

GREAT RIVER ENERGY

APPLICATION TO THE
MINNESOTA PUBLIC UTILITIES COMMISSION
FOR A
ROUTE PERMIT

ALTERNATIVE PERMITTING PROCESS

POTATO LAKE PROJECT

POTATO LAKE SUBSTATION
and
115 kV TRANSMISSION LINE

Docket ET2/TL-10-86



26 February 2010

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Appendix A – Commission and Agency Correspondence

Appendix B – Names of Property Owners Along the Proposed and Alternate Routes

LIST OF ACRONYMS

ACRONYMS	
AC	Alternating current
ACSR	Aluminum conductor steel reinforced
BMPs	Best Management Practices
BPA	Bonneville Power Administration
Commission	Minnesota Public Utilities Commission
Corps	United States Army Corps of Engineers
CSAH	County State Aid Highway
dB(A)	Decibel
DNR	Minnesota Department of Natural Resources
EMF	Electromagnetic fields
EPA	Environmental Protection Agency
EQB	Minnesota Environmental Quality Board
FAA	Federal Aviation Administration
G	Gauss
HVTL	High voltage transmission line
Hz	Hertz
Itasca-Mantrap	Itasca-Mantrap Cooperative Electrical Association
kV	Kilovolt
kV/m	Kilovolts per meter
mG	Milligauss
MHS	Minnesota Historical Society
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MVA	Megavolt-ampere
MW	Megawatt
NAC	Noise area classifications
NESC	National Electrical Safety Code
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
ppm	Parts per million
RF	Radio frequency
SWPPP	Stormwater Pollution Prevention Plan
USFWS	United States Fish and Wildlife Service

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Description of Application

Application for a Route Permit for a 115 kilovolt (kV) Overhead High Voltage Transmission Line (HVTL) and Associated Substation to Support Increased Load Growth in the Northern Park Rapids Area.

Pursuant to Minnesota Statutes Section 216E.04 and Minnesota Rules parts 7850.2800 to 7850.3900, Great River Energy hereby makes application to the Minnesota Public Utilities Commission (Commission) for a Route Permit for an overhead 115 kilovolt (kV) high voltage transmission line (HVTL) and associated substation in Hubbard County, Minnesota (Project) to meet the electrical needs of Great River Energy's member cooperative Itasca-Mantrap Cooperative Electrical Association (Itasca-Mantrap) customers located in the northern Park Rapids area. A route permit is required because the proposed HVTL would be capable of operating at a nominal voltage of more than 100 kV. The Application is submitted under the alternative permitting process.¹ Because the proposed line is less than 10 miles in length (7.25 miles), a certificate of need is not required.²

The Application is divided as follows:

1. **EXECUTIVE SUMMARY** –background information on Great River Energy and Itasca-Mantrap, and a brief description of the Project.
2. **INTRODUCTION** – discussion of the reason for the Project, eligibility for the alternative permitting process; explanation that a certificate of need is not required, and the notice to the Commission.
3. **PROJECT INFORMATION** – the proposed ownership of the line and associated facilities;³ the permittee for the Project, and a cost analysis of the Project including costs of construction, operation and maintenance.⁴
4. **ALTERNATIVES CONSIDERED AND REJECTED** – alternatives considered by Great River Energy and the reasons they were rejected.⁵
5. **DESCRIPTION OF THE PROPOSED PROJECT** – detailed description of the proposed Project including line specification and design and substation specifications.¹

¹ See Minn. Stat. § 216E.04 (2008) and Minn. R. 7850.1000 and 7850.1300 (2009).

² Minn. Stat § 216B.2421, Subd. 2(3) and 216B.243, requiring a certificate of need for 115 kV lines more than ten miles in length.

³ Minn. R. 7850.1900 subpt. 2(A).

⁴ Minn. R. 7850.1900 subpt. 2(K).

⁵ Minn. R. 7850.3100.

6. **ENVIRONMENTAL INFORMATION** – description of the environmental setting, effects on environmental and human resources, and mitigative measures,² including the identification of land uses and environmental conditions along the Proposed Route and the Alternate Route.
7. **ENGINEERING AND OPERATIONAL DESIGN OF PROPOSED HVTL AND SUBSTATION** – engineering and operational design concepts for the proposed Project, including electric and magnetic fields, air quality and radio/television interference.³
8. **PROPERTY/RIGHT OF WAY ACQUISITION AND RESTORATION** – existing utility and public rights of way along the Proposed Route⁴ and Alternate Route, and a description of right of way requirements, property/right of way acquisition procedures, tree clearing and right of way restoration procedures.⁵
9. **CONSTRUCTION, OPERATION AND MAINTENANCE OF THE HVTL AND ASSOCIATED SUBSTATION** –description of the procedures and practices for construction, operation and maintenance of the proposed line and substation.⁶
10. **AGENCY INVOLVEMENT, PUBLIC PARTICIPATION, AND PERMITS AND APPROVALS NEEDED** – agency contact and public participation opportunities and a list and brief description of federal, state and local permits that may be required for the proposed Project.⁷
11. **SUMMARY** –key elements of the Route Permit Application and a comparison to the established factors to be considered in evaluating this Application.⁸

¹ Minn. R. 7850.1900 subpt. 2(D).

² Minn. R. 7850.1900 subpts. 2(E-F) and 3.

³ Minn. R. 7850.1900 subpt. 2(J).

⁴ Minn. R. 7850.1900 subpt. 2(I)

⁵ Minn. R. 7850.1900 subpt. 2(M)

⁶ Minn. R. 7850.1900 subpt. 2(M)

⁷ Minn. R. 7850.1900 subpt. 2(N)

⁸ Minn. R. 7850.4100.

1. EXECUTIVE SUMMARY

1.1 General

Great River Energy is a not-for-profit generation and transmission cooperative based in Maple Grove, Minnesota. Great River Energy provides electrical energy and related services to 28 member cooperatives, including Itasca-Mantrap Cooperative Electrical Association (Itasca-Mantrap), the distribution cooperative serving the area proposed to be supplied by Great River Energy's new transmission line (Figure 1-1). Great River Energy's distribution cooperatives, in turn, supply electricity and related services to more than 639,000 residential, commercial and industrial customers in Minnesota and Wisconsin.

Great River Energy's 2,679-megawatt (MW) generation system includes a mix of baseload and peaking plants, including coal-fired, refuse-derived fuel, natural gas and oil plants as well as new wind generators. Great River Energy owns approximately 4,500 miles of transmission line in Minnesota, North Dakota, South Dakota and Wisconsin.

Itasca-Mantrap provides electricity and related services to approximately 9,200 residential, commercial and industrial customers in Minnesota. Approximately 821 residential, commercial and industrial customers in the northern Park Rapids area would benefit from the proposed Project.

Great River Energy and Itasca-Mantrap's mission is to provide safe, reliable, competitively priced energy to those they serve. Itasca-Mantrap has identified a need for a new distribution source (substation) to improve and maintain reliable service on the distribution grid north of Park Rapids. This area has seen on average, 6% growth annually from 2002 through the 2008-2009 winter.

The increase in demand from existing and new services is causing electricity delivery concerns in the area. The existing electrical system, consisting of distribution lines, transmission lines and substations, is approaching its physical limit to reliably deliver electricity to the area consumers. The Itasca-Mantrap system requires the installation of a new distribution source (substation) to boost the capability to serve additional load growth. To connect this new source to the transmission system, Great River Energy is proposing to build 7.25 miles of 115 kilovolt (kV) overhead transmission line.

This proposed new substation and new transmission line will operate at 34.5 kV for the short-term. However, because the transmission line between the Long Lake Substation and the Mantrap Substation is expected to be converted to 115 kV, Great River Energy is planning for future load growth by proposing a transmission line that is designed to 115 kV standards. As explained in more detail in Section 2, Great River Energy believes that serving the customers in this growing area with the existing 34.5 kV system is not a reasonable, long-term

solution and that a 115 kV system is the only reasonable alternative for satisfying the long-term needs of the area.

Figure 1-1 Great River Energy Service Territory



1.2 Description of the Project

Itasca-Mantrap and Great River Energy have studied the existing power service to the region and have determined that the existing distribution system has reached its capacity for serving new load growth. To address this deficiency, a new distribution delivery point (substation) from the transmission system is required to meet existing and future electric load requirements. This delivery point will require a new transmission line to interconnect it to the system.

The proposed facility additions described below will provide an additional power delivery source into the northern Park Rapids region.

1.2.1 Proposed Project

The proposed Project to address the electric delivery issues in the area includes:

- Build the proposed Potato Lake Substation as a new 115 kV substation, operating at 34.5 kV until conversion to 115 kV is necessary.
- Construct approximately 7.25 miles of new overhead 115 kV transmission line between Itasca-Mantrap's proposed Potato Lake Substation in Section 21 of Arago Township and a tap point on Great River Energy's existing Mantrap Sub Tap 34.5 kV line ("PM Line") in Lake Emma Township. The line will be operated at 34.5 kV until the surrounding system is converted to 115 kV. Along roads, the centerline will be approximately two to five feet outside road right of way.
- Remove, upgrade and attach approximately 2.25 miles of existing Itasca-Mantrap overhead distribution (12.5 kV) lines (along Highway 71 and 230th Street) to the new transmission line. New distribution lines would be underbuilt on the structures (along 230th Street and 141st Avenue) up to the intersection with CSAH 18.

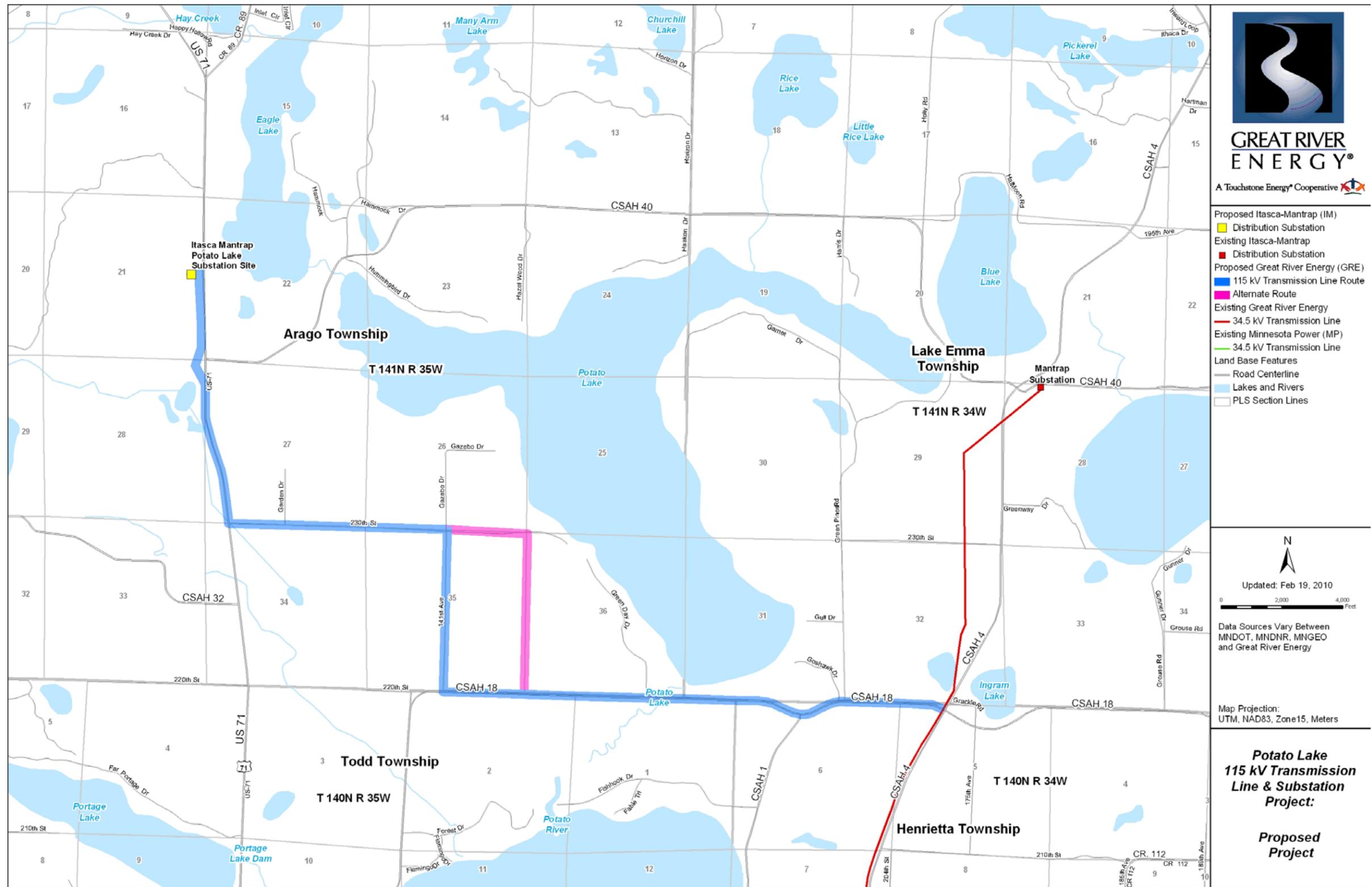
A Proposed Route and an Alternate Route for the new transmission line are described below and shown in Figure 1-2.

1.2.2 Proposed Route

The Proposed Route exits from the south side of the proposed Potato Lake Substation, runs south approximately 1.5 miles along Highway 71, east approximately 1.5 miles along 230th Street to 141st Avenue, south approximately one mile along 141st Avenue to County State Aid Highway (CSAH) 18, east approximately 3.25 miles along CSAH 18 to CSAH 4, and terminates at a proposed switch on the existing PM Line.

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Figure 1-2 Proposed Project



GREAT RIVER ENERGY®
 A Touchstone Energy® Cooperative

- Proposed Itasca-Mantrap (IM)
 - Distribution Substation
- Existing Itasca-Mantrap
 - Distribution Substation
- Proposed Great River Energy (GRE)
 - 115 kV Transmission Line Route
 - Alternate Route
- Existing Great River Energy
 - 34.5 kV Transmission Line
- Existing Minnesota Power (MP)
 - 34.5 kV Transmission Line
- Land Base Features
 - Road Centerline
 - Lakes and Rivers
 - PLS Section Lines

N

Updated: Feb 19, 2010

0 2,000 4,000 Feet

Data Sources Vary Between MNDOT, MNDNR, MNGEO and Great River Energy

Map Projection: UTM, NAD83, Zone15, Meters

**Potato Lake
 115 kV Transmission
 Line & Substation
 Project:**

**Proposed
 Project**

Approximately 2.25 miles of existing Itasca-Mantrap overhead distribution (12.5 kV) lines (along Highway 71 and 230th Street) would be attached to the new transmission line. New distribution lines would be underbuilt on the structures (along 230th Street and 141st Avenue) up to the intersection with CSAH 18.

1.2.3 Alternate Route

The Proposed Route was presented at a public open house on October 22, 2009. During the open house, members of the public suggested an Alternate Route that is shown in pink on Figure 1-2. This Alternate Route, which is also approximately 7.25 miles, is similar to the Proposed Route for about the first three miles but continues east along 230th Street an additional one-half mile, then turns south one mile along Sections 35 and 36 to CSAH 18, where it rejoins the Proposed Route.

Approximately 2.25 miles of existing Itasca-Mantrap overhead distribution (12.5 kV) lines (along Highway 71 and 230th Street) would be attached to the new transmission line. New distribution lines would be underbuilt on the structures (along 230th and the cross-country segment between Sections 35 and 36) up to the intersection with CSAH 18.

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2. INTRODUCTION

2.1 Need for the Project

Itasca-Mantrap serves the electric needs of the areas north of the City of Park Rapids. The existing Itasca-Mantrap distribution system serving the area has reached its capacity limit based on continued growth of electric demand. Electric load in the area has shown an average growth of over six percent per year over the last several years, with moderate growth expected to continue. This growth is anticipated to further reduce the existing system's reliability and could lead to potential brownouts, rotating blackouts and safety concerns based on failure of overloaded facilities.

Great River Energy, generation and transmission provider to Itasca-Mantrap, has received a request from Itasca-Mantrap to interconnect a new Potato Lake Substation to the transmission system. As transmission provider to its member distribution cooperatives, Great River Energy is obligated to provide this transmission interconnection to Itasca-Mantrap.

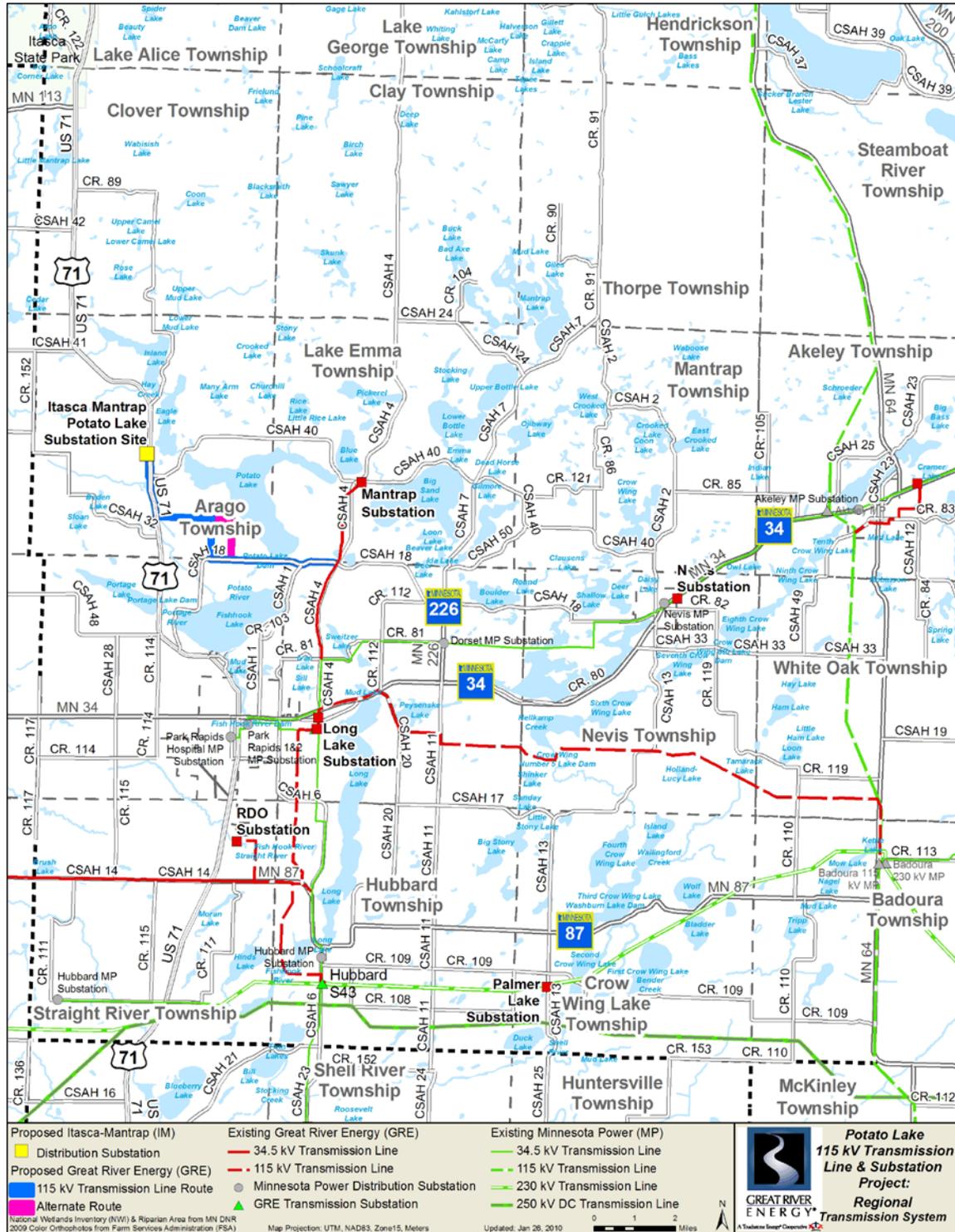
Great River Energy has analyzed the existing transmission system that serves the region and has determined 115 kV transmission is required to provide interconnection to the Potato Lake Substation. With moderate load growth rates anticipated to continue in the area, Great River Energy has determined that the existing 34.5 kV system that serves the area will eventually not be able to support the area load, thus a higher voltage would be required to provide adequate system support. Thus, Great River Energy is planning to construct the Potato Lake transmission line to 115 kV specifications and operate it at 34.5 kV until conversion to 115 kV becomes necessary. Traditionally, 115 kV transmission has been more reliable than other lower voltage options due to increased ground clearances and insulation levels.

2.1.1 Transmission System Description

The northern Park Rapids region is presently served from the 34.5 kV system sourced from the Long Lake and Akeley 115/34.5 kV substations. Minnesota Power owns a majority of this system while Great River Energy owns radial lines off the Minnesota Power system (shown in Figure 2-1).

The 34.5 kV system that serves the area is relatively weak when the Mantrap Substation is served solely from the Akeley 115/34.5 kV Substation. Eventually, during high load conditions, the load in the Potato Lake area may not be able to be served if there is an outage on the Minnesota Power "540" Line that is located along CSAH 4 between Park Rapids and County Road 81. The risk for brownouts and overloaded equipment is expected to become greater with continued growth in system demand.

Figure 2-1 Regional Transmission System



Great River Energy and Minnesota Power have been installing devices called capacitors in the area to help maintain the voltage on the 34.5 kV system. Capacitors are only a short-term solution in areas where rapid load growth has occurred, such as the northern Park Rapids area. There are currently five capacitors on this system. Although there are no strict limits as to the number of capacitors that are allowed on a particular part of the electric system, there is a limit to the number of capacitors that can be added due to capacitor coordination, overvoltage concerns and capacity issues. As the number of capacitor installations increases, coordination of the capacitor bank switching becomes more cumbersome, as there is a greater chance that capacitors will continually switch on and off (creating excessive voltage swings on the system). Excessively high system voltages can also occur with multiple capacitor installations while performing switching during outages. This is a concern as high system voltages create the possibility of electrical equipment damage (both utility- and consumer-owned). Additionally, having too many capacitors on the lines will potentially reduce the amount of capacity on the system, limiting delivery of power.

To address the expected deficiencies on the transmission system, Great River Energy is permitting the Potato Lake transmission line for 115 kV construction and operation. This will allow for future flexibility for voltage conversion to handle additional load growth beyond what the 34.5 kV system can reliably serve. Furthermore, analysis in the 2008 Great River Energy Long-Range Transmission Plan indicates that a conversion to 115 kV operation on the Mantrap and Potato Lake substations plus a looped 115 kV transmission system may be needed in the future as system demand continues to grow. Constructing the Potato Lake transmission line to 115 kV standards will ensure that this line could be easily integrated into such a system in the future. Current estimates place the 115 kV conversion at about 4-5 years in the future and the 115 kV loop development at about 10-15 years from today.

2.1.2 Load Growth Data

Great River Energy and Minnesota Power currently serve the area through the Long Lake and Akeley 115/34.5 kV substations that deliver power to the local Itasca-Mantrap load-serving distribution substations (Mantrap and Long Lake, with service provided by Itasca-Mantrap).

The expected electrical demand by substation is shown in Table 2-1.

Table 2-1 Historic and Expected Winter Electrical Demand (MW) by Substation

Distribution Substation	2002	2003	2004	2005	2006	2007	2008	Historical Annual Average Growth	2013 Projection	2018 Projection	Projected Annual Average Growth
Mantrap	6.8	6.6	7.0	8.2	9.5	9.8	10.2	6.92%	11.8	13.7	3.0%
Long Lake	7.4	7.5	7.5	9.3	10.0	10.0	10.1	5.41%	11.8	13.6	3.0%
Totals	14.2	14.1	14.5	17.5	19.5	19.8	20.3	6.15%	23.6	27.3	3.0%
% Yearly Growth	-	-0.70%	2.84%	20.69%	11.43%	1.54%	2.58%				

Population growth data in Hubbard County confirm this development trend and ongoing increase in demand, as shown below in Table 2-2. Population increased 11 percent in Hubbard County from 1995 to 2008. These data also make it clear that increased electric demand is virtually guaranteed even if individual customers consume no more than average historical levels of energy. The reality, however, is that the projected electric demand growth will require increased levels of transmission and distribution capacity.

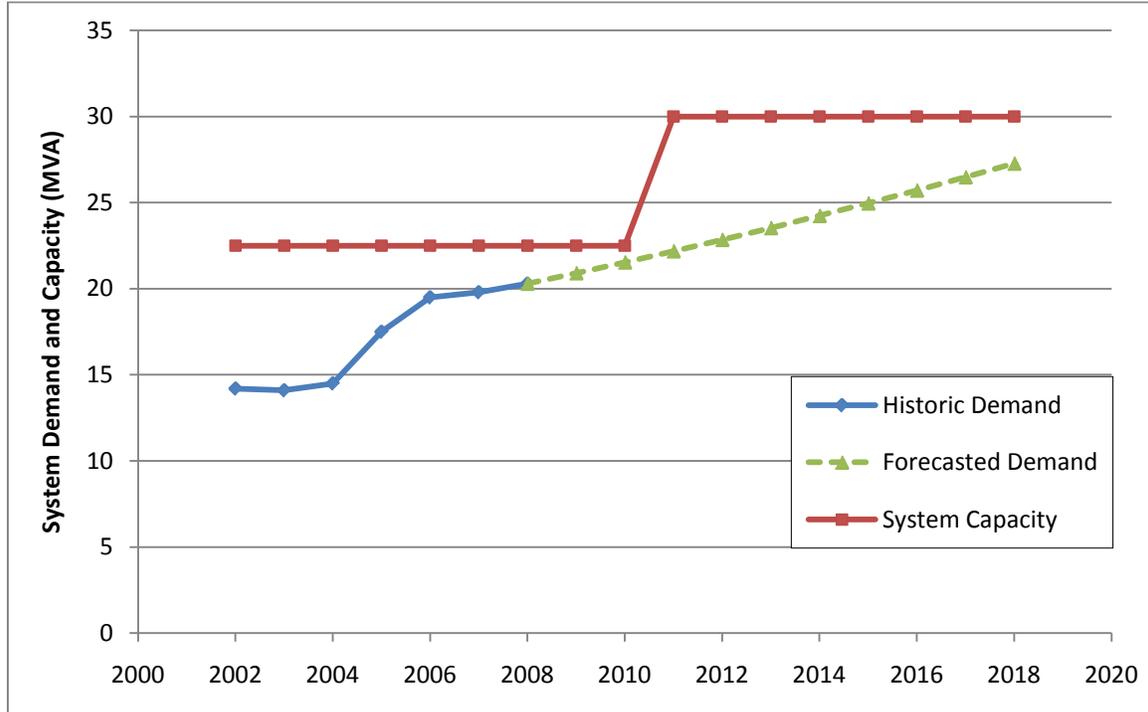
Table 2-2 Population Growth in Hubbard County

Year	Hubbard County
1995	16,569
2008	18,810

2.1.3 Proposed Project

The proposed Potato Lake 115 kV Project would increase the Project area's capacity for serving additional system load by providing three area distribution sources (Mantrap, Long Lake and Potato Lake) instead of two. These facilities represent 30 megavolt-amperes (MVA) of power delivery capability based on both system intact and contingent scenarios. This capacity addition is projected to meet the local distribution capacity needs for a minimum of 10 years if present load growth patterns are maintained. The projected capability of the system is based on the Itasca-Mantrap substation transformation capacity and on 2008 load modeling that is interpolated for the area load growth projection. With these assumptions, the capacity of the system is approximately 30 MVA, which is 7.5 MVA greater than the existing capacity of 22.5 MVA (see Figure 2-2).

Figure 2-2 Yearly Adjusted Net Demand/Capability



2.2 Certificate of Need Not Required

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

2.3 Eligibility for the Alternative Permitting Process

The Potato Lake Project involves construction of a new 115 kV transmission line and associated facilities. Because the proposed transmission line project is between 100 kV and 200 kV, it is eligible for review under the alternative permitting process authorized by Minnesota Statutes Section 216E.04, subd. 2(3) and Minnesota Rules 7850.2800, subp. 1(c). Great River Energy requests that the Project be considered for review under the alternate permitting process.

The permit application requirements are listed in Table 2-3. This table includes cross-references indicating the location of required information contained within the Potato Lake Project Route Permit Application.

¹ Minn. Stat. § 216B.2421, subd. 2(3) (2006).

Table 2-3 Completeness Checklist

Authority	Required Information	Where
Minn. R. 7850.2800, Subp. 1(C)	Subpart 1. Eligible Projects. An applicant for a site permit or a route permit for one of the following projects may elect to follow the procedures of parts 7850.2800 to 7850.3900 instead of the full permitting procedures in parts 7850.1700 to 7850.2700 for high voltage transmission lines of between 100 and 200 kilovolts	2.3
Minn. R. 7850.2800, Subp. 2.	Subpart 2. Notice to Commission. An applicant for a permit for one of the qualifying projects in subpart 1, who intends to follow the procedures of parts 7850.2800 to 7850.3700, shall notify the PUC of such intent, in writing, at least 10 days before submitting an application for the project	2.4 & Appendix A
Minn. R. 7850.3100	Contents of Application (alternative permitting process) The applicant shall include in the application the same information required in part 7850.1900, except the applicant need not propose any alternative sites or routes to the preferred site or route. If the applicant has rejected alternative sites or routes, the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them	Section 4.1 Figure 4-1 (See also 7850.1900, Subp.2 below)
Minn. R. 7850.1900, subp. 2 (applicable per Minn. R. 7850.3100)	Route Permit for HVTL (a) a statement of proposed ownership of the facility at the time of filing the application and after commercial operation	Section 3.1
	(b) the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated	Section 3.2
	c) at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference	Not applicable, per Minn. R. 7850.3100
	(d) a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line	Sections 1.2, 5.1, 5.2 Figures 1-2, 3-1, 5-1 to 5-9, 7-1
	(e) the environmental information required under 7850.1900, Subp. 3	See Minn. R. 7850.1900, subp. 3 (A)-(H) below
	(f) identification of land uses and environmental conditions along the proposed routes	Section 6 Figures 6-1 to 6-6
	(g) the names of each owner whose property is within any of the proposed routes for the high voltage transmission line	Section 10.2 & Appendix B
	(h) United States Geological Survey topographical maps or other maps acceptable to the chair showing the entire length of the high voltage transmission line on all proposed routes	Figure 1-2
	(i) identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share right-of-way with the proposed line	Section 8.1
	(j) the engineering and operational design concepts for the proposed high voltage transmission line, including information on the electric and magnetic fields of the transmission line	Sections 7.1-7.5 Tables 7-1 and 7-2 Figures 7-1 to 7-9
	(k) cost analysis of each route, including the costs of constructing, operating and maintaining the high voltage transmission line that are dependent on design and route	Section 3.5 Table 3-2

Authority	Required Information	Where
	(l) a description of possible design options to accommodate expansion of the high voltage transmission line in the future	Section 5.3
	(m) the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction and maintenance of the high voltage transmission line	Sections 8.2-8.5 Figure 8-1
	(n) a listing and brief description of federal, state and local permits that may be required for the proposed high voltage transmission line	Section 10.3 Table 10-1
	(o) a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required	Section 2.2 (Not Required)
Minn. R. 7850.1900, subp. 3	Environmental Information (a) a description of the environmental setting for each site or route	Section 6.1
	(b) a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation and public services	Section 6.2 Figure 6-1
	(c) a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism and mining	Section 6.3 Figure 6-2
	(d) a description of the effects of the facility on archaeological and historic resources	Section 6.4
	(e) a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna	Sections 6.5 – 6.7 Figure 6-3
	(F) a description of the effects of the facility on rare and unique natural resources	Section 6.5.4 Figure 6-4
	(g) identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route	Section 6
	(h) a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures	Section 6
Minn. R. 7850.2100, subp. 2 (applicable per Minn. R. 7850.3300)	Notice of Project Notification to persons on PUC's general list, to local officials and to property owners	Will be mailed within 15 days of application submission
Minn. R. 7850.2100, subp 4	Publication of notice in a legal newspaper of general circulation in each county in which the route is proposed to be located.	Will be published within 15 days of application submission
Minn. R. 7850.2100. subp. 5	Confirmation of notice by affidavits of mailing and publication with copies of the notices	Will be submitted within 30 days of notice being mailed and published
Minn. R. 7850.4100	Factors to be Considered in Permitting a HVTL (a) effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation and public services	Section 11
	(b) effects on public health and safety	Section 11

Authority	Required Information	Where
	(c) effects on land-based economies, including, but not limited to, agriculture, forestry, tourism and mining	Section 11
	(d) effects on archaeological and historic resources	Section 11
	(e) effects on the natural environment, including effects on air and water quality resources and flora and fauna	Section 11
	(f) effects on rare and unique natural resources	Section 11
	(g) application of design options that maximize energy efficiencies, mitigate adverse environmental effects and could accommodate expansion of transmission or generating capacity	Section 11
	(h) use or paralleling of existing rights-of-way, survey lines, natural division lines and agricultural field boundaries	Section 11
	(i) use of existing large electric power generating plant sites	Section 11
	(j) use of existing transportation, pipeline and electrical transmission systems or rights-of-way	Section 11
	(k) electrical system reliability	Section 11
	(l) costs of constructing, operating and maintaining the facility which are dependent on design and route	Section 11
	(m) adverse human and natural environmental effects which cannot be avoided	Section 11
	(n) irreversible and irretrievable commitments of resources	Section 11
Minn. R. 7850.4300, subps. 1 and 2	<p>Prohibited Routes</p> <p>Wilderness areas. No high voltage transmission line may be routed through state or national wilderness areas</p> <p>Parks and natural areas. No high voltage transmission line may be routed through state or national parks or state scientific and natural areas unless the transmission line would not materially damage or impair the purpose for which the area was designated and no feasible and prudent alternative exists. Economic considerations alone do not justify use of these areas for a high voltage transmission line</p>	Not Applicable
Minn. Stat. §216E.03, subd. 7 (applicable per Minn. Stat. §216E.04, subd. 8)	<p>Considerations in designating sites and routes</p> <p>(1) Evaluation of research and investigations relating to the effects on land, water and air resources of large electric power generating plants and high voltage transmission lines and the effects of water and air discharges and electric and magnetic fields resulting from such facilities on public health and welfare, vegetation, animals, materials and aesthetic values, including base line studies, predictive modeling and evaluation of new or improved methods for minimizing adverse impacts of water and air discharges and other matters pertaining to the effects of power plants on the water and air environment</p>	Sections 6.2.1, 6.2.4, 6.2.5, 6.5 - 6.7, 7.3, 7.4
	(2) Environmental evaluation of sites and routes proposed for future development and expansion and their relationship to the land, water, air and human resources of the state	Section 11 (G)
	(3) Evaluation of the effects of new electric power generation and transmission technologies and systems related to power plants designed to minimize adverse environmental effects	Not applicable
	(4) Evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants	Not applicable
	(5) Analysis of the direct and indirect economic impact of proposed sites and routes including, but not limited to, productive agricultural land lost or impaired	Sections 6.3.1, 6.6 & 6.7

Authority	Required Information	Where
	(6) Evaluation of adverse direct and indirect environmental effects that cannot be avoided should the proposed site and route be accepted	See all of the effects identified in Section 6 & Section 11
	(7) Evaluation of alternatives to the applicant's proposed site or route proposed pursuant to subdivisions 1 and 2	Not applicable to alternative process
	(8) Evaluation of potential routes that would use or parallel existing railroad and highway rights-of way	Sections 8.1 & 11 (H)
	(9) Evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations	Sections 6.3.1 & 11 (H)
	(10) Evaluation of the future needs for additional high voltage transmission lines in the same general area as any proposed route and the advisability of ordering the construction of structures capable of expansion in transmission capacity through multiple circuiting or design modifications	Sections 5.3 & 11 (G)
	(11) Evaluation of irreversible and irretrievable commitments of resources should the proposed site or route be approved	Section 11 (N)
	(12) When appropriate, consideration of problems raised by other state and federal agencies and local entities	Sections 6 & 10.1

2.4 Notice to the Commission

The Commission was notified by a letter dated and efiled 28 January 2010 that Great River Energy intended to utilize the alternative permitting process for the proposed Potato Lake Project.¹ This notice complies with the requirement to notify the Commission at least ten days prior to submission of an application.² A copy of this letter is included in Appendix A.

¹ Minn. Stat. § 216E.04 (2006) and Minn. R. 7850.2800 (2007).

² Minn. R. 7850.2800, Subpt. 2 (2007).

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3. PROJECT INFORMATION

3.1 Proposed Ownership

Great River Energy will own the approximately 7.25 miles of single circuit 115 kV overhead transmission line that will proceed from the proposed Potato Lake Substation south and then east to the proposed switch on the PM Line.

Great River Energy will have a permanent easement for the high voltage (115 kV) transmission facilities and control building (for metering, instrumentation, telecommunications and the battery bank) that it will own and operate separately.

Itasca-Mantrap will own the proposed Potato Lake Substation and has purchased 3.2 acres of land on which to construct the new facility. Itasca-Mantrap will own and operate all the low voltage distribution facilities and will own all common facilities (land, fence, etc.).

Contact information for Itasca-Mantrap is provided below.

Contact: Tony Nelson
Phone: (218) 732-0695
Fax: (218) 732-1379
Email: tnelson@itasca-mantrap.com

3.2 Permittee

Great River Energy will be named as permittee for this Project. Transfer of the permit to any other person or organization is not anticipated.

Contact information for Great River Energy is provided below.

Permittee: Great River Energy
12300 Elm Creek Blvd.
Maple Grove, Minnesota 55369
Contact: Marsha Parlow
Phone: (763) 445-5215
Fax: (763) 445-5246
Email: mparlow@grenergy.com

3.3 Project Location

The proposed Potato Lake 115 kV Project is located north of Park Rapids in Hubbard County, Minnesota (Figure 3-1). Table 3-1 identifies the political entities located within the Potato Lake Project area.

Table 3-1 Political Entities in the Potato Lake Project Area

County	Township	Sections	Township	Range
Hubbard	Arago	21, 22, 27, 28, 34, 35, 36	141 N	35 W
Hubbard	Lake Emma	31, 32	141 N	34 W
Hubbard	Todd	1, 2	140 N	35 W
Hubbard	Henrietta	5, 6	140 N	34 W

3.4 Project Schedule

Construction is expected to begin on the Potato Lake Project in early 2011. This date may vary depending on the easement acquisition process. Great River Energy hopes to complete construction by the summer of 2011, and anticipates an in-service date of August 2011.

3.5 Project Cost Analysis

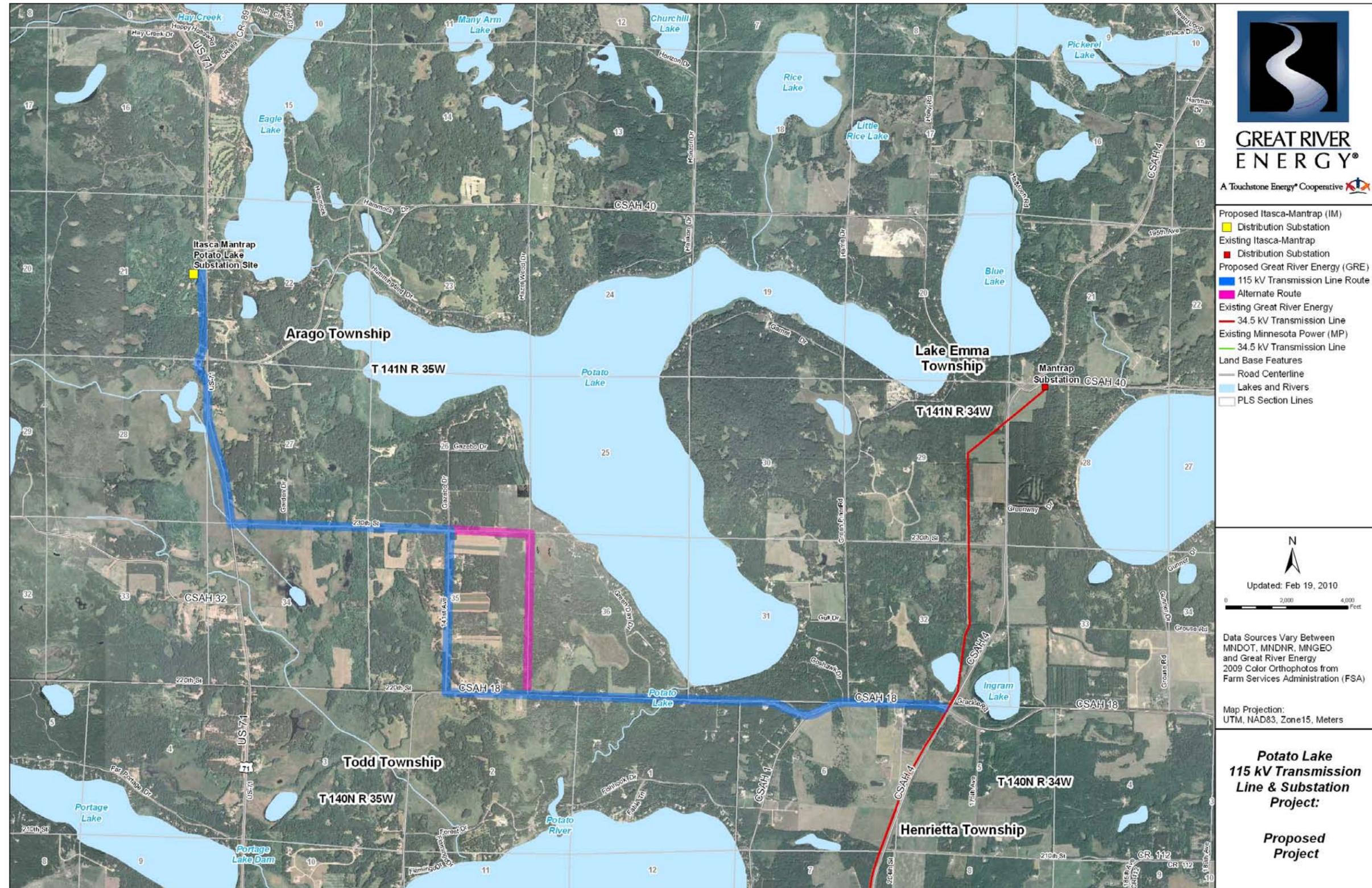
3.5.1 Project Costs

Estimates for the proposed transmission line are divided into pre- and post-construction costs, construction costs, and operation and maintenance costs. Pre- and post-construction costs include expenditures for permitting, surveying (land and cultural resources), right of way acquisition, right of way clearing and right of way restoration. Construction costs include substation and transmission line construction. Great River Energy and Itasca-Mantrap also evaluate the operation and maintenance costs associated with the Project after it is placed in service.

3.5.2 Pre- and Post-Construction Costs

Preconstruction costs include labor and expenses for preparation and approval of the Application, public information meetings, public hearings, cultural resource surveys if required, licensing or permitting fees, easement and land acquisition for approximately 7.25 miles of transmission line right of way and 3.2 acres for the substation, and the cost of right of way clearing. Post-construction costs include the restoration and revegetation of disturbed soils after construction of the Project is complete.

Figure 3-1 Proposed Project



3.5.3 Construction Costs

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

The single pole with underbuild construction costs are approximately \$370,000 per mile. This design is more expensive because of additional costs incurred by removing the existing lower voltage circuit and reattaching it to the new poles. There are also more structures per mile because of the shorter average span length. The H-Frame and the single pole (without underbuild) costs are approximately \$290,000 per mile.

There may be areas where construction is more difficult (e.g. where there are access issues or where greater span lengths must be employed to avoid sensitive features). In these areas the use of wooden mats, the Dura-Base Composite Mat System, or specialized construction vehicles to minimize environmental impacts during line construction may be required and could increase costs by approximately \$50,000 per mile.

The estimated Project costs are shown in Table 3-2.

Table 3-2 Estimated Project Costs (2009 Dollars)

Route	Estimated Pre- and Post- Construction Costs \$	Estimated Construction Costs - 115 kV Transmission Line \$	Estimated Substation Costs \$	Total Project Cost \$
Proposed Route (7.25 miles)	1,195,959	2,375,533	850,000	4,421,492
Alternate Route (7.25 miles)	1,215,959	2,395,533	850,000	4,461,492

All costs for the transmission line will be borne by Great River Energy. The proposed Potato Lake Substation costs will be borne by Itasca-Mantrap.

3.5.4 Operation and Maintenance Costs

Once constructed, operation and maintenance costs associated with the proposed Potato Lake 115 kV Substation will be minimal, other than weed control inside the substation.

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

In addition to these right of way maintenance costs, annual operating and maintenance costs associated with 115 kV transmission lines in Minnesota currently average about \$600 per mile. Storm restoration, annual inspections and ordinary replacement costs are included in these annual operating and maintenance costs.

4. ALTERNATIVE ROUTES CONSIDERED AND REJECTED

Minnesota permitting rules require that if any alternative routes or sites have been rejected "... the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them." ¹

4.1 Alternative Routes Considered

Alternatives to the Proposed Route that were evaluated by Great River Energy are described below and shown on Figure 4-1.

The alternative routes evaluated were reviewed and analyzed both in the field and using aerial photography and land-based maps that show natural features such as lakes, streams and wetlands. The routes that followed existing right of way corridors were preferred to cross-country routes.

4.1.1 Northern Alternative Route

A northern route alternative that started at the proposed Potato Lake Substation, ran south to CSAH 40, and continued east along CSAH 40 to the Mantrap Substation on CSAH 40 was evaluated. CSAH 40 is the main east-west roadway along the north side of Potato Lake.

The westerly segment of CSAH 40 has numerous curves and a significant amount of wetlands adjacent to the roadway, including the crossing of an outlet from Eagle Lake to Potato Lake. To navigate along this route, the transmission line design would require primarily light angle structures to follow along the curve of the existing road. These types of structures require down guys and in areas where guying is an issue, specially designed structures such as laminated wood poles and/or steel poles would be needed instead. This route also crosses many wetland areas, which causes concern because the suitability of underlying soils is unknown. In the event of very poor soils, specially designed steel poles on concrete pier foundations would likely be needed.

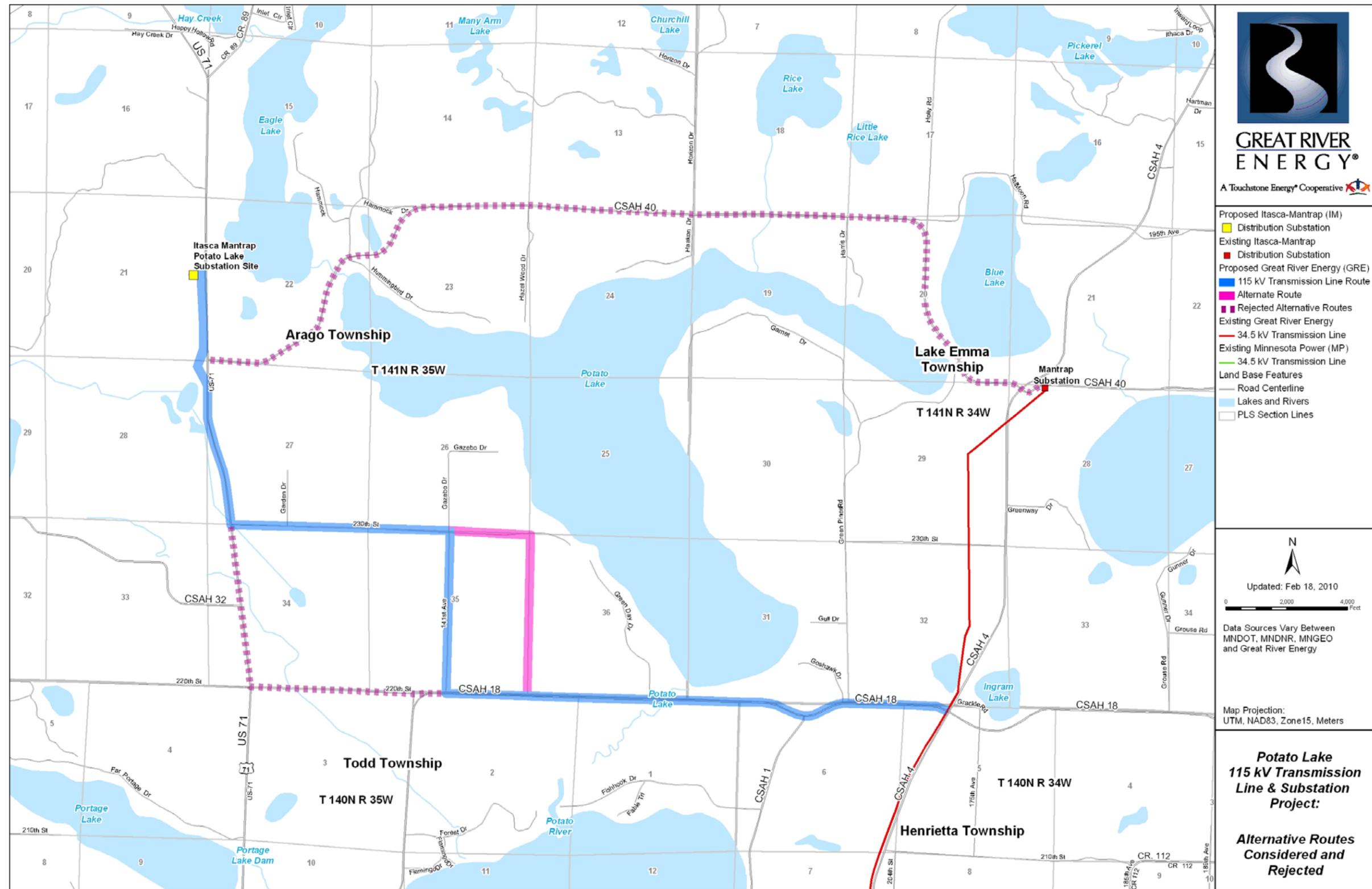
The easterly segment of CSAH 40 traverses a constricted point in which Potato Lake and Blue Lake are within approximately 200 feet on each side of the road. In this area, the majority of the lakefront property has been improved with residential or seasonal structures, including resort properties on the Potato Lake side.

This route was rejected based on engineering issues due to the difficulty in following along CSAH 40 and because there are more wetlands with unknown soil suitability. In addition, this alternative is closer in proximity to recreational snowmobile trails that could be affected if guying of structures is necessary.

¹ Minn. R. 7850.3100 (2007).

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Figure 4-1 Alternative Routes Considered and Rejected



4.1.2 Southwestern Alternative Route

A southwestern route alternative that continues southerly along US Highway 71 for one mile, then heads east on a cross-country route to the Proposed Route on CSAH 18 was also evaluated.

This route was rejected based on access issues and soil suitability concerns in the Tamarac swamp. Access to the line for maintenance or in an emergency would be difficult for the majority of the year in unfrozen conditions.

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5. DESCRIPTION OF THE PROPOSED PROJECT

Great River Energy is proposing the following transmission project in the Potato Lake area:

- Build the proposed Potato Lake Substation as a new 115 kV substation, operating at 34.5 kV until conversion to 115 kV is necessary.
- Construct approximately 7.25 miles of new overhead 115 kV transmission line between Itasca-Mantrap's proposed Potato Lake Substation in Section 21 of Arago Township and a tap point on Great River Energy's existing Mantrap Sub Tap 34.5 kV line ("PM Line") in Lake Emma Township. The line will be operated at 34.5 kV until the surrounding transmission system is converted to 115 kV. Along roads, the centerline will be approximately two to five feet outside of the road right of way.
- Remove, upgrade and attach approximately 2.25 miles of existing Itasca-Mantrap overhead distribution (12.5 kV) lines (along Highway 71 and 230th Street) to the new transmission line. The right of way width of the existing distribution line is 50 feet (25 feet each side of the centerline).
- New distribution lines would be underbuilt on the structures (along 230th Street and 141st Avenue) up to the intersection with CSAH 18.

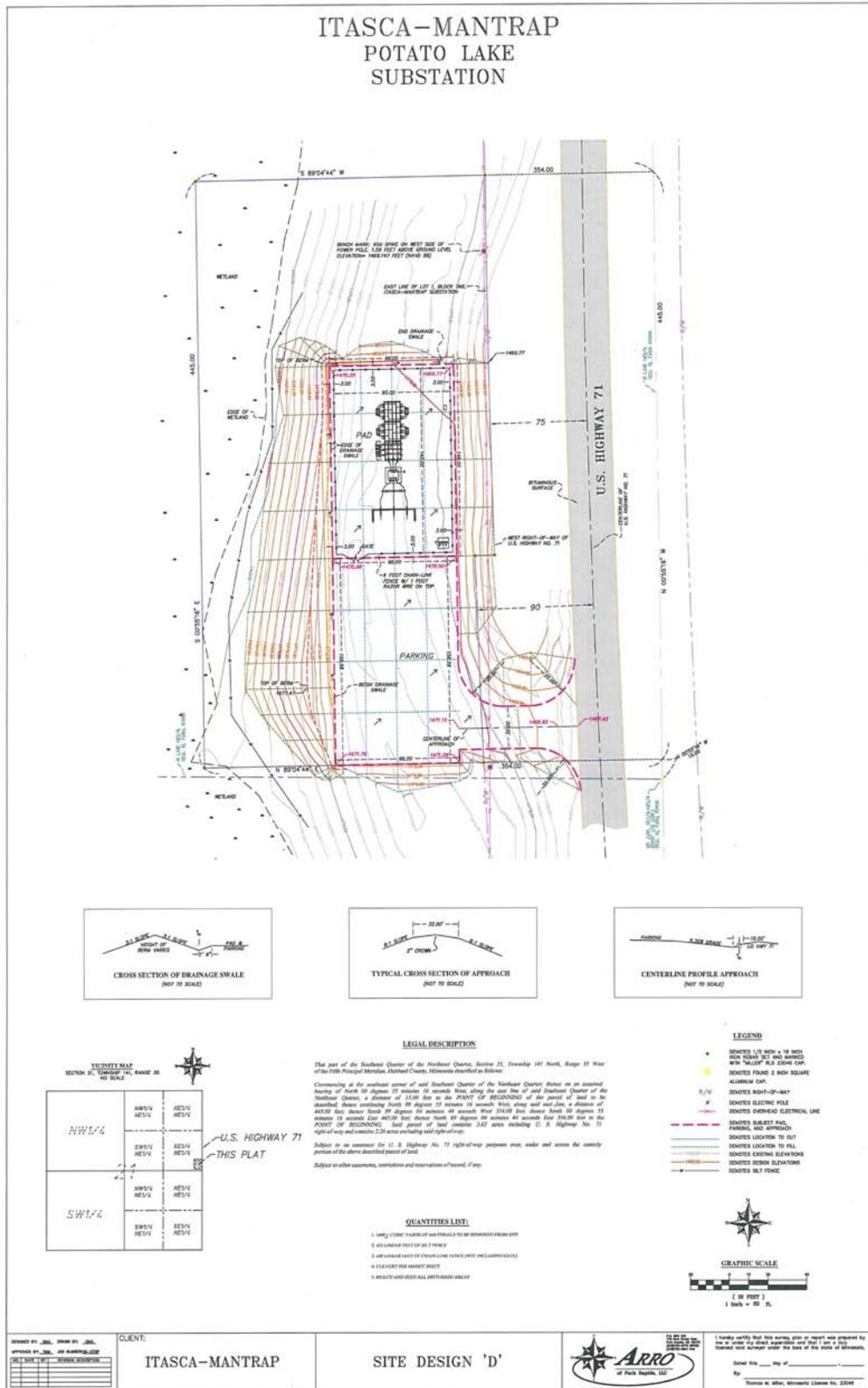
These transmission improvements are discussed in more detail below.

5.1 Potato Lake Substation

The proposed Potato Lake Substation (Figure 5-1) will be owned by Itasca-Mantrap and will be located in Section 21, Township 141N, Range 35W in Arago Township. The fenced-in area of the substation will be 96 feet by 146 feet on a 3.2 acre parcel. Itasca-Mantrap has purchased 3.2 acres of the land and will own all common facilities (land, fence, etc.).

Great River Energy will own and operate all the high voltage (115 kV) transmission facilities and the control building, which contains metering and telecommunications equipment, instrumentation and the battery bank.

Figure 5-1 Layout of Proposed Potato Lake Substation



5.2 Transmission Line

5.2.1 Route Selection Process

The proposed 7.25 miles of overhead 115 kV transmission line and proposed Potato Lake 115 kV Substation were reviewed during the electrical planning process by a team comprised of transmission planning, right of way, environmental and engineering design personnel. The team reviewed the general Project area for significant routing and siting issues that may arise, as well as any electric system performance issues associated with the various route alternatives. Route alternatives were identified using the process described below with a Proposed Route selected for this Application in accordance with Minnesota Rules part 7850.3100 (2009). One Alternate Route suggested by landowners at the open house held by the Great River Energy in October 2009 is also included in the Application. Rejected route alternatives are discussed in Section 4.

5.2.2 Route Selection Criteria

The siting team analyzed the Project area using various geographic data (e.g., aerial photos, topographic maps, public water inventory maps, etc.) and input from local government representatives and the public. Preliminary route options were then identified based on opportunities to:

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

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

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

5.2.3 Proposed Route

The Proposed Route for which Great River Energy is requesting a permit from the Commission exits the proposed Potato Lake Substation next to Highway 71, proceeds south paralleling Highway 71 for approximately 1.5 miles to the intersection of Highway 71 and 230th Street (Northern Pine Road), east along 230th Street for approximately 1.5 miles, south along 141st Avenue (Township Road 20) for approximately one mile to CSAH 18, then east 3.25 miles on CSAH 18 to CSAH 4 and the proposed 3-way switch on the existing PM Line as shown in Figures 5-2 to 5-7.

5.2.4 Alternate Route

The Alternate Route suggested at the public open house exits the proposed Potato Lake Substation next to Highway 71, proceeds south paralleling Highway 71 for approximately 1.5 miles to the intersection of Highway 71 and 230th Street, east along 230th Street for approximately two miles, south one mile (cross-country) along the section lines of 35 and 36 to CSAH 18, then east 2.75 miles to CSAH 4 and the proposed 3-way switch on the existing PM Line as shown in Figures 5-8 and 5-9.

5.2.5 Route Width Requested

Great River Energy requests that the Commission approve a 300 foot route that extends 150 feet on either side of the road centerlines to allow flexibility to work with landowners on the alignment and to accommodate environmental concerns.

Figure 5-2 Proposed Route Map 1



GREAT RIVER ENERGY®

A Touchstone Energy® Cooperative

- Proposed Itasca-Mantrap (IM)
 - Distribution Substation
- Existing Itasca-Mantrap
 - Distribution Substation
- Proposed Great River Energy (GRE)
 - 115 kV Transmission Line Route
- Existing Great River Energy
 - 34.5 kV Transmission Line
- Existing Minnesota Power (MP)
 - 34.5 kV Transmission Line
- Land Base Features
 - Road Centerline
 - PLS Section Lines



Updated: Feb 19, 2010



Data Sources Vary Between MNDOT, MNDNR, MNGEO and Great River Energy 2009 Color Orthophotos from Farm Services Administration (FSA)

Map Projection: UTM, NAD83, Zone15, Meters

Potato Lake 115 kV Transmission Line & Substation Project:

Route Map 01

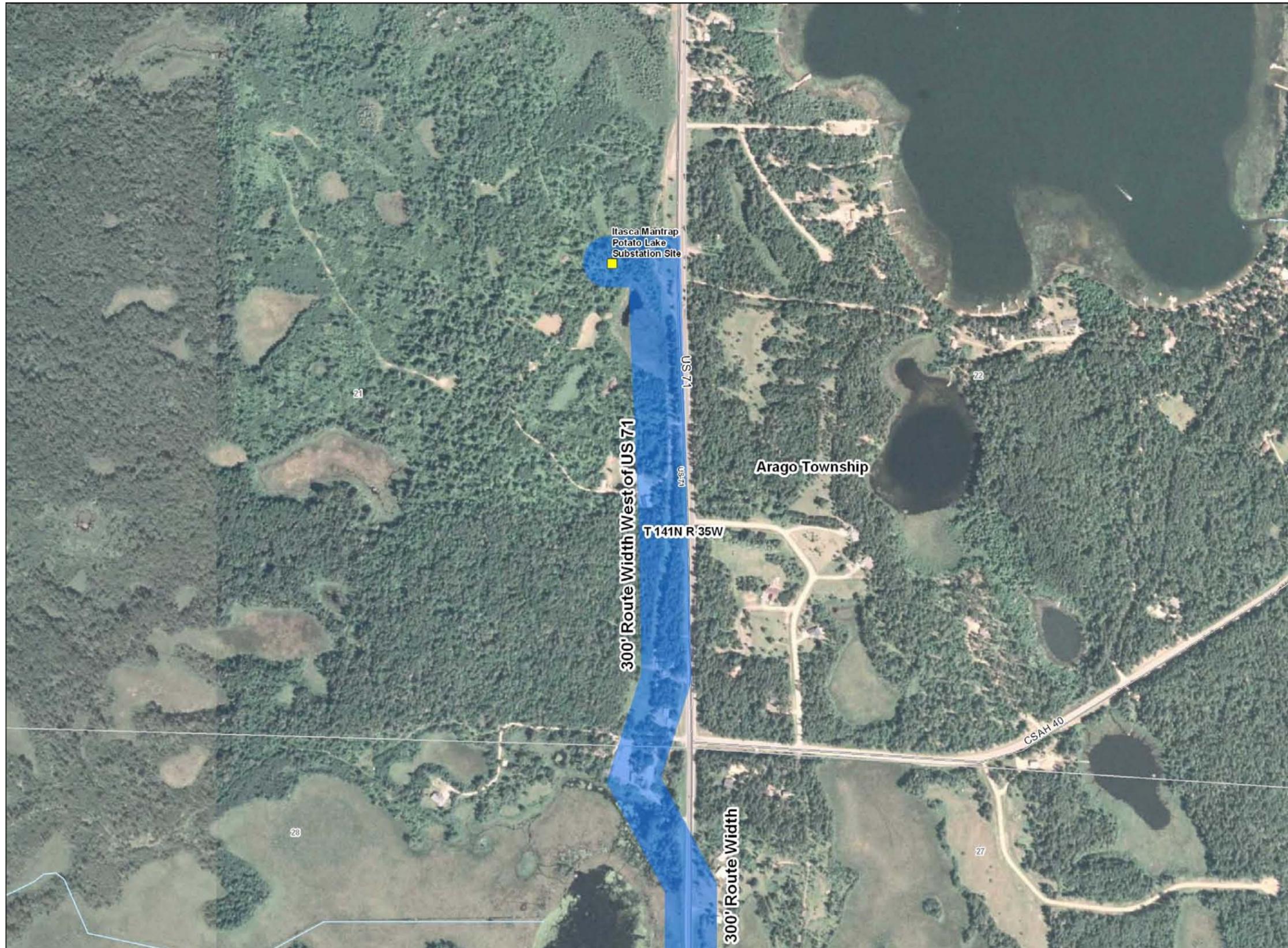
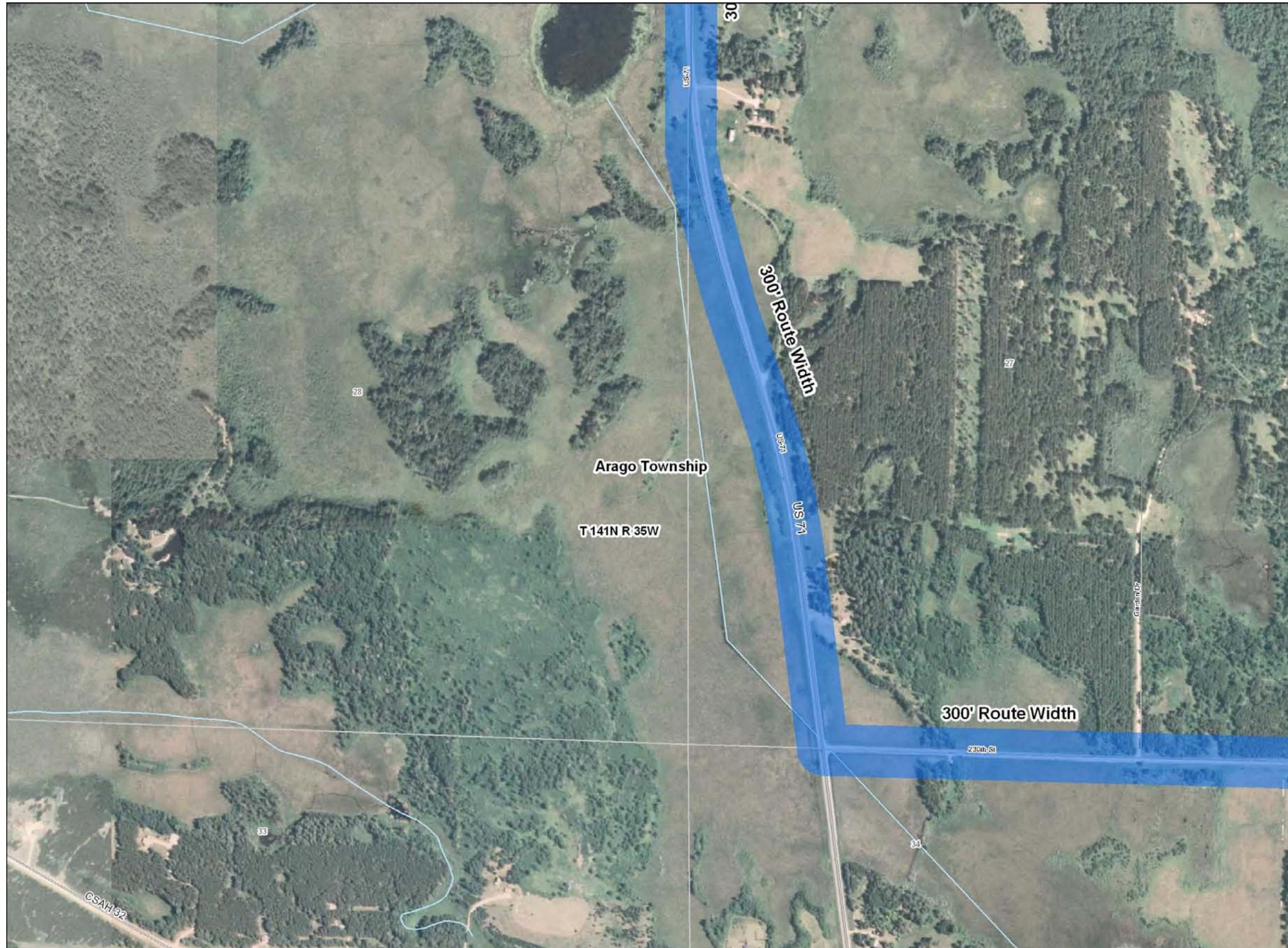


Figure 5-3 Proposed Route Map 2



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- Proposed Itasca-Mantrap (IM)
- Distribution Substation
- Existing Itasca-Mantrap
- Distribution Substation
- Proposed Great River Energy (GRE)
- 115 kV Transmission Line Route
- Existing Great River Energy
- 34.5 kV Transmission Line
- Existing Minnesota Power (MP)
- 34.5 kV Transmission Line
- Land Base Features
- Road Centerline
- PLS Section Lines



Updated: Feb 19, 2010



Data Sources Vary Between
MNDOT, MNDNR, MNGEO
and Great River Energy
2009 Color Orthophotos from
Farm Services Administration (FSA)

Map Projection:
UTM, NAD83, Zone15, Meters

**Potato Lake
115 kV Transmission
Line & Substation
Project:**

Route Map 02

Figure 5-4 Proposed Route Map 3



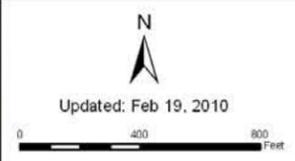
Figure 5-5 Proposed Route Map 4



GREAT RIVER ENERGY®

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Proposed Itasca-Mantrap (IM)
 Existing Itasca-Mantrap
 Proposed Great River Energy (GRE)
 Existing Great River Energy
 Existing Minnesota Power (MP)
 Land Base Features
 Road Centerline
 PLS Section Lines



Data Sources Vary Between MNDOT, MNDNR, MNGEO and Great River Energy
 2009 Color Orthophotos from Farm Services Administration (FSA)

Map Projection: UTM, NAD83, Zone15, Meters

**Potato Lake
 115 kV Transmission
 Line & Substation
 Project:**

Route Map 04

Figure 5-6 Proposed Route Map 5

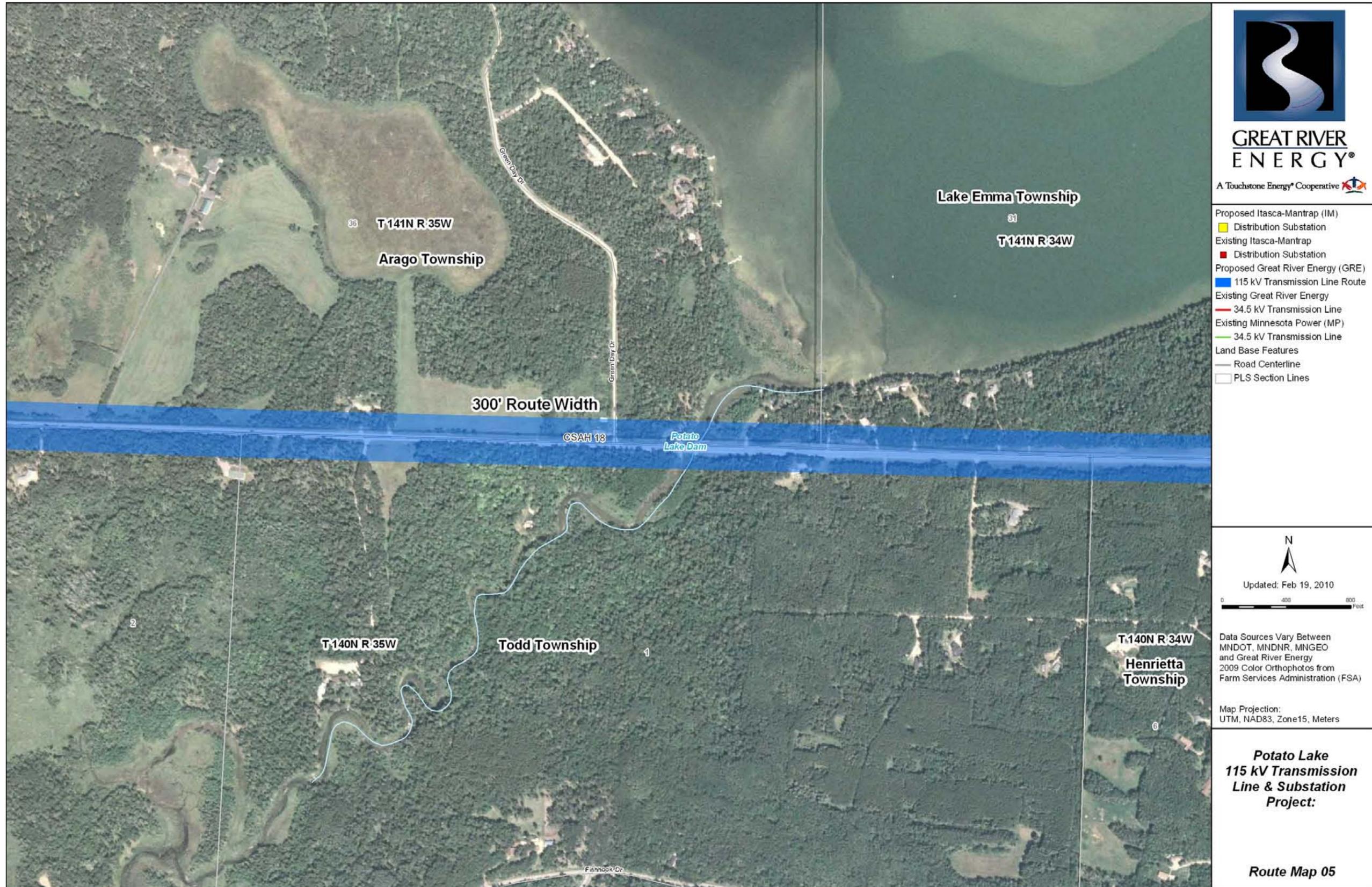
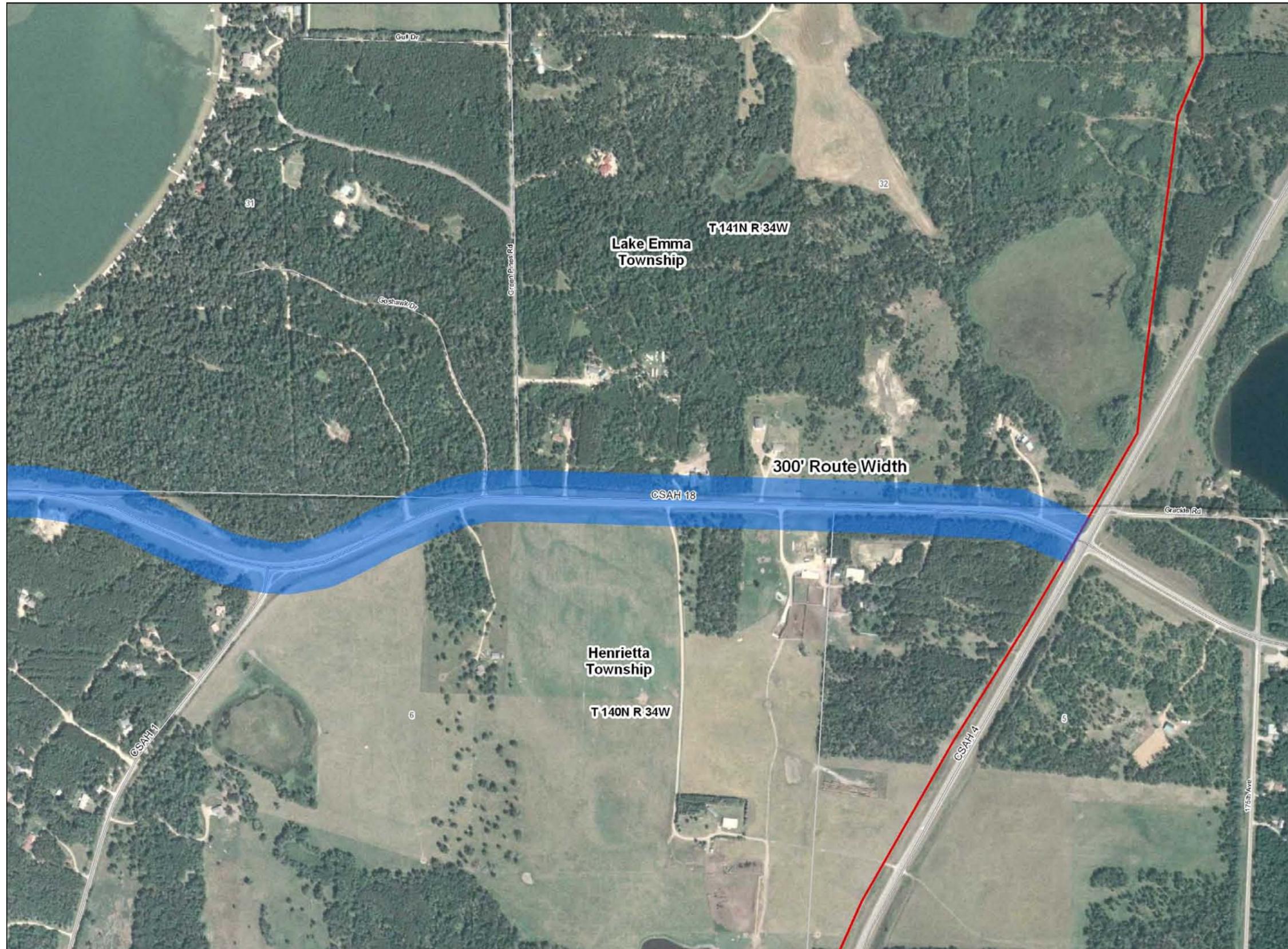


Figure 5-7 Proposed Route Map 6



GREAT RIVER ENERGY®

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- Proposed Itasca-Mantrap (IM)
 - Distribution Substation
- Existing Itasca-Mantrap
 - Distribution Substation
- Proposed Great River Energy (GRE)
 - 115 kV Transmission Line Route
- Existing Great River Energy
 - 34.5 kV Transmission Line
- Existing Minnesota Power (MP)
 - 34.5 kV Transmission Line
- Land Base Features
 - Road Centerline
 - PLS Section Lines



Updated: Feb 19, 2010



Data Sources Vary Between MNDOT, MNDNR, MNGEO and Great River Energy 2009 Color Orthophotos from Farm Services Administration (FSA)

Map Projection: UTM, NAD83, Zone15, Meters

**Potato Lake
115 kV Transmission
Line & Substation
Project:**

Route Map 06

Figure 5-8 Alternate Route Map 1

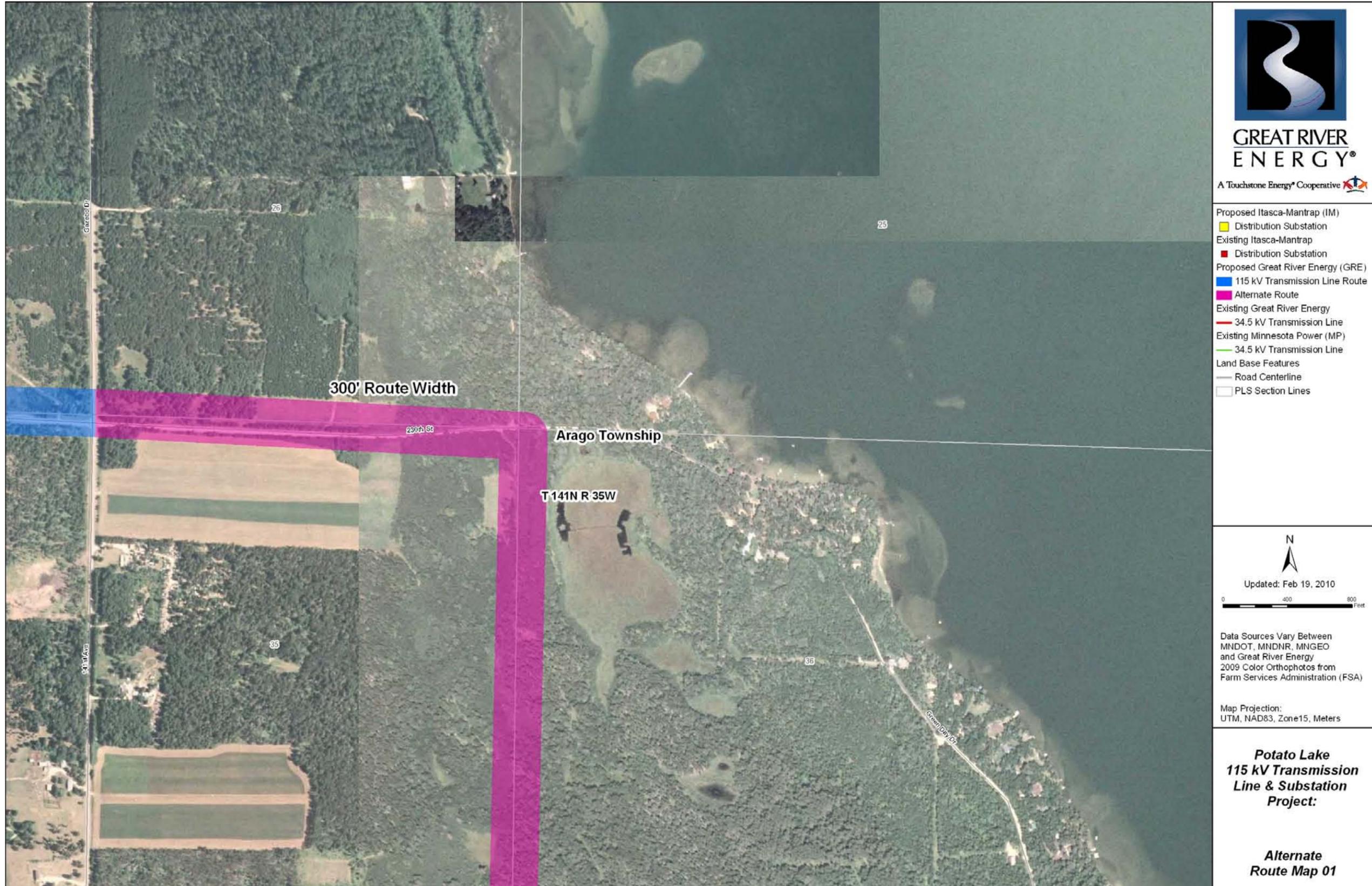
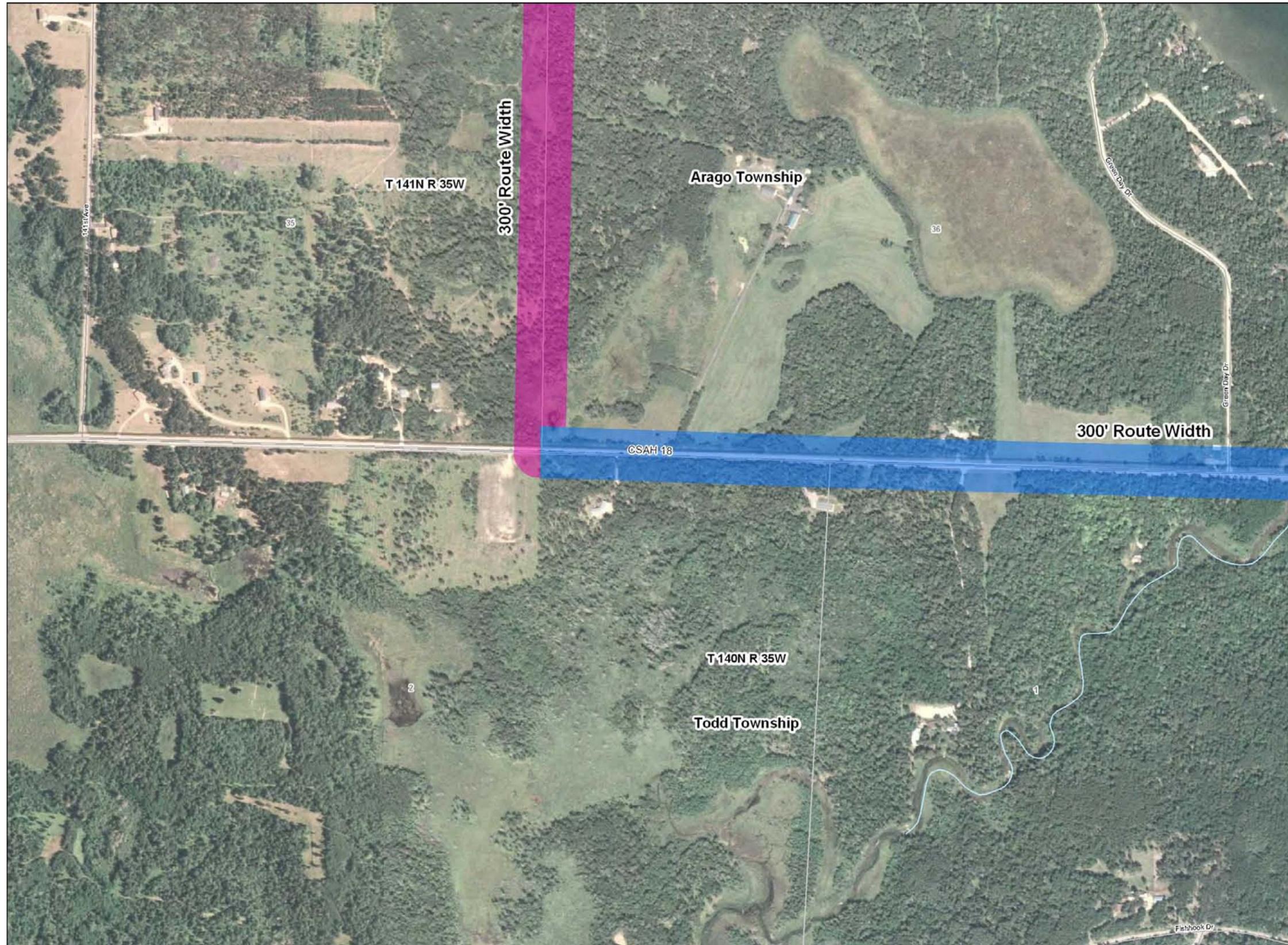


Figure 5-9 Alternate Route Map 2



GREAT RIVER ENERGY®

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- Proposed Itasca-Mantrap (IM)
- Distribution Substation
- Existing Itasca-Mantrap
- Distribution Substation
- Proposed Great River Energy (GRE)
- 115 kV Transmission Line Route
- Alternate Route
- Existing Great River Energy
- 34.5 kV Transmission Line
- Existing Minnesota Power (MP)
- 34.5 kV Transmission Line
- Land Base Features
- Road Centerline
- PLS Section Lines



Updated: Feb 19, 2010



Data Sources Vary Between
MNDOT, MNDNR, MNGEO
and Great River Energy
2009 Color Orthophotos from
Farm Services Administration (FSA)

Map Projection:
UTM, NAD83, Zone15, Meters

**Potato Lake
115 kV Transmission
Line & Substation
Project:**

**Alternate
Route Map 02**

5.3 Design Options to Accommodate Future Expansion

The Project is designed to upgrade the electric transmission system in and around the Potato Lake area. The line will be operated initially at 34.5 kV and will operate at 115 kV once the surrounding system has been upgraded to 115 kV. The Project will allow both Great River Energy and Itasca-Mantrap to maintain necessary voltage and reliability requirements in the Potato Lake Project area.

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