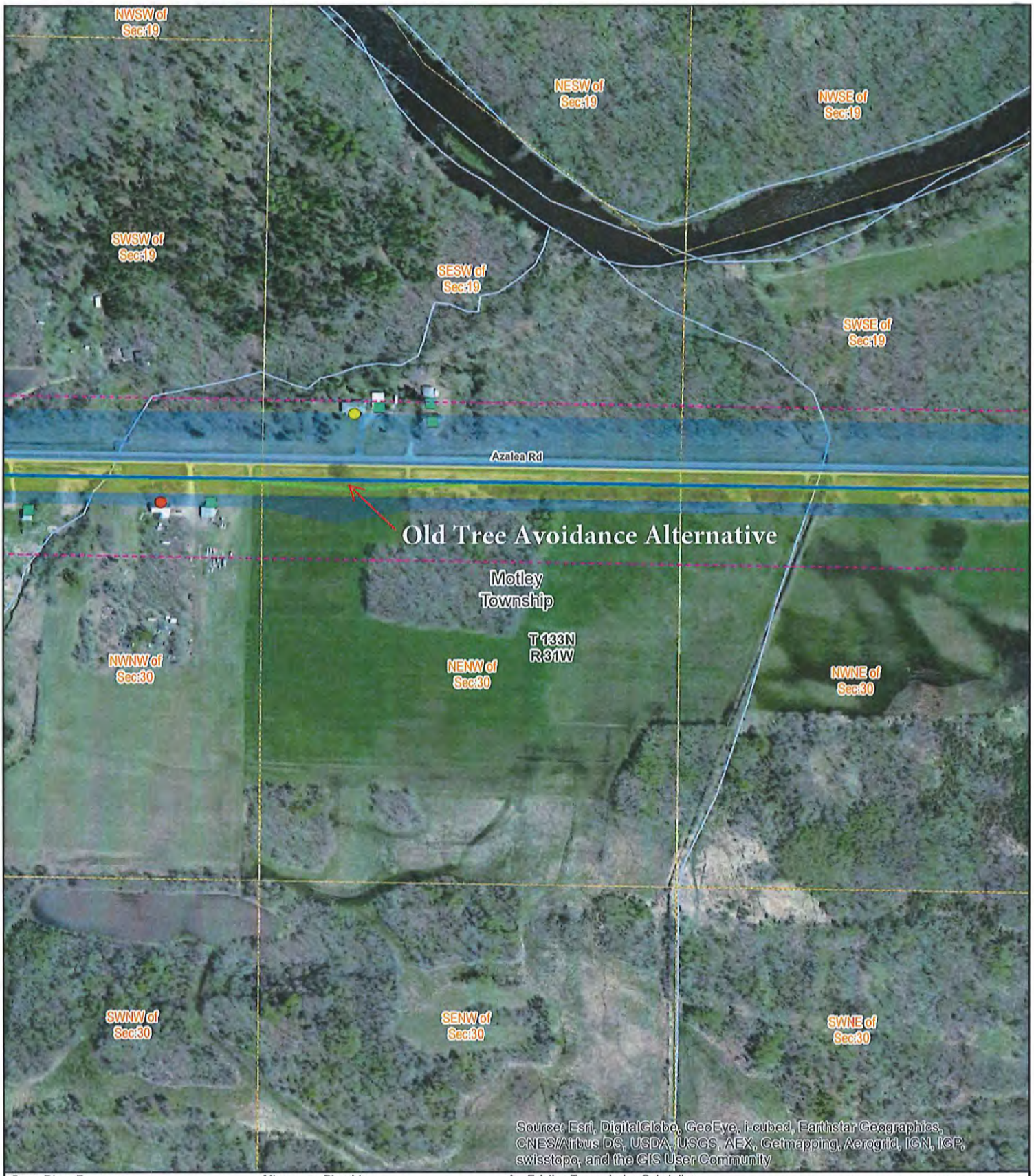
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

East Route Option Map 6

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (1)
- Residence 100-150' (0)
- Residence 150-250' (1)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (5)
- 250' from Alignment

Motley Area 115 kV Project
Appendix F - Detailed Route Maps
Map Sheet 20 of 31

N
0 50 100 200 Feet
GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 5

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Appendix B. Generic Route Permit Template

GENERIC ROUTE PERMIT TEMPLATE

STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

ROUTE PERMIT FOR CONSTRUCTION OF A HIGH-VOLTAGE TRANSMISSION LINE AND ASSOCIATED FACILITIES

IN
[*COUNTY*]

ISSUED TO
[*PERMITTEE*]

PUC DOCKET NO. [*Docket Number*]

In accordance with the requirements of Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850, this route permit is hereby issued to:

[*PERMITTEE*]

[*Permittee*] is authorized by this route permit to construct [*Provide a description of the project authorized by the Minnesota Public Utilities Commission*].

The transmission line and associated facilities shall be built within the route identified in this permit and as portrayed on the official route maps, and in compliance with the conditions specified in this permit.

Approved and adopted this ____ day of [*Month, Year*]

BY ORDER OF THE COMMISSION

_____

Daniel P. Wolf,
Executive Secretary

CONTENTS

FIGURES

ATTACHMENTS

Attachment [ ] – Complaint Procedures
Attachment [ ] – Compliance Procedures

1.0 ROUTE PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this route permit to [*Permittee Name*] (Permittee) pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850. This permit authorizes the [*Permittee Name*] to construct [*Provide a description of the project as authorized by the Minnesota Public Utilities Commission*], and as identified in the attached route permit maps, hereby incorporated into this document.

1.1 Pre-emption

Pursuant to Minn. Stat. § 216E.10, this route permit shall be the sole approval required to be obtained by the Permittee for construction of the transmission facilities and this permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

2.0 PROJECT DESCRIPTION

[*Provide a description of the project as authorized by the Minnesota Public Utilities Commission*]

2.1 Project Location

[*Describe the location of the project including details such as the county, state, city, and townships, as appropriate*]

County	Township Name	Township	Range	Section

2.2 Associated Facilities and Substations

[*Provide a detailed description of the associated facilities and substations as authorized by the Commission*]

2.3 Structures

[*Provide a detailed description of the structures and conductors authorized by the Commission*]

The table below details specifics on the various structure types as presented in the route permit application.

Line Type	Conductor	Structure		Foundation	Height	Span
		Type	Material			

2.4 Conductors

2.5 Safety Codes and Design Requirements

The transmission line and associated facilities shall be designed to meet or exceed all relevant local and state codes, the National Electric Safety Code (NESC), and North American Electric Reliability Corporation (NERC) requirements. This includes standards relating to clearances to ground, clearance to crossing utilities, clearance to buildings, strength of materials, clearances over roadways, right-of-way widths, and permit requirements.

3.0 DESIGNATED ROUTE

The route designated by the Commission in this permit is the route described below and shown on the route maps attached to this permit. The route is generally described as follows:

[*Provide detailed description of the authorized route including the route widths and any other specifics relevant to each segment. Also include a reference to the relevant route map to be attached to the permit.*]

The identified route widths will provide the Permittee with flexibility for minor adjustments of the specific alignment or right-of-way to accommodate landowner requests and unforeseen conditions. The final alignment (i.e., permanent and maintained rights-of-way) will be located within this designated route unless otherwise authorized below.

4.0 RIGHT-OF-WAY

The approved right-of-way width for the project is up to [*number*] feet.

This permit anticipates that the right-of-way will generally conform to the anticipated alignment as noted on the attached route permit maps unless changes are requested by individual landowners or unforeseen conditions are encountered or are otherwise provided for by this permit.

Any alignment modifications within the designated route shall be located so as to have comparable overall impacts relative to the factors in Minn. R. 7850.4100, as does the alignment

identified in this permit, and shall be specifically identified and documented in and approved as part of the plan and profile submitted pursuant to Section 9.1 of this permit.

Where the transmission line route parallels existing highway and other road rights-of-way, the transmission line right-of-way shall occupy and utilize the existing right-of-way to the maximum extent possible, consistent with the criteria in Minn. R. 7850.4100, the other requirements of this permit, and for highways under the jurisdiction of the Minnesota Department of Transportation (Mn/DOT) rules, policies, and procedures for accommodating utilities in trunk highway rights-of-way.

5.0 GENERAL CONDITIONS

The Permittee shall comply with the following conditions during construction of the transmission line and associated facilities over the life of this permit.

5.1 Notification to Landowners

The Permittee shall provide all affected landowners with a copy of this permit and, as a separate information piece, the complaint procedures at the time of the first contact with the landowners after issuance of this permit. The Permittee shall contact landowners prior to entering the property or conducting maintenance along the route. The Permittee shall work with landowners to locate the high-voltage transmission line to minimize the loss of agricultural land, forest, and wetlands, and to avoid homes and farmsteads.

At the time of first contact, the Permittee shall also provide all affected landowners with a copy of the Department of Commerce's Rights-of-Way and Easements for Energy Facility Construction and Operation fact sheet.[1]

5.2 Construction Practices

The Permittee shall follow those specific construction practices and material specifications described in [*Permittee Name*] Application to the Commission for a route permit for the [*Project Name*], dated [*Date*], unless this permit establishes a different requirement in which case this permit shall prevail.

5.2.1 Field Representative

At least 14 days prior to commencing construction, the Permittee shall advise the Commission in writing of the person or persons designated to be the field representative

[1] http://mn.gov/commerce/energyfacilities/documents/Easements%20Fact%20Sheet_08.05.14.pdf

for the Permittee with the responsibility to oversee compliance with the conditions of this permit during construction.

The field representative's address, phone number, emergency phone number, and email shall be provided to the Commission and shall be made available to affected landowners, residents, public officials and other interested persons. The Permittee may change the field representative at any time upon written notice to the Commission.

5.2.2 Employee Training and Education of Permit Terms and Conditions

The Permittee shall inform all employees, contractors, and other persons involved in the transmission line construction of the terms and conditions of this permit.

5.2.3 Public Services, Public Utilities, and Existing Easements

During construction, the Permittee shall minimize any disruption to public services or public utilities. To the extent disruptions to public services or public utilities occur these would be temporary and the Permittee will restore service promptly. Where any impacts to utilities have the potential to occur the Permittee will work with both landowners and local agencies to determine the most appropriate transmission structure placement.

The Permittee shall work with the landowners, townships, cities, and counties along the route to accommodate concerns regarding tree clearing, distance from existing structures, drain tiles, pole depth and placement in relationship to existing roads and road expansion plans.

The Permittee shall cooperate with county and city road authorities to develop appropriate signage and traffic management during construction.

5.2.4 Temporary Work Space

The Permittee shall limit temporary easements to special construction access needs and additional staging or lay-down areas required outside of the authorized right-of-way. Temporary space shall be selected to limit the removal and impacts to vegetation. Temporary easements outside of the authorized transmission line right-of-way will be obtained from affected landowners through rental agreements and are not provided for in this permit.

Temporary driveways may be constructed between the roadway and the structures to minimize impact using the shortest route possible. Construction mats should also be used to minimize impacts on access paths and construction areas.

5.2.5 Noise

Construction and routine maintenance activities shall be limited to daytime working hours, as defined in Minn. R. 7030.0200, to ensure nighttime noise level standards will not be exceeded.

5.2.6 Site Sediment and Erosion Control

The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency (MPCA) Construction Stormwater Program.

The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions.

Where larger areas of one acre or more are disturbed or other areas designated by the MPCA, the Permittee shall obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater permit from the MPCA.

5.2.7 Aesthetics

The Permittee shall consider input pertaining to visual impacts from landowners or land management agencies prior to final location of structures, rights-of-way, and other areas with the potential for visual disturbance. Care shall be used to preserve the natural landscape, minimize tree removal and prevent any unnecessary destruction of the natural surroundings in the vicinity of the Project during construction and maintenance.

Structures shall be placed at a distance, consistent with sound engineering principles and system reliability criteria, from intersecting roads, highway, or trail crossings and could cross roads to minimize or avoid impacts.

5.2.8 Vegetation Removal and Protection

The Permittee shall minimize the number of trees to be removed in selecting the right-of-way specifically preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings where vegetative screening may minimize aesthetic impacts, to the extent that such actions do not violate sound engineering principles or system reliability criteria.

Tall growing species located within the transmission line right-of-way that endanger the safe and reliable operation of the transmission facility will be removed by the Permittee. The Permittee shall leave undisturbed, to the extent possible, existing low growing species in the right-of-way or replant such species in the right-of-way to blend the difference between the right-of-way and adjacent areas, to the extent that the low growing vegetation that will not pose a threat to the transmission facility or impede construction.

5.2.9 Application of Herbicides

The Permittee shall restrict herbicide use to those herbicides and methods of application approved by the Minnesota Department of Agriculture and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. The Permittee shall contact the landowner or his designee to obtain approval for the use of herbicide prior to any application on their property. The landowner may request that there be no application of herbicides on any part of the right-of-way within the landowner's property. All herbicides shall be applied in a safe and cautious manner so as not to damage crops, orchards, tree farms, or gardens.

5.2.10 Noxious Weeds

The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil the Permittee shall select site appropriate seed certified to be free of noxious weeds. To the extent possible, the Permittee shall use native seed mixes. The Permittee shall consult with landowners on the selection and use of seed for replanting.

5.2.11 Restoration

The Permittee shall restore the right-of-way, temporary work spaces, access roads, abandoned right-of-way, and other public or private lands affected by construction of the transmission line.

Restoration within the right-of-way must be compatible with the safe operation, maintenance, and inspection of the transmission line. Within 60 days after completion of all restoration activities, the Permittee shall advise the Commission in writing of the completion of such activities.

5.2.12 Wetlands and Water Resources

Wetland impact avoidance measures that shall be implemented during design and construction of the transmission line will include spacing and placing the power poles at variable distances to span and avoid wetlands, watercourses, and floodplains. Unavoidable wetland impacts as a result of the placement of poles shall be limited to the immediate area around the poles. To minimize impacts, construction in wetland areas shall occur during frozen ground conditions. When construction during winter is not possible, wooden or composite mats shall be used to protect wetland vegetation. Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area.

Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts. No staging or stringing set up areas shall be placed within or adjacent to wetlands or water resources, as practicable. Power pole structures shall be assembled on upland areas before they are brought to the site for installation.

Areas disturbed by construction activities shall be restored to pre-construction conditions. Restoration of the wetlands will be performed by Permittee in accordance with the requirements of applicable state and federal permits or laws and landowner agreements.

All requirements of the U.S. Army Corps of Engineers (wetlands under federal jurisdiction), Minnesota Department of Natural Resources (Public Waters/Wetlands), and County (wetlands under the jurisdiction of the Minnesota Wetland Conservation Act) shall be met.

5.2.13 Archaeological and Historic Resources

The Permittee shall consult with the State Historic Preservation Office (SHPO) concerning the extent of a Phase I archaeological survey and appropriate mitigation measures for the Project. Permittee shall document and submit to the Commission the results of the consultation, including those portions of the Project that will be surveyed and the extent of the survey with the Construction Environmental Control Plan for the Project.

For those portions of the Project that are surveyed, Permittee shall submit, with the plan and profile for these portions, the results of the survey and all applicable avoidance and mitigation measures employed or to be employed.

Permittee shall inform construction personnel of known archaeological resources along the permitted route for the Project and of archaeological survey results. Permittee shall employ a monitor that reports to and communicates with the Environmental Monitor to identify and report archaeological resources encountered during construction of the Project and to coordinate with SHPO on appropriate mitigation measures.

5.2.14 Avian Mitigation

The Permittee's standard transmission design shall incorporate adequate spacing of conductors and grounding devices in accordance with Avian Power Line Interaction Committee standards to eliminate the risk of electrocution to raptors with larger wingspans that may simultaneously come in contact with a conductor and grounding devices.

The Permittee will consult with the Minnesota Department of Natural Resources regarding type and placement of bird diverters.

5.2.15 Cleanup

All waste and scrap that is the product of construction shall be removed from the right-of-way and all premises on which construction activities were conducted and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

5.2.16 Pollution and Hazardous Wastes

All appropriate precautions to protect against pollution of the environment must be taken by the Permittee. The Permittee shall be responsible for compliance with all laws applicable to the generation, storage, transportation, clean up and disposal of all wastes generated during construction and restoration of the right-of-way.

5.2.17 Damages

The Permittee shall fairly compensate landowners for damage to crops, fences, private roads and lanes, landscaping, drain tile, or other damages sustained during construction.

5.3 Electrical Performance Standards

5.3.1 Grounding

The Permittee shall design, construct, and operate the transmission line in a manner so that the maximum induced steady-state short-circuit current shall be limited to five milliamperes root mean square (rms) alternating current between the ground and any non-stationary object within the right-of-way, including but not limited to large motor vehicles and agricultural equipment. All fixed metallic objects on or off the right-of-way, except electric fences that parallel or cross the right-of-way, shall be grounded to the extent necessary to limit the induced short-circuit current between ground and the object so as not to exceed one milliampere rms under steady state conditions of the transmission line and to comply with the ground fault conditions specified in the NESC. The Permittee shall address and rectify any induced current problems that arise during transmission line operation.

5.3.2 Electric Field

The transmission line shall be designed, constructed, and operated in such a manner that the electric field measured one meter above ground level immediately below the transmission line shall not exceed 8.0 kV/m rms.

5.3.3 Interference with Communication Devices

If interference with radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices is caused by the presence or operation of the transmission line, the Permittee shall take whatever action is feasible to restore or provide reception equivalent to reception levels in the immediate area just prior to the construction of the line.

5.4 Other Requirements

5.4.1 Applicable Codes

The Permittee shall comply with applicable NERC planning standards and requirements of the NESC including clearances to ground, clearance to crossing utilities, clearance to buildings, right-of way widths, erecting power poles, and stringing of transmission line conductors.

5.4.2 Other Permits and Regulations

The Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the Project and comply with the conditions of these permits. A list of the permits known to be required is included in the permit application. The Permittee shall submit a copy of such permits to the Commission upon request.

6.0 SPECIAL CONDITIONS

The Permittee shall provide a report to the Commission as part of the plan and profile submission that describes the actions taken and mitigative measures developed regarding the Project and the following special conditions. Special conditions shall take precedence over other conditions of this permit should there be a conflict.

[*Describe any special conditions*]

Examples of special conditions included in permits:

- *Avian Mitigation Plan*
- *Environmental Control Plan*
- *Agriculture Mitigation Plan*
- *Vegetation Management Plan*
- *Property Restrictions*
- *Minnesota Department of Natural Resources Requirements*
- *Minnesota Pollution Control Requirements*
- *Minnesota State Historical Preservation Office Requirements*
- *Minnesota Department of Transportation Requirements*

7.0 DELAY IN CONSTRUCTION

If the Permittee has not commenced construction or improvement of the route within four years after the date of issuance of this permit the Permittee shall file a report on the failure to construct and the Commission shall consider suspension of the permit in accordance with Minn. R. 7850.4700.

8.0 COMPLAINT PROCEDURES

Prior to the start of construction, the Permittee shall submit to the Commission the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements of Minn. R. 7829.1500 or Minn. R. 7829.1700, and as set forth in the complaint procedures attached to this permit.

Upon request, the Permittee shall assist the Commission with the disposition of unresolved or longstanding complaints. This assistance shall include, but is not limited to, the submittal of complaint correspondence and complaint resolution efforts.

9.0 COMPLIANCE REQUIREMENTS

Failure to timely and properly make compliance filings required by this permit is a failure to comply with the conditions of this permit. Compliance filings must be electronically filed with the Commission.

9.1 Plan and Profile

At least 30 days before right-of-way preparation for construction begins on any segment or portion of the Project, the Permittee shall provide the Commission with a plan and profile of the right-of-way and the specifications and drawings for right-of-way preparation, construction, structure specifications and locations, cleanup, and restoration for the transmission line. The documentation shall include maps depicting the plan and profile including the right-of-way, alignment, and structures in relation to the route and alignment approved per this permit.

The Permittee may not commence construction until the 30 days has expired or until the Commission has advised the Permittee in writing that it has completed its review of the documents and determined that the planned construction is consistent with this permit. If the Permittee intends to make any significant changes in its plan and profile or the specifications and drawings after submission to the Commission, the Permittee shall notify the Commission at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

9.2 Periodic Status Reports

The Permittee shall report to the Commission on progress regarding finalization of the route, design of structures, and construction of the transmission line. The Permittee need not report more frequently than monthly.

9.3 Notification to Commission

At least three days before the line is to be placed into service, the Permittee shall notify the Commission of the date on which the line will be placed into service and the date on which construction was complete.

9.4 As-Builts

Within 60 days after completion of construction, the Permittee shall submit copies of all final as-built plans and specifications developed during the Project.

9.5 GPS Data

Within 60 days after completion of construction, the Permittee shall submit to the Commission, in the format requested by the Commission, geo-spatial information (e.g., ArcGIS compatible map files, GPS coordinates, associated database of characteristics) for all structures associated with the transmission line and each substation connected.

10.0 PERMIT AMENDMENT

This permit may be amended at any time by the Commission. Any person may request an amendment of the conditions of this permit by submitting a request to the Commission in writing describing the amendment sought and the reasons for the amendment. The Commission will mail notice of receipt of the request to the Permittee. The Commission may amend the conditions after affording the Permittee and interested persons such process as is required.

11.0 TRANSFER OF PERMIT

The Permittee may request at any time that the Commission transfer this permit to another person or entity. The Permittee shall provide the name and description of the person or entity to whom the permit is requested to be transferred, the reasons for the transfer, a description of the facilities affected, and the proposed effective date of the transfer.

The person to whom the permit is to be transferred shall provide the Commission with such information as the Commission shall require to determine whether the new Permittee can comply with the conditions of the permit. The Commission may authorize transfer of the permit after affording the Permittee, the new Permittee, and interested persons such process as is required.

12.0 REVOCATION OR SUSPENSION OF THE PERMIT

The Commission may initiate action to revoke or suspend this permit at any time. The Commission shall act in accordance with the requirements of Minn. R. 7850.5100, to revoke or suspend the permit.

Appendix C. Route Permit Example

STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

ROUTE PERMIT FOR CONSTRUCTION OF A HIGH-VOLTAGE TRANSMISSION LINE AND ASSOCIATED FACILITIES

IN
COTTONWOOD, JACKSON AND MARTIN COUNTIES

ISSUED TO
ODELL WIND FARM, LLC

PUC DOCKET NUMBER IP-6914/TL-13-591

In accordance with the requirements of Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850 this route permit is hereby issued to:

ODELL WIND FARM, LLC

Odell Wind Farm, LLC is authorized by this route permit to construct 9.5 miles of single circuit overhead 115 kilovolt (kV) High Voltage Transmission Line, up to 1,500 feet of a single 345 kV High Voltage Transmission Line, the Woad Hill Substation in Martin County, and associated facilities.

The transmission line and associated facilities shall be built within the route identified in this permit and as portrayed on the official route maps, and in compliance with the conditions specified in this permit.

Approved and adopted this 29th day of October, 2014

BY ORDER OF THE COMMISSION

Burl W. Haar,
Executive Secretary

This document can be made available in alternative formats (i.e., large print or audio) by calling 651-296-0406 (voice). Persons with hearing or speech disabilities may call us through their preferred Telecommunications Relay Service.

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FIGURES

ATTACHMENTS

1.0 ROUTE PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this route permit to Odell Wind Farm, LLC (Permittee) pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850. This permit authorizes the Odell Wind Farm, LLC to construct up to 9.5 miles of single circuit overhead 115 kilovolt (kV) High Voltage Transmission Line (HVTL) and up to 1,500 feet of a single 345 kV High Voltage Transmission Line, and as identified in the attached route permit maps, hereby incorporated into this permit.

1.1 Pre-emption

Pursuant to Minn. Stat. § 216E.10, this route permit shall be the sole approval required to be obtained by the Permittee for construction of the transmission facilities and this permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose governments.

2.0 PROJECT DESCRIPTION

The Project includes construction of approximately 9.5 miles of 115 kV high voltage transmission line, and associated facilities, including a 1,500-foot 345 kV HVTL, in Cottonwood, Jackson, and Martin counties, Minnesota, beginning at the planned Odell Wind Farm Substation in Cottonwood County to the proposed Woad Hill Substation in Martin County (the Project). The Project will provide interconnection to the 200-megawatt (MW) Odell Wind Farm located in Cottonwood, Jackson, Watonwan, and Martin Counties.

2.1 Project Location

The Project area includes the following locations:

County	Township Name	Township	Range	Section
Cottonwood	Mountain Lake	105N	34W	32,33,34,35,36
Jackson	Kimball	104N	34W	1,2,3,4,5,11,12
Martin	Cedar	104N	34W	4,5,6,7,8,9,16,17

2.2 Associated Facilities

The transmission line and associated facilities shall be designed to meet or exceed all relevant local and state codes, the National Electric Safety Code (NESC), and North American Electric Reliability Corporation (NERC) requirements.

This includes standards relating to clearances to ground, clearance to crossing utilities, clearance to buildings, strength of materials, clearances over roadways, right-of-way widths, and permit requirements. The transmission line shall be equipped with protective devices to safeguard the public if an accident occurs.

2.2.1 Substations

The new Woad Hill Substation will be constructed either in the NW or SE quadrant of 30th Avenue and south of 230th Street in Section 8 or Section 16 of Cedar Township in Martin County. The substation will consist of supporting structures for high voltage electrical structures, breakers, transformers, lightning protection, and control equipment. The area around the substation will be fenced with driveway access from the east and north. The ground within the substation will be graded and secondary containment areas for the transformer will be installed as necessary. Gravel will be placed on the surface of the ground in and around the substation to assist with weed control. The Woad Hill Substation will take up approximately 10 acres of land.

2.2.2 Structures

The Permittee will use wood and/or T steel structures capable of handling a single-circuit load by constructing the single-circuit transmission line on wood and/or steel monopole structures, direct-embedded in approximately 3-foot diameter holes augured to a depth of approximately fourteen percent of the total structure height, or approximately 9 to 14 feet. Pole structures will be located approximately 350 to 400 feet apart.

Final design and geotechnical investigations may warrant the use of special structures to avoid sensitive areas or to accommodate special engineering circumstances. Structure installations may require special engineering techniques in some locations, due to hydric soils, near and above surface bedrock, and other subsurface conditions. The near and above surface bedrock design and construction would typically involve using specialized drilling equipment to bore a hole directly into the bedrock. The need for self-supporting angle and dead-end or atypical structures will be determined during final design.

The table below identifies the structure types as presented in the route permit application.

Line Type	Conductor	Structure		Foundation	Approximate Height	Approximate Span
		Type	Material			
115 kV	1272 kcmil ACSR	Monopole	Wood	Direct embed	65-70 feet	400 feet
		Self-Supporting	Steel	Drilled Pier Concrete Foundation[1]		

2.2.3 Conductors

The conductor for each of the three phases of the 115 kV line will be 1272 kcmil (one thousand circular mils) ACSR (Aluminum Conductor Steel Reinforced) "Bittern" transmission line.

3.0 DESIGNATED ROUTE

The route designated by the Commission in this permit is the route described below and shown on the route maps attached to this permit. The route is generally described as follows:

The Project will connect the Odell Wind Farm Substation, extend approximately four miles to the east adjacent to County Highway 17, turn south and extend south into Jackson County for approximately one mile adjacent to County Road 85, then extend east for approximately three miles adjacent to 240th Street in Martin County, and turn south adjacent to 30th Avenue for approximately 1.5 miles ultimately terminating at the proposed Woad Hill Substation in Section 8 or Section 16 of Cedar Township in Martin County. The proposed Woad Hill Substation will be a new 345/115 kV substation on Northern States Power's Lakefield Junction-Wilmarth 345 kV transmission line.

The Project will utilize a variable 150 to 600 foot route width. The majority of the Route will be 150 feet wide extending from the road centerline. The route width in Sections 1 and 12 of Kimball Township in Jackson County will be 300 feet, extending 150 feet on both sides of the road centerline in order to provide flexibility to accommodate distances from home. The route width in Sections 6 and 7 of Cedar Township in Martin County will be 600 feet to allow flexibility to work around a known easement title issues.

[1] Drilled pier concrete foundations will be used for steel corner/dead-end structures if guying is not possible.

The identified route widths will provide the Permittee with flexibility for minor adjustments of the specific alignment or right-of-way to accommodate landowner requests and unforeseen conditions. The final alignment (i.e., permanent and maintained rights-of-way) will be located within this designated route unless otherwise authorized below.

3.1 Right-of-Way

The approved right-of-way for the project is up to 130 feet. The transmission easements for the Project include a strip of land that is 80 feet wide parallel and adjacent to the existing road right-of-way, and a strip of land comprising one-half of the existing road right-of-way. The road rights-of-way are generally 66 feet for township roads or 100 feet for county roads. The total easement width is 113 feet along township roads and 130 feet along county roads.

This permit anticipates that the right-of-way will generally conform to the anticipated alignment as noted on the attached route permit maps unless changes are requested by individual landowners and agreed to by Permittee or for unforeseen conditions that are encountered or are otherwise provided for by this permit.

Any right-of-way modifications within the designated route shall be located so as to have comparable overall impacts relative to the factors in Minn. R. 7850.4100, as does the right-of-way identified in this permit, and shall be specifically identified and documented in and approved as part of the plan and profile submitted pursuant to Section 8.1 of this permit.

Where the transmission line route parallels existing highway and other road rights-of-way, the transmission line right-of-way shall occupy and utilize the existing right-of-way to the maximum extent possible, consistent with the criteria in Minn. R. 7850.4100, the other requirements of this permit, and for highways under the jurisdiction of the Minnesota Department of Transportation (Mn/DOT) rules, policies, and procedures for accommodating utilities in trunk highway rights-of-way.

4.0 GENERAL CONDITIONS

The Permittee shall comply with the following conditions during construction of the transmission line and associated facilities over the life of this permit.

4.1 Notification to Landowners

The Permittee shall provide all affected landowners with a copy of this permit and, as a separate information piece, the complaint procedures at the time of the first contact with the landowners after issuance of this permit.

The Permittee shall contact landowners prior to entering the property or conducting maintenance along the route.

The Permittee shall work with landowners to locate the high-voltage transmission line to minimize the loss of agricultural land, forest, and wetlands, and to avoid homes and farmsteads.

4.2 Construction Practices

The Permittee shall follow those specific construction practices and material specifications described in the Odell Wind Farm, LLC Application to the Commission for a route permit for the Odell Wind Farm, dated December 12, 2013, as amended by the June 6, 2014 Request for Route Width Expansion unless this permit establishes a different requirement in which case this permit shall prevail.

4.2.1 Field Representative

At least 14 days prior to commencing construction, the Permittee shall advise the Commission in writing of the person or persons designated to be the field representative for the Permittee with the responsibility to oversee compliance with the conditions of this permit during construction. This person shall be accessible by telephone during normal business hours throughout right-of-way preparation, construction, cleanup, and restoration.

The field representative's address, phone number, emergency phone number, and email shall be provided to the Commission and to affected landowners, residents, public officials and other interested persons. The Permittee may change the field representative at any time upon notice to landowners and the Commission.

4.2.2 Employee Training and Education of Permit Terms and Conditions

The Permittee shall inform all employees, contractors, and other persons involved in the transmission line construction of the terms and conditions of this permit.

4.2.3 Public Services, Public Utilities, and Existing Easements

During construction, the Permittee shall minimize any disruption to public services or public utilities. To the extent disruptions to public services or public utilities occur these would be temporary and the Permittee will restore service promptly. Where any impacts to utilities have the potential to occur the Permittee will work with both landowners and local agencies to determine the most appropriate transmission structure placement.

The Permittee shall work with the landowners, townships, cities, and counties along the route to accommodate concerns regarding tree clearing, distance from existing structures, drain tiles, pole depth and placement in relationship to existing roads and road expansion plans.

The Permittee shall cooperate with county and city road authorities to develop appropriate signage and traffic management during construction.

4.2.4 Temporary Work Space

The Permittee shall limit temporary easements to special construction access needs and additional staging or lay-down areas required outside of the authorized right-of-way. Temporary space shall be selected to limit the removal and impacts to vegetation. Temporary easements outside of the authorized transmission line right-of-way will be obtained from affected landowners through rental agreements and are not provided for in this permit.

Temporary driveways may be constructed between the roadway and the structures to minimize impact using the shortest route possible. Construction mats should also be used to minimize impacts on access paths and construction areas.

4.2.5 Noise

Construction and routine maintenance activities shall be limited to daytime working hours, as defined in Minn. R. 7030.0200, to ensure nighttime noise level standards will not be exceeded.

4.2.6 Aesthetics

The Permittee shall consider input pertaining to visual impacts from landowners or land management agencies prior to final location of structures, rights-of-way, and other areas with the potential for visual disturbance. Care shall be used to preserve the natural landscape, minimize tree removal and prevent any unnecessary destruction of the natural surroundings in the vicinity of the project during construction and maintenance.

Structures shall be placed at a distance, consistent with sound engineering principles and system reliability criteria, from intersecting roads, highway, or trail crossings and could cross roads to minimize or avoid impacts.

4.2.7 Vegetation Removal and Protection

The Permittee shall minimize the number of trees to be removed in selecting the right-of-way specifically preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings where vegetative screening may minimize aesthetic impacts, to the extent that such actions do not violate sound engineering principles or system reliability criteria.

Tall growing species located within the transmission line right-of-way that endanger the safe and reliable operation of the transmission facility will be removed by the Permittee.

The Permittee shall leave undisturbed, to the extent possible, existing low growing species in the right-of-way or replant such species in the right-of-way to blend the difference between the right-of-way and adjacent areas, to the extent that the low growing vegetation that will not pose a threat to the transmission facility or impede construction.

4.2.8 Application of Herbicides

The Permittee shall restrict herbicide use to those herbicides and methods of application approved by the Minnesota Department of Agriculture and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. The Permittee shall contact the landowner or his designee to obtain approval for the use of herbicide prior to any application on their property. The landowner may request that there be no application of herbicides on any part of the right-of-way within the landowner's property. All herbicides shall be applied in a safe and cautious manner so as not to damage crops, orchards, tree farms, or gardens.

4.2.9 Noxious Weeds

The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil, the Permittee shall select site appropriate seed certified to be free of noxious weeds. To the extent possible, the Permittee shall use native seed mixes. The Permittee shall consult with landowners on the selection and use of seed for replanting.

4.2.10 Site Sediment and Erosion Control

The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency (MPCA) Construction Stormwater Program.

The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions.

Where larger areas of one acre or more are disturbed or other areas designated by the MPCA, the Permittee shall obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater permit from the MPCA.

4.2.11 Wetlands and Water Resources

Wetland impact avoidance measures that shall be implemented during design and construction of the transmission line will include spacing and placing the power poles at variable distances to span and avoid wetlands, watercourses, and floodplains. Unavoidable wetland impacts as a result of the placement of poles shall be limited to the immediate area around the poles. To minimize impacts, construction in wetland areas shall occur during frozen ground conditions. When construction during winter is not possible, wooden or composite mats shall be used to protect wetland vegetation. Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area.

Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts. No staging or stringing set up areas shall be placed within or adjacent to wetlands or water resources, as practicable. Power pole structures shall be assembled on upland areas before they are brought to the site for installation.

Areas disturbed by construction activities shall be restored to pre-construction conditions. Restoration of the wetlands will be performed by Permittee in accordance with the requirements of applicable state and federal permits or laws and landowner agreements.

All requirements of the U.S. Army Corps of Engineers (wetlands under federal jurisdiction), Minnesota Department of Natural Resources (Public Waters/Wetlands), and County (wetlands under the jurisdiction of the Minnesota Wetland Conservation Act) shall be met.

4.2.12 Archaeological and Historic Resources

The Permittee shall make every effort to avoid impacts to identified archaeological and historic resources when installing the high-voltage transmission line on the approved route. The Permittee shall consult with the Minnesota State Historic Preservation Office (SHPO) prior to commencing construction to determine whether an archaeological survey will be necessary for any length of the transmission line route.

In the event that a resource is encountered, the Permittee shall contact and consult with SHPO. The Permittee shall not excavate at such locations until authorization is provided by SHPO. Where feasible, avoidance of the resource is required. Where not feasible, mitigation must include an effort to minimize project impacts on the resource consistent with SHPO and State Archaeologist requirements. If human remains are encountered during construction, the Permittee shall immediately halt construction at that location and promptly notify local law enforcement authorities and the State Archaeologist.

Prior to construction, workers shall be trained about the need to avoid cultural properties, how to identify cultural properties, and procedures to follow if undocumented cultural properties, including gravesites, are found during construction.

4.2.13 Avian Mitigation

The Permittee's standard transmission design shall incorporate adequate spacing of conductors and grounding devices in accordance with Avian Power Line Interaction Committee standards to eliminate the risk of electrocution to raptors with larger wingspans that may simultaneously come in contact with a conductor and grounding devices. The Permittee will consult with the Minnesota Department of Natural Resources regarding type and placement of bird diverters.

4.2.14 Restoration

The Permittee shall restore the right-of-way, temporary work spaces, access roads, abandoned right-of-way, and other public or private lands affected by construction of the transmission line. Restoration within the right-of-way must be compatible with the safe operation, maintenance, and inspection of the transmission line. Within 60 days after completion of all restoration activities, the Permittee shall advise the Commission in writing of the completion of such activities.

4.2.15 Cleanup

All waste and scrap that is the product of construction shall be removed from the right-of-way and all premises on which construction activities were conducted and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

4.2.16 Pollution and Hazardous Wastes

All appropriate precautions to protect against pollution of the environment must be taken by the Permittee. The Permittee shall be responsible for compliance with all laws applicable to the generation, storage, transportation, clean up and disposal of all wastes generated during construction and restoration of the right-of-way.

4.2.17 Damages

The Permittee shall fairly compensate landowners for damage to crops, fences, private roads and lanes, landscaping, drain tile, or other damages sustained during construction.

4.3 Electrical Performance Standards

4.3.1 Grounding

The Permittee shall design, construct, and operate the transmission line in a manner so that the maximum induced steady-state short-circuit current shall be limited to five milliamperes root mean square (rms) alternating current between the ground and any non-stationary object within the right-of-way, including but not limited to large motor vehicles and agricultural equipment. All fixed metallic objects on or off the right-of-way, except electric fences that parallel or cross the right-of-way, shall be grounded to the extent necessary to limit the induced short-circuit current between ground and the object so as not to exceed one milliampere rms under steady state conditions of the transmission line and to comply with the ground fault conditions specified in the NESC. The Permittee shall address and rectify any induced current problems that arise during transmission line operation.

4.3.2 Electric Field

The transmission line shall be designed, constructed, and operated in such a manner that the electric field measured one meter above ground level immediately below the transmission line shall not exceed 8.0 kV/m rms.

4.3.3 Interference with Communication Devices

If interference with radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices is caused by the presence or operation of the transmission line, the Permittee shall take whatever action is feasible to restore or provide reception equivalent to reception levels in the immediate area just prior to the construction of the line.

4.4 Other Requirements

4.4.1 Applicable Codes

The Permittee shall comply with applicable NERC planning standards and requirements of the NESC including clearances to ground, clearance to crossing utilities, clearance to buildings, right-of way widths, erecting power poles, and stringing of transmission line conductors.

4.4.2 Other Permits and Regulations

The Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of these permits. A list of the permits known to be required is included in the permit application. The Permittee shall submit a copy of such permits to the Commission upon request.

5.0 SPECIAL CONDITIONS

The Permittee shall provide a report to the Commission as part of the plan and profile submission that describes the actions taken and mitigative measures developed regarding the project and the following special conditions. Special conditions shall take precedence over other conditions of this permit should there be a conflict.

5.1 Wildlife-Friendly Erosion Control Materials

The Permittee, in cooperation with the Minnesota Department of Natural Resources, shall use wildlife-friendly erosion control materials in areas known to be inhabited by wildlife species (birds, small mammals, reptiles, and amphibians) susceptible to entanglement in plastic netting.[2]

[2] http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf

5.2 Rare and Unique Resources

The Permittee shall follow measures and recommendations for avoiding and minimizing impacts to Blanding's turtle populations as outlined in the Minnesota Department of Natural Resources Environmental Review Fact Sheet Series for the Blanding's Turtle.[3] Construction and maintenance personnel will be made aware of rare resources and plant communities during pre-construction meetings to minimize potential disturbance. The Permittee shall avoid impacts to State-listed endangered, threatened, and special concern species in all areas of the project including temporary workspaces associated with the project.

6.0 DELAY IN CONSTRUCTION

If the Permittee has not commenced construction or improvement of the route within four years after the date of issuance of this permit the Permittee shall file a report on the failure to construct and the Commission shall consider suspension of the permit in accordance with Minn. R. 7850.4700.

7.0 COMPLAINT PROCEDURES

Prior to the start of construction, the Permittee shall submit to the Commission the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements of Minn. R. 7829.1500 or Minn. R. 7829.1700, and as set forth in the complaint procedures attached to this permit.

Upon request, the Permittee shall assist the Commission with the disposition of unresolved or longstanding complaints. This assistance shall include, but is not limited to, the submittal of complaint correspondence and complaint resolution efforts.

8.0 COMPLIANCE REQUIREMENTS

Failure to timely and properly make compliance filings required by this permit is a failure to comply with the conditions of this permit. Compliance filings must be electronically filed with the Commission.

[3] http://files.dnr.state.mn.us/natural_resources/animals/reptiles_amphibians/turtles/blandings_turtle/factsheet.pdf

8.1 Plan and Profile

At least 30 calendar days before right-of-way preparation for construction begins on any segment or portion of the project, the Permittee shall provide the Commission with a plan and profile of the right-of-way and the specifications and drawings for right-of-way preparation, construction, structure specifications and locations, cleanup, and restoration for the transmission line.
The documentation shall include maps depicting the plan and profile including the right-of-way, alignment, and structures in relation to the route and alignment approved per this permit.
The Permittee may not commence construction until the 30 days has expired or until the Commission has advised the Permittee in writing that it has completed its review of the documents and determined that the planned construction is consistent with this permit. If the Permittee intends to make any significant changes in its plan and profile or the specifications and drawings after submission to the Commission, the Permittee shall notify the Commission at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

8.2 Periodic Status Reports

The Permittee shall report to the Commission on progress regarding finalization of the route, design of structures, and construction of the transmission line. The Permittee need not report more frequently than monthly.

8.3 Completion of Construction

8.3.1 Notification to Commission

At least three days before the line is to be placed into service, the Permittee shall notify the Commission of the date on which the line will be placed into service and the date on which construction was complete.

8.3.2 As-Built Plans and Specifications

Within 60 days after completion of construction, the Permittee shall submit copies of all final as-built plans and specifications developed during the project.

8.3.3 GPS Data

Within 60 days after completion of construction, the Permittee shall submit to the Commission, in the format requested by the Commission, geo-spatial information (e.g., ArcGIS compatible map files, GPS coordinates, associated database of characteristics) for all structures associated with the transmission line and each substation connected.

9.0 PERMIT AMENDMENT

This permit may be amended at any time by the Commission. Any person may request an amendment of the conditions of this permit by submitting a request to the Commission in writing describing the amendment sought and the reasons for the amendment. The Commission will mail notice of receipt of the request to the Permittee. The Commission may amend the conditions after affording the Permittee and interested persons such process as is required.

10.0 TRANSFER OF PERMIT

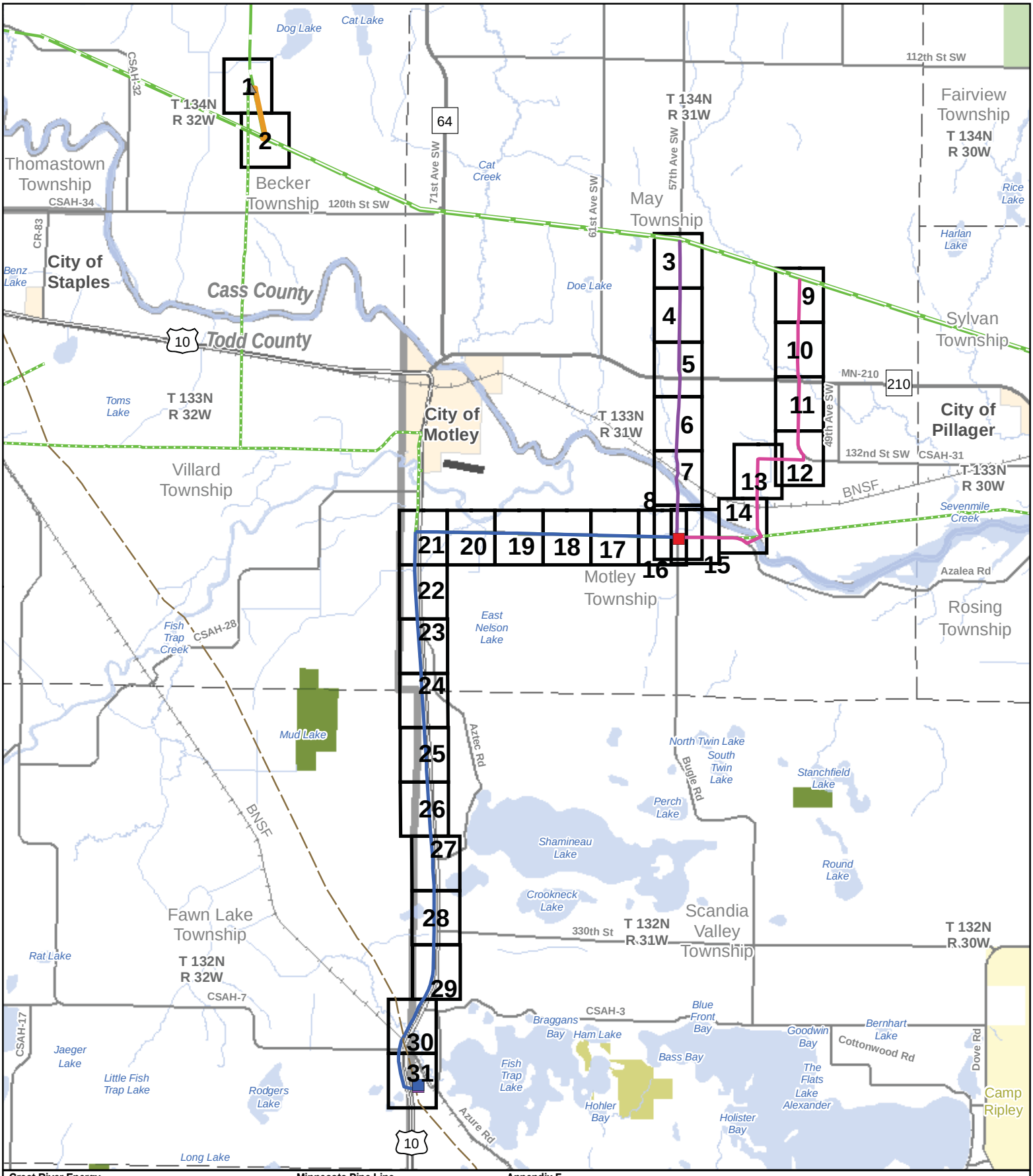
The Permittee may request at any time that the Commission transfer this permit to another person or entity. The Permittee shall provide the name and description of the person or entity to whom the permit is requested to be transferred, the reasons for the transfer, a description of the facilities affected, and the proposed effective date of the transfer.

The person to whom the permit is to be transferred shall provide the Commission with such information as the Commission shall require to determine whether the new Permittee can comply with the conditions of the permit. The Commission may authorize transfer of the permit after affording the Permittee, the new Permittee, and interested persons such process as is required.

11.0 REVOCATION OR SUSPENSION OF PERMIT

The Commission may initiate action to revoke or suspend this permit at any time. The Commission shall act in accordance with the requirements of Minn. R. 7850.5100, to revoke or suspend the permit.

Appendix D. Route Maps



Great River Energy
- Common Route - Proposed 115 kV Transmission Line
- East Route Option - Proposed 115 kV Transmission Line
- West Route Option - Proposed 115 kV Transmission Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed 115 kV Transmission Line
- Existing Transmission Substation
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

Appendix F
- Map Grid

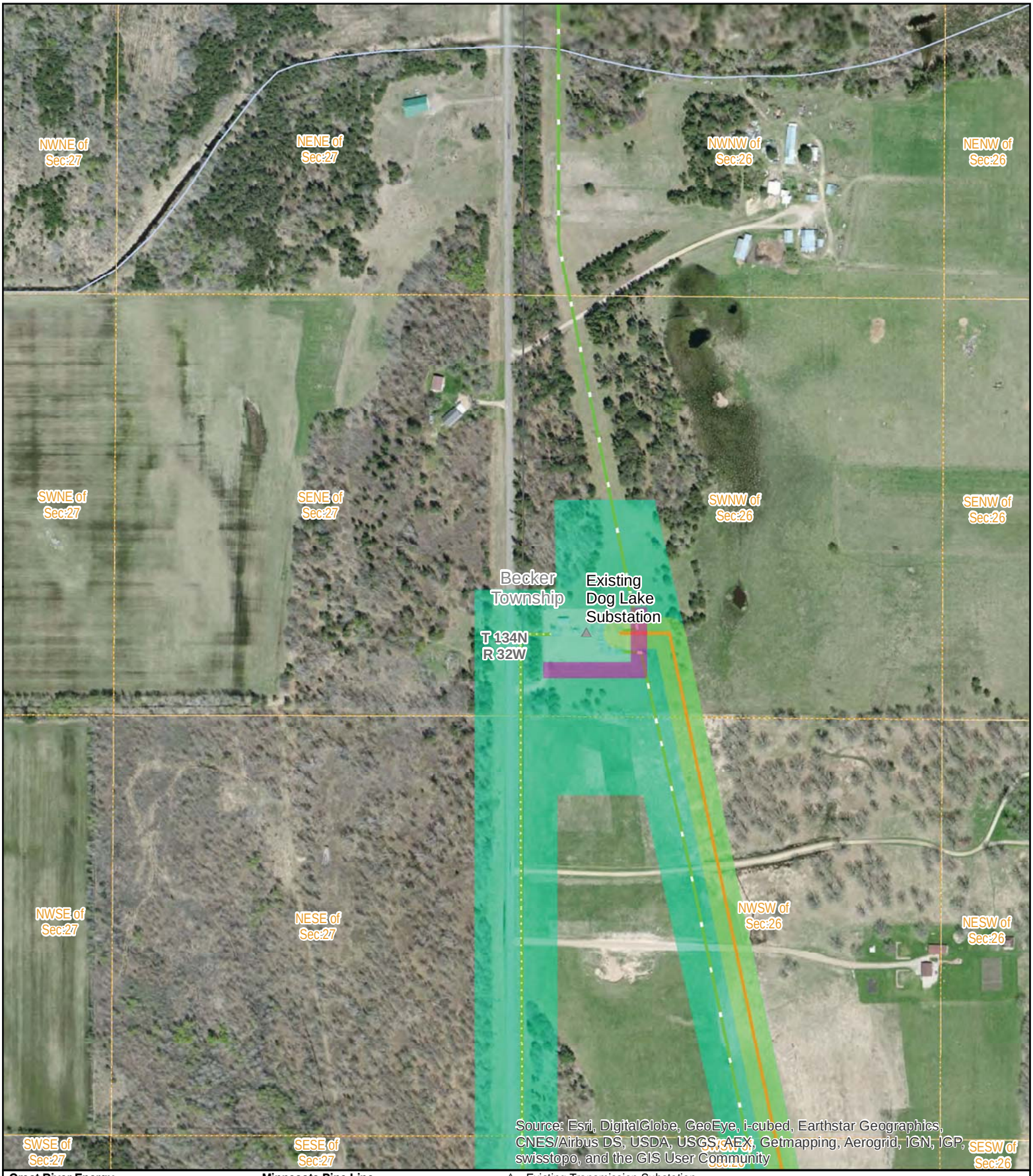
Motley Area 115 kV Project
Detailed Route Maps
Key

N

0 0.5 1 Miles

GIS Data sources include:
MNGEO, MNDNR, MNDOT, and Great River Energy.

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 1 of 31

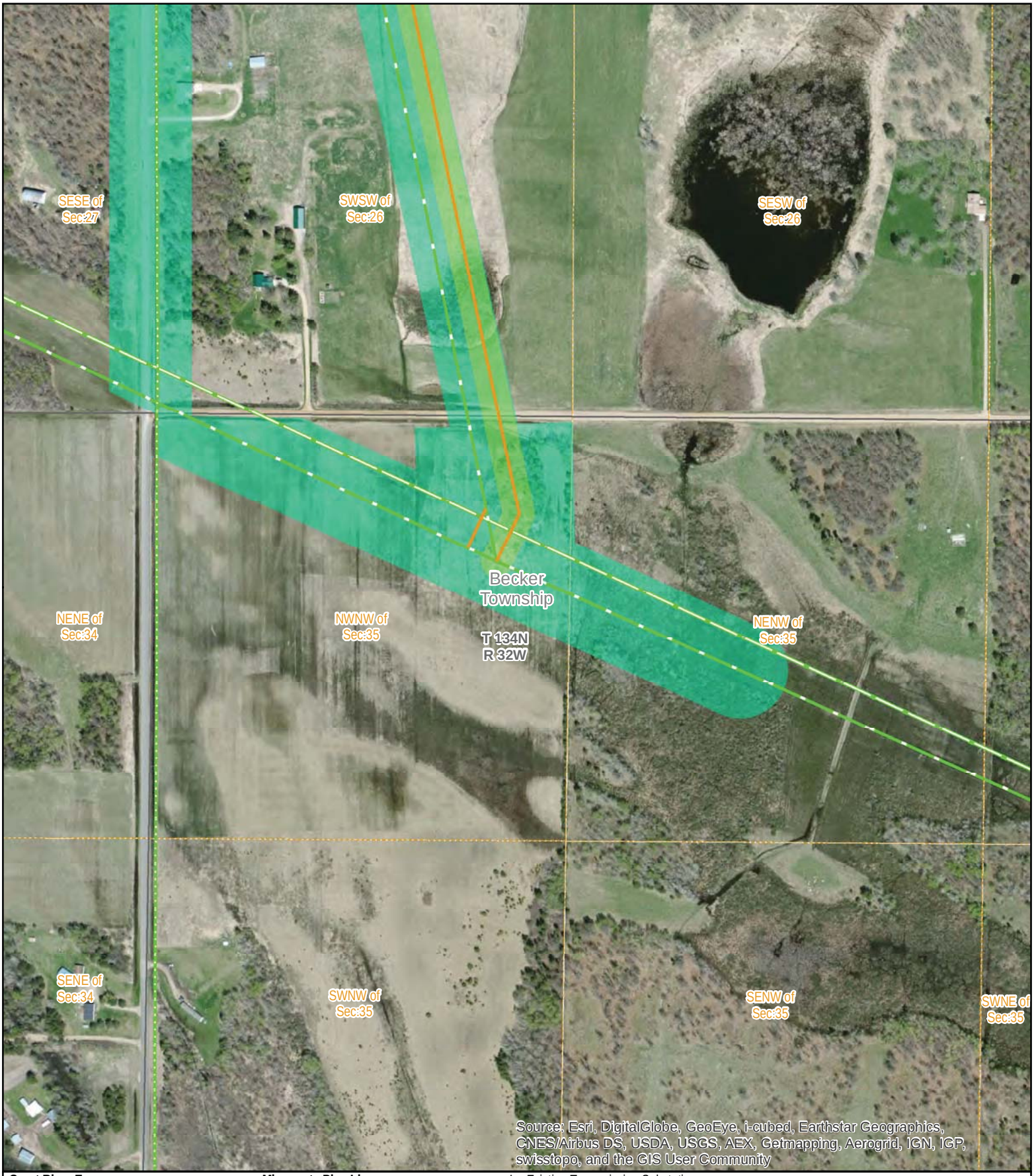
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Dog Lake Map 1

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 2 of 31

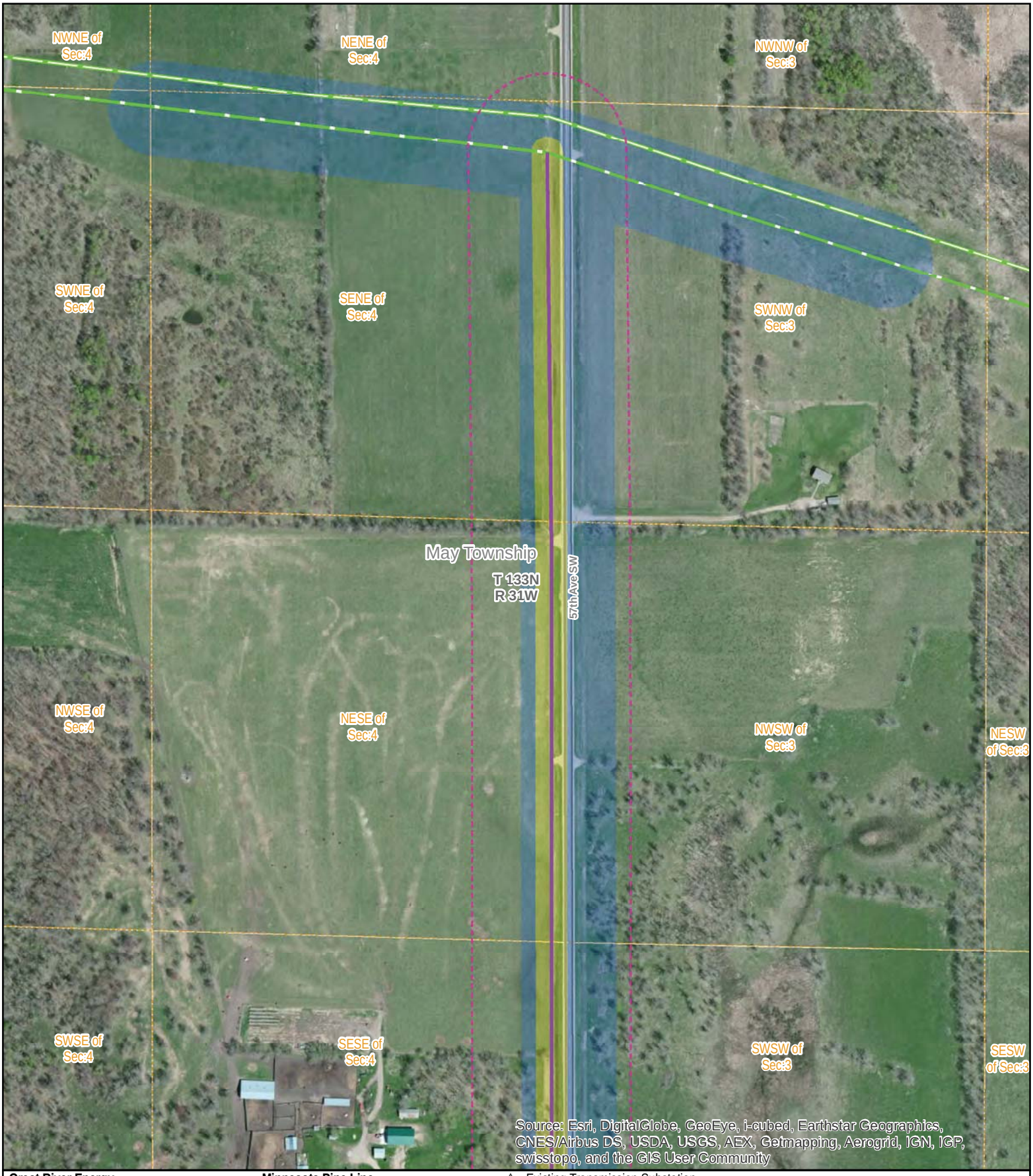
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Dog Lake Map 2

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 3 of 31

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

West Route Option Map 1

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (1)
- 250' from Alignment

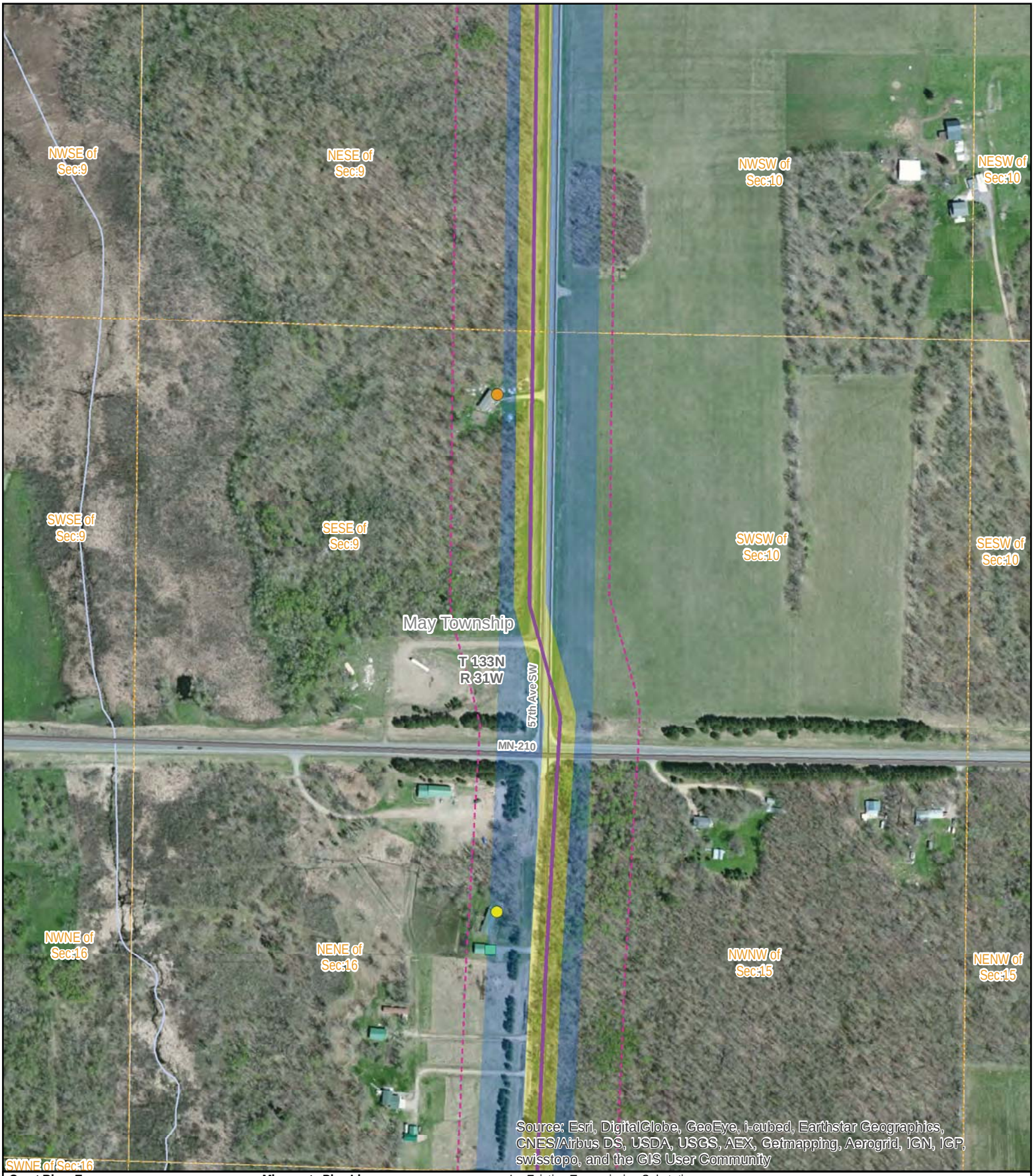
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 4 of 31
West Route Option Map 2

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (1)
- Residence 150-250' (1)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (1)
- 250' from Alignment

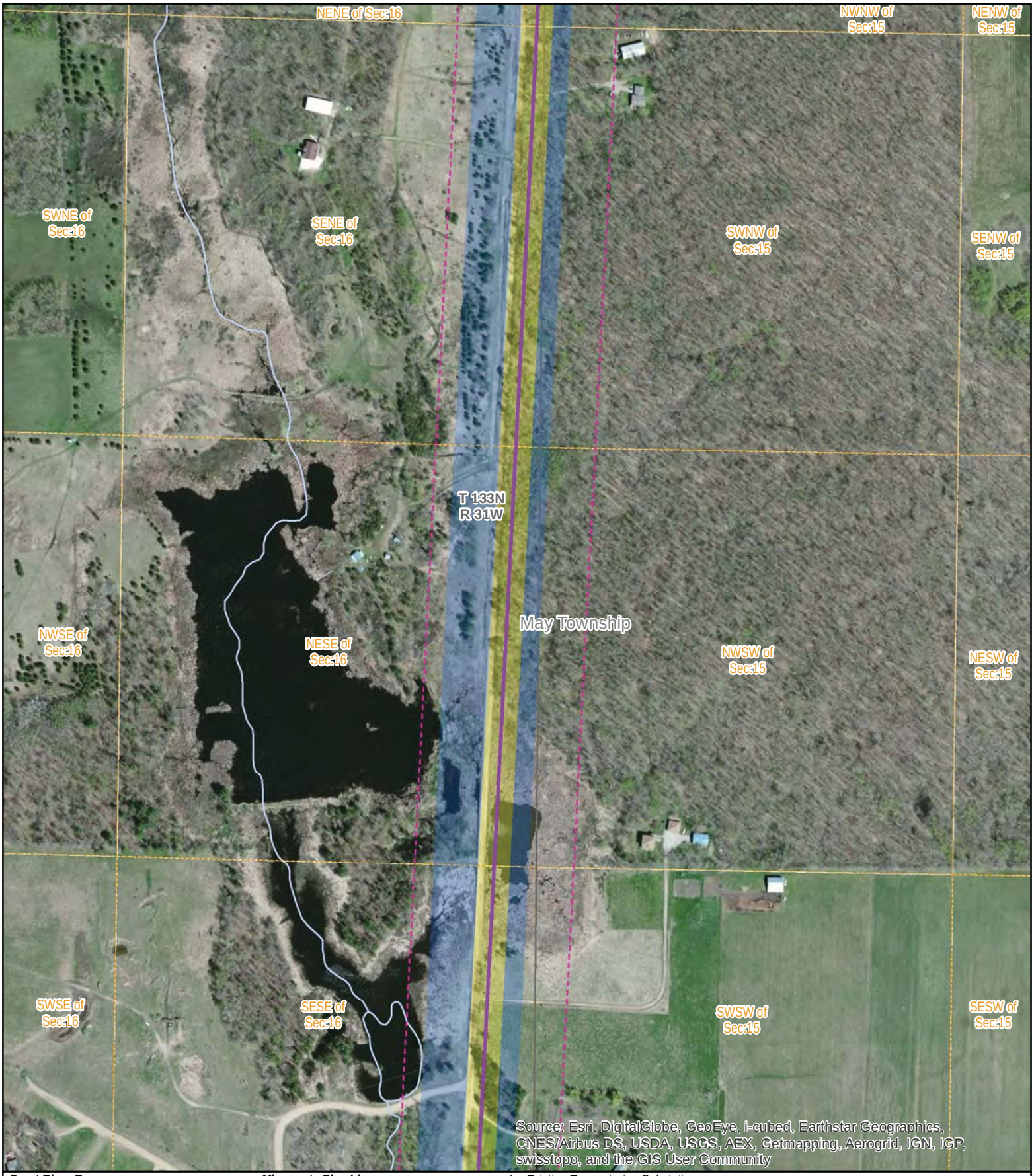
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 5 of 31
West Route Option Map 3

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (1)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

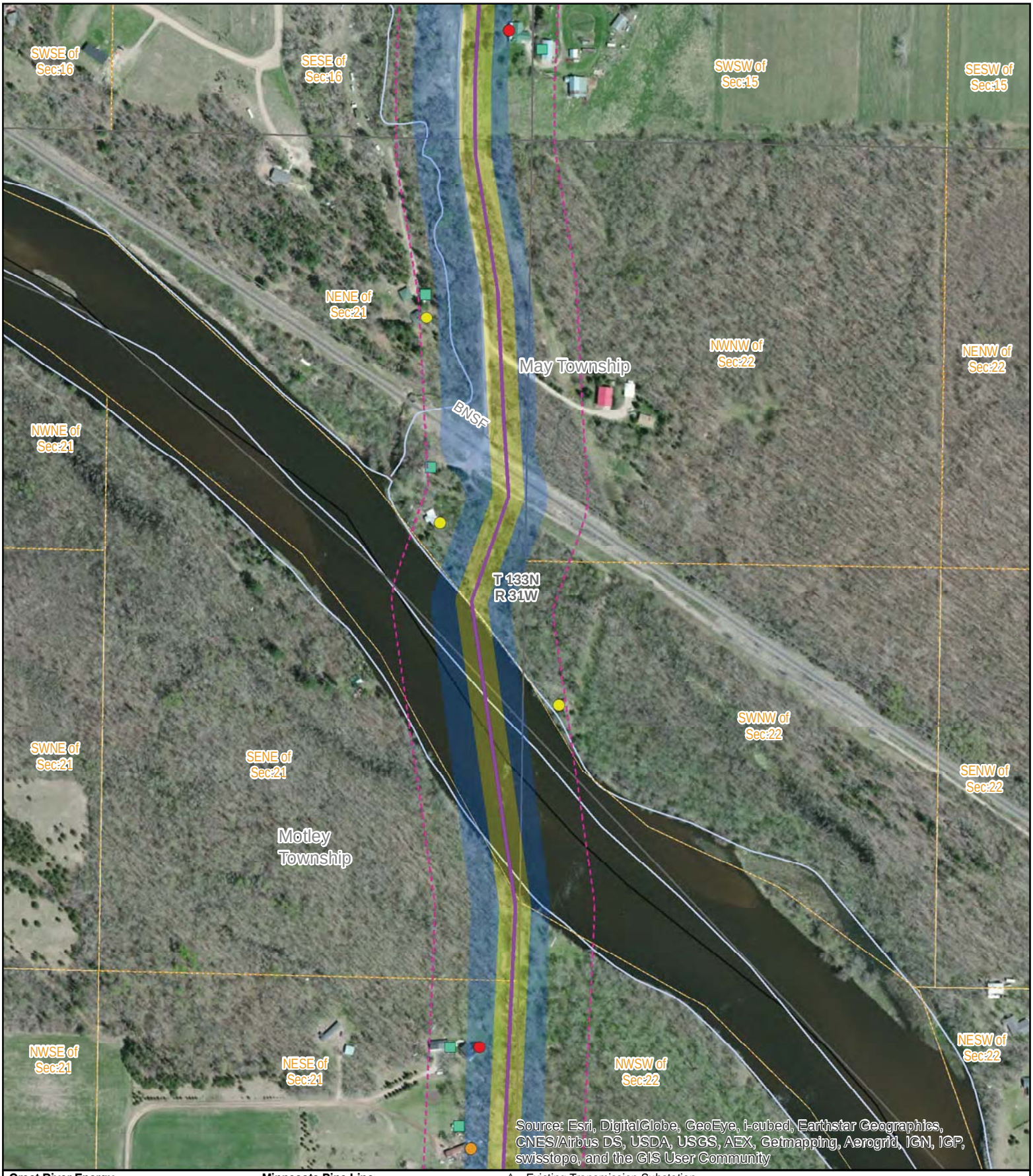
Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 6 of 31
West Route Option Map 4

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (2)
- Residence 100-150' (1)
- Residence 150-250' (3)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (5)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 7 of 31
West Route Option Map 5

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

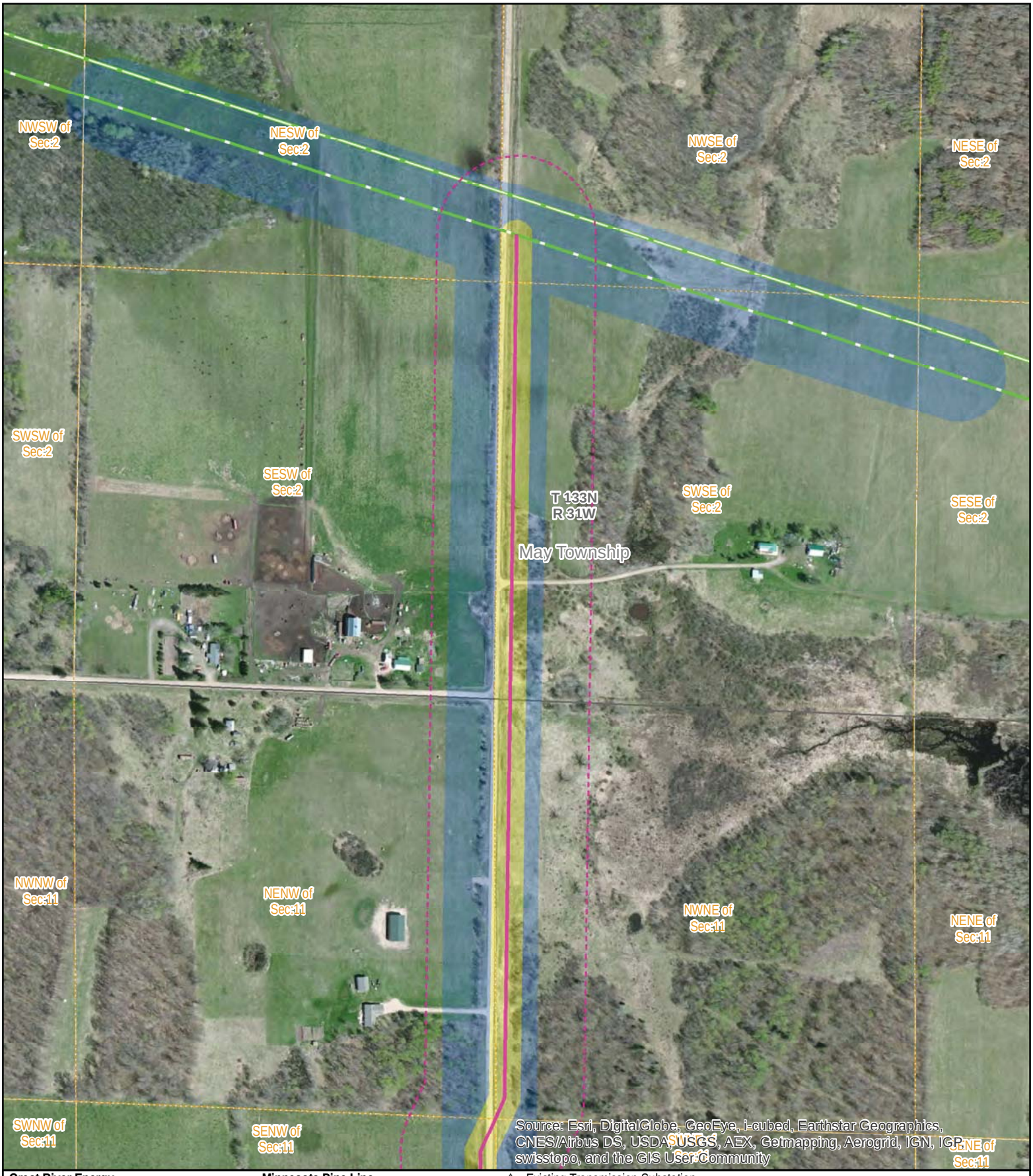
Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (2)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (6)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 8 of 31
West Route Option Map 6

N
0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

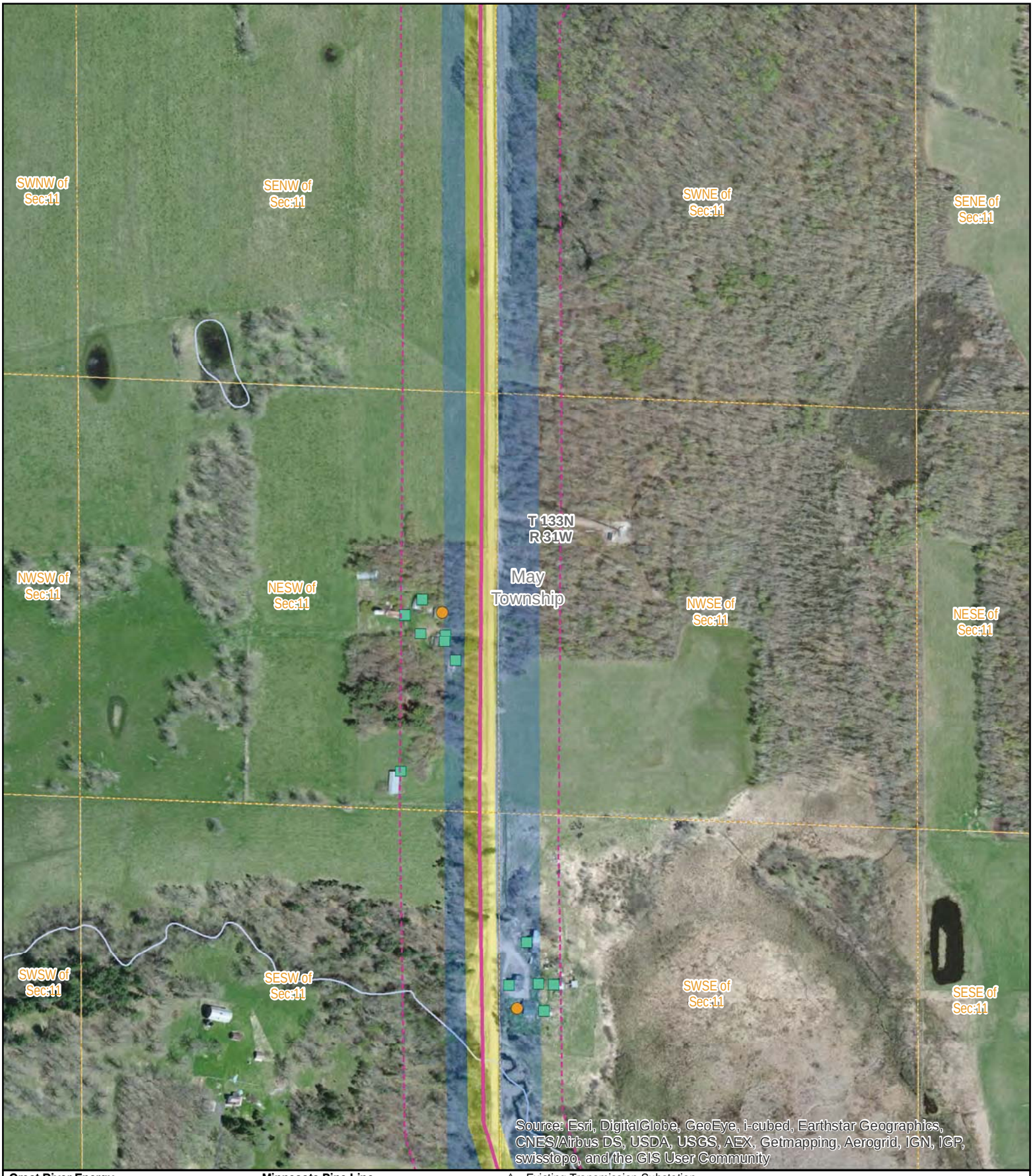
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 9 of 31
East Route Option Map 1

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (2)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (12)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 10 of 31

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

East Route Option Map 2

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 11 of 31

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

East Route Option Map 3

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (1)
- Residence 150-250' (2)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (5)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 12 of 31

N

0 50 100 200 Feet

East Route Option Map 4

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

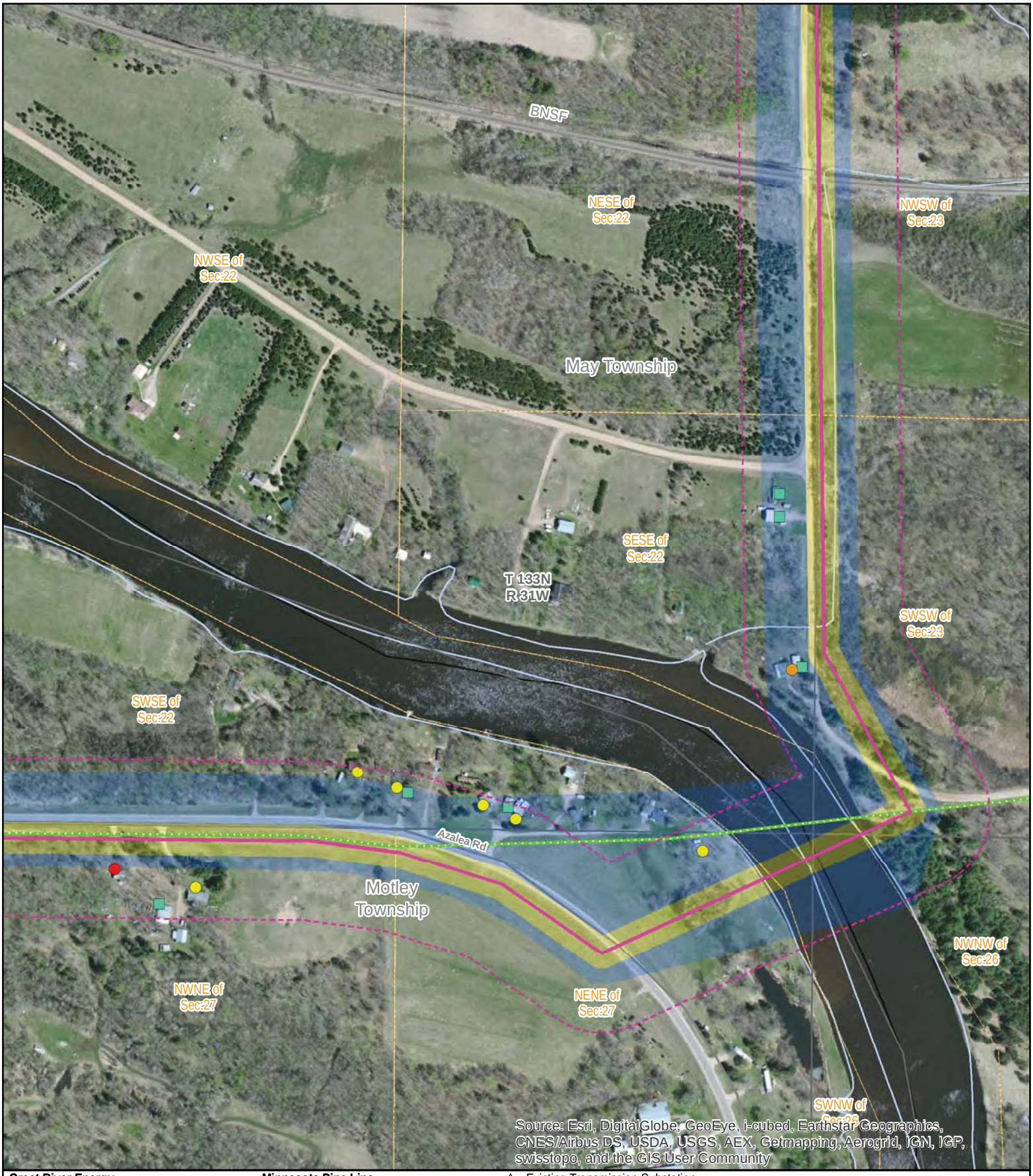
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 13 of 31
East Route Option Map 5

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (1)
- Residence 100-150' (1)
- Residence 150-250' (6)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (6)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 14 of 31

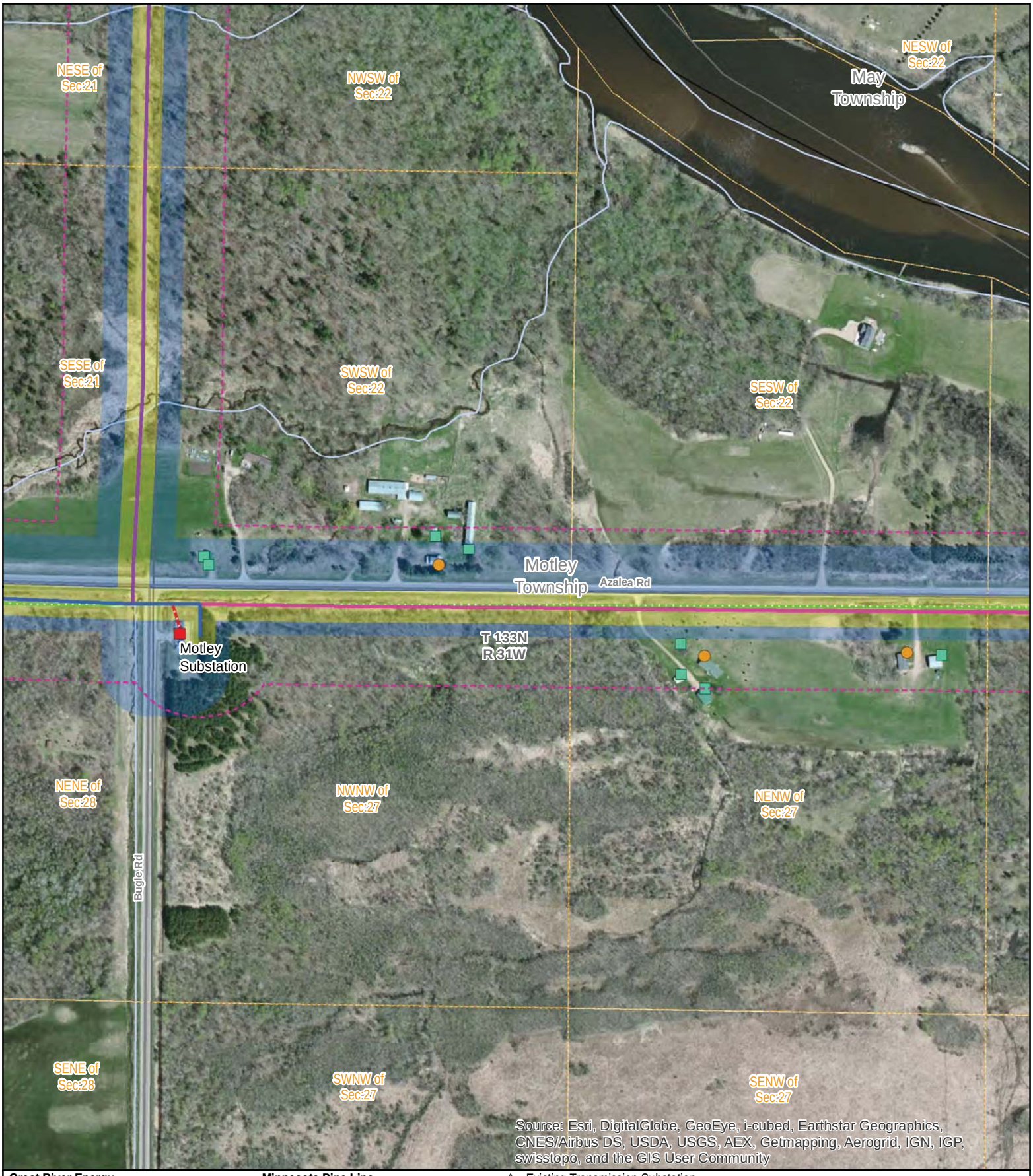
N

0 50 100 200 Feet

East Route Option Map 6

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (3)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (8)
- 250' from Alignment

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 15 of 31
East Route Option Map 7

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (2)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 16 of 31

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 1

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 17 of 31

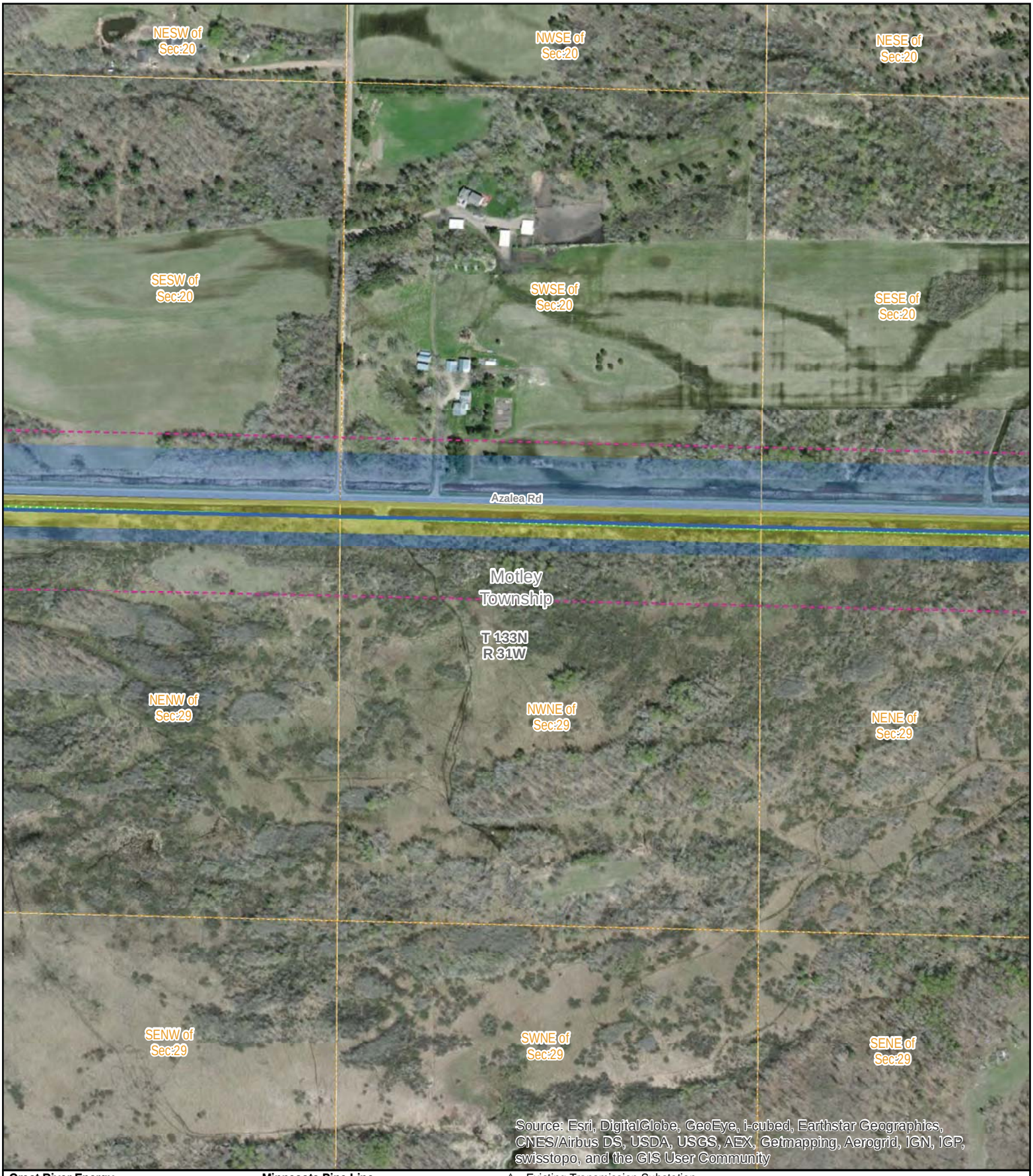
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 2

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 18 of 31

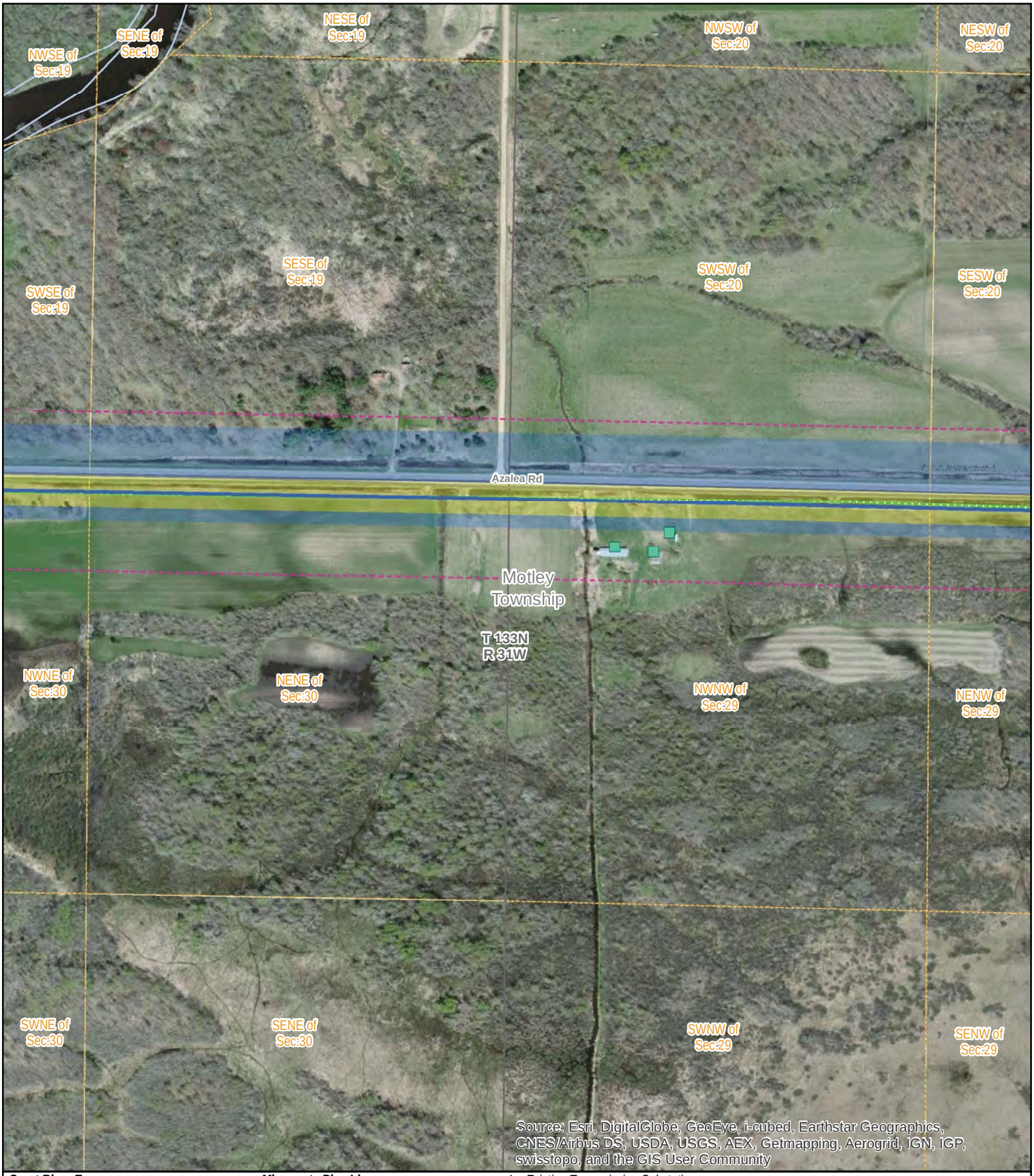
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 3

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (3)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 19 of 31

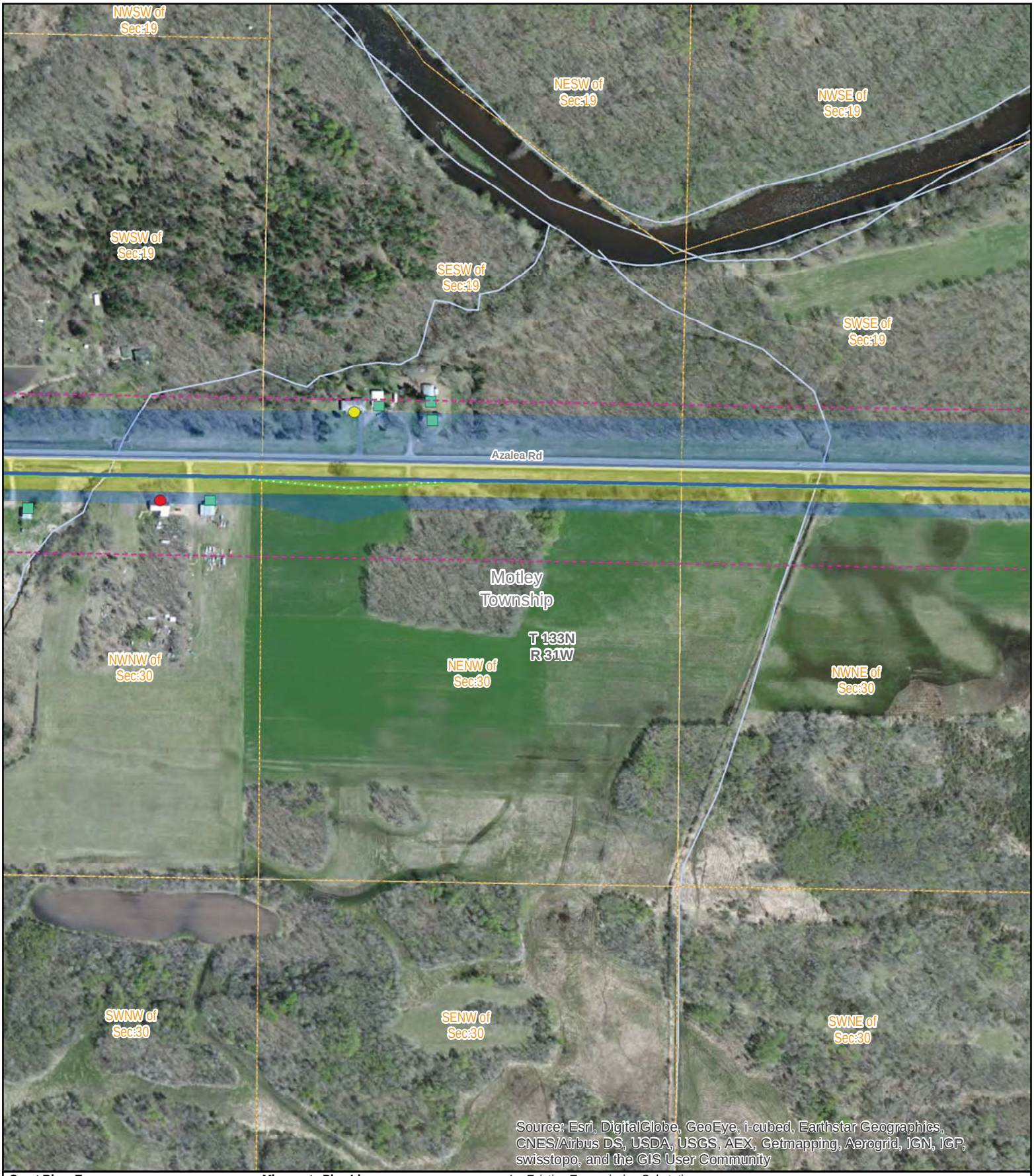
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 4

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (1)
- Residence 100-150' (0)
- Residence 150-250' (1)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (5)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 20 of 31

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 5

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (1)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (1)
- 250' from Alignment

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 21 of 31

Common Route Map 6

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (1)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (1)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 22 of 31

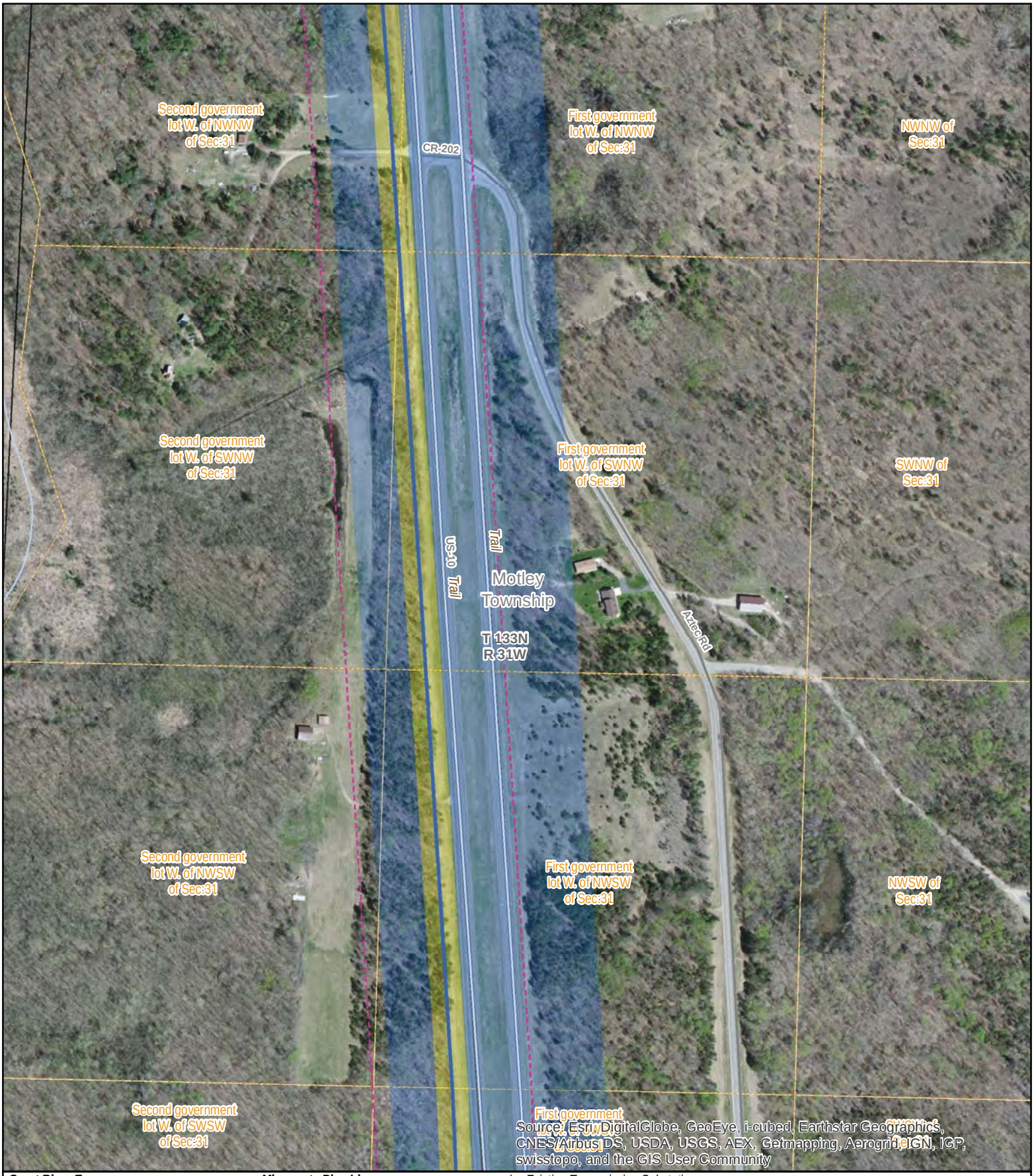
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 7

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 23 of 31

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 8

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (1)
- Residence 150-250' (1)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (2)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 24 of 31

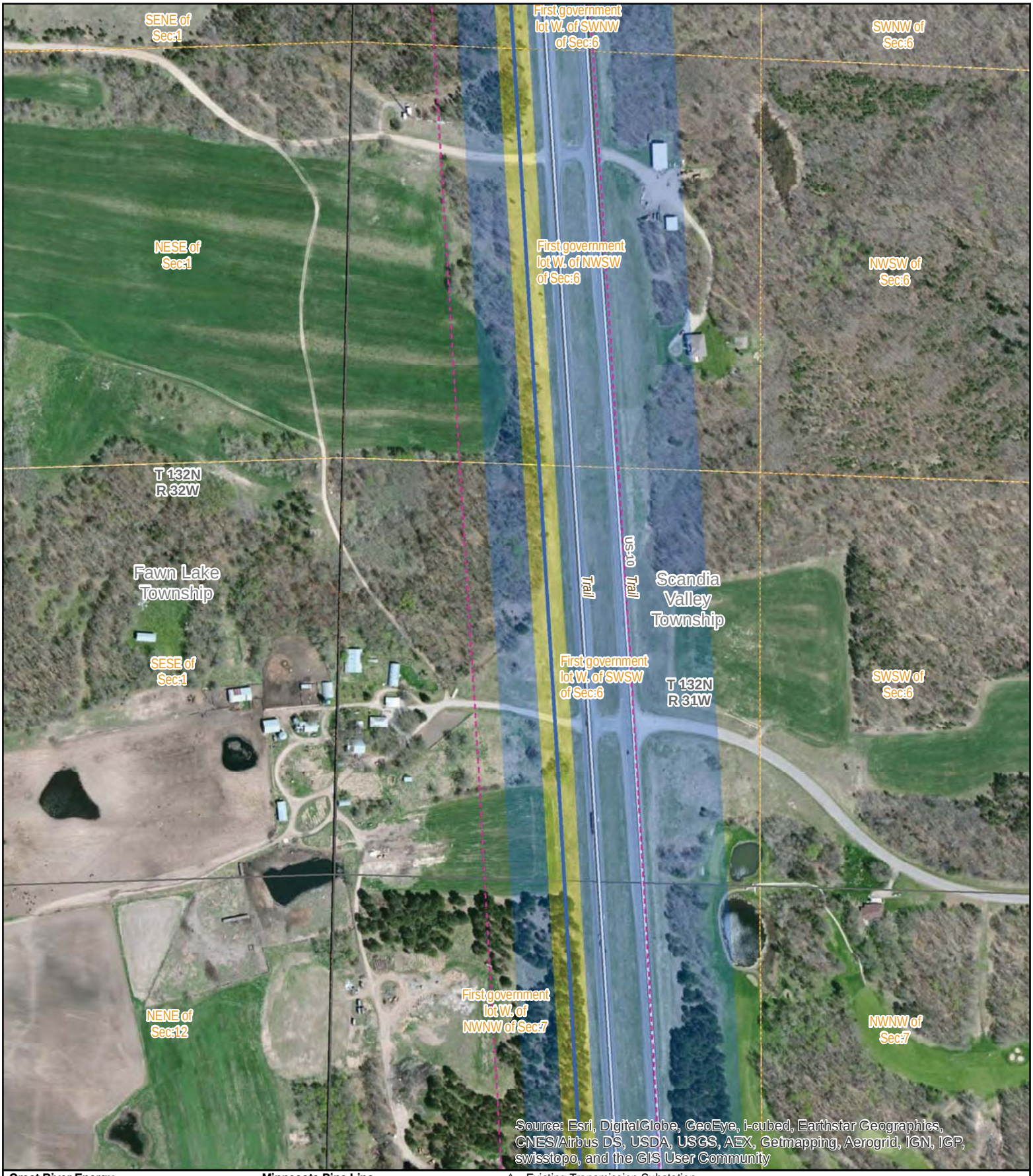
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 9

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 25 of 31

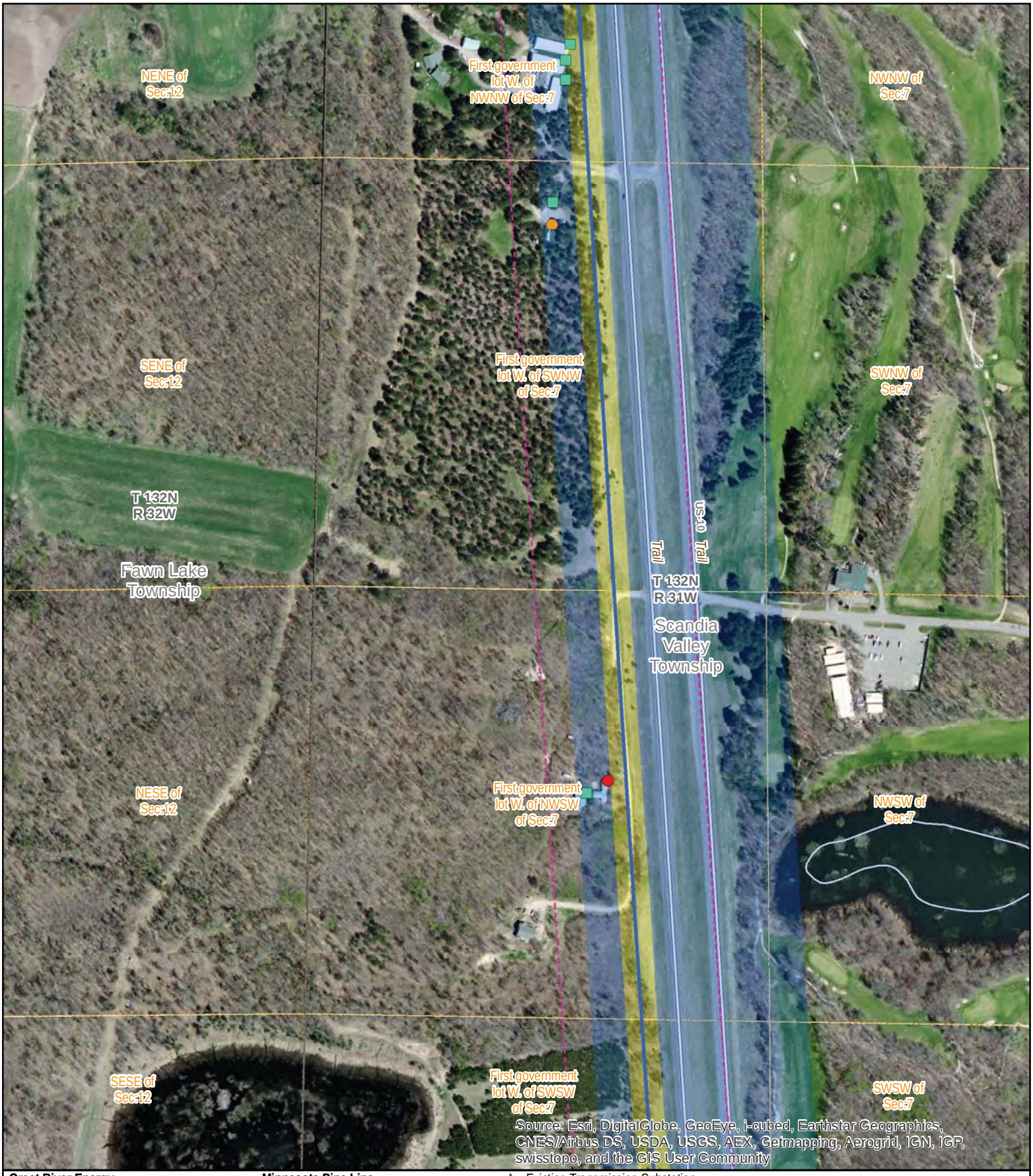
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 10

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (1)
- Residence 100-150' (1)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (5)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 26 of 31

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 11

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line
- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (3)
- Residence 50-100' (2)
- Residence 100-150' (1)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (11)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 27 of 31

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 12

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (0)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 28 of 31

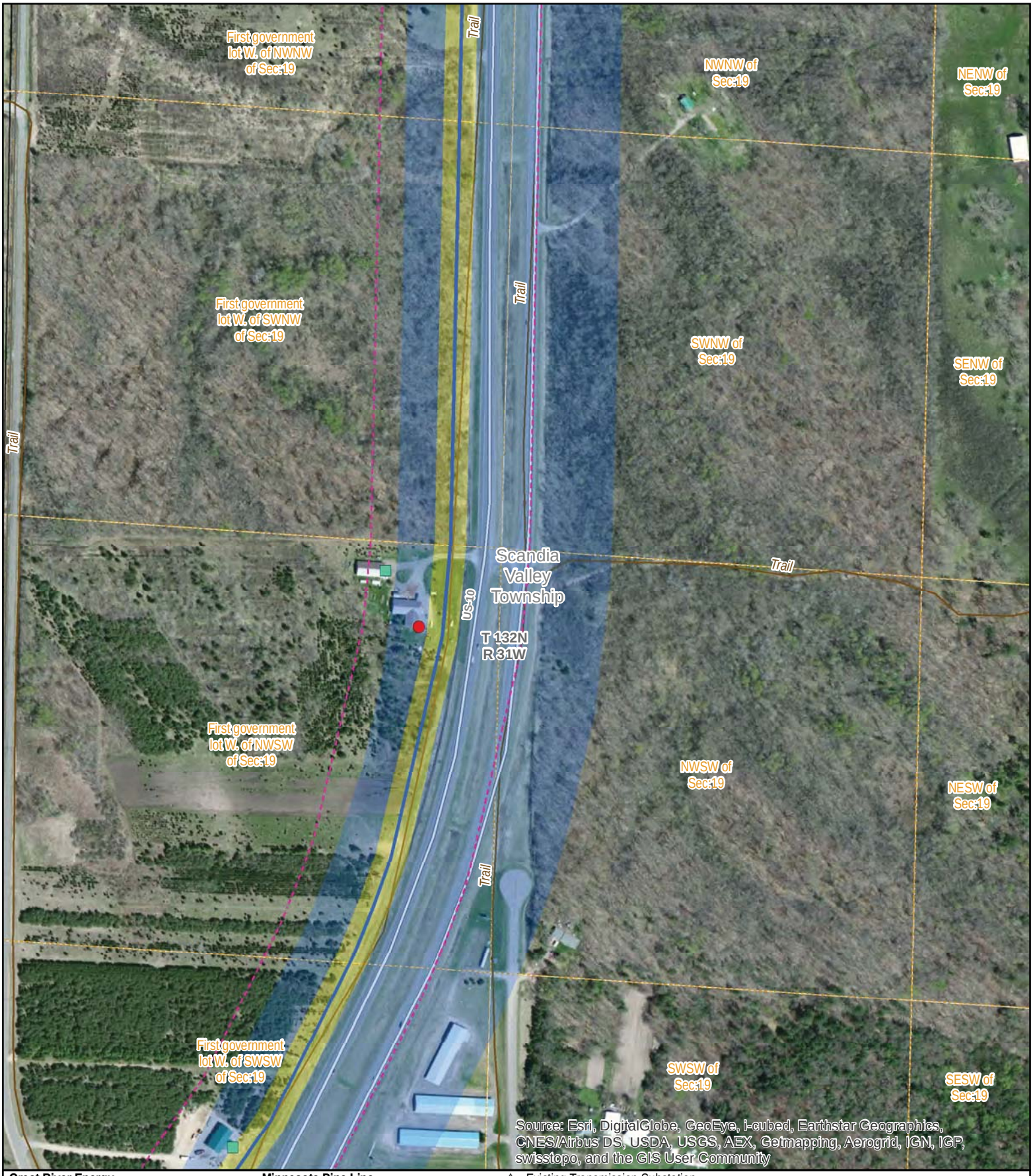
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 13

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (1)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (2)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 29 of 31

N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 14

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (4)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 30 of 31

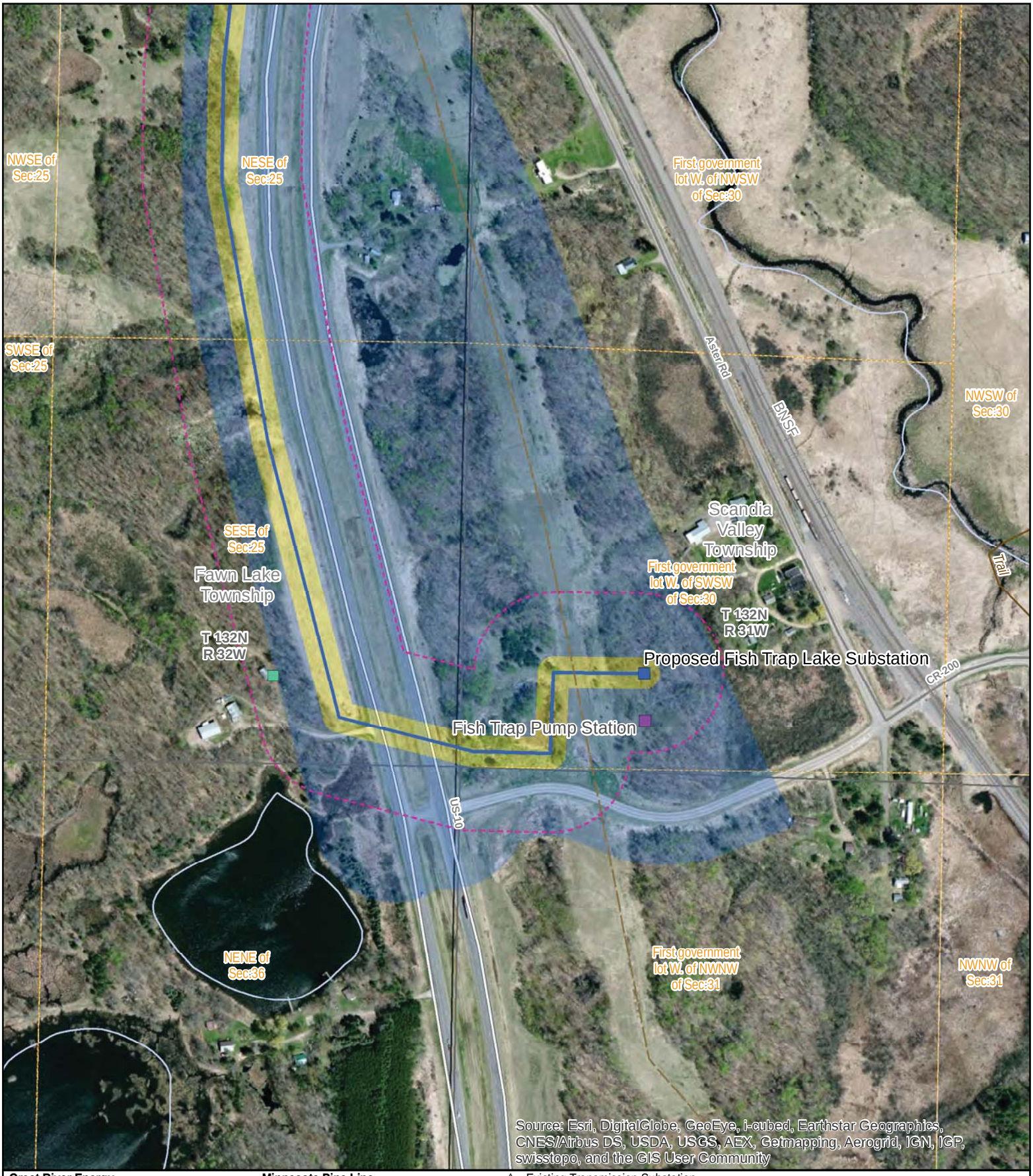
N

0 50 100 200 Feet

GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 15

GREAT RIVER ENERGY
A Touchstone Energy Cooperative



Great River Energy
- Proposed Route
- Proposed Easement Area (100' width)
- Common Route - Proposed 115 kV Line
- West Route Option - Proposed 115 kV Line
- East Route Option - Proposed 115 kV Line
- Existing Transmission Substation

Crow Wing Power
- Proposed Distribution Substation
- Existing Distribution Substation

Minnesota Pipe Line
- Proposed Pump Station
- Existing Pipeline

Minnesota Power
- Proposed Route
- Proposed Substation Expansion
- Proposed 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 115 kV Transmission Line
- Existing 34.5 kV Sub-Transmission Line

- Existing Transmission Substation
- Existing Distribution Substation

Structure
- Residence 0-50' (0)
- Residence 50-100' (0)
- Residence 100-150' (0)
- Residence 150-250' (0)
- Commercial / Industrial 50-250' (0)
- Non-Residential Building 0-250' (1)
- 250' from Alignment

Motley Area 115 kV Project
Detailed Route Maps
Map Sheet 31 of 31

N

0 50 100 200 Feet

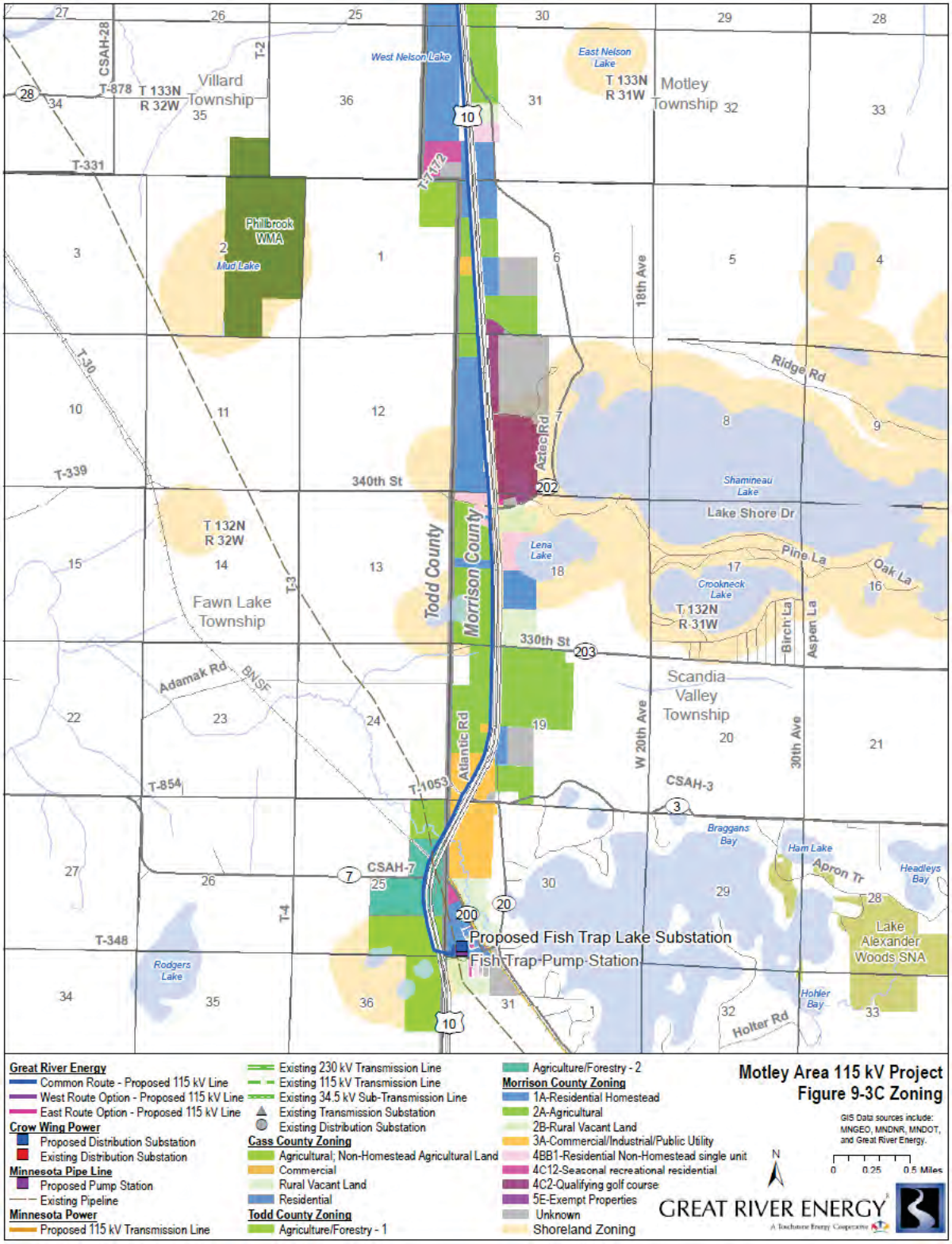
GIS Data sources include: MNGEO, MNDNR, MNDOT, and Great River Energy.

Common Route Map 16

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

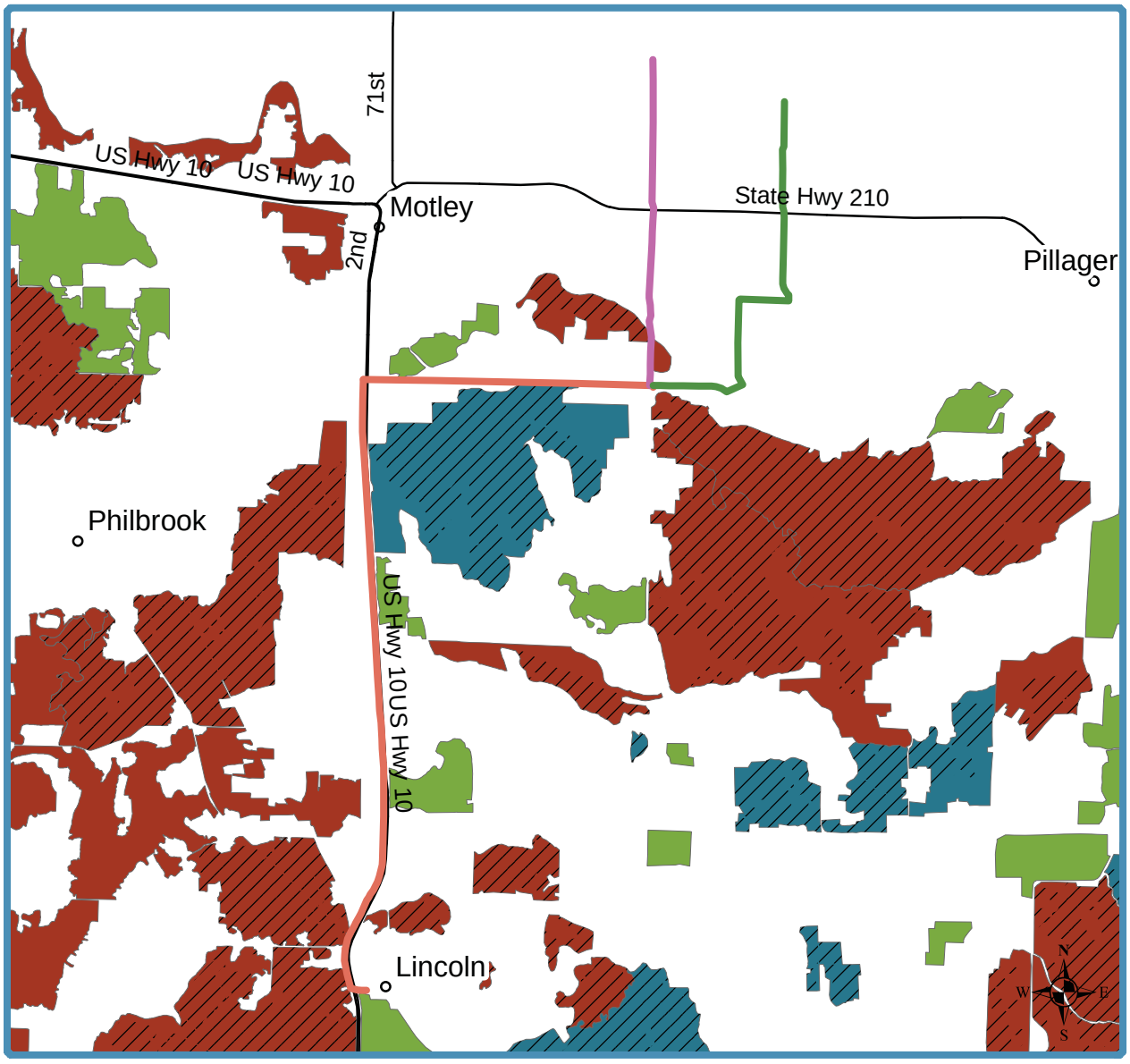
Appendix E. Resource Maps

Resource Map E1. Zoning-South



MINNESOTA DEPARTMENT OF COMMERCE

Motley Area Project
Map E2



Legend

Applicants Proposed Anticipated Alignments

- Common Route - Proposed 115 kV Transmission Line
- East Route Option - Proposed 115 kV Transmission Line
- West Route Option - Proposed 115 kV Transmission Line
- Native Plant Communities
- Roads

Sites of Biodiversity

- Below
- High
- Moderate
- Outstanding