APPENDIX G

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1.0 General Environmental Setting

This appendix describes the general environmental setting of the proposed Project and highlights the major features of the region between the Minnesota/Canada border and the substation endpoints (Figure 1). The Project includes a 500 kV AC electric transmission line from the Riel Substation in Manitoba, Canada, to a new substation on the Iron Range (Iron Range substation) of northern Minnesota. The new substation will be near the existing Blackberry Substation. Manitoba Hydro will be responsible for development and permitting the Canadian portion of the transmission line; information on the Canadian portion of the line is not included in this discussion.

For the following discussion, the Project has been divided into the 500 kV project area, and the substation study area. The environmental setting for each area and maps displaying information relating to the areas is included below.

2.0 500 kV Transmission Line Project Area

The 500 kV transmission line will be single circuit above-ground connecting the incoming line at the Minnesota/Canada border to the new Iron Range substation. The line will be approximately 250 to 300 miles long, depending on final route selection. Potential routes go through portions of Beltrami, Clearwater, Itasca, Kittson, Koochiching, Lake of the Woods, Marshall, Pennington, Polk, Red Lake, Roseau and St Louis counties, in Minnesota. Refer to Figures 2A-D for an overview of environmental issues for the 500 kV project area.

The physiography of northwestern Minnesota is characterized by the flat lakeplain and beach ridges of Glacial Lake Agassi. The ecological provinces (from west to east) include Red River Prairie, Aspen Parklands and Northern Minnesota Peatlands (DNR 2005). The physiography of north-central Minnesota is characterized by glacial landforms of moraines, drumlins, eskers, kames, outwash plains and till plains. The area includes expansive peat bogs and lakes within the Northern Minnesota Drift and Lake Plains ecological province (DNR 2003). Physiography of Northeast Minnesota, including the Masabi Iron Range area, is characterized by Canadian Shield bedrock with shallow soils and abundant lakes and streams. The Northern Superior Uplands is the primary ecological province (DNR 2003).

2.1.1. Human Settlement

Major population centers for the 500 kV project area are along US Highway 59, Minnesota Highway 11, US Highway 71, and US Highway 169. Major cities within the project area include Roseau, Baudette, Blackduck, Thief River Falls, Grand Rapids, and Hibbing (Local Census Data 2010). Numerous small towns are located throughout the project area.

2.1.2. Land Use

The 500 kV project area spans a wide range of land uses, which are highly variable in frequency and extent. Land use of the western portion of the project area is mostly agricultural (a mixture of row crops, small grains, and pasture/hay). The north central portion of the project area is primarily under the ownership of state agencies and is used for forestry, recreation and preservation of sensitive resources. The south central and eastern portion of the project area is a mixture private and public land dedicated

to forestry and recreation. The area in the vicinity of the proposed Iron Range substation is dominated by open pit mining and residential land uses (Fry et. al. 2011).

2.1.3. Airports & Transportation

There are approximately 80 airports in the 500 kV project area including 20 public use airports (FAA 2013). Many of the private airstrips are located in the western portion of the study area and are used by crop dusters. Canadian National and Canadian Pacific operate railways in the area. Major Roadways include US Highway 59, US Highway 2, US Highway 71, US Highway 169, Minnesota Highway 11, Minnesota Highway 32, Minnesota Highway 89, Minnesota Highway 1, Minnesota Highway 72, Minnesota Highway 6, and Minnesota Highway 65 (MnDOT 2011-2012).

2.1.4. Agriculture

Agriculture is the dominant land use in the western portion of the 500 kV project area. Many of the soils in the agricultural land are designated as "prime farmland if drained" by the Natural Resource Conservation Service County Soil Survey (USDA NRCS 2013). Agricultural lands include row crops, such as sugar beets and soybeans, wheat, hayland and pastureland.

2.1.5. Hydrology

The hydrology in the 500 kV project area includes a range of surface waters such as lakes, rivers, streams, and wetlands. There are numerous lakes scattered across this project area, with the majority located in the south from Thief River Falls to the Iron Range. Large lakes are relatively uncommon in the project area with the exception of Upper and Lower Red Lake. Rivers and streams are numerous but are relatively small because they tend to be within the upper reaches of their watersheds. Streams in the northern and western portions of the project area flow via the Red River to Hudson Bay; rivers in the southern portion flow via the Mississippi River to the Gulf; and rivers in the eastern portion flow through Lake Superior to the Atlantic. The rivers and streams present tend to be slow-flowing water bodies with wide floodplains and meandering paths. Larger rivers, such as the Roseau River, meander through tilled agricultural fields and are restricted to narrow floodplains except during major flood events. Streams in the agricultural areas are often channelized and converted to relatively straight ditches along section lines. The southern and eastern portions of the project area are heavily forested and largely contain forested wetlands and small streams.

Wetlands are present throughout the 500 kV project area, but the majority is concentrated in the Northern Minnesota and Ontario Peatlands Section (DNR 2003, DNR 2013d) located on/near the Red Lake Reservation. Most of the wetlands within the project area are scrub/shrub or forested types with the remaining wetlands comprised of emergent or seasonally flooded types. The western portion of the project area, west of Upper and Lower Red Lake, and the northwestern corner of the project area, around Warroad, Baudette, and Roseau, have substantially different wetland and hydrology characteristics than the remainder of the project area. In these areas, tilled agricultural practices have altered the majority of the wetland areas and modified local hydrology though drain tiles and ditches. Outside of agricultural areas, wetlands remain largely unaffected by drainage and are often large wetland complexes with interspersed upland areas. The project area northeast of Red Lake includes large peatlands, which are large emergent and scrub/shrub wetlands typically surrounded by forested wetland

and upland. Many of the wetlands and streams are regulated by the USACE and/or DNR. Minnesota Power will coordinate with these agencies to identify impacts and will obtain the required permits prior to construction.

2.1.6. Vegetation

Vegetation of the 500 kV project area is primarily agricultural crops west of Red Lake while portions between Baudette and US 71 are mostly wooded or emergent wetlands; areas to the south and east of Red Lake are primarily mixed forest. Natural community types may persist in areas that are inaccessible by farm equipment, are too dry to produce crops or hay, or where lands have been set aside to preserve their natural character. Numerous areas identified by the DNR as having moderate, high, or outstanding biodiversity significance occur throughout the project area (DNR 2013a). These sites may contain high-quality native plant communities, rare plants, rare animals, and/or aggregations of these features.

2.1.7. Natural Resources

2.1.7.1. Ecology

Three of Minnesota's four ecological provinces as described by DNR Ecological Classification System are located within the 500 kV project area (DNR 2013b). The portions of this project area within Kittson, Roseau, Marshall, Pennington, and Red Lake counties cross the Tallgrass Aspen Parklands province. Natural vegetation types that characterize this province include a mosaic of prairies, wetlands, and fens combined with groves of aspens or bur oaks that resemble small islands of forest among expansive grassland areas. The portions of the project area within Polk and Clearwater counties include the north end of the Eastern Broadleaf Forest province. This province is characterized by a dominance of deciduous trees that are tolerant of periodic burns, such as bur oak. This species thrives at the prairie's edge where fires were common prior to European settlement. The majority of the project area is located in the Laurentian Mixed Forest province, which includes all areas east of Red Lake. This province is characterized by forested plant communities dominated by mixed deciduous and coniferous species.

2.1.7.2. Habitats

The habitats within 500 kV project area support wildlife populations including herbivores such as deer, moose, or elk and species that may prey upon these species such as wolves and coyotes. A variety of smaller animals also occur throughout the project area including a variety of predatory birds, waterbirds, and songbirds. Areas with greater habitat diversity, such as native prairie, forest, brush lands, and wetland complexes, typically support greater species diversity and numbers than agricultural or managed lands.

2.1.7.3. Threatened, Endangered, & Special Concern Species

Concentrations of rare and protected species occur throughout the 500 kV project area. Two species listed as Threatened and three listed as Candidate under the Endangered Species Act of 1973 (ESA; 7 U.S.C. Sec. 136, 16 U.S.C. Sec 1531 et seq.) occur in the project area. The piping plover and western prairie fringed orchid occur in the northwestern project area in Glacial Lake Agassiz beach ridges and

wet prairies or sedge meadows, respectively. The three Candidate species, Sprague's pipit, Dakota skipper, and Poweshiek skipperling, are typically associated with native prairies (DNR 2007).

The 500 kV project area includes a number of state-owned and Nature Conservancy-owned parcels that may provide habitat for listed species. Additionally, there may be privately-owned parcels that contain suitable habitat for a variety of sensitive species.

The DNR Natural Heritage Rare Natural Features Database was reviewed to identify state listed threatened, endangered and special concern species and sensitive habitats that might occur in the 500 kV project area. There are approximately 68 vascular plants and one moss listed as threatened, endangered, or special concern by Minnesota that may occur in the project area. Eight vascular plants are state listed as endangered. The western prairie fringed orchid is also listed as federally threatened. Thirteen vascular plant species are listed as state threatened. The remaining 47 vascular plants and one moss are listed as special concern. Additionally, approximately 31 animal species and 51 other sensitive resources occur within this project area (DNR 2007).

In addition to sensitive species, the DNR Natural Heritage Database identifies locations of high quality terrestrial communities, other ecologically sensitive areas and waterbird nesting colonies. These locations may provide habitat for species that are protected by state or federal regulations. A number of these features are present, though the DNR Natural Heritage Database does not provide complete coverage for the project area (DNR 2013a).

2.1.8. Recreation

The 500 kV project area has a wide range of recreational opportunities including; hunting, fishing, camping, cycling, hiking, bird watching, boating, cross-country skiing, and snowmobiling. Some recreational activities, such as hunting, bird watching and cross-country skiing, are generally centered on public lands, such as SNAs, WMAs, and state forests. Other recreational activities, such as snowmobiling and cycling, are concentrated along established trails that may follow roadways or may cut across public and private lands far from other transportation infrastructure. Fishing and boating are common activities in the project area. The central region of the project area contains many concentrations of small and medium sized lakes with extensive development of cabins, resorts and other recreation destinations.

2.1.9. Forestry

Large scale forestry activities are common in the 500 kV project area, with the exception of the largely agricultural western and northwestern locations. Forestry activities occur in state forests, county forests and private property. The DNR has secured development rights from many forest parcels under the Forest Legacy Partnership program. Parcels enrolled in the program have restrictions that may require additional permitting and mitigation in order to secure easements for the Project (DNR 2013c).

2.1.10. Mining

Miscellaneous mining activity is present across the Project Area, but large scale industrial mining is concentrated in the Iron Range along State Hwy 169 between the cities of Grand Rapids and Hibbing, Minnesota. The proposed 500 kV line will cross this region shortly before it terminates at the new Iron Range substation. The 2007 Comprehensive Land Use plan indicates a major objective of identifying

potential areas for mining-related expansion, which are primarily situated between Grand Rapids and Nashwauk along U.S. 169 (Itasca County, Minnesota 2013). Current and future mining projects include the Keewatin Taconite expansion, Essar Steel Minnesota, the Magnetation facility under development at Taconite, and the Magnetation/AK Steel project (Western Mesabi Mine Planning Board 2011).

2.1.11. Archaeology

The 500 kV project area is within the Central Lakes Coniferous, the Red River Valley, the Northern Bog, and the Border Lakes archaeological regions (MnDOT 2002). The varied topography of these regions consists of hilly terminal moraines, rugged uplands, a variety of less rugged terrains of glacial origin, including ground moraines, outwash plains, and lake plains, numerous lakes and rivers, flat plains created by glacial lakes, bands of beach ridges, and peatlands with little landform elevation.

Prehistoric peoples used and occupied all of the 500 kV project area. Each of the regions contained materials or resources that were desirable to the inhabitants of the time, as well as locations that were suitable for regular habitation and settlement. In general, habitation sites would have been located near lakes or rivers and/or on elevated landforms. Specific use areas or resource gathering sites are likely numerous and more varied in their locations within these regions. An example of one type of site that would fit this description is high quality chert outcrops, which are present in some of these regions.

Prehistoric peoples from each of the major time periods (Paleo, Archaic, Woodland, and Fur Trade/Contact) were present in these regions. In addition, historic archaeological sites related to lumbering, mining, and recreation can be found in these regions. As previously noted, prehistoric archaeological sites will vary in their location because the reason for their need would have dictated where they were located. In contrast, historic archaeological sites tend to be more evenly distributed across the landscape because modern technologies allowed development of areas that were previously limited to prehistoric populations. There are 93 historic sites and districts listed on the National Register of Historic Places within the project area. These are nearly all above-ground structures. Additional NRHP-eligible structures, and historic and prehistoric archaeological sites are present within the 500kV project area, but require more detailed evaluation for these determinations.

3.0 Analysis of Endpoint

The project's substation endpoint will be located on the Iron Range, near the Blackberry substation in Itasca County, Minnesota. The study area extends 3 miles from the substation.

The existing Blackberry substation is located approximately 10 miles east of Grand Rapids, Minnesota. The proposed Iron Range substation for this Project will be located on a parcel adjacent to the Blackberry Substation. The exact location of the proposed substation has not yet been determined and, as a result, the Blackberry substation is used as the endpoint location for this discussion (Figure 4).

3.1. Human Settlement

The Blackberry Substation area contains the following Townships: Trout Lake, Feeley, and Blackberry. The nearest major city is Grand Rapids. There are no towns within the study area.

3.2. Land Use

The land cover in the Blackberry Substation area is primarily woody wetlands and pasture (Fry et. al. 2011). Additional land cover types include deciduous forest, shrubland, row crops, and evergreen forest. Land use is primarily forestry and recreation, with some pasture/farming. Homes are scattered across the study area, most being located near roads. A small concentration of lake homes is located on Little Sand Lake, northeast of the existing substation. Approximately nine transmission lines connect into Blackberry.

3.3. Airports & Transportation

There are no airports or railroads within three miles of the Blackberry Substation Area (FAA 2013). Major roadways in the area include CSAH 10, CSAH 21, CSAH 69, CSAH 70 and CSAH 71 (MnDOT 2011-2012). The area also includes several county and township roadways.

3.4. Agriculture

There are pockets of agricultural land in the located mostly northwest, west and south of the existing substation (Fry et. al. 2011). Much of the agriculture land in this area is designated as prime farmland. Pasture and hay land are dominant farming activities in Itasca County (NRCS 1987).

3.5. Hydrology

There are three named lakes located in the study area: Bass, Round and Little Sand lakes; as well as several named streams: Swan River, Trout Creek and Sand Creek. Wetlands are scattered throughout the study area; extensive wetlands (peatlands) are located north and east of the Blackberry Substation. Wetland types include forested, scrub shrub and emergent (DNR 2013d).

3.6. Vegetation

Vegetation around the Blackberry Substation is primarily forested wetland, mixed forest, and to a lesser extent pastured lands, hayed land, or shrub land (Fry et. al. 2011). Natural community types may persist in areas inaccessible by logging equipment or on lands too wet to harvest timber.

3.7. Natural Resources

3.7.1. Ecology

The study area lies within the Laurentian Mixed Forest province, which is characterized by forested plant communities dominated by mix deciduous and coniferous species interspersed with a variety of wetland plant community types (DNR 2003).

3.7.2. Habitats

The habitats present within three miles of the Blackberry Substation are primarily forested habitat types that commonly support wildlife populations of large herbivores such as deer and species that may prey upon these species such as wolves, bear, and coyotes. A variety of smaller animals also occur here including a numerous species of forest songbirds, predatory birds such as northern goshawk, broad-winged hawks, barred owls, and northern saw-whet owls, waterbirds, and game species such as ruffed grouse. Areas immediately adjacent to the Blackberry Substation include a greater percentage of hayed

lands and row crops that would be utilized by white-tailed deer, small mammals such as raccoon and small mammals that would encourage foraging use by species that prey.

The Minnesota Biological Survey (MBS) has not been completed for the study area. However, the DNR provided data on preliminary significance for biological communities (DNR 2013e). The MBS identifies one area of potential high biological significance, the Lammon Aid Peatland, and four areas of potential medium significance: Blackberry Lake, Blackberry – Warba Peatlands, Swan River – Sand Creek and Goodland Delta Esker. These five areas are largely situated south and east of the proposed substation and cover a large percentage of the study area,

3.7.3. Threatened, Endangered, & Special Concern Species

No records of federally protected species occur in the study area. The Canada lynx occur in brushy forested areas with an abundance of snowshoe hare. The USFWS designated critical habitat for the Canada Lynx east of U.S. 53, which runs from International Falls to Virginia, approximately 35 miles east of the Blackberry Substation (USFWS 2013). Thus, the Project is not proposed to affect lynx critical habitat. Three records of mussels, one bird, and one vascular plant listed as special concern by Minnesota occur within the study area.

3.8. Recreation

The study area provides some recreational opportunities including; fishing, hiking, boating, cross-country skiing, and snowmobiling. Snowmobiling and hiking occur on the Itasca Greenway Trail that generally runs north-south approximately 1.5 miles west of the Blackberry Substation. Round Lake and Little Sand Lake have public access for fishing and boating (DNR 2013f).

3.9. Forestry

Forestry activities occur in state and county forest parcels within the study area. Large county forest parcels and small state forest parcels are concentrated north and east of the Blackberry Substation. Smaller county forest parcels are located west and southwest of the Blackberry Substation. Parcels enrolled in the Forest Legacy Program are located within the study area, with most located southeast of the Blackberry Substation (DNR 2013c).

3.10. Mining

A small gravel or sand mine is located west of the Blackberry Substation (per aerial photo). Industrial mining activity is not present within the study area.

3.11. Archaeology

The study area is within the Central Lakes Coniferous archaeological region (MnDOT 2002). The varied topography of this region consists of hilly terminal moraines, rugged uplands, a variety of less rugged terrains of glacial origin, including ground moraines, outwash plains, and lake plains, and several lakes and rivers.

Prehistoric peoples likely occupied all of study area. This region would have contained materials or resources desirable to the inhabitants of the time, as well as locations that were suitable for habitation and settlement. In general, habitation sites would have been located near lakes or rivers and/or on

elevated landforms. Specific use areas or resource gathering sites are likely numerous and varied in their locations within this region. Sites relating to traditional religious activities may be present in the study area, but require specific knowledge that is not readily available to the public in order to locate.

Prehistoric peoples from each of the major time periods (Paleo, Archaic, Woodland, and Fur Trade/Contact) were present in this region. In addition, historic archaeological sites related to lumbering, mining, and recreation can be found in this region. As previously noted, prehistoric archaeological sites will vary in their location based on the reason for their need. In contrast, historic archaeological sites tend to be more evenly distributed across the landscape because modern technologies allowed development of areas that were previously limited to prehistoric populations. Although there appear to be no archaeological sites in the project area that are listed on the NRHP, historic and prehistoric archaeological sites that are eligible for listing may be present within the study area, but require more detailed evaluation for these determinations.

4.0 Summary of Issues

The transmission line and substation areas identified for the Project provide many options to avoid and minimize impacts during route selection, design and construction. As described below, environmental issues vary depending on the location within the area, but no location is without challenges.

4.1. General Considerations

- Avoidance of state parks and scientific and natural areas is required by MN regulation. If the selected route is located proximate to these state or federally protected lands, Minnesota Power will work closely with the state and federal agencies to identify the best route and substation site for the Project.
- Crossing the high density mining activity on the iron range will pose a challenge for the 500 kV transmission line. Minnesota Power will work closely with area mining interests, state mining regulators and local municipalities to avoid and minimize impacts to mining on the Iron Range.
- Extensive wetland complexes cover large portions of the project area. Impacts to sensitive wetlands will be avoided or minimized to the extent practicable, and Minnesota Power will work closely with federal, state and local wetland regulators to develop mitigation for unavoidable impacts.
- The area includes numerous locations considered to have biologically significant plant communities as well as habitat for numerous species of wildlife, including bald eagles and wolves. Routing and substation siting will consider options that avoid and minimize impacts to these areas and species.

- Information on the location and significance of biological and cultural resources is relatively limited. More detailed studies will be necessary as the project proceeds through permitting, design and construction.

4.2. 500 kV Transmission Line Project Area

There are several challenges in the proposed 500 kV study area:

- Select areas have concentrated residential development, such as the Iron Range. Additionally, residential development is scattered across the project area. Route selection will consider options that avoid and minimize impacts to existing homes.
- The Iron Range has limited locations for potential crossing. Route selection will consider options that avoid and minimize impacts to existing and future mining operations.
- The area includes large areas of deep peat soil. Crossing these soils may pose a challenge for engineering and construction and may require more extensive permitting or mitigation. Routing will consider options that avoid and minimize impacts to these areas.
- The area includes Forest Legacy Act parcels. Crossing these parcels may require extensive consultation and negotiation with the DNR and current landowners. Routing will consider options that avoid and minimize impacts to these parcels.
- The area includes a high proportion of state and federal land. Obtaining easement permission from the land agencies may require extensive coordination, permitting and mitigation. Routing will consider options that avoid and minimize impacts to these areas.
- The western portion of the project area includes an agricultural zone that utilizes aerial spraying for weed and pest control. The Project will consider options that avoid and minimize impacts to aerial spraying and farming operations.

4.3. Iron Range Substation Study Area

There are three primary challenges in the proposed Iron Range substation study area:

- The area has scattered residential development. Route selection and site development will consider options that avoid and minimize impacts to existing homes.
- The area has a large number of existing transmission lines entering the substation. Routing adjacent to and crossing these lines may be a challenge.
- The area includes large areas of deep peat soil. Constructing within these soils may pose an engineering challenge (e.g. geotechnical issues) and may require more extensive permitting or mitigation. Route selection and site development will consider options that avoid and minimize impacts to these areas.

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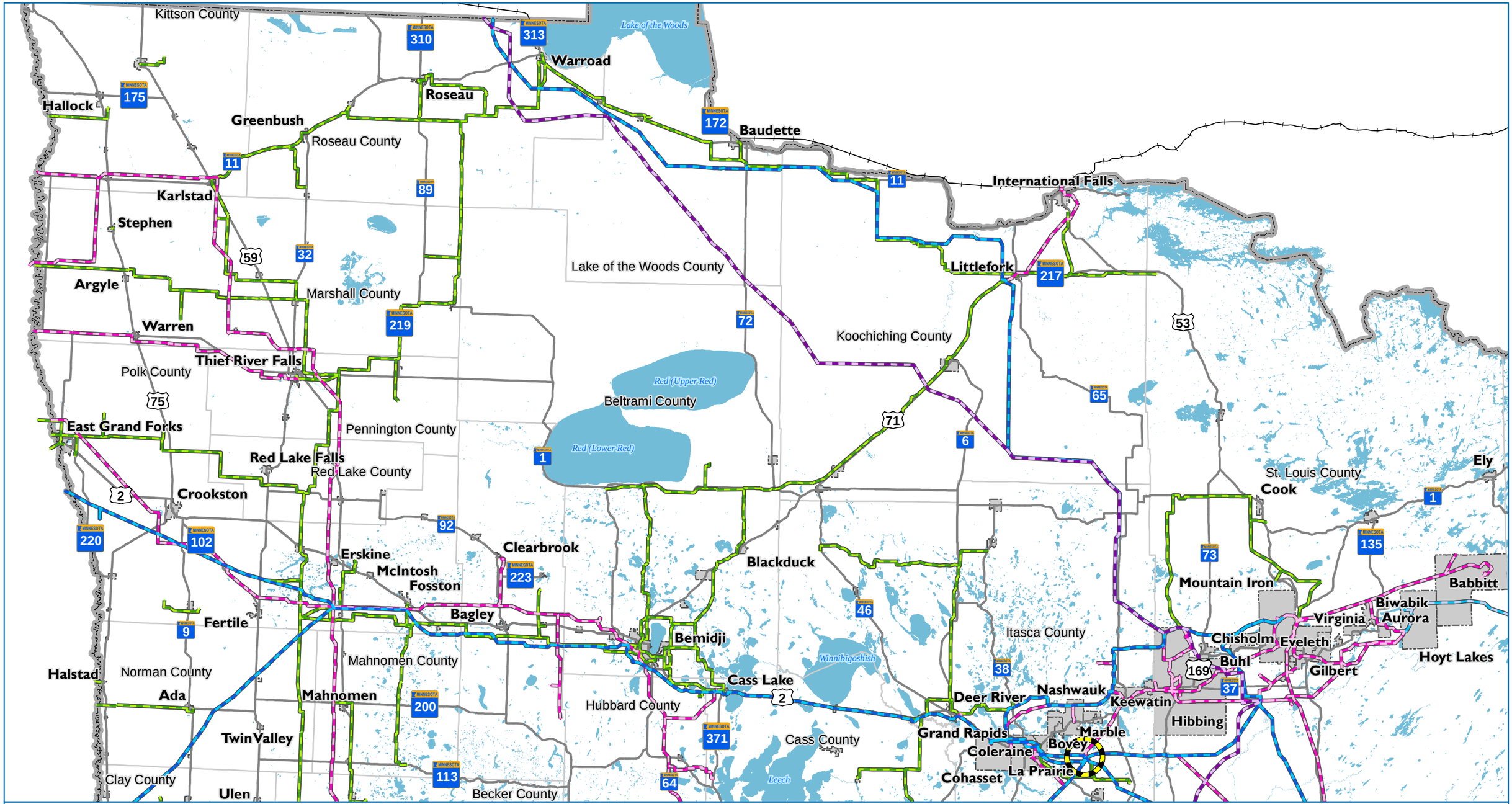

Figure: 1
Overview
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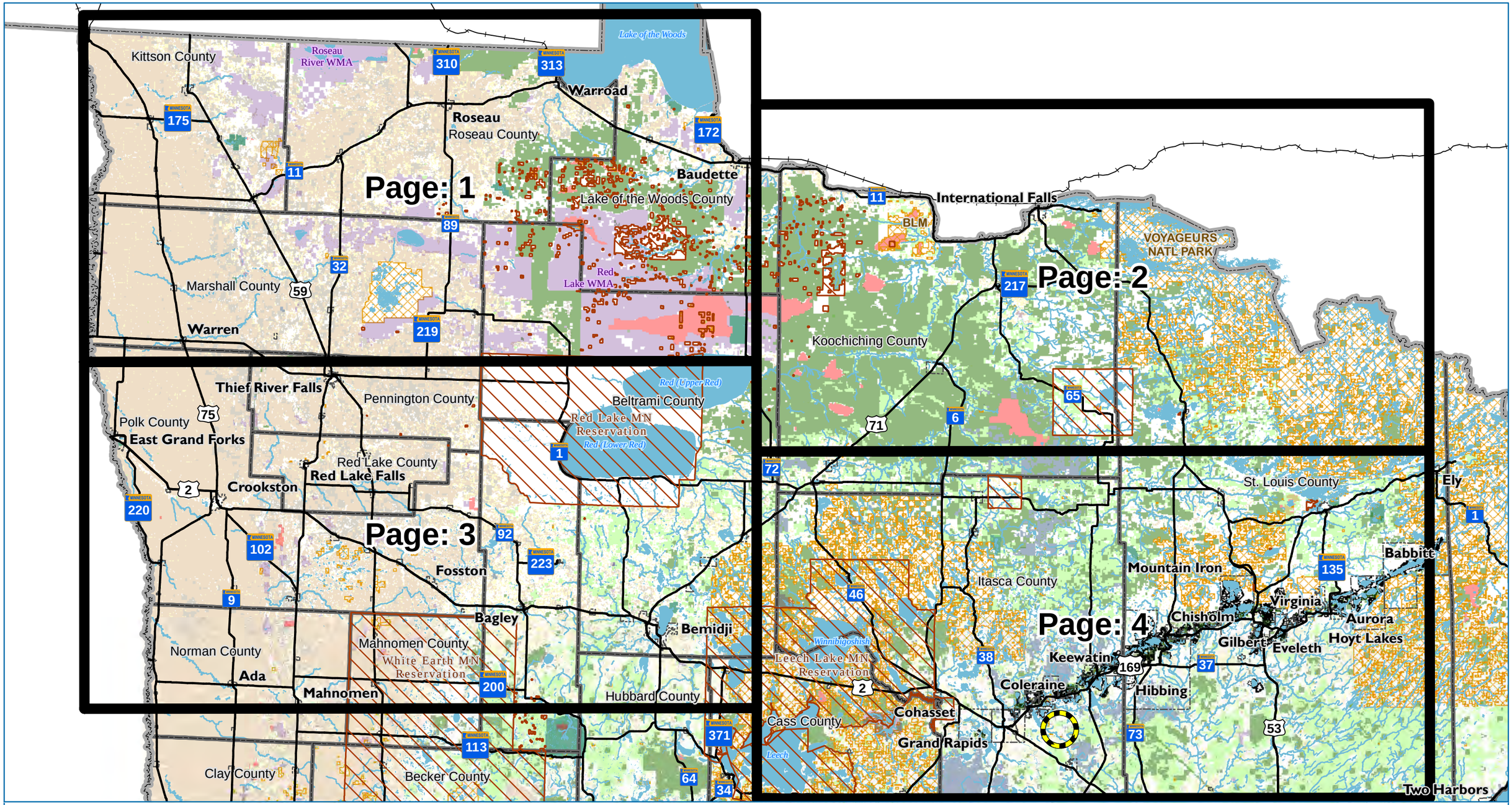

Miles
0 5 10

- Project Endpoint Area
- Railroad
- Reservation Boundary
- State Boundary
- County Boundary
- City / Township Boundary
- River / Stream
- Waterbody
- Wildlife Management Area
- Federal Land
- State Forest
- State Conservation Easement
- County Forest
- Mining
- Scientific & Natural Area
- State Park
- Pasture/Hay
- Row Crops
- Small Grains
- Fallow
- Urban/Recreational Grasses

Figure: 2
Environmental Setting
Certificate of Need

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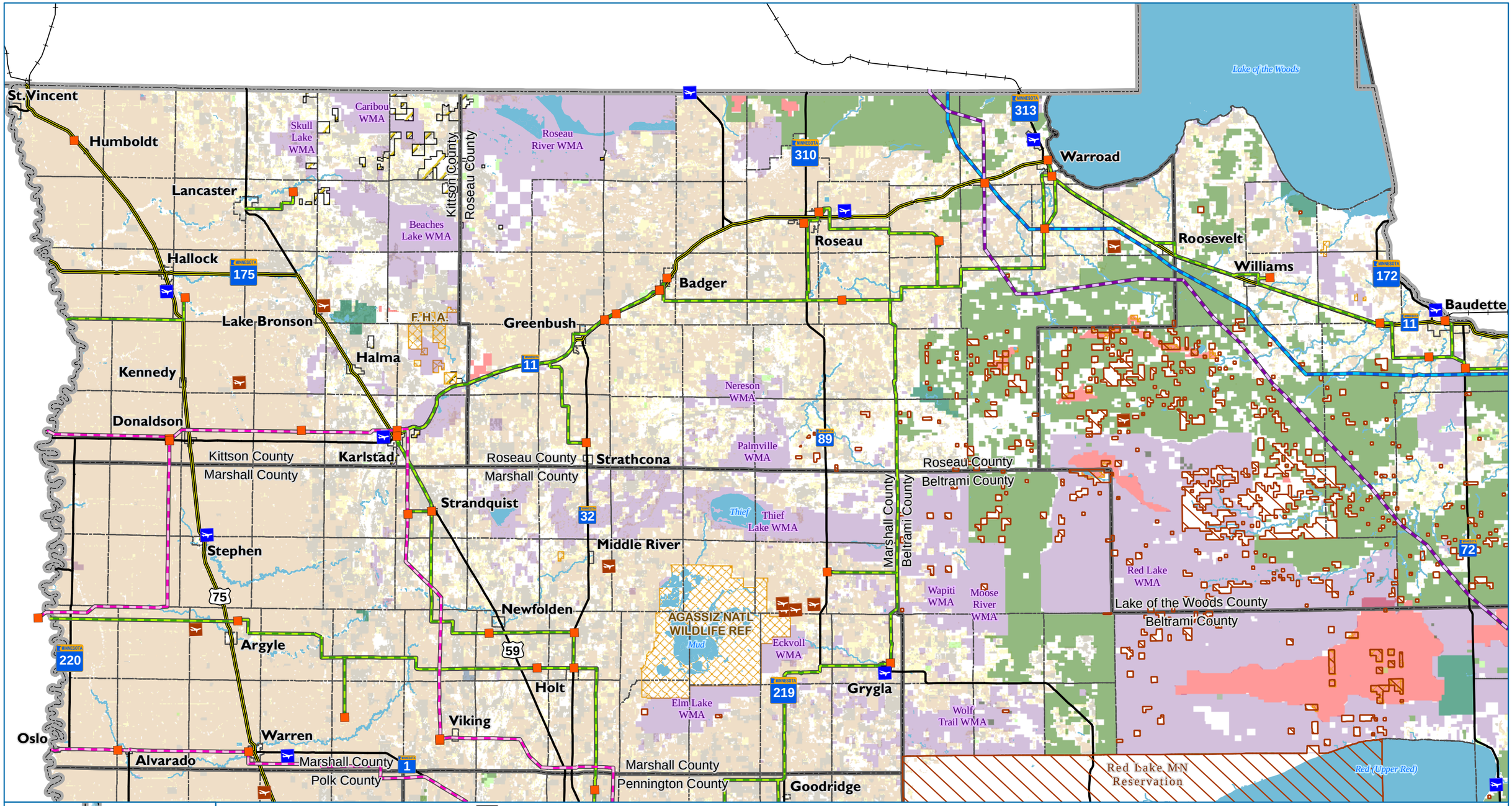

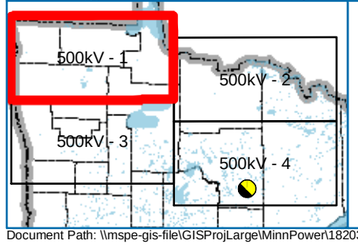

0 5 10 Miles

- Project Endpoint Area
- Substation
- 69kV AC
- 115kV AC
- 138kV AC
- 230kV AC
- 250kV DC
- 345kV AC
- 500kV AC
- Reservation Boundary
- State Boundary
- County Boundary
- City / Township Boundary
- River / Stream
- Waterbody
- Wildlife Management Area
- Federal Land
- State Forest
- State Conservation Easement
- County Forest
- Mining
- Scientific & Natural Area
- State Park
- The Nature Conservancy
- Private-use Airport
- Private-use Heliport
- Private-use Seaplane Base
- Public-use Airport
- Public-use Heliport
- Public-use Seaplane Base
- Scenic Byway
- Railroad
- Pasture/Hay
- Row Crops
- Small Grains
- Fallow
- Urban/Recreational Grasses

Figure: 500kV - 1
Environmental Setting
Certificate of Need

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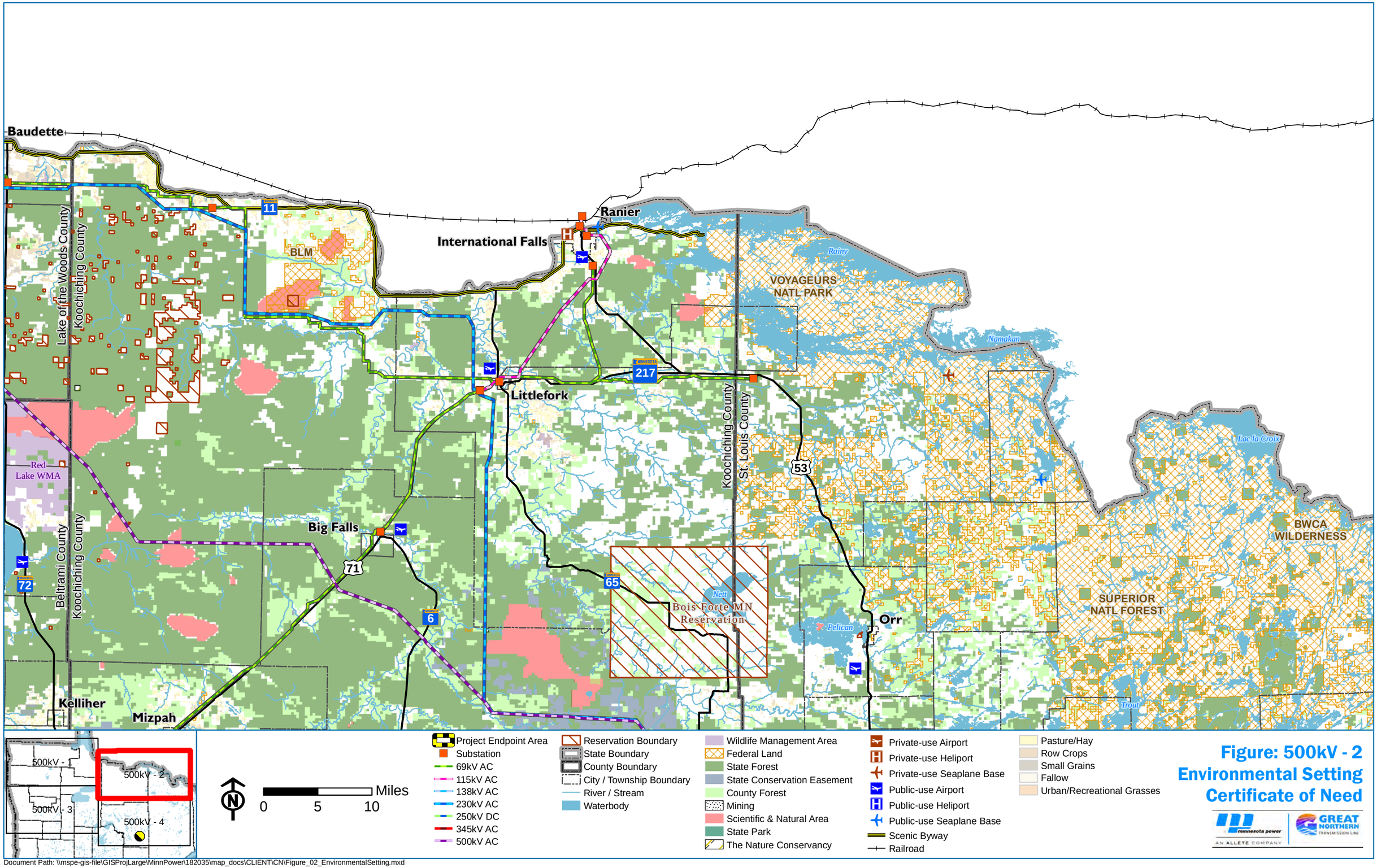

Figure: 500kV - 2
Environmental Setting
Certificate of Need

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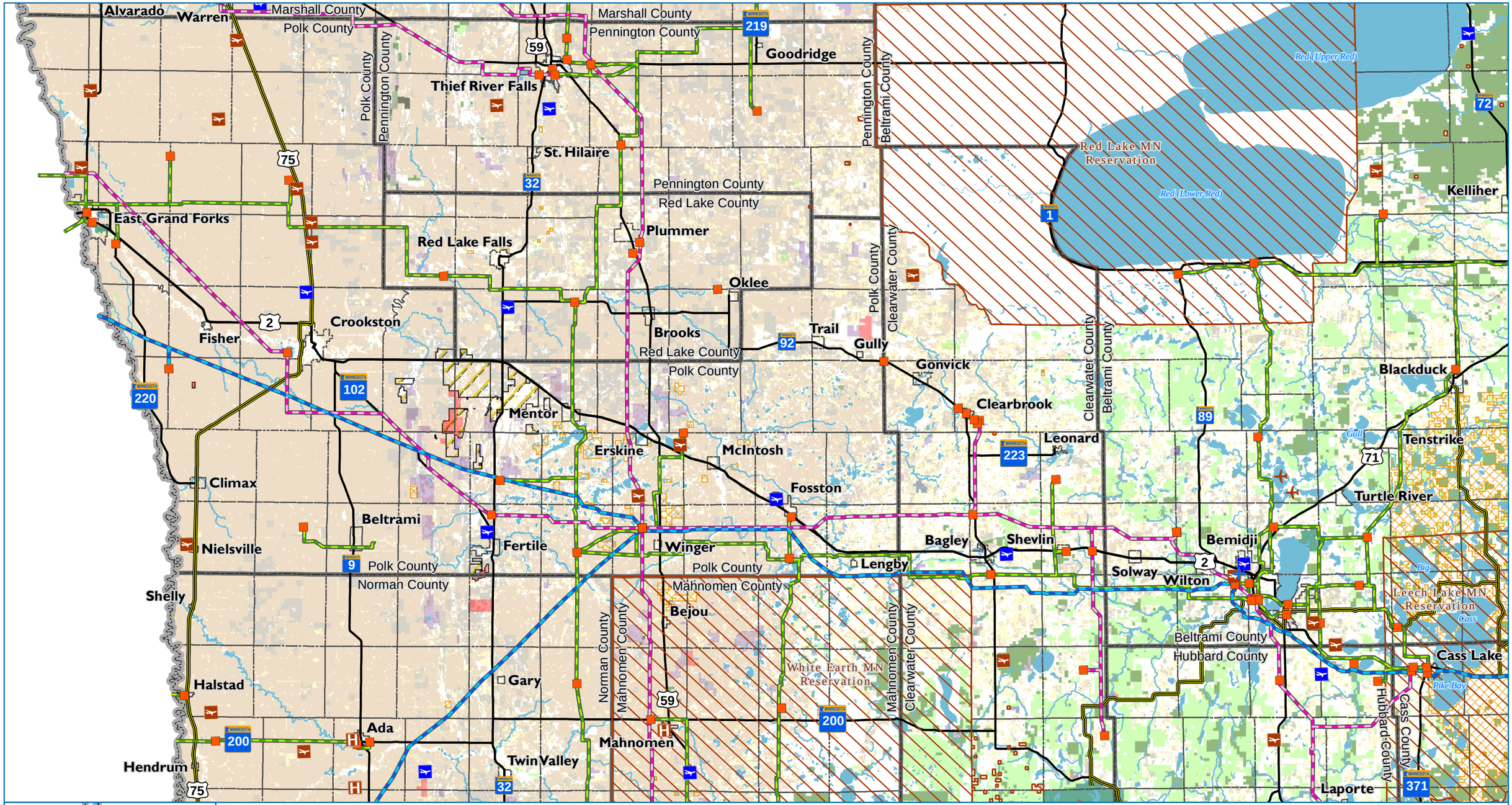

Figure: 500kV - 3
Environmental Setting
Certificate of Need

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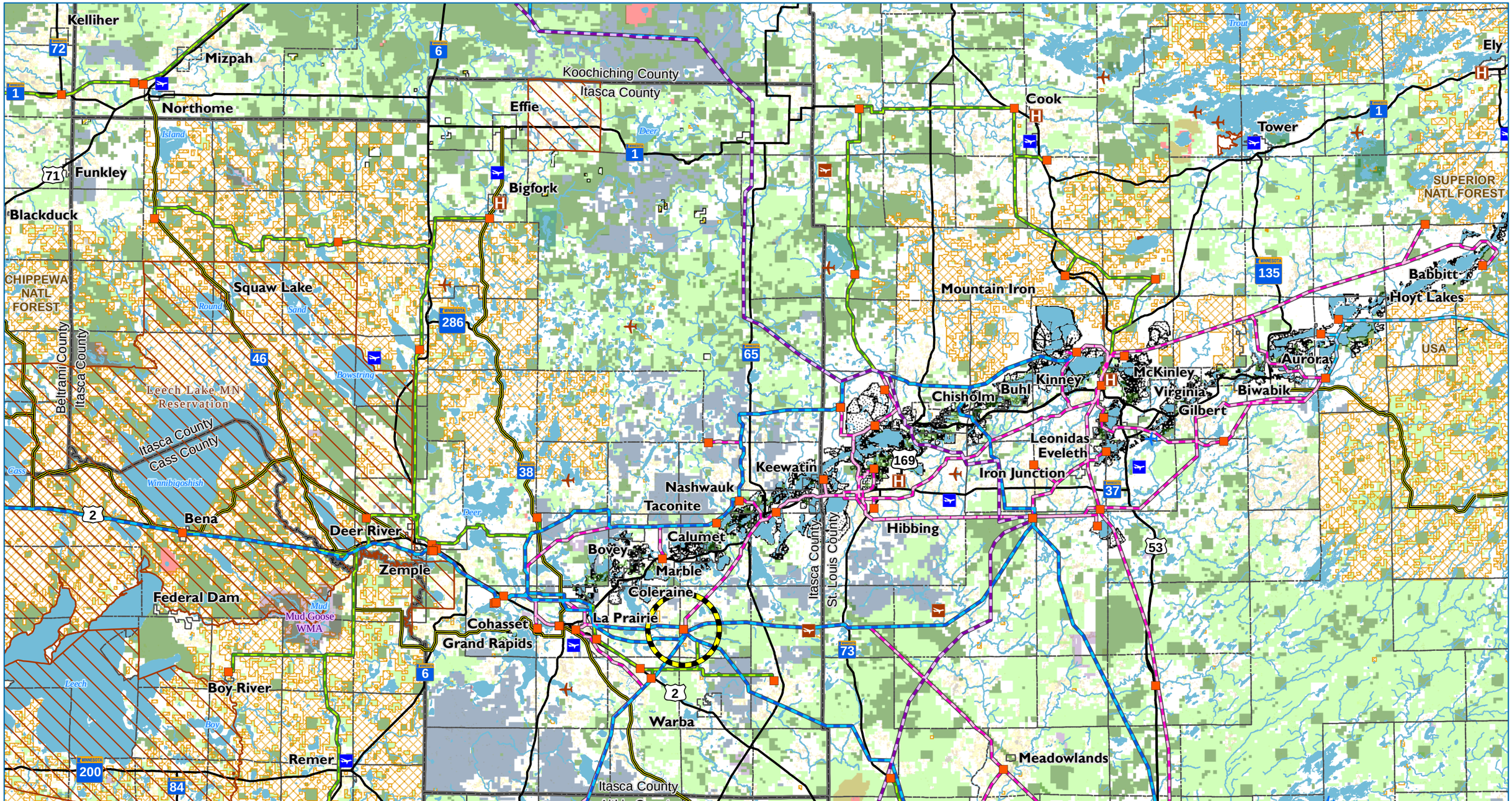

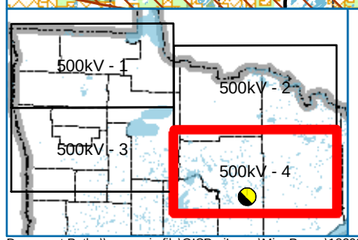

N

0 5 10 Miles

- Project Endpoint Area
- Substation
- 69kV AC
- 115kV AC
- 138kV AC
- 230kV AC
- 250kV DC
- 345kV AC
- 500kV AC
- Reservation Boundary
- State Boundary
- County Boundary
- City / Township Boundary
- River / Stream
- Waterbody
- Wildlife Management Area
- Federal Land
- State Forest
- State Conservation Easement
- County Forest
- Mining
- Scientific & Natural Area
- State Park
- The Nature Conservancy
- Private-use Airport
- Private-use Heliport
- Private-use Seaplane Base
- Public-use Airport
- Public-use Heliport
- Public-use Seaplane Base
- Scenic Byway
- Railroad
- Pasture/Hay
- Row Crops
- Small Grains
- Fallow
- Urban/Recreational Grasses

Figure: 500kV - 4
Environmental Setting
Certificate of Need

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