Exhibit A

Please refer to the Route Permit Application filed on December 2, 2011

CENTER TO GRAND FORKS 345 KV TRANSMISSION LINE PROJECT

Transmission Facility Route Permit Application

North Dakota Public Service Commission

Case No: PU-09-670

Minnkota Power
MPC COOPERATIVE, INC.

November 2011

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List of Abbreviations

Abbreviation	Definition
AADT	Average Annual Daily Traffic
AC	alternating current
ACGIH	American Council of Governmental Industrial Hygienists
ACSR	Aluminum conductor steel reinforced
ACSS	Aluminum conductor steel supported
Act	North Dakota Energy Conversion and Transmission Facility Siting Act
AES	Alternatives Evaluation Study
APLIC	Avian Power Line Interaction Committee
ATV	all-terrain vehicle
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Commission	North Dakota Public Service Commission
Corridor Certificate Application	Certificate of Corridor Compatibility Application
CPI	center pivot irrigation
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
dB	Decibel
dBA	A-weighted decibel
DC	direct current
DOT	North Dakota Department of Transportation
EHS	extra-high-strength
EMF	electric and magnetic fields
EMI	electromagnetic interference
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ESA	Endangered Species Act of 1973, as amended
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
GAP	Gap Analysis Program
GIS	Geographic Information System
Guidelines	Commission's Guidelines for Energy Conversion and Transmission Facility Siting
HVDC	high voltage direct-current
Hz	Hertz

Abbreviation	Definition
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
kcmil	Thousand circular mils
kV	Kilovolt
LOI	Letter of Intent
MBTA	Migratory Bird and Treaty Act
MCS	Macro-Corridor Study
Minnkota	Minnkota Power Cooperative, Inc.
MW	Megawatt
NAC	Noise Area Classifications
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDGF	North Dakota Game and Fish Department
NDDTL	North Dakota Department of Trust Lands
NDPR	North Dakota Parks and Recreation Department
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electricity Safety Code
NHI	Natural Heritage Inventory
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NMPA	Northern Municipal Power Agency
NWI	National Wetland Inventory
NWR	National Wildlife Refuge
OPGW	Fiber optical ground wire
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PLOTS	Private Lands Open to Sportsmen
PLSS	Public Land Survey System
PPA	power purchase agreement
PPM	parts per million
Project	Center to Grand Forks Transmission Line Project
Project Route	Transmission line facilities locations
ROW	right-of-way

Abbreviation	Definition
Rules	NDAC Energy Conversion and Transmission Facility Siting
RUS	Rural Utilities Service
SHPO	State Historic Preservation Office
Square Butte	Square Butte Electric Cooperative
SSURGO	Soil Survey Geographic soils data
STATSGO	General State Soil Geographic
SVC	Static VAR Compensator
SWPPP	Storm Water Pollution Prevention Plan
TNC	The Nature Conservancy
TW	trapezoidal wire
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USBOR	U.S. Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service
WDA	Wildlife Development Area
Western	Western Area Power Administration
WHO	World Health Organization
WMA	Wildlife Management Area
WPA	Waterfowl Production Area
Young 2	Milton R Young Station Unit 2

1.0 Introduction

Minnkota Power Cooperative, Inc. (Minnkota), proposes to construct, operate, and maintain a 345 kilovolt (kV) transmission line and substation modifications from Center, North Dakota to Grand Forks, North Dakota called the Center to Grand Forks 345 kV Transmission Line Project (Project) (Case No. PU-09-670). Minnkota submits this application for a Transmission Facility Route Permit and respectfully requests that the North Dakota Public Service Commission (Commission) approve the Route developed for the Project (Project Route). The Project Route is approximately 250-miles-long and begins at the Center 345 kV Substation located near Center, North Dakota, and continues east to the Prairie Substation located adjacent to Grand Forks, North Dakota.

On February 18, 2011, Minnkota submitted an Application for a Certificate of Corridor Compatibility (Corridor Certificate Application) to the Commission. The Corridor Certificate Application requested approval of a 1,000-foot-wide Project Corridor. Public hearings for the Corridor Certificate Application were held June 16, 17, and 24, 2011. The Certificate of Corridor Compatibility was issued on September 7, 2011.

Minnkota is a wholesale electric generation and transmission cooperative headquartered in Grand Forks, North Dakota. Incorporated on March 28, 1940, Minnkota provides, on a nonprofit basis, wholesale electric service to 11 retail/member-owner distribution cooperatives, which are the members and owners of Minnkota. The member systems' service areas encompass 34,500 square miles in the eastern third of North Dakota and northwestern Minnesota that contains an aggregate population of approximately 300,000 people. These cooperatives serve more than 120,000 retail customers including many of the region's schools, farms, homes, and businesses.

The primary source of base load generation for the rural cooperatives is the Milton R. Young Generation Station located approximately 24 miles northwest of Bismarck, North Dakota, near the community of Center, North Dakota. Minnkota also serves as the operating agent for the Northern Municipal Power Agency (NMPA) members with respect to their 30 percent share of the output from the Coyote Station near Beulah, North Dakota, and associated transmission facilities. NMPA is the energy supplier for 12 municipal utilities located within the Minnkota service area. In addition, Minnkota has acquired, through power purchase agreements (PPAs) with large wind developers, significant North Dakota-based wind energy resources, totaling about 357 megawatts (MW) of nameplate capacity.

1.1 Compliance with the Energy Conversion and Transmission Facility Siting Act Chapter 49-22

The North Dakota Energy Conversion and Transmission Facility Siting Act (Act) requires an application for a Route Permit to meet the criteria set forth in North Dakota Century Code (NDCC) Chapter 49-22. The routing of a transmission facility is to be made in an orderly manner compatible with environmental preservation and the efficient use of resources (NDCC Section 49-22-02). Consistent with this requirement, Minnkota's policy is to locate and design the Project to minimize environmental impacts and utilize existing corridors and section lines to the extent practical.

Within this application, Minnkota presents the information required by the Act. In addition, Minnkota discusses in this application its consideration of the exclusion areas, the avoidance areas, the selection criteria, and the policy criteria set forth in North Dakota Administrative

Code (NDAC) Section 69-06-08-02 when selecting the Project Route. Also, detailed transmission line design and technical information has been provided to allow a thorough evaluation of the Project Route (see **Appendix A** for the Design Data Report).

1.1.1 Rural Utilities Service Planning Documents

Minnkota requested financing assistance from the U.S. Department of Agriculture (USDA) Rural Utilities Service (RUS) to construct the Project. RUS administers the USDA's Rural Development Utilities Program and is required to complete an environmental analysis under the National Environmental Policy Act (NEPA) (7 Code of Federal Regulations (CFR) Part 1794) prior to approving financing assistance. The RUS requires preparation of four documents, i.e., an Alternative Evaluation Study (AES), a Macro-Corridor Study (MCS), a Scoping Report, and an Environmental Assessment (EA).

Beginning in March 2009 and on-going, Minnkota initiated a public involvement process for the Project. This is an effort to inform and gather data from the public, agencies, and tribal governments on the Project. Minnkota held five public open house meetings in May 2009, presented the Project at thirteen county commissioner meetings, met with a variety of state and federal agencies at a North Dakota Inter-Agency meeting, sent letters to tribal representatives, and held an additional open house meeting in August 2009.

The objectives of the outreach efforts were to educate interested stakeholders on the Project need and description, and gather information to develop potential corridors. To achieve these objectives, Minnkota publicized the Project and public meetings through press releases, local advertisements, informational postcards to the public, and letters to county commissioners, agencies, townships, and tribes. In addition, a toll free Project information hotline and website were established to offer resources and to collect input.

Following RUS guidance, Minnkota prepared an AES to identify the Project's purpose and need and system alternatives for meeting capacity requirements utilizing the alternating current (AC) transmission system. Appendix A of the Corridor Certificate Application provides a copy of the AES. The AES was approved by the RUS in October 2009. Refer to Section 2.2 of this application for a brief overview on the Alternatives that were studied.

In October 2009, Minnkota completed a MCS to begin the process of identifying corridors for potential routes. Refer to Appendix B of the Corridor Certificate Application for a copy of the MCS. Development of the MCS was a tiered process that narrowed a large study area into preliminary study corridors and then into macro-corridors. The MCS provided information about environmental, land use, social, cultural, and permitting factors for the macro-corridors. The macro-corridors evaluated for the Project were typically 6-miles-wide, while some portions of the macro-corridors were 8-miles-wide, such as near the Milton R Young Unit 2 Generation Station (Young 2) and the Prairie Substation. Study corridors were developed by considering the following criteria:

- Parallel existing rights-of-way (transmission lines, pipelines, railway, or roads), survey lines, section/field lines, and natural division lines;
- Avoid populated areas;
- Avoid major environmental natural features (Lake Ashtabula, Jamestown Reservoir, National Wildlife Refuges, Wildlife Management Areas, Wildlife Development Areas);
- Cross major rivers at areas in the vicinity of existing transmission line crossing;
- Avoid public airports;

- Maximize transmission system reliability (e.g., maintain maximum distance from existing system transmission lines);
- Minimize length; and
- Follow the Commission's Exclusion and Avoidance Area Criteria set forth in NDAC Section 69-06-08-02.

The purpose of the MCS was to identify potential constraints (natural or human resources that conflict with the location of new transmission line facilities) and opportunities (locations or areas well suited for the location of new transmission line facilities) that were considered when developing the macro-corridors. Generally, constraint areas were avoided, or at least minimized during the macro-corridor development process, and opportunities were used, to the extent practicable, to develop corridors between the two substations. Within the backdrop of constraints and opportunities, practical considerations such as total project length and potential cost issues were also considered.

In November 2009, the RUS held public and agency scoping meetings across the macro-corridors to gain input on opportunities and constraints within the macro-corridors. The goals of the public and agency meetings were to answer questions, provide information regarding the Project description, location, and need, and identify concerns regarding the potential environmental impacts. The agency meetings discussed compliance and permitting requirements and covered the range of issues to be addressed in the EA. In March 2010, the RUS released a Scoping Report for the Project. The Scoping Report summarized the public scoping process and inter-agency consultation regarding the macro-corridors and potential Project alternatives. Refer to Appendix C of the Corridor Certificate Application for a copy of the Scoping Report.

Following the release of the Scoping Report, the EA process began for the Project. Comments from the Scoping Report and state and federal agencies, Native American tribes, governmental representatives, and the public were used by Minnkota to identify potential Project impacts and refine the macro-corridors to develop EA "route" alternatives. Throughout the EA process, three 1,000-foot-wide "route" alternatives and 38 1,000-foot-wide segment alternatives were developed within the macro-corridors. Through the NEPA process and EA analysis of "route" and segment alternatives, Minnkota selected a preferred 1,000-foot-wide "route" alternative. Appendix D of the Corridor Certificate Application provided a copy of the EA.

In November 2010, the RUS released the EA for public and agency review during a 30-day-long EA comment period. The EA Comment Report was being prepared at the time this Route Permit application was prepared. Comments on the EA were used in developing the Corridor application and this Route Permit application. The preferred "route" alternative within the EA was further refined based on landowner discussions and was presented as the proposed Project Corridor within the Corridor Certificate Application. The RUS Finding of No Significant Impact (FONSI) is expected to be finalized and published in the first quarter of 2012.

1.1.2 Letter of Intent and Waiver of One-Year Notice

The Corridor Certificate Application included a discussion of Minnkota's Letter of Intent (LOI) to submit an application for a combined Certificate of Corridor Compatibility and Route Permit and a request for a waiver of the one-year notice period between filing the LOI and Certificate of Corridor Compatibility and Route Permit application. Refer to the Corridor Certificate Application Section 1.1.2 for details concerning the LOI.

1.1.3 Request for Commission Guidance Regarding a Route Proposal

The Corridor Certificate Application included discussion of Minnkota's request for Commission guidance on routing issues, including a Minnkota-specific routing proposal that addressed unique Project challenges. Refer to the Corridor Certificate Application Section 1.1.3 for details concerning the guidance request.

1.1.4 Certificate of Corridor Compatibility

On February 18, 2011, Minnkota submitted an application to the Commission for a Certificate of Corridor Compatibility. Consistent with the response letter to Minnkota from Commission Staff, dated May 13, 2010, the Corridor Certificate Application sought approval of a 1,000-foot-wide corridor for the Project. Public hearings on the Corridor Certificate Application were held June 16, 17, and 24, 2011. A Certificate of Corridor Compatibility approving a corridor for the Project (Project Corridor) was issued on September 7, 2011.

1.1.5 Proposed Corridor Modifications

Following issuance of the Certificate of Corridor Compatibility, Minnkota worked with landowners, agencies and others to identify a proposed Project Route within the Project Corridor that satisfies the siting criteria set forth in the Siting Act and Siting Rules and addresses various concerns raised both during and outside of the Corridor Certificate Application public hearings. The proposed Project Route identified falls slightly outside of the Project Corridor in five locations. For this reason, in addition to seeking a Route Permit for the proposed Project Route, Minnkota also requests that the Commission approve the five corridor modifications required to accommodate the proposed Project Route (proposed Modified Project Corridor). More specific information regarding the corridor modifications requested is set forth in Minnkota's Request for Modification of the Project Corridor and for Waiver of Procedures and Time Schedules (Corridor Modification and Waiver Request), which accompanies this Route Permit Application.

1.1.6 Route Permit

Table 1.1-1 outlines the information required to fulfill the requirements to obtain a Route Permit from the Commission using the Commission's Guidelines for Energy Conversion and Transmission Facility Siting (November 1979) and identifying where these requirements are addressed in this application. This Route Permit Application sets forth Minnkota's proposed Project Route within the proposed Modified Project Corridor.

Table 1.1-1. Route Permit Completion Checklist

State Authority	Description	Section
Chapter 49-22	Commission Guidelines: Energy Conversion and Transmission Facility Siting	1.1
Section A	Description	1.2, 4.2
1.	Type: Describe the type of transmission facility proposed.	1.0, 1.2, 4.2
2.	Product: Describe the product or products to be transmitted.	1.2.2
3.	Size and Design: Provide a general description of the proposed size and design, and any alternate size or design, which was considered. Provide one (1) copy of the design data report, separate from the application, for the proposed facility and any associated facilities.	4.0, Appendix A

State Authority	Description	Section
4.	Time Schedule: Provide the anticipated time schedule for the accomplishment of major events including, at a minimum, the following:	1.3
a.	Route Permit;	1.3
b.	Right-of-way acquisition complete;	1.3
c.	Construction start date;	1.3
d.	Construction complete;	1.3
e.	Test operations; and	1.3
f.	In-service date.	1.3
Section B	Location	Figure 3.1, Preliminary Plan and Profile, Appendix B
1.	Discuss the utility's policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives.	3.4
2.	Discuss the factors listed in Section 49-22-09, NDCC to aid the Commission's evaluation of the proposed route.	7.0
a.	Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.	7.1
b.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	7.2
c.	The potential for beneficial uses of waste energy from a proposed energy conversion facility	7.3
d.	Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated.	7.4
e.	Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects.	7.5
f.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.	7.6
g.	The direct and indirect economic impacts of the proposed facility	7.7
h.	Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.	7.8
i.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	7.9
j.	The effect of the proposed site or route on areas which are unique because of biological wealth or because they are habitats for rare and endangered species	7.10
k.	Problems raised by federal agencies, other state agencies, and local entities	7.11

State Authority	Description	Section
3.	Identify and map the criteria that led to the proposed route location within the designated corridor.	Figures, 1.2.1, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6
4.	Discuss in detail the relative value of each criteria and how the location, construction, and operation of the facility will affect each criteria.	1.2.1, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6
5.	The criteria to be evaluated shall include at a minimum all of the following which are within the designated corridor:	3.0
a.	Exclusion areas;	3.1
b.	Avoidance areas;	3.2
c.	Selection criteria;	3.3
d.	Policy criteria;	3.4
e.	Design and construction limitations; and	3.5
f.	Economic considerations.	3.6
6.	Discuss the mitigative measures that will be taken to minimize adverse impacts which result from the location, construction, and operation of the facility.	5.1.3, 5.2.3, 5.3.3, 5.4.3, 5.5.3, 5.6.3, 5.7.3, 5.8.3, 5.9.3, 5.10.3, 5.11.3, 5.12.3, 5.13.3, 5.14.3, 5.15.3, 5.16.3, 5.17
7.	List the qualifications of the people in the various disciplines that contributed to the facility route location study	7.0
8.	Maps	Figures
a.	Map the criteria within the designated corridor showing the proposed route and location of any new associated facilities. Several different criteria may be shown on each map, depending on the map scale and the density and nature of the criteria. Minimum map scale shall be ½ inch = 1 mile. All maps shall be at the same scale unless otherwise specified.	Figures
b.	Furnish one (1) set of Mylar maps, separate from the application, of the same scale as the criteria maps and showing the same basic features as the criteria maps, including the designated corridor, but not the proposed route or location of any new associated facilities.	Figures. GIS-based maps are included with this Application in lieu of Mylar maps
c.	Furnish one (1) set of uncontrolled 9x9 inch stereo-pair aerial photographs, separate from the application, with acceptable resolution showing the designated corridor, proposed route and location of any new associated faculties, and Section, Township and Range numbers, at a scale of 1 inch = 2000 feet, together with a flight map at a scale of ½ inch = 1 mile showing each flight line and the beginning and ending photo number of each flight line. Photo mosaic strip maps will also be acceptable. If the applicant can demonstrate that because of the limited size and scope of the project, aerial photographs would not be practical, this requirement may be waived.	Figures. GIS-based maps are included with this Application.

1.2 Project Summary

The Project consists of approximately 250 miles of new, high voltage AC transmission line from the existing Center 345 kV Substation at the Milton R. Young Generation Station located about 4.5 miles southeast of the town of Center, North Dakota in Oliver County, to the existing Prairie Substation located on the western boundary of the city of Grand Forks, North Dakota in Grand Forks County (**Figure 1**). The Project will deliver energy from existing base load generation to Minnkota's cooperative members. While final engineering and design have not been completed, the majority of the line will be constructed with self-supported mono-pole tubular steel structures. Typical structures will be approximately 140-feet-high and placed approximately 1,000-feet apart. The typical right-of-way (ROW) is 150-feet-wide. In some limited instances, where specialty structures are required for long spans, additional ROW may be needed for the transmission line and this will be stated within the easement agreement. A preliminary plan and profile is attached. Final structure locations and design information will be provided to the Commission prior to construction.

1.2.1 Study Area, Project Corridor, and Route Development Summary

The Project's NEPA-compliance requirement changed corridor and route development from the traditional two-step process (i.e., Certificate of Corridor Compatibility and Route Permit), to a four-step process (i.e., MCS, EA, Certificate of Corridor Compatibility, and Route Permit). Section 1.1.1 describes in more detail the NEPA-compliance documents. Minnkota identified a need for additional power generation in northeast North Dakota and northwest Minnesota. Transmission constraints in this area were also threatening the stability of the regional transmission system. Minnkota defined a Study Area, rectangular in shape, that encompassed an area from Young 2 near Center, North Dakota (in the west), to Grand Forks and Fargo, North Dakota (in the east). The Study Area was narrowed into preliminary study corridors, based upon the criteria discussed in Section 1.1.1. Preliminary study corridors were developed to terminate in Grand Forks and Fargo. System impact studies indicate that a termination in Grand Forks supports a higher North Dakota load serving limit for the regionally limiting contingency. Voltage stability limits for prior-outage contingencies were also shown to be higher for the Grand Forks alternative. Fargo was not recommended as an end point due to the increased benefits shown from terminating in Grand Forks (refer to the AES provided in Appendix A of the Corridor Certificate Application).

Minnkota began the route development process by preparing the AES to identify alternatives for meeting capacity requirements and also prepared a MCS to begin the process of identifying a corridor for potential routes. The MCS was developed for the RUS and provided information about environmental, land use, social, cultural, and permitting factors for the macro-corridors within the Study Area (refer to the MCS provided in Appendix B of the Corridor Certificate Application). The RUS conducted a series of public meetings and an agency meeting to gain input on opportunities and constraints within the macro-corridors. The Scoping Report summarizes the comments collected during the meetings and a 30-day comment period (refer to the Scoping Report provided in Appendix C of the Corridor Certificate Application). Based on comments from the Scoping Report, public and agency input, and Minnkota's review of the macro-corridors, an EA was developed and a preferred 1,000-foot-wide Project Route was selected (refer to the EA provided in Appendix D of the Corridor Certificate Application). The preferred 1,000-foot-wide "route" alternative selected in the EA was further refined based on

landowner input and environmental studies and was presented to the Commission as the proposed Project Corridor in the Corridor Certificate Application.

The factors addressed in NDCC Section 49-22-09 were considered in identifying the Project Route for a 345 kV transmission line within the proposed Modified Project Corridor. The factors are discussed in Section 5.0. All exclusion and avoidance area criteria were considered in selecting the Project Route within the proposed Modified Project Corridor. Minnkota sought to avoid residential areas, irrigated land, recreational areas, wildlife, and conservation areas and to minimize impacts to agricultural fields to the extent practicable. Minnkota also considered utilizing existing rights-of-way and Public Land Survey System (PLSS) lines when crossing agricultural fields and interconnecting with existing infrastructure where possible, such as with the existing substations at both ends of the Project. This is consistent with the Commission's Policy Criteria for transmission corridors and routes (see NDAC Sections 69-06-08-02(2)(e), 69-06-08-02(4)(i), and 69-06-08-02(4)(g)), which encourage applicants to avoid residences and to maximize benefits by coordinating facilities and utilizing existing and proposed rights-of-way and corridors.

1.2.2 Product

The Project will transmit Young 2 output from the existing Center 345 kV Substation (located northeast of the Milton R. Young Generation Station, near Center, North Dakota) to the existing Prairie Substation in Grand Forks, North Dakota. The line is intended to be energized at 345 kV AC. Much of the energy transmitted on the new transmission line will be used to serve Minnkota customers in North Dakota and Minnesota.

1.3 Project Schedule

Minnkota's construction schedule will be set by satisfactorily reaching a number of milestone agreements and obtaining required approvals. The in-service date is dependent upon permitting and development activities. Minnkota is targeting construction to begin in spring/summer 2012, provided that Minnkota can secure all preconstruction permits and approvals. No future Project expansions or additions are anticipated at this time.

1. **Certificate of Corridor Compatibility:** Minnkota submitted a Corridor Certificate Application in February 2011. The Commission issued a Findings of Fact, Conclusions of Law and Order for a Certificate of Corridor Compatibility on September, 7, 2011. Minnkota anticipates that the proposed Modified Project Corridor will be approved at the same time the Route Permit is issued in the first quarter of 2012.
2. **Route Permit:** Minnkota submits this Route Permit application for the Project. Minnkota anticipates the Route Permit will be issued in the first quarter of 2012. It is critical for Minnkota to receive the Route Permit as soon as possible, as completing this step will allow Minnkota to move forward with other commitments associated with the Project, including ordering long-lead-time equipment and securing other permits and approvals.
3. **Right-of-Way Acquisition Complete:** Minnkota is responsible for all right-of-way acquisition and is in the process of obtaining the necessary easement options from landowners. The voluntary land acquisition process is anticipated to be substantially complete by winter 2011.

4. **Equipment Procurement, Manufacture, and Delivery:** Minnkota will order the transmission and substation components as soon as practicable. Once the components have been ordered, delivery is anticipated to occur so as to allow construction to be completed by the 4th quarter 2013.
5. **Construction:** Project construction is expected to begin in spring/summer 2012, subject to obtaining applicable permits. Construction will take approximately twenty months to complete.
6. **Test and Operations:** Minnkota expects system commissioning will occur in 4th quarter 2013.
7. **In-Service Date:** The expected in-service date is 4th quarter 2013.

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2.0 Need for Facility

2.1 Needs Analysis

Over the past ten years, Minnkota's load has grown at a rate of 2.9 percent annually (refer to the AES provided in Appendix A of the Corridor Certificate Application). In addition, Minnkota's 2009 Load Forecast Study showed that load will continue to grow at a rate of approximately 1.9 percent annually over the next 25 years (Minnkota 2010a). In order to adequately serve this future load growth, Minnkota must increase its base load generation resources. In particular, additional base load generation is needed by the winter of 2013 to address an increased need for electricity to serve new residences, commercial accounts, and pipeline pumping projects (Minnkota 2010a).

To address the need for additional base load generation resources, Minnkota will acquire additional generation from Young 2 in early 2013 and eventually acquire all of the Young 2 output. A more detailed needs analysis is included in Section 2.0 of the Corridor Certificate Application.

2.2 Alternatives

Minnkota conducted an AES on the Project for the RUS, which discussed system alternatives for addressing Minnkota's Young 2 output transmission requirements utilizing the AC transmission system. The AES was included as Appendix A to the Corridor Certificate Application. As discussed in the AES, regional transmission studies and Minnkota-specific system studies have shown that the best solution for addressing Minnkota's transmission requirements, as well as for meeting the voltage stability and load-serving capability needs of the Red River Valley region, is to construct a new transmission facility. The Project is needed to transmit the baseload generation to meet anticipated customer demand from Young 2 to the Red River Valley and to improve regional electrical system reliability. The AES analyzed specific alternatives to the Project (i.e., No Action, 230 kV Line, and 345 kV Line from Center to Fargo). These alternatives are discussed in detail in Section 2.2 of the Corridor Certificate Application.

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3.0 Transmission Facility Route Criteria

The Project Route selection included an inventory and suitability analysis of criteria listed in NDAC Section 69-06-08-02, including exclusion and avoidance area criteria; selection criteria that relate to minimizing potential land use and environmental impacts; policy criteria that relate to maximizing public benefits; and design and construction limitations. Minnkota also included economic considerations.

The ROW is the 150-foot-wide area in which the transmission line facility will be constructed and the Route refers to the specific locations of the transmission line facilities. **Figure 2** displays Project Route siting criteria used to determine the location of the Project Route.

3.1 Exclusion Areas

Per Section 69-06-08-02(1), the geographical areas listed in **Table 3.1-1** shall be excluded in the consideration of a route for a transmission facility, and shall include a buffer zone of reasonable width to protect the integrity of the area. Exclusion areas are mapped for the Project Route in **Figure 3**.

Table 3.1-1. Exclusion Areas

Geographic Area	Present within Project ROW	Proposed Buffer	Section Addressed
Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; monuments; and wilderness areas	Not present within Project ROW.	No impacts are anticipated and no buffer is proposed.	5.2; 5.7; 5.8
Designated or registered state: parks; historic sites; monuments; historical markers; archaeological sites; and nature preserves	Not present within Project ROW.	No impacts are anticipated and no buffer is proposed.	5.2; 5.7; 5.8
County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions	Not present within Project ROW.	No impacts are anticipated and no buffer is proposed.	5.2, 5.8

Geographic Area	Present within Project ROW	Proposed Buffer	Section Addressed
Areas critical to the life stages of threatened or endangered species	Missouri River is designated critical habitat for federally threatened piping plover. River will be spanned by the transmission line. Minnkota is working with the U.S. Fish and Wildlife Service (USFWS) on the Missouri River crossing for the Project Route.	The RUS has engaged the USFWS in the Section 7 consultation process to ensure that the Project will not jeopardize the continued existence of any listed species or adversely modify critical habitats. No direct impacts within critical habitat expected; transmission line will span Missouri River, with structures being placed approximately 150-feet-away (back) from river's edge. Minnkota will not construct the Missouri River crossing during the typical breeding season for the piping plover. During construction, no equipment will be located within the Missouri River.	5.2, 5.8, 5.14; 5.15, 5.16
Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged	No. Areas containing unique or rare plant or animal species are present within the Project ROW, but these areas and unique or rare species will not be irreversibly damaged by the Project Route.	See Section 5.16.3 for a list of mitigation and minimization measures Minnkota has identified. The Project is not expected to result in the listing of or jeopardizing of continued existence of any wildlife species, and will not violate any wildlife protection laws. Some examples of mitigation and minimization measures include shield wire marking, spanning the Missouri River, constructing the Missouri River crossing between November and the following March, pre-construction piping plover surveys, and designing the transmission line following Avian Powerline Interaction Committee (APLIC) standards.	5.2, 5.8, 5.15, 5.16

3.2 Avoidance Areas

Per Section 69-06-08-02(2), the geographical areas listed in **Table 3.2-1** shall not be considered in the routing of a transmission facility unless the applicant shows that under the circumstances there is no reasonable alternative. In determining whether an avoidance area should be designated for a facility, the Commission may consider, among other things, proposed management of adverse impacts; orderly siting of facilities; system reliability and integrity; efficient use of resources; and alternative routes. Avoidance areas are mapped for the Project Route in **Figure 3.**

Table 3.2-1. Avoidance Areas

Avoidance Area	Present within Project ROW	Proposed Buffer	Section Addressed
Designated or registered national: historic districts; wildlife areas; wild, scenic or recreational rivers; wildlife refuges; and grasslands	Not present within Project ROW.	No impacts are anticipated and no buffer is proposed. Access will be maintained and recreational activity may continue.	5.2; 5.7; 5.8; 5.12; 5.15
Designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands	1 Wildlife Management Area (WMA) (Wilbur Boldt).	The Project Route avoids the WMA (no structures or conductors will be placed within the WMA). However, the Project ROW will overhang the WMA. Minnkota has submitted an application for an overhang easement to the North Dakota Game and Fish Department (NDGF) for the Wilbur Boldt WMA. Access will be maintained and recreational activity may continue.	5.8; 5.12; 5.14
Historical resources which are not specifically designated as exclusion or avoidance areas	- 21 archaeological resource sites have been identified within the Project ROW. - 36 architectural resources have been identified within the Architectural APE - 26 historic structures from SHPO database and 10 eligible structures from the architectural inventory. The Architectural APE extends 0.5 mile on either side of the Project ROW centerline and 1 mile on either side of the Project ROW centerline at the Missouri River crossing	9 structures will be located in four archaeological resource areas – 3 structures within two sites and 6 structures within two site lead boundaries, no impacts anticipated since additional testing will occur at the two site and the two site lead boundaries were surveyed and found archaeological material. Minnkota will seek SHPO concurrence prior to construction. One architectural resource will be visually impacted by the Project Route, but the impact will be mitigated through screening. No architectural resources are located within the Project ROW. Minnkota is in the process of conducting cultural resource field surveys of high probability areas to avoid impacting cultural resource sites identified in the ROW. In addition, Minnkota will monitor auger locations in areas that have a high potential for deeply buried sites. The Programmatic Agreement, as executed by the SHPO, outlines the procedures for the identification and treatment of sites.	5.7

Avoidance Area	Present within Project ROW	Proposed Buffer	Section Addressed
Areas that are geologically unstable	Not present within Project ROW.	No impacts are anticipated and no buffer is proposed.	5.11
Within 500 feet of a residence, school, or place of business	- 10 occupied or vacant, but occupiable homes within 500-feet feet of the Transmission Facility. - 1 vacant, not habitable home is located within the Project Route and will be removed.	Minnkota developed a route to avoid occupied homes by maximizing setbacks to the extent practicable. In some instances, it was preferable for the Project Route to pass within 500 feet of an occupied residence due to other routing factors. Minnkota has obtained waivers of the 500-foot setback requirement for 9 occupied homes and the 1 vacant, not habitable home.	5.2; 5.3; 5.9
Reservoirs and municipal water supplies	Not present within Project ROW.	Minnkota does not anticipate direct or indirect effects to reservoirs and municipal water supplies.	5.3; 5.11; 5.12
Water sources for organized rural water districts	The McClusky Canal will be crossed by the Project Route at two locations. At both locations, two structures will be placed on uplands of the canal. Rural water pipelines may potentially be present.	The McClusky Canal will be crossed by the Project Route, but no direct impacts to the canal are anticipated. A Special Use Permit will be obtained from the U.S. Bureau of Reclamation (USBOR) for installation of two structures on USBOR property. Minnkota will conduct a survey for underground utilities and does not anticipate direct or indirect effects to rural water districts.	5.3; 5.11
Irrigated land. This criterion shall not apply to an underground transmission facility.	Not present within Project ROW.	No impacts are anticipated and no buffer is proposed.	5.2; 5.9
Areas of recreational significance which are not designated as exclusion areas	- North Country National Scenic Trail. - Lewis and Clark National Historic Trail. - Chain of Lakes Recreation Area (McClusky Canal). No reasonable alternative exists to crossing these trails and canal.	Minnkota will span trails. One structure will be located within the Chain of Lakes Recreation Area (McClusky Canal) totaling about 78.5 sq ft of permanent impact. Minnkota is applying for a Special Use Permit from the USBOR. Visual impacts will be minimized by placement of structures away from these features to the extent practicable. Access will be maintained and recreational activity may continue.	5.8

3.3 Selection Criteria

Per Section 69-06-08-02(3), a route shall be designated only when it is demonstrated to the Commission by the applicant that any significant adverse effects resulting from the location, construction, and maintenance of the facility, as they relate to the following, will be at an acceptable minimum or that those effects will be managed and maintained at an acceptable minimum (**Table 3.3-1**). **Figures 2**, **3,** and **4** identify the selection criteria for the Project

Table 3.3-1. Selection Criteria

Selection Criteria	Potential Adverse Effects	Section Addressed
Agricultural production	Permanent impacts will occur as a result of structure placement in tillable soil, expansion of the Center 345 kV Substation, installation of the fiber optic stations, and fiber optic station access road development; impacts are approximately 78.5 square feet per structure or a total of about 6.5 acres for the Project (includes about 4.2 acres of Restricted Tillage Area as described in section 5.9). Temporary construction impacts such as soil compaction and crop damage will likely occur; approximately 2,827 square feet per structure or a total of about 715.4 acres for the Project. Minnkota will work with landowners to minimize impacts to their land.	5.2; 5.9
Family farms and ranches	Eleven homes (10 occupied and 1 vacant, not habitable) are present within 500-feet of the transmission facility. The closest home to the Project Route (about 49 feet) is Minnkota owned. Minnkota will work with landowners to minimize impacts to their land and farming and/or ranching operations.	5.2; 5.9
Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation	No CPI systems are present within the Project ROW. It is likely land economically suitable for irrigation is present within the Route; however, Minnkota will work with landowners to minimize impacts to their land.	5.2, 5.9

Selection Criteria	Potential Adverse Effects	Section Addressed
Surface drainage patterns and ground water flow patterns	No impacts are anticipated to rivers, streams, and drainage ways resources. Minnkota will span all rivers and streams to the extent practicable. A Sheyenne River hydrology study has been completed for the Project. The removal of soil and groundwater at each structure location is not anticipated to impact local groundwater flow patterns due to the temporary and small-scale nature of the removal. Structures will be placed in floodplains on the Missouri River, Sheyenne River, Goose River, Little Goose River, and English Coulee. Structures will be designed to withstand flood conditions, as necessary. The Missouri River floodplain crossing requires three transmission structures, totaling approximately 4,078 square feet of permanent impacts. For the Sheyenne River, three transmission structures are necessary within the floodplain totaling approximately 236 square feet of permanent impacts. Three crossings of the English Coulee floodplain are required; the flood retention area requires five transmission structures, totaling 393 square feet of permanent impacts, 3 structures are required at the second location with 231 square feet of impact, and no impacts would occur at the third crossing. Two structures are necessary to cross the Goose River resulting in 157 square feet of floodplain impact, and one structure would affect the Little Goose River floodplain with 78.5 square feet of permanent impacts. To minimize impacts during construction, a National Pollutant Discharge Elimination System (NPDES) permit and a Storm Water Pollution Prevention Plan (SWPPP) will be prepared and a Notice of Intent (NOI) will be submitted to the North Dakota Department of Health.	5.11, 5.12
Noise sensitive land uses	Ten occupied homes and one vacant, not habitable home are within 500-feet of the Project Route. These homes may experience short-term effects during construction such as elevated noise levels and increased vehicle traffic. However, no noise impacts are anticipated during Project operation. Closest occupied structure from the Center 345 kV Substation is about 5,380 feet and from Prairie Substation is about 2,880 feet. No impacts to noise sensitive land uses are anticipated due to substation upgrades.	5.5
The visual effect on the adjacent area	The transmission line will be visible to individuals traveling on adjacent roads and to residences and landowners that live close to the transmission line and substations. The Project Route selected minimizes the number of residences potentially impacted by the line. Minnkota sited the Route along field lines away from residences to the extent practicable.	5.6
Extractive and storage resources	2 gravel pits are located within the Project ROW. These landowners have not indicated future extraction plans. Minnkota has addressed a future extraction strategy with the landowners within their option agreements. No adverse effects are anticipated.	5.2; 5.9
Wetlands, woodlands, and wooded areas	Wetland surveys will be completed prior to construction to avoid or minimize the placement of transmission structures within wetlands. The most common wooded areas are shelterbelts in fields and around residences and buildings. Some rivers and streams crossed by the Route may have a wooded, riparian fringe. If impacts to wetlands and woodlands cannot be avoided, options to minimize impacts will be considered and mitigation will be proposed consistent with regulatory requirements.	5.9; 5.13; 5.14

Selection Criteria	Potential Adverse Effects	Section Addressed
Radio and television reception and other communication or electronic control facilities	No communication towers are located in the Project ROW. The communication tower located within the Project Corridor will limit where adjacent structures are placed in relation to the tower, but will not impact operation of the Project or the communication tower.	5.3; 5.9
Human health and safety	Once construction is complete, the transmission line will span all roads and therefore will not impede emergency services. Minnkota conducted an electric and magnetic field (EMF) effect estimate for the Project (as shown in Table 5.4-4). Results of the estimate show that calculated EMF levels for maximum operating conditions and normal operating conditions are below published guidelines. Minnkota will design the Project to meet National Electric Safety Code (NESC) standards. Safety concerns related to electric fields are sufficiently addressed by adherence to the NESC. No additional mitigation is required or anticipated.	5.3; 5.4
Animal health and safety	No impacts to livestock are anticipated. Impacts to wildlife populations are expected to be minimal. Minnkota has committed to marking the shield wires in select areas and designing the line and structures per APLIC guidelines.	5.4; 5.9; 5.15; 5.16
Plant life	The project area is primarily agricultural in nature. The most common type of rare plant communities in the Project ROW is western wheatgrass prairie, needle and thread mixed grass prairie, and cottonwood-green ash floodplain forests near the Missouri and Sheyenne Rivers. Permanent impacts to plant life will occur at structure and fiber optic station locations and areas of tree clearing. Areas of temporary construction impacts will be restored. Construction impacts to wooded areas will be limited to the 150-foot-wide right-of way in compliance with NERC standards for transmission facilities; low growing woody vegetation within the right-of-way may be allowed if it does not interfere with the safe operation and maintenance of the line. Impacts to individual trees would be replaced at a ratio of 2:1.	5.14

3.4 Policy Criteria

Per Section 69-06-08-02(4), the Commission may give preference to an applicant that will maximize benefits that result from the adoption of the following policies and practices, and in a proper case may require the adoption of such policies and practices (**Table 3.4-1**).

Table 3.4-1. Policy Criteria

Policy Criteria	Suitable Policy or Practice of Applicant	Section Addressed
Location and design	Minnkota's policy is to locate and design to minimize environmental impacts and utilize existing corridors.	1.1; 1.2.1
Training and utilization of available labor in this state for the general and specialized skills required	Minnkota has discussed with construction contractors the use of local labor and will compile a listing of available local labor for use during construction.	5.1

Policy Criteria	Suitable Policy or Practice of Applicant	Section Addressed
Economies of construction and operation	Minnkota will utilize specialty contractors with proven experience in large transmission projects. Economy is obtained by originating and terminating into existing jointly owned substation facilities.	5.1
Use of citizen coordinating committees	Minnkota will work with landowners of properties crossed by the Project to site the transmission facility, and it is not anticipated that citizen coordinating committees will be necessary.	See Section 6.0 in the Corridor Certificate Application
A commitment of a portion of the transmitted product for use in this state	Energy transmitted by the Project will be used in Minnkota's service territory, which includes North Dakota.	1.0; 1.2;
Labor relations	No labor relations will be affected.	5.1
Coordination of facilities	Minnkota has coordinated and will continue to coordinate with area utilities regarding the location of the facilities to maximize benefits and minimize duplication of efforts.	1.2.1; 1.2.2
Monitoring of impacts	Minnkota will utilize BMPs during construction to minimize environmental impacts and will monitor construction compliance with the commitments made in this application and applicable permit conditions, including the Commission's Order.	5.10.3; 5.14.3; 5.15.3
Utilization of existing and proposed rights-of-way and corridors	One of the primary goals in locating the Project Route was to maximize use of existing rights-of-way, corridors, and field breaks, to the extent practical. Paralleling opportunities are shown in Table 5.2-3.	1.2.1; 5.2
Other existing or proposed transmission facilities	Paralleling opportunities will be utilized to the extent practical. Project will utilize the existing Center 345 kV Substation and Prairie Substation.	1.2; 4.2.4; 5.2

Minnkota's policy #5-LA-1 clarifies its position relative to environmental laws and regulations, and states that:

It is a policy of Minnkota Power Cooperative to obey all laws and comply with all regulations promulgated pursuant to those laws affecting and governing the operation of Minnkota.

This is especially emphasized in the area of environmental laws and regulations. Each employee must be aware that there may be environmental responsibilities and requirements relating to their job at Minnkota. Each employee must follow rules they are instructed to observe relating to compliance with these legal responsibilities and requirements.

Minnkota's environmental policies are consistent with Commission policy criteria outlined in NDAC Section 69-06-08-02(4).

3.5 Design and Construction Limitations

Design and construction limitations for a transmission line within the Project ROW are primarily associated with the location of the transmission line. The Project Route is the most direct route that also minimizes impacts to the criteria identified in Section 69-06-08-02.

Most wetland impacts will be avoided through careful routing of the transmission line and associated facilities. Where impacts occur, they will be minimized by matting. Since new easements may be secured by the USFWS and USDA Natural Resource Conservation Service (NRCS), Minnkota continues to work with the agencies and landowners to obtain the exact locations of USFWS grassland and wetland easements and NRCS – Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP) parcels. In April 2011, locations of USFWS easements current through October 2010 were obtained in order to assess impacts and begin permitting conversations. In September 2011, a field review of the easement locations was conducted with the USFWS.

Following geotechnical exploration, it may become necessary to utilize special structures to avoid sensitive environmental features or different construction methodology may be required such as a specific footing design to accommodate soil features or other design limitations. The Missouri River crossing will require a special structure, i.e., a three pole structure with each phase supported by a separate pole (**Table 4.2-2**).

3.6 Economic Considerations

There are several economic considerations in deciding where the Project should be routed. Overall, minimizing the length decreases the cost to construct the transmission line due to less material and ROW needed and less potential affects upon the land use. Minimized length also reduces line loss, as electricity travels from the generation source to the end user. As described in Section 2.2, this line design is the most economical and efficient alternative to deliver the electricity.

The single-pole, self-supporting design will have a smaller footprint on the land than other structure types (H-frame or three-pole) thereby minimizing environmental impacts. Another consideration in decreasing cost is in minimizing the number of corner structures required for the transmission line. Corner structures increase project costs, since special structures and engineering are typically required. They also slightly increase environmental impact as they have a larger construction footprint. Minnkota attempted to minimize the overall Project costs while simultaneously considering exclusion areas, avoidance areas, selection criteria, policy criteria, and landowner concerns.

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4.0 Engineering and Operational Design

Engineering design data is presented in **Appendix A**. Minnkota submits a preliminary plan and profile (attached). A legal description for the Project Route is provided in **Appendix B**. Reference **Figure 2** for the Project Route.

4.1 General Route Description

The following is a description of the Project Route from west to east starting at the Center 345 kV Substation and ending at the Prairie Substation (**Figure 1**). The Project Route is approximately 250-miles-long. The Project Route proceeds diagonally northeast out of the Center 345 kV Substation for about 0.9 miles to the section line, then proceeds due east along the section line for about 3.25 miles. The Project Route then turns diagonally southeast on a cross-country path for about 0.5 miles, then proceeds east for approximately 0.75 miles, then northeast for about 0.5 miles to the section line. The Project Route travels east along the section line for about 3 miles, then diagonals to the northeast for about 1 mile, then turns to travel east for almost 3 miles to the Missouri River. It crosses the Missouri River about 0.16 miles north of the existing HVDC transmission line on the west side of the river and about 0.5 miles north of the existing HVDC transmission line on the east side of the river. From the west side of the Missouri River, the Project Route proceeds diagonally northeast for almost 2 miles, crossing State Highway 1804, then the Project Route proceeds east along 279th Ave NE for about 2.25 miles. The Project Route then proceeds north for about 0.75 miles before turning diagonally northwest for about 2 miles. The Project Route then proceeds north for 3.75 miles along a section line, and then east for about 5.5 miles along a quarter-section line to within 0.5 miles west of State Highway 41.

The Project Route proceeds north for about 8.5 miles along the quarter-section line about 0.5 miles west of State Highway 41, turns east for approximately 2 miles along State Highway 41, and follows State Highway 41 to the north for about 9 miles; within this segment, the Project Route spans the McClusky Canal and Chain of Lakes Recreation Area. The Project Route turns east for about 2 miles along 3rd St NW to the McLean/Sheridan County line. The Project Route proceeds diagonally, cross-country for about 2.4 miles to 5th St NW; then turns east along 5th St NW for about 0.75 miles. The Project Route travels diagonally, cross-country for about 7 miles, then diagonally northeast for 0.75 miles to the west side of 1st Ave NE in Sheridan County. At that point the Project Route proceeds east (about 0.25 miles north of 10th St NE) for about 20.5 miles; within this segment, the Project Route crosses the McClusky Canal and State Highway 14. The Project Route turns south for about 0.25 miles to 10th St NE/the section line; then turns east along the section line for about 4 miles, before turning north for about 0.25 miles to the quarter-section line. The Project Route goes east for about 1 mile approximately 0.25 miles north of 10th St NE. The Project Route turns south for about 0.25 miles to the section line, then travels east for about 2.25 miles along the section line to within 0.25 miles west of State Highway 3, and then proceeds north for about 1 mile to 11th St NE. The Project Route turns east along 11th St NE for about 6.75 miles, crossing State Highway 3, then turns north for about 1 mile on a quarter-section line to 12th St NE. The Project Route turns east along 12th St NE for about 9 miles, crossing U.S. Highway 52; then turns north for about 1.5 miles on a quarter-section line between 44th Ave NE and 45th Ave NE. The Project Route turns east along a quarter-section line for about 17.5 miles to 62nd Ave NE, crossing State Highway 30. The Project Route turns north along 62nd Ave NE for about 0.25 miles, then turns east for about 2 miles, before turning south for about 0.25 miles to the quarter-section line. The Project Route turns east along a quarter-

section line for about 7.5 miles to a quarter-section line between 71st Ave NE and 72nd Ave NE, crossing U.S. Highway 281, where it turns south for about 1 mile to just north of the quarter-section line, and continues east for about 4 miles just north of the quarter-section line to where it turns south for about 0.5 miles to just north of the section line along 12th St NE (Foster/Eddy County line) where it travels approximately 12 miles to the east.

To bypass the towns of McHenry and Binford, the Project Route goes south for approximately 3.25 miles, then east for about 12.5 miles along 3rd St NE/9th St NE (crossing State Highway 20), and north for about 3 miles to 12th St NE. Along 12th St NE, the Project Route heads east for about 20.5 miles, across State Highway 1, Sheyenne River, and State Highway 45, to about 0.5 miles east of 120th Ave NE in Steele County where the Project Route travels north for about 6 miles on the quarter-section to 18th St NE near Aneta. At Aneta, the Project Route goes northeast, diagonally, cross-country for about 7.5 miles to 6th Ave NE in Grand Forks County. The Project Route travels east along 6th Ave NE for about 7.75 miles, then north for about 0.2 miles along 41st St NE. The Project Route then proceeds east for about 9.5 miles, crossing State Highway 18, and turns north for about 2 miles along the quarter-section line (about 0.5 miles west of 31st St NE). Then the Project Route travels east about 200 feet north of 8th Ave NE for about 4.5 miles to 27th St NE. At 27th St NE, the Project Route travels north for about 0.5 miles and then travels east for about 4.25 miles to the existing Western (Western Area Power Administration) 230 kV transmission line. Then, the Project Route proceeds northeast, diagonally, cross-country for about 4 miles adjacent to the Western line ROW, then north for about 2.5 miles along the quarter-section line, approximately 0.5 miles west of 19th St NE, where it turns to go east along the 14th Ave NE section line for about 0.5 miles to 19th St NE. The Project Route goes north for about 1.5 miles along 19th St NE to the quarter-section line between 15th Ave NE and 16th Ave NE. The Project Route turns to go east along the quarter-section line for almost 4.5 miles. At 0.5 miles west of 14th St NE, the Project Route heads north along the quarter-section line for about 0.75 miles to the south side of the existing 230 kV transmission line and then proceeds east along the south side of the existing transmission line for about 1.5 miles into the Prairie Substation.

4.2 Description of Proposed Facilities

The transmission line will be designed to meet all relevant state codes, National Electric Safety Code (NESC), RUS standards, and other standards that Minnkota has adopted. Appropriate standards will be met for construction and installation and all applicable safety procedures will be followed during and after installation. The standards have been established to identify minimum conductor distances to ground, conductor spacing, and other parameters. The following summarizes applicable standards as they relate to this Project.

In general, a high-voltage transmission line consists of three phases, each at the end of a separate insulator string (or v-string configuration), all physically supported by structures. Each phase consists of one or more conductors. When more than one conductor is used to make up a phase, the term "bundled" conductors is used. Conductors are metal cables consisting of multiple strands of steel and aluminum wire wound together. There are also two shield wires strung above the electrical phases to prevent, to the extent possible, lighting from striking the phases. Shield wires are typically less than 1 inch in diameter. One of the shield wires will also include fiber optic cable that allows a path for substation protection and control equipment to communicate to equipment at other terminals on the transmission line. Transmission lines are constructed on a ROW, in which the width is primarily dependent on structure design, span length, and the electrical safety requirements associated with the transmission line voltage.

4.2.1 Transmission Facility and Right-of-Way Design

Transmission Structure

Single pole, self-weathering tubular steel single circuit structures are proposed for the majority of the Project. The self-weathering steel oxidizes or rusts to form a dark reddish brown surface coating to protect the structure from further weathering. The steel single poles are placed on large concrete foundations, which are wider than the pole base. **Table 4.2-1** outlines typical characteristics of the 345 kV transmission line structures.

Table 4.2-1. Typical Characteristics of Single Pole 345 kV Transmission Line Structures

Characteristics	Details
Voltage (kV)	345 kV
ROW width (feet)	150
Approximate span length (feet)	1,000
Range of structure heights for most common structures (feet)	125 - 140
Number of structures per mile	5 - 7
Minimum ground clearance beneath conductor (feet)	35 - 40
Depth of concrete footings for the poles (feet)	30 - 40
Diameter of concrete footings for the poles (feet)	7 - 10
Average area of permanent disturbance per structure (square feet)	78.5

The Missouri River crossing requires a specialty structure design due to the large span distance. A steel three pole structure design will be utilized. The structure would have three poles adjacent to each other or a pole for each phase wire. The three pole structure will be shorter than a single pole structure normally utilized for a span of this length.

Table 4.2-2 summarizes the structure designs and foundations for the Project, the Missouri River structures, and the H-frame structures to be used near the Grand Forks International Airport. **Diagram 1** shows the Project tangent structure. **Diagram 2** shows the Project dead end structure. **Diagram 3** shows the H-frame structure to be used near the Grand Forks airport. **Diagram 4** illustrates the specialty structure that will be used to span the Missouri River.

Table 4.2-2. Structure Design Summary

Structure Location	Structure Type	Structure Material	ROW Width (feet)	Structure Height (feet)	Foundation Diameter (feet)	Approx Span Between Structures (feet)
Project - Tangent	Single Pole Davit Arm	Self-Weathering Tubular Steel	150	95-180	7-10	1,000
Project – Dead End	Single Pole Davit Arm	Self-Weathering Tubular Steel	150	95-180	11-15	1,000
H-Frame near Grand Forks Airport	Two Pole H-Frame	Wood or Steel	150	62-80	5-7	600-800
Missouri River Span	Three Pole	Self-Weathering Tubular Steel	250	205	10-12	2,400-3,000

Diagram 1. Project Tangent Structure

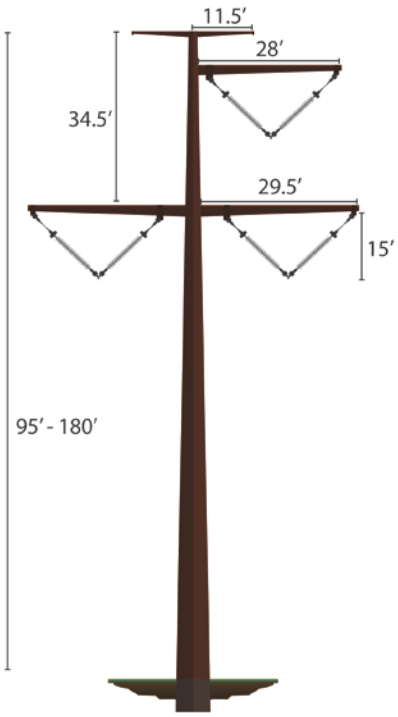


Diagram 2. Project Dead End Structure

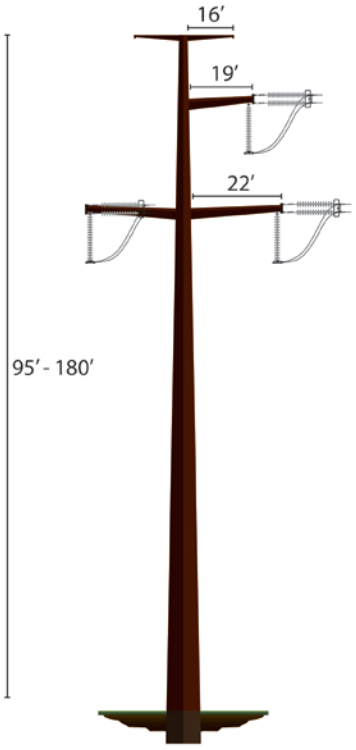


Diagram 3. H-Frame Structure

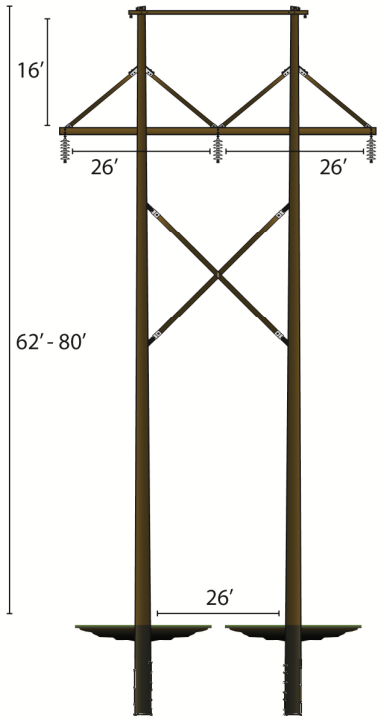
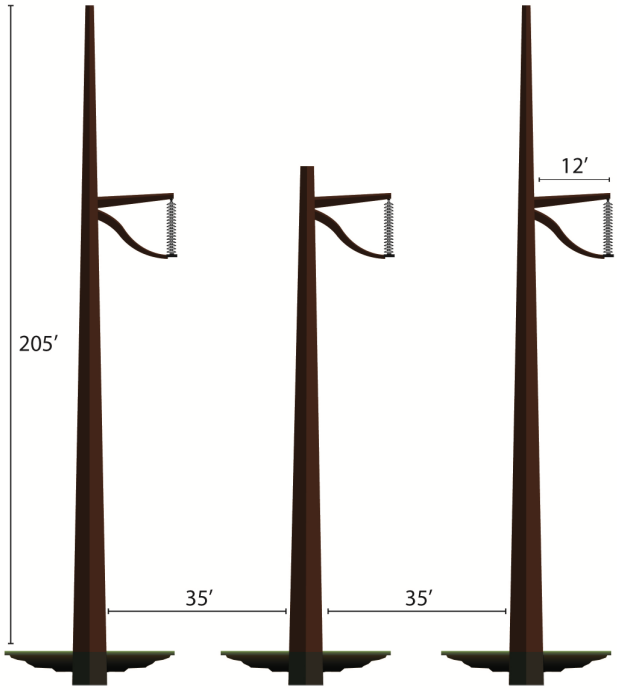


Diagram 4. Missouri River Span Structure



Conductors and Shield Wires

It is anticipated that each phase wire will consist of bundled conductors composed of two 959.6 kcmil (thousand circular mils) Suwannee trapezoidal wire (TW) type aluminum conductor steel reinforced (ACSR) cables. Each conductor has an outside diameter of 1.1 inches. The trapezoidal configuration of the aluminum strands allows more capacity than in an equal diameter conductor of standard ACSR design. Suwannee TW type ACSR consists of seven steel wires at the center surrounded by 22 trapezoidal shaped aluminum strands. The trapezoidal configuration of the aluminum strands reduces air gaps between strands. Two shield wires, also known as lightning protection wires, are planned. On one side, the shield wire will be fiber optical ground wire (OPGW), and, on the other side, the shield wire will be 0.5-inch Extra High Strength (EHS) steel cable. OPGW consists of 24 strands of single mode fiber optics conductors in a steel tube wrapped with ten strands of steel wire around the fiber optic tube.

Span

Span represents the distance between structures (regardless of structure type or service design). The average span distance would be about 1,000 feet. Spans used throughout the proposed Project would be adjusted to account for topography, specific physical resources along the transmission line route, and land uses.

Right-of-Way Design

The majority of the new 345 kV transmission line facilities will be built with single pole structures, which typically require a 150-foot-wide ROW for the length of the transmission line. The Missouri River crossing will require a 250-feet-wide ROW due to the long span. The additional ROW will be identified in the easement agreement with the landowner. If the transmission line is placed on property division lines across private land, the easement width to be acquired from each of the adjacent landowner(s) will vary.

It is intended that the Project will not share ROW with existing features; rather, it will parallel ROWs of existing features. Throughout the route development process, Minnkota sought to identify areas to parallel existing linear features including roads. Identification of opportunities to parallel existing linear features minimizes the proliferation of new corridors.

Given the terrain in the area, construction of access roads outside of the ROW will generally not be needed. If obstructions exist that are completely blocking ingress and/or egress along the ROW, such as flowing creeks, Minnkota will arrange with landowners to use existing field roads or create temporary access from state and county highways to access the structure locations.

Minnkota land agents will work individually with property owners to purchase easements for the Project. Under the easement agreements, property owners will not be allowed to place any structures or other objects within the 150-foot ROW that will restrict access to the ROW, inhibit maintenance of the transmission line, or jeopardize safe operations of the transmission line, without Minnkota's prior written approval.

The fiber optic regeneration sites and access roads required for the Project will be purchased in fee. These sites are located near road crossings to provide all-weather access to the sites.

4.2.2 Associated Facilities and Project Components

Center 345 kV Substation Upgrades

The Center 345 kV Substation is located about 4.5 miles southeast of the town of Center, North Dakota, and about 1 mile east of the Milton R. Young Generation Station in Oliver County. Most upgrades will occur within the existing substation's fenced boundary (ownership shared with Otter Tail Power Company). This will involve installing new 345 kV circuit breakers, 345 kV dead-end structures, one new and one replacement 345/230 kV transformer and associated bus work, new 345 kV switches and associated foundations, steel structures, and control panels. A line reactor for open line voltage control will also be required. The reactor will require a 22,500-square-foot (0.5 acre) expansion to the north end of the substation, beyond the existing fenced boundary but on Minnkota-owned property.

New 230 kV Tie Line

This approximately 1,500-foot-long 230 kV Tie Line will parallel the existing tie line on Minnkota-owned property. It will be needed to complete a second transmission-to-transmission interconnection between the Square Butte 230 kV Substation and the Center 345 kV Substation. The Square Butte 230 kV Substation is located approximately 0.2 miles south of the Center 345 kV Substation.

Existing 230 kV Tie Line Upgrades

The existing Square Butte 230 kV Substation to Center 345 kV Substation Tie Line modifications will include: terminating the existing line to a new transformer (T2) terminal at the Center 345 kV Substation, new 1272/Pheasant ACSR aluminum conductor, steel overhead ground wire and associated line hardware, installing 1 new deadend structure for the T2 terminal location, removal of an existing deadend structure at the T1 terminal location. All work will occur on Minnkota-owned property.

Square Butte 230 kV Substation

The Square Butte 230 kV Substation is located about 4.5 miles southeast of the town of Center, North Dakota, and about 1 mile east of the Milton R. Young Generation Station in Oliver County. Existing 230 kV circuit breakers and line terminal equipment will be re-allocated from the existing HVDC tie line to the new 345 kV interconnect as part of the agreement with Minnesota Power. This activity will be completed within the existing substation footprint.

Prairie Substation Upgrades

The Prairie Substation is located just west of the City of Grand Forks, North Dakota in Grand Forks County. All upgrades will occur within the fenced boundary of the existing Minnkota-operated substation. This will involve installing new 345 kV circuit breakers, 345 kV dead-end structures, one new and one relocated 345/230 kV transformer and associated bus work, new 345 kV switches and associated foundations, steel structures, and control panels. New 230 kV circuit breakers will be added to accommodate interconnecting with the existing 230 kV ring bus.

Fiber Optic Regeneration Stations

Four fiber optic regeneration stations will be required along the transmission line route to re-amplify the protection and control signals carried in the OPGW. The stations will be about 50 to 55 miles apart. Permanent access roads will be constructed for each fiber optic regeneration

station. Each station will require a permanent area of about 50-foot by 50-foot (2,500 sq ft total) that would be leveled, graveled, and have a perimeter fence. The station would have a small 10-foot by 15-foot (150 sq ft total) heated and air-conditioned control building to house the electronic equipment, a battery bank for backup power, and a 20-foot-wide permanent access road. These four stations will be placed in proximity to the base of a structure within the 150-foot-wide Route. **Figure 2** shows the location of each station. **Table 4.2-3** provides location and site information for each fiber optic regeneration station along the Project Route.

Table 4.2-3: Fiber Optic Regeneration Stations for the Project

Fiber Optic Regeneration Station	County	PLSS	Civil Township	Length of Access Road
1	Sheridan	T146N, R78W, Section 7, NE	Pickard	100 feet
2	Wells	T147N, R70W, Section 5, NE	South Cottonwood	60 feet
3	Foster	T147N, R63W, Section 13, SE	Florance	66 feet
4	Grand Forks	T150N, R56W, Section 35, SE	Logan Center	65 feet

Laydown Areas

There are eight laydown areas planned for the Project. Minnkota will have three laydown areas located on property currently owned and utilized by Minnkota for its operations. Laydown areas A1 and A2 will be located at the Center 345 kV Substation and laydown area G1 will be located near the Prairie Substation on property that is currently utilized by Minnkota as a laydown area and equipment yard (indicated in **Table 4.2-4)**.

Five additional temporary laydown areas may be established for the Project and each will temporarily impact approximately 10 acres. **Table 4.2-4** outlines the location of the laydown areas. **Figures 2** and **3** depict the laydown area locations. These areas were selected for their location, access, security, ability to efficiently and safely warehouse supplies and in an effort to minimize excavation and grading. Minnkota plans to secure the right to use the laydown areas by obtaining easement agreements from affected landowners.

The laydown areas will be leveled (if necessary), graveled, and may have a perimeter fence. Erosion and sediment control best management practices would be utilized for sites near wetlands. Construction office trailers may be located within the laydown areas. The laydown areas will accept delivery of and store equipment and materials necessary to construct the new transmission line facilities, and will be an area for pre-assembly work and to potentially locate portable concrete batch plant sites. Areas disturbed as a result of establishing the laydown area will be restored to pre-construction condition or per landowner agreement.

Table 4.2-4. Laydown Areas for the Project

Laydown Area ID	Size of Laydown Area (Acres)	Public Land Survey	Comment
1A (Milton R. Young Station property)	5	T141N, R83W, Section 5	Existing Minnkota laydown area
1B (Center 345 kV Substation)	10	T142N, R83W, Section 33	Existing Minnkota-owned land

Laydown Area ID	Size of Laydown Area (Acres)	Public Land Survey	Comment
2	10	T148N, R73W, Section 36	Temporary on private land
3	10	T147N, R66W, Section 7	Temporary on private land
4A, 4B, 4C,	10, 2, 2	T147N, R65W, Section 4	Temporary on private land
5	10	T147N, R60W, Section 20	Temporary on private land
6	10	T149N, R55W, Section 6	Temporary on private land
7 (Prairie Substation)	15	T151N, R51W, Section 12	Existing Minnkota-owned land

Relocation of Transmission Line Structures at the Center 345 kV Substation

Relocation of an existing Minnkota-owned transmission line section and addition of new structures will facilitate the addition of a second tie line between the Center 345 kV Substation and the Square Butte 230 kV substation. All relocated structures will occur on Minnkota-owned property. Currently, Minnkota is in negotiation regarding the work details with the other utilities that use this substation. This work may involve:

- Terminating the existing 230 kV Tie Line in a new bay within the substation. The new bay is approximately one span length south of the existing termination point.
    - Remove one structure. Add a new structure and terminate at the new bay.
    - Replace conductor between structures.

Highway Crossing and Construction Access Locations

The Project Route will cross U.S. and state highways at 16 locations. Section 5.3.2 discusses the highway crossings and access locations from west to east and potential impacts.

4.2.3 Right-of-Way Preparation, Construction, Restoration and Maintenance

Right-of-Way Preparation

Primarily agricultural and pasture lands will be crossed by the Project. For safety purposes and to meet NERC guidelines for reliability standards, tree and shrub clearing may be required in some areas in the ROW. However, where safety requirements permit, trees and low growing shrubs may remain (generally less than 15 feet in height). Significant amounts of grading are not anticipated for preparation of the transmission ROW. Some grading will be required for the fiber optic regeneration stations and their associated access roads, as well as temporary access roads required for river crossings (if site conditions deem necessary) and other areas in which direct access is challenged and may require temporary access measures.

Transmission Construction Procedures

Construction will begin after required federal, state, and local approvals are obtained, sufficient property and ROWs are acquired, soil conditions are determined and final design is completed. The precise timing of construction will depend upon various requirements that may be in place due to permit conditions, weather conditions, and available workforce.

Transmission line structures are generally designed for installation at existing grades. Typically, structure sites with 10 percent or less slope will not be graded or leveled. At sites with more than 10 percent slope, working areas will be graded level or fill will be brought in for working pads. If

the landowner permits, Minnkota prefers to leave the leveled areas and working pads in place for use in future maintenance activities. If the landowner does not wish to leave the area leveled, the site will be graded back to its pre-construction condition as much as possible, and all imported fill will be removed.

Laydown areas will be established for the Project to handle delivery and temporary storage of equipment and materials necessary to construct the new transmission line facilities. Structures may either be delivered to the staked location or may be stored temporarily at a laydown area. When the structures are delivered to the location where they will be installed, they will be placed on the ROW out of the clear zone of any adjacent roadways or designated pathways. Insulators and other hardware will be attached while the structure is on the ground. The structure will then be lifted, placed, and secured using a crane.

Minnkota proposes that the majority of structures have a concrete foundation. The foundation contractor will establish batch plants, which may be portable, and may be located within laydown areas. If batch plants are located away from a laydown area, then concrete trucks will be required to bring concrete from a concrete batch plant. The foundation contractor will be responsible for all appropriate permits and agreements. Holes will be drilled in preparation for concrete. Depending on soil conditions, drilled pier foundations for tangent (in-line structures) may vary in diameter from 7 to 10 feet, and be 30 to 40 (or more) feet deep. Drilled pier foundations for deadend structures (angle), which have higher load bearing requirements, may vary in diameter from 11 to 15 feet, and be 45 to 87 (or more) feet deep. After the concrete foundation is set, the structure will erected and bolted to it.

Most of the construction activity will be limited to the area immediately around each structure. Little additional ground disturbance will be needed at the structure sites. The total area temporarily disturbed in the vicinity of each structure is expected to be confined to an area of about 60 feet in diameter (2,827 square feet). Temporary construction access roads may be needed to access structure locations and will be located within the ROW. If a temporary access road is needed outside of the ROW, Minnkota will use existing public and private roads where possible. Where no existing roads provide access and if needed, temporary access roads up to 30-feet-wide will be constructed and located through disturbed uplands (e.g., farmed land) once any necessary access easements have been secured from the landowner(s).

Once the structures have been erected, conductors will be installed by establishing stringing setup areas within the ROW. These areas are usually established every 2 to 5 miles along the Route. Conductor stringing operations require brief access to each structure to secure the conductor wire to the insulator hardware and to install shield wire clamps once final sag is established. Stringing equipment generally consists of wire pullers, tensioners, conductor reels, shield wire reels, and sheave blocks. Stringing operations involve pulling lightweight cables or ropes through the stringing sheaves located at every structure site. This cable or rope will be used to pull the conductors through the sheaves under sufficient tension to keep the conductor from coming into contact with the ground. Temporary guard or clearance poles will be installed as needed over existing distribution or communication lines, streets, roads, highways, or other obstructions, after any necessary notifications are made and permits obtained. This ensures that conductors will not obstruct traffic or contact existing energized conductors or other cables. Helicopters would be utilized to string wires across the Missouri River. The use of helicopters may also aid construction in the alkali flats and other sensitive areas.

Fiber Optic Regeneration Station Construction

Four fiber optic regeneration station sites will be located at about 50 mile intervals along the route and not located in wetlands or near the Missouri River. Each station will be located adjacent to a proposed transmission line structure within the ROW and near an existing road. The power line to each regeneration station will be underground from the point of interconnection with the local distribution line to the regeneration station. A permanent access road to each station will be required, but siting them adjacent to an existing road will reduce the length of each proposed access road. Each site will be a fenced, graded, and graveled area of 50-foot by 50-foot. A small heated and air conditioned control building will be placed within this area to house the electronic equipment, heating and air conditioning equipment, and a battery bank for backup power.

Restoration Procedures

During construction, crews will attempt to limit ground disturbance wherever possible. Upon completion of construction activities, landowners will be contacted to determine if any damage has occurred as a result of the Project. If damage has occurred to crops, fences, or the property, Minnkota will fairly reimburse the landowner for the damages sustained. As is necessary, Minnkota may engage an outside contractor to restore the damaged property to as near as possible to the preconstruction condition. Disturbed areas will be restored to their preconstruction condition to the maximum extent practicable or as required by regulatory agencies. Post-construction reclamation activities include removing and disposing of debris, dismantling all temporary facilities (including laydown areas and temporary access roads), leveling disturbed soil, alleviating soil compaction, and reseeding non-cultivated areas disturbed by construction activities with vegetation similar to that which was removed.

Erosion control measures will be implemented as necessary to minimize runoff during construction. Specific measures will be determined once final design of the route is complete and a field review is made to determine any areas of concern. Erosion control measures such as silt fencing, straw bale fencing, mulching, seeding, or mesh fabric overlay will be installed when and where appropriate. Access routes to structure locations will be reviewed prior to the mobilization of equipment so erosion concerns can be avoided or minimized. Construction crews will exercise caution when equipment is within 50 feet of streams and rivers and will not drive equipment through streams or rivers crossed by the transmission line.

Maintenance Procedures

Transmission infrastructure has very few mechanical elements and is built to withstand normal weather extremes. With the exception of severe weather, such as tornadoes and extreme ice storms, transmission lines rarely fail. They are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system; such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

Over the life of the Project, Minnkota will use the ROW to perform inspections (usually by fixed wing aircraft), maintain equipment, and make repairs. Minnkota will also conduct routine maintenance to remove undesired vegetation that may interfere with the safe and reliable operation of the proposed line.

4.2.4 Easement/Right-of-Way Acquisition

For transmission lines, utilities typically acquire easement rights to accommodate the facilities. The evaluation and acquisition process includes title examination, owner contacts, survey work, document preparation, and payment.

The first step in the ROW process is to identify all persons and entities that may have a legal interest in the real estate upon which the facilities will be built. To compile this list, a ROW agent completes a public records search of all land involved in the Project. A title report is then developed for each parcel to determine the legal description of the property and the owner(s) of record of the property and to gather information regarding easements, liens, restrictions, encumbrances, and other conditions of record.

The next step is evaluation of a specific parcel. Once landowners are identified, a ROW agent contacts each property owner or the property owner's representative. The ROW agent describes the need for the transmission facilities, explains how the specific project may affect each parcel, and seeks information from the landowner about any specific construction concerns. The ROW agent requests the owner's permission for survey crews to enter the property to conduct preliminary survey work. Permission may also be requested to take soil borings to assess soil conditions and determine appropriate foundation design. Surveys are then conducted to locate section corners, cultural resources, wetlands, man-made features, and associated elevations to be used during the detailed engineering of the transmission line. All surveys are performed by experienced professionals.

The ROW agent next prepares an offer that is specific for the property owner(s) based on several factors, including the local market value of land, the calculated acreage required for the ROW, current land usage, and an additional per pole payment for the rights to build, operate, and maintain the transmission facilities within the easement area and reasonable access to the easement area. The landowner is allowed a reasonable amount of time to consider the offer and present any documentation that the owner believes is relevant to determining the property's value. Initially, the ROW agent may obtain an option to purchase an easement for the proposed route.

Utilities are usually able to work with the landowners to address their concerns and an agreement is reached for the utilities' purchase of land rights. The ROW agent prepares all of the documents required to complete each transaction. Required documents generally include: option, notice of option, easement, and payment agreement. If an agreement cannot be reached, condemnation may be used.

Once sufficient ROW has been obtained and the construction phase begins, to the fullest extent that is possible, individual property owners will be advised of construction schedules, needed access to the site, and any vegetation clearing required for the Project. The ROW will be cleared of the amount of vegetation necessary to construct, operate, and maintain the transmission line, and landowners will be compensated for crop and property damages as provided for in the easement. To ensure safe construction of the transmission line, special consideration may be needed for fences, crops, or livestock. For instance, fences may need to be moved, or temporary or permanent gates may need to be installed; crops may need to be harvested early; and livestock may need to be moved. In each case, the ROW agent will coordinate these processes with the landowner. Where possible, location of temporary laydown areas will be limited to previously disturbed or developed areas. When additional property is temporarily required for construction, appropriate temporary easement agreements will be obtained from landowners for the duration

of construction. These temporary easements will be limited to special construction access needs or additional laydown areas required outside of the proposed ROW.

4.2.5 Route Modifications Based on Corridor Compatibility Public Hearings and Subsequent Landowner Discussions

The purpose of this section is to discuss the route selection process for those segments of the Project that were specifically addressed in the public testimony presented at the Corridor Compatibility Application public hearings before the Commission and during subsequent landowner discussions.

Oliver County – Expanded Corridor in Sections 35 and 36, T142N, R83W and Sections 31 and 32, T142N, R82W

Public testimony identified a concern regarding the placement of the proposed Project in proximity to an occupied duplex residence located in the southern portion of Section 29, T142, R82W. The owner of the residence proposed that the Project be shifted south, in closer proximity to an existing 250 kV DC transmission line located near the quarter-section line in Sections 31 and 32. The proposed Project Corridor was expanded by the Commission to allow further consideration of this request.

Potential concerns initially identified for this segment included the potential for cultural sites on the ridge tops in Section 31, T142N, R82W, electrical interaction between the existing DC transmission line and the proposed Project if in close proximity for an extended length, and the presence of a residence located just north of the existing 250 kV DC transmission line in the southern portion of the northwest quarter of Section 32.

The proposed Project Route runs diagonally to the southeast in Sections 31 and 32, T142, R82W, and traverses east through Section 32 as close as possible to the mid-way point between the existing 250 kV DC line and the occupied residence in Section 29. Then the Project Route goes diagonally northeast in Sections 32 and 33, T142, R82W. The proposed Project Route maximizes the distance between the occupied residence and the Project, while minimizing the potential for electrical interaction between the DC and AC transmission lines. Additionally, landowners have confirmed that the residence in Section 32, T142, R82W is unoccupied, cultural resource surveys performed indicate that the Project Route will not impact cultural sites, and further analysis of the route has confirmed the topography will not prohibit utilizing the route selected.

Burleigh Co. – Public Testimony Regarding Section 14, T142N, R81W

Public testimony identified a concern regarding a potential route across and tree removal in the southern portion of Section 14, T142N, 81W. No alternative routes that did not impact adjacent landowners were suggested.

The proposed Project Route was developed as a result of public meetings with Painted Woods Township and associated landowners. The Project Route crosses a low-lying drainage area, which was chosen to minimize agricultural land use and vegetation impacts. During several discussions with adjacent landowners, no alternatives were proposed that would further minimize impacts to land use or vegetation removal, or that would be viable options given the input and recommendations from Painted Woods Township. Within the Project Route, only a few trees would potentially need to be removed.

McLean Co. – Public Testimony Regarding Sections 18 through 13, T143N, R80W

Public testimony included a request to shift the proposed Project Corridor to the north side of the landowner's properties in Sections 18 through 13, T143N, R80W, rather than traversing the same properties on the quarter-section line.

Potential concerns identified in this area included occupied residences in the southern portions of Sections 10 and 11, T143N, R80W, and the presence of a number of small wetland areas and a railroad crossing. A route along the northern section line would place a transmission facility very close to the occupied residences in Sections 10 and 11, T143N, R80W, and would require waivers of the 500 foot avoidance area criteria.

The proposed Project Route maximizes the distance from occupied residences by following the quarter-section line. In addition, the route minimizes land use impacts because it is closer to field edges than would be possible running parallel to the northern section line.

Sheridan Co. Diagonal – Public Testimony Regarding Sections 23 and 26, T147N, R78W

Public testimony included a request to alter the proposed Project Corridor along the diagonal located in Sections 23 and 26, T147N, R78W in Sheridan County. In addition, alternatives were presented to Minnkota outside of the Corridor Compatibility Application public hearings.

Potential concerns identified in this area included the presence of a high concentration of wetlands, previously identified cultural resource sites, and USFWS easements, as well as the need to coordinate the location of the Project with the proposed Sheridan Ridge II wind farm facilities.

The alternatives proposed to Minnkota did not minimize land use impacts, presented severe design challenges due to crossing numerous, large wetlands, and were contrary to requests by other landowners in the vicinity. The proposed Project Route, on the other hand, minimizes impacts to agricultural land, avoids wetlands, avoids previously identified cultural sites, and minimizes USFWS wetland/grassland easements, and does not conflict with the proposed Sheridan Ridge II wind farm.

Sheridan Co. Diagonal – ND Department of Trust Lands Letter Regarding Section 8, T146N, R78W

During discussions with landowners along the diagonal segment in Sheridan County, the ND Department of Trust Lands (NDDTL) (formerly known as the ND State Land Department) identified an area in Section 8, T146N, R78W as containing potential commercial aggregate. Discussions with the NDDTL and adjacent landowners identified a route that would reduce the potential for impact to the future recovery of aggregate, and does not result in any additional land use or environmental impacts. However, the Project Route extends beyond the Project Corridor in this area, and modification of the Project Corridor would be necessary (see Corridor Modification and Waiver Request).

Sheridan and Wells Co. – Expanded Corridor from Mountain City Township (T147N, R77W) to Crystal Lake Township (T147N, R73W)

Public testimony questioned why the proposed Project Corridor was adjacent to the quarter-section line and not closer to the southern section line through the east-west segment extending from Mountain City Township (T147N, R77W) to Crystal Lake Township (T147N, R73W) in Sheridan and Wells Counties. The proposed Project Corridor was expanded by the Commission to allow further consideration of this issue.

Potential concerns identified in this area included the proximity to occupied residences, the presence of numerous large wetlands and waterbodies, and the need to coordinate the location of the Project with the proposed Sheridan Ridge I and II wind farm facilities. The proposed Project Route addresses these concerns.

The portion of the Project Route that extends east from Mountain City Township (T147N, R77W) to midway through Boon Township (Section 10, T147N, R74W) was selected because it facilitated coordination with the Sheridan Ridge I wind farm, avoided several large waterbodies on the southern portions of the sections crossed and had landowner acceptance.

At the midpoint of Section 10, T147N, R74W, the proposed Project Route parallels the southern section line for about 4 miles and then shifts north to the quarter-section line for approximately 1 mile through Sections 8 and 9, T147N, R73W to avoid a large water body located on the southern section line in those sections. The proposed Project Route then shifts south to parallel the southern section line until approximately 0.25 miles west of ND-3 in Section 11, T147N, R73W.

Wells Co. – Expanded Corridor from Crystal Lake Township (T147N, R73W) to South Cottonwood Township (T147N, R70W)

Public testimony identified resistance to the proposed corridor in Wells County from Crystal Lake Township (T147N, R73W) to South Cottonwood Township (T147N, R70W), but presented no reasonable alternatives through this segment of the Project. The proposed Project Corridor was expanded by the Commission to allow further consideration of routing options through this segment. Subsequent to the Corridor Compatibility Application public hearings, Minnkota met with a group of landowners to discuss proposed routing alternatives.

Potential concerns identified in this area were occupied residences, the presence of numerous large waterbodies and wetlands, USFWS easements, and four federal or state managed areas (Ehni WPA, Monk WPA, Hoornaert WPA, and Hoornaert WMA). The proposed Project Route minimizes the proximity to occupied residences and managed areas, while minimizing land use impacts.

The proposed Project Route proceeds east-west along the southern portion of Sections 1 and 2, T147N, R73W, and Sections 1, 2, 3, 4, 5 and 6, T147N, R72W. In Section 1, T147N, R72W (about 2 miles east of the James River), the proposed Project Route shifts one mile north to 12th St NE and proceeds east-west for about nine miles.

Eddy County –Landowner Discussion Regarding Sections 28 and 27, T148N, R67W

During discussions with a landowner in Eddy County, the landowner requested that the Project investigate an alternative route. As proposed by the landowner, the re-route would remain on the landowner's property, but would be further from the landowner's residence and would enable Minnkota to avoid certain cultural resources identified within the Project Corridor. The proposed Project Route turns and goes north along the west side of Section 28, T148N, R67W, then turns and runs east through the northern half of Sections 28 and 27, T148N, R67W, and then turns south along the eastern edge of Section 27 before turning east again. However, the Project Route extends beyond the Project Corridor in this area, and modification of the Project Corridor would be necessary (see Corridor Modification and Waiver Request).

Eddy and Foster Co. – Expanded Corridor from Pleasant Prairie (T148N, R65W) and Nordmare Townships (T147N, R65W) to Cherry Lake (T148N, R63W) and Florance Townships (T147N, R63W)

Public testimony identified a concern with the proximity of the proposed Project to a group of residences, as well as general opposition to the proposed Project, in Eddy County. The proposed Project Corridor was expanded by the Commission to allow further consideration of routing options through this segment.

Potential concerns identified in this area included proximity to occupied residences, center pivot irrigation systems on the eastern side of the segment, the Topp WPA, and numerous large wetlands and waterbodies. The proposed Project Route addresses these concerns.

One alternative proposed by a landowner was to locate a route along the northern portion of Sections 34 and 35, T148N, R64W to avoid the residences in those sections. However, routing along the northern portion of Sections 34 and 35 is not feasible because the only viable location to cross the large wetland areas would result in the route being closer to the residences in Sections 34 and 35 than it will be utilizing the proposed Project Route.

Grand Forks Co. – Alkali Flats (Fairfield (T150N, R52W) and Oakville (T151N, R52W) Townships) and NDDTL Letter

Public testimony identified a concern regarding potential impacts of the Project on avian species and native grassland/saline wetlands within an area referred to as the alkali flats in Oakville (T151N, R52W) and Fairfield (T150N, R52W) Townships of Grand Forks County. The Commission widened the proposed Project Corridor at Minnkota's request to allow further consideration of a routing request across an NDDTL parcel in Grand Forks County. The Commission also requested that Minnkota engage in further consultation with the Grand Forks County Prairie Partners and Audubon Dakota regarding transmission line construction and minimization of potential impacts. Minnkota consulted with the NDDTL, the Grand Forks County Prairie Partners, and Audubon Dakota when selecting the proposed Project Route in this area.

The proposed Project Route proceeds north along the quarter-section line through Section 1, T150N, R52W, and Sections 25 and 36, T151N, R52W. In Section 24, T151N, R52W, the Project Route turns east and then north along the section line through Section 24 and half of Section 13. This alignment was selected to minimize impacts to native grassland, occupied residences, and agricultural land identified by the NDDTL, other landowners, the Grand Forks County Prairie Partners, and Audubon Dakota. However, the Project Route extends beyond the Project Corridor in this area, and modification of the Project Corridor would be necessary (see Corridor Modification and Waiver Request).

Grand Forks Co. – Brenna Township (T151N, R51W)

Public testimony noted concerns regarding proximity of the Project to occupied residences, as well as concerns regarding flight operation limitations and flight safety for the Grand Forks International Airport. An additional potential concern in this area is agricultural land impacts, since the area contains high quality farmland.

Utilizing input from landowners, agencies and others, Minnkota selected the proposed Project Route in Brenna Township. The proposed Project Route balances the number of residences in proximity to the Project with minimizing land use impacts by placing the proposed Project Route adjacent to the quarter-section line near field edges and paralleling existing transmission

corridors where feasible. However, the Project Route extends beyond the Project Corridor in this area, and modification of the Project Corridor would be necessary (see Corridor Modification and Waiver Request).

Discussions are ongoing with the Grand Forks International Airport, the University of North Dakota Aeronautics Department, and the Federal Aviation Administration. Previous discussions have indicated that the Project can and will be designed within stated guidelines and will not have adverse impacts on flight operations or flight safety.

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5.0 Environmental Analysis

This section describes the environmental setting as it relates to the Project ROW and Route. The Project ROW is the 150-foot-wide area in which the transmission line facilities will be constructed and the Project Route refers to the specific locations of the transmission line facilities. The following subsections discuss resources within the Project ROW, potential impacts from the Project, and mitigation measures.

The impact discussion describes the potential effects from the Project. Impacts are discussed in terms of short-term vs. long-term and indirect vs. direct, depending upon the resource. Temporary impacts are associated with the construction areas around structure locations for the Project Route and 230 kV Tie Line, a temporary access road within the ROW, and laydown areas. Permanent impacts are associated with the structure locations for the Project Route and 230 kV Tie Line, restricted tillage area (cropland only), Center 345 kV Substation expansion, and fiber optic regeneration stations and associated access roads. **Table 5.0-1** provides a summary of the temporary and permanent impacts for the Project Route.

Table 5.0-1. Project Route Summary Table

	Impact	Route
	Total Length (mile)	250.2
	Total ROW Acres[1]	4,544
	Approximate Number of Structures (includes 230 kV Tie-Line)	1,335
Temporary Impacts	Temporary Structure Impact (acres)	85.5
	Access Road Impact (acres)	908
	Laydown Areas (7 areas) (acres) (Impact does not include 1A)	80
	Fiber Optic Regeneration Station Access Roads (4) (acres)	0.06
	230 kV Tie Line Structures Impact (acres)	0.24
	230 kV Tie Line Access Road Impact (acres)	1.2
	Total Temporary Impact (acres) [2]	1,021
	Percent of ROW – Temporary Impact	22.5
Permanent Impacts	Permanent Structure Impact (acres)	2.5
	Fiber Optic Regeneration Station (4) (acres)	0.2
	Fiber Optic Regeneration Station Access Roads (4) (acres)	0.13
	Center 345 kV Substation Expansion (acres)	0.5
	230 kV Tie Line Structure Impact (acres)	<0.01
	Total Permanent Impacts (acres)	3.4
	Percent of ROW – Permanent Impacts	0.07
	Restricted Tillage Area (acres)	4.2

1: Project Route, 230 kV Tie Line, laydown areas, Center 345 kV Substation Expansion
2: Does not reflect sum of numbers because some impact types overlap in impact areas.

Impact calculations for this Project were completed using the ArcInfo license of ESRI® ArcMap™ 10.0, using UTM NAD83 projection. The following assumptions were used to estimate resource impacts on land cover, vegetation, soils, prime farmland, wetlands, floodplains, and managed resource areas based on the preliminary structure locations:

- Average of 1,000-foot-long span between mono-pole structures (tangent and deadend).
- Average of 700-foot-long span between H-frame structures.
- Majority of structures are single pole, self-supporting.
    - Structures near the Grand Forks International Airport will be H-frame. Twelve of 14 are in cropland where it is not possible to farm the space between the poles of each structure.
    - Structures on either side of the Missouri River will be 3 poles, i.e., 1 pole for each conductor.
- The ROW will be 150-feet-wide and one temporary access road is proposed to be located within the ROW for the length of the proposed transmission line.
- The ROW will be 250-feet-wide at the Missouri River crossing.
- Temporary impacts will include:
    - 30-foot radius for each mono-pole structure location (approximately 2,827 square feet per structure).
    - 30-foot-wide access road which will follow the proposed centerline.
    - 5 laydown areas along the line (approximately 10 acres each) and two laydown areas at the Project substations (approximately 15 acres each).
    - Four 30-foot-wide access roads to the fiber optic regeneration stations that are 60 to 100 feet long .
    - 200-foot-by-200-foot area (3 poles at 6-foot radius including the space between the poles) for each of the Missouri River structures.
    - 150-foot-by-100-foot area (2 poles per structure and about 26-feet between the poles) for each H-frame structure near Grand Forks Airport.
    - Temporary impacts for the 230 kV Tie Line will include a 25-foot radius area around each pole for three 3-pole structures (3,909 square feet per structure) and one 2-pole H-frame structure (2,936 square feet per structure). Poles in each structure are spaced 20-feet apart.
- Permanent impacts will include:
    - 5-foot radius for each mono-pole structure location (approximately 78.5 square feet per pole).
    - Four 50-foot-by-50-foot fiber optic regeneration station pads with a 10-foot-by-15-foot building on the pad.
    - Four 20-foot-wide access roads for fiber optic regeneration stations that are 60 to 100 feet long .
    - 100-foot-by-20-foot area around each Missouri River structure.
    - 3.5-foot radius for each H-frame pole (77 square feet per structure).
    - Center 345 kV Substation will be 22,500-square foot (0.5 acre) expansion beyond the existing fenced boundary.
    - Permanent impacts for the 230 kV Tie Line will include a 3.5-foot radius area around each pole of three 3-pole structures (115.5 square feet per structure) and a 2.5-foot radius around each pole for one 2-pole H-frame structure (39.3 square feet per structure).
- A Restricted Tillage Area was added as a permanent impact to each structure location on tillable land. This area was added to the calculated impacts on tillable land as a landowner may not wish to farm the land any closer than five feet from the structure base. Extent

of tillable land was determined using 2004 North Dakota Gap Analysis Program (ND GAP) Land Cover data (cropland).
    - The additional area buffer (5-foot radius) was added to each mono-pole structure location on tillable land (about 235.5 square feet per structure). Therefore, the total permanent impact of each structure on tillable land equals a 10-foot radius (about 314 square feet per structure).
    - The additional area for each H-frame structure on tillable land would include an area that equals about 17-foot by 50-foot area, or about 850 square feet. This area includes an additional 10-foot radius buffer for each pole, plus the area between the poles, which would be inaccessible for tilled farming.
- Temporary and permanent impacts associated with the relocation of transmission line structures at the Center 345 kV Substation and Prairie Substation are not included in the impact discussions, since any impact will occur on previously disturbed Minnkota-owned property and within an area of the same land use, therefore, impacts would be the same as existing conditions.

The mitigation discussion provides potential measures to reduce or eliminate anticipated impacts identified for each resource area. Mitigation measures are not discussed for identified potential effects that are either not anticipated to occur under construction or operation of the Project or are anticipated to result in a positive effect. The mitigation discussion addresses typical high voltage transmission line permit conditions issued by state and federal agencies, mitigation strategies proposed by Minnkota and additional mitigation measures that may be warranted.

5.1 Demographics

5.1.1 Description of Resources

The Project ROW crosses portions of 11 counties in North Dakota and several farm-based communities. The largest cities located near the Project ROW include Grand Forks (population 52,838), Aneta (population 222), and Northwood (population 945) (U.S. Census 2010). The Spirit Lake Nation lands, which have the nearest minority population, are located approximately 10 miles north of New Rockford, Eddy County, North Dakota. The Project ROW does not cross the Spirit Lake Nation lands.

Economic Characteristics

Most counties along the Project ROW identify agricultural practices as a foundation of both the social and economic fabric of the county. Aggregate mining for sand or gravel is also an important economic activity in rural areas and in several instances, this type of extractive land use contributes directly to county and local road projects or other developments. Minnkota's Milton R. Young Generation Station and the lignite mining operations at the nearby Center Mine, owned and operated by BNI Coal Ltd., are important regional sources of employment in the western vicinity of the Project.

As the Project ROW proceeds from west to east, the employment base of counties diversifies closer to Grand Forks County. Refer to Table 5.1-1 in the Corridor Certificate Application for a list of the top four employment industries within the 11 counties crossed by the Project.

Social Characteristics

Population characteristics considered relevant to the social setting of the Project ROW include the total population, projected population, per capita income, and poverty status. Communities in central North Dakota toward the west end of the Project ROW have gradually experienced reductions in total population. In general, per capita incomes rise as the Project ROW proceeds from east-central North Dakota towards Grand Forks, North Dakota and towards the west end of the Project ROW. This increase is a function of several factors including, but not limited to, higher cost of living, higher paying jobs, and higher property values. Aside from Oliver and Burleigh counties, poverty levels are generally higher at the west end of the Project ROW when compared to the east end of the Project ROW.

Population by Race and Ethnicity

A variety of racial and ethnic groups are present in the vicinity of the Project ROW. Race is defined as a self-identification data item based on an individual's perception of his or her racial identity. Respondents to the 2010 Census selected the race(s) with which they most closely identified themselves. Ethnicity is defined as a classification of a population that share common characteristics such as religion, cultural traditions, language, tribal heritage, or national origin. All counties along the Project ROW have populations with 95 percent or higher of White/Caucasian. The remaining populations in all of the counties include Black/African American, American Indian, Hawaiian, some other race alone, or two or more races.

5.1.2 Impacts

The short-term impacts of the Project on demographic resources will be relatively minor. Permanent agricultural land conversion associated with the Project Route will constitute a small socioeconomic impact to those landowners with facilities on their land. Section 5.2.2 discusses

impacts to agricultural land. Agricultural areas surrounding transmission line structures will be able to be farmed following construction of the Project Route. There is no indication that any minority or low-income population is concentrated in any one area of the Project ROW, or that the transmission line will be placed in an area occupied primarily by a minority group.

Construction of the transmission line and associated facilities will provide temporary increases to the total personal income of the area through expenditures for housing, lodging, food services and general supplies by the major contractors. Opportunity exists for sub-contracting to local contractors for gravel, fill, and civil work. During peak construction an estimated 200 to 225 workers may be active at several locations along the Project ROW. Additional personal income will also be generated by circulation and recirculation of dollars paid out by Minnkota as business expenditures and state and local taxes. Labor relations will not be affected.

As part of the federal scoping process for the Project, questions and concerns about property value were raised. Generally, it has been found that a new transmission line may potentially result in a small decline in residential property values in urban and suburban areas immediately following construction, but this effect diminishes after a few years. Studies of the effect of a transmission line on rural property values have concluded that power line structures and easements do not have a significant impact on rural property values. For instance, a recent study concluded that the differences in sale prices and market values for rural Wisconsin properties with a high-voltage electric transmission line were not statistically significant (1.11 to 2.44 percent) when compared to properties without a transmission line (Jackson 2010).

Minnkota will offer to conduct staking reviews with the landowner to minimize potential impacts to the land to the extent practicable. Minnkota will obtain an easement from each landowner whose property will be crossed by the Project ROW. The easements allow Minnkota to locate transmission facilities on the property and enter for maintenance when needed. The landowner retains ownership and use of the land subject to the easement, which restricts certain activities within the easement in order to avoid compromising the safety and efficiency of the transmission line.

5.1.3 Mitigation

Socioeconomic impacts associated with the Project will be primarily positive due to an influx of wages and expenditures made at local businesses during construction and an increase in the county's tax base from the operation of the transmission line. Minnkota and the specialty contractors will use local labor and sub-contractors to the extent practicable. Impacts to landowners will be minimized to the extent practicable by discussing final structure location with landowners, establishing good lines of communication, negotiating easement payments, and maintaining communication with landowners along the Project ROW. Easements will allow Minnkota to locate transmission facilities on the property and enter for maintenance when needed. In return, the landowner receives compensation comprised of the following, as applicable: a per acre impacted land value payment for the easement area (based on land-use type); a structure payment (based on land-use value and type); and a crop damage payment for damages caused by construction. Minnkota will pay higher easement payments for diagonal crossings. The Project is not anticipated to impact minority or low-income populations, therefore no mitigation measures are proposed.

5.2 Land Use

The Project ROW is primarily dominated by rural agricultural land use, i.e., pasture or cropland and nearby farmsteads. Less common types of land use in the vicinity of the Project ROW include small farm-based towns, utility scale wind energy facilities, utility ROWs, airports, aggregate mining, wild game habitat, and livestock production. Larger urban areas are generally not present outside of Carrington, Cooperstown, and Grand Forks.

Data sources used to analyze land use in the Project ROW include local, state, and federal agencies, nonprofit organizations, and field work conducted by Minnkota's consultants. Land use and land cover data were gathered from the North Dakota GAP data (USGS 2004). Mapping was completed using the ArcInfo license of ESRI® ArcMap™ 10.0.

5.2.1 Description of Resources

Agriculture

Land use within the Project ROW primarily consists of agricultural production of cultivated crops and livestock with some dispersed areas used for hay production. Table 5.2-1 identifies acres of agricultural land use within the Project ROW. Cultivated croplands (farmland) generally increase as the Project ROW proceeds from west to east towards the city of Grand Forks and the Red River Valley. Pasture lands are more abundant in the western portion of the Project. As demonstrated by the high percentage of cropland and pasture land across the Project ROW, agriculture is one of the most important industries in North Dakota.

Table 5.2-1. Agricultural Land Use in Project ROW

GAP Land Cover Category	Acres in ROW	Percent of ROW
Cropland	2,460	54.1
Pasture	787	17.3
Total Agricultural Area	3,247	71.4

Source: USGS2004

Human Settlement

Farmsteads are widely distributed, but are typically located near rural roads running along section lines. In general, farmstead density increases as the Project ROW heads from west to east towards the Red River Valley. Small, farm-based communities are located within the vicinity of the Project. These communities range in size from unincorporated areas with a few houses to more established, incorporated municipalities. Incorporated municipalities near the Project ROW include Aneta, Northwood, and Grand Forks. In addition to homes, more developed communities may include other structures such as businesses, schools and other government facilities, churches, and cemeteries.

According to the North Dakota Administrative Code (NDAC), the edge of the nearest transmission line facility, usually the end of the transmission structure arm or conductor, must be 500 ft or greater from the edge of an occupied residence (home) (NDCC Section 49-22-05.1 and NDAC Rules 69-06-08-02(2)(e)).

Table 5.2-2 identifies the homes within 500 feet of the transmission structure arm. The nearest home is 49 feet from the transmission structure arm, but it is owned by Minnkota (Home Number 1 in **Table 5.2-2**). The house locations are displayed on Figure 2.

Table 5.2-2. Homes within 500 feet of the Transmission Facility

Home (West to East)	Distance from Home to Structure Arm (ft)	County	PLSS Township	Civil Township	Section	Comment	Waiver Status
1	49 ft	Oliver	T142N, R83W	Unorganized Territory	26	Occupied	Waiver granted
2	205 ft	Wells	T147N, R71W	West Ontario	4	Occupied	Waiver granted
3	320 ft	Griggs	T148N, R60W	Willow	34	Vacant, habitable	Waiver granted
4	0 ft	Griggs	T147N, R60W	Addie	2	Vacant, not habitable	Waiver granted
5	496 ft	Griggs	T148N, R58W	Lenora	33	Occupied	Waiver granted
6	431 ft	Nelson	T149N, R57W	Ora	33	Occupied	Waiver granted
7	482 ft	Grand Forks	T150N, R54W	Avon	33	Occupied	Waiver granted
8	370 ft	Grand Forks	T151N, R51W	Brenna	18	Occupied	Waiver granted
9	165 ft	Grand Forks	T151N, R51W	Brenna	14	Occupied	Waiver granted
10	479 ft	Grand Forks	T151N, R51W	Brenna	14	Occupied	Landowner discussion
11	161 ft	Grand Forks	T151N, R51W	Brenna	11	Occupied	Waiver granted

Existing Infrastructure

Developed infrastructure in the vicinity of the Project ROW includes federal, state, county, and township roads; utility scale wind energy facility; utility ROWs; radar facilities; and railroads. It is likely rural water lines are present in the Project ROW (see Section 5.3). Airports are discussed in Section 5.3. Figures 2 and 3 display the known location of various infrastructure types within and adjacent to the Project ROW.

Table 5.2-3 shows existing infrastructure and paralleling linear ROWs within and adjacent to the Project ROW. Existing ROWs (transmission lines, railway, or roads) adjacent to the Project ROW present opportunities for paralleling as these features are typically disturbed corridors and are considered compatible with the construction and operation of a new transmission line. In some cases, these ROWs may present siting challenges or have to be spanned.

Table 5.2-3. Existing Infrastructure within and adjacent to the Project ROW

Infrastructure Type	
Point Features	Count
- Cemetery (Yucca Catholic Cemetery)	1
- Agriculture Buildings and Structures (including 3 outbuildings on Minnkota-	7

Infrastructure Type	
owned farmstead. Excluding homes – Homes are referenced in Table 5.2-2)	
Paralleling Linear ROW	Miles
- Transmission Line	7.4
- Highway [1]	10.6
- Other Roads[2]	41.9
Total Length of ROW Parallel to Existing Corridors	*59.9 (23.9%)*
Railroads Crossed by Project ROW	Location
- Burlington Northern Santa Fe Railway	T142N, R81W, Section 28
- Dakota Missouri Valley and Western Railroad	T143N, R80W, Section 17
- Canadian Pacific Railway	T148N, R70W, Section 25
- Red River Valley and Western Railroad	T148N, R66W, Section 30
- Burlington Northern Santa Fe Railway (2 lines at 1 location)	T148N, R65W, Section 35
- Burlington Northern Santa Fe Railway	T148N, R57W, Section 6
- Burlington Northern Santa Fe Railway	T150N, R54W, Section 32
Pipelines Crossed by Project ROW	Location
- Williston Basin Interstate (gas)	T143N, R81W, Section 13
- CHS/Cenex (gas)	T148N, R65W, Section 35
- Williston Basin Interstate (gas)	T148N, R67W, Section 25
- Alliance Pipeline (gas)	T148N, R67W, Section 29
- TransCanada Pipeline (oil)	T149N, R57W, Section 22
- Enbridge Pipeline (gas)	T151N, R52W, Section 24

1: This analysis includes existing transmission lines paralleling highways.
2: Features include graded and drained roads, gravel, paved, trail, and unimproved roads.

As noted in the Corridor Certificate Application, one communication tower is located within the Project Corridor (T148N, R57W, Section 19); this communication tower is avoided by the Project ROW. The Project ROW overhangs the northern portion of the Yucca Catholic Cemetery in T142N, R82W, Section 34. Seven railroads and six pipelines are crossed by the Project Route (**Table 5.2-3**). No center pivot irrigation (CPI) systems are crossed by the Project ROW. Seven structures, such as sheds and outbuildings, are located within the Project ROW.

Planned Wind Energy Facilities

Although wind energy development is increasing in North Dakota, the exact size and location of future wind energy developments are uncertain at the present time. The Project ROW crosses through two potential wind energy development areas in Sheridan County and one potential wind energy development area in Oliver County. Minnkota is in contact with the development companies and no substantive impacts to the wind projects are anticipated. In general, a transmission line may be seen as a benefit to a wind energy project for transfer of energy output.

Mining Resources

Due to the glacial history of the landscape, several aggregate gravel pits are found in this region of North Dakota. These areas are typically used for gravel or sand extraction. The gravel pits are often expanding and their operation requires the use of heavy machinery. Transmission line

development may be compatible with aggregate resource extraction, if structure placement and overhead lines will not interfere with future operations at the gravel pit facility.

There are two gravel pits crossed by the Project ROW, as listed in **Table 5.2-4**. Minnkota has contacted the landowners regarding future plans for extraction and there are no plans to expand these facilities. Figure 2 displays the location of gravel pits. Coal surface mines are present near the western portion of the Project, but are not crossed by the Project ROW.

Table 5.2-4. Gravel Pits within the Project ROW

Gravel Pit (West to East)	PLSS Township
1	T144N, R80W, Section 25
2	T148N, R67W, Section 25 and 26

Conservation Areas

USFWS grassland and wetland easements and NRCS CRP and CREP parcels are crossed by the Project. These areas have been assigned various levels of legal protection and are intended to serve as wildlife habitat, to protect natural features, or to preserve water quality.

NRCS CRP contracts are considered confidential and information is not released without landowner permission. As such, information about the location of these easements is unknown. Construction of a transmission line within CRP or CREP lands is not incompatible; the impacts would be minimal and limited. Minnkota's land agents will work with individual landowners to identify CRP and CREP parcels and to minimize potential impacts if any are located within the Project ROW.

USFWS grassland easements are surface easements that minimize impacts to land cover. Likewise, USFWS wetland easements protect the wetland basin(s) within the easement land. The USFWS provided locations of wetland and grassland easements as shown on Figure 5. A grassland easement covers all land cover types within the easement property. However, a wetland easement only covers the wetland basins; upland areas on the property are not covered by a wetland easement.

Minnkota obtained USFWS grassland and wetland easement locations in April 2011. The acreage of the wetland easements reflects both wetland and upland land cover types. Wetland easements within the Project ROW total 773 acres, but the acreage of wetland basins within those easements is significantly less and will be determined based on USFWS file review, historic aerial photo interpretation, and field review. The USFWS data identified 19 acres of grassland easements within the Project ROW. Minnkota's consultant is working with the USFWS to refine wetland easement and grassland easement impacts and to obtain the necessary Special Use Permit for the Project.

The Project ROW will not cross any National Forests, National Grasslands, National Waterfowl Production Areas, or National Wildlife Refuges.

Private Lands Open to Sportsmen (PLOTS) is a voluntary program offered to landowners by the North Dakota Game and Fish Department (NDGF), which provides landowners with monetary compensation for allowing public access to their land for fishing or hunting. Land parcels are typically enrolled in the PLOTS program for two to three years, but some are under a

long-term agreement. The location of these parcels is made public by the NDGF. Some CRP parcels are enrolled in the PLOTS program. Minnkota's land agents will work with individual landowners to identify CRP parcels and to minimize potential impacts if any are located within the Project ROW. Within the Project ROW there are 6 PLOTS lands totaling 29.4 acres. PLOTS lands are displayed on Figure 5.

The Nature Conservancy (TNC) and Ducks Unlimited own property near the Project which is used specifically to provide habitat for sensitive species native to North Dakota and nesting areas for waterfowl along their migratory pathway. These areas are generally concentrated near the Missouri River and none are crossed by the Project ROW (**Figure 5**).

State Trust Lands

The North Dakota Department of Trust Lands (NDDTL) (formerly known as the North Dakota State Land Department) manages the State Trust Lands and School Trust Lands in North Dakota, which were granted at statehood for the support of primary and secondary education. Some of these tracts have identifiable assets in addition to the current pastureland or cultivated land uses. NDDTL's primary concerns were related to the Project's potential to impact future wind development or aggregate extraction on these tracts; however the presence of a transmission line does not preclude a tract from wind development or gravel extraction, if properly sited. NDDTL's provided comments on the Project in which it discussed (1) tracts not recommended for the transmission line, tracts that can accommodate the transmission line, and areas of future gravel extraction. However, some tracts were not addressed by the NDDTL in their Project comments. **Table 5.2-5** identifies the numbers and acres of State Trust Lands within the Project ROW which are depicted on Figure 5.

Table 5.2-5. NDDTL Recommendations for State Trust Lands within Project ROW

NDDTL Recommendation	Total Number of Tracts	Acres
Tracts Not Recommended for Transmission Line	2	19.6
Tracts Minimally Impacted by the Transmission Line	3	18.2
Tracts Not Addressed by the NDDTL	4	33.9
TOTAL	9	71.7

5.2.2 Impacts

Agriculture

Land use in the Project ROW is dominated by agricultural cropland, which totals about 54 percent of the ROW followed by pastureland, which totals about 17 percent of the ROW. The most common form of agricultural land use is row crops. The only agricultural land that will be permanently removed from production is the area directly affected by structure placement and fiber optic regeneration stations (and associated fiber optic regeneration station roads). The area directly under the transmission line that is outside of the structure location may continue to be used for agriculture. **Table 5.2-6** identifies temporary and permanent impacts anticipated for agricultural land for the Project .

Table 5.2-6. Agricultural Land Use Impacts for Project

GAP Land Cover Category	Temporary Impacts (acres)	Permanent Impacts (acres)[1]
Cropland	534.8	5.7[1]
Pasture	180.6	0.8
Total Agricultural Area	715.4	6.5

1. A Restricted Tillage Area was added as a permanent impact to each structure location on tillable land. Without the Restricted Tillage Area, permanent impacts total 3.4 acres for the entire Project, regardless of land use.

Where appropriate, the Project ROW follows existing field edges or crosses fields in a manner designed to minimize impacts to plowing and harvest patterns or as discussed with the landowner in the easement agreement. In addition, Minnkota will offer to stake individual structure locations on each landowner's property for their visual review and input.

For construction that takes place outside of the winter months, temporary impacts to agriculture could occur as a result of construction activity. These impacts could include, but are not limited to, loss of planting opportunity, crop damage, and soil compaction. Minnkota will work directly with landowners to minimize impacts and to provide appropriate compensation for lost planting opportunities and crop damage. Soils compacted by construction activities will be restored using a deep tillage practice, such as sub-soiling.

Drain tiles may be present along the transmission line route. Minnkota will work with the landowners to identify locations of drainage tiles along the route and will minimize interference with drain tile, where possible. In the event that Minnkota encounters a tile that the landowner did not identify, Minnkota will relocate the structure and repair the tile line, if damaged.

The Project may make certain agricultural activities more difficult, such as maneuvering equipment around structures and aerial spraying. Landowners may conduct aerial spraying to apply pesticides, fungicides, and fertilizers. Aerial spraying is typically conducted by small aircraft with low flying altitudes. After the Project is constructed, aerial sprayers will need to employ the same flight patterns as used when working adjacent to tree rows, distribution lines, or communication structures.

Human Settlement

Short-term impacts to residents and local business owners in the vicinity of the Project primarily will be related to disruption caused by temporary construction activities, such as elevated noise levels and increased vehicle traffic.

The NESC requires certain clearances between transmission line facilities and buildings for safe operation of the transmission line. Minnkota developed a route for the Project sufficient to maintain clearances required to safely operate the transmission line.

Ten homes (occupied or vacant, but habitable) are located within 500-feet of transmission facility. One vacant home is located within the Project ROW. The nearest home is 49 feet from the transmission facility; this home is owned by Minnkota. Minnkota has obtained waivers from most of the affected landowners to route the transmission facility within 500 feet of their residence. Long-term effects upon residences will be visual in nature and include building restrictions within the easement. Homes located near the Project may experience short-term

effects during construction such as elevated noise levels, increased fugitive dust, and increased vehicle traffic.

Existing Infrastructure

One communication tower is located within the Project Corridor (T148N, R57W, Section 19), but is avoided by the Project Route. The communication tower located within the Project Corridor will limit where adjacent transmission structures are placed with relation to the tower, but will not impact operation of the Project or the communication tower.

The northern half of the Yucca Catholic Cemetery is crossed by the Project ROW in T142N, R82W, Section 34. Minnkota has obtained an overhang easement from Yucca Catholic Cemetery.

Seven structures are located within the Project ROW, but are either spanned or are adjacent to the Project Route. Structures located within the proposed ROW will be voluntarily displaced; typically, this means that the structure will be purchased by Minnkota and the structure will be moved from the area. In some instances, the structures will be left in place or relocated consistent with landowner agreements.

Typically, CPI systems are located in the center of a quarter-section and have a 360 degree rotation for field irrigation. No CPI systems are crossed by the Project ROW and Minnkota is working with landowners that have expressed future irrigation plans.

Seven railroads and six pipelines are crossed by the Project ROW. These crossings will be spanned.

Planned Wind Facilities

The Project ROW crosses three potential wind energy facilities. Minnkota is in communication with the wind energy developers and no impacts are anticipated. Construction of the Project may provide wind developers with more direct access to transmission on which to distribute their power.

Mining Resources

Minnkota has contacted the landowners regarding future plans for extraction from the two gravel pits crossed by the Project ROW and there are no plans to expand these facilities. Preliminary structure locations indicate that a structure will be placed at the assumed northern edge of gravel pit Number 1 and that structures will be placed on the assumed eastern and western edges of gravel pit Number 2. Minnkota is also contacting the landowner of the gravel pit south of the Project ROW in T147N, R73W, Section 8 to determine the extent of future operations. Minnkota will continue to work with landowners to minimize potential impacts to future gravel operations.

Lignite mining is active near the western terminus of the Project at the BNI Center Mine. The current location of this mine is approximately 6 miles west of the Center 345 kV Substation. The mining operation is expanding south. Impacts to coal mining are not anticipated from the Project.

Conservation Areas

USFWS maintains grassland and wetland conservation easements within the Project ROW. A grassland easement would be impacted by placement of a structure within the easement. A wetland easement would be impacted by placement of a structure within a wetland basin under

easement. Minnkota is working with local USFWS wetland management districts and landowners to determine the exact location and size of these wetlands under easement and to avoid or minimize impacts. Impacts based on preliminary structure locations are shown in **Table 5.2-7**.

Table 5.2-7. Temporary and Permanent Impacts to USFWS Easements from the Project Route

Easement Type	Temporary Impacts (Acres)	Permanent Impacts (Square Feet)
USFWS Wetland[1]	27	406
USFWS Grassland	4	471
Total	31	877

[1] Wetland easement impact is based upon the desktop and field reviewed wetland boundaries as of November 8, 2011. Actual impact of easement wetlands will be less, since construction access will likely avoid wetlands. Wetland easement impacts are based on actual wetland basin location as verified by field visits and desktop evaluation. Minnkota will review delineated boundaries with USFWS for wetland basins within wetland easements.

NRCS oversees CRP-enrolled parcels in the Project ROW; however, the location of these parcels is not publically available because the contracts are considered confidential. Minnkota will work with local NRCS offices and landowners to determine the location of and address concerns regarding CRP parcels. Individuals using PLOTS lands will have access under the transmission line to access the property. For the transmission line structures (preliminary locations) placed on PLOTS land, there will be 3.2 acres of temporary impacts and 628 square feet of permanent impacts. The transmission line will not impact recreational opportunities on PLOTS lands.

State Trust Lands

The NDDTL indicated that some State Trust Lands have identifiable assets in addition to the current pastureland use, such as aggregate deposits, wind farm development, or cultivated land that may be impacted by construction of the Project Route. **Table 5.2-8** identifies temporary and permanent impacts (acres) to State Trust Lands from the transmission line facility. Direct impacts to State Trust Lands could not be completely avoided by the Project Route.

Table 5.2-8. Land Impacts to State Surface Tracts from the Project Route

NDDTL Tract Recommendations	Temporary Impacts (ac)	Permanent Impacts (ac)
Tracts Not Recommended for Transmission Line	4.0	0.03
Tracts Minimally Impacted by the Transmission Line	3.8	0.01
Tracts Not Addressed by the NDDTL	7.5	0.02
TOTAL	15.3	0.06

5.2.3 Mitigation

Agriculture

The Project Route was designed to minimize impacts to agricultural land use. Several measures will be utilized to mitigate impacts, including:

- Working with the landowners to site the Project Route so as to minimize impacts on their property. Minnkota will offer to conduct a staking review with landowners, to the extent practical.
- Siting the final Project Route along existing field edges.
- Crossing fields parallel to existing plowing patterns or by crossing fields at 90 degree angles.
- Monetarily compensating landowners for crop or other (fence or drain tile) damage caused by construction or operation and maintenance activities.
- Monetarily compensating landowners for a structure on their land.
- Minnkota will apply herbicide around the base of structure if requested by landowners.

Human Settlement

Minnkota developed a Project Route to avoid occupied homes by maximizing setbacks to the extent practicable. In some instances, it was preferable for the Project Route to pass within 500 feet of an occupied residence due to other routing factors and, in such cases, Minnkota is working with the landowners affected and obtained a waiver of the 500-foot setback requirement.

Residents and local business owners in the vicinity of the Project primarily will be affected by temporary construction activities and long-term aesthetic changes. In addition, landowners may be affected by temporary changes in land use by development of the Project Route. Specifically, agricultural land will be temporarily disrupted during construction. To minimize impacts to landowners, Minnkota will utilize the following mitigation measures:

- The exact location of structure sites, the ROW, and other disturbed areas will be determined with landowner's input.
- The minimum area necessary will be disturbed.
- Construction activities will be limited to the 150-foot-wide ROW, unless temporary easements or access permission across adjacent property are obtained from the landowner(s).

Landowner compensation will be established in conjunction with easement acquisition for each landowner. As discussed in Section 5.1.3, compensation is based on the footprint of the easement upon the property, the number of structures, and crop damage.

Existing Infrastructure

Minnkota obtained an overhang easement for the portion of the Project ROW that crosses the Yucca Catholic Cemetery. No additional mitigation is planned.

Mitigation for impacts to other public airports and communication structures will not be required as these features will be avoided or impacts will be minimized by through Project sighting and design.

Minnkota will work with pipeline operators and railway companies to minimize impacts to their facilities during construction and operation. Minnkota will negotiate approvals with railway and pipeline operators, as necessary.

Planned Wind Facilities

Minnkota will continue to work with the wind energy project development companies. No impacts are anticipated, therefore no mitigation is proposed. In general, a transmission line may be seen as a benefit to a wind energy project for transfer of energy output.

Aggregate Mining

The landowners indicated that there were no future extraction plans for the gravel pits, therefore no mitigation is necessary.

Conservation Areas

Minnkota is working with local NRCS offices and landowners to determine the location of lands enrolled in CRP and to avoid or minimize impacts. If impacts cannot be avoided, Minnkota will work with the appropriate agency and landowner to remove the area from CRP, if necessary. Minnkota is working with the USFWS and applying for a Special Use Permit for impacts to grassland and wetland easements.

State Surface Tracts

The Project Route was designed to minimize or avoid impacts to existing resources on State Trust Lands. Minnkota will work with NDDTL to complete a Right-of-Way Permit application to cross State Trust Lands.

5.3 Public Services

5.3.1 Description of Resources

Public services generally refer to services provided by government entities to their citizens. Public services are often those services that are used to benefit public health and safety, such as education and emergency services (fire, ambulance, and police). Public services are concentrated within the municipalities near the Project ROW. There are three municipalities within the vicinity of the Project (Aneta, Grand Forks, and Northwood). Fiber optics, pipelines, transmission lines, rural water lines, and associated facilities exist within or are crossed by the Project ROW.

Airports

No commercial or general aviation airports are present within the Project ROW. The R. Leep Airstrip located in T147N, R73W, Section 14, the closest private airstrip to the Project Route, is approximately 0.8 miles away. Nearby airport facilities are predominantly general aviation airports, but some are smaller private facilities.

The Grand Forks International Airport has planned improvements for the existing airport layout because of a forecasted increase in aircraft operations. According to the July 2006 Land Use Compatibility Plan for Grand Forks International Airport, the future plans include construction of two additional runways. Grand Forks International Airport intends to make additional upgrades, including extending the current main runway and existing crosswind runway. Portions of the Project ROW fall within Airport Zone D (airspace protection buffer area) of the Grand Forks International Airport.

Roads

County and township (section line) roads characterize the existing roadway infrastructure in and around the Project. The Project ROW will cross state and U.S. highways at 16 locations (**Table 5.3-1**). The average daily traffic volumes on the area's highways are documented in Figure 6. Determining the specific capacity of any highway is a complex process; however, general estimates are used for planning purposes. For purposes of comparison, the functional capacity of a two-lane paved rural highway is approximately 5,000 vehicles per day, referred to as the average annual daily traffic (AADT). In general, the state highways in and near the Project ROW carry higher levels of traffic than the average for rural North Dakota, but represent only a fraction of the roadway capacity.

5.3.2 Impacts

Many public services near or within the Project ROW are located within municipality boundaries, but rural water, fiber optic, transmission lines, and distribution lines are also located outside of municipalities. Several of these municipalities have medical centers, hospitals, fire stations, police stations, and schools.

Potential temporary impacts to public services, mainly emergency services, are related to construction activities that may disrupt roadways and access. Generally, construction activities will be staged such that public roads will not be closed for any substantial period. Emergency access for local residents, should they need emergency services, will be provided by halting construction and relocating equipment so emergency vehicles could access the residence. Once construction is complete, the transmission line will span all roads and therefore will not impede emergency services.

The Project is not anticipated to have any long-term negative direct or indirect effects to public services. The Project will have a positive effect on public services by providing improved reliability and capacity to meet the growing demands for electrical service in the Minnkota service area. The added transmission will reduce the risk of brownouts (leading to potential blackouts) by providing a means to transmit additional base load power to the Minnkota service area. Aside from the identified electrical impacts that are being addressed and mitigated through existing processes with neighboring utilities, Minnkota does not anticipate additional direct or indirect impacts to existing utilities from this Project.

Airports

Transmission lines can present an important safety concern to airports and aircraft. The FAA has established guidelines to determine the appropriate setback distance for tall structures, including transmission lines, from public use airports and heliports. Federal Aviation Regulation (FAR) Part 77 establishes standards and notice requirements for reporting airspace obstructions for objects currently impacting or that could impact navigable airspace around aviation facilities. FAR Part 77 defines a series of imaginary surface zones surrounding airports that specify height restrictions for structures based on slope ratios. These imaginary surfaces include the primary surface, horizontal surface, conical surface, approach surface and the transitional surface. According to FAR Part 77, "an object will be considered an obstruction to a public airport (excluding seaplane bases and heliports) if it is of greater height" than any of the aforementioned imaginary surfaces. Each of these imaginary surfaces have corresponding slopes, based in part on the airport's use designation, flight volumes, and plane size capabilities. All surfaces are measured at the mean sea-level elevation of the airport.

Certain objects such as steel pole transmission line structures have the potential to conflict with the operation of airport navigational aids and weather observation station facilities, including radar facilities used for aircraft navigation. These facilities may require routing regulations similar to those applicable to airports and airstrips. Coordination with the Grand Forks International Airport and University of North Dakota (UND) Aerospace staff indicate that the project would not impact airport navigational aids or weather observation facilities.

In accordance with the Land Use Compatibility Plan for Grand Forks International Airport (July 2006) and the FAA, pursuant to the requirements set forth by FAR Part 77, Subsection 13, Minnkota completed an airspace review for all structures within Zone D. Due to results of the FAA determination, Minnkota has reduced the height of structures by using H-frame structures within Zone D therefore no impacts to airspace are anticipated. The Project has completed and submitted the paperwork necessary for the FAA to provide preliminary concurrence of the Project design. Letters from the Grand Forks International Airport and UND Aerospace were filed with the Commission during the Corridor Public Hearings as Exhibits 24 and 25.

Roads

The construction workforce is expected to generate increased vehicle trips on local roadways. Since many of the area roadways have limited traffic currently, the anticipated increased vehicle traffic during peak construction represents a large percentage increase and will be perceptible to daily users of the roads. Slow moving construction vehicles may cause delays on smaller roads, similar to farm equipment during harvest. In addition, delays may occur as the transmission line is being strung across a roadway. These impacts will be short term and temporary.

Two of the 16 potential State and US highway construction access locations may require a temporary impact within Department of Transportation (DOT) ROW. No permanent impacts are anticipated. **Table 5.3-1** shows the highway crossing and access locations from west to east and potential impacts. As necessary, Minnkota will apply for approval from the North Dakota DOT for an access permit.

Table 5.3-1. Highway Crossing and Construction Access Locations

ND or U.S. Hwy	North or East Access	South or West Access	Temporary Impact Anticipated	Description of Temporary Impact
25	Drive off access	Existing field access	Yes	Remove and replace fence east side
1804	Existing field access	Existing field access	No	N/A
83	Drive off access	Drive off access	Yes	Remove and replace fence both sides
41	Access from side road	Drive off access	No	N/A
200	Drive off access	Access from side road	No	N/A
14	Existing field access	Existing field access	No	N/A
3	Drive off access	Access from side road	No	N/A
52	Access from side road	Drive off access 500' south	No	N/A
30	Drive off access	Existing field access	No	N/A
281	Existing field access	Existing field access	No	N/A
20	Existing field access	Existing field access	No	N/A
1	Existing field access	Existing field access	No	N/A
45	Access from side road	Access from side road	No	N/A
32	Existing field access	Existing field access	No	N/A
15	Existing field access	Existing field access	No	N/A
18	Drive off access	Drive off access	No	N/A

Existing field access - Construction access will be via existing field access which is adequate in size and strength to handle construction equipment.

Drive off access - Construction access will be through existing shoulder which is shallow enough and has adequate strength to handle construction equipment.

Access from side road - Construction access will not be along highway, but rather will access ROW via side road close to crossing location.

5.3.3 Mitigation

Proper safeguards will be implemented for construction and operation of the Project facilities. The Project facilities will be designed according to local, state, and NESC standards regarding ground clearance, crossing utilities clearance, building clearance, strength of materials, and ROW widths. Construction crews and/or contract crews will comply with local, state, and NESC standards regarding facility installation and standard construction practices. Minnkota will establish industry safety procedures that will be followed during and after installation of the transmission line, including clear signage during all construction activities.

Airports

Following consultation with the Grand Forks International Airport, UND Aerospace and the FAA, Minnkota has proposed H-frame structures near the Grand Forks International Airport to reduce structure height and avoid impacts to airport operations, therefore no impacts are anticipated and mitigation will not be necessary. Minnkota will continue to work with the Grand Forks International Airport, UND Aerospace and the FAA and does not anticipate any impacts to airport navigational aids, weather observation station facilities, airspace, and glide slope intercept for public airports near the Project Route.

Roads

Minnkota will ensure that all safety requirements are met during the construction and operation of Project facilities. Additionally, when crossing roads or railroads during stringing operations, guard structures may be utilized as necessary to eliminate traffic delays and provide safeguards for the public. Minnkota is working with counties and townships to develop construction traffic plans that will be made available prior to construction. With the construction traffic plans, proper safeguards, and protective measures implemented as described above, no additional mitigation should be needed.

5.4 Human Health and Safety

Human health and safety concerns include potential issues such as electric and magnetic fields (EMF) (collectively referred to as electromagnetic fields), stray voltage, and air quality. The majority of the information in this section was obtained from federal and state agencies and national and international organizations, including the National Institute of Environmental Health Sciences (NIEHS), U.S. Environmental Protection Agency (EPA), and World Health Organization (WHO).

5.4.1 Description of Resources

Electric and Magnetic Fields

EMF, as it relates to transmission lines, references two separate fields: electric fields and magnetic fields. Electric fields are produced by the line voltage, and magnetic fields are produced by the electric current in the lines. An electric field results from the voltage on an electrical wire as caused by electric charges, and electric fields can exert forces on other nearby charges. The intensity of the electric field is related to the voltage of the line and proximity to the conductor. Electric fields are measured in volts per meter (V/m) or kilovolts per meter (kV/m) where 1 kV = 1,000 V.

A magnetic field is created when charges move along a wire. The moving charges produce an electric current. The intensity of the magnetic field is proportional to the current flow through the conductors and proximity to the conductor. Magnetic fields are measured in milligauss (mG) or microTeslas (uT). Peak magnetic field levels can vary considerably depending upon the amount of current carried by the line.

Electric fields and magnetic fields are produced both by the natural world around us and the electricity we use on a daily basis. The earth's steady state electric field is approximately 100 V/m and the earth's steady state magnetic field is approximately 550 mG. These do not have the 60-times-per-second time variation of power line fields, but we experience them as time-varying fields as we move through them. Thunderstorms can temporarily increase the electric field in a given location to several thousand V/m.

The EMF produced by electrical equipment, which includes transmission lines, varies in time at a frequency of 60 cycles per second or "60 Hertz (Hz)." According to the Electric Power Research Institute (EPRI), the average household background 60-Hz magnetic field is between 0.5 and 4 mG with an average of 1 mG, and the average 60-Hz electric field is 1-20 V/m. **Table 5.4-1** displays typical 60-Hz magnetic field levels from common household appliances. The EMF produced by electrical appliances and transmission lines are considered to be extremely-low-frequency (ELF) fields. High frequency EMF are associated with radio, TV, radar, and cell phone signals. ELF-EMF are produced by any electric appliance or electric circuit. Both the electric and magnetic fields that constitute EMF are strongest close to the sources of voltage and current, and decrease rapidly with distance.

Table 5.4-1. Typical 60-Hz Magnetic Field Levels from Common Household Appliances

Appliance	Median magnetic field 6 inches from appliance (mG)	Median magnetic field 2 feet away (mG)
Refrigerator	2	1
Vacuum cleaner	300	10

Appliance	Median magnetic field 6 inches from appliance (mG)	Median magnetic field 2 feet away (mG)
Electric oven	9	-
Dishwasher	20	4
Microwave oven	200	10
Hair dryer	300	-
Computers	14	2
Fluorescent lights	40	2

Source: NIEHS 2002
Note: Dash means the magnetic field at this distance from the operating appliance could not be distinguished from background measurements taken before the appliance had been turned on.

There are no standards established for safe levels of exposure to 60-Hz EMF. Although some states have established standards or guidelines with regard to transmission line electric and magnetic fields, there are no North Dakota published guidelines for EMF. The EMF standards and guidelines established by other states for transmission lines are displayed in **Table 5.4-2**. The phrase "On ROW" refers to the location directly under the transmission line and the phrase "Edge ROW" refers to a distance 75 feet from directly underneath a transmission line.

Table 5.4-2. State EMF Standards and Guidelines for Transmission Lines

State/Line Voltage		Electric Field (kV/m)		Magnetic Field (mG)	
		On ROW	Edge ROW	On ROW	Edge ROW
Florida[c]	69-230 kV	8.0	2.0[f]	--	150
	230-500 kV	10.0	2.0[f]	--	200
	>500 kV	15.0	5.5[f]	--	250[e]
Massachusetts		--	1.8	--	85
Minnesota		8.0	--	--	--
Montana		7.0[a]	1.0[b]	--	--
New Jersey		--	3.0	--	--
New York		11.8	1.6	--	200
		11.0[d]			
		7.0[a]			
Oregon		9.0	--	--	--

[a] *Maximum for highway crossings*
[b] *May be waived by the landowner*
[c] *Magnetic fields for winter-normal, maximum line current-carrying capability*
[d] *Maximum for private road crossings*
[e] *Includes 500 kV double-circuit lines built on existing ROWs*
[f] *Includes the property boundary of a substation*

-- No Guidelines

Some organizations have set EMF advisory limits that serve as guidelines for permissible EMF exposure levels. For example, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) recently established a continuous magnetic field exposure limit of 2,000 mG and a continuous electric field exposure limit of 4,200 V/m (4.2 kV/m) for members of the general public. The American Council of Governmental Industrial Hygienists (ACGIH) has set a

Threshold Limit Value for occupational exposure to 60-Hz magnetic fields of 10,000 mG and electric fields of 25,000 V/m (25 kV/m).**Table 5.4-3** displays EMF guidelines established by health and safety organizations.

Table 5.4-3. Electric and Magnetic Field Exposure Guidelines for Power-Line Fields

Organization	Electric Field (kV/m)		Magnetic Field (mG)	
	General Public	Occupational	General Public	Occupational
ICNIRP (2010)	4.2	8.3	2,000	4,200
IEEE (2002)	5	20	9,040	27,100
ACGIH (2009)	--	25	_	10,000

ICNIRP – International Commission on Non-Ionizing Radiation Protection
IEEE – Institute of Electrical and Electronic Engineers
ACGIH – American Conference of Governmental Industrial Hygienists

Minnkota conducted an analysis of calculated EMF levels for the Project. **Table 5.4-4** shows the calculated EMF levels for the Project and how the calculated levels at any location within the ROW are below the ICNIRP guidelines (2,000 mG and 4.2 kV/m) for public exposure to EMF. Computations were performed using industry standard approaches as outlined in the Transmission Line Reference Book – 345 kV and Above; Second Edition, 1982, Electric Power Research Institute, Inc., Palo Alto, CA, USA, and modified by data approaches developed by Bonneville Power Administration and Washington State University.

Table 5.4-4. Calculated EMF Levels for the Project

Project Load Condition	Electric Field (kV/m)		Magnetic Field (mG)	
	On ROW	Edge ROW	On ROW	Edge ROW
Normal Operating Condition[a]	2.4	1.2	75	23
Maximum Operating Condition[b]	4.5	1.2	341	100

[a] *Normal Operating Condition was assumed to be 404 MVA for winter-normal at maximum allowable voltage.*
[b] *Maximum Operating Condition was assumed to be that condition of operating parameters which would result in the highest field levels.*

Electric and Magnetic Field Research

Concerns about potential health effects of EMF from transmission lines were first raised in the late 1970s, triggered by a weak statistical correlation between living in proximity to utility distribution systems and childhood leukemia cases. There has been much public debate and research regarding ELF-EMF for over 35 years. Considerable research has been undertaken to understand how electric and magnetic fields interact with the physical nature of matter. Because electric fields are blocked by ordinary substances that conduct electricity, such as skin, foliage, and house structures, magnetic fields have been the focus of most of the research regarding possible health effects to both humans and livestock. While there are numerous internet sites devoted to EMF (whether from transmission lines, cell phones, or radio frequency signals), the vast majority of public-health agencies believe that EMF from transmission lines do not cause health problems. In part, these scientific consensus groups note the physical impossibility of any health effect (or adverse biological effect) being caused by exposure to low-frequency, low-intensity magnetic fields. Exhaustive reviews of the health effects from power-frequency fields conclude that the evidence of health risk is weak and there is little laboratory evidence

correlating extra low frequency EMF exposure with health risk, as demonstrated in the following discussion.

EMF and Leukemia

After reviewing more than two decades of research, NIEHS scientists concluded that the overall pattern of results suggests a weak association between increasing exposure to EMF and an increased risk of childhood leukemia (NIEHS 1999). In the President's Cancer Panel 2008-2009 Annual Report (published in April 2010), the weaknesses of the childhood-leukemia epidemiologic associations in the studies were discussed: (1) EMF were not measured, but distance to power lines was used to estimate exposures inside of a home, (2) all sources of EMF were not considered, and (3) the selection of cases and controls was likely biased.

ICNIRP reviewed the scientific evidence relating to extremely low magnetic fields and increased risk of childhood leukemia and concluded that the evidence "is too weak to form the basis for exposure guidelines" (ICNIRP 1998, 2010). Several scientific organizations including the American Medical Association (AMA 1994), American Cancer Society (ACS 1996), American Physical Society (APS 2005), and National Academy of Sciences (NAS 1997) have stated that the body of evidence in regard to ELF-EMF, particularly magnetic fields, indicates that exposure to these fields do not present a human health hazard.

A large number of credible, scientific organizations have come to similar conclusions about ELF-EMF and public health:

- The epidemiology studies on EMF are not based on actual EMF exposures and show weak and generally inconsistent correlations between estimates of EMF exposure and health statistics.
- Laboratory research has not been able to establish either cause and effect relationship between exposure to magnetic fields and any human disease, or a plausible biophysical or biological mechanism by which exposure to EMF could cause cellular changes that would lead to disease.
- The magnetic fields produced by power lines do not have the energy necessary to break chemical bonds and cause DNA mutations, and hence cannot interfere with basic biological function at the molecular level.

Many public health agencies (e.g., American Cancer Society, Environmental Protection Agency, Food and Drug Administration, Centers for Disease Control) have not established numerical guidelines for power line EMF because they have not found scientific studies sufficiently supportive of the need to set either an EMF exposure guideline or a "safe distance" criterion. No legitimate public health agency has proposed that an "unsafe" region exists in the proximity of overhead transmission lines.

EMF and Livestock

The vast amount of laboratory animal research focused on EMF effects on living organisms has not demonstrated that power line magnetic fields affect reproductive function. In addition, a considerable amount of research on EMF and livestock (particularly cows) has been conducted in Quebec, Canada and has been funded by Hydro-Quebec. A recent joint study conducted by McGill University, Ministere de l'Agriculture, des Pecheries et de l'Alimentation du Quebec (MAPAQ) and the Quebec Dairy Committee exposed cows to high levels of EMF. This study did not show any changes in the hormonal profile and dairy production of Holstein cows. This, in addition to several other studies conducted since the 1970s, provides reassurance that no

biological disorder can be attributed to the exposure of livestock to EMFs generated by high-voltage transmission lines. In addition, no harmful effect on the health, productivity, fertility, reproduction, or behavior of livestock exposed to EMFs has been observed, and typical EMF exposures are not anticipated to be harmful to farm animals.

In addition, Minnkota, and other utilities in agricultural regions of the country, have operated 345 kV systems for many years. Through the years, no statements concerning the potential adverse effects of the 345 kV power system on cattle have ever been received.

EMF and Implantable Medical Devices

Implantable medical devices, for example cardiac pacemakers, defibrillators, neurostimulators, and insulin pumps may experience interference from strong EMF. The 2004 EPRI report indicated that implantable medical devices may be more susceptible to interference from electric fields than from magnetic fields. Electric fields will be strongest directly under the transmission line and will decrease with increasing distance from the transmission line towards the ROW edge. Although no actual real-world events have been reported in people near high-voltage transmission lines, laboratory research has shown the following potential effects can occur to pacemakers exposed to electric fields:

- Rate increasing
- Erratic pacing
- Switching to asynchronous pacing or fixed-rate pacing
- Single beat inhibition (i.e., a single beat is missed by the pacemaker)
- Total inhibition

Research completed by Toivonen et al. (1991) indicated that the lowest field intensity suggestive of possible interference was in electric fields ranging from 1.2 to 1.7 kV/m (near a 110 kV power line), but some pacemakers maintained normal function in electric fields up to 8 kV/m (near a 400 kV power line). The 15 patients in this study collectively had 12 different models of pacemakers from four manufacturers. Scholten et al. (2004) concludes that the risk of interference inhibition of unipolar cardiac pacemakers from high voltage power lines in everyday life is small. In the unlikely event a pacemaker experiences interference, the pacemaker goes into a default pacing mode and then returns to its normal operation when the person moves away from the source of the interference. Scholtenet al. (2004) indicated that moving 20 meters (66 feet) away from the point directly underneath the line (two 380 kV circuits) resulted in the most precipitous drop in electric fields. **Table 5.4-1** illustrated that by moving an additional foot or so away from the source of the magnetic fields, that the values decrease significantly, which is true for all sources of EMF.

Modern bipolar devices are much less susceptible to interactions with electric fields. Dyrda et al.'s (2009) review of Trigano et al. (2005) concluded "risks with bipolar sensing [in bipolar pacemakers] appeared negligible." In addition, major manufacturers (Medtronic and Guidant) of pacemakers and implantable medical devices have indicated that electric fields below 6 kV/m are unlikely to cause interactions affecting operation of most of their devices (Tower Project 2005).

Induced Voltage

Induced voltage is an electrical condition through which very low levels of voltage are transferred to and may be measured in objects in the near vicinity of a high voltage transmission line. Near objects could be buildings, fences, pipelines, railways, or other equipment in very close proximity to the transmission line. The electric field from a transmission line can interact with a

conductive object, such as a metal fence, which is in proximity to the transmission line. This will induce a voltage on the object, the magnitude of which is dependent on many factors, including the weather; object shape, size, orientation, and capacitance; object to ground resistance; and object location along the ROW. Electrically grounded objects exhibit no induced voltage, but if nearby objects are insulated or semi-insulated from the ground and a person touches them, a small current will pass through the person's body to the ground. This might 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. Induced voltage from capacitive coupling normally is not a problem. Where it is, the problem can be mitigated with proper grounding of the affected objects.

Stray Voltage

Stray voltage is a condition that can occur on the electric service entrances to structures from distribution lines (i.e., the smaller, lower-voltage electric line that brings power from utility substations to a house, barn, and other farm buildings), not transmission lines (i.e., the electric line that brings power from the generation source to substations and hence to the distribution system). Stray voltage describes a special case of voltage developed on the grounded neutral of the electrical wiring system of a farm and/or a utility's electric power delivery system. If this voltage reaches sufficient levels, animals coming into contact with grounded devices may receive a mild electric shock that can cause a behavioral response. For example, if a cow touches a poorly grounded metal object in a building with its nose and is standing on a damp floor, and if the metal object and the floor have different electrical potentials, then a weak electric current will pass through the cow's body. This current, if strong enough for the animal to feel, may cause some discomfort. A good resource on stray voltage issues is the USDA Agricultural Handbook (#696): *Effects of electrical voltage/current on animals: how to detect and remedy problems* (1991).

Air Quality

Corona consists of the breakdown or ionization of air within a few centimeters of transmission line conductors and hardware. Usually some imperfection such as a sharp edge, a protrusion on hardware, a scratch on the conductor, or water is necessary to cause corona. Corona can produce ozone and oxides of nitrogen in the air surrounding the conductor. Ozone also forms in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants, such as hydrocarbons from auto emissions. In the case of air pollutants, the natural production rate of ozone is directly proportional to temperature and sunlight and inversely proportional to humidity. Thus, humidity or moisture, the same factor that increases corona discharges from transmission lines, inhibits the production of ozone from air pollutants. Ozone is a very reactive form of oxygen molecules and combines readily with other elements and compounds in the atmosphere. Because of its chemical reactivity, ozone is relatively short-lived.

5.4.2 Impacts

Electric and Magnetic Fields

EMF will be strongest directly under the transmission line and decrease with increasing distance from the transmission line towards the ROW edge. Minnkota conducted an analysis of EMF calculated levels for the Project (as shown in **Table 5.4-4**). As load changes on the transmission line, the electric current flow changes, therefore the magnetic fields change.

At the maximum-load operating condition under the transmission line, the electric field is 4.5 kV/m and the magnetic field is 341 mG. This is considered the worst-case scenario for the Project. The results of Minnkota's analysis shows that calculated EMF levels for the Project under maximum operating conditions and normal operating conditions are below the published guidelines from organizations (such as ICNIRP and ACGIH) (**Table 5.4-3**) and the states that have published safe-exposure guidelines (**Table 5.4-2**).

The effects that may occur to a person with an implantable medical device are usually temporary and the medical device generally resumes normal function once the person is removed from the source of electric fields. At levels associated with high-voltage transmission lines, the Project will not have regular, temporary interference with implantable medical devices. No other EMF-related impacts to humans or animals are anticipated.

Induced Voltage

The main concern with induced voltage on an object is the current flow through the person to ground if a person were to touch an ungrounded metal object under the lines. Insulated electric fences used in livestock operations may pick up an induced charge from transmission lines. Usually, the induced charge will drain off when the charger unit is connected to the fence. When the charger is disconnected either during maintenance or when the fence is being built, minor shocks may result but can be avoided by grounding the wire when disconnected from the charger.

As discussed below, Minnkota will utilize appropriate mitigation measures to prevent induced voltage impacts to railway or pipeline facilities. There are no anticipated induced voltage impacts expected as a result of the construction or operation of the Project.

Stray Voltage

Since transmission lines do not produce stray voltage, there are no anticipated stray voltage impacts as a result of the construction or operation of the Project.

Air Quality

No impacts to air quality due to the operation of the transmission line are anticipated. The federal government has regulations regarding permissible ambient air concentrations of ozone and oxides of nitrogen. North Dakota has incorporated these federal ambient air quality standards into its air quality rules. The ambient air quality standard for ozone is 0.075 parts per million (ppm) based upon a three-year average of the annual fourth-highest daily maximum 8-hour average (40 CFR §50.15) concentration. Humid conditions and rain may cause transmission line insulators to release corona-discharge electricity, converting oxygen to ozone. Calculations done for a 345 kV project showed that the maximum 1-hour concentration during foul weather (worst case) will be 0.0007 ppm, which is far below both federal and state standards.

Temporary air quality impacts caused by construction-vehicle emissions and fugitive dust from ROW clearing and construction may occur, but will be minimal and temporary.

5.4.3 Mitigation

The NESC provides standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and ROW widths. Minnkota will design the Project to adhere to NESC standards. The U.S. Occupational Safety and Health Administration (OSHA) regulates worker safety in both construction and industrial settings and has developed and enforces regulations that are designed to protect workers from potential accidents. Minnkota will

require OSHA-compliant safety procedures that will be followed during and after installation of the transmission line, including clear signage during all construction activities. The transmission lines will be equipped with protective devices (breakers and relays located where transmission lines connect to substations) to safeguard the public in the event of an accident. The protective equipment will de-energize the transmission line should such an event occur. In addition, the substation facilities will be properly fenced and accessible only by authorized personnel.

Electric and Magnetic Fields

As demonstrated by the conclusions of the numerous studies presented in Sections 5.4.1 and 5.4.2 and the results of Minnkota's analysis of calculated EMF levels, normal operating conditions and maximum operation conditions will create EMF levels nearby the lines that will be at or below published guidelines. Minnkota does not anticipate any affects from EMF; thus it is not anticipated that any mitigation will be necessary.

Induced Voltage

As part of the design and engineering process, the Project Route will be designed to minimize any induced voltages in objects in proximity to the facilities. NESC clearances will be met, and the transmission line engineered in such a way as to ensure that induced voltages are minimized. To ensure that any electric discharge from induced voltages does not reach unsafe levels, the NESC requires that any discharge be less than 5 milliamperes (ma). Following construction, Minnkota will assure, as necessary, that any fixed object, such as a fence or other large permanent conductive object close to or parallel to the Project Route, will be grounded so any discharge will be less than the 5 ma NESC limit.

Insulated electric fences used in livestock operations may pick up an induced charge from transmission lines. Potential shocks can be prevented by shorting out one or more of the fence insulators to ground with a wire when the charger is disconnected or installing an electric filter to ground charges induced from a power line, while still allowing the charger to be effective.

Stray Voltage

Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences. No impacts from stray voltage are anticipated; therefore no mitigation is proposed.

Air Quality

Best Management Practices (BMPs) will be used to control fugitive dust during construction, including operating vehicles at reduced speeds and use of water and dust abatement methods. Dust suppression will be required of the construction contractors who will access and maintain the ROW and haul roads during construction. Minnkota or the construction contractors will apply for a permit from the State Water Commission for water appropriations related to construction purposes.

5.5 Noise

5.5.1 Description of Resources

Noise is defined as unwanted sound. Noise may include a variety of sounds of different intensities across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The A-weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA. A noise level change of 3 dBA is barely perceptible to average human hearing. A 5 dBA change in noise level, however, is clearly noticeable. A 10 dBA change in noise levels is perceived as a doubling or halving of noise loudness, while a 20 dBA change is considered a dramatic change in loudness.

Cumulative noise increases occur on a logarithmic scale. If a noise source is doubled, there is a 3 dBA increase in noise, which is barely discernible to the human ear. For cumulative increases resulting from sources of different magnitudes, the rule of thumb is that if there is a difference of greater than 10 dBA between noise sources, there will be no additive effect (i.e., only the louder source will be heard and the quieter source will not contribute to noise levels). Table 5.5-1 below provides noise levels associated with common, everyday sources and places the magnitude of noise levels discussed here in context.

Table 5.5-1. Noise Levels Associated with Common Sources

Sound Pressure Level (dBA)	Noise Source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Concert
110	Pneumatic chipper (powered by compressed air or hydraulics)
100	Jointer/planer
90	Chainsaw
80	Heavy truck traffic
70	Business office
60	Conversational speech
50	Library
40	Bedroom
30	Secluded woods
20	Whisper

Source: A Guide to Noise Control in Minnesota, MPCA (revised, 1999)

For this Project's design process, Minnkota has adopted the following criteria that are consistent with other 345 kV transmission projects in the area, such as the CapX2020 Fargo to St. Cloud Project. The land use activities associated with residential, commercial, and industrial land have been grouped together into Noise Area Classifications (NAC). Each NAC is assigned daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) limits for land use activities within the NAC.

The limits are expressed as a range of permissible dBA within a one hour period. L50 is the dBA that may be exceeded 50 percent (30 minutes) of the time within an hour, while L10 is the dBA

that may be exceeded 10 percent (6 minutes) of the time within an hour. Residences, which are typically considered sensitive to noise, are classified as NAC 1. **Table 5.5-2** shows the daytime and nighttime limits in dBA for residential areas (NAC 1).

Table 5.5-2. Noise Limits by Noise Area Classification (dBA)

Noise Area Classification	Daytime		Nighttime	
	L10	L50	L10	L50
1	65	60	55	50

The state of North Dakota does not regulate noise with measureable standards. There has been recent comment on proposed noise level targets, which were prepared by the North Dakota Legislative Council for the Energy Development and Transmission Committee. The proposed noise level targets reference 50 dB at the property line for noise sensitive land uses such as residences. As there is no weighting to this metric, Minnkota assumes that this is an un-weighted metric to account for predominant low frequency noise.

5.5.2 Impacts

Transmission Line

Construction activities will generate noise that is short-term and intermittent. Noise generated during operation of construction equipment and worker presence will create a short-term impact to nearby residences.

Transmission lines produce noise under certain conditions. The level of noise depends on conductor conditions, voltage level, and weather conditions. In foggy, damp, or rainy weather, transmission lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the conductors. During heavy rain the background noise level of the rain is usually greater than the noise from the transmission line. As a result, people do not normally hear noise from a transmission line during heavy rain. During light rain, dense fog, snow and other times when there is moisture in the air, transmission lines will produce audible noise approximately equal to household background levels.

The Project Route was modeled to evaluate audible noise from high voltage transmission lines using the EMF Tools software developed at the BPA based on methodologies in *Transmission Line Reference Book – 345 kV and Above* from the Electric Power Research Institute (see Exhibit 11 from the Certificate of Corridor Compatibility Hearings). The model was executed as a worst-case scenario benchmark, to ensure that noise was not under-predicted. The L50 is a noise level that will not be exceeded more than 50 percent of the time. Using the L50 for demonstrating compliance with nighttime L50 standard is the most conservative because the nighttime L50 is the most stringent of noise metrics. The maximum predicted L50 for the proposed transmission line of the Project for a single pole, 345 kV, single circuit tangent in the rain at a height of 2 meters is 47.2 dBA.

The Commission's guidelines require that the Project Route be no closer than 500 feet from a residence unless a waiver is granted. Therefore, it was assumed that any residences within 500 feet of a transmission facility will fall within the NAC 1 category. As such, L50 from the Project must not exceed nighttime levels of 50 dBA at these residences. Noise levels generated by the Project will be the same at night as those generated during the daytime, and compliance with the

nighttime levels (more restrictive) will also demonstrate compliance with the daytime noise standards due to greater noise sensitivity of humans at night.

In summary, noise associated with the operation of the Project facilities at the Project Route is not predicted to exceed the nighttime L50 standard. Minnkota anticipates that coronal noise from the Project Route will be far enough away from residences so as to not be heard above the ambient noise produced by wind and other natural phenomena.

Substation

The loudest noise levels associated with substation operation are when the cooling fans and oil pumps are in operation. Both of the substations proposed for transmission and equipment upgrades are located on Minnkota property. Noise levels around the substations are not anticipated to increase as a result of these upgrades.

5.5.3 Mitigation

Construction activities will generate noise that is short-term and intermittent. Noise impacts associated with construction will be mitigated in noise sensitive areas by limiting the hours of work to daytime hours. Heavy equipment used in construction will be equipped with sound attenuation devices, such as mufflers, to minimize the daytime noise levels. No long-term noise impacts are anticipated, thus no mitigation is necessary.

5.6 Visual Impacts

5.6.1 Description of Resources

The discussion of visual quality and aesthetics is based on a qualitative review of the existing landscape environment surrounding the Project ROW. Visual and aesthetic resources within the vicinity of the Project ROW were identified through discussions with state and local agency officials, comments received from participating citizens at open houses, ROW agent discussions with landowners, and through a review of aerial photography and field observation. Generally, visual and aesthetic resources within the Project ROW and surrounding vicinity include historic residential or commercial structures, parklands, cultivated agricultural land, rural open space areas (i.e., rolling pasture lands, CRP), water features, and wooded and shrubland draws.

The landscape topography crossed by the Project ROW is a mixture of agriculture, farmsteads, fallow fields, large open vistas, and gently rolling hillside topography. The Project ROW is primarily located in rural areas of North Dakota, where the landscape is mostly flat in the Red River Valley to rolling agricultural lands towards the Missouri River that can be classified as rural open space. Rural residences and farm buildings (inhabited and uninhabited) scattered along rural county roads are focal points in the open space character of the landscape. Scattered areas of tree cover occur throughout the Project ROW, primarily in areas considered unsuitable for farming, or planted as protection from the wind and sun around rural residences or farmsteads. Many residents have surrounded their homes with a mix of deciduous and coniferous trees that serve as natural windbreaks, shade, and enhanced privacy for homes.

High scenic integrity and significance areas include river and open water features, historic structures, wooded draws, public recreation areas, and tours or trails. State highway 1804 and roadway 1806 (labeled as 22nd Avenue NW within the Project ROW), associated with the Lewis and Clark Trail, are located along the east and west sides of the Missouri River in Burleigh and Oliver counties. The North Country National Scenic Trail is located along the McClusky Canal in McLean and Sheridan counties and along the Sheyenne River in Griggs County.

Land parcels along the Project ROW considered to contain outstanding natural features that warrant protection or management have been placed into state and federal conservation easement programs or fee trust lands such as WMAs or wildlife habitat areas under the jurisdiction of the USFWS.

In addition to the naturally occurring landscape features and the historic/scenic roads, historic structures are located at various points along the Project ROW. Data from the State Historic Preservation Office (SHPO) and the National Register of Historic Places (NRHP) were obtained to identify historic structures along the Project ROW.

5.6.2 Impacts

The visual impact of the transmission line facilities could affect landowners who live along or near the roads that the Project Route follows or community residents who regularly travel along these roads. Depending on a viewer's physical location, the terrain, and natural landscape features such as tree cover, the transmission structures could be visible for 1.5 to 2 miles. A viewer's degree of discernable detail decreases as physical distance from an object increases. Beyond 2 miles in physical distance, the outline of structures most likely will not be seen. The transmission line conductors are unlikely to be seen clearly beyond distances of one-half to three-quarters mile.

Several areas that the Project ROW crosses may be considered visually sensitive, specifically the crossing points of the Missouri River, Sheyenne River, James River, Goose River, McClusky Canal, and various creeks.

5.6.3 Mitigation

The Project Route is located in areas where compatible land uses have been identified by the public and agencies. Typical structures will be between 95 and 180-feet-tall, typically located just outside the field break or public road ROW. Many of these roads currently do not share a ROW with a transmission line. However, they often include power distribution lines serving rural residences and farmsteads.

Care will be taken to avoid the placement of structures in visually sensitive areas and ecologically sensitive areas, typically identified by the public as areas of scenic significance. Minnkota will work with landowners who have property in the Project ROW by conducting staking reviews where feasible to minimize the impact of the transmission line to the surrounding landscape and limit the removal of trees. If trees are removed, Minnkota will follow the Commission's tree and shrub replacement guidelines.

The Project Route will be a contrast to surrounding land uses and Minnkota has engaged landowners and public agencies to identify concerns related to the transmission line facilities and aesthetics. In general, mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Potential mitigative measures include the following:

- Where feasible, the location of structures, ROWs, and other disturbed areas will be finalized by considering input from landowners or land management agencies to minimize visual impacts.
- Structure types (design) will be uniform to the extent practical. Minnkota proposes to mostly use self-weathering, self-supporting, single pole steel structures. The height of the structure may be reduced, as feasible, to minimize impacts within areas of high scenic importance. The self-weathering structure will turn a brownish color to help blend in with the landscape.
- Final structures will be placed at the maximum feasible distance from scenic highways, waterways, and trail crossings, within the limits of structure design.
- Care will be taken to preserve the natural landscape; construction and operation will be conducted to prevent any unnecessary destruction, scarring or defacing of the natural surroundings in the vicinity of the work.
- To the greatest extent possible, waterways are crossed in the same location as existing disturbances, such as utility lines or roads.

5.7 Cultural Resources

As the lead agency for the federal permitting process, the RUS is coordinating compliance with both the Section 106 procedures of the National Historic Preservation Act of 1966, as amended (NHPA)(16 U.S.C. § 470 et seq.), and the steps taken to meet NEPA requirements in development of a Programmatic Agreement (PA).

5.7.1 Description of Resources

Although there is no legal definition, for purposes of the NEPA, "cultural resources" refer to historic, aesthetic, and cultural aspects of the human environment. These can include natural and built resources, and the relationship that people have to those resources. Section 106 of the NHPA recognizes that certain types of cultural resources exhibiting historic associations may meet specific evaluation criteria developed by the National Park Service (NPS) that qualify them for listing in the National Register of Historic Places (NRHP). Those cultural resources that are listed in or are eligible for listing in the NRHP are designated "historic properties." Historic properties can include archaeological and historical resources as well as properties of traditional religious and cultural importance that have special meaning for traditional communities. These resources vary in size, shape, condition, and importance. Some may be visually evident on the landscape, while others may be buried or only visible to knowledgeable people.

5.7.2 Archaeological Resources and Impacts within the ROW

Minnkota reviewed SHPO records to identify known archaeological resources within the Project ROW. The list of known resources is limited to those identified through previous surveys in specific locations, often tied to urban and rural development and infrastructure projects. The Class I literature review included reports of previously surveyed areas relevant to the broad macro-corridors and Government Land Office maps. The Class I literature review was filed as Appendix F in the Corridor Certificate Application. The archaeological resources recorded in the Project Area are grouped into seven categories to aid in assessment. These are Mound sites (sites with or without burials or additional features), Stone Features (sites containing circles, cairns, effigies or other stone alignments), Isolated Finds (single or very few chipped or ground stone flakes, tools, or broken tools), Cultural Material Scatter (chipped stone, animal bone, tools, or ceramics, either historic or prehistoric), Habitation (prehistoric earthlodges, hearths, caches, depressions), Multi-component (containing both prehistoric and historic habitation materials or features), Unknown (not enough information on site form to categorize the site), and Historic Districts.

An archaeological inventory of the Project ROW has not been completed, so it is not possible to quantify reliably the potential for impacting archaeological sites. With RUS and SHPO consultation and to aid archaeological inventory, an archaeological predictive model was developed for this Project that is based on geographic information about the Project Area that is provided by multiple sources, such as the US Geological Survey, Department of the Interior, Department of Agriculture, and SHPO. Some basic landscape data, such as surface slope, directional exposure, and distance to nearest stream or river, are derived from these larger data sets in GIS.

Information such as surface slope, soil type, vegetation cover, distance to water, etc., are examined in relation to known sites and areas of high and low site density were identified by statistical analysis. The significant variables are combined in a multivariate procedure called logistic regression, which generates probabilities of site occurrences for (in this case) various

combinations of soil types and vegetation covers. These scores are grouped into high, medium, and low probability zones and a color coded map is generated. Minnkota reviewed the location of the Project ROW relative to the predictive model results.

Beginning in October 2010, areas of high probability and some areas of medium and low probability within the ROW underwent archaeological surveys (pedestrian and shovel testing). Additional pedestrian surveys were conducted in May, June, October, and November 2011. Subsurface testing of selected areas began after the pedestrian survey in June, October, and November 2011. Depending on the results of the field surveys, some locations might be subject to archaeological inventory. Archaeological surveys not completed this fall will be conducted in spring 2012.

Table 5.7-1 identifies the previously recorded archaeological resources within SHPO's database and sites from the June 2011 Project surveys within the Project ROW and laydown areas. No previously recorded sites are listed on the NRHP.

Within SHPO's database there are site lead boundaries that often encompass an entire section or quarter-section of land and are defined as locations identified by a non-cultural resource professional as containing artifacts or historic value, or a location exhibiting four or fewer artifacts, that a cultural resource professional feels has a strong possibility of containing more artifacts/features. In instances where the Project ROW transects a site lead boundary, archaeological survey was completed within the Project ROW using pedestrian survey and/or shovel testing, as needed. During the archaeological survey, no cultural materials or features were observed within the Project ROW that is located within a site lead boundary and no impacts to site leads are anticipated. If during construction archaeological material should be identified within one of these site lead boundaries, Minnkota will follow the procedures described in Section IX, Post-Review Unanticipated Discoveries within the PA (**Appendix C**).

Physical avoidance of resources was considered in locating the Project Route and will continue to be considered as structure locations are finalized. Where avoidance of a cultural resource is not feasible, it will be evaluated, and if eligible, treated according to the stipulations outlined in the PA.

Minnkota anticipates that all direct impacts to archaeological resources will be avoided by completing additional investigations and by spanning the resource. If, in the unlikely event, avoidance of effects is not feasible, any adverse effects will be mitigated as stated in the PA.

The Spirit Lake Nation lands are located 11 miles north of the Project Route in Eddy County and the Knife River Indian Villages National Historic Site is located south of Washburn on the west end of the Project Route. These resources will not be impacted during construction or operation of the Project. Minnkota has contacted Native American tribes with an interest in the Project. Minnkota will follow the conditions regarding the identification and treatment of resources as stated in the PA.

Table 5.7-1. Archaeological Resources within the Project ROW

County	Site Number	Site Type/ Name	NRHP Status	Location			Affected	Comment
				T	R	S		
Oliver	32OL641	Stone features and artifact scatter	Not evaluated	142	82	31	1 structure within site– No impacts anticipated	One structure is within the site boundary. Additional shovel testing will be completed at the proposed structure location to ensure significant archaeological deposits are not affected
Oliver	32OL642	Stone features and artifact scatter	Not evaluated	142	82	27	2 structures within site– No impacts anticipated	Additional shovel testing was completed at both proposed structure locations to further delineate site boundaries and to ensure that significant archaeological deposits are not affected
Burleigh	32BLX146	Stone circles	Not evaluated	144	79	5	1 structure within Site Lead–No impacts anticipated	One structure is within the Site Lead boundary. During the pedestrian survey, no stone circles were relocated within the portion of the Project ROW that transects the Site Lead
Burleigh	32BL718	Lithic scatter	Not evaluated	142	80	6	Spanned– No impacts anticipated	This site will be spanned
Burleigh	32BL720	Isolated find	Not eligible	142	81	1	Spanned– No impacts anticipated	This site will be spanned
Burleigh	32BLX287	Isolated find	Not eligible	142	80	19	Spanned– No impacts anticipated	This site will be spanned
Burleigh	32BLX288	Isolated find	Not eligible	144	79	6	Spanned– No impacts anticipated	This site will be spanned
McLean	32ML1237	Lithic scatter	Not evaluated	143	81	36	Spanned– No impacts anticipated	This site will be spanned
McLean	32ML1238	Stone features and artifact scatter	Not evaluated	143	81	24	Spanned– No impacts anticipated	This site will be spanned
McLean	32ML1239	Stone feature	Not evaluated	143	81	24	Spanned– No impacts anticipated	This site will be spanned

County	Site Number	Site Type/ Name	NRHP Status	Location			Affected	Comment
				T	R	S		
McLean	32ML1240	Stone feature	Not evaluated	144	80	24	Spanned– No impacts anticipated	This site will be spanned
McLean	32MLX767	Isolated find	Not eligible	143	81	36	Spanned– No impacts anticipated	This site will be spanned
McLean	32MLX768	Lithic scatter	Not evaluated	143	81	36	Spanned– No impacts anticipated	This site will be spanned
Sheridan	32SHX88	Unknown	Not evaluated	147	76	9	Spanned– No impacts anticipated	This site will be spanned
Sheridan	32SHX12	Mound and Stone circle	Not evaluated	147	78	26	Spanned– No impacts anticipated	This site will be spanned
Sheridan	32SH270	Stone feature	Not evaluated	147	76	9	Spanned– No impacts anticipated	This site will be spanned
Sheridan	32SH271	Stone features	Not evaluated	147	76	9	Spanned– No impacts anticipated	This site will be spanned
Griggs	32GGX117	Mound-unknown prehistoric earthen mound	Not evaluated	147	59	1	Spanned– No impacts anticipated	This site will be spanned
Griggs	32GG180	Depression and artifact scatter	Not evaluated	147	60	2	Spanned– No impacts anticipated	This site will be spanned
Grand Forks	32GFX24	Listed as a Mound and Cultural material scatter	Not evaluated	150	52	19	5 structures– No impacts anticipated	The boundary of Site Lead 32GFx24 includes the entirety of Section 19. During the pedestrian survey, the area suspected to be a mound was relocated and recorded. The cultural material scatter was not relocated. The proposed locations of the five structures are outside the area recorded as a potential mound.
Grand Forks	32GF3552	Depressions and artifact scatter	Not evaluated	150	52	19	Spanned– No impacts anticipated	This site will be spanned

5.7.3 Deeply Buried Archaeological Resources

In January 2011, Strata Morph Geoexplorations (Strata Morph) prepared an assessment for Minnkota concerning the potential for deeply buried soil horizons that could possibly hold archaeological resources along the proposed Project Corridor in the Corridor Certificate Application (**Appendix D and E**). The Strata Morph assessment analyzed the likelihood that particular geologic environments along the proposed Project Corridor in the Corridor Certificate Application were stable enough to have been occupied by early Americans and that these geologic environments were later buried by soils (sand, silt, loess) deposited by water or wind. A deeply buried surface soil in this context is one that is 50 centimeters or deeper from today's surface. Currently, the assessment is being updated for the Project Route as proposed within this Route Permit Application.

Strata Morph identified 51 discrete areas along the proposed Project Corridor in the Corridor Certificate Application that had potential for buried paleosols. Of these 51 areas, 12 were ranked as having high potential, 25 ranked as having moderate potential, and 13 ranked as having moderate-to-low potential. Most of the proposed Project Corridor in the Corridor Certificate Application has little to no potential for deeply buried surface soils. To mitigate any potential affects, archaeologists will monitor soil augering at each foundation location during construction within the high potential areas to identify and record any historic properties.

5.7.4 Architectural Resources and Impacts within the APE

Minnkota reviewed records sent from the SHPO to identify known historical structures within the Architectural Area of Potential Effects (APE). The Architectural APE, was developed in consultation with the SHPO and RUS for direct and visual effects, which extends 0.5 mile on either side of the Project ROW centerline and 1 mile on either side of the Project ROW centerline at the Missouri River crossing. Approximately 461 points from the SHPO and other state GIS data were found to contain buildings and structures within the Architectural APE. To help summarize the results of the records review, sites were grouped into categories as follows: Civic Buildings (post office, school, town hall), Farmstead Features (farmstead, house, ranch, elevator, windmill, dump, depression, foundation, corral, fence, barn), Cemetery (cemetery and burial), Bridge, Church, Trail, Railroad (track and facility), Town Site, Camp Site (camp and expedition), District, and Miscellaneous (steamboat, Sheyenne River, unknown).

In April, May, and November 2011, the buildings and structures within the Architectural APE were visually inspected for their potential to be determined historic properties. The goal of this historic building inventory and evaluation was to develop and make recommendations concerning whether the construction of the Project would have an adverse visual or direct effect on historic properties in its vicinity. An adverse effect to historic property might occur due to direct effects such as demolition, or indirect effects such as visual intrusion.

A total of 267 locations with buildings and structures throughout the Architectural APE were visually inspected for their potential to be historically significant. Of these, the majority were not of historic age (50 years of age or older). Of those that were of historic age, most had lost integrity, having undergone extensive unsympathetic alterations (major additions to the original structure, synthetic siding, replacement windows and doors in altered openings, etc.), which eliminated them from consideration as historic property. A second common trend was the loss of contributing buildings such as residences or barns—sites often just had a vacant house or a barn and the remainder of the buildings had been demolished. The third pattern involved the

introduction of large, modern vintage, prefabricated, metal storage buildings into the historic period complex.

The inventory identified nine sites as eligible for listing on the NRHP and one previously listed eligible site within the Architectural APE. The *Historic Building Inventory and Evaluation of the Proposed Route of a 345 kV Electrical Transmission Line from Center to Grand Forks in North Dakota* summarizes the April and May 2011 inventory methods and results (**Appendix E**). SHPO has concurred with the inventory findings (**Appendix E**). Currently, the assessment is being updated for the Project Route as proposed within this Route Permit Application.

Table 5.7-2 identifies the SHPO-previously recorded and new-inventoried eligible architectural properties within the Architectural APE.

One historic property will be impacted for visual effects by the Project Route. SHPO concurs that site #32NE80 involves an adverse affect that can be mitigated with screening. Minnkota has developed a Treatment Plan that is under review by RUS and SHPO. No other architectural resources will be adversely affected by the Project Route.

Table 5.7-2. Architectural Properties within the Architectural APE

County	Site Number	Site Type/Name	NRHP Status	Location			Affected	Comment
				T	R	S		
Burleigh	32BLX19	Hoiland House	Not evaluated	142	81	24	N	
Grand Forks	32GF120	Farmstead-Alden Gronlie Octagonal Elevator Site	Not evaluated	150	53	20	N	Octagonal grain elevator non-extant
Nelson	32NEX61	House	Not evaluated	149	57	31	N	
Nelson	32NEX69	House	Not evaluated	149	57	31	N	
Nelson	32NEX70	House	Not evaluated	149	57	31	N	
Nelson	32NEX71	House	Not evaluated	149	57	31	N	
Nelson	32NEX72	House	Not evaluated	149	57	31	N	
Oliver	32OL388	Farmstead	Not evaluated	142	81	28	N	Non-extant
Wells	32WEX38	Stavenger Lutheran Church	Not evaluated	148	68	28	N	Non-extant
Burleigh	32BL119	Farm	Not evaluated	142	81	22	N	Non-extant
Burleigh	32BLX131	Mercer's Ranch	Not evaluated	142	81	15	N	Non-extant
Burleigh	32BLX133	Painted Woods Post Office	Not evaluated	142	81	26	N	
Burleigh	32BLX139	Grads Lake Post Office	Not evaluated	143	79	7	N	Non-extant
Eddy	32ED222	Rocky Run	Not evaluated	148	66/67	30/25	N	Non-extant
Eddy	32EDX2	Brantford Townsite	Not evaluated	148	65	35	N	
Grand Forks	32GF3219	Bridge	Recommended National Register ineligible	150	55	35/36	N	
Grand Forks	32GFX49		Not evaluated	151	51	19	N	
Grand Forks	32GFX250		Not evaluated	151	51	15/22	N	
Griggs	32GG81	Farmstead	Not evaluated	148	59	35	N	
McLean	32ML885	Historic archaeological site	Recommended National Register ineligible	145	79	23	N	
Nelson	32NEX1	Aneta Post Office	Not evaluated	149	57	32	N	

County	Site Number	Site Type/Name	NRHP Status	Location			Affected	Comment
				T	R	S		
Oliver	32OL389	Historical archaeological site-depression	Not evaluated	142	81	28	N	
Oliver	32OL435	Price School	Not evaluated	142	81	28	N	Non-extant
Oliver	32OL436	Pricetown Site	Recommended National Register ineligible	142	81	28	N	
Sheridan	32SH348	Heavily modified sod house	Not evaluated	147	75	8	N	
Wells	32WEX24	Delger Post Office	Not evaluated	147	72	9	N	
Eddy	32ED160	Farmstead	Recommended National Register eligible	148	67	28	N	SHPO and RUS concur on eligibility
Grand Forks	32GF3554	Former schoolhouse/town hall	Recommended National Register eligible	150	52	16	N	SHPO and RUS concur on eligibility
Grand Forks	32GF3555	Farmstead	Recommended National Register eligible	150	53	26	N	SHPO and RUS concur on eligibility
Grand Forks	32GF3556	Farmstead	Recommended National Register eligible	150	54	24	N	SHPO and RUS concur on eligibility
Nelson	32NE78	Farmstead	Recommended National Register eligible	149	57	12	N	SHPO and RUS concur on eligibility
Nelson	32NE79	Farmstead	Recommended National Register eligible	149	57	23	N	SHPO and RUS concur on eligibility
Nelson	32NE80	Farmstead	Recommended National Register eligible	149	57	33	Y	SHPO and RUS concur on eligibility. Treatment Plan under review.

County	Site Number	Site Type/Name	NRHP Status	Location			Affected	Comment
				T	R	S		
Sheridan	32SH272	Vacant schoolhouse	Recommended National Register eligible	147	78	13	N	SHPO and RUS concur on eligibility
Wells	32WEX118	Farmstead	Recommended National Register eligible	148	69	28	N	SHPO and RUS concur on eligibility
Eddy	32ED32	Sylvanus Marriage Octagonal Barn	National Register-listed	148	66	28	N	National Register-listed

5.7.5 Mitigation

General Project

During final engineering, Minnkota will strive to avoid archaeological sites and historic properties. If avoidance of a NRHP listed or eligible archaeological site or historic property is not feasible, Minnkota will follow the terms of the PA to develop appropriate mitigation measures tailored to the values that make it significant. Where sites that have not been evaluated for listing on the NRHP may be physically impacted by Project facilities, Minnkota will follow steps outlined in the PA to determine eligibility and effects, and will develop mitigation measures to mitigate potential adverse effects. Mitigation may involve the following:

- Preservation in place
- Site stabilization
- Protection from erosion
- Interpretation or data recovery, if necessary, as appropriate
- Protection from looting/vandalism
- Revegetating to counteract wind erosion
- Fencing off sensitive areas during construction
- Trees cut at ground level with stumps left in place
- An archaeologist monitors soil augering at each foundation location during construction within the high potential areas of deeply buried sites to identify and record any historic properties, according to the PA

The construction contractor will be required to comply with environmental, cultural, archaeological, and historical guidelines set forth as a result of the Section 106 consultation process. Guidelines will include an unanticipated discoveries plan and monitoring at auger locations in high potential areas. Additional actions will include notification and working with the proper and applicable authorities.

Architectural Resources

Minnkota has developed a Treatment Plan to mitigate affects to the architectural site #32NE80. The Plan is being reviewed by the RUS and SHPO. The proposed mitigation measure will be screening between the Project and the architectural site. SHPO has indicated preliminary concurrence with this effort, please see **Appendix E**.

5.8 Recreational Resources

5.8.1 Description of Resources

Many recreational resources exist in the Project ROW vicinity, including trails, rivers, lakes, federal lands, and state lands. Outdoor recreational opportunities include riding all-terrain vehicles (ATVs) and snowmobiles, hiking, boating, fishing, camping, swimming, hunting, and nature observation. Recreational resource and land management data were gathered from state and federal agencies. Figure 5 displays the location of managed recreation lands near the Project Route.

State-Managed Lands

NDGF's WMAs and North Dakota Parks and Recreation Department's (NDPR) state parks, nature preserves, and recreation areas play a large role in North Dakota's outdoor recreation system. There are no state parks or nature preserves located within the Project ROW. The Wilbur Boldt WMA is crossed by the Project ROW (T142N, R83W, Section 34).

Federally Managed Lands

USFWS manages WPAs, Wildlife Development Areas (WDAs), and National Wildlife Refuges (NWRs). The U.S. Bureau of Reclamation (USBOR) manages the Chain of Lakes Recreation Area/McClusky Canal through Sheridan, Burleigh, and McLean counties. East Park Lake, West Park Lake, Heckers Lake, and New Johns Lake are four in-line lakes on the McClusky Canal that make up the Chain of Lakes Recreation Area. These federally managed lands provide habitat for a variety of fish, waterfowl, shorebirds, grassland birds, plants, insects, and wildlife as well as provide opportunities for public access and wildlife dependent recreation such as hunting, fishing, wildlife watching, photography, camping, boating, canoeing, fishing, and ATV/snowmobile riding (refer to Figure 5). The Chain of Lakes Recreation Area (McClusky Canal) in McLean County (T145N, R79W, Section 26) and the McClusky Canal lands in Sheridan County (T147N, R76W, Section 7) will be crossed by the Project ROW. About 3.7 acres of the Chain of Lakes Recreation Area and 4.3 acres McClusky Canal lands in Sheridan County are located in the Project ROW.

As discussed in the Land Use section (Section 5.2.1), USFWS also holds easements on private lands for the protection of wetland and grasslands resources. The purpose of wetland easements is to preserve the wetland areas, whereas the grassland easements preserve the wetland areas and adjacent grassland buffers for the reproduction and growth of waterfowl and wildlife species. Minnkota is working with the USFWS to secure a Special Use Permit to cross easement lands.

Trails

NPS administers the North Country National Scenic Trail, which crosses seven states (New York, Pennsylvania, Ohio, Michigan, Wisconsin, Minnesota, and North Dakota). NPS explains that the trail is a collection of certified and proposed segments. Within North Dakota, beginning at Valley City, North Dakota, the trail follows the Sheyenne River to the Garrison Diversion then to the McClusky and New Rockford Canals. Most of the certified segments occur on public lands, i.e., USFWS, USBOR, and U.S. Forest Service (USFS). Currently, the NPS is reviewing segments on the western portion of the trail in order to connect with the Lewis and Clark National Historic Trail and the Knife River Indian Village National Historic Site (an NPS property). A portion of the trail runs parallel to the McClusky Canal and Chain of Lakes Recreation Area. Recreational opportunities include hiking and camping at some locations.

In addition, the NPS administers the Lewis and Clark National Historic Trail that crosses 11 states. The NPS attempts to preserve the remnants of the historic route of 1804-1806 Corps of Discovery Expedition and to provide a comprehensive interpretation of its history, including the American Indian perspective, to allow for better visitor understanding and appreciation of its significance. Recreational opportunities include canoeing the Missouri River and driving State Highway 1804 and 22nd Avenue NW (roadway 1806). Table 5.8-1 outlines the trails crossed by the Project ROW.

Table 5.8-1. Trails Crossed by the Project ROW

Trail Name	Associated Resource Land	County
North Country National Scenic Trail	McClusky Canal - Chain of Lakes Recreation Area	McLean County
North Country National Scenic Trail	McClusky Canal	Sheridan County
North Country National Scenic Trail	Sheyenne River	Griggs County
Lewis and Clark National Historic Trail	Missouri River and State Highway 1804 and 22nd Avenue NW (roadway 1806)	Burleigh and Oliver Counties

National Heritage Area

A National Heritage Area is "a place designated by Congress where natural, cultural, historic and recreational resources combine to form a cohesive, nationally distinctive landscape arising from patterns of human activity shaped by geography." The Northern Plains Heritage Foundation received funding from Congress through the NPS to undertake a study to identify and evaluate a range of alternatives for managing, preserving, and interpreting the assemblage of nationally important historic sites, structures, stories, legends, and landscapes existing within the free flowing segment of the Missouri River in central North Dakota. The boundaries of the Northern Plains National Heritage Area are as follows: "The proposed east/west boundary of the study area encompasses a distance of ten miles across or approximately five miles from the banks of the free flowing segment of the Missouri River. The north/south boundary encompasses an approximate eighty mile distance from the Huff Mandan Village south of Mandan to the Big Hidatsa Village north of Stanton ND" (NPHF 2010). This boundary includes a core area of resources in Burleigh, McLean, Mercer, Morton, and Oliver Counties and any sites, buildings, and districts within the core area recommended by the management plan for inclusion in the Heritage Area (Omnibus Public Land Management Act of 2009).

Automobile Tours

No designated state or federal scenic byways or backways are crossed by the Project ROW. The Sakakawea Scenic Byway near Washburn, North Dakota is located approximately 10 miles north of the Project ROW along State Highway 200A from Washburn, North Dakota to Stanton, North Dakota. State Highway 1804 and and 22nd Avenue NW (roadway 1806) are a part of the Lewis and Clark National Historic Trail. State Highway 1804 and 22nd Avenue NW (roadway 1806) are located on the east and west sides of the Missouri River, respectively, and are crossed by the Project ROW.

Other Recreational Resources

No additional designated recreational resources, such as boat landings, golf courses, and playgrounds/ball fields, are located within the Project ROW. The Project Route crosses the

Missouri and Sheyenne rivers, which are recreation resources for fishing, canoeing, and nature observation.

PLOTS is a voluntary program offered to landowners by the NDGF, which provides landowners with monetary compensation for allowing public access to their land for fishing or hunting. Section 5.2.1 discusses PLOTS lands within the Project ROW.

TNC owns three properties near the western terminus of the Project ROW: Cross Ranch Preserve, John E. Williams Memorial Nature Preserve, and Davis Ranch Preserve, located 3, 4.5, and 10 miles away from the Project, respectively. Wildlife observation is allowed on TNC-owned lands.

5.8.2 Impacts

Direct impacts to recreational resources will be minimized to the extent feasible. Potential direct effects involve altering or physically changing recreation resources, conflicting with recreation area goals, or affecting accessibility to areas. Indirect effects are visual impacts to the scenic quality and natural appearance of the landscape as viewed from the recreational use area by a recreational user. The transmission line will span recreational resources, such as rivers and lakes, to minimize impacts to the extent practical. In general, recreational impacts will be visual in nature and limited to individuals using public or private property in the corridor for hiking, hunting, fishing, or nature observation. The Project will not cause any direct changes to the use of the existing recreational resources.

The Project will likely be visible from all recreational resources located within and adjacent to the Project Route and will have the potential to be visible from all recreation resources within approximately 1 mile of the Project Route depending on the surrounding topography and vegetation.

State-Managed Lands

A portion of the Project ROW crosses the state-managed Wilbur Boldt WMA, but no structures will be placed within the WMA and the conductors will not span the WMA. Minnkota has submitted an application for an overhang easement to the NDGF to cross the Wilbur Boldt WMA.

Federally Managed Lands

Based on preliminary structure locations, one structure will be located within the Chain of Lakes Recreation Area and one structure will be located within the fence line of the McClusky Canal lands in Sheridan County totaling about 1.7 acres of temporary impact (0.8 acres to the Chain of Lakes Recreation Area and 0.9 acres to the McClusky Canal lands) and about 157 square feet of permanent impact (78.5 sq ft of impact to both areas). Although two structures will be located within the Chain of Lakes Recreation Area and the McClusky Canal, the structures will not interfere with the recreation use of the Chain of Lakes and canal or affect access to the land. An indirect effect may be visual in nature. Minnkota has proposed to cross the Chain of Lakes Recreation Area adjacent to State Highway 41 and Minnkota is applying for a Special Use Permit from the USBOR for impacts on USBOR lands and will comply with all permit conditions, thereby reducing the potential recreational and visual impacts.

The Project Route crosses USFWS wetland and grassland easements. Impacts to easements are discussed in Section 5.2.2. Minnkota is working with the USFWS to adjust the location of transmission line structures in the grasslands and wetlands to minimize or avoid potential

impacts. Minnkota is coordinating with the USFWS to obtain a Special Use Permit to cross easement lands.

Trails

The Project Route will span two trails. The transmission line will span the North Country National Scenic Trail in McLean, Sheridan, and Griggs counties. The transmission line will span the Lewis and Clark National Historic Trail at the Missouri River, State Highway 1804 and 22nd Avenue NW. No structures will be placed directly on the trails. Individuals using these trails will continue to have access; during construction there may be short periods of disruption due to construction activity in the area.

Users of the recreational areas and trails may experience short-term effects during construction such as elevated noise levels, increased fugitive dust, and increased vehicle traffic.

National Heritage Area

The Project Route will cross the Northern Plains National Heritage Area. No structures will be placed within the Missouri River or block trail access. Individuals using the river and trails will continue to have access to the resources. However, during construction there may be short periods of disruption due to construction activity in the area.

Automobile Tours

No designated state or federal scenic byways or parkways are crossed by the Project ROW, therefore no impacts are anticipated. State Highway 1804 and 22nd Avenue NW (undesignated) are part of the Lewis and Clark National Historic Trail. Users of the recreational areas and trails may experience short-term effects during construction such as elevated noise levels, increased fugitive dust, and increased vehicle traffic.

Other Recreational Resources

No impacts to other recreation resources, such as golf courses, parks, and camps are anticipated.

No impacts to TNC lands are anticipated. Individuals using PLOTS lands will have access under the transmission line to access the property. Impacts to PLOTS lands are discussed in Section 5.2.2. The transmission line will not impact recreational opportunities on PLOTS lands as hunting may continue on the land.

5.8.3 Mitigation

Minnkota will obtain a ROW overhang easement from the NDGF and will minimize impacts of crossing the Wilbur Boldt WMA by not placing structures within the WMA or having wires cross the WMA. Minnkota is applying for a Special Use Permit from the USBOR for the two structures on their lands; one structure within the Chain of Lakes Recreation Area and one structure on McClusky Canal lands in Sheridan County, respectively. Minnkota is applying for a Special Use Permit from the USFWS to cross grassland and wetland easements. Minnkota will comply with all permit conditions. The Project will avoid impacts to other federally managed lands, therefore no mitigation is proposed.

The Project Route will span existing trails, State Highway 1804, and 22nd Avenue NW. Since it is not anticipated that any recreational resources will be removed from service by implementation of the Project, no adjacent land will need to be converted or dedicated to recreational use or wildlife management. Secondary recreational uses of Project ROW may be allowable, such as

walk-in access to PLOTS for hunting or trail use for walkers or bicyclists. No other mitigation is anticipated to be necessary.

5.9 Effects on Land-Based Economics

5.9.1 Description of Resources

Agriculture

Agriculture is the primary land-based economic resource in the Project ROW. The highest yield resources include wheat, corn, soybeans, hay, barley, and sunflowers. Much of the agricultural land is designated as "prime farmland," indicating land that is most desirable for agricultural production. Federal regulations define prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses" (7 CFR, 657.5 (a) (1)). Prime farmland is discussed in the Soils Section (Section 5.10). Livestock operations are also located within the Project vicinity including cattle, hogs, turkey, and sheep farms.

According to the North Dakota 2007 Agricultural Statistics published by the USDA, the state of North Dakota ranks 18th among the states in total crop cash receipts. In 2002, there were an estimated 30,619 farms in North Dakota, and in 2007 the number increased by 4 percent to an estimated 31,970 farms. Three of the counties crossed by the Project ROW (Grand Forks, McLean, and Wells) are ranked in the top 20 for the state's total value of agricultural products sold (USDA 2007).

In 2008, North Dakota had a total of 152 certified organic farms and ranked third in the country for number of certified organic cropland acres. North Dakota is the leader in production of organic oilseeds (flax and sunflowers), producing 50 percent of the total U.S. production (North Dakota Organic Advisory Board 2010).

Table 5.9-1 in the Corridor Certificate Application summarized farmland, cropland, and agricultural production for all counties within the Project Corridor based on 2007 USDA census data. The primary crop is wheat, and additional high production crops include hay, soybeans, corn, and barley. The number of farms increased in all counties from 2002 to 2007 with the exception of Sheridan and Oliver counties. Grand Forks County is ranked third in the state for highest total agricultural products sold.

GPS

GPS navigation systems are becoming more common on farm equipment. GPS units collect location data from at least four or more satellites at any given time. The accuracy of the location data is affected by the number of satellites, how they are dispersed across the sky at any instant and atmospheric and satellite information factors. Since satellites are in constant motion above the earth, GPS units are constantly picking up and dropping satellite signals. At times there might be instances when the GPS unit is not able to connect to enough satellites and the required accuracy is not met.

In 2002, the IEEE published a study that investigated the effects of overhead power lines on GPS receivers (IEEE *Transactions On Power* October 2002). Measurements evaluated whether GPS signal could be blocked by overhead conductors or whether use of GPS signal could be affected by electromagnetic interference (EMI) (i.e., corona discharge or gap discharge noise). The study found that neither occurred.

Forestry

The Project ROW is located primarily in pasture and cultivated land with some forested areas adjacent to farmsteads, waterways, and within state and federally managed lands. There are no economically important forestry resources within the Project ROW.

Tourism

Minnkota identified tourism activities that are located within the Project ROW along with resources within the vicinity that may be indirectly impacted by the Project because of viewshed effects or alteration of the landscape. The majority of tourism opportunities in the vicinity of the Project are associated with recreational resources including WMAs, WPAs, Chain of Lakes Recreation Area, Cross Ranch State Park, TNC Nature Preserves, Missouri River, PLOTS, and the North Country National Scenic Trail.

Mining

North Dakota's most important mined products are petroleum, coal, and natural gas. Other mined products include sand, gravel, clays, and salt. Of these, only sand and gravel are produced in the area of the Project ROW (refer to Section 5.2).

5.9.2 Impacts

Agriculture

The Project will result in permanent and temporary impacts to farmland. During construction, temporary impacts, such as soil compaction, crop damage, construction and use of access roads, and structure building within a ROW will occur. Temporary impacts to agricultural lands are outlined in **Table 5.2-7**.

Permanent impacts to agricultural lands will occur as a result of structure placement. The permanent agricultural land impacts are outlined in **Table 5.2-7** (including Restricted Tillage Area). A Restricted Tillage Area was added as a permanent impact to each structure location on tillable land. This area was added to the calculated impacts on tillable land as a farmer may not wish to cultivate the land any closer than 5 feet from the structure base. As noted in **Table 5.2-7**, the direct impacts to agricultural land will be very limited. As a result, the Project will not affect the overall agricultural economies of the affected counties.

GPS

The 2002 IEEE study did not find that conductors and associated EMI would block or affect use of GPS satellite signal. However, it should be noted that a GPS receiver may experience less accuracy due to temporarily poor satellite alignment and/or outages to the base station or transmitter. On rare occasions, a transmission line structure may cause a temporary drop in GPS accuracy due to blockage of line-of-sight to one satellite, but this will only occur if the receiver, structure, and satellite are in a line, which is rare. Connection is usually restored within minutes and the GPS units return to normal function.

Forestry

Woodlands are primarily associated with homesteads and shelterbelts. Permanent impacts as a result of ROW clearing are discussed in Section 5.14.2. No impacts to economically important forestry resources will occur, as these resources are not located within the Project ROW.

Tourism

Refer to Section 5.8 for a discussion of the impacts to recreational resources. Direct impacts to tourism resources will be very limited. As a result, the Project will not affect the overall tourism-based economy of the affected counties.

Mining

Impacts to mining are discussed in Section 5.2.2. Direct impacts to mining land will be very limited. As a result, the Project will not affect the overall mining-based economy of the affected counties.

5.9.3 Mitigation

Agriculture

Minnkota will work with landowners to minimize impacts to all farming and grazing operations along the Project Route. By aligning the transmission line along existing ROWs such as roads and section and field lines, impacts will be minimized. Minnkota will compensate landowners for any crop damage, soil compaction, or damages that may occur during construction. Areas disturbed during construction will be repaired and restored to preconstruction contours to the extent practicable so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural re-vegetation, provide for proper drainage, and prevent erosion.

GPS

Some landowners use GPS navigation systems on farm equipment; however, interference with such systems is unlikely and, if it does occur, will be temporary. Following construction, Minnkota will provide GPS coordinates for the transmission line structures to landowners, if requested. No other mitigation measures should be necessary.

Forestry

The Project will be routed to minimize impacts to trees to the maximum extent possible. Minnkota will conduct a tree and shrub inventory of the ROW and will follow the Commission's replacement ratio of 2:1 for tree and shrub impacts.

Tourism

Refer to Section 5.8 for a discussion of the potential mitigation measures for recreational resources.

Mining

Refer to Section 5.2.3 for a discussion of the potential mitigation measures for mining resources.

5.10 Soils

Soil Survey Geographic (SSURGO) soils data made available by the NRCS were analyzed using the ArcInfo license of ESRI® ArcMap™ 10.0 to determine impacts to prime farmland and to comply with the Farmland Protection Policy Act (FPPA). General State Soil Geographic (STATSGO) soil associations, which consist of groupings of soils with distinctive characteristics, were also reviewed as part of this analysis.

5.10.1 Description of Resources

General Soils

Soils within the Project ROW range from black loam in the Red River Valley to a more porous, sandy soil in the west. Table 5.10-1 summarizes the primary STATSGO soil series for the Project ROW. Gravel and cobble are relatively frequent soil components within the western Project ROW. Figure 7 displays the soil map units across the Project ROW.

Loamy soils are ideal for agricultural uses because it retains nutrients and allows for water flow. This soil type is commonly considered prime farmland, and covers the majority of the eastern portions of the Project ROW. The sandy, rocky soil in the west is primarily used as pasture land.

Table 5.10-1. STATSGO Soil Associations within the Project ROW

Soil Association	Acres of Soil Type in ROW	Percent of ROW	Description of Primary Soil Series
Bearden-Antler (s4801)	161	3.5	The Bearden series consists of very deep, somewhat poorly drained, moderately to slowly permeable soils that formed in calcareous silt loam and silty clay loam lacustrine sediments. These soils are on glacial lake plains and have slopes of 0 to 3 percent.
Buse-Barnes (s4751)	42	0.9	The Buse series consists of very deep, well-drained soils that formed in loamy glacial till on moraines. These soils have moderate and moderately slow permeability. They have slopes of 3 to 60 percent.
Glyndon (s4728)	67	1.5	The Glyndon series consists of very deep, somewhat poorly drained soils that formed in silty glacial lacustrine sediments and delta sediments on glacial lake plains. They have moderate permeability in the upper part and moderately rapid permeability in the lower part. They have slopes of 0 to 3 percent.
Heimdal-Esmond-Emrick (s4770)	308	6.8	The Heimdal series consists of very deep, well drained, moderately permeable soils that formed in calcareous glacial till. These soils are on glacial till plains and moraines. Slope ranges from 0 to 40 percent.
Heimdal-Fram-Emrick (s4768)	272	6.0	
Heimdal-Fram-Emrick (s4769)	528	11.6	
Heimdal-Hecla-Embden-Egeland (s4732)	115	2.5	
La Prairie-Fairdale (s4779)	20	0.4	The La Prairie series consists of very deep, moderately well drained, moderately permeable soil that formed in loamy alluvium. These soils are on terraces and bottom lands in stream valleys. Slope ranges from 0 to 6 percent.
Lamoure-La Prairie-Heimdal-Emrick (s4782)	13	0.3	The Lamoure series consists of very deep, somewhat poorly drained or poorly drained soils formed in silty alluvium on flood plains. Permeability is moderate or moderately slow. Slopes are less than 2 percent.
Lankin-Gilby-Antler (s4739)	101	2.2	The Lankin series consists of deep, moderately well drained, moderately slowly permeable soils that formed in lacustrine sediments overlying till. These soils are on glacial lake plains and in interbeach areas and have slopes ranging from 0 to 3 percent.
Lohnes-Claire (s4749)	34	0.7	The Lohnes series consists of very deep, well drained, rapidly permeable soils that formed in coarse and medium sands. These soils are on glacial lake and outwash plains and have slopes ranging from 0 to 15 percent.
Miranda-Larson-Heimdal-Emrick (s4771)	42	0.9	The Miranda series consists of very deep, moderately well or somewhat poorly drained soils formed in till on uplands. Permeability is very slow. Slopes range from 0 to 9 percent.
Ojata-Bearden (s4785)	109	2.4	The Ojata series consists of deep, poorly drained, moderately slowly or slowly permeable soils that formed in silty lake sediments. These soils are on slightly depressed flats, swales, and channels in glacial lake and outwash plains and have slopes less than 1 percent.
Perella-Colvin-Bearden (s3435)	14	0.3	The Perella series consists of very deep, poorly drained soils that formed in lacustrine sediments. Saturated hydraulic conductivity is moderately high. These soils are in depressions on glacial lake plains. Slope ranges from 0 to 1 percent.

Soil Association	Acres of Soil Type in ROW	Percent of ROW	Description of Primary Soil Series
Renshaw-Divide-Arvilla (s4741)	79	1.7	The Renshaw series consists of very deep, somewhat excessively drained soils formed in loamy sediments and the underlying sand and gravel on outwash plains and terraces. Permeability is moderate in the upper part and very rapid in the underlying material. Slopes range from 0 to 25 percent.
Renshaw-Overly-Lankin-Brantford (s4740)	18	0.4	
Svea-Barnes (s4758)	141	3.1	The Svea series consists of very deep, well or moderately well drained soils that formed in calcareous till and local alluvium from the till. Permeability is moderate in the solum and moderate or moderately slow in the C horizon. These soils are on concave positions on till plains and have slopes ranging from 0 to 25 percent.
Svea-Buse-Barnes (s4760)	30	0.7	
Svea-Cresbard (s4764)	95	2.1	
Svea-Cresbard-Cavour-Barnes (s4766)	104	2.3	
Svea-Hamerly-Barnes (s4759)	340	7.5	
Svea-Kloten-Edgeley (s4752)	49	1.1	
Tiffany-Hecla-Glyndon-Embden (s4729)	28	0.6	The Tiffany series consists of very deep, poorly drained soils that formed in glacial outwash. These soils have moderately high or high saturated hydraulic conductivity. These soils are in depressions and on glaciolacustrine deltas and outwash plains. Slope ranges from 0 to 1 percent.
Tiffany-Swenoda-Barnes (s4730)	39	0.9	
Tonka-Svea-Hamerly-Barnes (s4754)	162	3.6	The Tonka series consists of very deep, poorly drained, slowly permeable soils that formed in local alluvium over till or glaciolacustrine deposits. These soils are in closed basins and depressions on till and glacial lake plains and have slopes of 0 to 1 percent.
Towner-Embden (s4762)	87	1.9	The Towner series consists of very deep, well or moderately well drained soils that formed in wind and water deposited sands over glacial till or lacustrine sediments. Permeability is rapid or moderately rapid in the upper part and moderate or moderately slow in the 2Bk and 2C horizons. These soils are on sand-mantled till or glaciolacustrine plains and have slopes ranging from 0 to 15 percent.
Trembles-Lohler-Havrelon (s4825)	18	0.4	The Trembles series are very deep, well and moderately well drained soils formed in alluvium. They are on floodplains, bottomlands, and low terraces. Slopes range from 0 to 4 percent.
Vallers-Svea-Hamerly-Buse-Barnes (s4756)	304	6.7	The Vallers series consists of very deep, poorly drained soils that formed in calcareous fine-loamy till on till plains, moraines and lake plains. These soils have moderately slow permeability. Slopes range from 0 to 3 percent.
Vebar-Reeder-Cabba-Amor (s4829)	20	0.4	The Vebar series consists of well drained, moderately deep, moderately rapidly permeable soils that formed in residuum weathered from soft calcareous sandstone. These soils are on uplands and have slope ranging from 0 to 65 percent.
Velva-LaDelle-Barnes-Arvilla (s4780)	39	0.9	The Velva series consists of very deep, well drained, moderately or moderately rapidly permeable soils that formed in stratified recent alluvium. These soils are on flood plains and low terraces and have slopes of 0 to 6 percent.

Soil Association	Acres of Soil Type in ROW	Percent of ROW	Description of Primary Soil Series
Wabek-Ruso (s4820)	38	0.8	The Wabek series consists of very deep, excessively drained, rapidly and very rapidly permeable soils formed in sand and gravel glaciofluvial deposits. These soils are on outwash plains, beach ridges, terraces, and terrace escarpments and have slope of 0 to 45 percent.
Walum-Kensal-Brantford-Binford (s4743)	29	0.6	The Walum series consists of very deep, moderately well drained, soils that formed in glaciofluvial sand and gravel containing appreciable amounts of shale. Permeability is moderately rapid above the sand and gravel and rapid or very rapid in the sand and gravel. These soils are on glacial outwash plains and have slopes ranging from 0 to 3 percent.
Williams-Bowbells (s4786)	269	5.9	The Williams series consists of very deep, well drained, moderately slow or slowly permeable soils formed in calcareous glacial till. These soils are on glacial till plains and moraines and have slope of 0 to 35 percent.
Wilton-Williams-Temvik-Mandan (s4797)	216	4.8	The Wilton series consists of very deep, well drained soils that formed in a silty loess mantle overlying till. Permeability is moderate in the silty loess mantle and moderately slow in the till. These soils are on uplands and have slopes of 0 to 9 percent.
Wyndmere-Barnes-Arvilla (s4747)	45	1.0	The Wyndmere series consists of very deep, somewhat poorly drained, moderately rapidly permeable soils formed in calcareous moderately coarse and coarse glaciofluvial and glaciolacustrine deposits. These soils are on delta, outwash, and glaciolacustrine plains, and on beach ridges. Slope ranges from 0 to 3 percent.
Wyndmere-Hecla-Embden-Arvilla (s4733)	79	1.7	
Zahl-Williams (s4792)	174	3.8	The Zahl series consists of very deep, well drained, moderately slow or slowly permeable soils that formed in calcareous glacial till. These soils are on glacial till plains, moraines, and valley side slopes and have slopes of 1 to 60 percent.
Zahl-Williams-Vida-Bowbells (s4787)	205	4.5	
Zahl-Zahill-Williams-Cabbart-Cabba (s4811)	105	2.3	

Source: USDA, NRCS. 2006.

Prime Farmland

Federal agencies have a mandate under the FPPA to minimize unnecessary and irreversible conversion of farmland to nonagricultural uses. A Farmland Conversion Impact Rating (Form AD-1006) will be completed by the NRCS for the Project. Soils are generally classified as Prime Farmland, Prime Farmland if Drained, and Farmland of Statewide Importance. Figure 8 displays the location of these farmland classifications along the Project ROW.

Soils considered Prime Farmland are widespread throughout the Project ROW, but are most densely concentrated along the central and eastern portions of the Project. In general, Prime Farmland is abundant in and east of Sheridan County to the Red River Valley. As the Project ROW approaches the Red River Valley, Prime Farmland becomes more concentrated into large contiguous blocks of the landscape. Prime Farmland is less common in the vicinity of the Missouri River (McLean and Oliver Counties).

Soils classified as Prime Farmland if Drained are more common along the eastern portions of the Project ROW. These soils are generally concentrated into two areas. The western block of soils considered Prime Farmland if Drained is oriented along a northwest/southeast axis generally situated between Harvey, North Dakota and Carrington, North Dakota. The eastern block is concentrated in the Red River valley within Grand Forks County, North Dakota. This eastern block frequently abuts the contiguous blocks of Prime Farmland within the valley to form an expansive block covering most of the southwestern portions of Grand Forks County.

Soils designated as Farmland of Statewide Importance are less common along the Project ROW. These soils are most common in the vicinity of Sharon, North Dakota, in Steele and Grand Forks counties. These soils are not as widespread as Prime Farmland at any location. Table 5.10-2 displays farmland classifications for the Project ROW.

Table 5.10-2. Farmland Classifications for Project ROW

Farmland Classification	Acres of ROW	Percent of ROW
Prime Farmland	1,275	28.1
Prime Farmland if Drained	644	14.1
Farmland of Statewide Importance	535	11.8
Total	2,454	54.0

Source: SSURGO

Potentially Erodible Soils

The North Dakota soil databases do not have attributes to identify erodible or highly erodible soils. In general, soils of 6 percent or greater slope have a higher potential for erosion due to surface water runoff, if disturbed. Therefore, Minnkota calculated slope using GIS from the 30 meter National Elevation Dataset for North Dakota. Approximately 500 acres (11.0 percent of the Project ROW) have a 6 percent or greater slope.

5.10.2 Impacts

General Soils

Surface soils will be disturbed by site clearing, grading, and excavation activities at structure locations, pulling and tensioning sites, setup areas, and during the transport of crews, machinery,

materials, and equipment over access routes (primarily along the Project ROW). This disturbance is minimal, and is generally less invasive than typical agricultural practices such as plowing and tilling. Soil compaction will occur on access roads, laydown areas, and along the Project ROW. Minnkota will attempt to utilize existing, disturbed areas for laydown areas to the extent practical. **Table 5.10-3** provides temporary and permanent impact by soil association.

Table 5.10-3. Temporary and Permanent Impacts by Soils Association

Soil Association	Temporary Impacts (acres)	Permanent Impacts (sq ft)
Bearden-Antler (s4801)	37	4,141
Buse-Barnes (s4751)	9	942
Glyndon (s4728)	14	1,492
Heimdal-Esmond-Emrick (s4770)	64	6,990
Heimdal-Fram-Emrick (s4768)	56	6,362
Heimdal-Fram-Emrick (s4769)	133	12,252
Heimdal-Hecla-Embden-Egeland (s4732)	24	2,592
La Prairie-Fairdale (s4779)	4	393
Lamoure-La Prairie-Heimdal-Emrick (s4782)	3	236
Lankin-Gilby-Antler (s4739)	21	2,278
Lohnes-Claire (s4749)	7	785
Miranda-Larson-Heimdal-Emrick (s4771)	9	942
Ojata-Bearden (s4785)	23	2,513
Perella-Colvin-Bearden (s3435)	19	393
Renshaw-Divide-Arvilla (s4741)	17	1,806
Renshaw-Overly-Lankin-Brantford (s4740)	4	393
Svea-Barnes (s4758)	29	3,299
Svea-Buse-Barnes (s4760)	6	628
Svea-Cresbard (s4764)	19	2,042
Svea-Cresbard-Cavour-Barnes (s4766)	21	2,356
Svea-Hamerly-Barnes (s4759)	70	7,775
Svea-Kloten-Edgeley (s4752)	10	1,100
Tiffany-Hecla-Glyndon-Embden (s4729)	6	707
Tiffany-Swenoda-Barnes (s4730)	8	942
Tonka-Svea-Hamerly-Barnes (s4754)	33	3,691
Towner-Embden (s4762)	18	2,042
Trembles-Lohler-Havrelon (s4825)	3	2,079
Vallers-Svea-Hamerly-Buse-Barnes (s4756)	73	6,912
Vebar-Reeder-Cabba-Amor (s4829)	4	471
Velva-LaDelle-Barnes-Arvilla (s4780)	18	864

Soil Association	Temporary Impacts (acres)	Permanent Impacts (sq ft)
Wabek-Ruso (s4820)	8	864
Walum-Kensal-Brantford-Binford (s4743)	16	707
Williams-Bowbells (s4786)	56	6,122
Wilton-Williams-Temvik-Mandan (s4797)	45	5,105
Wyndmere-Barnes-Arvilla (s4747)	9	1,100
Wyndmere-Hecla-Embden-Arvilla (s4733)	16	1,728
Zahl-Williams (s4792)	36	4,006
Zahl-Williams-Vida-Bowbells (s4787)	54	5,187
Zahl-Zahill-Williams-Cabbart-Cabba (s4811)	21	2,435

Extended periods of saturation during Project construction may make soils prone to compaction and rutting. Soil compaction has a restrictive action on water penetration, root development, and the rate of oxygen diffusion into soils. Low density and change of vegetation types may be an indirect effect of soil compaction. Soil characteristics that affect soil compaction include soil texture, soil moisture, and grain size. All soil types are susceptible to compaction and will also be susceptible to rutting if construction occurs when the upper layers of these soils are moist or near saturation.

Prime Farmland

Table 5.10-4 provides the temporary and permanent impacts of prime farmlands and farmlands of statewide importance.

Table 5.10-4. Temporary and Permanent Impacts to Prime Farmland Classifications

Prime Farmland Classification	Temporary Impacts (acres)	Permanent Impacts (acres)[1]
Prime Farmland	281	2.2
Prime Farmland if Drained	110	1
Farmland of Statewide Importance	151	1.8
Total	542	5

1. A Restricted Tillage Area was added as a permanent impact

Potentially Erodible Soils

Disturbed soils can be subject to erosion, defined as the detachment and transport of individual soil grains by wind or water. Erosion by wind is related to soil moisture, soil texture, organic matter content, soil structure, vegetative cover, and climate. Wind erosion often occurs on dry, fine sandy soils when vegetation cover is sparse and strong winds are prevalent. Water erosion is related closely to a soil's infiltration capacity and the coherence of the soil particles that comprise the soil. Slopes of 6 percent or greater tend to have a higher potential for erosion.

Approximately 106 acres of temporary impact and 1 acre of permanent impact will occur on slopes of 6 percent or greater for the Project ROW. Soil properties that influence water erosion

include soil texture, percent organic matter, soil structure, soil infiltration capacity, and soil permeability. Soils containing high proportions of silt and very fine sand are most erodible. Well-drained and well-graded gravels and gravel sand mixtures with little or no silt are the least erodible soils. Water erosion is also influenced by slope length and gradient, as well as frequency, intensity, and duration of rainfall and the amount of time bare soils are exposed. Erosion could be caused by site clearing and earthmoving in addition to natural processes.

5.10.3 Mitigation

A National Pollutant Discharge Elimination System (NPDES) Permit will be applied for and a Stormwater Pollution and Prevention Plan (SWPPP) will be developed and field with the North Dakota Department of Health (NDDOH) that includes appropriate BMPs for construction. All disturbed areas will be re-vegetated once construction is complete. Seed mixes will be specified based on site characteristics and in accordance with regulatory permits. Where disturbance and excavation cannot be avoided entirely, impacts will be minimized using BMPs. Sediment and erosion control plans will be developed that specify the types of BMPs necessary. Depending on the site, BMPs may include installation of silt fencing, straw bales, or ditch blocks and/or covering bare soils with mulch, plastic sheeting, or fiber rolls to protect drainage ways and streams from sediment runoff from exposed soils. Erosion controls will be inspected during construction, especially during significant precipitation events. Soil compaction will be treated and restored through tillage operations after construction is complete, and in consultation with the landowner.

Impacts to prime farmland will be minimized by the use of soil and erosion BMPs and adjusting final structure placement to the extent practicable. Further impacts to prime farmlands will be minimized by paralleling the Project adjacent to existing ROW features and field lines. Minnkota will coordinate with NRCS to determine if anticipated impacts require evaluation under FPPA and will coordinate this review.

To the extent practicable, soil disturbance and excavation activities on steep slopes will be avoided. Slopes of 6 percent or greater will require BMPs if soils are graded or cleared.

5.11 Geologic and Groundwater Resources

Descriptions of the surficial and bedrock geology were obtained from digital GIS-based files obtained from the North Dakota Geological Survey, except as noted.

5.11.1 Description of Resources

Geology

Most of the Project ROW is underlain by Quaternary-age glacial sediments deposited by glacial ice originating from the Keewatin Ice Sheet. Glacial till of the Coleharbor Group is the dominant type of surficial sediment. Bluemle (2006) describes the till as an unsorted, unbedded mixture of boulders, gravel, and sand in a matrix of silt and clay, yellowish-brown to olive-gray in color. Smaller pockets of cross-bedded sand, also part of the Coleharbor Group, exist near some streams. The most extensive (approximately 10 miles) of these is near Baldhill Creek in Griggs County. Coleharbor Group thickness averages 100 feet in the Project ROW. Recent-age sediments, in the form of river-deposited clay, silt, and sand, and windblown sand, underlie most of the remainder of the Project ROW. The only part of the Project ROW where glacial and post-glacial sediments are absent is in the Sheyenne River valley, where the Pierre Formation (bedrock) has been exposed through erosion effects of the river and its tributaries.

Bedrock in the eastern two-thirds of the Project ROW is primarily shale formed in offshore marine environments during the Cretaceous Period. The Pierre, Niobrara, and Belle Fourche formations are the major shale units present, and they range in thickness from 75 to 700 feet. Bedrock in the western third of the Project ROW is composed of sandstone and lignite of the Tertiary and Cretaceous periods, which is generally 400 to 650 feet thick.

Groundwater

Groundwater resources in the Project ROW exist in both surficial (unconsolidated) and bedrock aquifers. Major surficial aquifers are composed of river alluvium, such as along the Missouri River, and glacial outwash. These types of aquifers tend to be long and narrow in shape, and are not widespread in the Project ROW. The Spiritwood Aquifer is a sand and gravel aquifer that trends north-to-south and intersects the Project ROW in Griggs County. This aquifer is composed of sand and gravel that was deposited in a pre-existing bedrock valley, and is overlain by till in many areas. The depth to groundwater varies widely across the Project ROW, and ranges from near the ground surface adjacent to streams, to more than 100 feet in topographically high areas underlain by thick till sequences.

5.11.2 Impacts

Permanent in-ground structure foundations that extend below the water table will have minimal impact on groundwater flow patterns. Impacts will be limited to the displacement of surficial sediments and groundwater during construction of structure foundations. A boring for structural foundations may extend 40 to 100 feet below ground surface depending on soil conditions and structure type. Boring diameter may be 7 to 10 feet. Given these values, the maximum volume of displaced soil and groundwater will be approximately 7,854 cubic feet (291 cubic yards) at a structure location. The removal of soil and groundwater at each structure location is not anticipated to impact local groundwater flow patterns due to the temporary and small-scale nature of the removal. Construction spoils, including soil cuttings and boring stabilization fluids, will be disposed of offsite unless otherwise requested by the landowner or a local permitting

authority. Topsoil will be left on site, if desired by the landowner. Groundwater from dewatering will be discharged on site into an approved BMP structure.

The storage and use of fuels, greases, and other chemicals during construction has the potential, if not handled properly or spilled, to impact geologic materials and groundwater. In addition, there is potential for construction activities to encounter previously contaminated soil.

5.11.3 Mitigation

Impacts to geologic and groundwater sources will be avoided and/or mitigated by the following:

- The depth and diameter of structure foundations will be minimized during the design phase.
- In the event that previously contaminated soils are discovered during construction, the contractor will stop work immediately, contact the NDDOH, and consult with the agency with respect to an acceptable plan of action.
- A Spill Pollution and Prevention Plan will be developed that includes procedures for proper storage and disposal of all hazardous and non-hazardous wastes generated during the construction process.
- Controlled laydown areas may be used for refueling, for hazardous material loading and unloading operations, and to provide adequate spill cleanup materials and equipment. Spill impacts, if any, will be mitigated in compliance with applicable federal, state, and local cleanup standards.
- Specific equipment inspection and maintenance procedures to identify and minimize any potential for hazardous material spillage or leakage (i.e. fuel spillage, oil or grease leakage, etc.) will be in place, with inspections performed periodically and results documented.

5.12 Surface Water and Floodplain Resources

5.12.1 Description of Resources

There are many surface water resources (lakes, rivers, and streams) within or adjacent to the Project ROW (**Figure 9**). The Missouri River is the largest watercourse that is crossed by the Project Route and is associated with large sandbars and wooded riparian habitat. In general, perennial watercourses are more frequent in the eastern half of the Project ROW. Lakes are fairly evenly scattered throughout the vicinity of the Project.

Rivers, Streams, and Lakes

Table 5.12-1 summarizes surface waters crossed by the Project ROW, which includes three perennial rivers, three intermittent rivers, and one canal. While most of the watercourses crossed by the Project Route are intermittent in nature, aerial photography indicates that some of these intermittent surface waters may support open water for extended periods of time. The Missouri, James and Sheyenne rivers are subject to frequent flooding during the spring as a result of snow melt.

While some "lakes" in North Dakota are in a traditional sense actually large wetlands, for the purpose of this application, lakes were identified according to surface waters that have been named "Lake."

Table 5.12-1. Surface Waters Crossed by the Project ROW – From West to East

Surface Water	Number of Crossings	Crossing Comments
Named Rivers and Canals		
Missouri River – perennial	1	Approximate river width at crossing 1,750 feet
McClusky Canal	2	Crossed in Sheridan Co. and McLean Co.; canal typically maintains perennial flow at crossings; surface water is typically 150 feet wide or less at crossings, upper banks at Sheridan crossing may be more than 300 feet wide
James River – perennial and intermittent	2	Crossed in Eddy Co.; river 150 feet or less at crossing; James River also has an intermittent crossing in Wells Co.
Sheyenne River – perennial	1	Crossed in Griggs Co.; river is highly sinuous, meandering across an approximately 3,469-foot-wide floodplain
Goose River – intermittent	1	Crossed in Grand Forks Co.; river crossing is about 20 feet with an approximately 1,644-foot-wide floodplain
Little Goose River – intermittent	1	Crossed in Grand Forks Co.; river 150 feet or less at crossing with an approximately 1,155-foot-wide floodplain
Named Streams/Creeks with Open Water		
Yanktonai Creek – intermittent	1	Narrow meandering surface water that is crossed in McLean Co. near US 83
Painted Woods Creek – intermittent	1	Crossed in McLean Co.
Rocky Run – intermittent	3	Crossed in Eddy Co.; stream generally 50 feet wide except for crossing at Rosefield Slough, which is about 400 feet wide
Pickerel Lake Creek – perennial	1	Creek narrow (approximately 20 feet) at Griggs Co. crossing location

Surface Water	Number of Crossings	Crossing Comments
Goose Creek - intermittent	1	Crossed in Grand Forks Co.; river crossing is about 10 feet wide with an approximately 150-foot wide floodplain
English Coulee – intermittent	5	Crosses three meanders of Coulee within 2.5 miles; crosses two ditched sections within 1.0 mile, near Prairie Substation
Named Lakes		
Yanktonai Lake	1	780-foot-wide crossing at west side of lake; lake is approximately 30 acres in McLean Co.
Rosefield Slough	1	430-foot-wide crossing at south side of slough in Eddy Co.
Round Lake	1	Crossing is 980 feet long at south side of lake in Eddy County
Lake Norway	1	Crossed north side of 115 acre lake in Griggs Co.; crossing width is 1,100 feet

Floodplains

The Project Route will cross Federal Emergency Management Agency (FEMA) floodplains at the Missouri River, Goose River, Little Goose River, three English Coulee crossings, and a drainage channel along 14th Street NE in Grand Forks County. Flood elevation information for the Sheyenne River was provided by a Project-specific hydrology study conducted in January 2011 (**Appendix F**). FEMA data was not available for the James River crossings.

Table 5.12-2 summarizes the surface waters with floodplain crossings by the Project ROW. Figure 9 depicts the floodplain areas associated with the surface water.

Table 5.12-2. Surface Waters with Floodplains Crossed by the Project ROW

Surface Water	Floodplain Crossing Length (ft)
Missouri River	4,546
Sheyenne River	3,469
Goose River	1,644
Little Goose River	1,155
English Coulee Flood Retention Area	4,780
English Coulee	1,130
English Coulee	182
Unnamed Drainage Channel (along 14th ST NE in Grand Forks County)	133

5.12.2 Impacts

Rivers, Streams, and Lakes

No direct short-term or long-term impacts to watercourses or lakes are expected as part of the construction and operation of the Project facilities. The Project Route is designed to span all rivers, streams, and lakes, including the Missouri River; therefore direct impacts will be avoided. Indirect impacts, such as erosion and sedimentation associated with clearing and construction or compaction, will be minimal and mitigated with BMPs.

Potential flooding associated with the Missouri River was considered during Project design. The Project's concrete foundation will typically be designed to beat least 2 feet above the highest flood stage level and rip-rap will be placed around and between structures; therefore no impacts to the Project are anticipated from Missouri River flooding or an increase in the flood stage are anticipated from the Project Route.

The Devils Lake basin, located in northeastern North Dakota, has experienced dramatic increases in lake water levels. The current water level has inundated much of the surrounding area, causing displacement of residents and impacting surface transportation. The Sheyenne River was the natural outlet to Devils Lake at one time. Currently, the capacity of the constructed Devils Lake outlet may have to be increased to control flooding effects within the basin; as a result, flows within the Sheyenne River may increase. Minnkota conducted a hydrology study that modeled the potential impact of the Devils Lake output into the Sheyenne River to determine a potential flood stage of the Sheyenne River and will place concrete foundations at least 2 feet above the calculated flood stage level. This will accommodate potential flood effects on the Sheyenne River due to proposed improvements to the outlet of Devils Lake. The Project Route will be designed to consider the potential for future increased flows in the Sheyenne River, therefore no impacts to the Sheyenne River or an increase in potential flooding are anticipated from the Project Route. BMPs will be utilized to prevent indirect impacts due to runoff, erosion and sedimentation, or blockage of drainageways.

Perennial water sources will be used to obtain water for dust suppression and the concrete batch plant. Water appropriation permits will be obtained, if necessary, prior to the activity. Water for construction purposes will not be taken from USFWS wetland easements.

Floodplains

Floodplains will be spanned by the Project Route wherever feasible. **Table 5.12-3** provides the temporary and permanent impacts to the floodplain areas crossed by the Project Route.

Table 5.12-3. Temporary and Permanent Impacts to Surface Waters with Floodplains Crossed by the Project Route

Surface Water	Number of Structures within the Floodplain	Temporary Impacts (ac)	Permanent Impacts (sq ft)
Missouri River	3 (1 mono-pole, 2 three-pole)	4.6	4,078
Sheyenne River	3	2.5	236
Goose River	2	1.2	157
Little Goose River	1	0.8	78.5
English Coulee Flood Retention Area	5	3.4	393
English Coulee	3 (H-frame)	1.5	231
English Coulee	0	0.1	0
Unnamed Drainage Channel (along 14TH ST NE in Grand Forks County)	0	0.1	0

5.12.3 Mitigation

Rivers, Streams and Lakes

The Project will require a number of water resource permits, including coverage under the Section 402 (Clean Water Act) NPDES General Permit for Storm Water Discharges Associated with Construction Activities and associated SWPPP, Permit to Cross North Dakota Sovereign Lands, Section 404 (Clean Water Act) Permit, Section 401 Water Quality Certification and Section 10 (Rivers and Harbors Act) Permit. The placement of transmission line structures, land clearing that involves soil disturbance, or placement of construction mats may be considered a discharge of fill material that will require a permit from U.S. Army Corps of Engineers (USACE) pursuant to Section 404 of the Clean Water Act. These permits will require Minnkota to develop and implement BMPs for sediment and erosion control during construction and operation of the Project to protect topsoil and adjacent surface and groundwater resources, and to minimize soil erosion. Additionally, the site contractor will be responsible for obtaining appropriate permits for construction related practices such as dewatering and wastewater discharge associated with concrete batch plants, as necessary. Typical BMPs may include:

- Locate structures and disturbed areas away from rivers and lakes, where practicable;
- Contain stockpiled material, fuel, and chemicals, away from stream banks and lake shorelines;
- Fuel construction vehicles outside of waterbodies, including wetlands, and use appropriate spill prevention and containment procedures;
- Install sediment and erosion control measures prior to construction, in accordance with sediment and erosion control plans and permits; maintain in good working order for the duration of construction;
- Use turbidity control methods prior to discharging wastewater from concrete batching or other construction operations to streams or other surface waters;
- Spread topsoil and seed in a timely manner; and
- Avoid use of fertilizers, pesticides, or herbicides in or near waterbodies, including wetlands.

If final Project structures cannot be sited such that impacts to jurisdictional water resources are avoided, compensatory mitigation under a USACE Section 404 Permit may be required to replace the loss of aquatic resource functions in the watershed. Compensatory mitigation could include the restoration, establishment, enhancement, or preservation of wetlands or other aquatic resources to off-set Project impacts.

Minnkota will place structures at least 2 feet above the 100-year flood stage of the Missouri River. This will accommodate potential flood effects from the river; therefore no mitigation is anticipated.

A hydrology study at the Sheyenne River has been completed to address concerns associated with the Devils Lake outflow. Based upon the hydrology study, Minnkota will place structures at least 2 feet above the calculated flood stage level. This will accommodate potential flood effects on the Sheyenne River due to proposed improvements to the outlet of Devils Lake; therefore no mitigation is anticipated.

Dust suppression measures will be conducted by the foundation contractor who will be responsible for maintaining the ROW during construction. Minnkota or the foundation

contractor will apply for a permit from the State Water Commission for water appropriations related to construction purposes.

Minnkota will work with local planning and zoning commissions to obtain any applicable permits and approvals for potential impacts within the floodplains.

5.13 Wetlands

5.13.1 Description of Resources

The Project ROW encompasses an area that is generally described as part of the prairie pothole region. The prairie pothole region is characterized by numerous shallow freshwater lakes and wetlands that pockmark the landscape. This region, which extends from Canada south to South Dakota and Minnesota, provides waterfowl habitat that is estimated to produce 50 to 75 percent of North American waterfowl in any given year (Witsch et al. 2000).

The ecology of these wetlands is dictated by seasonal wet-dry cycles. Snowmelt and spring rains serve as the primary water sources, resulting in many seasonal wetlands that hold surface water early in the growing season and then dry out as the summer progresses. While some of these wetlands can be quite large (greater than 100 acres), the majority of pothole wetlands are less than 10 acres.

Some of these wetlands may have relatively high salinities that support plant communities that are tolerant of salty conditions. Saline wetlands, in some parts of North Dakota, also provide nesting habitat for the federally threatened piping plover.

Within the Project ROW, wetlands tend to be most dense west of eastern Steele County, which forms the boundary of the Lake Agassiz Plain. In general, wetlands in the west half of the Project ROW (from Wells County west) have been less disturbed by agricultural practices and, thus, retain a more natural state.

Wetlands are identified as shallow water systems that provide unique functions and values to the surrounding landscape, such as water quality protection, wildlife habitat, and flood storage. Wetlands connected to Waters of the U.S. (i.e., not isolated basins) are protected under Section 404 of the Clean Water Act and are regulated by USACE and the EPA. Some of the wetlands within the Project ROW are held in a USFWS wetland easement or grassland easement.

General wetland locations were obtained from the National Wetland Inventory (NWI) (**Figure 9**). NWI data represents general locations and acreages of wetlands within the Project ROW. Because the size of wetlands were determined by the use of aerial photography that is dependent on the year the photograph was taken and the level of water in the wetland at that time, the NWI data in North Dakota may not reflect the true size of wetlands. Minnkota began wetland delineations in the fall 2010 and anticipates field evaluations to be completed in spring 2012, which will indicate accurate wetland location size. The wetland delineation report will be filed with the Commission upon completion. Wetlands are located throughout the Project ROW; the various wetland types are shown in Table 5.13-1. All wetlands in the Project ROW have been desktop reviewed and about 94 percent of wetlands in the Project ROW have been field reviewed.

Table 5.13-1. Desktop and Field Reviewed Wetlands Identified within Project ROW

Wetland Type	Wetland Acres of ROW	Percent of Wetlands within ROW
Freshwater Emergent Wetland	492	90.6
Freshwater Forested/Shrub Wetland	6	1.1
Freshwater Pond	21	3.9
Lake	8	1.5
Riverine	16	2.9
Total	543	100.0

Source: Minnkota desktop and field reviewed wetlands. All wetlands in ROW have been desktop reviewed and 94% of wetlands in ROW have been field reviewed.

5.13.2 Impacts

Wetland impacts will be avoided or minimized through careful siting of the Project Route, to the extent practical. As noted previously, the USFWS manages wetlands on wetland and grassland easements. Some impacts are anticipated to wetlands and USFWS wetland easements. Minnkota continues to work with the USFWS to document wetland impacts and is applying for a Special Use Permit from the USFWS to cross easement lands.

Temporary construction impacts may occur in association with facility construction and an access road to a structure location. Permanent impacts are associated with installation of structures that result in "fill" being placed within a wetland. Conversion of a forested wetland to another wetland type is not identified as an impact. **Table 5.13-2** estimates wetland impacts for the Project Route based on desktop and field reviewed wetlands within the Project ROW.

Table 5.13-2. Estimated Wetland Impacts for Project Route

Wetland Type	Estimated Wetland Impact	
	Temporary Impact (acres)	Permanent Impact (sq ft)
Freshwater Emergent Wetland	100.5	2,019
Freshwater Forested/Shrub Wetland	1.4	78.5
Freshwater Pond	4.2	158
Lake	1.5	0
Riverine	2.2	0
Total	110	2,256 (0.03 acres)

Source: Minnkota desktop and field reviewed wetlands.

5.13.3 Mitigation

Permanent impacts to wetlands will be avoided to the extent practicable through refinement of Project design. The majority of the wetlands within the Project ROW that may be permanently impacted by the Project Route appear to be isolated basins that likely do not fall under USACE jurisdiction. Surveys for USACE jurisdictional wetlands will be completed prior to construction.

Permanent impacts to jurisdictional wetlands and waters will be mitigated according to the USACE regulatory requirements, as applicable. Permanent impacts to wetlands under USFWS easements will require a Special Use permit from the USFWS, and Minnkota will continue to coordinate with the USFWS throughout Project development.

Minnkota will use BMPs during construction and operation of the transmission line and associated facilities to protect topsoil and adjacent wetland resources and to minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, stabilizing restored material, and re-vegetating disturbed areas with native species.

5.14 Vegetation

5.14.1 Description of Resources

GAP land cover data for North Dakota was used for this analysis (USGS 2004). Figure 10 depicts the land cover within the Project ROW and Table 5.14-1 presents the total acres of each land cover category that occurs within the Project ROW.

Table 5.14-1. GAP Land Cover Types within the Project ROW

GAP Land Cover Category	Acres in ROW	Percent of ROW
Cropland	2,460	54.1
Pasture	787	17.3
Prairie	670	14.8
Wetland	372	8.2
Shrubland	183	4.0
Woodland	47	1.0
Developed	18	0.4
Barren/Sparse Vegetation	7	0.1
Total	4,544	100

Source: USGS 2004

Agricultural Vegetation (Cropland and Pasture)

The general vegetative cover within the Project ROW consists primarily of cropland and pasture, consisting of about 71 percent of the Project ROW. Typically, areas used as cropland are established as monotypic communities; agricultural species used for grain and legume production such as wheat, corn, soybeans or sugar beets. Pasture land is also common and is typically dominated by native or planted grasses. Overgrazed pastures tend to be dominated by non-native grasses. Agricultural vegetative cover generally increases as the Project ROW extends east, with percent cover ranging from approximately 60 percent cropland in the western portion of the Project ROW to nearly 90 percent cropland in the eastern portion of the Project ROW.

Prairie, Woodland/Shrubland and Wetland Vegetation

In the western sections of the Project ROW, toward the Missouri River, prairie and wetland vegetation become more prevalent. Historically, North Dakota was mostly prairie land cover although much of the area has been modified for agricultural production. In the western portions of the Project ROW, prairie cover can be as high as 24 percent, decreasing to nearly 2 percent in the east toward the Red River Valley. A general review of the Project ROW indicated that the majority (approximately 90 percent) of field identified prairie occurs within the Northwestern Great Plains Ecoregion, which is locally known as the Missouri Plateau/Missouri Coteau (Wiken et. al. 2011 and USGS 2006). The Missouri Plateau is located along the Project ROW within Oliver, McLean, Sheridan, and the extreme western portion of Wells County. The ecoregion is described as having a mid-latitude steppe climate and has a dominate vegetation community of short and mixed grass prairie (Wiken et. al. 2011 and USGS 2006). Native prairie was noted to occur anywhere on the landscape where local soil conditions or topography did not allow for row cropping to occur. This was also true for the few areas outside of the Missouri Plateau identified as prairie. Typical species present in remnant prairie areas include bluestem

(*Andropogon* spp*, Schizachyrium* spp.), needlegrass (*Achnatherum*), Indian grass (*Sorghastrum nutans*), and sideoats (*Bouteloua curtipendula*). Healthy prairie habitats can also include a variety of forbs such as prairie smoke (*Geum triflorum*), pasque flower (*Pulsatilla vulgaris*), and coneflower (*Echinacea* spp*., Ratibida* spp.).

Common wetland vegetation includes reed canarygrass (*Phalaris arundinaceae*), prairie cordgrass (*Spartina pectinata*), and cattail (*Typha* spp.). Large wetland complexes are typically considered a constraint to transmission line development, as construction may require additional permitting, wetland specific BMPs, or structure placement that will cause permanent impacts. Furthermore, maintenance of new infrastructure and ROW could be more problematic in wet areas. Refer to Section 5.13.1 for a discussion of wetlands within the Project ROW.

Wooded and shrub areas are not prevalent in North Dakota, making up a small percentage of vegetative cover within the Project ROW (approximately 5 percent). Currently, the most common wooded and shrub areas are shelterbelts around residences and buildings. Some rivers and streams crossed by the Project Route may have a wooded or shrubby riparian fringe, such as the Missouri and Sheyenne Rivers. Species commonly found in these wooded areas include deciduous species such as green ash (*Fraxinus pennsylvanica*), aspen (*Populus tremuloides*), burr oak (*Quercus macrocarpa*) and eastern cottonwood (*Populus deltoides*). Common shrub species include sandbar willow (*Salix* spp.), chokecherry (*Prunus virginiana*), and hawthorn (round leaved) (*Crateagus rotundifolia*).

Conservation Focus Areas

The NDGF's Private Lands Initiative Program utilizes a State Wildlife Grant to provide assistance to landowners to develop and protect habitat for species of conservation priority that are located within conservation focus areas identified in the *North Dakota Comprehensive Wildlife Conservation Strategy Plan* (NDGF 2011). There are five conservation focus areas crossed by the Project ROW, including the Missouri River System Breaks, Missouri Coteau Breaks, Devil's Lake Basin, Sand Deltas and Beach Ridges, and Saline Area. For each conservation focus area, the NDGF identified a list of key species of conservation priority that includes birds, mammals, reptiles and amphibians, and fish. Figure 11 depicts the conservation focus areas crossed by the Project ROW. **Table 5.14-2** provides a description of each conservation focus area along with the key species of conservation priority identified by the NDGF.

Table 5.14-2. Conservation Focus Areas Crossed by the Project ROW

NDGF Conservation Focus Area	Description of Area	Associated Landscape	Key Species of Conservation Priority			
			Birds	Mammals	Reptiles and Amphibians	Fish
Missouri River System Breaks	Steep, dissected topography with woody draws, riparian forest, and shortgrass prairie uplands	Rivers, Streams and Riparian	bald eagle, piping plover, least tern, red-headed woodpecker, golden eagle	river otter	smooth softshell, false map turtle	sturgeon chub, pearl dace, blue sucker, paddlefish, pallid sturgeon, flathead catfish, flathead chub, sicklefin chub, yellow bullhead
Missouri Coteau Breaks	Rolling, steep topography with intact native prairie remains amongst wheat and hay fields; cattle grazing; abundant wetlands	Mixed-grass Prairie (Missouri Coteau)	American bittern, Northern pintail, Northern harrier, Swainson's hawk, ferruginous hawk, sharp-tailed grouse, willet, upland sandpiper, marbled godwit, Wilson's phalarope, short-eared owl, loggerhead shrike, sedge wren, Sprague's pipit, lark bunting, grasshopper sparrow, Baird's sparrow, Le Conte's sparrow, Nelson's sharp-tailed sparrow, chestnut-collared longspur, dickcissel, bobolink	Richardson's ground squirrel	spadefoot toad, smooth green snake	none identified
Devil's Lake Basin	Extensive wetland drainage and intense farming is predominant due to the rich soil and relatively flat topography; high concentration of large wetlands and lakes; includes the James and Sheyenne rivers in the southern portion of the basin; adjacent non-wooded uplands intact in many areas	Eastern Mixed-grass Prairie (Drift Prairie)	American bittern, Northern pintail, Northern harrier, Swainson's hawk, sharp-tailed grouse, willet, upland sandpiper, marbled godwit, short-eared owl, bobolink	Richardson's ground squirrel	plains spadefoot	none identified
Sand Deltas and Beach Ridges	Thick sand deposits from river sediments with windblown sand dune formations; some agriculture and areas of overgrazing; includes the Sheyenne River and Sheyenne National Grasslands	Tallgrass Prairie (Red River Valley)	greater prairie-chicken, sharp-tailed grouse, short-eared owl, upland sandpiper, sedge wren, Le Conte's sparrow	plains pocket mouse	Northern prairie skink	Western hognose snake
Saline Area	Characterized by saline soil due to salty ground water flowing to the surface from underlying sandstone; land mostly unsuitable for crop farming; grazing occurs in uncultivated areas; supports salt-tolerant plants; many wetlands are brackish	Tallgrass Prairie (Red River Valley)	greater prairie chicken, upper sandpiper, sedge wren, Le Conte's sparrow	none identified	none identified	none identified

Source: NDGF 2005, North Dakota Comprehensive Wildlife Conservation Strategy Plan.

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Impaired and Vulnerable Terrestrial Communities

NDPR maintains the North Dakota Natural Heritage Inventory (NHI) as a spatial reference to protected and sensitive species occurrences or sensitive natural communities. The database includes data pertaining to flora and fauna species. The NHI provides a system for identifying and prioritizing ecologically significant natural features in the state. The North Dakota Natural Heritage Program has used these ranks to help develop a list of plant and animal species considered to be Species of Concern in North Dakota (Dirk 2006a, 2006b). North Dakota Species of Concern do not receive legal protection under state and/or federal endangered species acts. While this inventory has not been completed throughout the entire Project ROW, data is available for the vicinity of the Missouri and Sheyenne Rivers.

This database has assigned each occurrence a state conservation ranking, standards developed in part by NatureServe (NatureServe 2010). These rankings range between S1 for species or communities which are critically imperiled (less than 5 occurrences regionally) to S5 for species or communities considered secure (common species). Some communities are not assigned a rank or are considered historical or extirpated (NatureServe 2010). Species of Concern in North Dakota typically have been assigned a natural heritage state rank of S1, S2, or S3, as outlined below:

- **S1 Critically Imperiled** – Critically imperiled in the state because of extreme rarity or because some factor of its biology makes it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrences or very few remaining individuals (less than 1,000). [Critically endangered in state.]
- **S2 Imperiled** – Imperiled in the state because of rarity or because of other factors making it very vulnerable to extirpation from the state. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000). [Endangered in the state.]
- **S3 Vulnerable** – Vulnerable in the state either because of rarity, or because it is found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 to 10,000 individuals. [Threatened in the state.] (NDPR 2011)

These rankings are valuable to determine the extent of rare communities present in a given location.

Sensitive communities present in the vicinity of the Project ROW include areas of high quality prairie such as dry-mesic tallgrass prairies or needle-and-thread mixed grasses, high quality woodlands such as floodplain forests or burr oak upland woodlands and high quality shrublands and high quality wetlands. These communities likely harbor a greater diversity of plant species than the surrounding landscape. Impaired or vulnerable terrestrial communities along the associated state conservation rankings are presented in Table 5.14-3 for the Project ROW.

Table 5.14-3. Impaired or Vulnerable Terrestrial Communities and Associated State Conservation Rankings in Project ROW

State Conservation Ranking	Common Community Names	Acres in ROW
S1	Dry Mesic Tallgrass Prairie	4.6
	Water Sedge Rich Fen	2.2
S2	Needle-and-thread Mixed Grass Prairie	6.7
	Needlegrass-wheatgrass Prairie	3.6
S2/S3	Saltgrass Saline Meadow	0.8
S3	Bur Oak Upland Woodland	0.3
	Cottonwood-Green Ash Floodplain Forest	6.2
	Green Ash Upland Woodland	0.1
S3/S4	Western Wheatgrass Prairie	6.7
Total		31.2

Source: NDPR 2011

5.14.2 Impacts

Temporary and permanent impacts to land cover are provided in **Table 5.14-4**. Woodland cover impacts would result in a permanent vegetation conversion from woodland to shrubland or grassland within the Project ROW.

Table 5.14-4. GAP Land Cover Impacts for the Project Route

GAP Land Cover Category	Temporary Impacts (acres)	Conversion/Permanent Impacts (acres)
Cropland[1]	534.8	5.7
Shrubland	183	0.3
Pasture	180.6	0.8
Prairie	158.0	0.5
Woodland	NA	47.0
Wetland	78.0	0.2
Developed	19.5	0
Barren/Sparse Vegetation	1.1	0
Total	98.6	54.5

[1] *Cropland impacts include the Restricted Tillage Area.*

Agricultural Vegetation (Cropland and Pasture)

Land use in the Project ROW is dominated by agricultural cropland and pasture. A Restricted Tillage Area was added as a permanent impact to each structure location on tillable land. This area was added to the calculated impacts on tillable land as a farmer may not wish to farm the land any closer than five feet from the structure base. Extent of tillable land was determined using 2004 ND GAP Land Cover data (cropland).

Prairie, Woodland/Shrubland, and Wetland Vegetation

The most common type of prairie habitat along the Project Route is dominated by a mixture of non-native vegetation, bluestem, needlegrass, and wheatgrass. Many prairie areas are degraded due to overgrazing. Permanent impacts to prairie areas will be limited to structure and fiber optic regeneration footprints.

In some areas, wetlands may share similar characteristics as prairie areas, but in many cases are degraded or dominated by non-native vegetation. Permanent impacts to wetlands are defined in Section 5.13.2.

Woodlands and windbreaks will be permanently impacted within the 150-foot-wide Project ROW that is cleared of tall, woody vegetation (**Table 5.14-3**). Consideration was given to limiting woodland clearing to a narrower area, however, this would not meet the operation and safety standards under NERC for a 345 kV transmission line. Minnkota will request approval from the Commission for clearing the entire 150-foot-wide ROW. Woodlands that may be considered to have higher biological integrity include the cottonwood floodplains in the vicinity of the proposed Missouri River crossing.

Shrublands may be cleared for the 150-foot-wide Project ROW during construction, but then allowed to regrow to a height of 15 feet following construction. Therefore, in shrubland the temporary impact would be the clearing of the Project ROW. Permanent impacts would be limited to the structure locations (**Table 5.14-3**).

Conservation Focus Areas

Minnkota recognizes that each of the five conservation focus areas crossed by the Project ROW would be temporarily and permanently impacted by Project Route construction. However, no conservation projects have been identified in the areas that would be impacted by the Project Route.

Impaired and Vulnerable Terrestrial Communities

The most common types of sensitive community along the Project ROW are western wheatgrass and needle-and-thread mixed grass prairies (**Figure 12**). These communities are overlapping and present along the eastern bluffs of the Missouri River. Cottonwood-green ash floodplain forests are the next most frequent type of community present along the Project ROW (**Figure 12**). Known occurrences of this community along this Project ROW are adjacent to the Missouri River crossing (**Figure 12**). **Table 5.14-5** identifies impacts to impaired or vulnerable terrestrial communities for the Project Route.

Table 5.14-5. Impaired or Vulnerable Terrestrial Communities for Project Route

State Conservation Ranking	Common Community Names	Temporary Impacts (acres)	Permanent Impacts (acres)
S1	Dry Mesic Tallgrass Prairie	1.1	<0.01
	Water Sedge Rich Fen	0.4	0
S2	Needle-and-thread Mixed Grass Prairie	1.4	<0.01
	Needlegrass-wheatgrass Prairie	0.8	<0.01
S2/S3	Saltgrass Saline Meadow	0.2	0
S3	Bur Oak Upland Woodland	NA	0.3

State Conservation Ranking	Common Community Names	Temporary Impacts (acres)	Permanent Impacts (acres)
	Cottonwood-Green Ash Floodplain Forest	NA	6.2
	Green Ash Upland Woodland	NA	0.1
S3/S4	Western Wheatgrass Prairie	1.4	<0.01
Total		5.3	6.6

5.14.3 Mitigation

Agriculture

Mitigation of impacts to agricultural vegetation (cropland and pasture) is addressed in Section 5.2.3.

Prairie, Woodland, and Wetland Vegetation

Impacts to native vegetation will be minimized by spanning habitats of higher quality, to the extent practical. Where spanning is not feasible, impacts to native vegetation will be mitigated by re-establishing native species once construction is complete. Areas of non-native vegetation will be re-vegetated using native species appropriate for the local habitat, if approved by the landowner, to the extent practical.

Structure placement will be selected to avoid placement in wetland areas when possible. Mitigation, if required, will be completed in consultation with the USACE under Section 404 Permit requirements. Wetlands that do not require a Section 404 Permit will be restored to preconstruction conditions.

Impacts to woodland vegetation will occur within the Project ROW where these habitats are present. Minnkota will mitigate impacts to woodland areas using a 2:1 replacement ratio (based on the number of trees removed), per Commission requirements. Minnkota will monitor replacement vegetation, per Commission requirements. If feasible, the replacement areas will be located in the vicinity of the impacts. Where functional woodlands will be removed (such as shelterbelts), mitigation will be designed to replace the intended utility of the impacted woodland.

Conservation Focus Areas

Impacts to NDGF conservation focus areas will be minimized in a similar manner as discussed above; however, construction BMPs to minimize the spread of non-native species will be employed. In the conservation focus areas, BMPs may include but are not limited to, the following actions:

- Where soil will be disturbed, the topsoil will be excavated separately from subsoil and stored in separate stockpiles.
- Disturbed soils will not be transported to a different location on the Project.
- The time which areas of disturbed soils are left bare will be minimized.
- Disturbed areas will be revegetated using a native seed mix consistent with native communities present near the area of disturbance.

Impaired and Vulnerable Terrestrial Communities

Impacts to impaired and vulnerable terrestrial communities located within the ROW will be minimized in a similar manner as discussed above under Conservation Focus Areas. Minnkota will mitigate impacts to woodland areas using a 2:1 replacement ratio (based on the number of trees removed), per Commission requirements.

5.15 Wildlife

5.15.1 Description of Resources

General Wildlife

In general, wildlife species present within the Project ROW are typical of agricultural landscapes, pasture grasslands, and wetland habitat. Common mammals for these habitats include raccoon *(Procyon lotor)*, skunk *(Mephitis* spp.*)*, red fox *(Vulpes vulpes)*, rabbits *(Syvilagus* spp.*)*, bats (*Myotis* spp.), white-tailed deer *(Odocorleus virginianus)*, and coyote *(Canis latrans)*. The secondary ranges of pronghorn antelope (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*) include the western part of the Project ROW. Typical birds include songbirds; waterfowl; raptors; and game birds, such as pheasant *(Phasianus colchinus),* gray partridge (*Perdix perdix*), and sharp-tailed grouse (*Tympanuchus phasianellus*). In general, birds nest in shelterbelts and fencerow trees, and on the ground in the grasslands associated with prairie remnants, conservation land, lightly grazed pasture, and riparian areas.

The Missouri and Sheyenne Rivers, in particular, provide corridors for migrating and foraging wildlife as well as ample cover for small mammals, raptors, waterfowl, upland game birds, and other common wildlife along the Project ROW. The area described as the Northwestern Great Plains Ecoregion, which includes the Project ROW from western Wells County west to the Missouri River, includes relatively large tracts of pasture land with scattered remnant native habitat. This area provides habitat for a variety of grassland species (USGS 2006).

Species of Concern in North Dakota

Species of Concern include those plant and animal species that have populations considered at risk in the state of North Dakota; but North Dakota Species of Concern do not receive legal protection under state and/or federal endangered species acts. Federally listed species are discussed in Section 5.16. **Table 5.15-1** provides the Species of Concern documented in the NHI within 1 mile of the Project ROW.

Since areas within the Project ROW have been studied by the State of North Dakota to varying degrees of completeness, the species represented by the NHI data best serve as a snapshot of the potential presence of sensitive species, and do not necessarily represent a comprehensive list of all sensitive species located within the Project ROW. When assessing species records it may be important to consider the similarity of habitats when interpreting the available data.

The NHI Species of Concern within 1 mile of the Project ROW include sheathed pondweed, white lady's slipper, piping plover, least tern, bald eagle, and turkey vulture. In general, most Species of Concern are associated with high quality native or sensitive habitats and landscape features. In the Project ROW, most Species of Concern observations occur along the Missouri and Sheyenne Rivers (**Figure 12**). Other species observations not associated with a major river are associated with unique habitats, such as remnant native prairie, riparian woodlands, wetland complexes, or rock outcroppings.

Table 5.15-1 summarizes known raptor nests, owl nests, and sharp-tailed grouse leks within the Project ROW and within 1 mile of the Project ROW. NDGF has recorded sharp-tailed grouse lek areas in Grand Forks County, in the vicinity of the English Coulee Retention Dam, and in Sheridan County near the Prophets Mountain area. The closest lek from the Project ROW edge is about 100 feet. On March 29 and 30, 2010, aerial surveys for raptor nests were conducted

within the Project ROW (refer to Appendix G in the Corridor Certificate Application). The data from this survey are summarized in **Table 5.15-2**.

Table 5.15-1. Sensitive Species within Project ROW and 1 Mile of the Project ROW

Species	Number Within ROW	Number Within 1 mile of ROW
NHI Species of Concern	0	10
Raptor Nests*	0	0
Burrowing Owl Nests	0	0
Sharp-tail Grouse Leks	0	14

**Raptor nests include bald eagle and ferruginous hawk. Does not include data from March 2010 raptor surveys.*

Table 5.15-2. March 2010 Raptor Nest Survey Results within Project ROW

Feature Type	Number Within ROW	Number Within 1 mile of ROW
Raptor Nest	2	18
Raptor Observed	0	2

Source: Minnkota 2010b

USFWS made recommendations regarding nesting birds in a response letter received by Minnkota on June 2, 2009, as stated in the subsections below. The bald eagle and raptor nest surveys were conducted in consideration of the recommendations quoted below.

USFWS Bald Eagle Recommendations

The North Dakota Game and Fish (NDGF) bald eagle nest database indicated that bald eagle nests are located in the project area. We recommend conducting surveys to identify bald eagle nests along the proposed route in winter/early spring before trees have leaves that could screen possible nests. To avoid/minimize impacts to nesting bald eagles from transmission line construction activities, the Service recommends (1) keeping a distance between the activity and the nest (distance buffers: 660 feet if the activity will be visible from the nest; 330 feet if the activity will not be visible from the nest). Clearing, external construction, and landscaping between 330 feet and 660 feet should be done outside breeding season. (2) maintaining preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees. The Service's May 2007, National Bald Eagle Management Guidelines contain detailed information on protecting bald eagles from disturbance due to human activity. The guidelines can be accessed on the Service's website: (http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/NationalBaldEagleManagementGuidelines.pdf).

USFWS Migratory Bird Recommendation

Schedule constructions for late summer or fall/early winter so as not to disrupt waterfowl or other wildlife during the breeding season February 1 to July 15. If work is proposed to take place during the breeding season or at any other time which may result in the take of migratory birds or active nests, the Service recommends that the project proponent arrange to have a qualified biologist conduct a field survey of the affected habitats to determine the absence or presence of nesting migratory birds. If nesting migratory birds are found, we request you contact this

office, suspend construction, or take other measures, such as maintaining adequate buffers, to protect the birds until the young have fledged. The Service further recommends that field surveys from nesting birds, along with information regarding the qualifications of the biologist(s) performing surveys, and any avoidance measures implemented at the project site, be thoroughly documented and that such documentation be shared with the Service and maintained on file by the project proponent at least until such time as construction on the Project has been completed.

5.15.2 Impacts

Both direct and indirect effects could occur to wildlife species as a result of the Project. Direct effects to wildlife are the result of construction activities that displace wildlife because of noise, ground disturbance or other disruptions. Indirect effects are those effects that may occur after construction is complete and the project is in place.

Direct effects could include:

- Direct habitat modification and reduction associated with construction clearing or grading;
- Disturbance to raptor nests (excluding bald and golden eagle nests) during the breeding season;
- Introduction of sediment and fugitive dust through erosion and runoff during construction;
- Potential for displacement during construction of ground nesting birds, such as sharp-tailed grouse, from lekking areas, particularly where the Project ROW crosses near Prophets Mountain in Sheridan County.
- Exposure to contaminants from fuels and chemicals that are used during construction and operation; and
- Injury or mortality associated with collisions with construction equipment and/or overhead transmission lines. Collisions are discussed in more detail below.

The two raptor nests occurring within the Project ROW would be impacted by ROW clearing activities. Preconstruction surveys would occur to determine if the nests are being actively used.

Raptors, waterfowl, and other bird species may be affected by the construction and placement of the Project facilities. Avian collisions are a possibility after the completion of the transmission line. Waterfowl may be susceptible to transmission line collision, especially if the line is placed between agricultural fields that serve as feeding areas, or between wetlands and open water, which serve as resting areas. The transmission line shield wire is the part of the structure that is most likely to be involved in an avian collision. Avian collisions are considered important for whooping crane migration, especially in the western half of the Project ROW. Whooping cranes are discussed in Section 5.16.

Indirect effects could include:

- Habitat disturbances that result in habitat fragmentation and/or species crowding in adjacent habitat, interfering with behavior and/or migration;
- Introduction of invasive vegetation that could change on-site habitat conditions; and
- Interference with behavior or migration from noise created by construction and human activity.

5.15.3 Mitigation

Minnkota will use the following methods to address avian and other wildlife issues associated with the transmission line:

- Will continue to work with the USFWS and RUS to identify areas where both of the transmission line shield wires should be marked. As noted in Section 5.16, both of the shield wires will be marked in an alternating pattern, as appropriate, to mitigate for sections of the Project Route near suitable whooping crane habitat within the whooping crane migration corridor.
- The transmission line will be designed following the Avian Power Line Interaction Committee's (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* and *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*.
- Preconstruction surveys of the ROW and associated facilities for wetlands and woodlands will be completed to minimize impacts to wildlife habitat.
- To discourage active nesting within temporary or permanent Project disturbance areas, tree removal, ground clearing, or mowing will occur in late fall or early spring to discourage tree and ground nesting.
- If areas are not cleared in early spring before the breeding season, a qualified biologist will survey the Project ROW for active nests of protected species and provide a construction buffer of the nest.
- Construction will occur after the lekking season or when birds are not present on the lekking grounds. Surveys of known lekking areas will be conducted to determine the presences or absences of birds.
- Minnkota will work with the NDGF on the two raptor nest locations that may be removed.
- In case of permanent jurisdictional wetland impacts, any unavoidable loss of jurisdictional wetland habitat will be replaced with functionally equivalent wetlands, as required by applicable permits.
- Appropriate erosion and sediment control measures will be installed and maintained to reduce sediment transport to adjacent wetlands, streams, and river channels.
- If impacted, per the Commission's requirements, trees will be replaced at a 2:1 ratio outside the Project ROW, subject to landowner approval.
- Avoid refueling vehicles within 100 feet of a waterway's edge to minimize the potential for hazardous-materials spills reaching the waterway.
- Prompt restoration and re-vegetation of disturbed areas.
- Use native plant seed stock for re-vegetation.

The Project is not expected to result in the listing of or jeopardizing the continued existence of any wildlife species, and will not violate any wildlife protection law, including the Migratory Bird Treaty Act.

5.16 Rare and Unique Natural Resources

5.16.1 Description of Resources

The Endangered Species Act (ESA) of 1973, as amended, provides for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend. Section 7 of the ESA requires federal agencies to insure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species, or to modify their critical habitat. The RUS has developed a draft Biological Assessment (BA) to support their efforts to meet their responsibilities under Section 7(a) of the ESA. Through review of the BA, the RUS will make a determination of whether the Project will or will not affect a listed species or adversely modify critical habitat. Minnkota continues to consult with USFWS and RUS.

Federally threatened species are those species likely to become endangered within the foreseeable future throughout all or a significant portion of their range. Federally endangered species are those species already in danger of extinction throughout all, or a significant portion of, their range. Designated critical habitat is a specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection. **Table 5.16-1** summarizes federally listed species and critical habitat that may occur within the Project ROW (USFWS 2009 and 2011).

Table 5.16-1. Federally Listed Species and Critical Habitat by Counties that are Crossed by Project ROW

Species	Type	County Occurrences	Preferred Habitat	Habitat Present in Project ROW
Endangered				
Interior least tern (*Sterna antillarum*):	Bird	Burleigh, McLean, Oliver	Nests along midstream sandbars of the Missouri and Yellowstone rivers.	Yes, Missouri River
Whooping crane (*Grus americana*)	Bird	All	Migrates through North Dakota during spring and fall. Prefers to roost in wetlands and stock dams with good visibility (i.e., no or minimal woody debris within wetland or on wetland fringe).	Yes
Pallid sturgeon (*Scaphirhynchus albus*)	Fish	Burleigh, McLean, Oliver	Known only in the Missouri and Yellowstone rivers. No reproduction has been documented in 15 years.	Yes, Missouri River
Gray wolf (*Canis lupus*)	Mammal	McLean, Oliver	Occasional visitor in North Dakota. Most frequently observed in the Turtle Mountains area of northern North Dakota.	No, Project greater than 75 miles from Turtle Mountains
Black-footed ferret (*Mustela nigripes*)	Mammal	Oliver	Exclusively associated with prairie dog towns. No records of occurrence in recent years, although there is potential for reintroduction in the future.	No, large prairie dog towns capable of sustaining a ferret population are not present within the Project ROW
Threatened				
Piping plover (*Charadrius melodus*)	Bird	Burleigh, Eddy, Foster, McLean, Oliver, Sheridan, Wells	Nests on midstream sandbars of the Missouri and Yellowstone rivers and along shorelines of saline wetlands.	Yes, Missouri River

Species	Type	County Occurrences	Preferred Habitat	Habitat Present in Project ROW
Designated Critical Habitat				
Piping plover (*Charadrius melodus*)	Bird	Burleigh, Eddy, McLean, Oliver, Sheridan	Missouri River - Critical habitat includes sparsely vegetated channel sandbars, sand and gravel beaches on islands, temporary pools on sandbars and islands, and the interface with the river. Alkali Lakes and Wetlands – Critical Habitat includes: (1) shallow, seasonally to permanently flooded, mixosaline to hypersaline wetlands with sandy to gravelly, sparsely vegetated beaches, salt-encrusted mud flats, and/or gravelly salt flats; (2) springs and fens along edges of alkali lakes and wetlands; and (3) adjacent uplands 200 feet above the high water mark of the alkali lake or wetland.	Yes, at Missouri River crossing; Crossing a nesting sandbar; No designated alkali lake or wetlands within Project ROW
Delisted				
Bald eagle (*Haliaeetus leucocephalus*)	Bird	Possible in all counties crossed by Project ROW	The bald eagle has been recently delisted from the ESA. However, the bald eagle is still protected by other federal laws including: the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act.	Possible; aerial surveys conducted on March 2010 documented one eagle nest in Eddy County about 1,200 feet south of Project ROW (Minnkota 2010b)

Source: NDPR 2011 and USFWS Endangered Species Program 5/3/10

Table 5.16-2 provides the number of occurrences of federally listed species within and near the Project ROW. The species occurrences within 1 mile of the ROW represent past observations of piping plover and interior least tern along the Missouri River. USFWS has indicated that the ROW crosses one historic nesting sandbar in the Missouri River of piping plover and interior least tern. Confirmed whooping crane migration sightings are scattered throughout the west half of the Project ROW, from about the City of Carrington westward.

Table 5.16-2. Number of Federally Listed Species Occurrences within and near the Project ROW

Species Occurrences	Number Within ROW	Number Within 1 Mile of ROW
NDPR T&E Occurrences	0	4
Whooping Crane Sightings	0	2
Total T&E Species Observations	0	6

Source: NDPR 2011 and USFWS Endangered Species Program 5/3/10

Table 5.16-3 summarizes the number of bald eagles that were observed within or near the Project ROW during aerial surveys conducted from March 29-30, 2010.

Table 5.16-3. Number of Bald Eagle Nests and Observations within or near the Project ROW

Observations	Number Within ROW	Number Within 1 Mile of ROW
Bald Eagles (Soaring)	0	0
Bald Eagles (Perched)	0	10
Total Bald Eagles Observed	0	10

Source: Minnkota 2010b.

An active bald eagle nest was observed approximately 1,200 feet south of the Project ROW in Eddy County. Most of the bald eagle observations occurred near the central portion of the Project ROW, within Foster, Eddy, and Wells counties (Minnkota 2010b).

5.16.2 Impacts

Due to the linear nature of the Project Route, potential impacts to terrestrial species habitat will be limited to the area within the Project ROW. Long-term permanent habitat impacts will occur at structure locations, Center 345 kV Substation, and fiber optic station locations. Where tree clearing is required, short-term impacts would occur within the Project ROW. Existing, adjacent habitat will be left undisturbed.

Table 5.16-4 summarizes potential impacts to federally listed species and critical habitat. Species with potential impacts are discussed in more detail in this section.

Table 5.16-4. Adverse Impacts to Federally Listed Species and Critical Habitat

Species	Type	Direct Impact Anticipated	Indirect Impact Anticipated	Comment
Endangered				
Interior least tern (*Sterna antillarum*):	Bird	No	No	Route spans historic nesting sandbars; line will be marked with bird flight diverters where suitable habitat is present
Whooping crane (*Grus americana*)	Bird	Possible	Possible	Route runs perpendicular to the migration corridor and includes potential whooping crane stopover habitat; line will be marked with bird flight diverters where suitable habitat is present
Pallid sturgeon *(Scaphirhynchus albus*)	Fish	No	No	No impacts to the Missouri River are expected
Gray wolf (*Canis lupus*)	Mammal	No	No	Greater than 75 miles from Turtle Mountains, an area that is occasionally used by gray wolf
Black-footed ferret (*Mustela nigripes*)	Mammal	No	No	No known populations in North Dakota; Route does not cross any known potential habitat (prairie dog towns)
Threatened				
Piping plover (*Charadrius melodus*)	Bird	No	No	Route spans historic nesting sandbars; line will be marked with bird flight diverters where suitable habitat is present

Species	Type	Direct Impact Anticipated	Indirect Impact Anticipated	Comment
Designated Critical Habitat				
Piping plover (*Charadrius melodus*)	Bird	No	No	The Missouri River sandbars, which is designated critical habitat, will be spanned by the transmission line; line will be marked with bird flight diverters where suitable habitat is present
Delisted				
Bald eagle (*Haliaeetus leucocephalus*)	Bird	No	No	No eagle nests will be impacted by the Project; transmission line will meet APLIC guidelines

Interior Least Tern

The Project Route spans the Missouri River across an historic nesting grounds sandbar. Aerial photography from 2009 indicates that sandbars are still present at these locations.

A direct impact to interior least tern could occur in the event of a collision with the transmission line. While typical flight height information is not readily available, it is documented that, when searching for prey, interior least terns hover about 3 to 33 feet above water, which is lower than the expected height of the transmission line (Thompson et al. 1997). As such, direct impacts due to collision with the transmission line during feeding forays would be unlikely. Little information is available that establishes flight heights during local movements or migration for the least tern. However, several generalizations about avian migration flight characteristics can be inferred from published literature and may aid in assessing collision risk for migratory least terns.

Most birds migrate during periods of good weather and geographic features such as rivers or mountain ranges are used by birds to orient themselves during migration. Flight heights tend to be higher for migrating birds at night or with tailwinds than during daylight hours or with a headwind (Curry and Kerlinger 2004, Scanlon et al. 2010, Dolbeer 2006). Given these generalizations about avian migration, there may be an increased risk to least terns during the spring migration when the prevailing winds are from the north/northwest and during daytime hours. Static wires on the new transmission line would be marked with avian flight diverters in an alternating pattern near suitable habitat. Transmission conductor wires that will be used at the Missouri River crossing have an outside diameter of 1.38 inches, which is a thicker diameter than normal conductor wires and will be easier for birds to see during daylight movements. Helicopters will be employed to string transmission lines across the Missouri River after breeding season (construction anticipated from November and March), therefore no construction activity will occur within the Missouri River.

Structure locations would be designed to avoid direct impacts to nesting habitat and are designed to be 150 feet back from the river's bank. Minnkota proposes to cross the Missouri River in one span. Therefore, no structures would be placed within the Missouri River or its sandbars. In addition, Minnkota proposes to cross the Missouri River near the existing HVDC transmission line. During construction, no equipment will be located within the Missouri River. The Project would not cause a loss, fragmentation, or modification of sandbar habitat.

Fiber optic and regeneration stations will be located in upland habitats away from the Missouri River and will not impact or modify sandbar habitat.

The timing of construction at the Missouri River would be restricted such that construction activities would not be allowed during the nesting season from April 1 through August 15. To avoid potential impacts related to construction activities, construction at the Missouri River is anticipated to occur between November and March. Because construction at the Missouri River will occur after August 15, no direct effects due to construction are anticipated.

Whooping Crane

This region of North Dakota crossed by the Project ROW has seen conversion of native prairie and wetlands into agricultural land use beginning with 19th-century settlement, negatively impacting the quality and quantity of migration stopover habitat for numerous migratory birds. Construction of roads, increased urban and industrial developments, and utility lines, which are all associated with human disturbance, have negatively affected whooping cranes and migration habitat.

Potential direct effects to whooping cranes include mortality associated with collisions and permanent loss of habitat. According to the USFWS, collisions with power lines are the greatest known source of mortality for fledged whooping cranes. Specifically Stehn and Wassenich (2007) stated that shield wires are the wires most often struck by birds in flight. During discussions, the USFWS has commented that a new transmission line has the potential to affect whooping cranes during their annual spring and fall migration through North Dakota (Ellsworth, pers. comm. 2010). According to Stehn and Wassenich (2007), whooping cranes are susceptible to collisions because of their large body size and wing span, slower wing beat, and relative lack of maneuverability with juveniles being more vulnerable to collisions than adults. The Project ROW crosses perpendicularly to the east half of the whooping crane migration corridor (refer to **Figure 12**). The western terminus of the transmission line is located within the center (50th percentile band) of the whooping crane migration corridor. Migrating cranes are most vulnerable to collisions in the early morning or late evening when light levels are diminished, as they fly at very low altitudes between roost and foraging sites, or when flying at low altitude when starting or ending a migration flight, especially when thermal currents are minimal. Stehn and Wassenich (2007) thought that power lines dividing roosting wetlands from feeding areas caused the most collisions for cranes because these circumstances encouraged crossing the lines at low altitude several times each day.

Short-term direct impacts could occur in the event that a whooping crane is displaced from available stopover habitat during Project construction. Long-term direct impact could occur in the event that installation of a new transmission line causes displacement from local stopover habitat.

Stehn and Wassenich (2007) stated that whooping cranes responded to marked lines and tried to avoid the lines. Minnkota proposes to mark both transmission line shield wires in an alternating pattern with bird-flight-diverter-type visual marking devices, as follows:

- Bird-flight-diverters will be installed at locations where the Project Route is within 1.0 mile of suitable habitat. A survey for suitable habitat has been completed.
- Both shield wires will be marked with swan type diverters.
- Diverters will be spaced 100 feet apart on each wire, marking will be staggered such that they appear to be 50 feet apart. The mid 70% of the span will be marked.

- Minnkota will provide the USFWS with a written confirmation that the shield wires were marked as well as the location of markers.

The primary indirect effect is the potential for complete avoidance by whooping cranes of the stopover habitat located near the proposed transmission line. Loss of migration habitat is a growing concern regarding the Aransas-Wood Buffalo whooping crane population. Searching for suitable stopover habitat may cause increased exposure to hazards as birds are required to fly low for longer distances. The increased disturbance could also place the cranes at greater risk of exposure to other hazards encountered during migration such as structures, incidental hunting, disease, and predation.

Piping Plover

The Project Route spans the Missouri River over an historic nesting grounds sandbar. Aerial photography from 2009 indicates that sandbar is still present at these locations. The Project Route that crosses the Missouri River is located within the Missouri River critical habitat (**Figure 12**).

A direct impact to piping plover could occur in the event of a collision with the transmission line. While typical flight height information is not readily available, at times piping plovers walk or run rather than fly, because their inconspicuous sand-colored plumage makes them more difficult to see on the ground than if they flew and exposed their bright white underbody (Elliott-Smith et al. 2004). However, trading flights between nesting and foraging locations along the Missouri River do occur.

Little information is available that establishes flight heights during local movements or migration for the piping plover. Generalized information on flight heights of shorebirds during migration suggest that the piping plover would migrate between 1,000 and 13,000 feet in elevation (Smithsonian 1998), which is well above the transmission line height. Flight heights tend to be higher for migrating birds at night or with tailwinds than during daylight hours or with a headwind (Curry and Kerlinger 2004, Scanlon et al. 2010, Dolbeer 2006). Given these generalizations about avian migration, there may be an increased risk to piping plovers during spring migration when the prevailing winds are from the north/northwest and during daytime hours.

Potential impacts for piping plover are the same as those identified for the interior least turn and include potential collision, potential for impacts to nesting habitat, and potential disruption during nesting. The Project Route will not place structures within known nesting habit or designated critical habitat. The timing of construction at the Missouri River would be restricted such that construction activities would not be allowed during the nesting season from April 1 through August 15. To avoid potential impacts related to construction activities, construction at the Missouri River is anticipated to occur between November and March. Since piping plovers may use alkali wetland habitats for nesting, Minnkota proposes to conduct pre-construction surveys for active nesting piping plovers within the ROW. If active nesting areas are identified during the surveys, Minnkota proposes to maintain a 0.5-mile buffer from active piping plover nesting areas. These areas may be identified outside of the Missouri River channel, in isolated waterbodies, or in designated critical habitat. Because construction at the Missouri River will occur after August 15; Minnkota proposes a 0.5-mile buffer of active nesting areas within the Project ROW. Therefore, no indirect effects due to construction are anticipated.

Pallid Sturgeon

The Project Route crosses the Missouri River, which is habitat for the pallid sturgeon. The Project Route would span the Missouri River and no construction will occur within the Missouri River.. Minnkota proposes to place structures about 150 feet away from the river's existing bank to account for river flows that have the potential to erode the river's bank. No structures will be placed within the river channel. Helicopters will be employed to string transmission line wires across the Missouri River. No barges or boats will be used during construction, therefore propeller strikes to the pallid sturgeon are not anticipated and disturbance and displacement of the sturgeon during construction is anticipated to be minimal. No direct impacts are anticipated to the pallid sturgeon due to construction or operation of the transmission line.

The Project would utilize BMPs that would limit indirect impacts from sedimentation and erosion during construction, such as silt fence, straw bales, and revegetation. The Project would not change water temperature of the river. Minnkota would not refuel vehicles within 100 feet of the river's edge to minimize the potential for hazardous-materials spills reaching the river. No indirect impacts are anticipated to the pallid sturgeon due to construction or operation of the transmission line.

Gray Wolf

While the gray wolf may pass through the Project ROW, but viable gray wolf habitat does not occur in the Project ROW. It is unlikely that gray wolves would be present during construction and operation, with the possible exception of an occasional transient animal. If gray wolves enter the Project ROW during construction they could be struck by vehicles, but the chance of collisions is considered negligible, particularly since posted speed limits would be very low.

The Project Route would not have indirect effects on the gray wolf. In general, the Project vicinity and North Dakota do not provide suitable habitat for establishment of a viable wolf population. Any wolves that have occurred or may occur in the Project vicinity are rare, dispersing individuals from the core population in Minnesota, well to the east of the Project Route.

Black-Footed Ferret

Generally, the black-footed ferret population is susceptible to permanent loss of habitat, eradication of prairie dog towns (food source) and predation from raptors. Potential black-footed ferret reintroduction habitat may occur in portions of Oliver County. No records of black-footed ferret occurrences within the Project ROW have been documented in recent years and there are no reintroduced populations near the Project Route. The Project ROW does not cross any known prairie dog town that may be a potential food source for the black-footed ferret. In addition, Minnkota will design their structures per APLIC guidelines that will reduce the ability of raptors to perch on the structures. This may reduce the opportunities for raptors to perch on the structures to prey on the black-footed ferret, if a population was reintroduced to the Project ROW. No direct or indirect impacts are anticipated to the black-footed ferret due to construction or operation of a transmission line within the Project ROW.

Piping Plover Critical Habitat

The Project Route crosses the Missouri River, which is designated piping plover critical habitat. No direct or indirect impacts to critical habitat (sandbars) are expected as the transmission line will span the Missouri River. Line marking devices will be installed at this location to minimize the potential for collision with the transmission line.

5.16.3 Mitigation

Mitigation and minimization measures are expected to include:

- Designing and siting the Project Route according to APLIC guidelines for minimization of electrocution and collision.
- Marking both shield wires of the transmission line in an alternating pattern with bird-flight-diverters within 1 mile of suitable whooping crane habitat.
- Avoiding designated piping plover critical habitat at the Lake Williams area.
- Constructing the Missouri River crossing outside of the breeding and fledgling season for the interior least tern and piping plover. The USFWS reports that the breeding season for both species lasts from about April 1 through August 15.
- Conducting pre-construction surveys for active piping plover nesting areas within the ROW. If active nesting areas are identified during the surveys that are outside the Missouri River and designated critical habitat, Minnkota proposes to maintain a 0.5-mile buffer of the active piping plover nesting areas.
- Utilizing a three pole structure for the Missouri River span, which reduces the number of wire planes. The proposed structure will have two planes of wires – one (top) plane for the shield wires and a second (lower) plane for the conductors.
- Using a helicopter to string wires across the Missouri River, so that no construction equipment will be within the Missouri River.
- Avoiding placing structures within the Missouri River channel or on sandbars of the Missouri River where interior least tern and piping plover nesting could occur.
- Maintaining a distance of at least 330 feet from active eagle nests, or 660 feet if the activity will be visible from the nest.
- Avoiding direct impacts to wetlands, prairie, wooded draws or other sensitive habitat areas whenever feasible.
- Conducting tree and shrub clearing in the fall and winter prior to the nesting season. If clearing is not completed in the fall or winter before the breeding season, a qualified biologist would conduct surveys for active nesting birds prior to construction and provide a construction buffer.
- Replacing trees at a 2:1 mitigation ratio outside the Project ROW, per the Commission's requirements and subject to landowner approval.
- Avoid refueling vehicles within 100 feet of a waterway's edge to minimize the potential for hazardous materials spills reaching the waterway.
- Throughout the Project, Minnkota will utilize BMPs that will limit indirect impacts from sedimentation and erosion during construction, such as silt fence, straw bales, and revegetation.

5.17 Summary of Route Impacts

Table 5.17-1 summarizes temporary and permanent impacts to the resources discussed in Chapter 5. **Table 5.17-2** summarizes the appropriate mitigation for resources that will be impacted as a result Project construction.

Table 5.17-1. Summary of Project ROW

Resource		ROW	
Project Facility	Total Length (miles)	250	
	Total ROW Acres	4,544	
	Number of Structures	1,335	
Impact Acres	Acres of Temporary Impact	1,021	
	Acres of Permanent Impact	3.4	
	Acres of Woodland Conversion	47	
Homes	Count within 500 ft of the Transmission Facility	10 – Occupied 1 – Vacant, no habitable	
Wetlands	Acres of Desktop and Field Reviewed Wetlands in the Project ROW	543	
	Wetland Impact	Temporary	Permanent
		110 ac	2,256 sq ft
Land Cover	Impact Acres	Temporary	Permanent
	Cropland	534.8	5.7
	Shrubland	183.0	0.3
	Pasture	180.6	0.8
	Prairie	158.0	0.5
	Woodland	0	47.0
	Wetland	78.0	0.2
	Developed	19.5	0.0
	Barren/Sparse Vegetation	1.1	0.0
Resource Areas	Managed Resource Areas affected by the Project	Two - Wilbur Boldt WMA - Chain of Lakes Recreation Area	
Cultural	Archaeological Resources in ROW	- 21 sites in ROW - 9 structures within 4 sites - No impacts anticipated	

Resource		ROW
	Architectural Properties in Architectural APE	- 36 architectural resources identified within the Architectural APE - 10 eligible structures within the Architectural APE - 1 structure will be visually impacted, but the impact will be mitigated through screening
Species	Federally Listed Species within ROW	0
	Federally Listed Species within 1 mile	6
	Sensitive Species within ROW (nests)	2
	Sensitive Species within 1 mile (including NHI, leks, nests, and bald eagles)	54
Infrastructure	Center Pivot Irrigation within ROW	0
	Communication Tower within ROW	0
	Airports within 1 Mile of Route Centerline	1

Table 5.17-2. Mitigation Summary

Resource	Impact	Mitigation
Demographics	Socioeconomic impacts are primarily positive due to increased expenditures during construction and the long term benefits of an increased tax base of the county due to transmission line tax. A nominal amount of land would be permanently removed from production due to the construction of the Project. The Project is not anticipated to result in an economic or social hardship to minority or low-income populations. A concern of residents living near existing or proposed transmission lines is how proximity to the line could affect the value of their property.	The Project is not expected to have negative economic impacts on local and regional economies. As such, no mitigation measures are proposed to address the socioeconomic impacts. The payments of taxes to the state, then allocated to the counties in which the transmission line and associated infrastructure are located, will have a positive impact. Easement payments to landowners will compensate landowners for the utility easement on their property.
Land Use	Approximately 5.7 acres of agricultural cropland (includes 4.2 acres of Restricted Tillage Area) will be permanently impacted due to the construction of the transmission line. The existing land use is primarily agricultural and would remain in agricultural use since the land under or adjacent to the line can still be used by the landowner. 10 occupied homes and 1 vacant, not habitable home within 500 of transmission facility. One cemetery will be spanned by the Project Route and Minnkota has obtained	Minnkota is working with landowners and regulatory agencies to minimize impacts of the Project. To minimize impacts to landowners, Minnkota has agreed to the following mitigation measures: -The exact location of structure sites, the Route, and other disturbed areas will be determined with landowner input, to the extent practicable. -The minimum area necessary will be disturbed. -Construction activities will be limited to the ROW, unless permission to access adjacent

Resource	Impact	Mitigation
	an overhang easement.	property is obtained from the landowner(s). -Landowner compensation will be established by individual easements. -Landowners will be compensated for crop damage caused by construction or operation and maintenance activities. -Minnkota will obtain a waiver of the 500 ft setback
Public Services	No impacts are anticipated.	Proper safeguards will be implemented for construction and operation of the facility. The Project will have a positive effect on public services by providing improved reliability and capacity to meet the growing demands for electrical service in the Project Vicinity.
Human Health and Safety	At levels associated with high-voltage transmission lines, the Project will not have regular, temporary interference with implantable medical devices. No other EMF-related impacts to humans or animals are anticipated. There are no anticipated induced voltage or stray voltage impacts expected as a result of the construction or operation of the Project. No impacts to air quality due to the operation of the transmission line are anticipated.	Minnkota does not anticipate any affects to human health or safety; thus it is not anticipated that any mitigation will be necessary. Following construction, BMPs will be used to control fugitive dust during construction, including operating vehicles at reduced speeds and use of water and dust abatement methods.
Noise	Homes near the Project Route may experience short-term elevated noise levels and increased vehicle traffic during construction. However, no noise impacts are anticipated during Project operation. The closest home to the Project Route (49 feet) is Minnkota owned. The closest occupied structure to the Center Substation is about 5,380 feet away; the closest occupied structure to the Prairie Substation is about 2,880 feet away. No impacts to noise sensitive land uses are anticipated.	No long-term noise impacts are anticipated, thus, no mitigation will be necessary. Construction activities will generate noise that is short-term and intermittent. Noise impacts associated with construction will be mitigated in noise sensitive areas by limiting the hours of work to daytime hours. Heavy equipment used in construction will be equipped with sound attenuation devices, such as mufflers, to minimize the daytime noise levels.
Visual	The transmission line would be evident to individuals traveling on adjacent roads as well as residences and landowners that live in close proximity to the transmission line and substations.	The Project Route minimizes the number of residences potentially impacted by the line. Minnkota routed the Project along field lines away from residences to the extent practicable. The Project utilizes single pole, self weathering structures.
Cultural and Archaeological	No impacts to archaeological sites are anticipated. One architectural property will be visually impacted.	Cultural and archaeological surveys will be completed prior to construction, Minnkota will follow steps outlined in a PA to determine eligibility and mitigation of adverse effects. The architectural property will be mitigated through screening as documented in a Treatment Plan that is under review.

Resource	Impact	Mitigation
Recreation Resources	Impacts to recreational resources are primarily visual, and limited to individuals using the resources. The Wilbur Boldt WMA will be spanned by the Project. One structure will be located within the Chain of Lakes Recreation Area (McClusky Canal). The Project Route will span three trails. PLOTS parcels and USFWS easements will be crossed by the Project Route.	Minnkota will route the transmission line along field breaks and section lines to avoid state and federal managed lands. Visual impacts will be minimized by placement of structures away from these features to the extent possible. Access to trails, PLOTS, and USFWS easements will be maintained and recreational activity may continue. Minnkota will obtain appropriate approvals and permits.
Land Based Economies	The permanent agricultural cropland that will be converted due to the Project will be approximately 5.7 acres (includes Restricted Tillage Area).	Minnkota will work with landowners to minimize impacts to all farming and grazing operations along the Project Route. In the event that Minnkota encounters drain tile not previously identified by the landowner, Minnkota will work with landowner to repair the tile so that its function is restored.
Soils	Approximately 1,021 acres of temporary impacts and about 3 acres of permanent impacts are anticipated.	BMPs for erosion and sediment control will be utilized to minimize wind and water erosion along the route. Only land needed for the transmission line structures will be permanently impacted. Temporarily disturbed areas that are not cultivated will be revegetated.
Geologic and Groundwater Resources	No impacts to geologic and groundwater resources are anticipated.	No mitigation measures are necessary.
Surface Water and Floodplain Resources	No direct impacts are anticipated to rivers, streams, or drainageways. About 0.1 acres (5,174 sq ft) of floodplain will be permanently impacted.	To minimize indirect impacts during construction an NPDES permit and SWPPP will be prepared and submitted to the North Dakota Department of Health. Minnkota will span all rivers and streams to the extent practicable. Minnkota will apply for the appropriate approvals for floodplain impacts. No structures will be placed within a regulatory floodway.
Wetlands	Preliminary structure locations indicate 2,256 square feet (0.03 ac) of permanent wetland impacts.	Minnkota will work with the USACE and USFWS to initiate the permitting process and to identify appropriate mitigation, if necessary.
Vegetation	A total of approximately 5.7 acres (including Restricted Tillage Area) of cropland will be permanently impacted by the transmission line construction and up to 47 acres of woodland will be converted to shrubland or grassland. A total of about 6.6 acres of impaired or vulnerable terrestrial communities will be permanently impacted by the Project Route.	Minnkota will use BMPs during construction and operation to minimize impacts. Impacts to individual trees or shrubs would be replaced at a ratio of 2:1 outside the Project ROW. Temporarily disturbed areas will be reseeded.

Resource	Impact	Mitigation
Wildlife	Impacts to wildlife populations are expected to be minimal. The potential for avian collisions with the Project Route exists.	A variety of mitigation measures would be implemented, as discussed in Section 5.15.3. Some examples of wildlife mitigation measures include continued consultation with USFWS, designing the transmission line following APLIC standards, conducting preconstruction wetland and woodland surveys, and implementing erosion control measures.
Rare and Unique Natural Resources	Impacts to rare and unique natural resources are not anticipated.	Minnkota has committed to marking of both shield wires in an alternating pattern in select areas, designed the Project per APLIC guidelines, and will schedule construction in specific areas in accordance with USFWS recommendations.

6.0 Identification of Permits/Approvals

Minnkota is required to obtain approvals from a variety of federal, state, and local agencies prior to constructing the Project. Agencies with primary approval/permitting authority include RUS and the Commission. **Table 6.0-1** identifies permits, approvals, and other project coordination that may be needed with federal agencies, tribal governments, State of North Dakota, counties, and townships. This listing of regulatory requirements is subject to change as Project development continues. In addition, Minnkota's continued public and agency coordination is outlined in Appendix G.

Table 6.0-1. Potential Required Permits and Approvals

Agency	Type of Permit, Regulatory Compliance, or Coordination	Need
Federal		
Rural Utilities Service	Approval of Financial Assistance	Approval of Financial Assistance
	NEPA Compliance, Finding of No Significant Impact	Provide final decision for Environmental Assessment
	Section 7 of the Endangered Species Act	Finalize consultation with USFWS
	Section 106 of the National Historic Preservation Act Coordination	Implement Programmatic Agreement
	Native American Consultation	Implement Programmatic Agreement
U.S. Fish and Wildlife Service	Section 7 of the Endangered Species Act, Migratory Bird Treaty Act of 1918, and Bald and Golden Eagle Protection Act of 1972	Section 7 Consultation under NEPA for Special Use Permit
	Special Use Permit (SUP) and Compatibility Determination	If construction in wetlands within wetland easements or in grassland easements, then compatibility analysis is required. Special Use Permit needed if temporary disturbance to land subject to a grassland easement or wetland subject to a wetland easement.
U.S. Army Corps of Engineers	Section 404 of the Clean Water Act	Nationwide Permit 12 required for dredging or fill in jurisdictional waters of the United States for utility line projects.
	Section 10 of the Rivers and Harbors Act of 1899	Section 10 Permit - Letter of Permission required for the Missouri River crossing.
	Pre-Construction Notification	Pre-Construction Notification need for the Nationwide Permit 12 and Section 10 Letter of Permission
Federal Aviation Administration	FAA Form 7460-1, Notice of Proposed Construction or Alteration	The FAA must confirm that construction of the Project does not constitute a hazard to air navigation.
	FAA Form 7460-2 - Notice of Actual Construction or Alteration	Notifies FAA of actual constructed or altered structures.

Agency	Type of Permit, Regulatory Compliance, or Coordination	Need
	FAA Form 7461-1, Notice of Proposed Construction Hazard Determination	Notifies FAA of structures that might affect navigable airspace. Form requires proposed markings and lighting. FAA must review possible impacts to air safety and navigation, as well as the potential for adverse effects on radar systems.
Department of Agriculture – Natural Resources Conservation Service	Farmland Conversion Form - Form AD-1006	Farmland conversion impact rating.
Environmental Protection Agency	Spill Prevention Control and Countermeasure (SPCC) Plan	Required if the substation facility has greater than 1,320 gallons of oil. Current SPCC Plans will be revised as necessary. A copy of the plan will be maintained on file with the substation's owner/operator and will be reviewed by the certifying engineer every five years.
U.S. Department of the Interior - Bureau of Reclamation	Special Use Permit (SUP)	Needed for structures located within the Chain of Lakes Recreation Area and McClusky Canal lands in Sheridan County.
State		
Public Service Commission	Certificate of Corridor Compatibility	Required prior to construction of a transmission facility; designates corridor within which a route may be located.
	Route Permit	Required prior to construction of a transmission facility; designates route location within approved corridor.
Department of Health	Section 401 Water Quality Certification	Required for fill in jurisdictional waters of the United States.
	NPDES Permit: General Construction Storm Water	Required for disturbance of over 1 acre of land. Must prepare a SWPPP.
Division of Emergency Management	Emergency Planning and Community Right-to-Know Act (EPCRA) Tier II report	Required for owner/operators of facilities containing hazardous materials. A copy of the report must be filed annually by March 1st.
Parks and Recreation	Natural Heritage Inventory	Compliance with NDCC § 20.1-02-05 – Management programs have been established for protection of threatened and endangered species in North Dakota. North Dakota does not have a list of threatened and endangered species.

Agency	Type of Permit, Regulatory Compliance, or Coordination	Need
State Water Commission – Office of State Engineer	State Sovereign Lands Permit	If a project's proposed construction activities could impact an island or bed of a navigable water or stream, a Sovereign Lands Permit must be obtained from the North Dakota State Water Commission, Office of the State Engineer.
	Conditional Water Permit	Water appropriation.
State Historical Society	Section 106 of the National Historic Preservation Act Coordination	Compliance with NDCC §§ 55-03-01 and 55-03-01.1 and consultation under Section 106 of the NHPA is required for projects considered a federal undertaking (i.e., federal funding, USACE).
	Permit to Investigate Effects on Cultural Resources	Compliance with NDCC Ch 55-03 to assess the potential project effects to cultural resources.
North Dakota Highway Patrol	Overheight/Overweight Permit	Permit required for hauling construction equipment and materials on state highways. Contractors will obtain as necessary.
State Land Department	Right-of-Way Permit	Permit to obtain an easement on a state surface tract.
Department of Transportation	Road Approach/Access Permit	Permit required for construction of access roads from state highways.
	Utility Permit/Risk Management Documents	Permit required for utility crossings on state highway ROW.
Local		
Counties – Burleigh, Eddy (some townships also require permits), Foster (one township requires permit), Griggs, McLean, Oliver, Sheridan (one township requires permit), Steele, Nelson	Conditional Use Permits (See Appendix G)	Permit may be required for project construction depending on zoning regulations.
	Building Permit	Permit may be required for substation construction and generation outlet line.
	Haul Road Agreement	Permit may be required for hauling construction equipment and materials on county roads.
	Utility Permit	Permit required for utility crossings on county road ROW.
Grand Forks County	Floodplain approval	Elevation certificates are required for any building in the floodplain

Agency	Type of Permit, Regulatory Compliance, or Coordination	Need
Townships – Painted Woods Twp and Wilson Twp – Burleigh Co. Addie Twp – Griggs Co. Sharon Twp and Franklin Twp. – Steele Co. Fairfield Twp, Logan Twp and Loretta Twp – Grand Forks Co.	Conditional Use Permits (See Appendix G)	Permit may be required for project construction depending on zoning regulations.
Cities	Building Permit	Permit required if construction within municipal boundary.
Miscellaneous		
Railway Companies	Temporary Occupancy Permit	Required for any work within railroad ROW.
	Wire Line Crossing or Longitudinal Communication and Electric Permit	Required for locations where Project crosses or is within railroad ROW.
Pipeline Companies	Utility Crossing Permit	Permit required to cross existing pipeline facilities.
Transmission Line Utility Companies	Utility Crossing Permission	Permit required to cross existing transmission facilities.

7.0 Factors Considered

Section 49-22-09 of the North Dakota Century Code (within the North Dakota Energy Conversion and Transmission Facility Siting Act) lists 11 factors to guide the Commission in evaluation of a route. In addition, Minnkota's continued public and agency coordination is outlined in Appendix G.

7.1 Public Health and Welfare, Natural Resources, and the Environment

Section 5.0 discusses the research and investigations relating to the effects of the proposed facility on public health and welfare, natural resources, and the environment. The effects and mitigation in relation to the Project Route are discussed under the impacts and mitigation subheadings within Section 5.0. Minnkota took into consideration public, agency, and tribal input and concerns when selecting the Project Route. Minnkota will minimize impacts to landowners, agricultural practices, the Missouri River crossing, cultural resources, wildlife, and environmental features.

7.2 Technologies to Minimize Adverse Environmental Effects

Minnkota will utilize the most current technologies that minimize impacts to the environment. The structures proposed for the Project are the most appropriate technologies to minimize adverse environmental effects. In addition, utilizing existing substation minimizes adverse environmental effects.

7.3 Potential for Beneficial Uses of Waste Energy

This factor is not applicable to this Project.

7.4 Unavoidable Adverse Environmental Effects

Unavoidable adverse environmental effects include the visual impacts and physical impacts to the land (primarily agricultural land) associated with the Project. Minnkota will implement measures as described in Section 5.0 and as identified by regulatory agencies to minimize these unavoidable adverse environmental effects.

7.5 Alternatives to the Proposed Route

As previously discussed, several alternatives to the Project were identified by Minnkota and reviewed during the federal scoping process carried out by RUS. The AES discussed system and project alternatives. Appendix A of the Corridor Certificate Application provides a copy of the AES. The MCS and EA analyzed routing alternatives. Appendix B of the Corridor Certificate Application provides a copy of the MCS. Appendix D of the Corridor Certificate Application provides a copy of the EA. The Project Route presented in this Route Permit Application depicts the best location from an economic, landowner, environmental, and PSC route criteria standpoint for a 345 kV line from Center to Grand Forks, North Dakota.

7.6 Irreversible and Irretrievable Commitment of Natural Resources for the Route

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of

an affected resource that cannot be restored as a result of the action. There are few commitments of resources associated with this Project that are irreversible and irretrievable, but include those resources primarily related to construction. Construction resources that will be used include aggregate resources, concrete, steel, and hydrocarbon fuel.

7.7 Direct and Indirect Economic Impacts of the Proposed Facility

Direct economic impacts include the impacts associated with removing agricultural land from production due to the construction and operation of the Project. In general, agricultural areas surrounding each structure can still be farmed, and landowners will be compensated for the land occupied by the Project.

The remaining direct and indirect economic impacts are primarily positive. To the extent that local sub-contractors are used for portions of the construction, total wages and salaries paid to contractors and workers will contribute to the total personal income of the region. Additional personal income will be generated for residents in the county and the state by circulation and recirculation of dollars paid out by Minnkota as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies, and other products and services benefit businesses in the counties and the state.

7.8 Existing Development Plans of the State, Local Government, and Private Entities at or in the Vicinity of the Route

No conflicts are anticipated with existing state and local government and private entities' development plans. Minnkota is working with the Grand Forks International Airport, UND Aerospace, and the FAA to minimize and avoid impacts associated with the airport expansion. Minnkota will obtain the necessary permits from local governmental units for the Project. Minnkota is working with three wind development companies to avoid substantive impacts to their potential wind energy projects.

7.9 Effect on Cultural Resources

No impacts to identified archaeological resources are anticipated. One architectural property will have visual affects, which will be mitigated through screening. The mitigation is detailed in a Treatment Plan that is being reviewed by the SHPO and RUS. Minnkota will file the Treatment Plan with the Commission following agency concurrence. Minnkota has completed a Class I Literature Search for the Project Route. With consultation from SHPO and RUS, Minnkota developed a model that identified areas that may have a high, moderate, or low probability of containing cultural resource sites. Minnkota is in the process of conducting a Class III cultural resources inventory of the high probability areas along the route. The construction contractor will be required to comply with environmental, cultural, archaeological, or historical guidelines as will be set forth through Section 106 requirements and the PA, which are currently in negotiations. It is anticipated that the route will avoid all archaeological sites and archaeological and architectural sites will be treated in accordance with the PA. Action will include notification and working with the appropriate authorities.

7.10 Effect on Biological Resources

Minnkota has implemented measures to avoid and minimize effects to biological resources in the vicinity of the Project Route. The impact of the Project on vegetation, wildlife and sensitive species is expected to be minimal. The Project will include measures to minimize impacts to avian species.

7.11 Problems Raised by Agencies

At the Commission's request, Minnkota will provide electronic copies of agency mailings. Appendix H of the Corridor Certificate Application included a list of the federal agencies, tribes, state agencies, and county commissioners that have been notified about the Project. For those agencies that responded, their concerns are summarized below and a copy of their response letter was included in Appendix I of the Corridor Certificate Application.

Federal Aviation Administration

In addition to outlining permitting requirements, the FAA recommended in their June 4, 2009 response letter that the design, construction, operation, and any wetland and/or wildlife mitigation associated with the Project not create a hazardous wildlife attractant to surrounding airports.

The Project will not create hazardous wildlife attractants for nearby airports. Minnkota will obtain the appropriate permits from the FAA (see Sections 5.2, 5.3 and 6.0).

North Dakota Game and Fish Department

On May 26, 2009, NDGF commented that its primary concern is the possible disturbance of native prairie and wetland areas during construction. They asked that wetlands be avoided to the extent possible, above-ground appurtenances not be placed in wetland areas, and disturbed areas be reclaimed to pre-project conditions. NDGF also recommended that overhead lines be marked when placed over perennial streams or sited in proximity to large wetland complexes to minimize possible avian impacts. NDGF noted that a Special Use Permit will be required to cross WMA land.

Minnkota will not impact WMA land so a permit from NDGF will not be necessary. Minnkota is discussing an overhang easement with the NDGF for the Wilbur Boldt WMA. Minnkota will minimize native prairie impacts and span wetlands to the extent possible and reclaim disturbed areas. As described in Section 5.16.3, the shield wires will be marked, as proposed in the Biological Assessment submitted to the USFWS, for sections of the Project near suitable whooping crane habitat.

North Dakota Department of Transportation

North Dakota Department of Transportation (DOT) noted on May 13, 2009 that if construction work is necessary in highway ROWs, appropriate permits and risk management documents will need to be obtained from DOT. Minnkota will obtain the appropriate permits and risk management documents from DOT (see Section 5.3).

Office of the State Engineer

On May 1, 2009, the Office of the State Engineer noted several bodies of water spanned by the Project contain Sovereign Lands of the State. Any construction work that crosses or is below the Ordinary High Water Mark for the Missouri River, Sheyenne River, and the James River will require a Sovereign Lands Permit. Ordinary High Water Mark is defined as "that line below which the action of the water is frequent enough either to prevent the growth of vegetation or to restrict its growth to predominantly wetland species. Islands in navigable waters are considered to be below the ordinary high watermark in their entirety" (NDAC Ch. 89-10-01). Minnkota will obtain Sovereign Lands Permits from the Office of the State Engineer, as addressed in Section 6.0.

North Dakota Parks and Recreation Department

NDPR noted on May 26, 2009 that the Project through Oliver and McLean counties includes properties containing significant natural, historic, scenic, and cultural resources. NDPR recommended selecting the southern corridor identified on the preliminary corridor map, avoiding Cross Ranch Nature Preserve, and obtaining appropriate permits to cross any federal Land and Water Conservation Fund properties. NDPR also stated its North Dakota Natural Heritage Inventory biological conservation database information is not based on a comprehensive inventory so there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database, the Project should be accomplished with minimal impacts and efforts will be made to ensure critical habitats are not disturbed in order to help secure rare species conservation in North Dakota, and any disturbed areas will be reclaimed using native species.

Minnkota did utilize the southern corridor identified on the preliminary corridor map, the Project Route does not cross the Cross Ranch Nature Preserve, and all federal Land and Water Conservation Fund properties have been avoided. Sections 5.15.3 and 5.16.3 discuss numerous mitigation measures for wildlife and habitat conservation. Minnkota will reseed non-cultivated areas disturbed by construction activities with vegetation similar to that which was removed.

Natural Resources Conservation Service

NRCS noted on May 5, 2009 that the Project may be subject to the FPPA. Minnkota will file a Farmland Conversion Form (Form AD-1006) with NRCS.

NRCS recommended that impacts to wetlands be avoided. Minnkota will span wetlands to the extent possible and obtain permits from appropriate agencies for wetland impacts (see Sections 5.10 and 5.13).

U.S. Army Corps of Engineers

USACE responded on May 11, 2009, that permits should be requested if work will be done in navigable waters (under Section 10 of the Rivers and Harbors Act) or Waters of the United States (under Section 404 of the Clean Water Act). Minnkota will span wetlands to the extent possible and obtain permits from appropriate agencies for wetland impacts and crossings of navigable waters (see Section 5.13).

U.S. Fish and Wildlife Service

USFWS concerns were expressed in its June 2, 2009 letter and at agency meetings with Minnkota. The letter (Appendix I of Corridor Certificate Application) noted USFWS concerns related to potential impacts to USFWS trust resources, including migratory birds, federally listed threatened and endangered species of plants and animals and their habitats, bald and golden eagles, and units of the National Wildlife Refuge system. USFWS also recommended numerous conservation measures.

Minnkota continues to work with the USFWS to develop suitable mitigation measures for impacts to wetland and grassland easements and to work with the RUS to meet USFWS minimization guidelines. Sections 5.15.3 and 5.16.3 discuss Minnkota's mitigation measures for wildlife and habitat conservation.

8.0 Qualifications of Contributors

Name/Project Role	Education and Professional Experience
Michelle Bissonnette Energy Environmental Practice Leader HDR Engineering, Inc.	Michelle Bissonnette is a Senior Project Manager, Vice President of the Environmental Power and Energy Practice and on HDR's National Power and Energy leadership team. The majority of Michelle's consulting career has been spent in the power and energy field. Her experience includes environmental assessment, public involvement, siting, and permitting work on a variety of utility projects from power generation to transmission and distribution as well as wind, pipeline and combustion turbine projects. In her current position, she manages teams that conduct environmental assessments and permitting for transmission line, wind power, and energy projects. She also coordinates national power and energy projects for HDR's environmental groups. B.S., Landscape Architecture, University of Minnesota, 1982 Foreign Studies/French Minor, University of Grenoble, France, 1977
Brian Hunker Project Manager/Environmental Scientist HDR Engineering, Inc.	Brian Hunker is an Environmental Scientist with a diverse project background in environmental documentation and permitting. He has been involved in the preparation of Environmental Assessments, Environmental Impact Statements, and other NEPA-related and environmental permitting documents for local, state, and federal power and energy projects across the United States. B.S., Environmental Sciences/Studies (Zoology and Biological Aspects of Conservation), University of Wisconsin-Madison, 1999
Lydia Nelson Senior Environmental Scientist HDR Engineering, Inc.	Lydia Nelson has more that 25 years of experience as an environmental project manager and project scientist. Ms. Nelson has managed or helped to develop NEPA documents for numerous federal agencies, including the RUS, NPS, USFS, FTA and FHWA. She routinely works with federal, state, and local agencies in the development of permit applications such as Section 404, Section 10, Section 7, state route and siting applications, NPDES, and local conditional use permits. Ms. Nelson has extensive experience in wetland delineation, functional assessment, wetland mitigation design, water resource evaluation, prime farmlands, hydric soils, wildlife habitat, and endangered species. Ms. Nelson performs quality control/quality assurance review for large NEPA documents and permit applications. B.S., Environmental Sciences/Studies (Soil Science), Oregon State University, 1983 B.S., Biology, Central Michigan University, 1981
Patricia Terhaar, PG, CPG Senior Project Manager HDR Engineering, Inc.	Ms. Terhaar has 24 years of environmental consulting and project management experience. She has managed or worked as part of multi-disciplinary teams in the preparation of documents supporting NEPA compliance for energy projects across the United States. Ms. Terhaar has also managed and performed phase I/II site assessments, hydrogeologic investigations, and remedial investigations/feasibility studies associated with landfills, hazardous waste sites, chemical and petroleum spills, asbestos, and brownfields. M.S., Geology, Texas A&M University, 1985 B.S., Earth Science, Montana State University, 1983

Name/Project Role	Education and Professional Experience
Emily Siedschlag Environmental Scientist/Public Involvement Specialist HDR Engineering, Inc.	Ms. Siedschlag has four years of experience in environmental consulting including wetland delineations, biological surveys, and data analysis. She has experience developing survey protocols, coordinating field surveys and discussing mitigation and monitoring prior to project construction. Ms. Siedschlag has experience working with federal, state, and local agencies in the development of NEPA documents and permit applications. B.A., Environmental Studies (Geography), Gustavus Adolphus College, 2006
Ann Fossum GIS Specialist HDR Engineering, Inc.	Ms. Fossum has eight years of experience with GIS and more than five years of experience as a GIS specialist, including experience with spatial analysis, editing, data creation, conversion, map production, modeling, and GPS data collection and processing. For the last two years, she has applied her GIS knowledge to assist in the development of power transmission and wind farm projects throughout the United States, including NEPA and permit application document support. She has experience with ArcGIS, MapInfo, MicroStation and various other GIS software and utilities. B.A., Geography, Gustavus Adolphus College, 2004
Kelly Garvey Environmental Project Manager HDR Engineering, Inc.	Ms. Garvey has 25 years of experience in Environmental Permitting and Environmental Review. She has been involved in preparation of Environmental Impact Statements, Environmental Assessments and Environmental permits for a wide variety industrial and municipal projects. Ms Garvey has been involved with state, federal and local governments in developing environmental documents. Associates in Applied Science in Water Quality, Vermilion Community College, Ely Minnesota, 1982
Mollie M. Smith Attorney Fredrikson & Byron, P.A.	Ms. Smith is a shareholder in Fredrikson & Byron's Litigation, Oil & Gas, Transmission, Renewable Energy and Condemnation & Eminent Domain Groups. Ms. Smith assists clients with oil and gas litigation matters; wind farm, transmission line and pipeline permitting matters; and condemnation/eminent domain matters. University of Minnesota Law School, J.D., 2004 Colorado State University, M.A., 2000 Northern State University, B.A., 1997
Mike Hennes System Projects Manager Minnkota Power Cooperative, Inc.	Mr. Hennes has more than twenty years of utility engineering and project management experience. Mr. Hennes has also served as an electrical engineer, project engineer and Substation Engineering Manager while working for Minnkota. B.S., Electrical Engineering. University of North Dakota, 1993 B.S., Engineering Management. University of North Dakota, 1993 A.A.S., Electronics Technology, North Dakota College of Science, 1975

Name/Project Role	Education and Professional Experience
John T. Graves, P.E. Environmental Manager Minnkota Power Cooperative, Inc.	Mr. Graves is a registered Professional Engineer with over 30 years experience in the environmental area for the utility and government sectors. Mr. Graves has served on multi-company permitting teams for projects while employed with Minnkota Power Cooperative Inc. as the Environmental Manager. B.S. Mechanical Engineering, University of North Dakota, 1972

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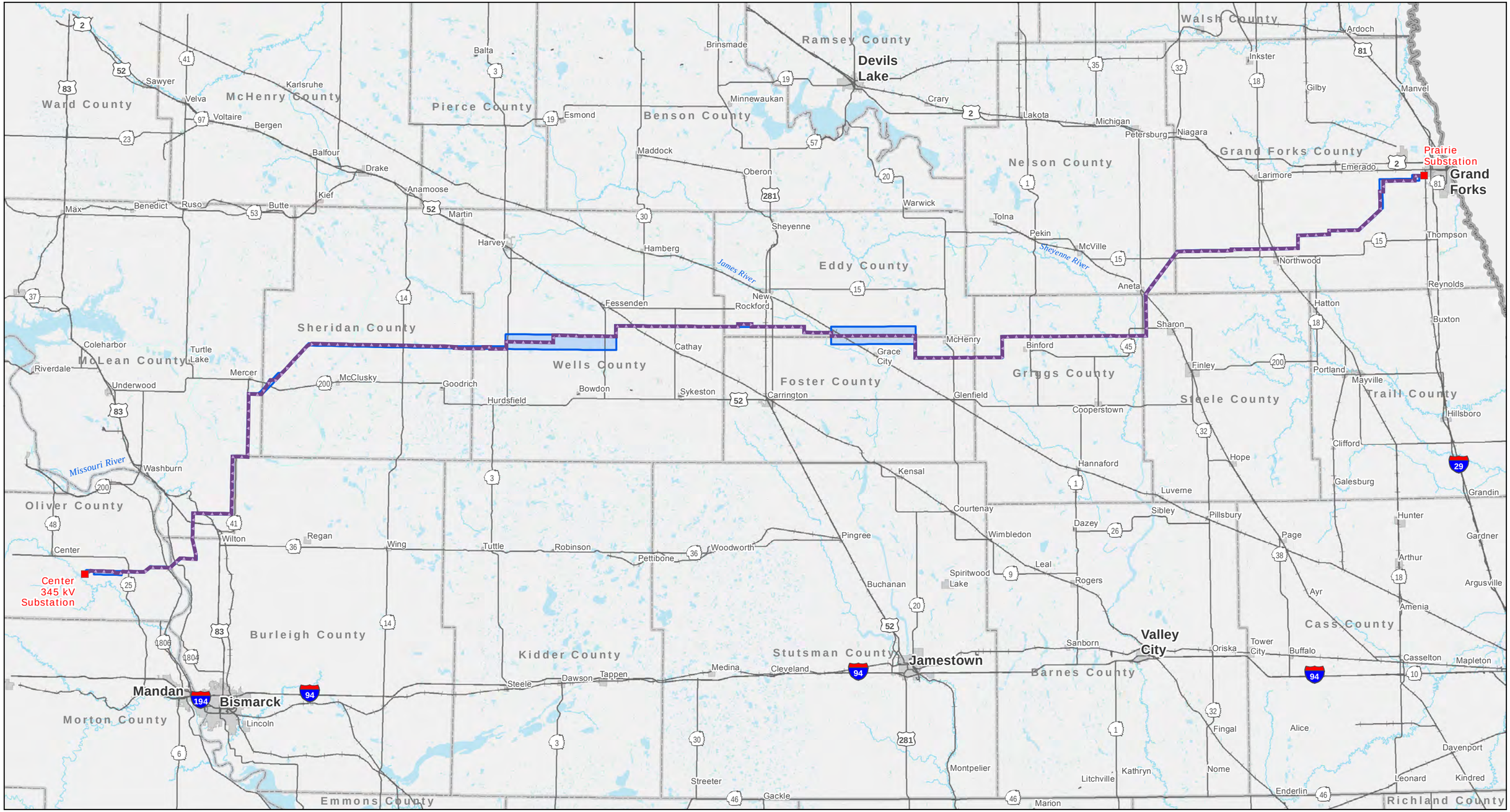


Figure 1
Project Vicinity
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

Date: 11/28/2011

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22ND ST SW
32ND AVE SW
33RD AVE SW
T142N
R 83W
29
28
27
26
25
30
1 -
Minnkota-owned
Wilbur
Boldt WMA
Substation
Expansion
Area
Center 345 kV
Substation
Laydown
Area 1b
32
Nelson
Lake
34
35
36
31
Square Butte
230 kV Substation
T142N
R 82W
23RD ST SW
Laydown
Area 1a
Hagel Creek
24 1/2 ST SW
24TH ST SW
31ST AVE SW
35TH AVE SW
5
4
3
2
1
6
T141N
R 83W
T141N
R 82W
26TH ST SW
25 1/2 ST

DISCLAIMER:

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Map Index

Project ROW
Project Structure
Proposed Modified Corridor – November 18, 2011
Substation
Laydown Area
Fiber Optic Regeneration Station

Existing Transmission Lines
400-kV DC
345-kV AC
250-kV DC
230-kV AC
115-kV or less AC
Gas or Oil Pipeline

Occupiable Home within 500 ft of Transmission Facility
Not Occupiable Home within 500 ft of Transmission Facility
Occupiable Home beyond 500 ft of Transmission Facility
School
Business

Gravel Pit or Mine
Dump or Landfill
Irrigated Land
Public Airport
Private Airport
Incorporated Area
In-Use Railroad

State Park, Recreation Area or WMA
USFWS WPA or WDA
USFWS NWR
USBOR Land
TNC Preserve
State Trust Land
100-year Floodplain

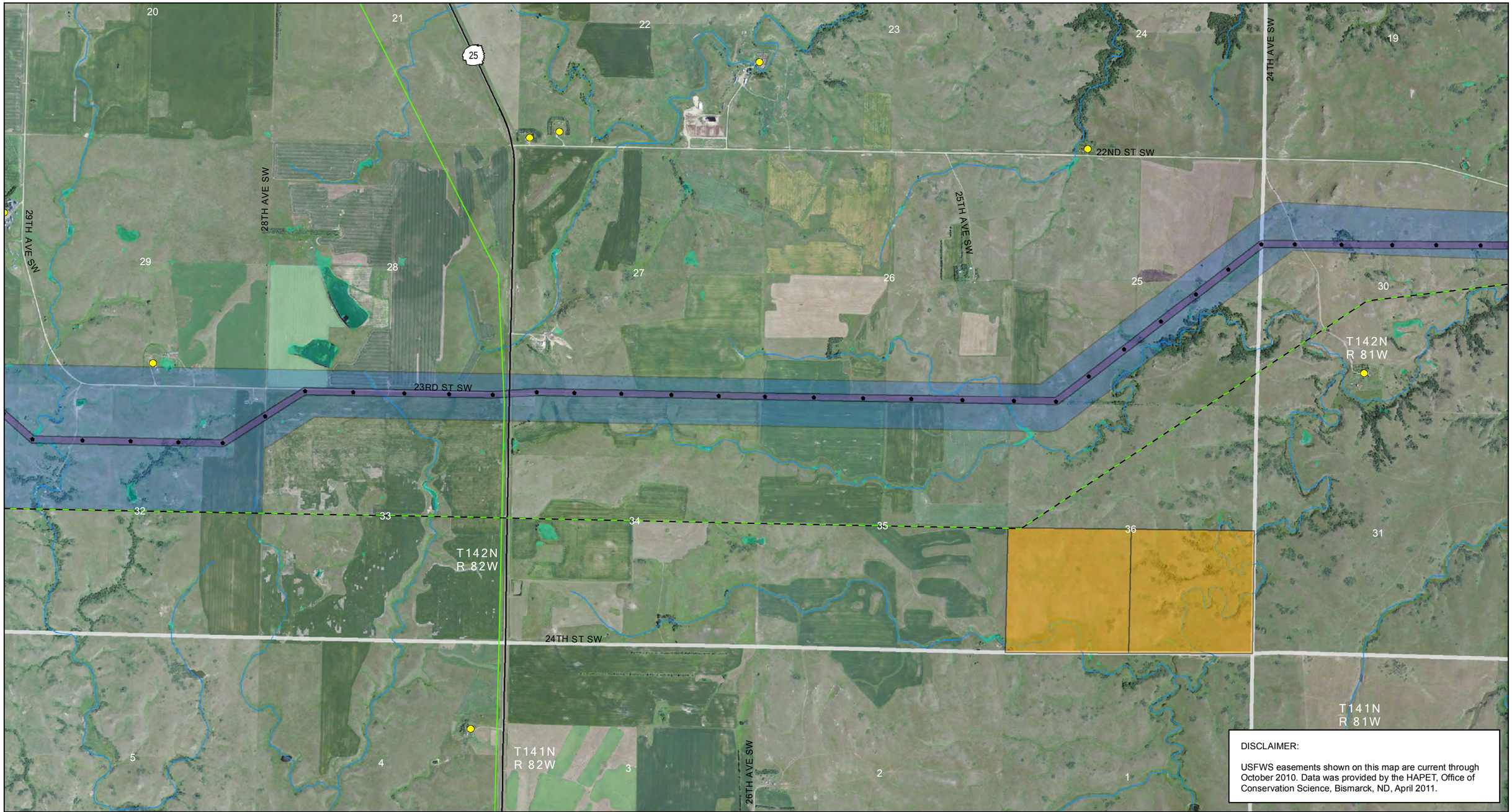
Wetland
USGS Mapped Waterway
USFWS Grassland Easement
USFWS Wetland Easement
USFWS Conservation Easement

Figure 2: Page 1 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

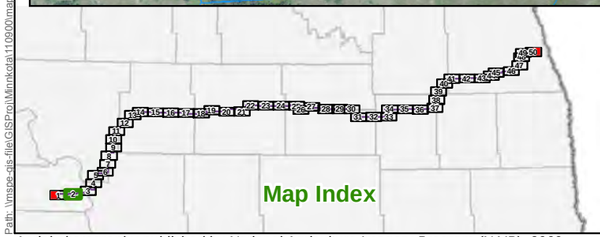
Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011



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- Project ROW
- Project Structure
- Proposed Modified Corridor – November 18, 2011
- Substation
- Laydown Area
- Fiber Optic Regeneration Station

Existing Transmission Lines
- 400-kV DC
- 345-kV AC
- 250-kV DC
- 230-kV AC
- 115-kV or less AC
- Gas or Oil Pipeline

- Occupiable Home within 500 ft of Transmission Facility
- Not Occupiable Home within 500 ft of Transmission Facility
- Occupiable Home beyond 500 ft of Transmission Facility
- School
- Business

- Gravel Pit or Mine
- Dump or Landfill
- Irrigated Land
- Public Airport
- Private Airport
- Incorporated Area
- In-Use Railroad

- State Park, Recreation Area or WMA
- USFWS WPA or WDA
- USFWS NWR
- USBOR Land
- TNC Preserve
- State Trust Land
- 100-year Floodplain

- Wetland
- USGS Mapped Waterway
- USFWS Grassland Easement
- USFWS Wetland Easement
- USFWS Conservation Easement

Figure 2: Page 2 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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20TH ST SW
292ND AVE NW
17
22ND AVE SW
16
15
14
13
18
Lewis and Clark National Historic Trail
Burleigh County
Oliver County
Missouri River
1804
21ST ST SW
279TH AVE NE
Sherk Creek
20
21
22
23
24
54TH ST NW
19
266TH AVE NW
266TH AVE NE
22ND ST SW
29
28
27
26
25
30
80TH ST NW
T142N
R 81W
PRICE
253RD AVE NW

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Project ROW
Project Structure
Proposed Modified Corridor – November 18, 2011
Substation
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400-kV DC
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115-kV or less AC
Gas or Oil Pipeline

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TNC Preserve
State Trust Land
100-year Floodplain

Wetland
USGS Mapped Waterway
USFWS Grassland Easement
USFWS Wetland Easement
USFWS Conservation Easement

Figure 2: Page 3 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011

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17TH ST SW

Yanktonai Lake

T143N R 81W

T143N R 80W

17TH ST SW

34

35

36

31

32

33

18TH ST SW

20TH AVE SW

19TH AVE SW

16TH AVE SW

15TH AVE SW

McLean County

Burleigh County

Painted Woods

3

2

1

6

5

4

67TH ST NW

41ST ST NW

28TH ST NW

74TH ST NW

305TH AVE NW

T142N R 81W

T142N R 80W

15TH ST NW

10

11

12

7

8

9

1804

Missouri River

292ND AVE NW

54TH ST NW

Ecklund

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Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

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14 1/2 ST SW
19TH AVE SW
Yanktonai Creek
14TH ST SW
15TH AVE SW
16TH AVE SW
17TH AVE SW
15TH ST SW
T143N
R 80W
T143N
R 81W
18 1/2 AVE SW
19 1/2 AVE SW
16 1/2 ST SW
20TH AVE SW
17TH ST SW
18TH AVE SW
Yanktonai Lake
16 1/2 AVE SW
14 1/2 AVE SW
16TH ST SW
83

13 14 15 17 18 19 20 22 23 24 25 26 27 28 29 30

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USFWS NWR
USBOR Land
TNC Preserve
State Trust Land
100-year Floodplain

Wetland
USGS Mapped Waterway
USFWS Grassland Easement
USFWS Wetland Easement
USFWS Conservation Easement

Figure 2: Page 5 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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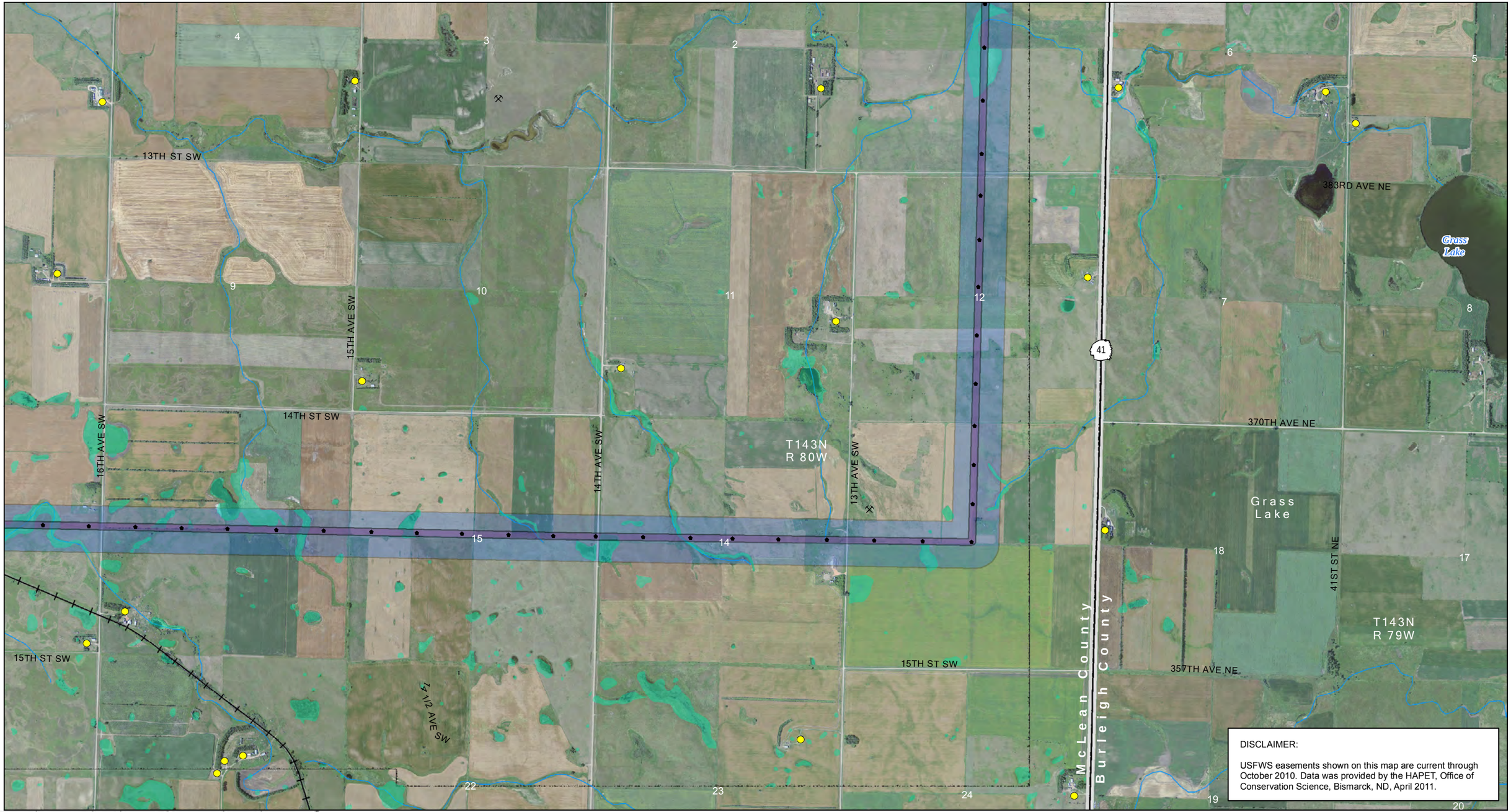
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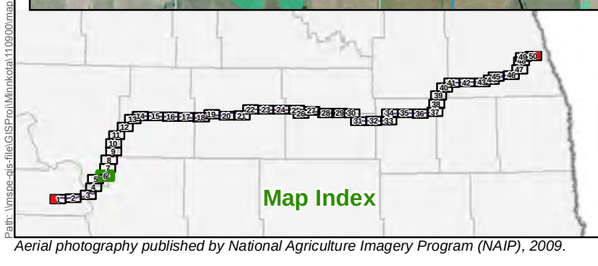
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- Project ROW
- Project Structure
- Proposed Modified Corridor – November 18, 2011
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- Laydown Area
- Fiber Optic Regeneration Station

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- 250-kV DC
- 230-kV AC
- 115-kV or less AC
- Gas or Oil Pipeline

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- State Trust Land
- 100-year Floodplain

- Wetland
- USGS Mapped Waterway
- USFWS Grassland Easement
- USFWS Wetland Easement
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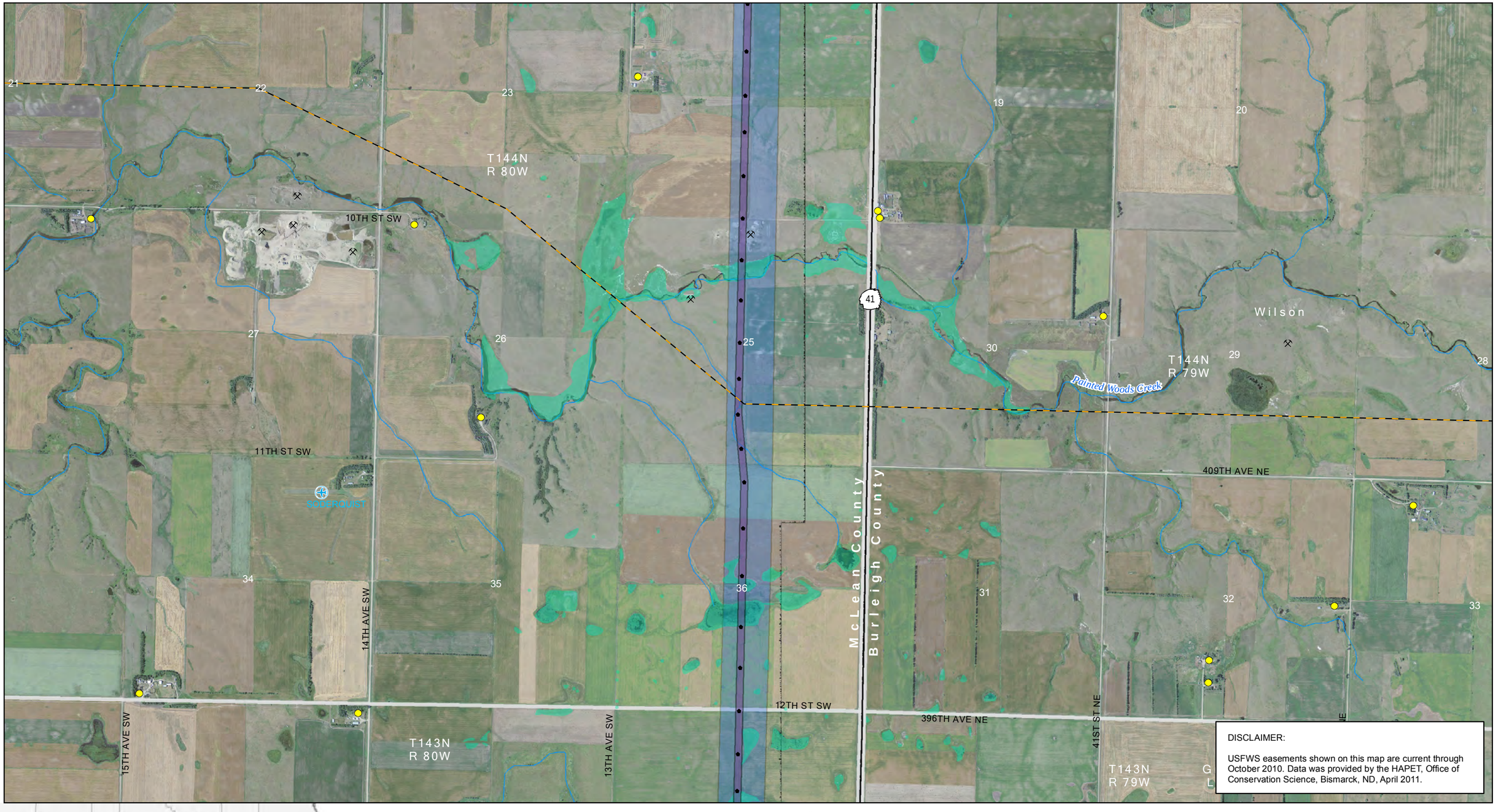
Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Figure 2: Page 6 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

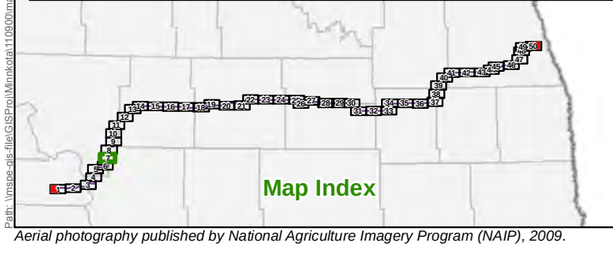
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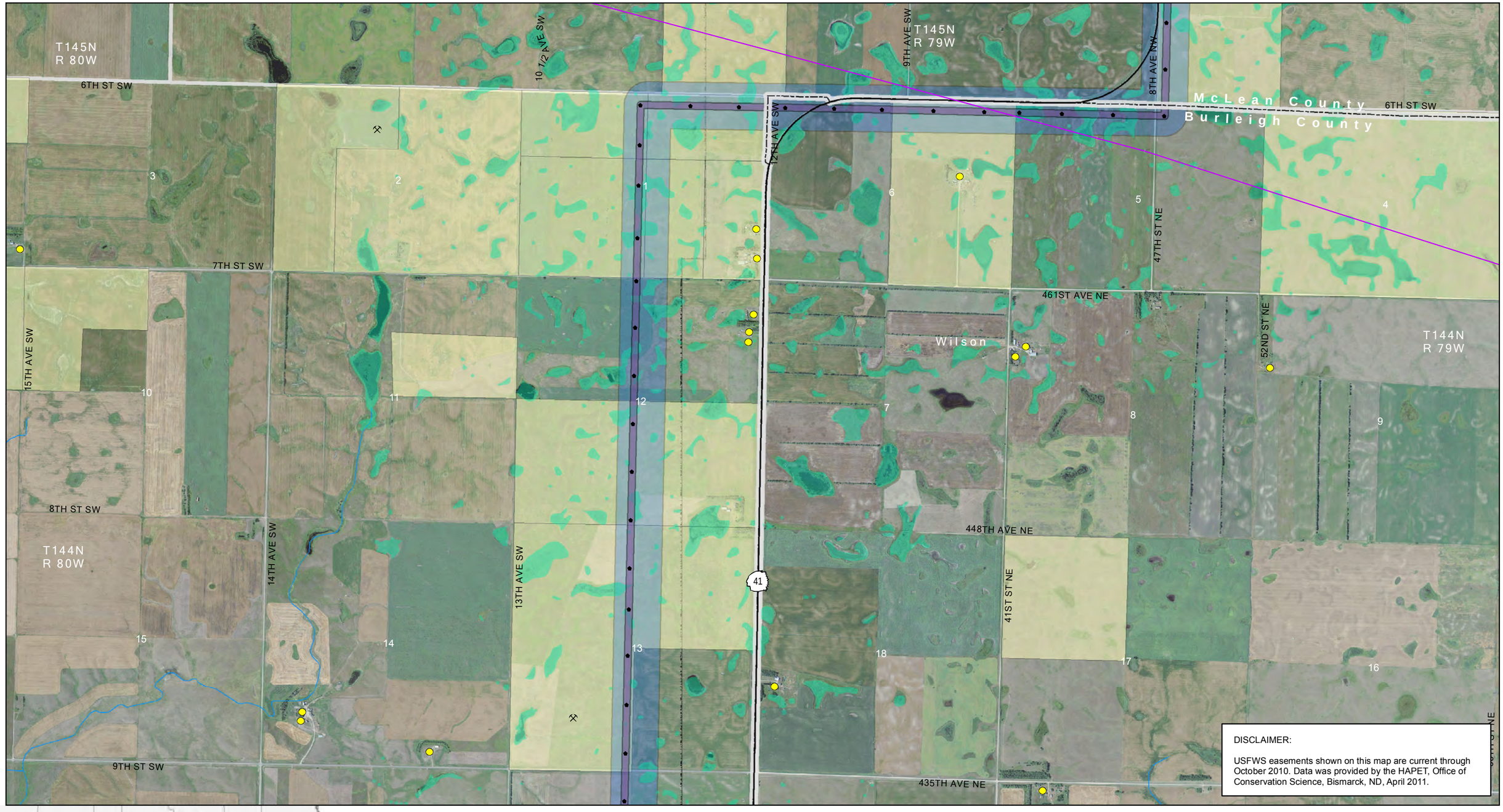
- Wetland
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- USFWS Grassland Easement
- USFWS Wetland Easement
- USFWS Conservation Easement

Figure 2: Page 7 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

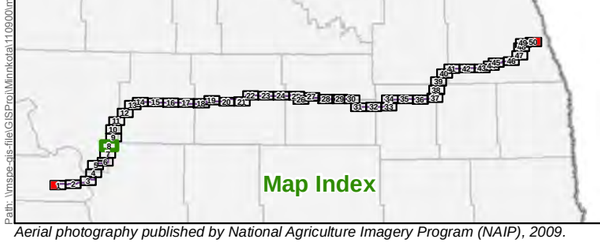
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Figure 2: Page 8 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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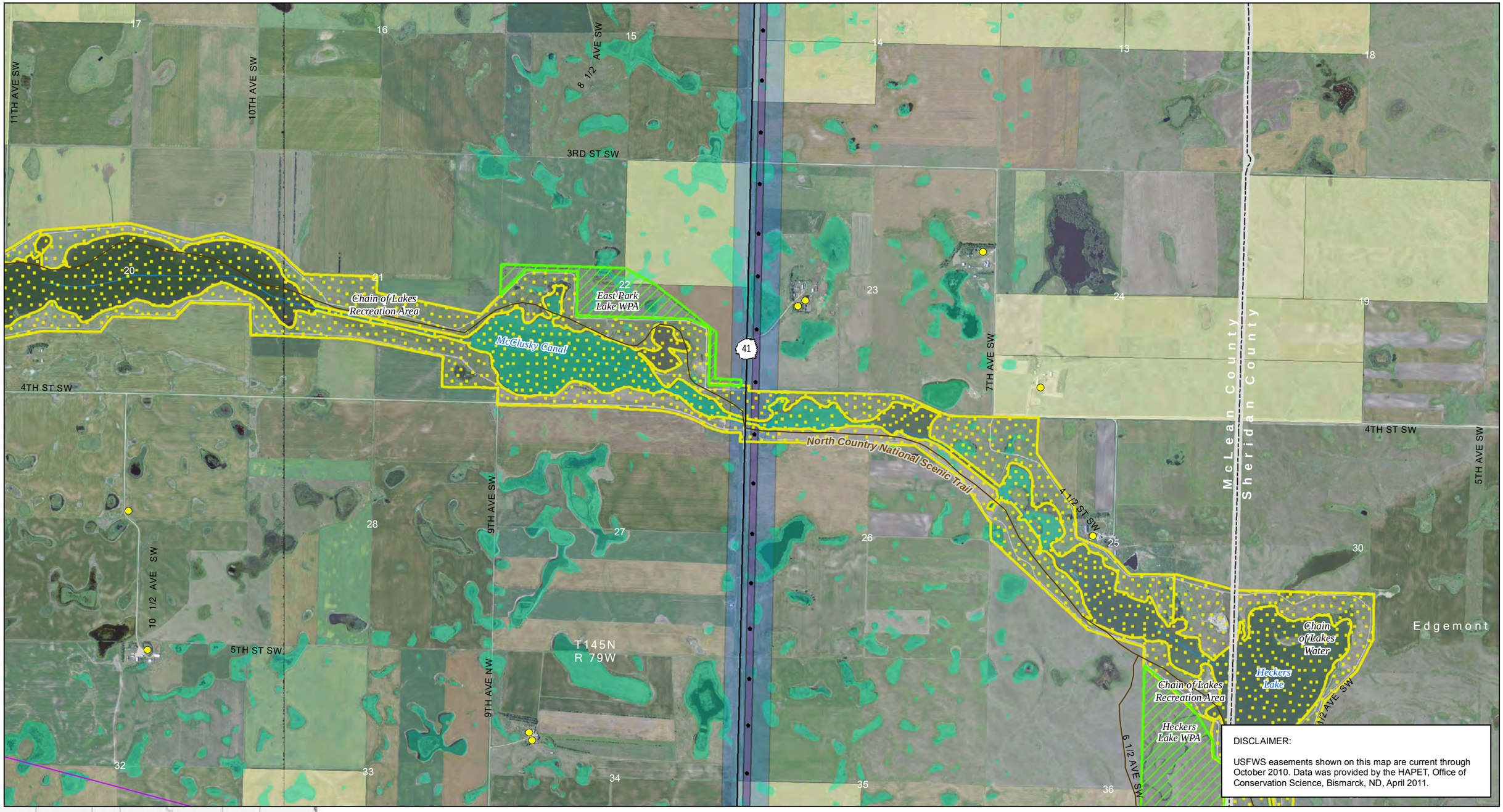
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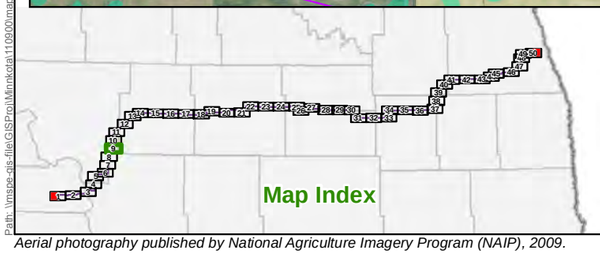
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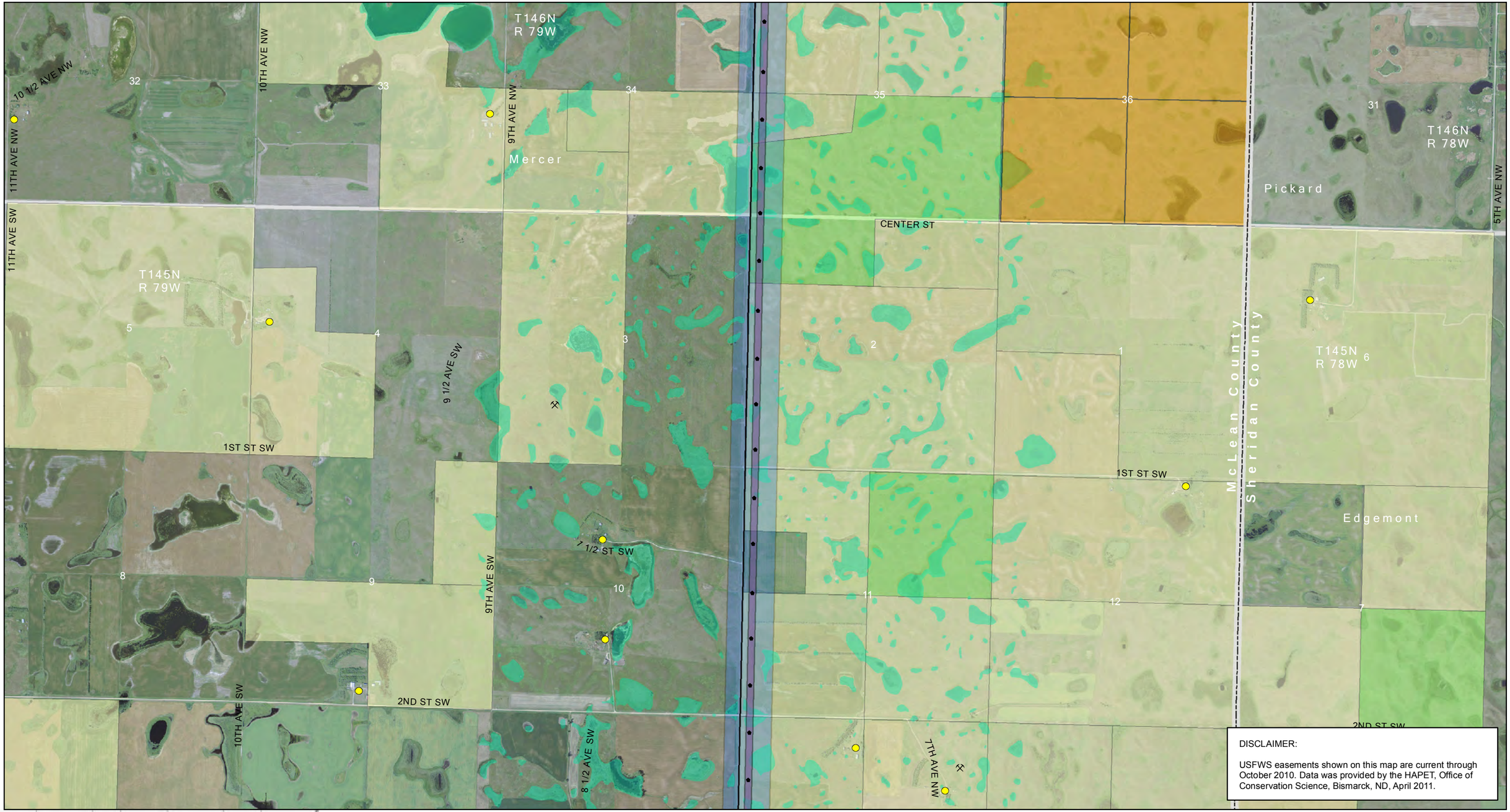
Figure 2: Page 9 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

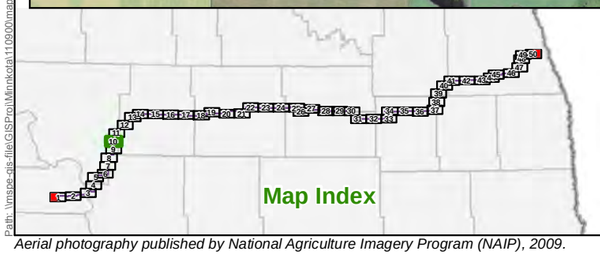
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Figure 2: Page 10 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011

Gaub WPA

T146N
R 79W

2ND ST NW

Mercer

McLean County
Sheridan County

Pickard

3RD ST NW

2 1/2 ST NW

1ST ST NW

5TH AVE NW

9TH AVE NW

4TH AVE NW

16 15 14 13 18 17
21 22 23 24 19 20
28 27 26 25 30 29

41

200

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Figure 2: Page 11 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

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Date: 11/28/2011

T147N
R 78W

3RD AVE NW

6TH AVE NW

Wise

Prophets

36

31

32

33

34

35

T147N
R 79W

6TH ST NW

2ND AVE SW

McLean County

Sheridan County

1

6

5

4

2

1

5TH AVE NW

Regeneration
Station 1

5TH ST NW

T146N
R 79W

T146N
R 78W

Mercer

200

7

8

9

10

Pickard

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Map Index

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State Trust Land
100-year Floodplain

Wetland
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USFWS Grassland Easement
USFWS Wetland Easement
USFWS Conservation Easement

Figure 2: Page 12 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

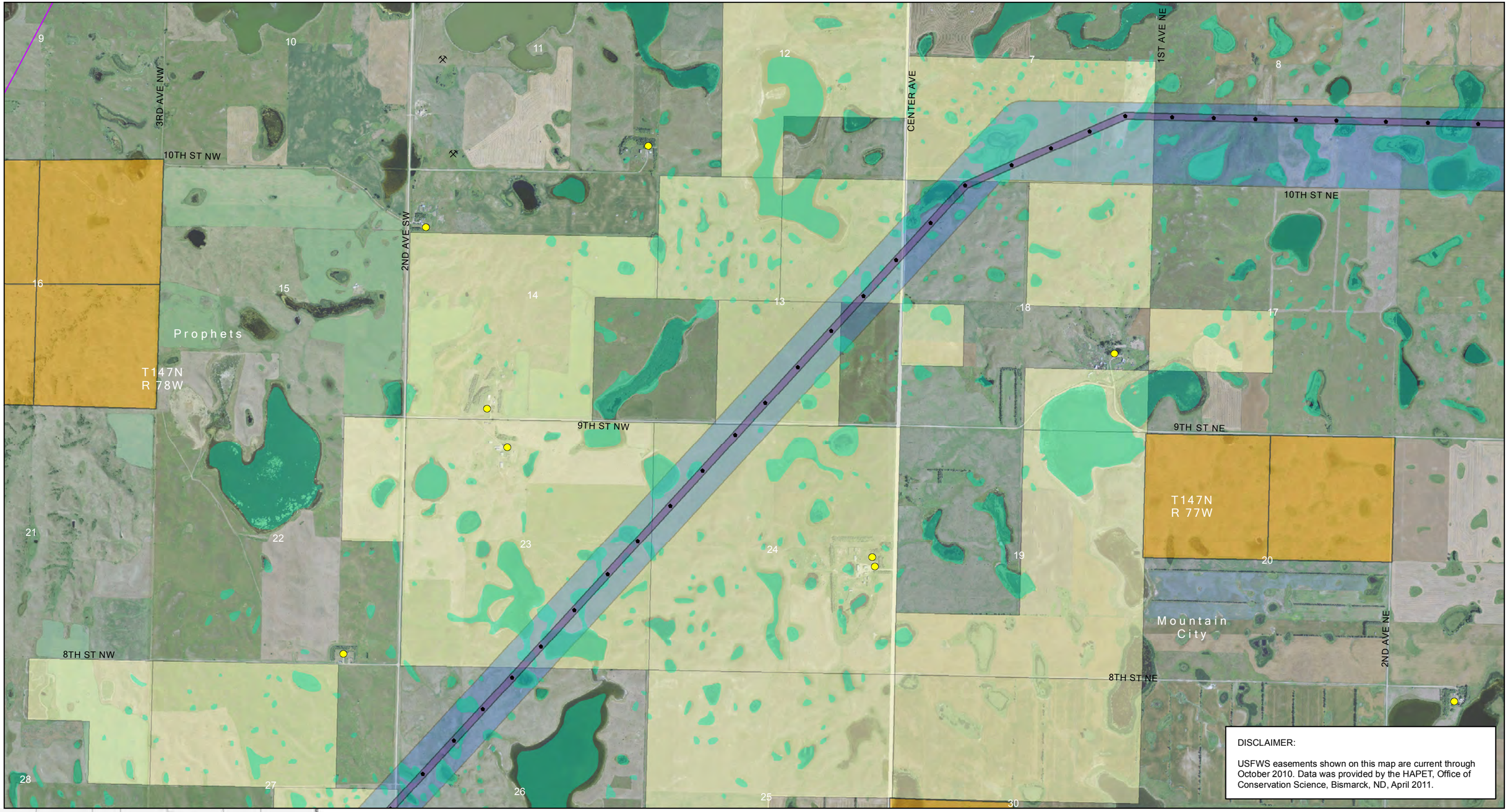
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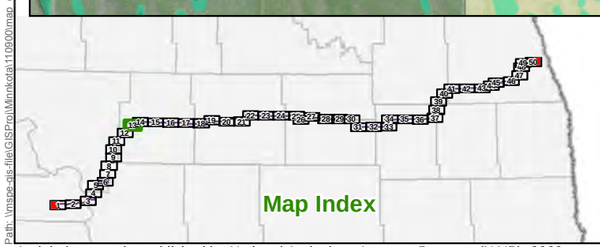
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Figure 2: Page 13 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

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Date: 11/28/2011

Prophets

1 6 5 4 3 2

11TH ST NW

1ST AVE NE

2ND AVE NE

3RD AVE NE

4TH AVE NE

11TH ST NE

12 7 8 9 10 11

T147N
R 77W

Mountain
City

10TH ST NE

13 18 17 16 15 14

CENTER AVE

9TH ST NW

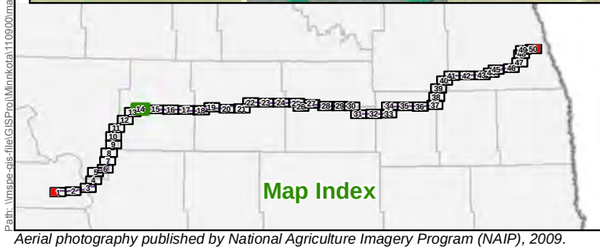
9TH ST NE

5TH AVE SE

T147N
R 78W

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Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
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Date: 11/28/2011

Mountain City

North Country National Scenic Trail

Kindschi WPA

11TH ST NE

8TH AVE NE

11TH AVE NE

T147N
R 77W

6TH AVE NE

10TH ST NE

7TH AVE NE

Hellman

McClusky Canal

Canal Lands

9TH AVE NE

T147N
R 76W

10TH AVE NE

9TH ST NE

1 6 5 4 3 2
12 7 8 9 10 11
13 18 17 16 15 14 13

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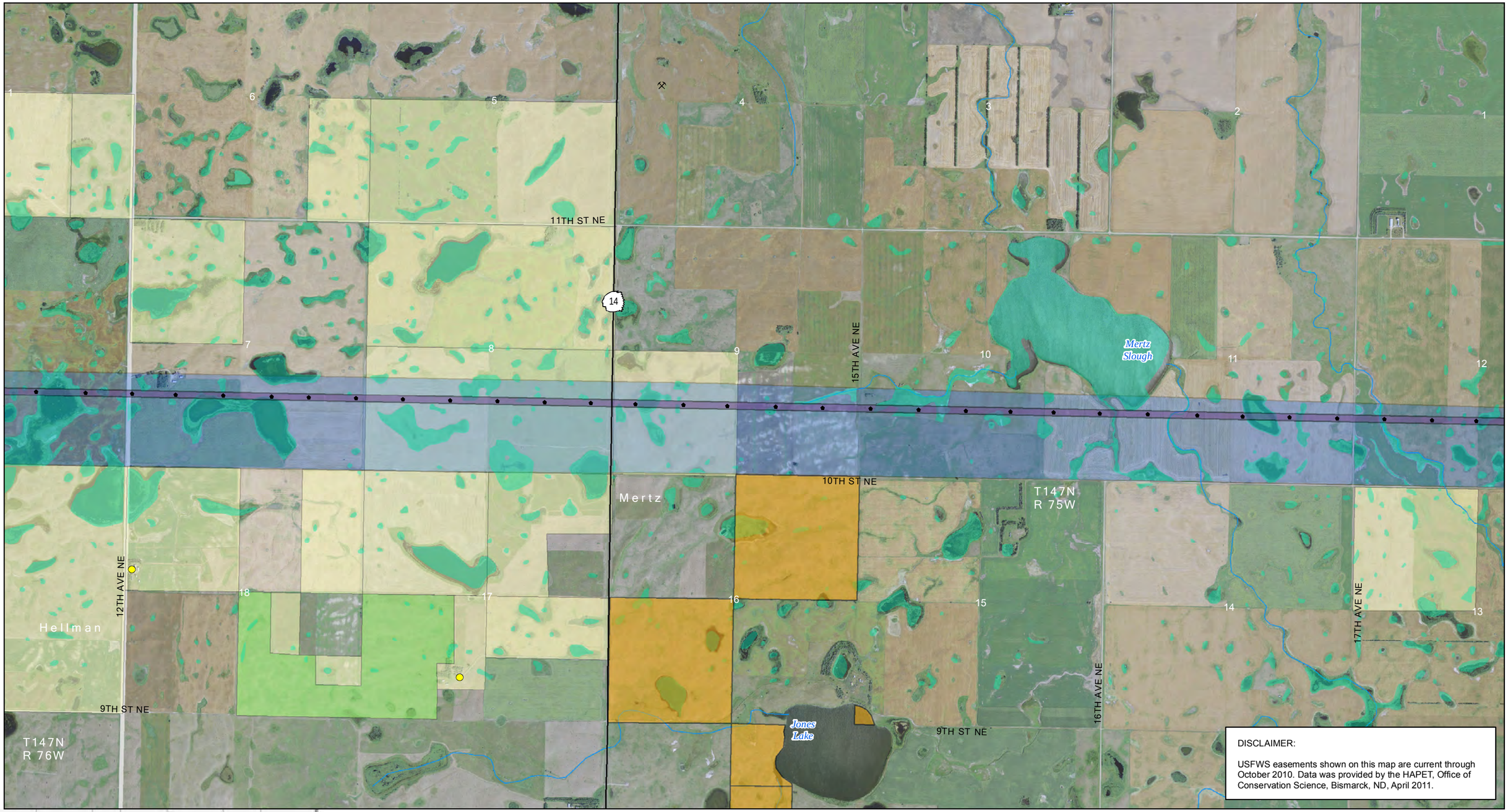
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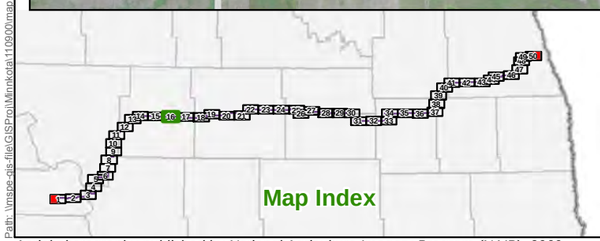
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Route Siting Criteria
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Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

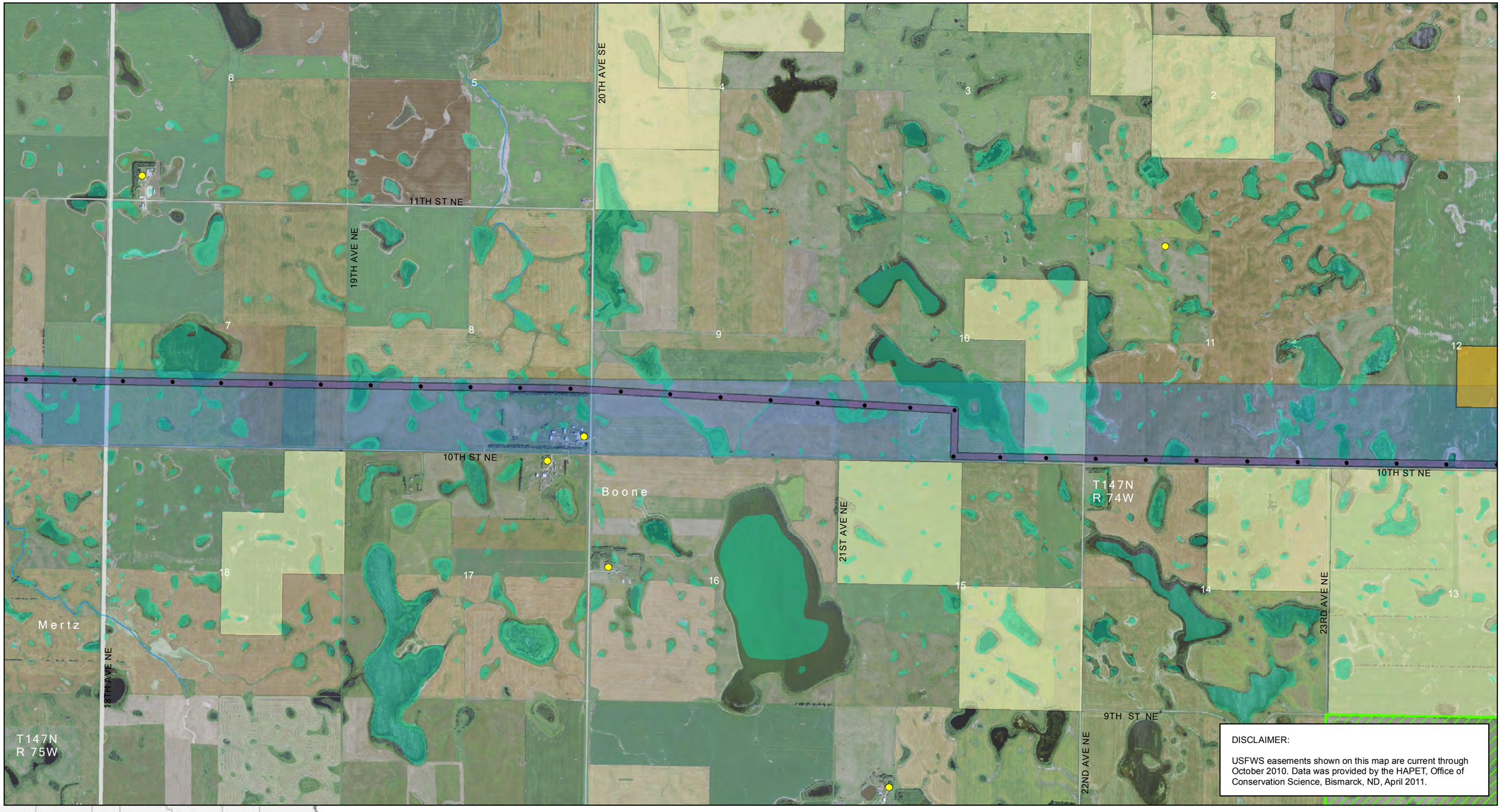
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Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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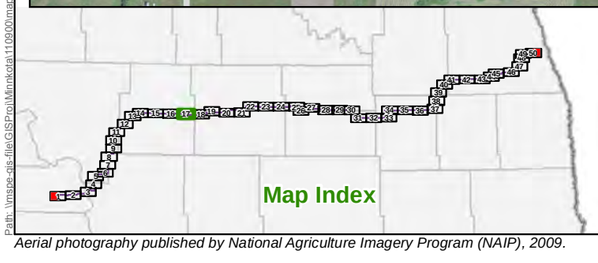
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- Project ROW
- Project Structure
- Proposed Modified Corridor – November 18, 2011
- Substation
- Laydown Area
- Fiber Optic Regeneration Station

Existing Transmission Lines
- 400-kV DC
- 345-kV AC
- 250-kV DC
- 230-kV AC
- 115-kV or less AC
- Gas or Oil Pipeline

- Occupiable Home within 500 ft of Transmission Facility
- Not Occupiable Home within 500 ft of Transmission Facility
- Occupiable Home beyond 500 ft of Transmission Facility
- School
- Business

- Gravel Pit or Mine
- Dump or Landfill
- Irrigated Land
- Public Airport
- Private Airport
- Incorporated Area
- In-Use Railroad

- State Park, Recreation Area or WMA
- USFWS WPA or WDA
- USFWS NWR
- USBOR Land
- TNC Preserve
- State Trust Land
- 100-year Floodplain

- Wetland
- USGS Mapped Waterway
- USFWS Grassland Easement
- USFWS Wetland Easement
- USFWS Conservation Easement

Figure 2: Page 17 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011

Boone

Sheridan County

Wells County

Crystal Lake WPA

11TH ST NE

25TH AVE SE

26TH AVE SE

28TH AVE SE

T147N
R 73W

10TH ST NE

T147N
R 74W

Crystal Lake

24TH AVE SE

Faul WPA

Wells County WMA

Indian Hills WPA

9TH ST NE

R. LEER STRIP

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Project ROW
Project Structure
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Fiber Optic Regeneration Station

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USFWS NWR
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TNC Preserve
State Trust Land
100-year Floodplain

Wetland
USGS Mapped Waterway
USFWS Grassland Easement
USFWS Wetland Easement
USFWS Conservation Easement

Figure 2: Page 18 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Path: \\mapp-gis-file\GIS\Proj\Minnkota\110000\map_docs\PSC\RouteApp\CGFPPA_02_11x17_ 50p_RouteSitingCriteria.mxd

Date: 11/28/2011

13TH ST NE
28TH AVE NE
T148N
R 73W
Laydown
Area 2
Pony
Gulch
35
36
3
30TH AVE NE
31TH AVE NE
31
T148N
R 72W
32
32TH AVE NE
Rusland
33
33TH AVE NE
34
James River
12TH ST NE
30TH AVE SE
32ND AVE SE
33TH AVE SE
2
1
6
5
4
3
28TH AVE SE
T147N
R 73W
11TH ST NE
Crystal
Lake
11
12
7
8
9
10
10TH ST NE
Wells
County WMA
31ST AVE SE
Delger
T147N
R 72W

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Project ROW
Project Structure
Proposed Modified Corridor – November 18, 2011
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TNC Preserve
State Trust Land
100-year Floodplain

Wetland
USGS Mapped Waterway
USFWS Grassland Easement
USFWS Wetland Easement
USFWS Conservation Easement

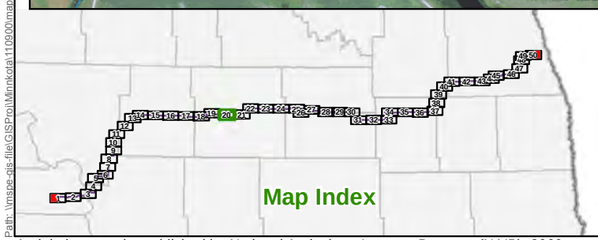
Figure 2: Page 19 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

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Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.





Project ROW
Project Structure
Proposed Modified Corridor – November 18, 2011
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Irrigated Land
Public Airport
Private Airport
Incorporated Area
In-Use Railroad

State Park, Recreation Area or WMA
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USFWS NWR
USBOR Land
TNC Preserve
State Trust Land
100-year Floodplain

Wetland
USGS Mapped Waterway
USFWS Grassland Easement
USFWS Wetland Easement
USFWS Conservation Easement

Figure 2: Page 20 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

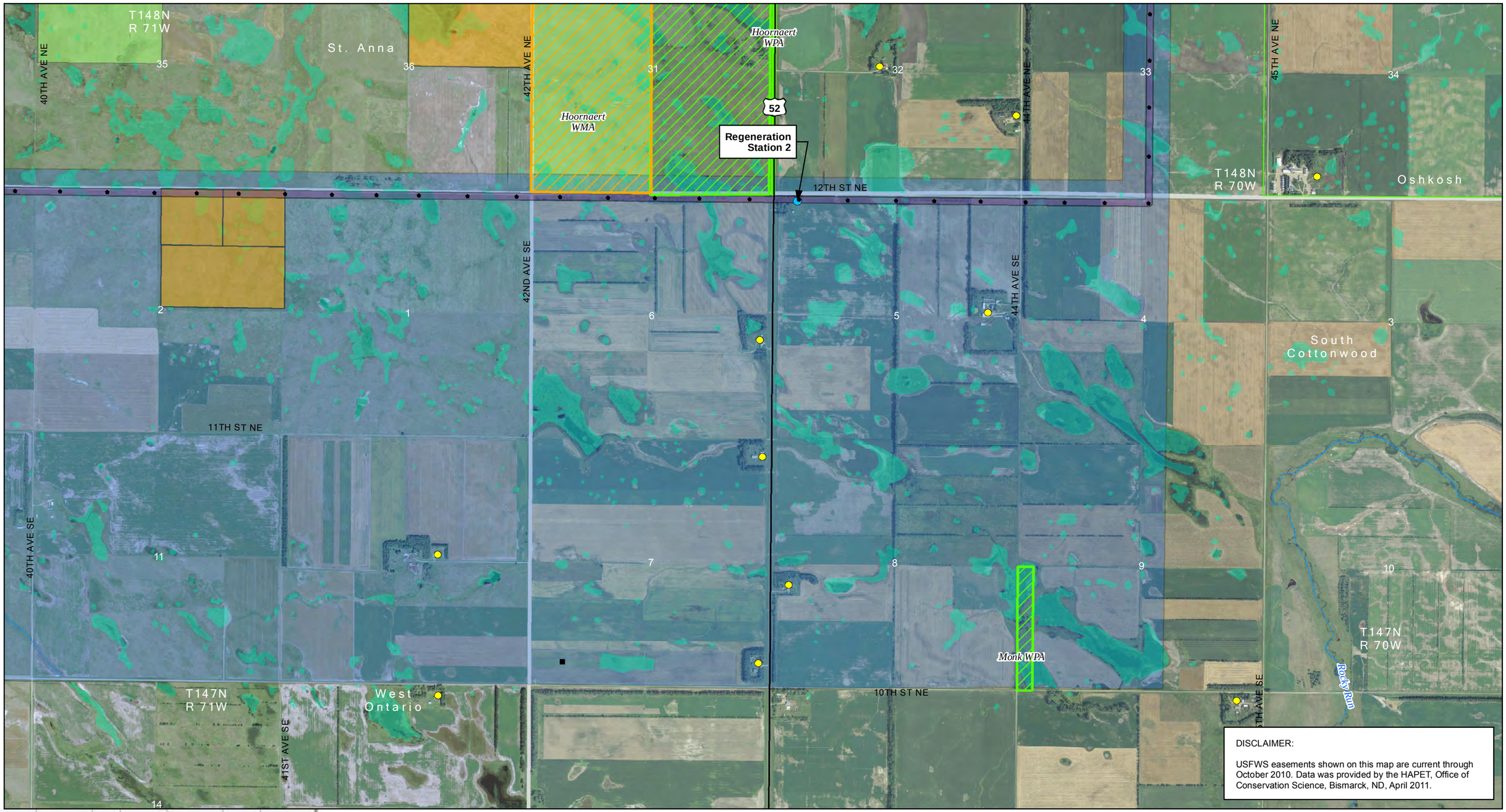
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Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011
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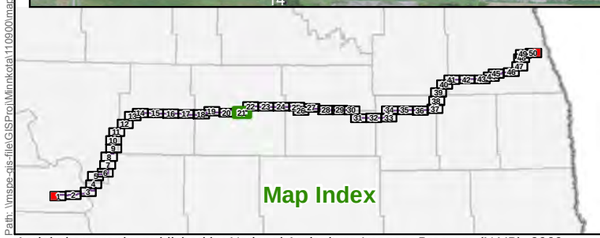
Date: 11/28/2011

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- USFWS Grassland Easement
- USFWS Wetland Easement
- USFWS Conservation Easement

Figure 2: Page 21 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011

15TH ST NE
44TH AVE NE
45TH AVE NE
46TH AVE NE
48TH AVE NE
14TH ST NE
13TH ST NE
12TH ST NE
44TH AVE SE
45TH AVE SE
46TH AVE SE
47TH AVE SE
48TH AVE SE
47TH AVE NE
48 1/2 AVE NE
49TH AVE NE
20
21
22
23
24
19
26
25
32
33
34
35
36
31
T148N
R 70W
T147N
R 70W
T148N
R 69W
Oshkosh
Germantown
South
Cottonwood
Schindler
WPA

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Project ROW
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Laydown Area
Fiber Optic Regeneration Station

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345-kV AC
250-kV DC
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Private Airport
Incorporated Area
In-Use Railroad

State Park, Recreation Area or WMA
USFWS WPA or WDA
USFWS NWR
USBOR Land
TNC Preserve
State Trust Land
100-year Floodplain

Wetland
USGS Mapped Waterway
USFWS Grassland Easement
USFWS Wetland Easement
USFWS Conservation Easement

Figure 2: Page 22 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Path: \\mspe-gis-file\GIS\Proj\Minnkota\1109000\map_docs\PSC\RouteApp\CGFRPA_02_11x17L_50p_RouteSitingCriteria.mxd

Date: 11/28/2011

15TH ST NE
51TH AVE NE
52TH AVE NE
54TH AVE NE
14TH ST NE
13TH ST NE
12TH ST NE
50TH AVE NE
55TH AVE NE
50TH AVE SE
51ST AVE SE
52ND AVE SE
20
21
22
23
24
19
20
27
26
25
30
29
33
34
35
36
31
32
30
T148N
R 69W
T148N
R 68W
T147N
R 69W
T147N
R 68W
Germantown
Fairville
Cathay

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250-kV DC
230-kV AC
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Gravel Pit or Mine
Dump or Landfill
Irrigated Land
Public Airport
Private Airport
Incorporated Area
In-Use Railroad

State Park, Recreation Area or WMA
USFWS WPA or WDA
USFWS NWR
USBOR Land
TNC Preserve
State Trust Land
100-year Floodplain

Wetland
USGS Mapped Waterway
USFWS Grassland Easement
USFWS Wetland Easement
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Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Path: \\mpsp-gis-file\GISProj\Minnkota\110900\map_docs\PSC\RouteApp\CGFERPA_02_11x17L_50p_RouteSitingCriteria.mxd

Date: 11/28/2011

15TH ST NE
57TH AVE NE
58TH AVE NE
21
22
23
24
T148N
R 68W
14TH ST NE
27
26
25
Wells County
Eddy County
15TH ST NE
19
T148N
R 67W
Rosefield
61ST AVE NE
20
59TH AVE NE
Fairville
13TH ST NE
56TH AVE NE
33
34
35
36
31
32
60TH AVE NE
56TH AVE SE
58TH AVE SE
59TH AVE SE
12TH ST NE
T147N
R 68W
Woodward
Birtsell

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- Fiber Optic Regeneration Station

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- School
- Business

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- Dump or Landfill
- Irrigated Land
- Public Airport
- Private Airport
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- In-Use Railroad

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- USBOR Land
- TNC Preserve
- State Trust Land
- 100-year Floodplain

- Wetland
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- USFWS Wetland Easement
- USFWS Conservation Easement

Figure 2: Page 24 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

15TH ST NE
62ND AVE NE
63RD AVE NE
64TH AVE NE
T148N
R 67W
21
22
23
24
19
20
Superior
14TH ST NE
Lake Claire
Rosefield Slough
28
27
26
25
62 1/2 AVE NE
13TH ST NE
66TH AVE NE
281
Rocky Run
Kelly Creek
33
34
35
36
31
32
T148N
R 66W
Rosefield
12TH ST NE
Eddy County
Foster County
T147N
R 67W
Birtsell
T147N
R 66W

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- Project ROW
- Project Structure
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Figure 2: Page 25 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

Rosefield
13TH ST NE
64TH AVE NE
66TH AVE NE
Rocky Run
T148N
R 67W
T148N
R 66W
Superior
13TH ST NE
34
35
36
31
32
33
12TH ST NE
Eddy County
Foster County
281
3
2
1
6
5
4
3
Birtsell
65TH AVE NE
Estabrook
T147N
R 67W
T147N
R 66W
Kelly Creek
68TH AVE NE
69TH AVE NE
5TH ST NE
BARLOW
Laydown
Area 3
10
11
12
7
8

This page shows laydown area only.

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USGS Mapped Waterway
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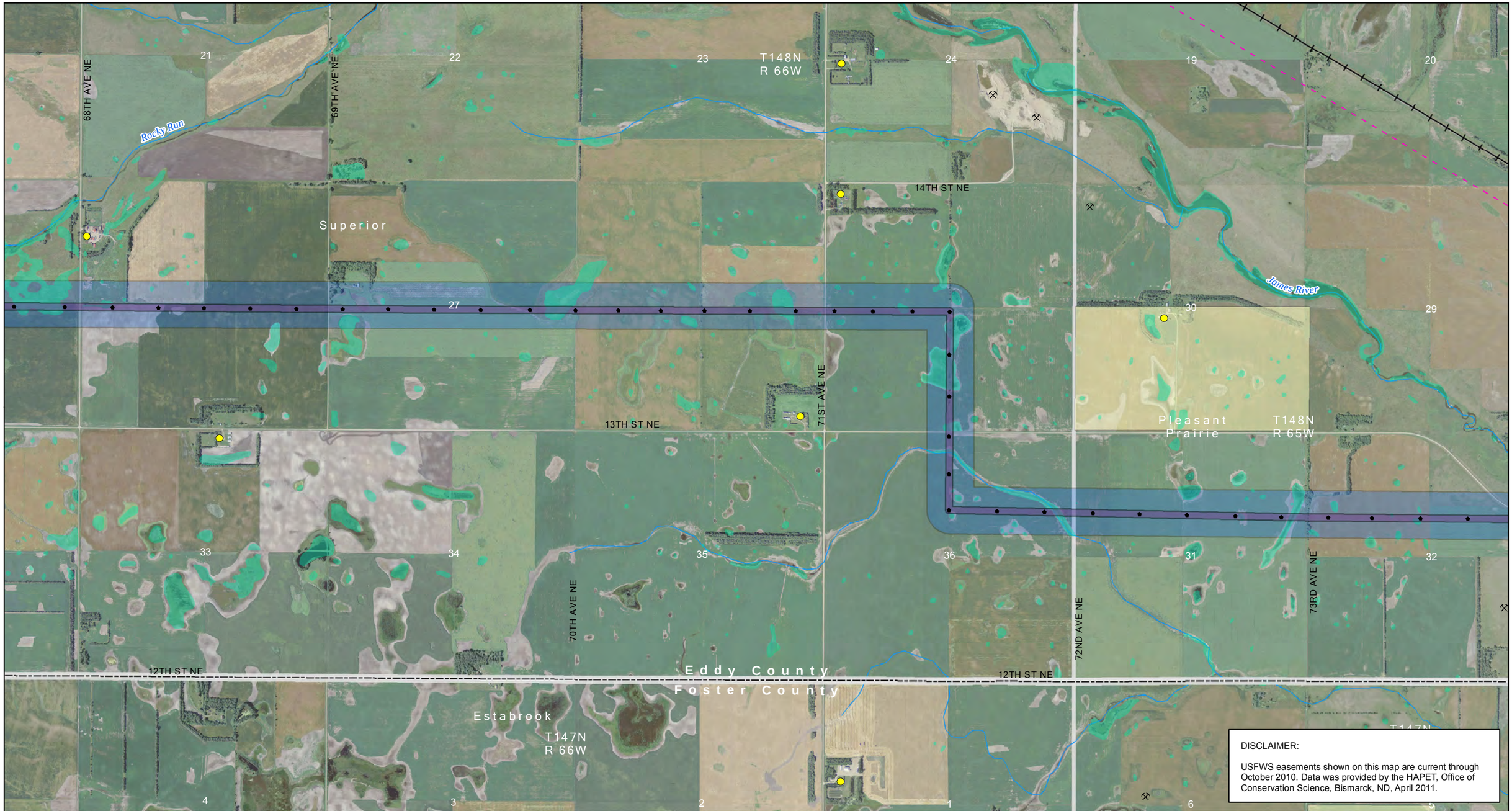
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Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

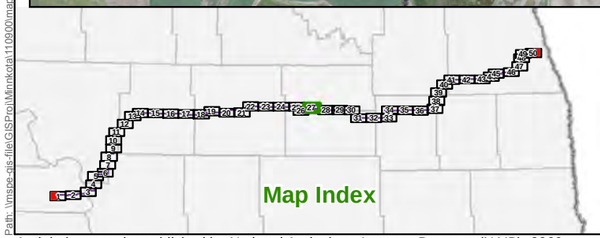
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Scale 1:24,000

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Project ROW
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USFWS Wetland Easement
USFWS Conservation Easement

Figure 2: Page 27 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

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Path: \\mspe-gis-file\GIS\Proj\Minnkota\110900\map_docs\PSC\RouteApp\CGFERPA_02_11x17L_50p_RouteSitingCriteria.mxd

Date: 11/28/2011

Pleasant Prairie

Columbia

T148N R 65W

T148N R 64W

T147N R 65W

T147N R 64W

Nordmore

BRANTFORD

Eddy County

Foster County

76TH AVE NE

77TH AVE NE

74TH AVE NE

75TH AVE NE

78TH AVE NE

79TH AVE NE

13TH ST NE

12TH ST NE

5TH ST NE

Laydown Area 4b

Laydown Area 4a

Laydown Area 4c

James River

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TNC Preserve
State Trust Land
100-year Floodplain

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USFWS Wetland Easement
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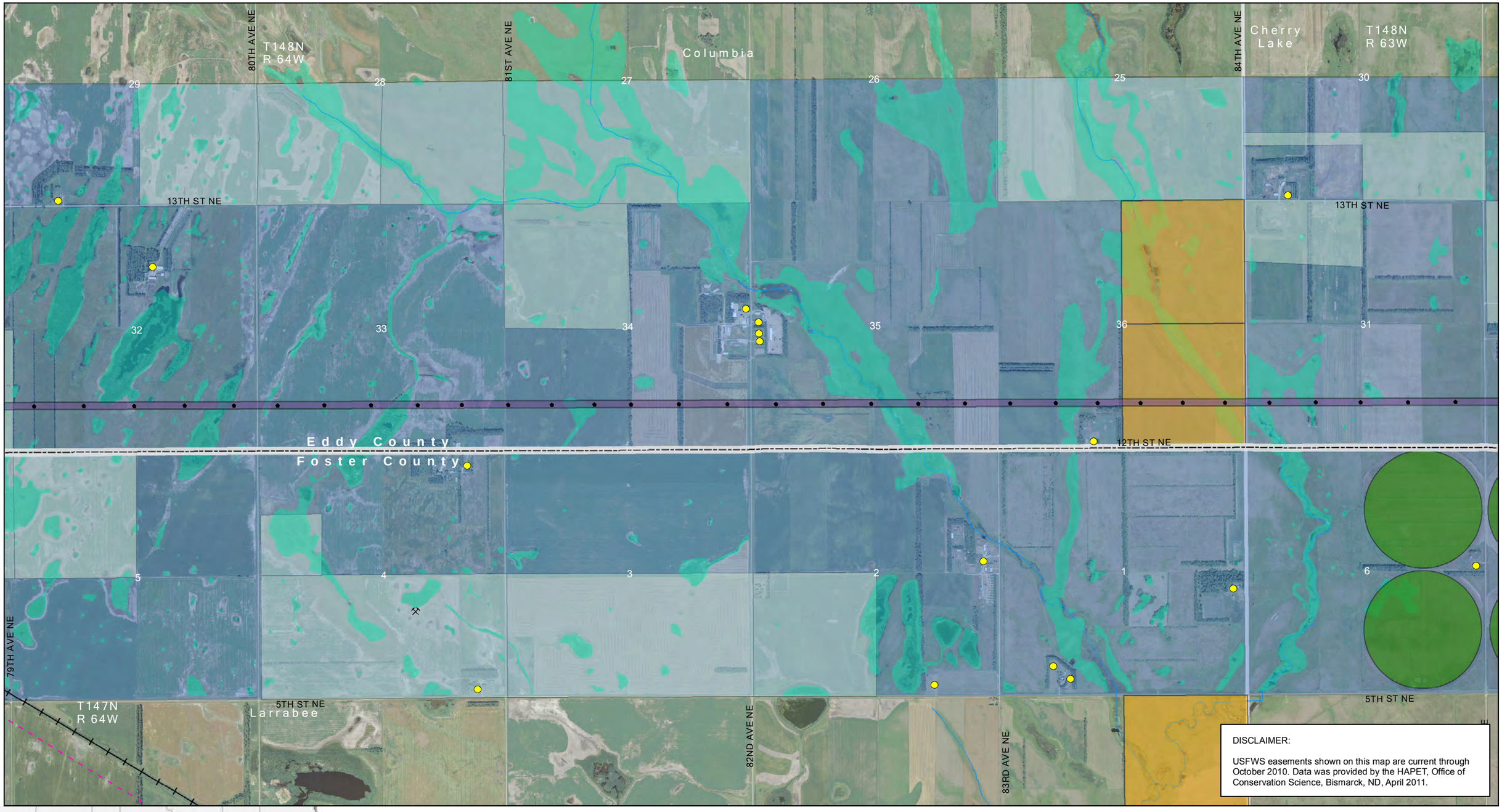
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Route Siting Criteria
Center to Grand Forks Project
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0 2,000 4,000 Feet
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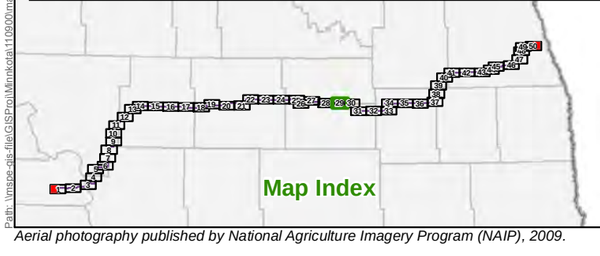
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Date: 11/28/2011



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- 345-kV AC
- 250-kV DC
- 230-kV AC
- 115-kV or less AC
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- Not Occupiable Home within 500 ft of Transmission Facility
- Occupiable Home beyond 500 ft of Transmission Facility
- School
- Business

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- Dump or Landfill
- Irrigated Land
- Public Airport
- Private Airport
- Incorporated Area
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- State Park, Recreation Area or WMA
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- USFWS NWR
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- State Trust Land
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- Wetland
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- USFWS Conservation Easement

Figure 2: Page 29 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

Columbia
T148N
R 64W

84TH AVE NE

30 29 28 27 26 25

13TH ST NE

88TH AVE NE

T148N
R 63W

31 32 33 34 35 36

85TH AVE NE

86TH AVE NE

Round Lake

Cherry Lake

89TH AVE NE

12TH ST NE

Eddy County
Foster County

6 5 4 3 2 1

Topp WPA

Florance

T147N
R 63W

5TH ST NE

T147N
R 64W

87TH AVE NE

7 8 9 10 11

Larrabee

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Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

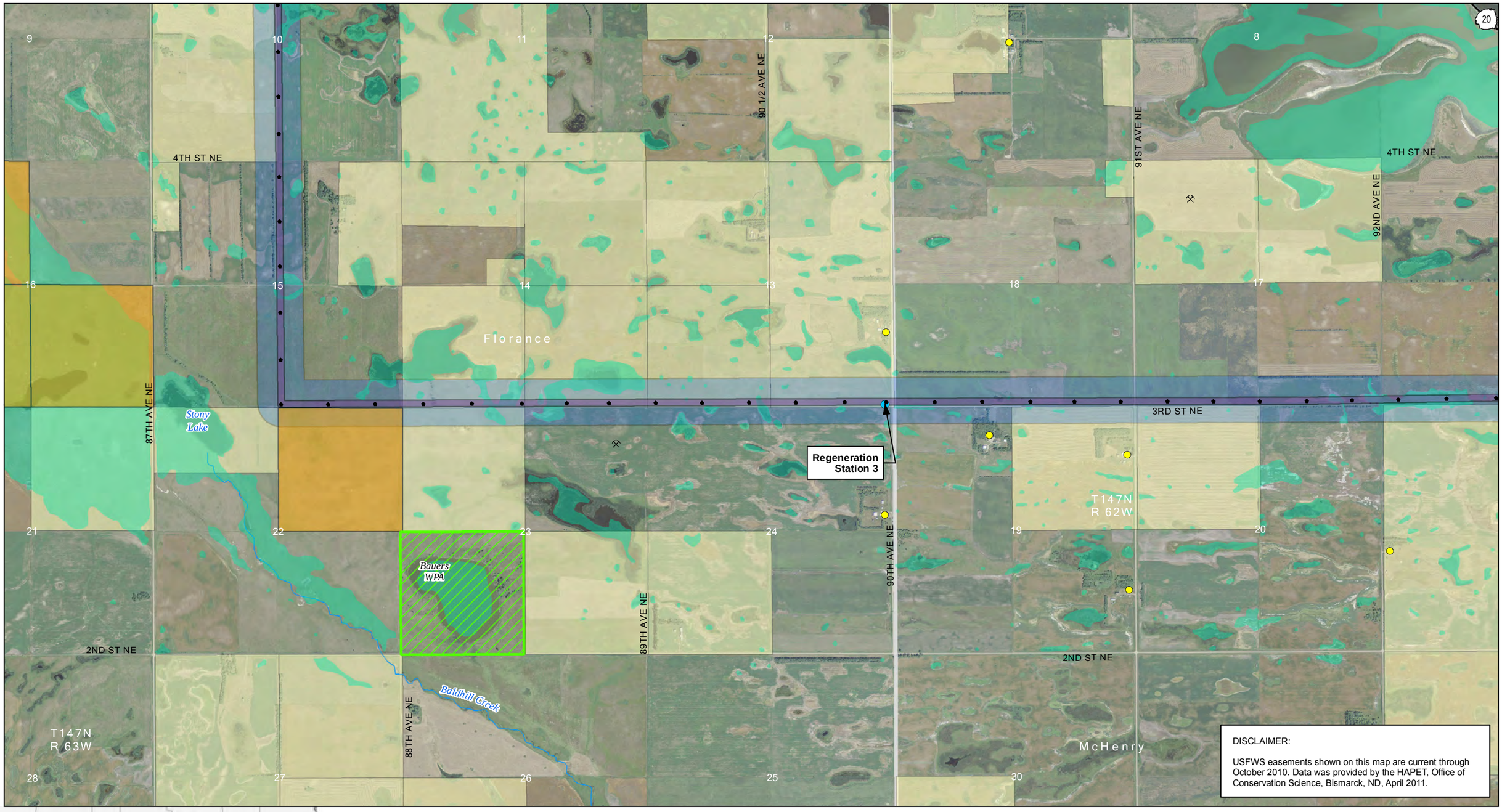
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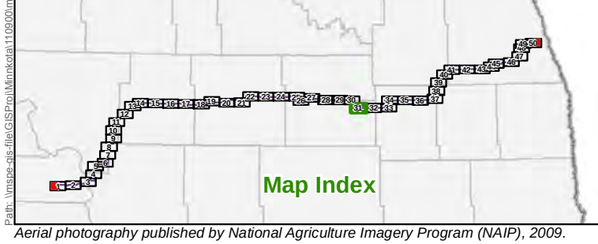
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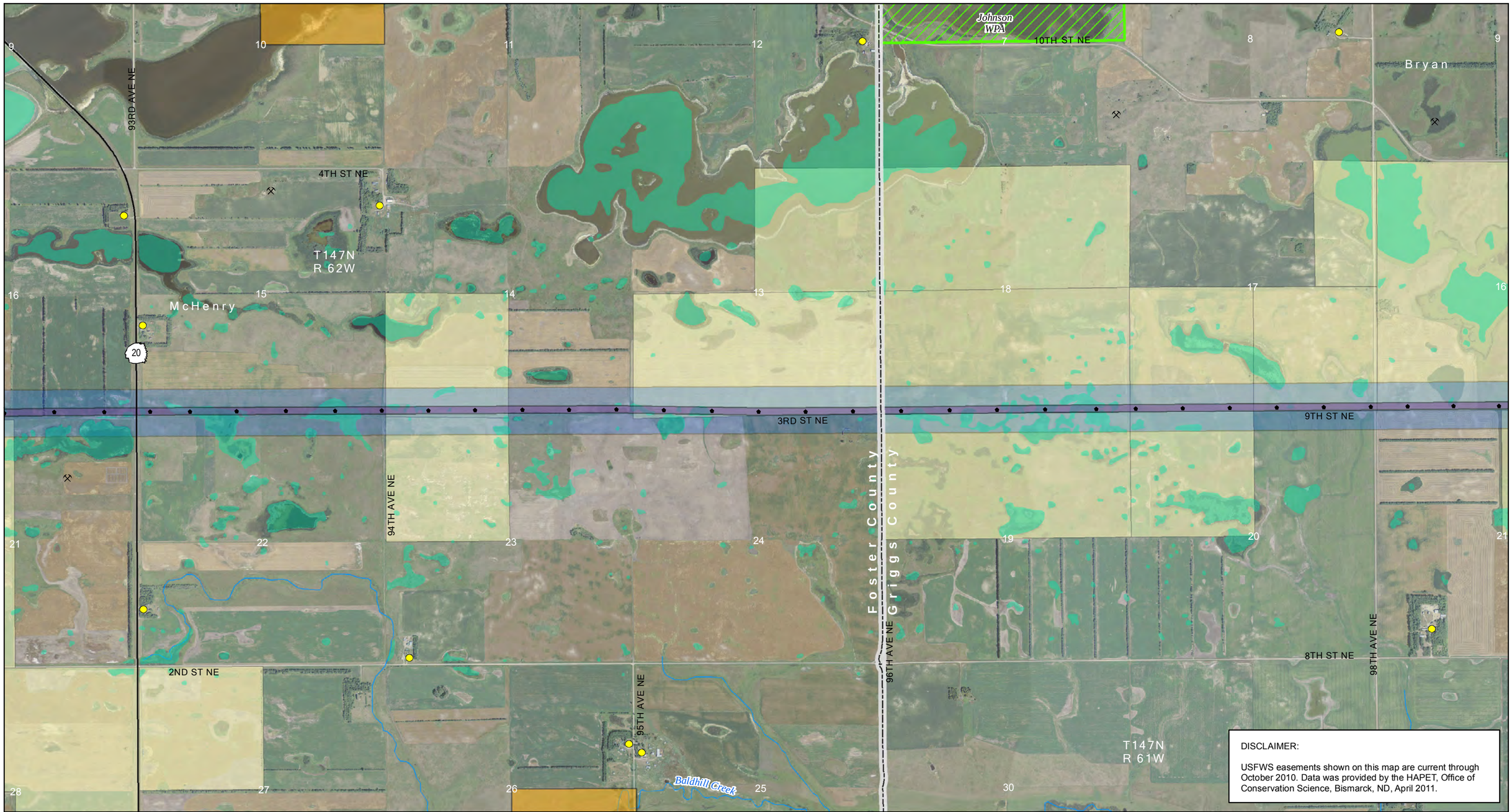
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Figure 2: Page 31 of 50
Route Siting Criteria
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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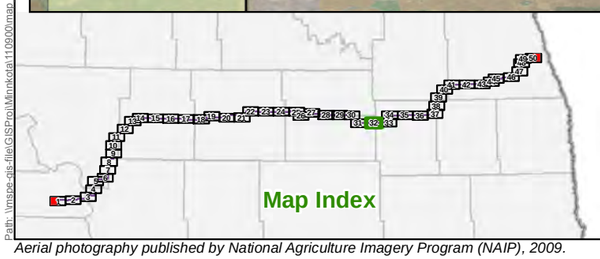
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Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

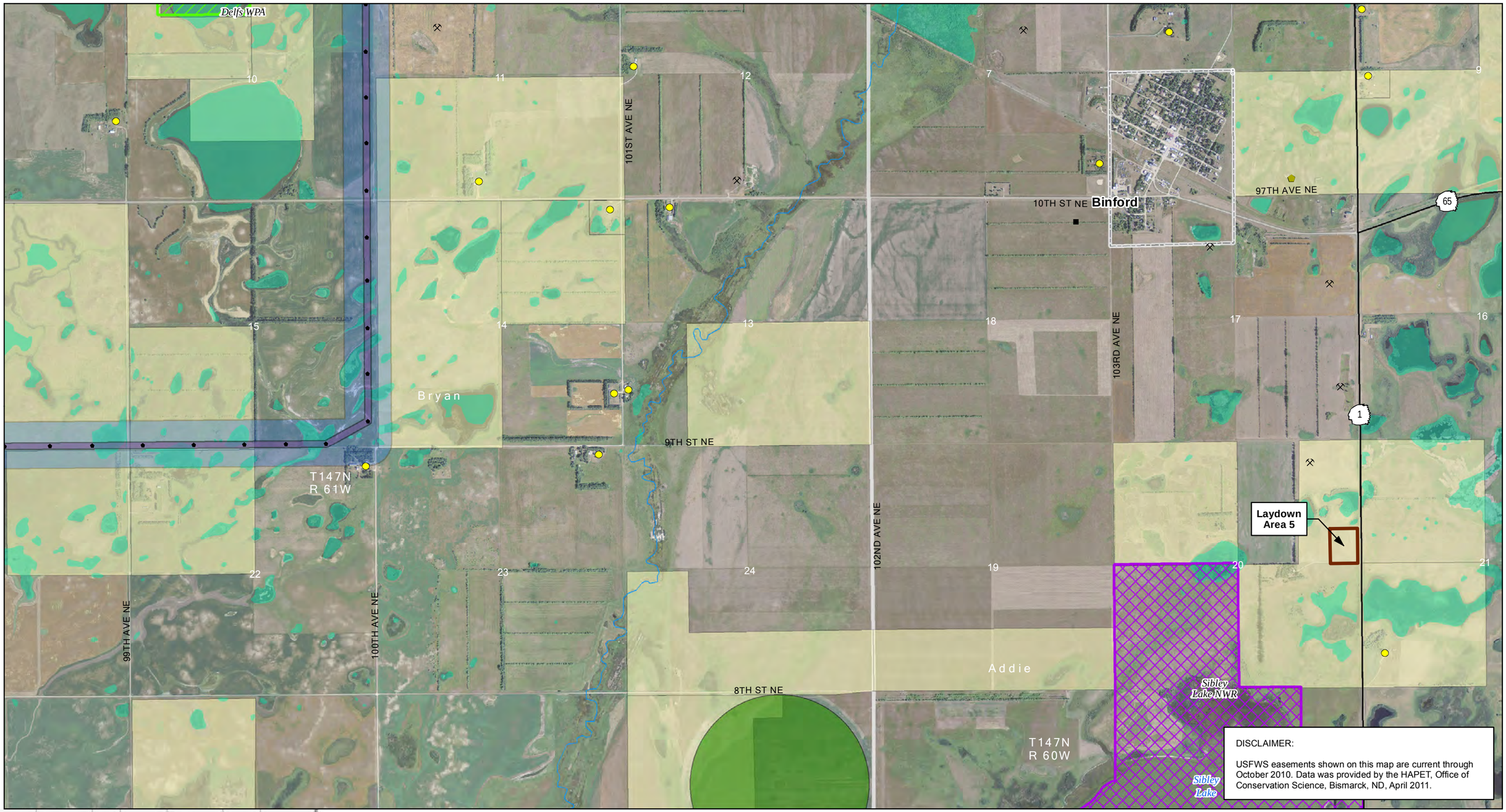
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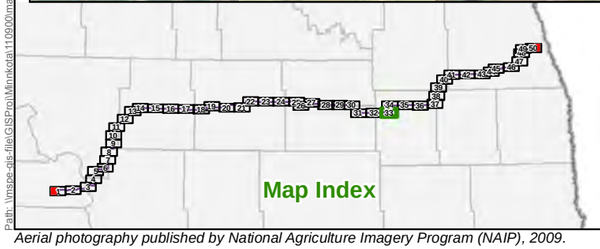
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Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

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Rosendal
Willow
Bryan
Addie
Plum Lake
Delfs WPA

13TH ST NE
13 1/2 ST NE
12TH ST NE
11 1/2 ST NE
11TH ST NE
99TH AVE NE
100TH AVE NE
101ST AVE NE
101 1/2 AVE NE
102ND AVE NE
103RD AVE NE
103 1/2 AVE NE

T148N R 61W
T148N R 60W
T147N R 61W
T147N R 60W

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Date: 11/28/2011

Tande WPA

Lake Norway

Lake Silver

Plum Lake

Long Lake

Willow

Addie

Tyrol

Pilot Mound

T148N R 60W

T147N R 60W

T148N R 59W

T147N R 59W

106TH AVE NE

105TH AVE NE

107TH AVE NE

108TH AVE NE

109TH AVE NE

110TH AVE NE

13TH ST NE

12TH ST NE

11TH ST NE

3

4 - Not Occupiable

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T148N
R 59W

T148N
R 58W

T147N
R 59W

T147N
R 58W

Pilot
Mound

Tyrol

Lenora

Romness

111TH AVE NE

113TH AVE NE

113 1/2 AVE NE

114TH AVE NE

115 1/2 AVE NE

115TH AVE NE

116TH AVE NE

116 1/2 AVE NE

13TH ST NE

12TH ST NE

11TH ST NE

10 1/2 ST NE

North Country National Scenic Trail

Sheyenne River

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14TH ST NE

T148N
R 58W

27

26

25

118TH AVE NE

13TH ST NE

45

Lenora

34

35

36

119TH AVE NE

Griggs County

Steele County

14TH ST NE

Sharon

29

T148N
R 57W

28

32

31

121ST AVE NE

32

33

122ND AVE NE

12TH ST NE

5

T147N
R 58W

3

2

1

Pickerel Lake Creek

117TH AVE NE

Romness

11TH ST NE

120TH AVE NE

6

5

4

T147N
R 57W

Franklin

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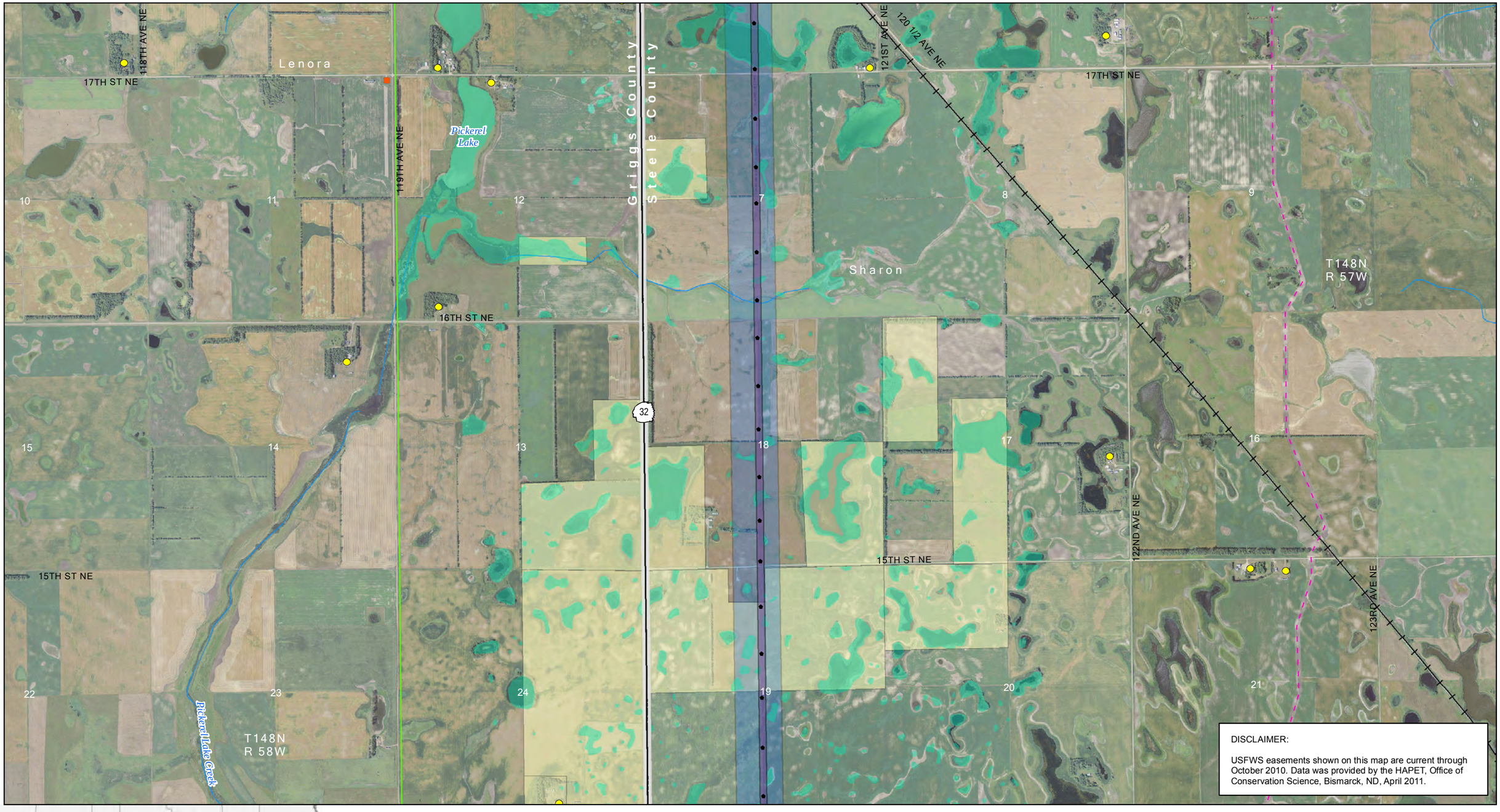
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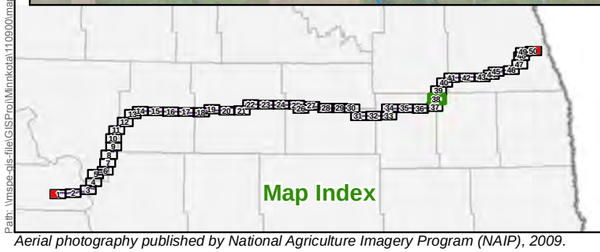
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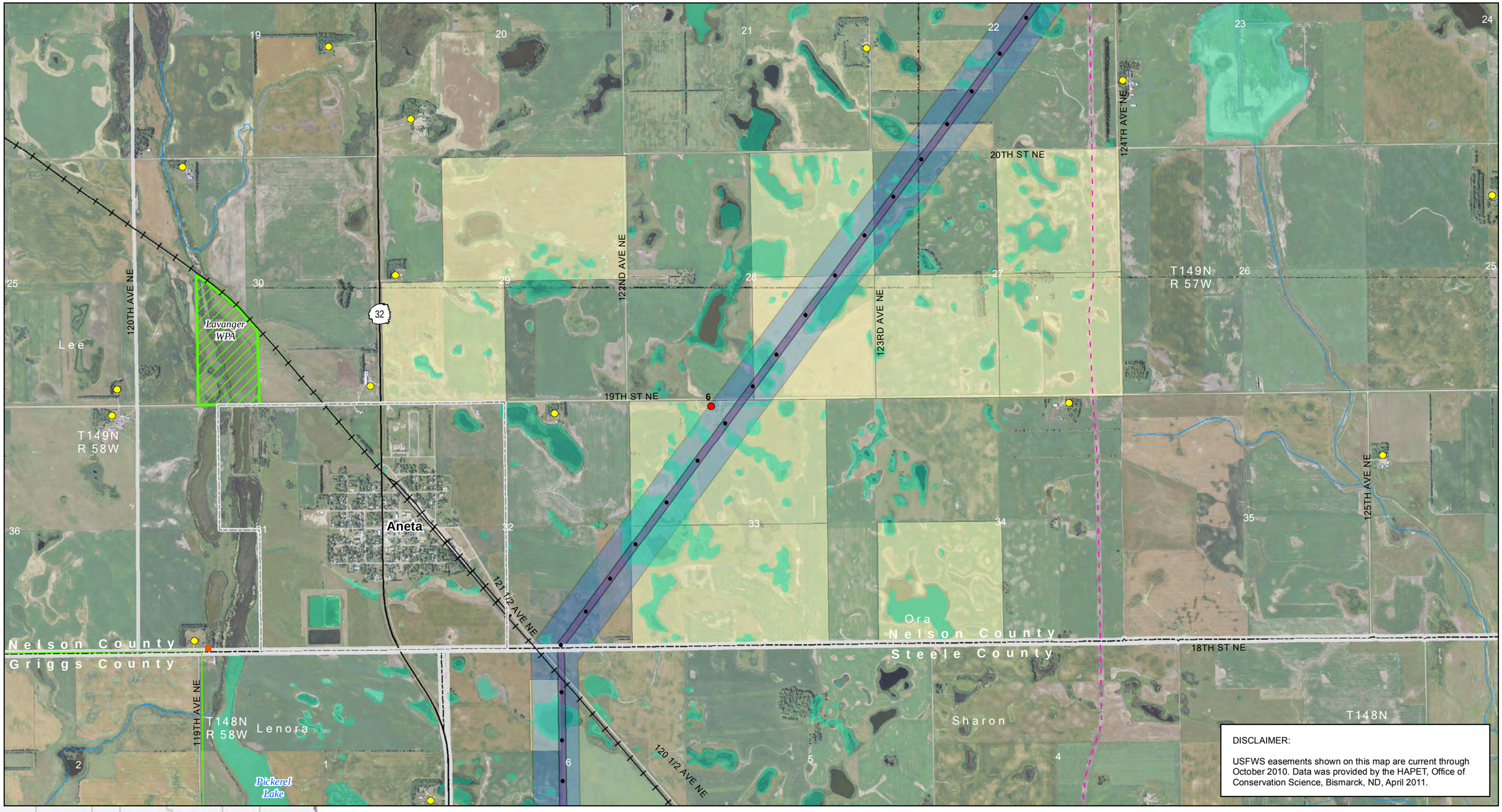
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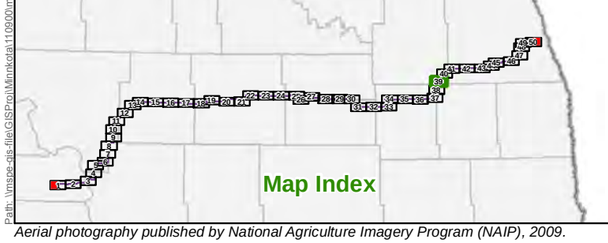
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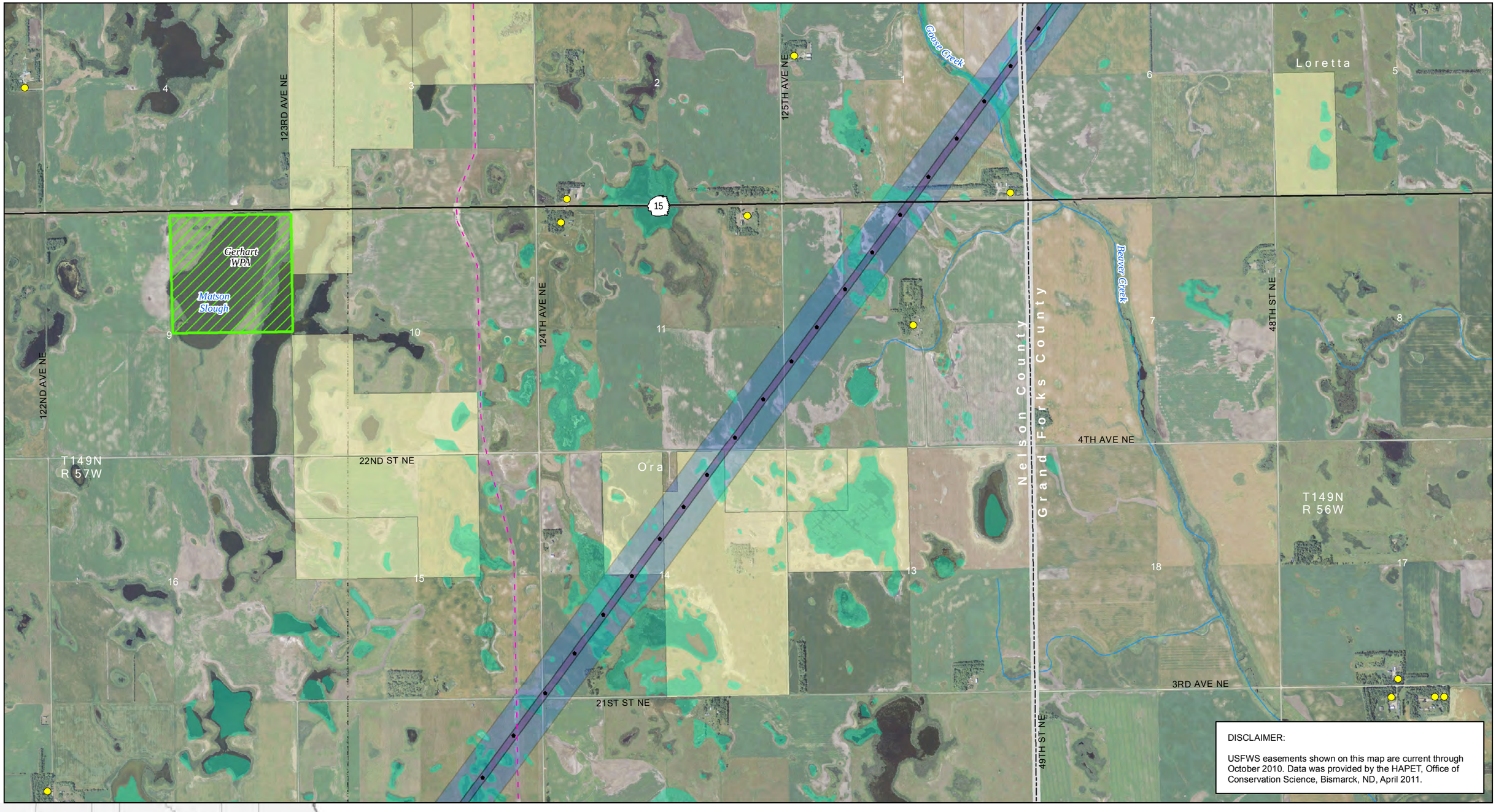
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0 2,000 4,000 Feet

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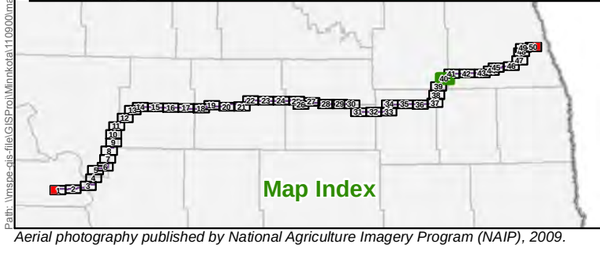
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Rugh

Goose Creek

25TH ST NE

Nelson County

Grand Forks County

Logan Center

7TH AVE NE

T150N R 56W

T150N R 57W

24TH ST NE

Ora

6TH AVE NE

47TH ST NE

48TH ST NE

125TH AVE NE

Regeneration Station 4

T149N R 57W

Loretta

46TH ST

46TH ST NE

47TH ST

49TH ST NE

Beaver Creek

15

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Laydown Area
Fiber Optic Regeneration Station

Existing Transmission Lines
400-kV DC
345-kV AC
250-kV DC
230-kV AC
115-kV or less AC
Gas or Oil Pipeline

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Dump or Landfill
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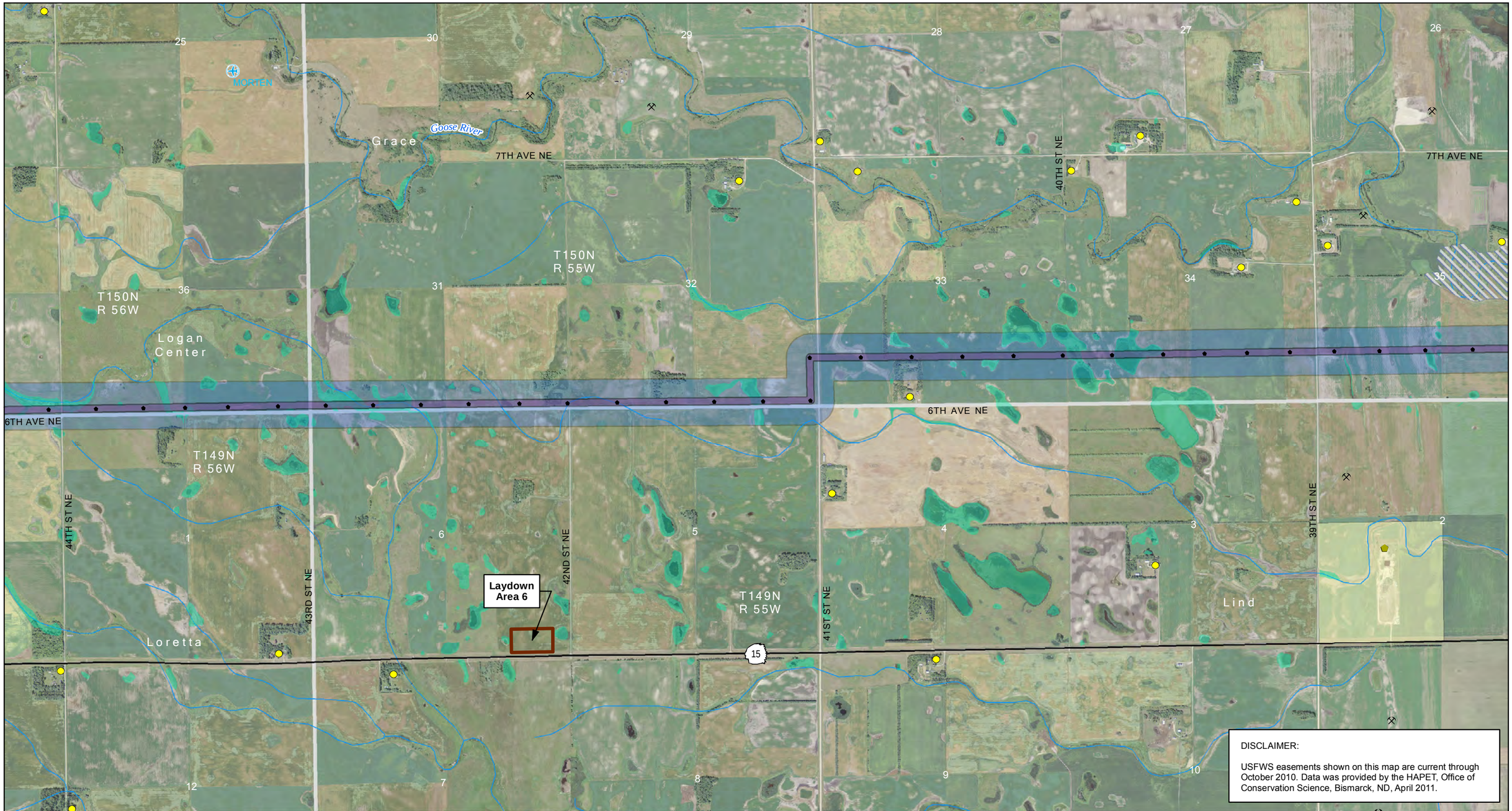
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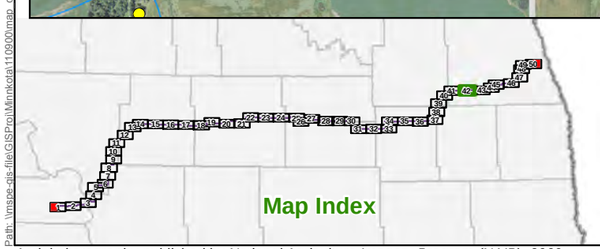
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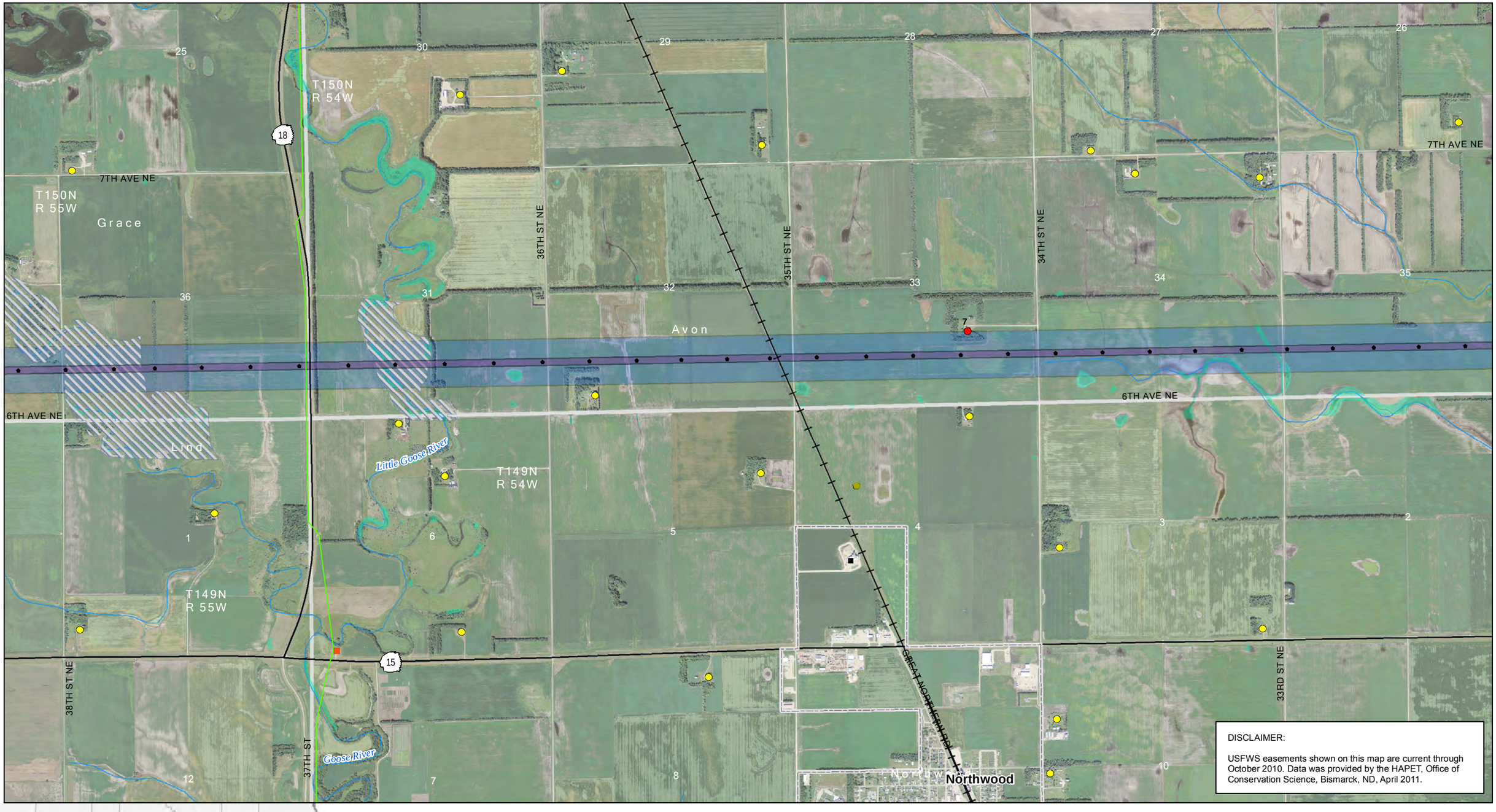
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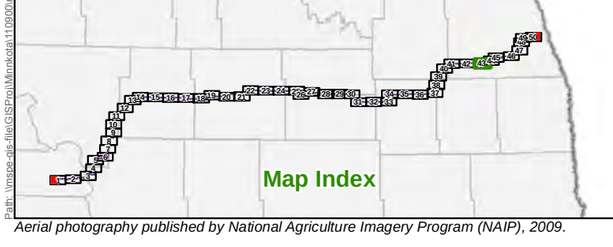
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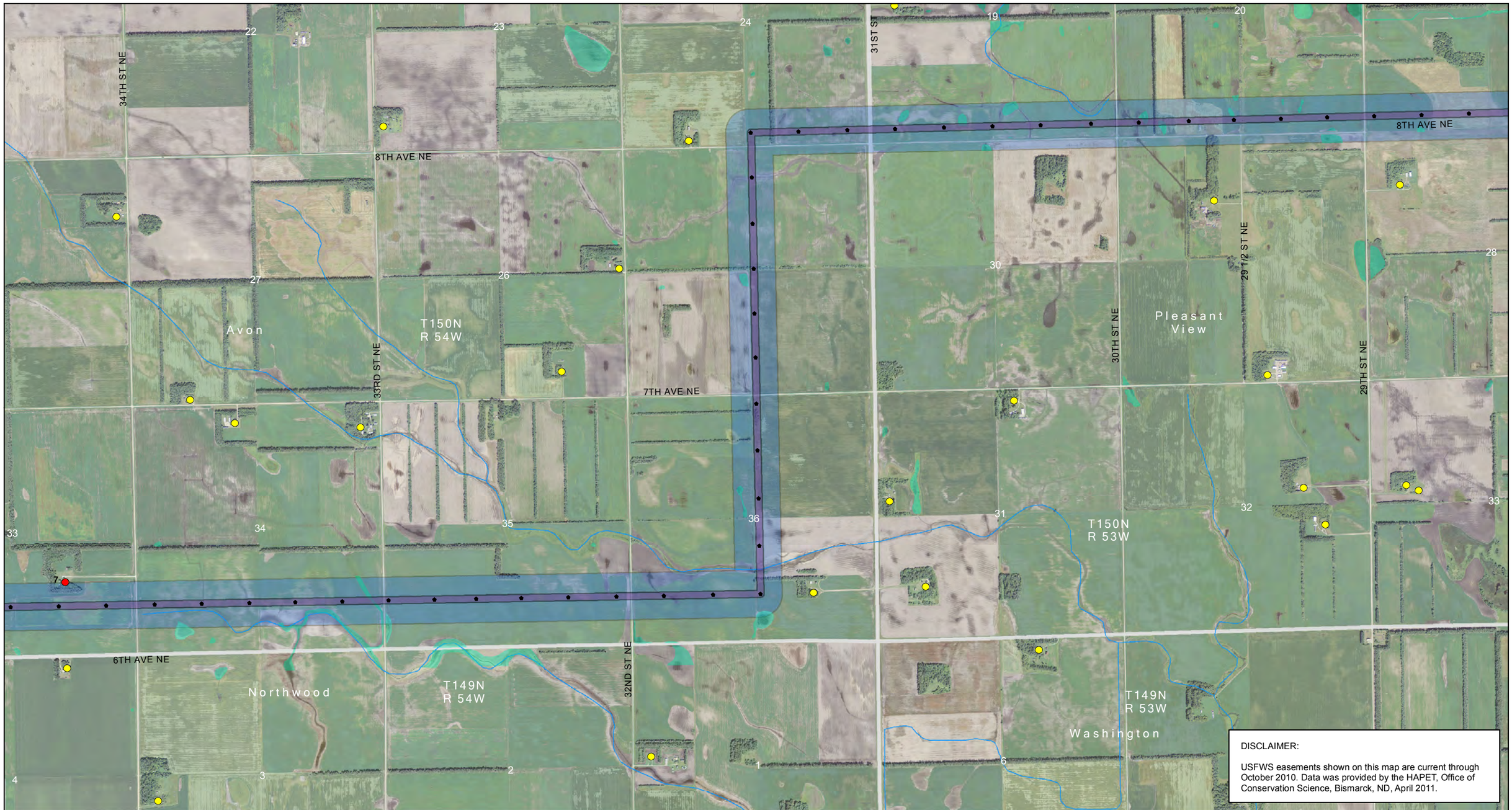
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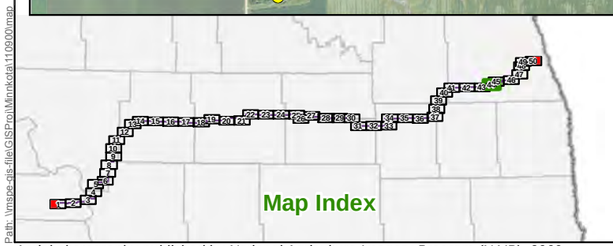
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Route Siting Criteria
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0 2,000 4,000 Feet

Scale 1:24,000

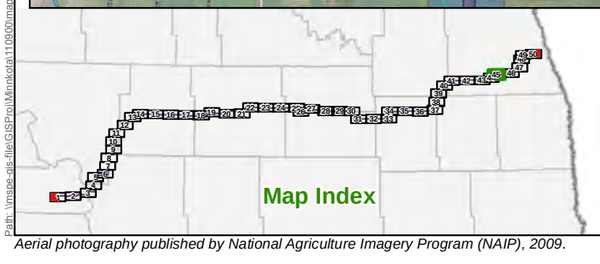
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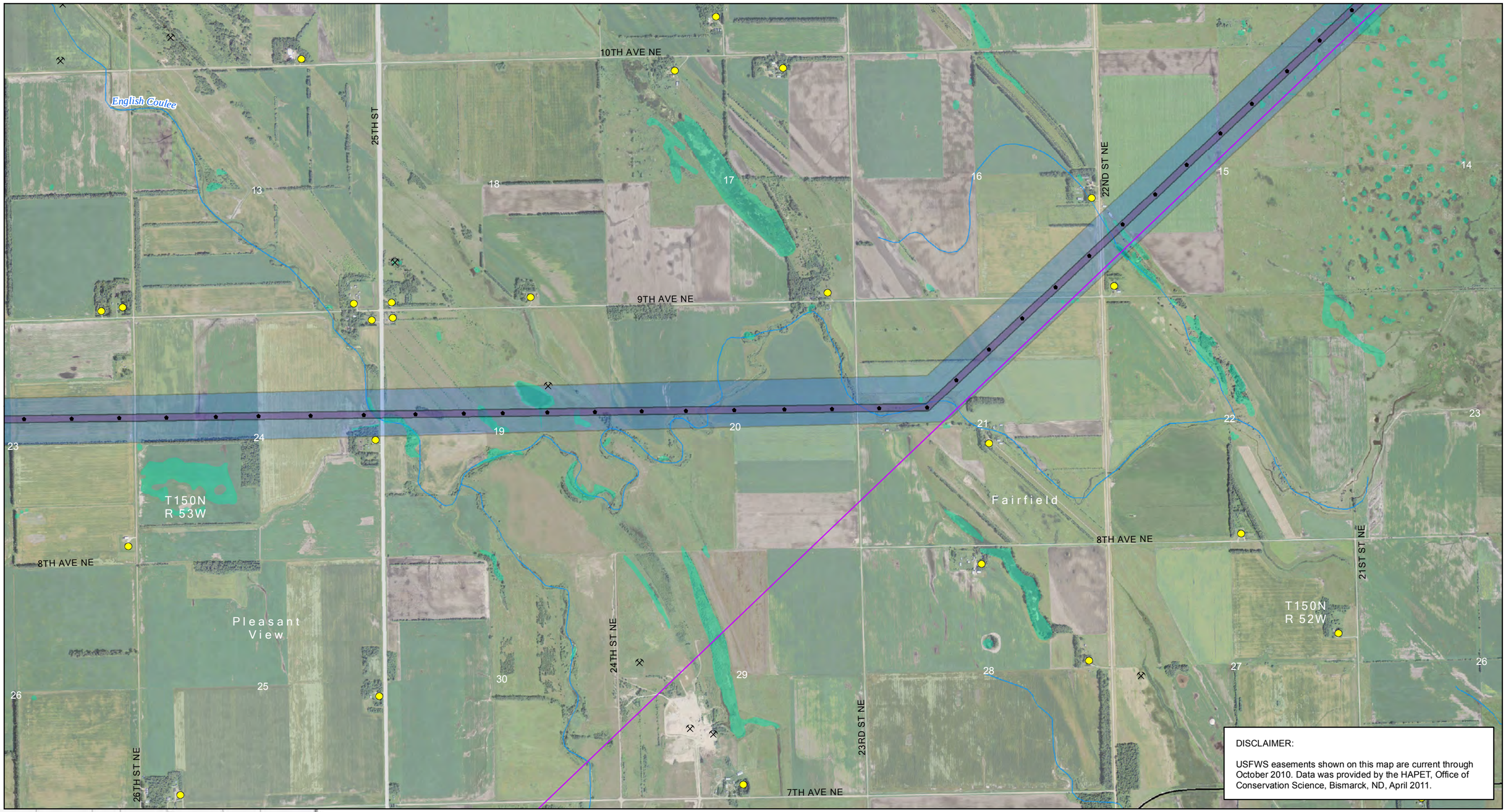
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Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:24,000

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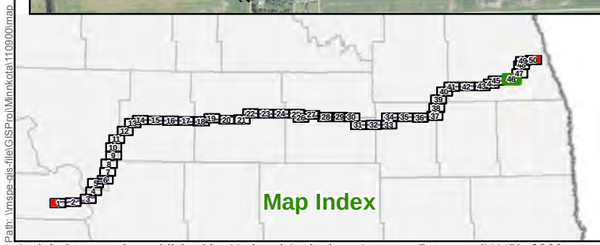
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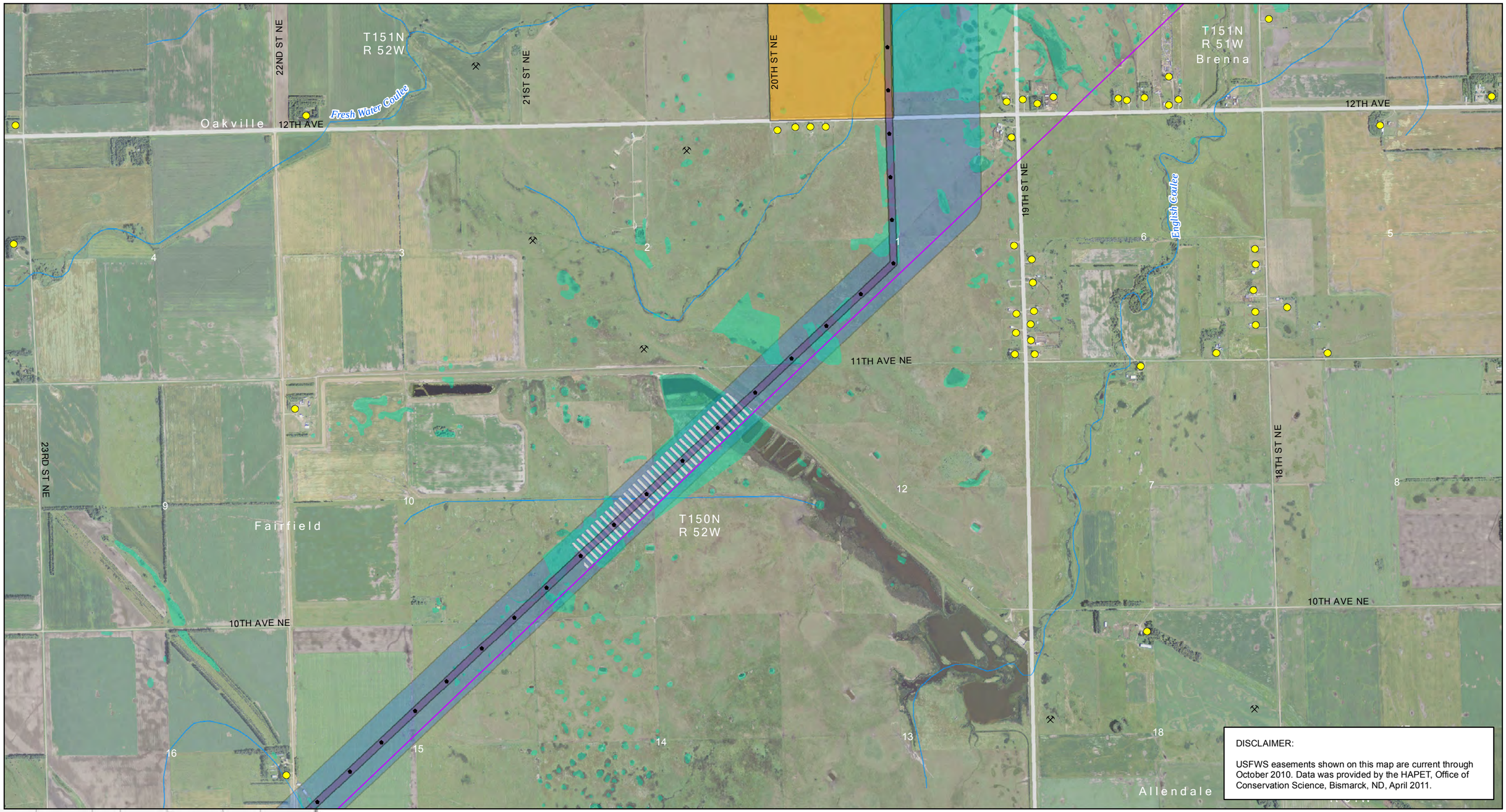
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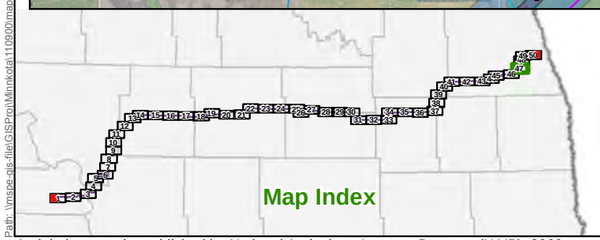
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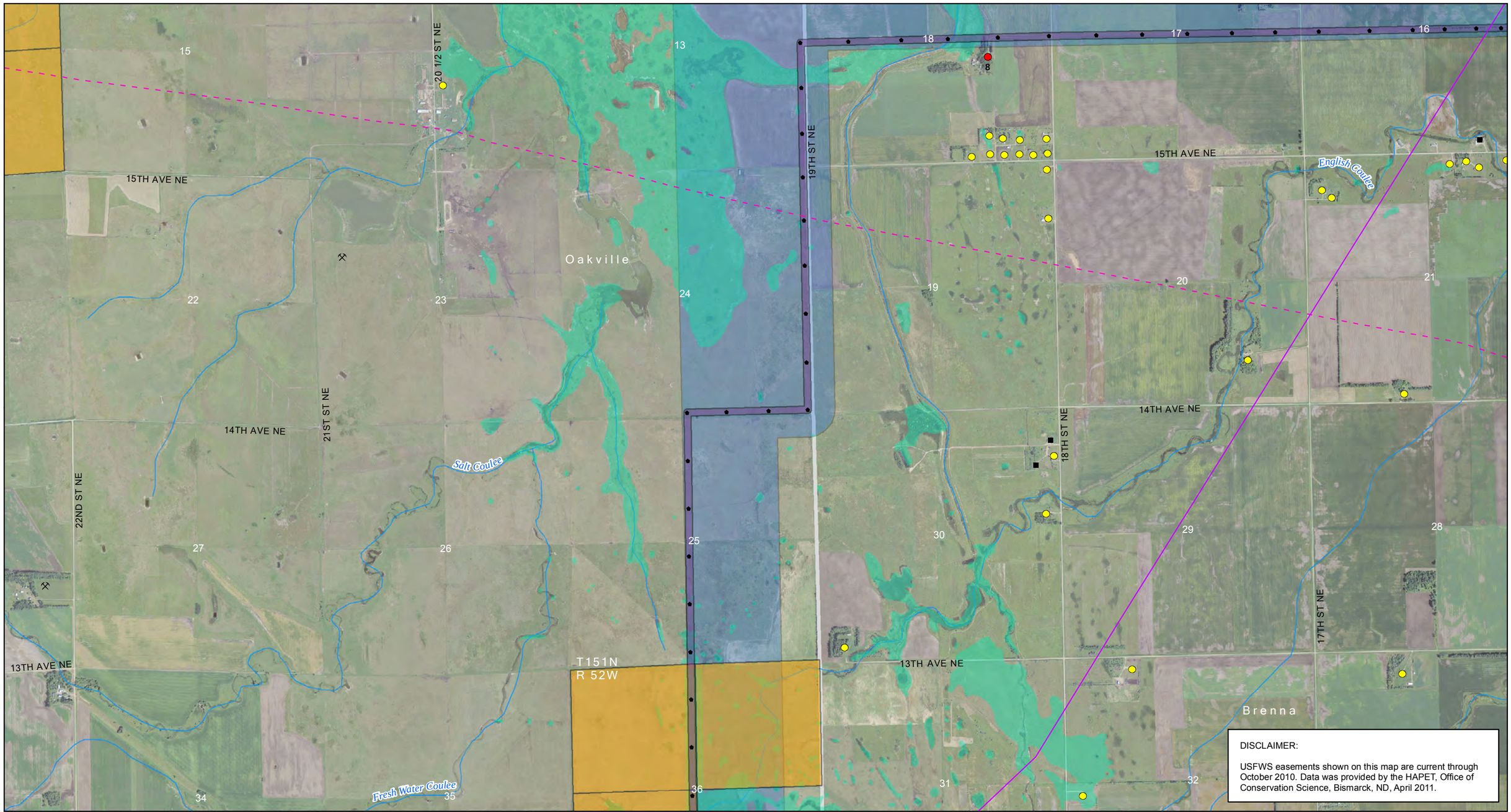
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0 2,000 4,000 Feet

Scale 1:24,000

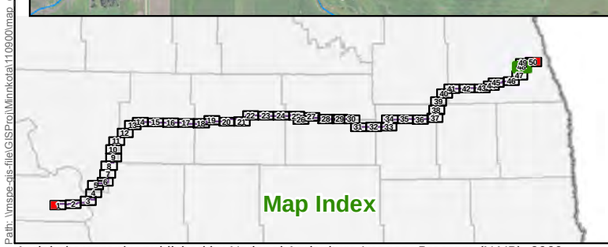
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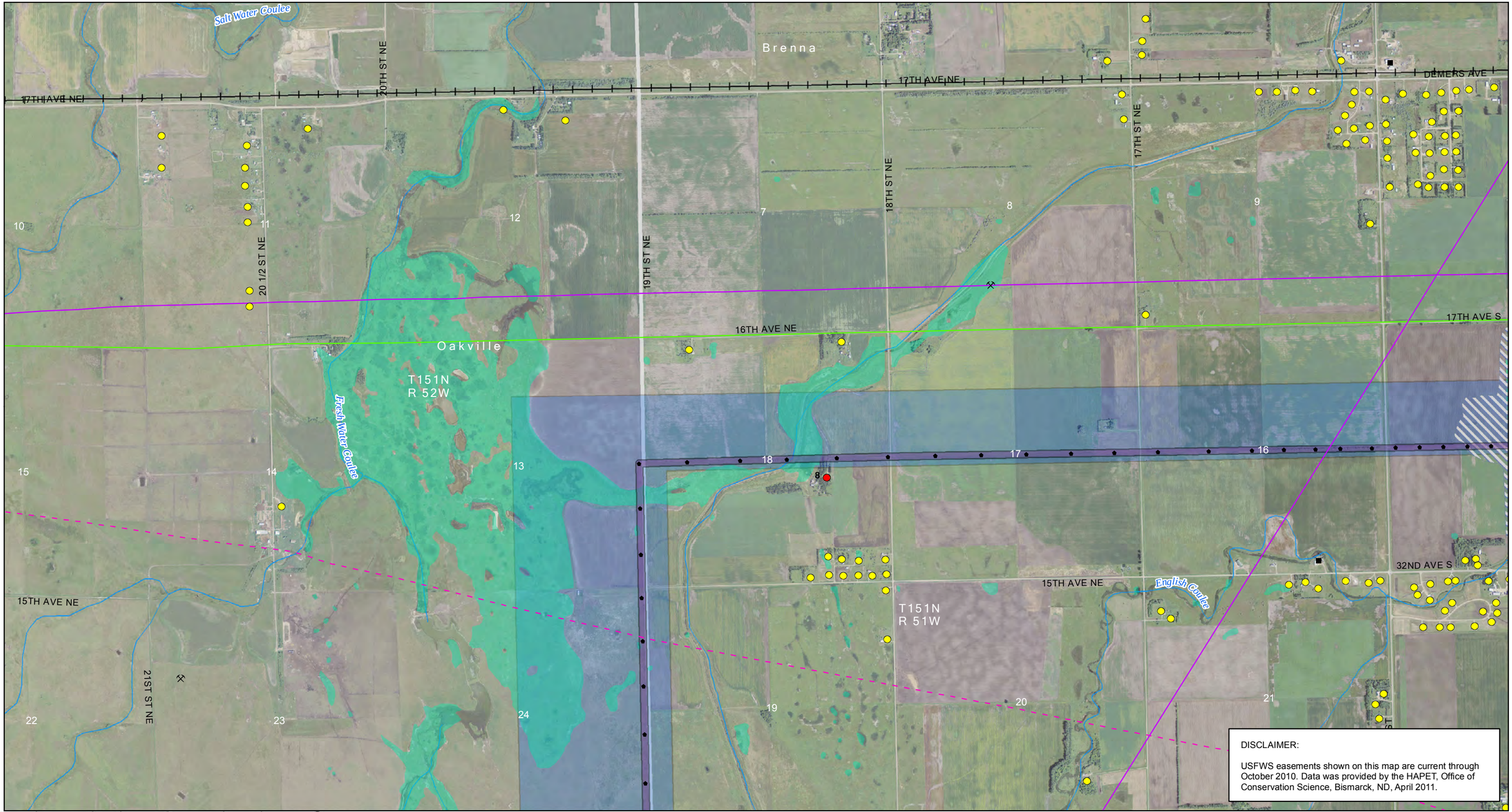
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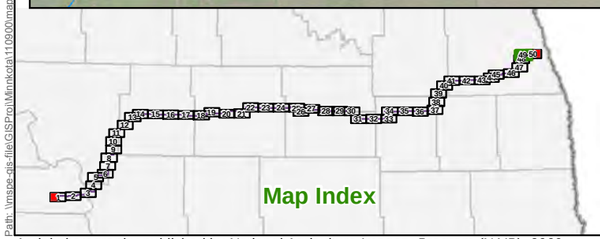
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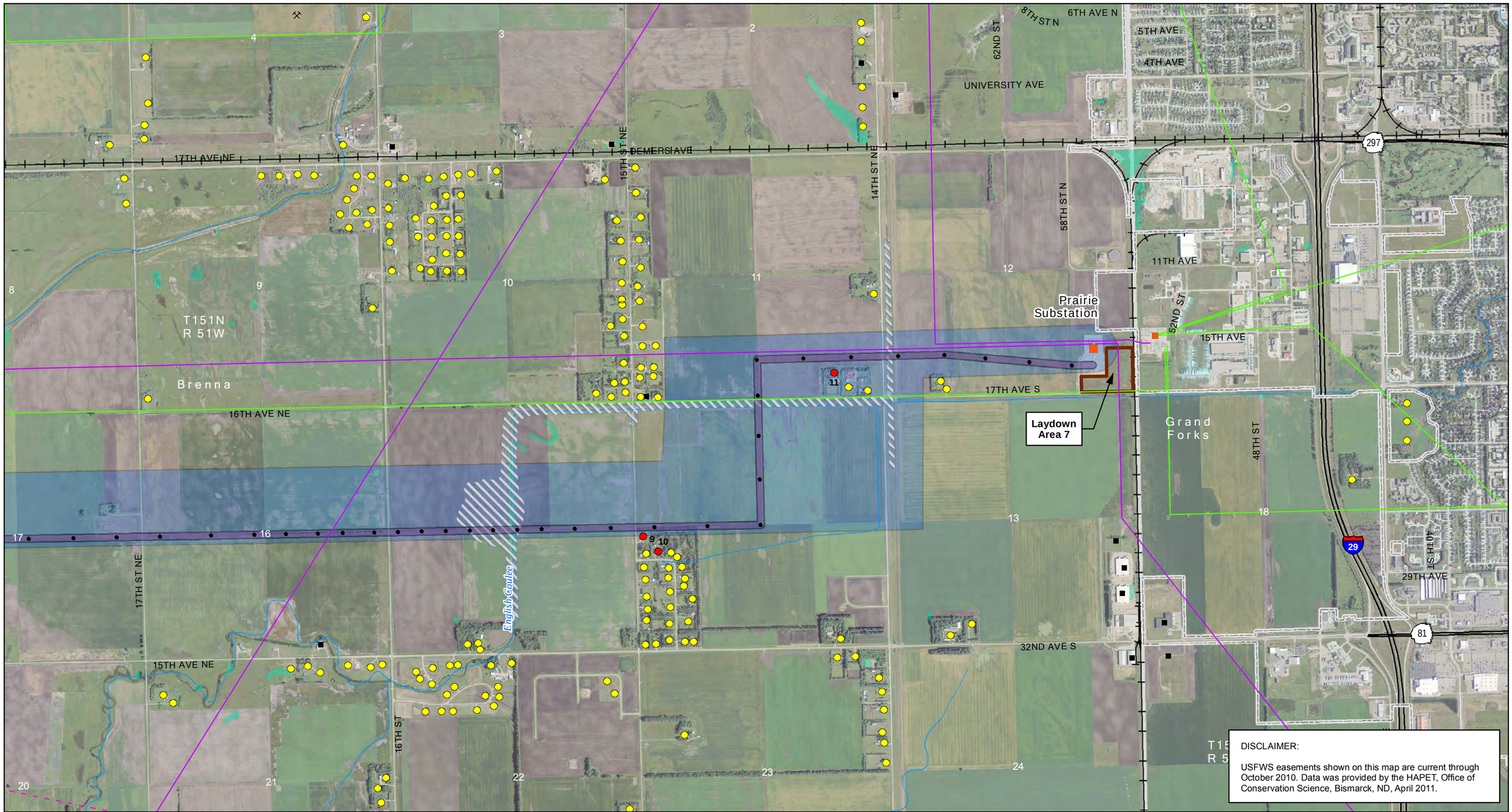
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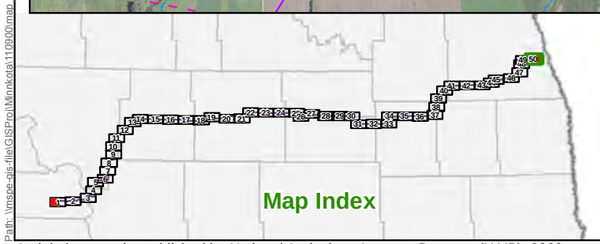
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0 2,000 4,000 Feet

Scale 1:24,000

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22ND ST SW
32ND AVE SW
33RD AVE SW
T142N
R 83W
T142N
R 82W
29
28
27
26
25
30
1 -
Minnkota-owned
Wilbur
Boldt WMA
Substation
Expansion
Area
Center 345 kV
Substation
Square Butte
230 kV Substation
Laydown
Area 1b
Laydown
Area 1a
32
Nelson
Lake
34
35
36
31
23RD ST SW
24TH ST SW
24 1/2 ST SW
Hagel Creek
35TH AVE SW
5
4
3
2
1
6
26TH ST SW
25 1/2 ST
31ST AVE SW
30TH AVE SW
T141N
R 82W
T141N
R 83W
Square Butte Creek

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- Proposed Structure
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Fiber Optic Regeneration Station

Sensitive location information has been redacted from this Figure.

Exclusion Areas
- State Park, Recreation Area or Nature Preserve
- Piping Plover Critical Habitat

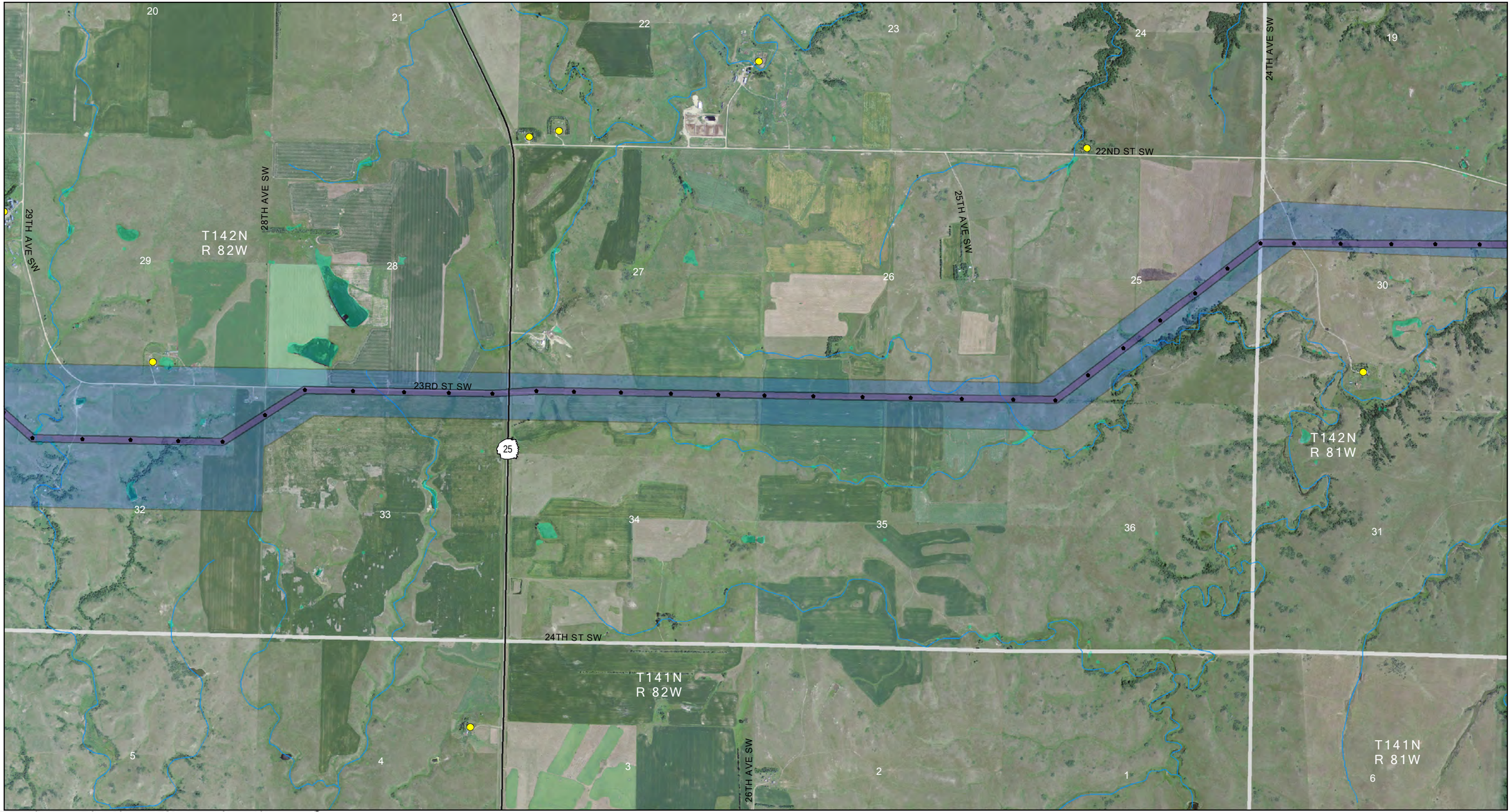
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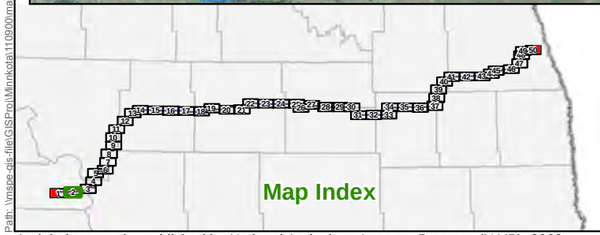
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Figure 3: Page 1 of 50
Route Exclusion and Avoidance Areas
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Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Date: 11/28/2011





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- National Trail

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Figure 3: Page 2 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

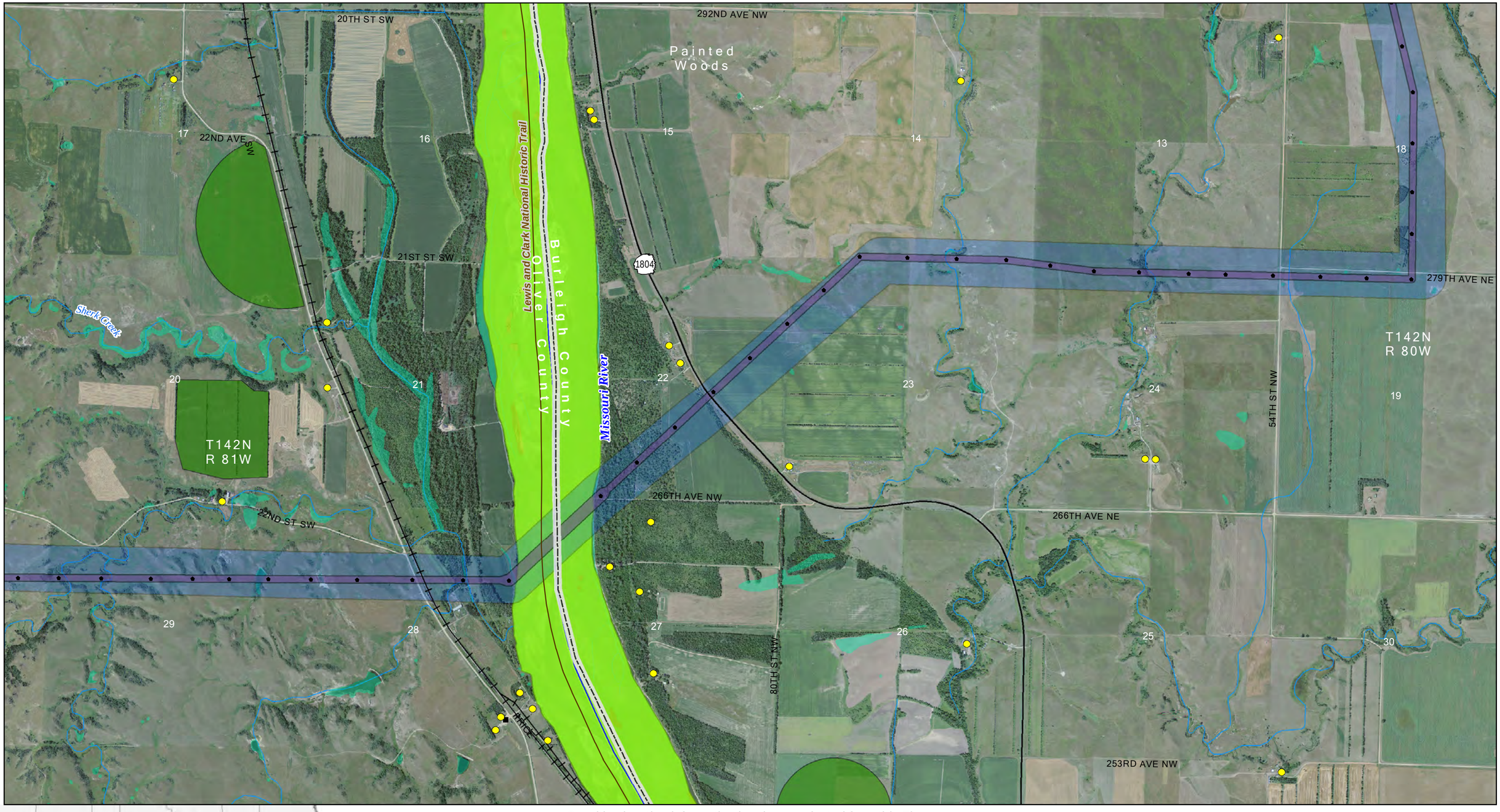
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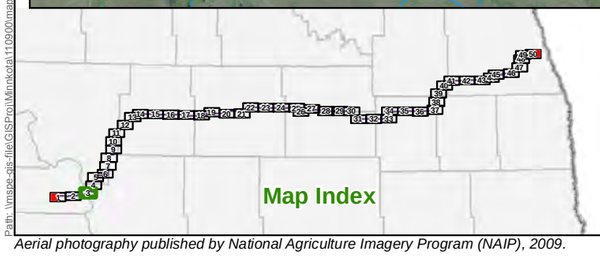
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Date: 11/28/2011

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Project Areas

- Project ROW
- Proposed Structure
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Fiber Optic Regeneration Station

Sensitive location information has been redacted from this Figure.

Exclusion Areas

- State Park, Recreation Area or Nature Preserve
- Piping Plover Critical Habitat

Avoidance Areas

- Occupiable Home within 500 ft of Transmission Facility
- Not Occupiable Home within 500 ft of Transmission Facility
- Occupiable Home beyond 500 ft of Transmission Facility
- School
- Business
- Irrigated Land
- USFWS NWR
- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

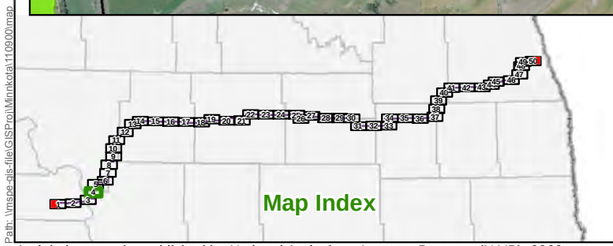
Figure 3: Page 3 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011





Project Areas
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- Business
- Irrigated Land
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- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

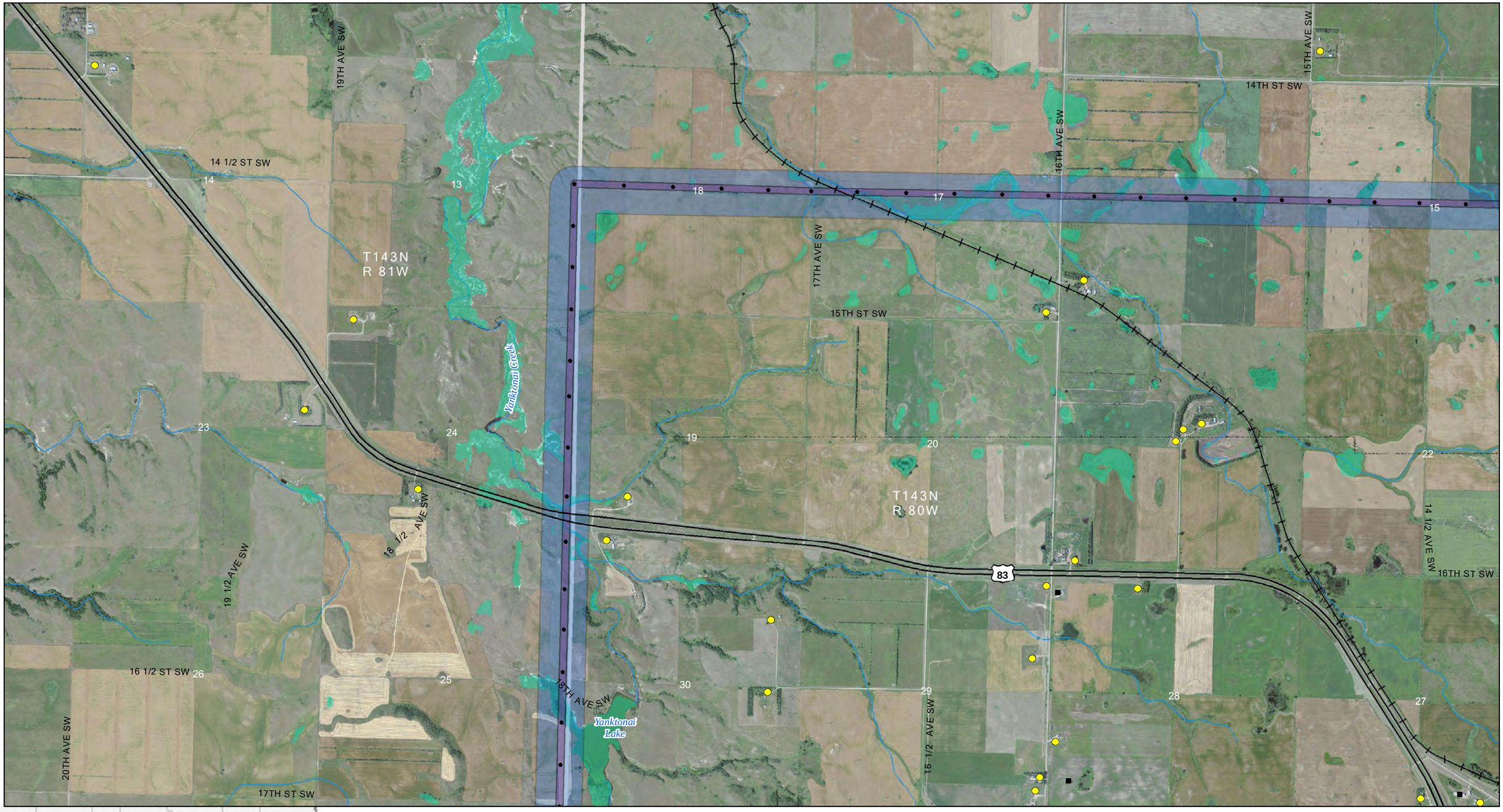
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Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

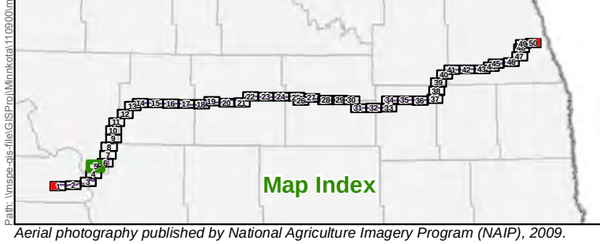
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Date: 11/28/2011





Project Areas

- Project ROW
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- Proposed Modified Corridor – November 18, 2011
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- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 5 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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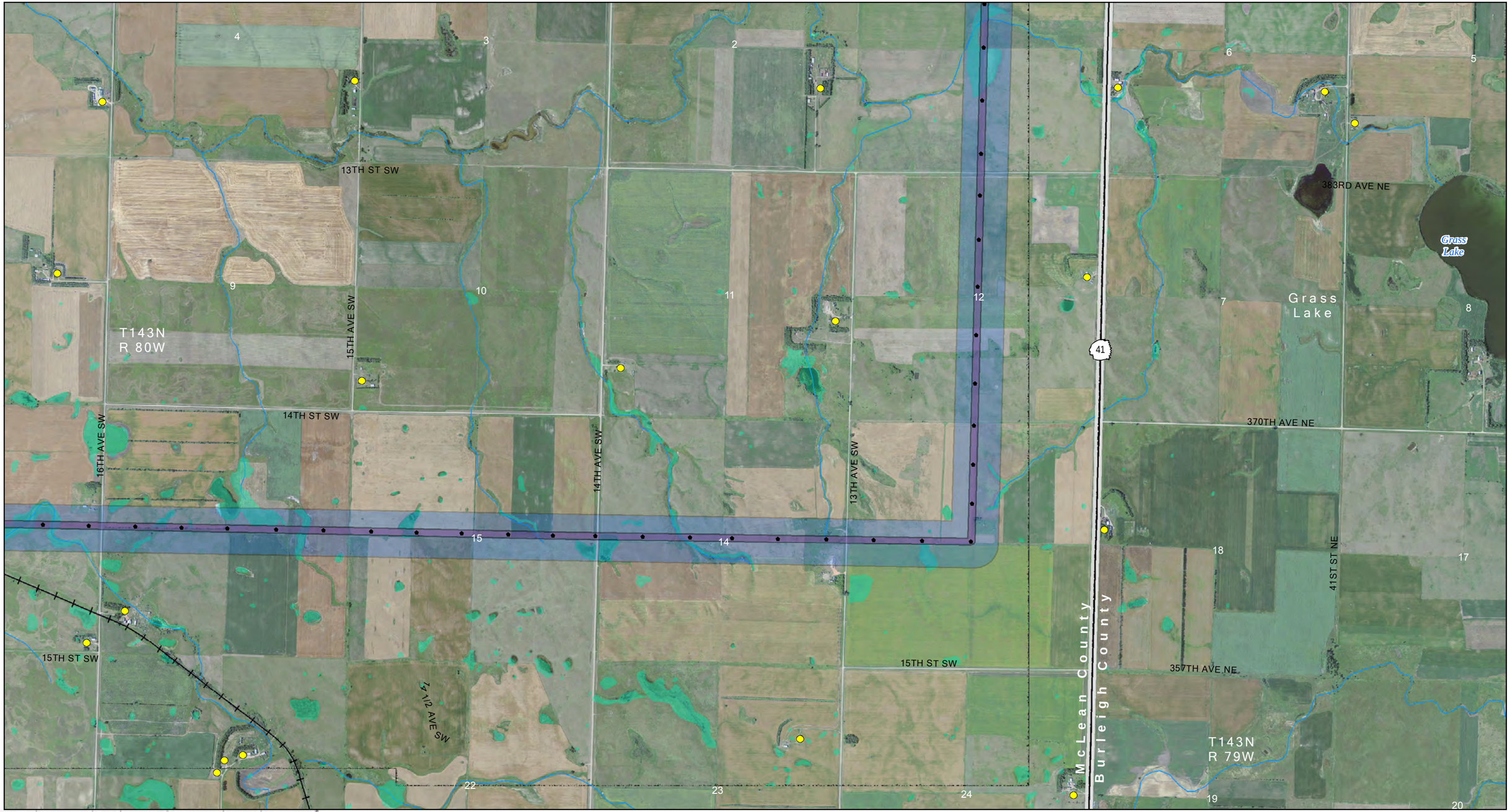
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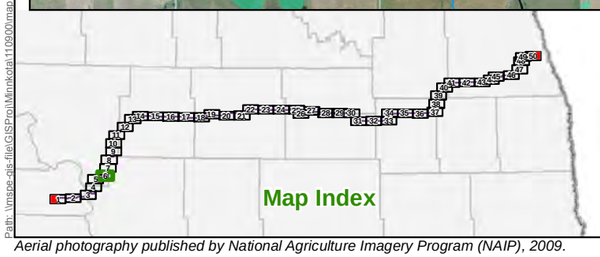
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Project Areas

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- Business
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- USFWS WPA or WDA
- State WMA
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- National Trail

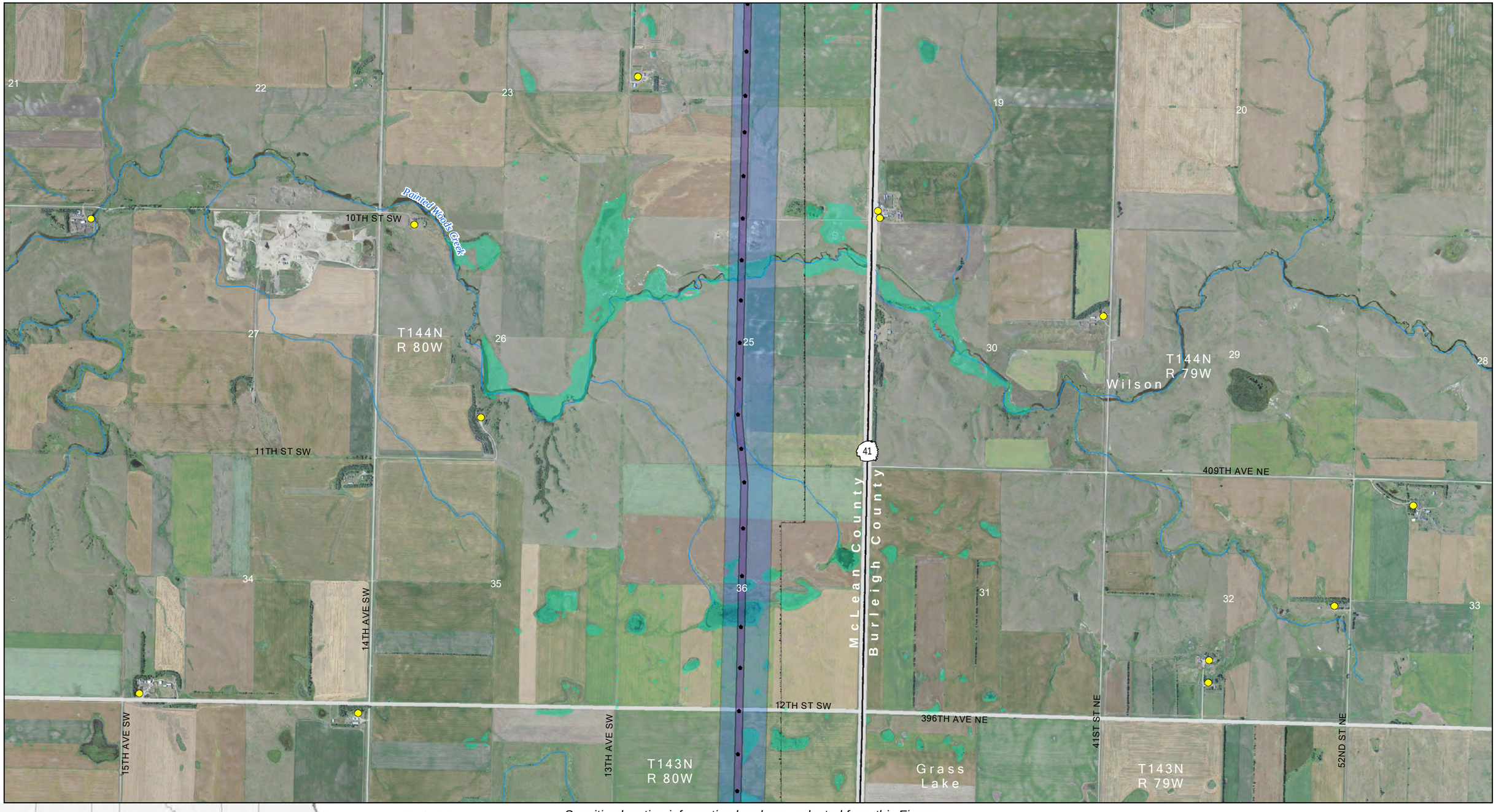
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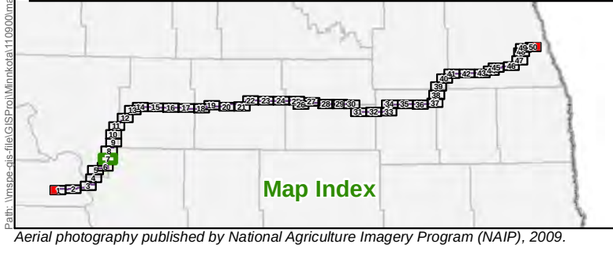
Figure 3: Page 6 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Date: 11/28/2011





Project Areas

- Project ROW
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- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 7 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

T145N R 80W

T145N R 79W

T144N R 80W

T144N R 79W

6TH ST SW

7TH ST SW

8TH ST SW

9TH ST SW

10 1/2 AVE SW

9TH AVE SW

8TH AVE NW

12TH AVE SW

15TH AVE SW

14TH AVE SW

13TH AVE SW

47TH ST NE

461ST AVE NE

52ND ST NE

448TH AVE NE

41ST ST NE

435TH AVE NE

66TH ST NE

McLean County

Burleigh County

Wilson

41

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Map Index

Project Areas

- Project ROW
- Proposed Structure
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Fiber Optic Regeneration Station

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- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 8 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

T145N
R 79W

11TH AVE SW
10TH AVE SW
8 1/2 AVE SW
3RD ST SW
Edgemont
Chain of Lakes Recreation Area
East Park Lake WPA
McClusky Canal
41
7TH AVE SW
4TH ST SW
North Country National Scenic Trail
4-1/2 ST SW
McLean County
Sheridan County
5TH AVE SW
T145N
R 78W
10 1/2 AVE SW
5TH ST SW
9TH AVE SW
9TH AVE NW
Chain of Lakes Water
Heckers Lake
Chain of Lakes Recreation Area
Heckers Lake WPA
6 1/2 AVE SW
5 1/2 AVE SW
11TH AVE SW

Map Index

Project Areas
- Project ROW
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- Business
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- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 9 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

Mercer
Pickard
Edgemont
T146N R 79W
T146N R 78W
T145N R 79W
T145N R 78W
CENTER ST
1ST ST SW
2ND ST SW
10 1/2 AVE NW
11TH AVE NW
10TH AVE NW
9TH AVE NW
5TH AVE NW
11TH AVE SW
9 1/2 AVE SW
7 1/2 ST SW
9TH AVE SW
10TH AVE SW
8 1/2 AVE SW
7TH AVE NW
McLean County
Sheridan County
32
33
34
35
36
31
5
4
3
2
1
6
8
9
10
11
12
7

Map Index

Project Areas
- Project ROW
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- Business
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- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Figure 3: Page 10 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:24,000

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Date: 11/28/2011

Gaub WPA

Mercer

McLean County
Sheridan County

Pickard

T146N
R 79W

T146N
R 78W

2ND ST NW

1ST ST NW

3RD ST NW

2 1/2 ST NW

9TH AVE NW

5TH AVE NW

4TH AVE NW

16 15 14 13 18 17
21 22 23 24 19 20
28 27 26 25 30 29

41

200

Map Index

Project Areas
- Project ROW
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- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Fiber Optic Regeneration Station

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- Business
- Irrigated Land
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- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 11 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:24,000

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Date: 11/28/2011

T147N
R 79W

6TH AVE NW

3RD AVE NW

T147N
R 78W

Prophets

36

31

32

33

34

35

Wise

6TH ST NW

2ND AVE SW

T146N
R 78W

1

6

5

5TH AVE NW

4

2

1

Mercer

McLean County

Sheridan County

Pickard

Regeneration
Station 1

5TH ST NW

T146N
R 79W

200

7

8

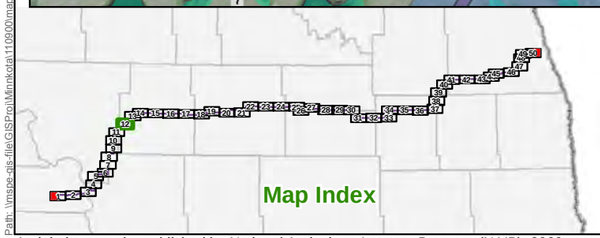
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10

11

12

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- USFWS WPA or WDA
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Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Figure 3: Page 12 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N

0 2,000 4,000 Feet

Scale 1:24,000

Date: 11/28/2011

Mountain City

Prophets

T147N R 78W

T147N R 77W

9 10 11 12 7 8 16 15 14 13 18 17 21 22 23 24 19 20 28 27 26 25 30

3RD AVE NW

2ND AVE SW

CENTER AVE

1ST AVE NE

2ND AVE NE

10TH ST NW

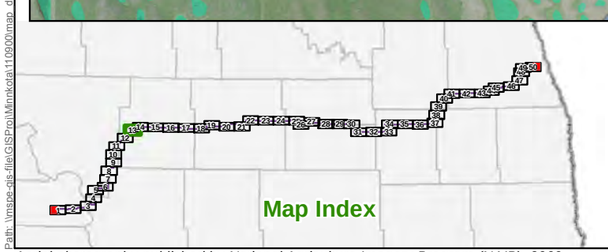
9TH ST NW

8TH ST NW

10TH ST NE

9TH ST NE

8TH ST NE



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Figure 3: Page 13 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:24,000

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Date: 11/28/2011

1 6 5 4 3 2

11TH ST NW

1ST AVE NE

2ND AVE NE

3RD AVE NE

4TH AVE NE

11TH ST NE

Mountain City

12 Prophets

7 8 9 10 11

T147N
R 77W

10TH ST NE

13 18 17 16 15 14

CENTER AVE

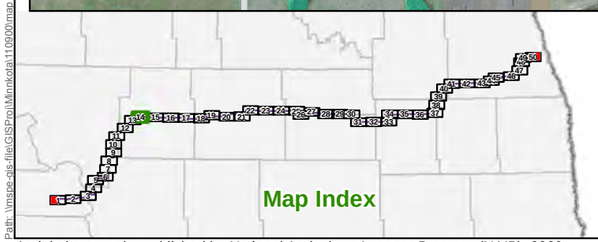
9TH ST NW

9TH ST NE

5TH AVE SE

T147N
R 78W

McClusky Canal Canal Lands



Project Areas

- Project ROW
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Figure 3: Page 14 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

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Date: 11/28/2011

Mountain City

North Country National Scenic Trail

Kindschi WPA

11TH ST NE

8TH AVE NE

11TH AVE NE

6TH AVE NE

T147N
R 76W

Hellman

10TH ST NE

T147N
R 77W

McClusky Canal

McClusky Canal Canal Lands

7TH AVE NE

9TH AVE NE

10TH AVE NE

9TH ST NE

1 6 5 4 3 2
12 7 8 9 10
13 18 17 16 15 14 13

Map Index

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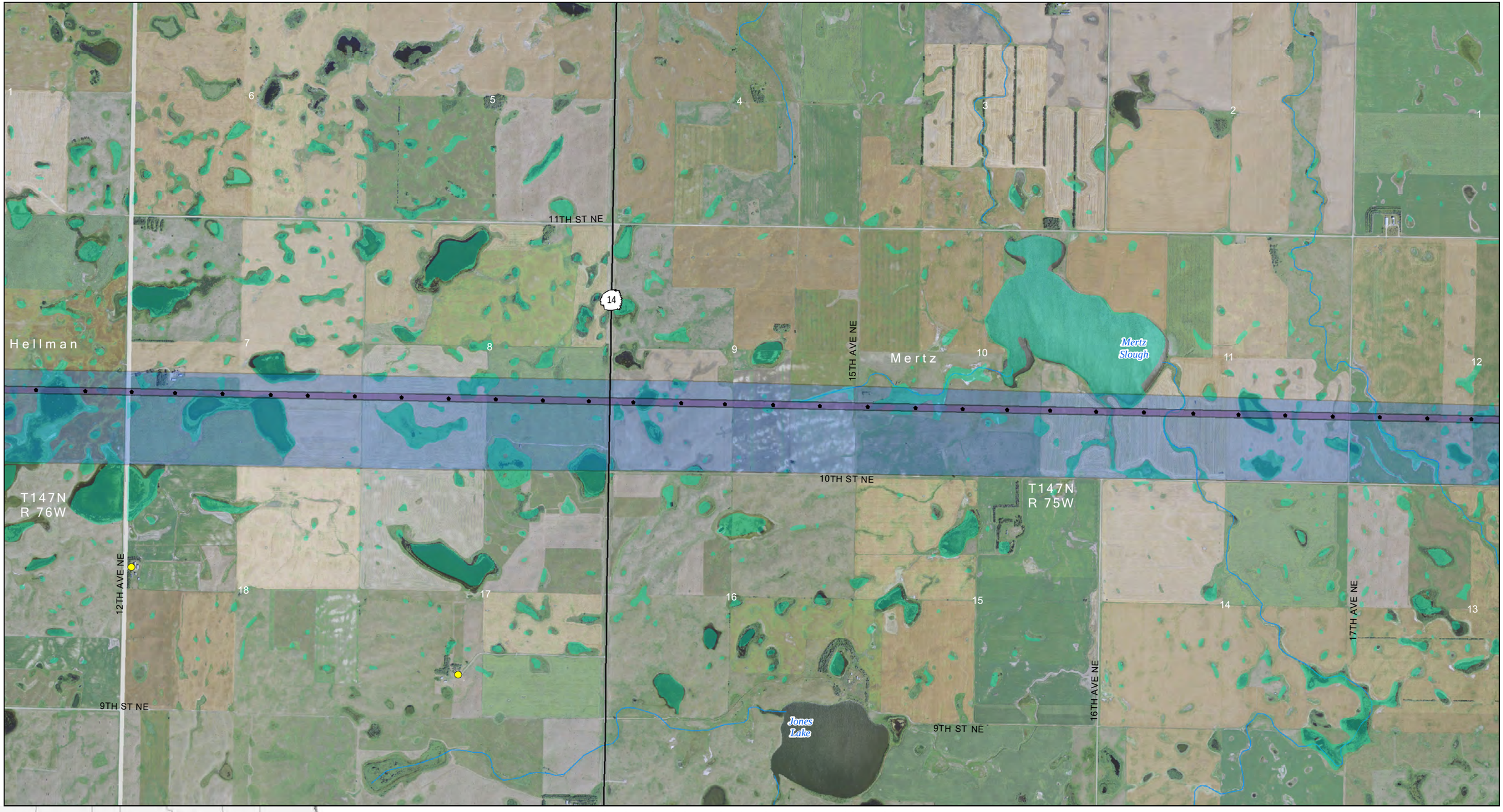
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Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

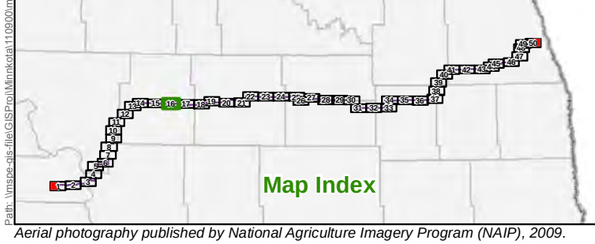
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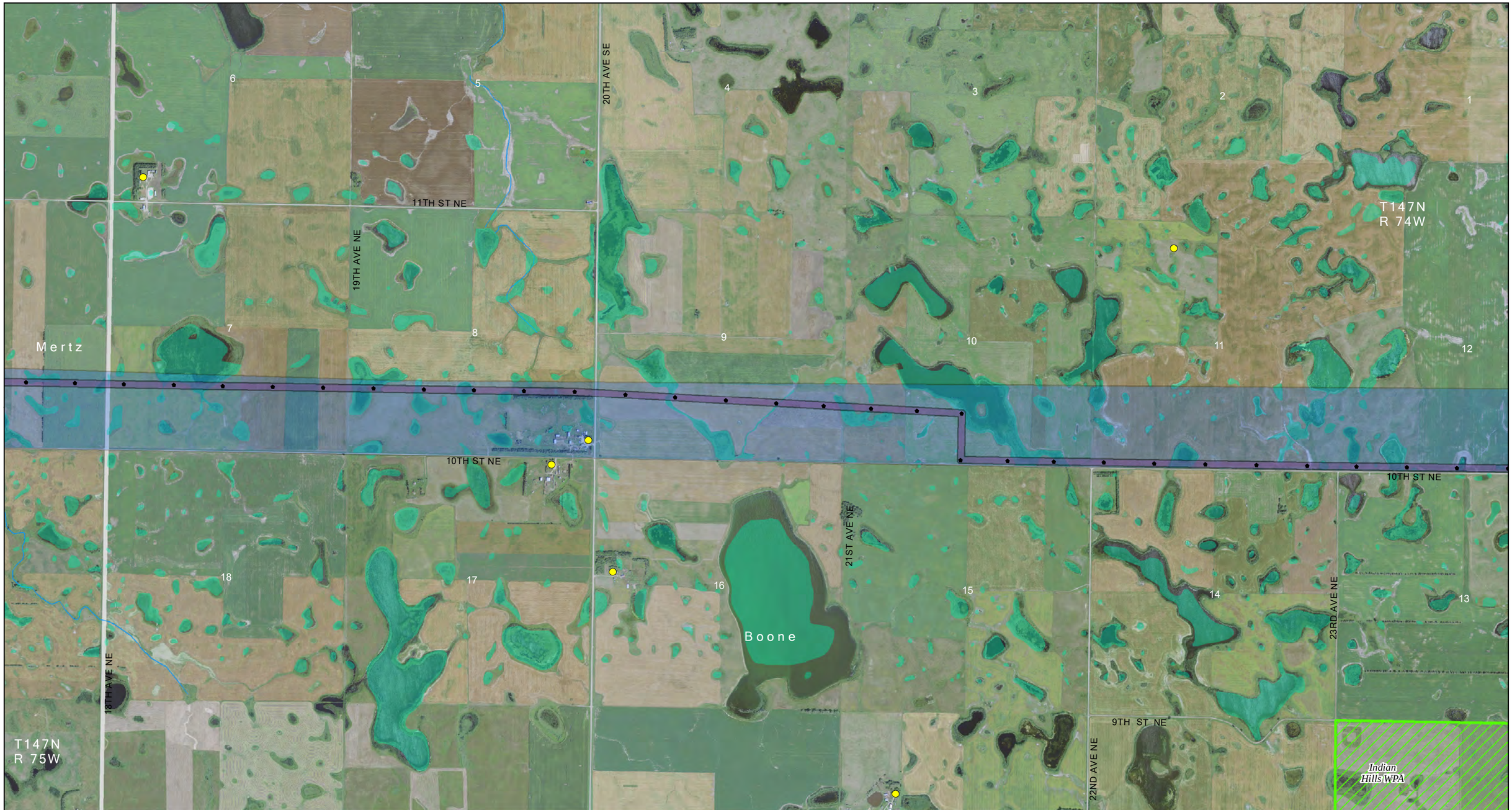
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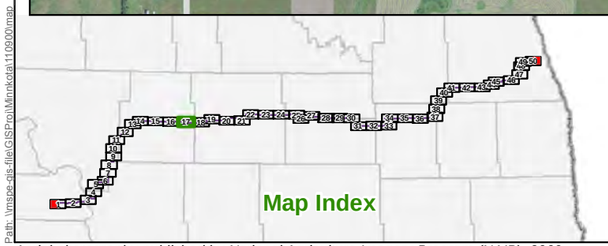
Figure 3: Page 16 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Path: \\mspe-gis-file\GISProj\Minnkota\110900\mxd_docs\PSC\RouteApp\CGFERPA_03_11x17L_50p_ExclAvoid.mxd

Date: 11/28/2011





Project Areas
- Project ROW
- Proposed Structure
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Fiber Optic Regeneration Station

Sensitive location information has been redacted from this Figure.

Exclusion Areas
- State Park, Recreation Area or Nature Preserve
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Avoidance Areas
- Occupiable Home within 500 ft of Transmission Facility
- Not Occupiable Home within 500 ft of Transmission Facility
- Occupiable Home beyond 500 ft of Transmission Facility
- School
- Business
- Irrigated Land
- USFWS NWR
- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 17 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

Crystal Lake WPA

Crystal Lake

Sheridan County

Wells County

Boone

25TH AVE SE

26TH AVE SE

28TH AVE SE

11TH ST NE

10TH ST NE

9TH ST NE

24TH AVE SE

T147N R 73W

T147N R 74W

Indian Hills WPA

Faul WPA

Wells County WMA

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

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- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 18 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

13TH ST NE
28TH AVE NE
T148N
R 73W
Laydown Area 2
35
36
Pony Gulch
3
30TH AVE NE
31TH AVE NE
31
T148N
R 72W
32
32TH AVE NE
Rusland
33
33TH AVE NE
34
James River
12TH ST NE
30TH AVE SE
32ND AVE SE
33TH AVE SE
Crystal Lake
2
1
6
5
4
3
28TH AVE SE
11TH ST NE
T147N
R 73W
11
12
7
8
9
10
10TH ST NE
Wells County WMA
31ST AVE SE
T147N
R 72W
Delger

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- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
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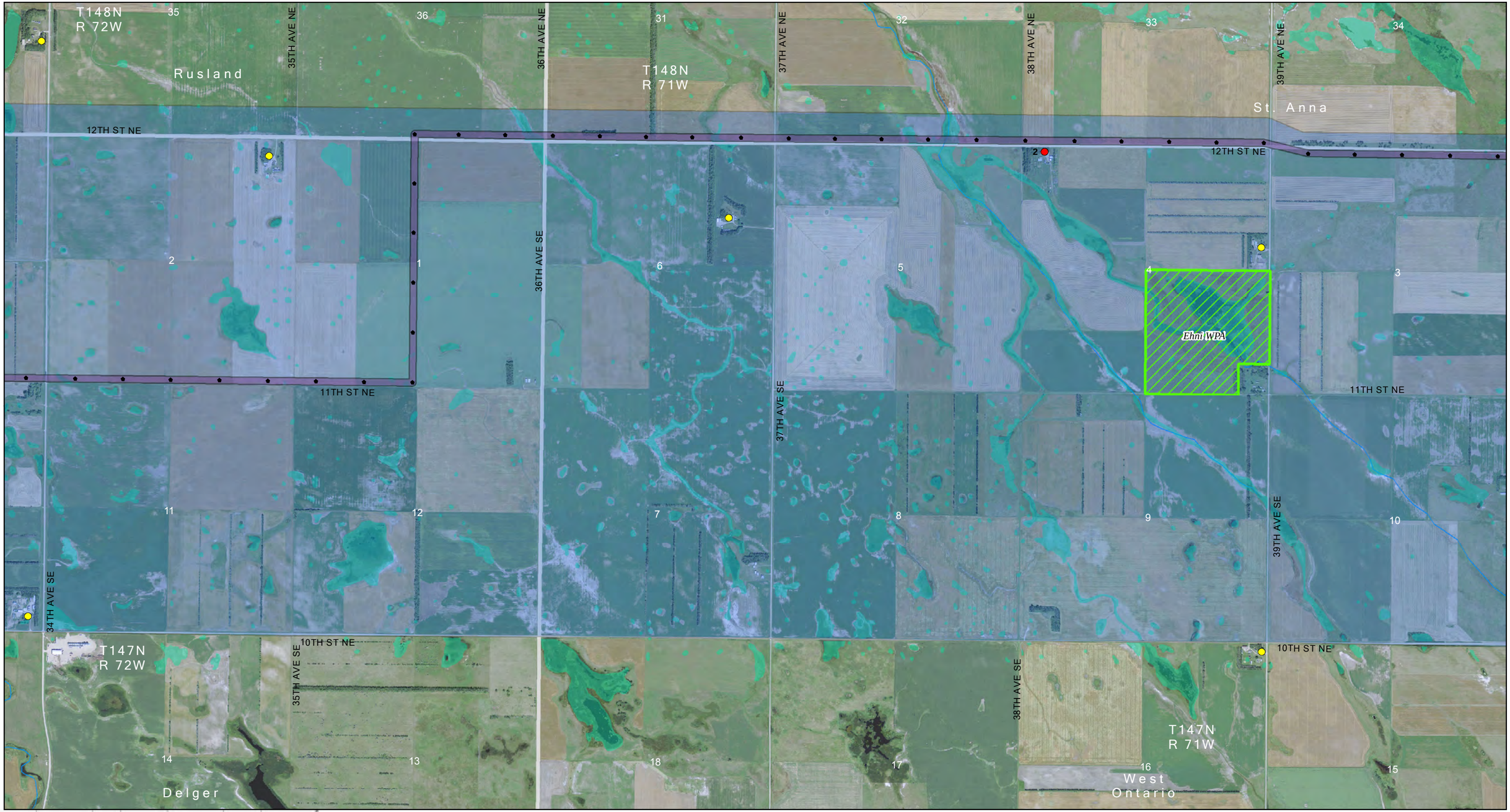
Figure 3: Page 19 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

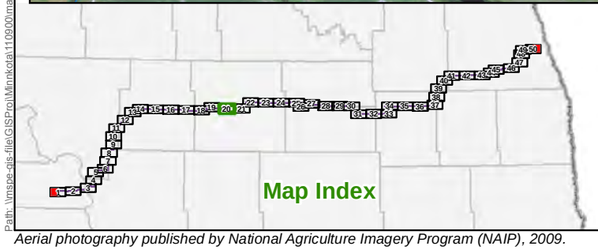
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Date: 11/28/2011





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- USFWS WPA or WDA
- State WMA
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- National Trail

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Figure 3: Page 20 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

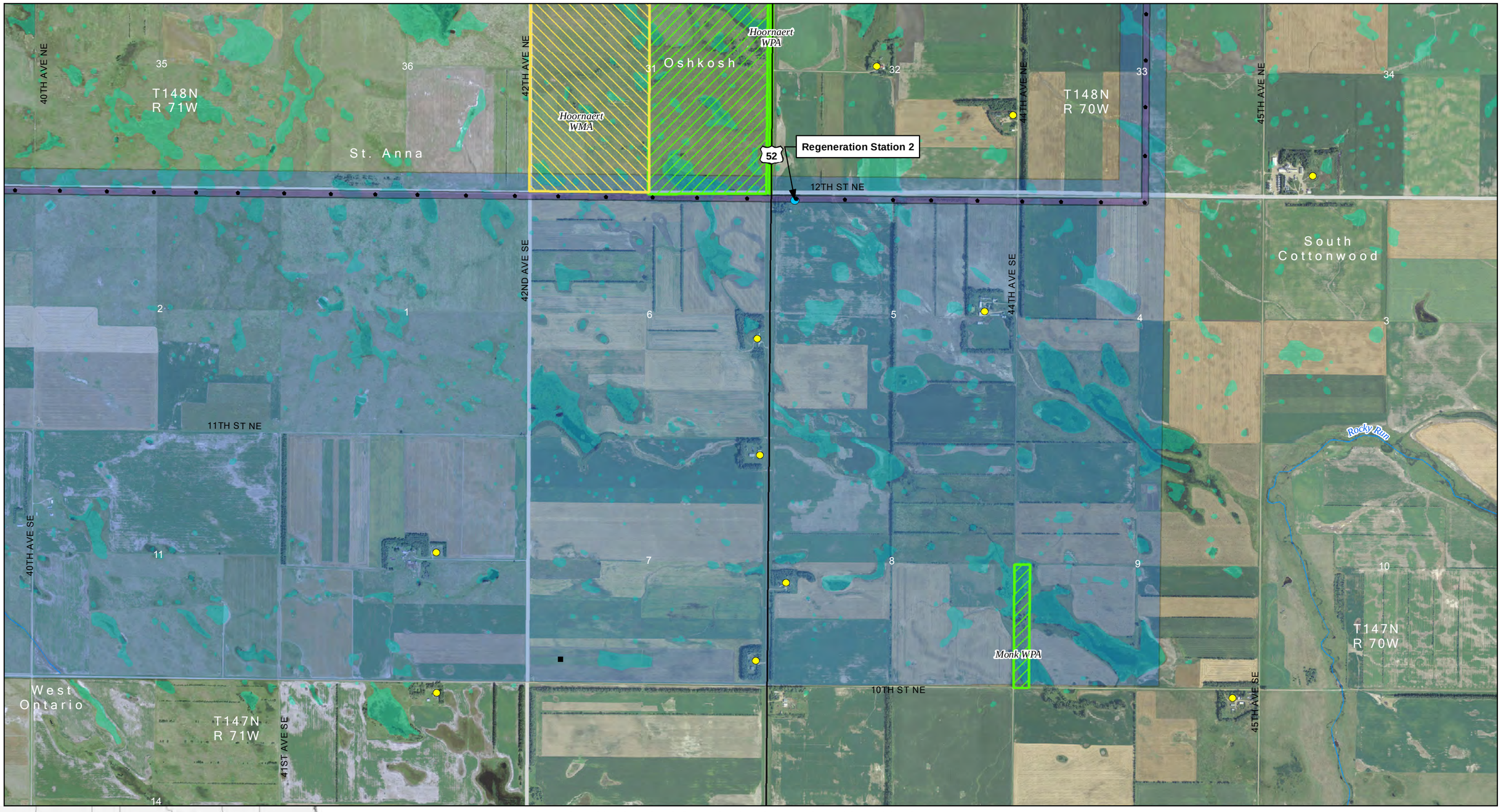
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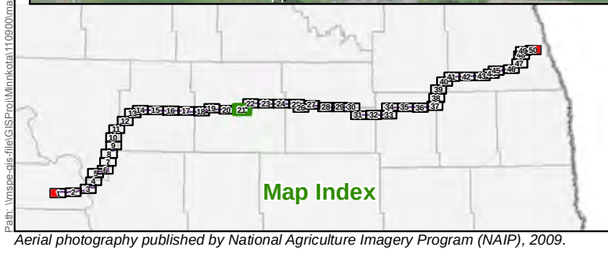
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Date: 11/28/2011

Path: \\mspe-gis-file\GIS\Proj\Minnkota\110900\map_docs\PSC\RouteApp\CGFERPA_03_11x17L_50p_ExclAvoid.mxd





Project Areas

- Project ROW
- Proposed Structure
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
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- Business
- Irrigated Land
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- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 21 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011

15TH ST NE
44TH AVE NE
45TH AVE NE
46TH AVE NE
48TH AVE NE
14TH ST NE
13TH ST NE
12TH ST NE
47TH AVE NE
48 1/2 AVE NE
49TH AVE NE
44TH AVE SE
45TH AVE SE
46TH AVE SE
47TH AVE SE
48TH AVE SE
49TH AVE SE
20
21
22
23
24
19
26
25
32
33
34
35
36
31
Oshkosh
Germantown
South Cottonwood
Cathay
Schindler WPA
T148N R 70W
T147N R 70W
T148N R 69W
T147N R 69W

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- Project ROW
- Proposed Structure
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- Project Substation
- Laydown Area
- Fiber Optic Regeneration Station

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- School
- Business
- Irrigated Land
- USFWS NWR
- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 22 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Path: \\mspe-gis-file\GIS\Proj\Minnkota\110900\map_docs\PSC\RouteApp\CGFRPA_03_11x17L_50p_ExclAvoid.mxd

Date: 11/28/2011

15TH ST NE
51TH AVE NE
52TH AVE NE
54TH AVE NE
14TH ST NE
T148N
R 69W
Germantown
T148N
R 68W
Fairville
50TH AVE NE
13TH ST NE
55TH AVE NE
50TH AVE SE
51ST AVE SE
52ND AVE SE
55TH AVE SE
12TH ST NE
T147N
R 69W
Cathay
Woodward
T147N
R 68W

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Project Areas
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- Project Substation
- Laydown Area
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- State WMA
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- National Trail

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Figure 3: Page 23 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:24,000

Path: \\mpsc-gis-file\GISProj\Minnkota\110900\map_docs\PSC\RouteApp\CGFERPA_03_11x17L_50p_ExclAvoid.mxd

Date: 11/28/2011

15TH ST NE
57TH AVE NE
58TH AVE NE
Rosefield
15TH ST NE
61ST AVE NE
21
22
23
24
19
20
T148N
R 67W
Wells County
Eddy County
14TH ST NE
27
26
25
59TH AVE NE
Fairville
13TH ST NE
56TH AVE NE
56TH AVE SE
T148N
R 68W
33
34
35
36
31
32
60TH AVE NE
58TH AVE SE
59TH AVE SE
12TH ST NE
Woodward
T147N
R 68W
Eddy County
Foster County
Rocky Run
T147N
R 67W
12TH ST NE
Birtsell

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- Project ROW
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- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 24 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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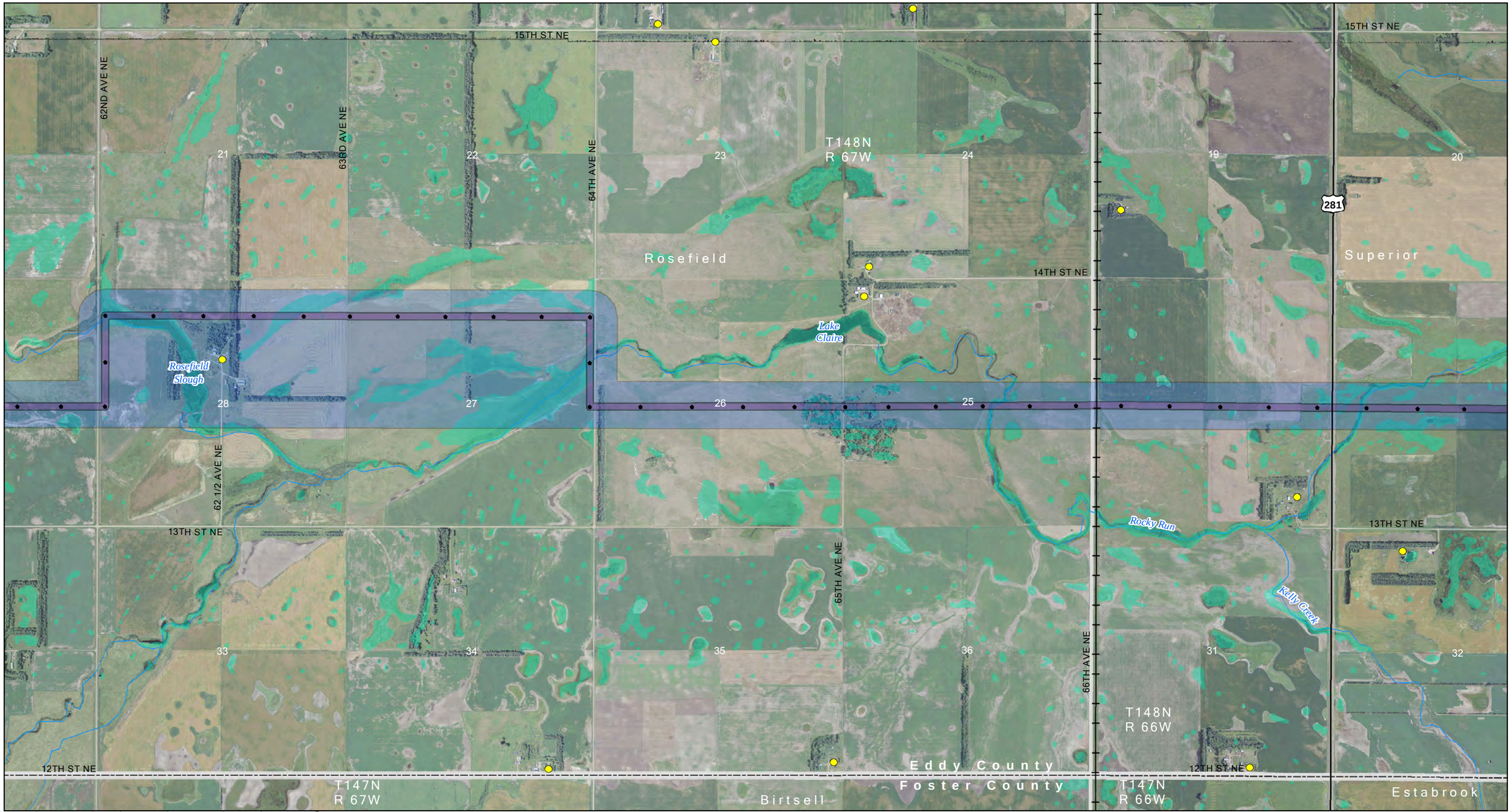
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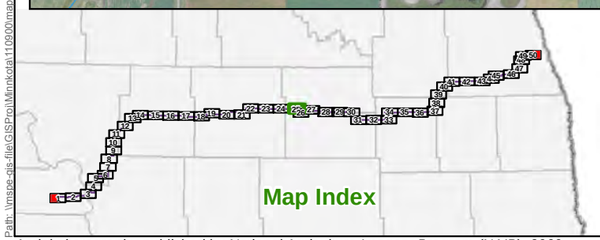
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Date: 11/28/2011





Project Areas

- Project ROW
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- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
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- Business
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- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 25 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

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13TH ST NE
64TH AVE NE
Rosefield
T148N
R 67W
66TH AVE NE
Rocky Run
13TH ST NE
T148N
R 66W
281
Eddy County
Foster County
12TH ST NE
Superior
34
35
36
31
32
33
3
2
1
6
5
4
3
T147N
R 67W
65TH AVE NE
5TH ST NE
Kelly Creek
68TH AVE NE
69TH AVE NE
T147N
R 66W
BARLOW
Laydown Area 3
Estabrook
10
11
12
7
8
9
Birtsell

This page shows laydown area only.

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- USFWS WPA or WDA
- State WMA
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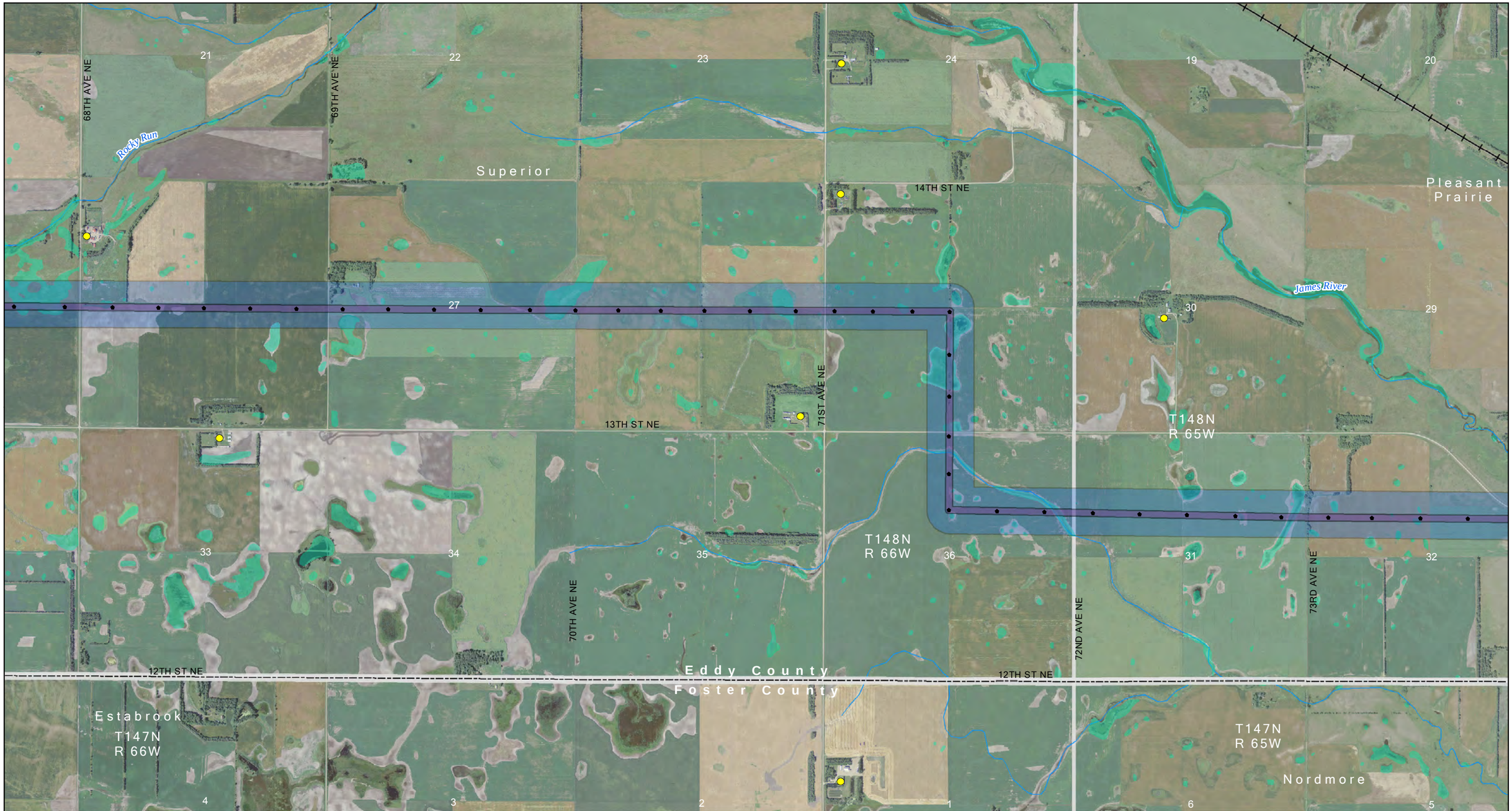
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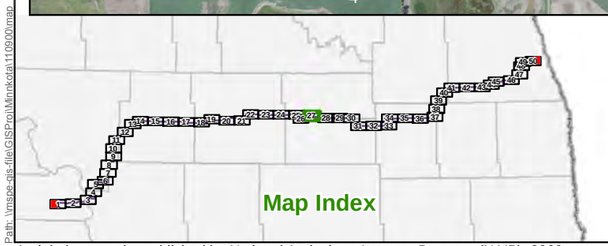
Figure 3: Page 26 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Date: 11/28/2011

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Project Areas

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- State WMA
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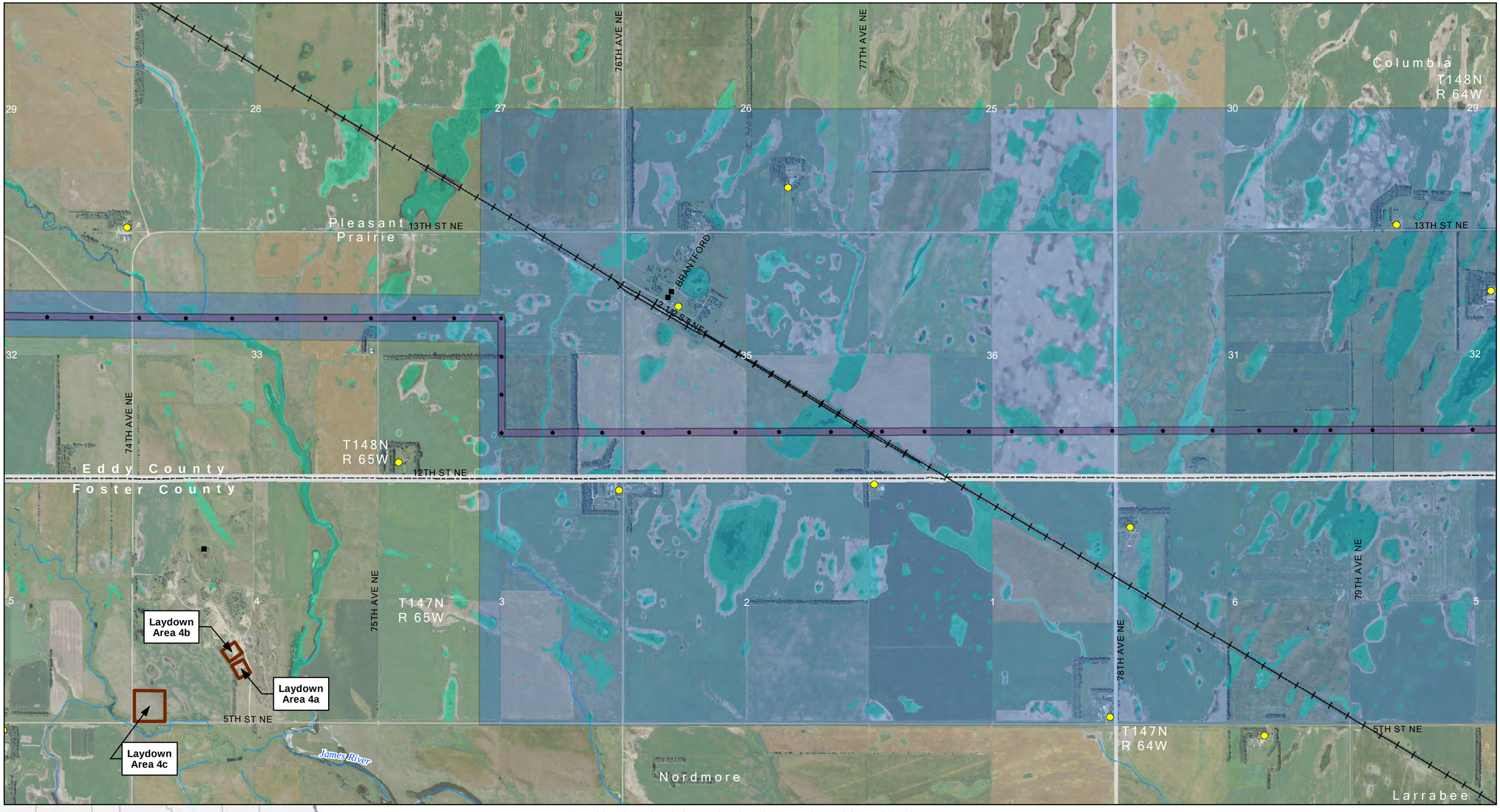
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Route Exclusion and Avoidance Areas
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Minnkota Power Cooperative, Inc.

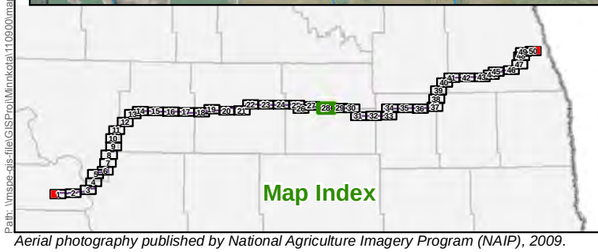
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- USFWS WPA or WDA
- State WMA
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- National Trail

Figure 3: Page 28 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011

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Columbia

Cherry Lake

T148N R 64W

T148N R 63W

80TH AVE NE

81ST AVE NE

84TH AVE NE

13TH ST NE

12TH ST NE

Eddy County

Foster County

79TH AVE NE

5TH ST NE

82ND AVE NE

83RD AVE NE

85TH AVE NE

T147N R 64W

T147N R 63W

Larrabee

Florance

29 28 27 26 25 30

32 33 34 35 36 31

5 4 3 2 1 6

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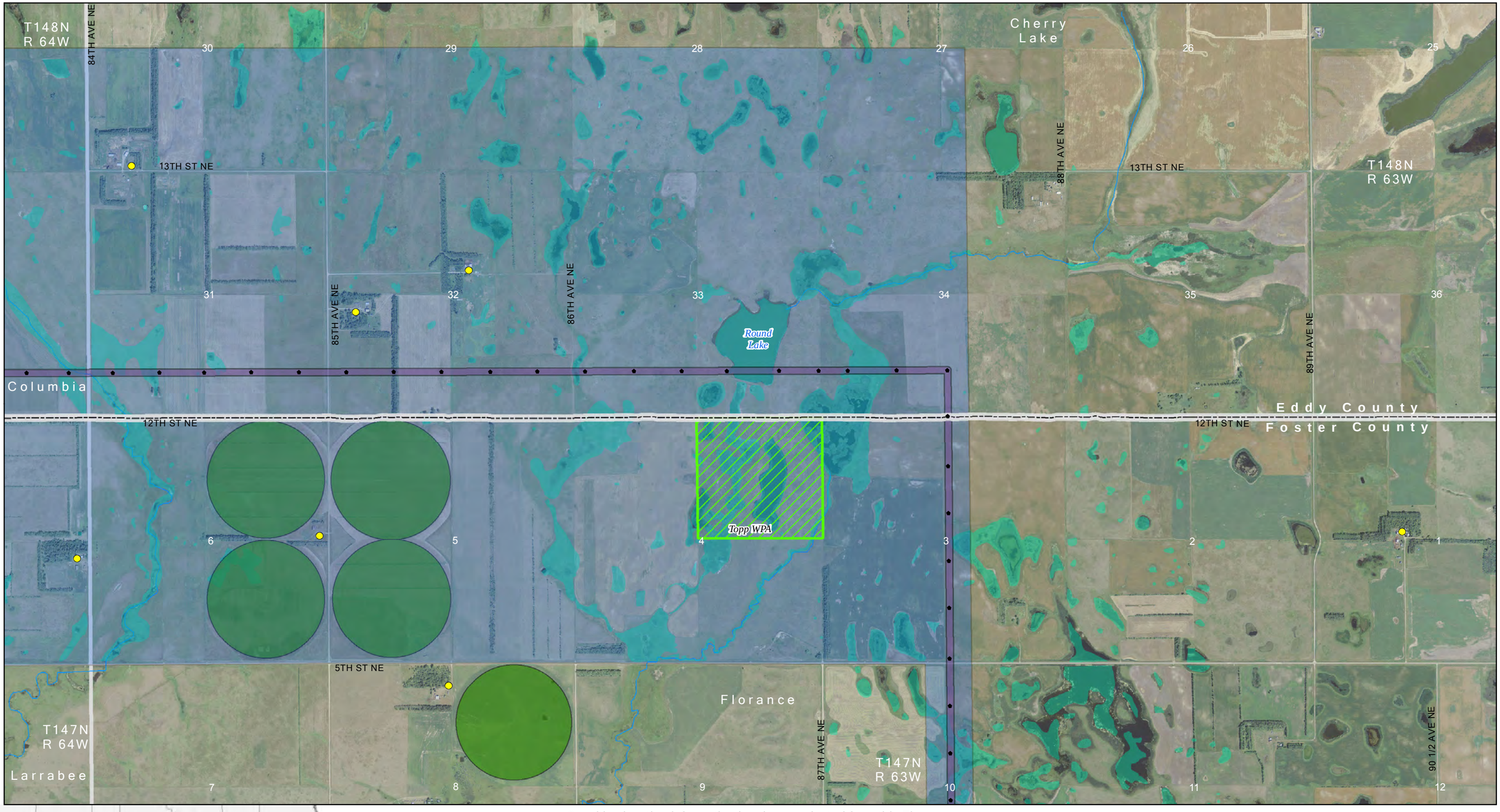
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Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

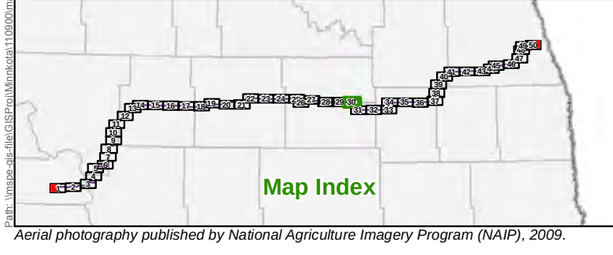
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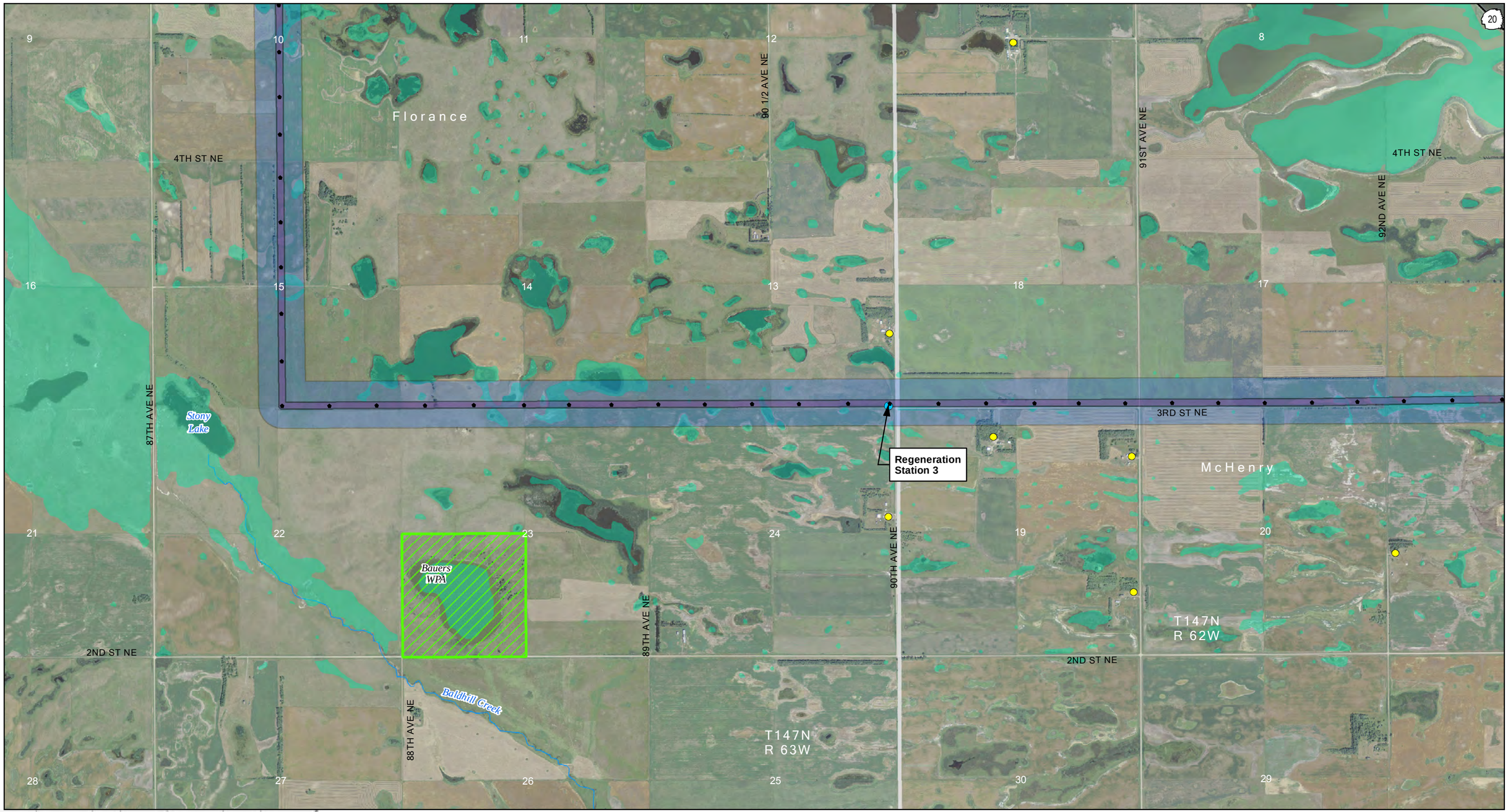
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Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

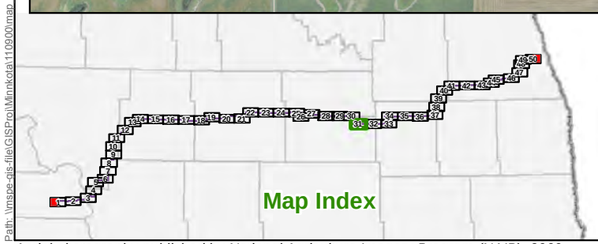
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Date: 11/28/2011





Project Areas

- Project ROW
- Proposed Structure
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Fiber Optic Regeneration Station

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- Business
- Irrigated Land
- USFWS NWR
- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

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Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

T147N
R 62W

Johnson WPA

10TH ST NE

93RD AVE NE

4TH ST NE

3RD ST NE

9TH ST NE

94TH AVE NE

2ND ST NE

McHenry

95TH AVE NE

Baldhill Creek

Foster County

Griggs County

96TH AVE NE

Bryan

8TH ST NE

98TH AVE NE

T147N
R 61W

9 10 11 12 7 8 9
16 15 14 13 18 17 16
21 22 23 24 19 20 21
28 27 26 25 30 29

20

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Figure 3: Page 32 of 50
Route Exclusion and Avoidance Areas
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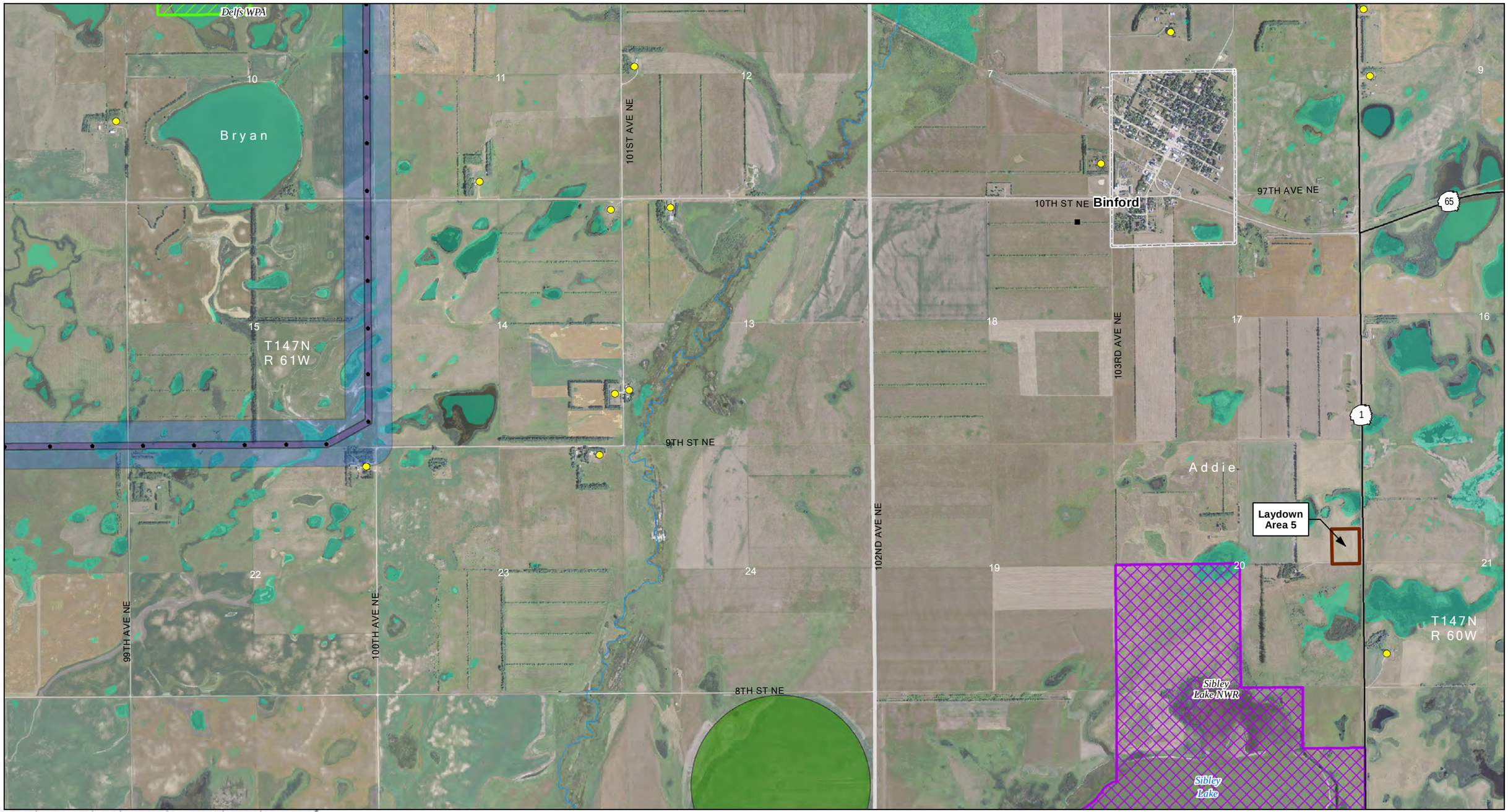
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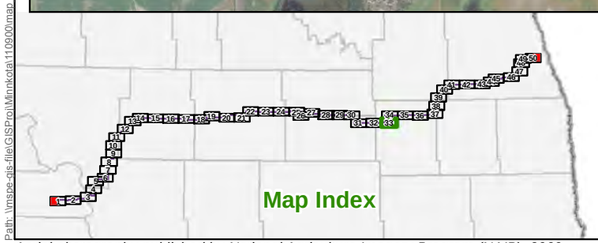
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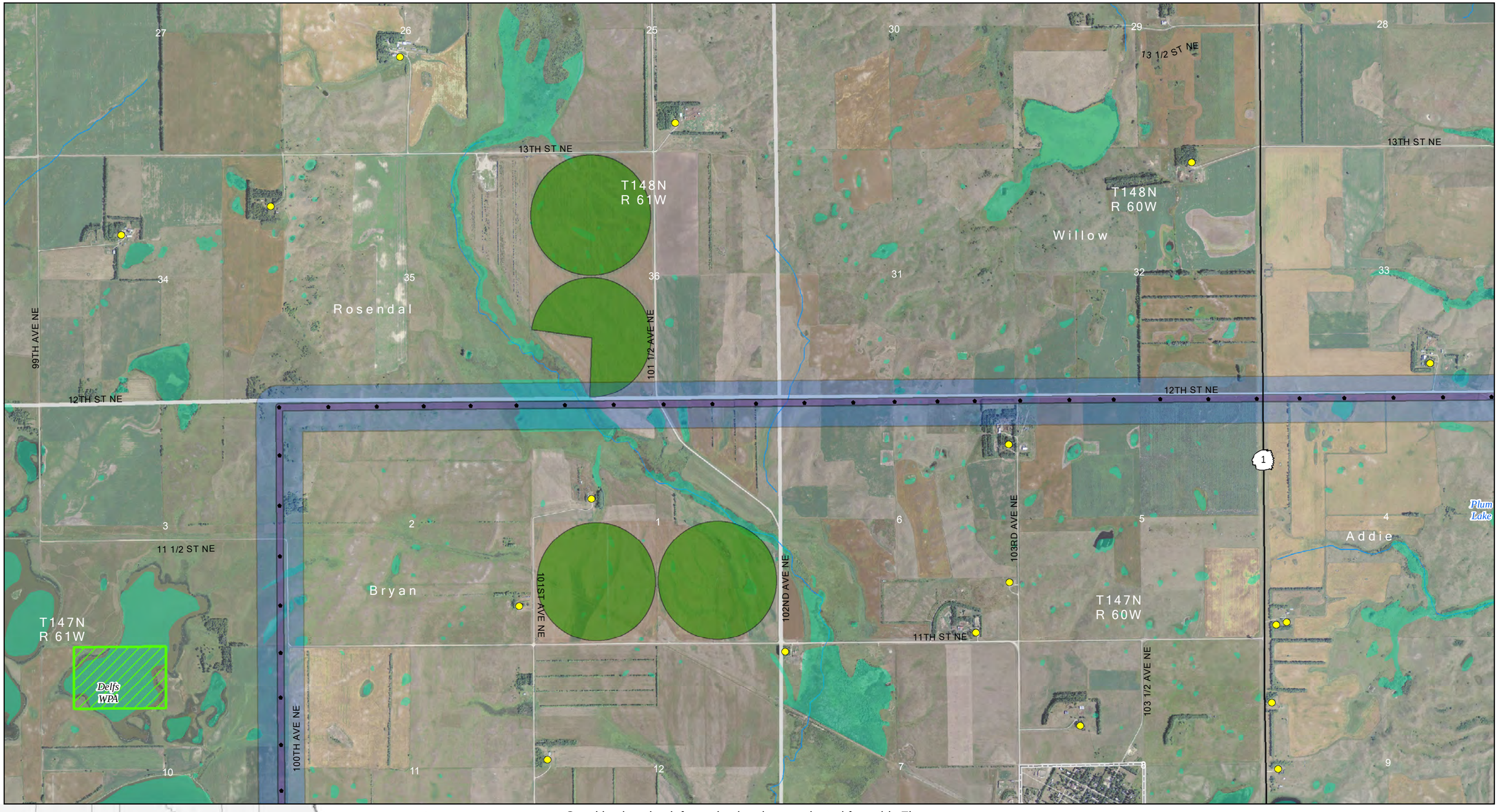
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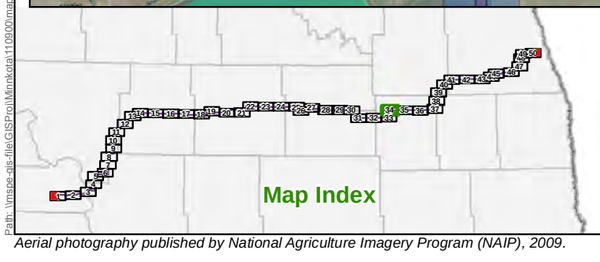
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Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:24,000

Date: 11/28/2011





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Route Exclusion and Avoidance Areas
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Minnkota Power Cooperative, Inc.

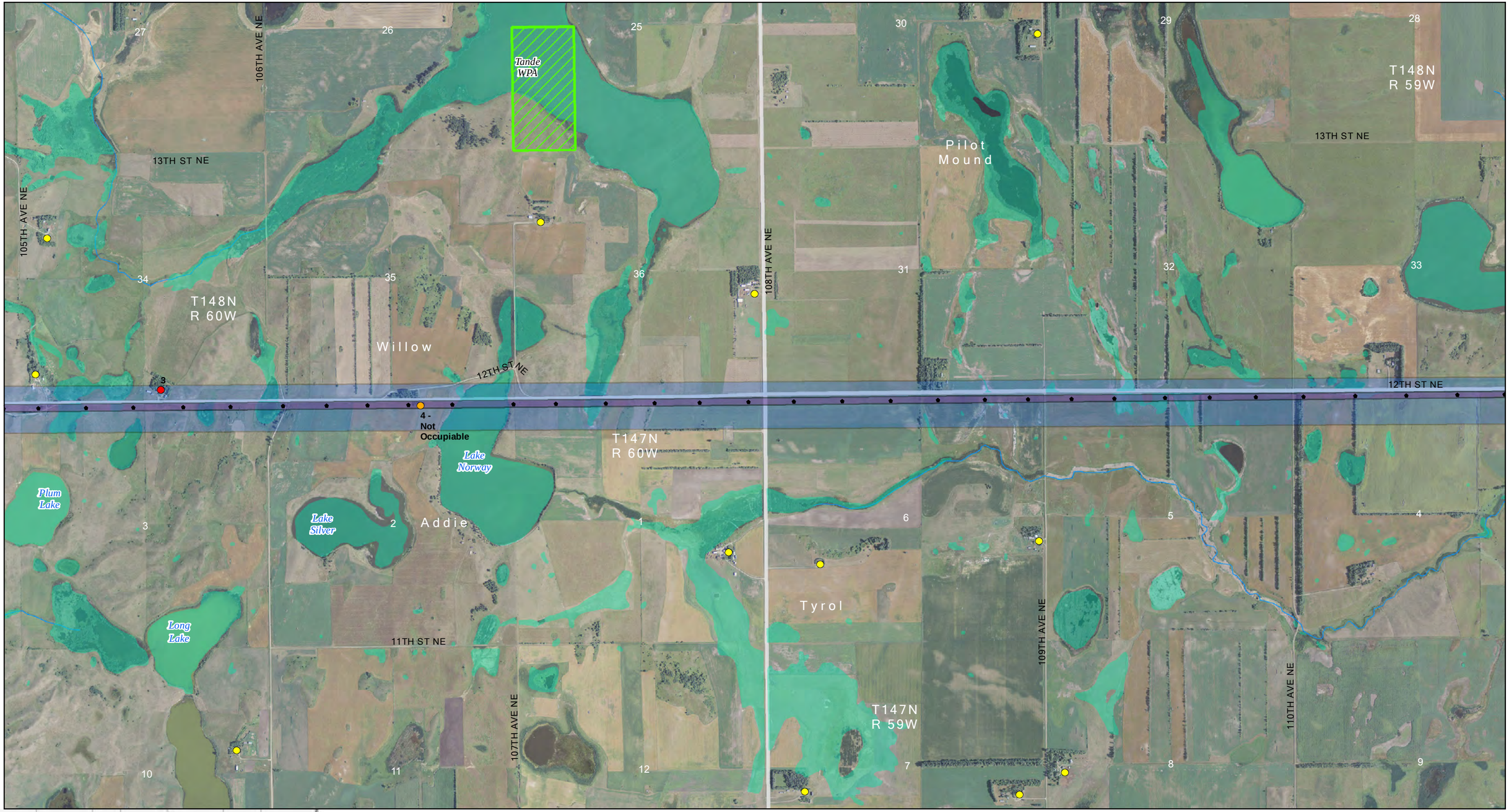
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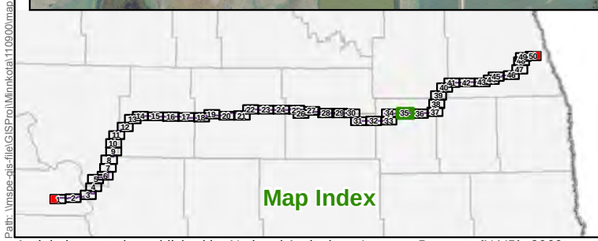
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Route Exclusion and Avoidance Areas
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Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Date: 11/28/2011

T148N
R 59W

Pilot
Mound

T147N
R 59W

T148N
R 58W

Lenora

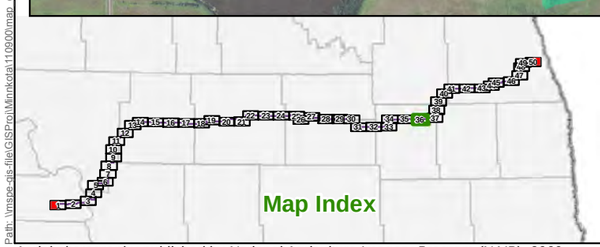
Tyrol

Romness

T147N
R 58W

34
35
36
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3
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1
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5
4
10
11
12
7
8
9

113TH AVE NE
113 1/2 AVE NE
114TH AVE NE
13TH ST NE
116TH AVE NE
12TH ST NE
115 1/2 AVE NE
North Country National Scenic Trail
11TH ST NE
115TH AVE NE
111TH AVE NE
10 1/2 ST NE
116 1/2 AVE NE
Sheyenne River



Project Areas
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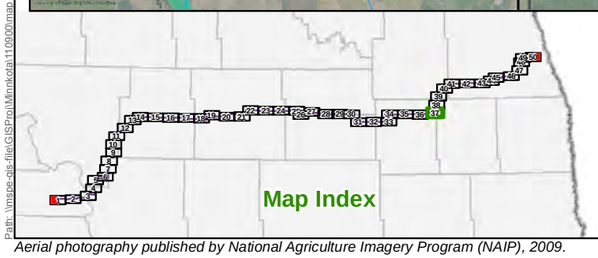
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Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Date: 11/28/2011

14TH ST NE
13TH ST NE
12TH ST NE
11TH ST NE
118TH AVE NE
119TH AVE NE
117TH AVE NE
121ST AVE NE
122ND AVE NE
120TH AVE NE
Lenora
Sharon
Romness
Franklin
Griggs County
Steele County
Pickerel Lake Creek
T148N R 58W
T148N R 57W
T147N R 58W
T147N R 57W
27
26
25
29
28
34
35
36
31
32
33
3
2
1
6
5
4
45
32
5



Project Areas
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Figure 3: Page 37 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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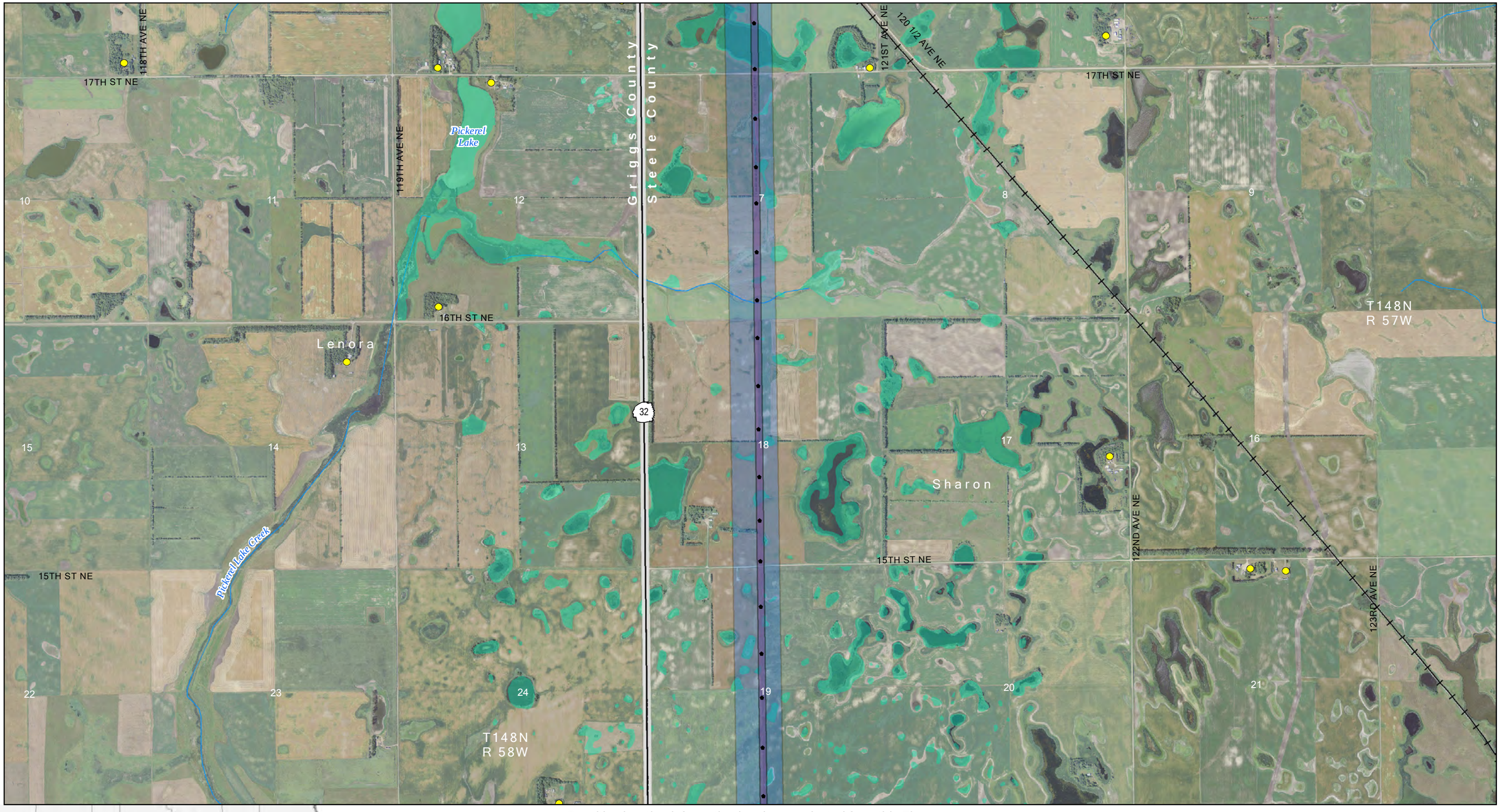
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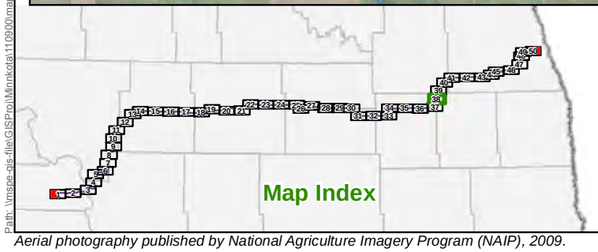
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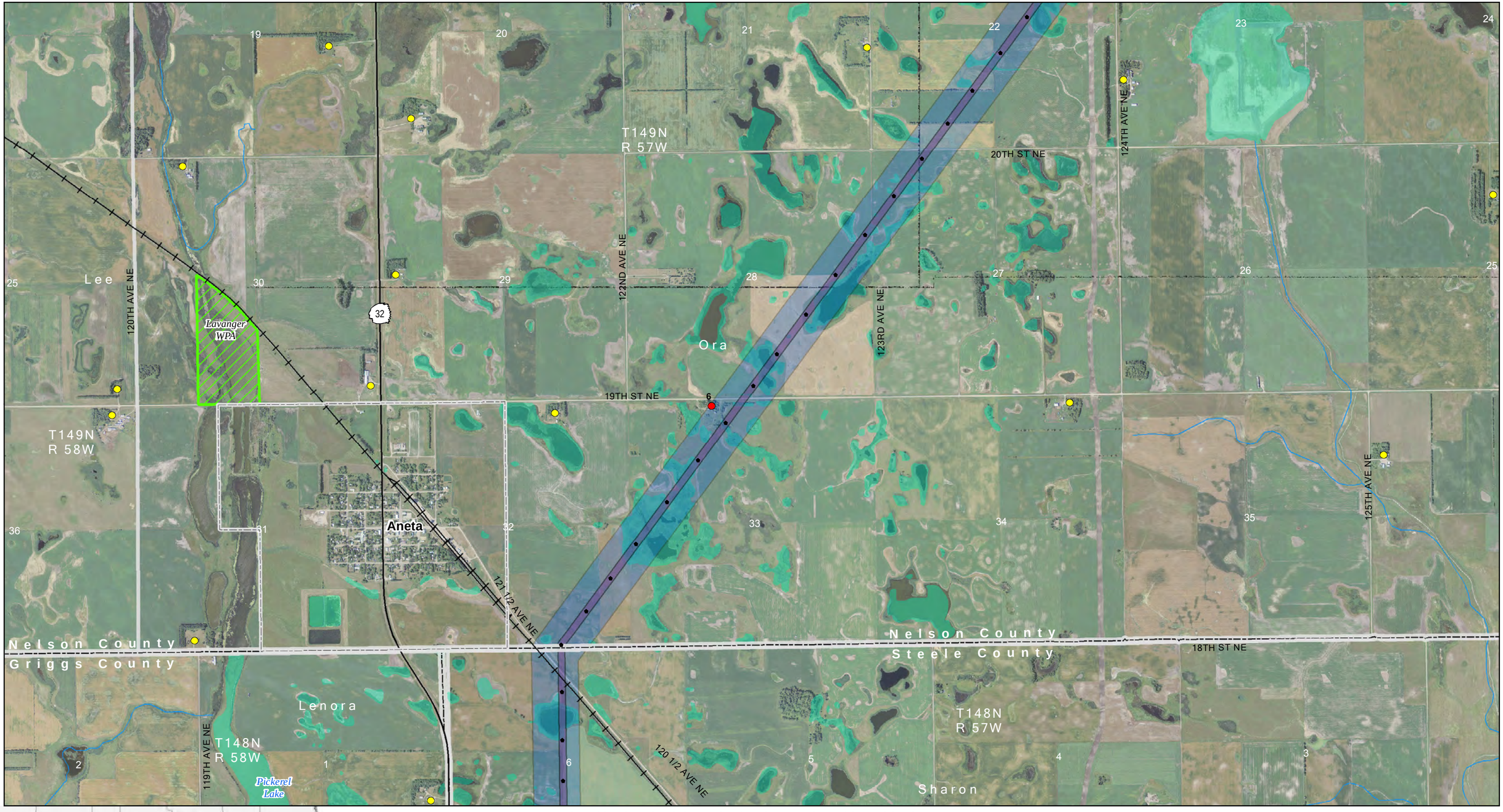
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Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

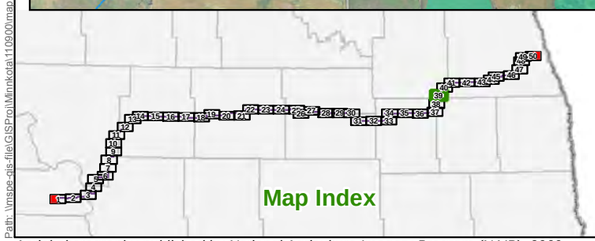
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Date: 11/28/2011

Gerhart WPA

Matson Slough

Ora

Loretta

T149N
R 56W

T149N
R 57W

123RD AVE NE

125TH AVE NE

124TH AVE NE

122ND AVE NE

48TH ST NE

22ND ST NE

4TH AVE NE

21ST ST NE

3RD AVE NE

49TH ST NE

Goose Creek

Beaver Creek

Nelson County

Grand Forks County

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Scale 1:24,000

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Date: 11/28/2011

Logan Center

T150N R 56W

T150N R 57W

Rugh

Ora

T149N R 56W

T149N R 57W

Loretta

Nelson County

Grand Forks County

Goose Creek

Beaver Creek

25TH ST NE

24TH ST NE

6TH AVE NE

7TH AVE NE

125TH AVE NE

49TH ST NE

48TH ST NE

47TH ST NE

46TH ST

46TH ST NE

45TH ST NE

Regeneration Station 4

25 30 29 28 27 26

36 31 32 33 34 35

1 6 5 4 3 2

7 8 9 10 11

15

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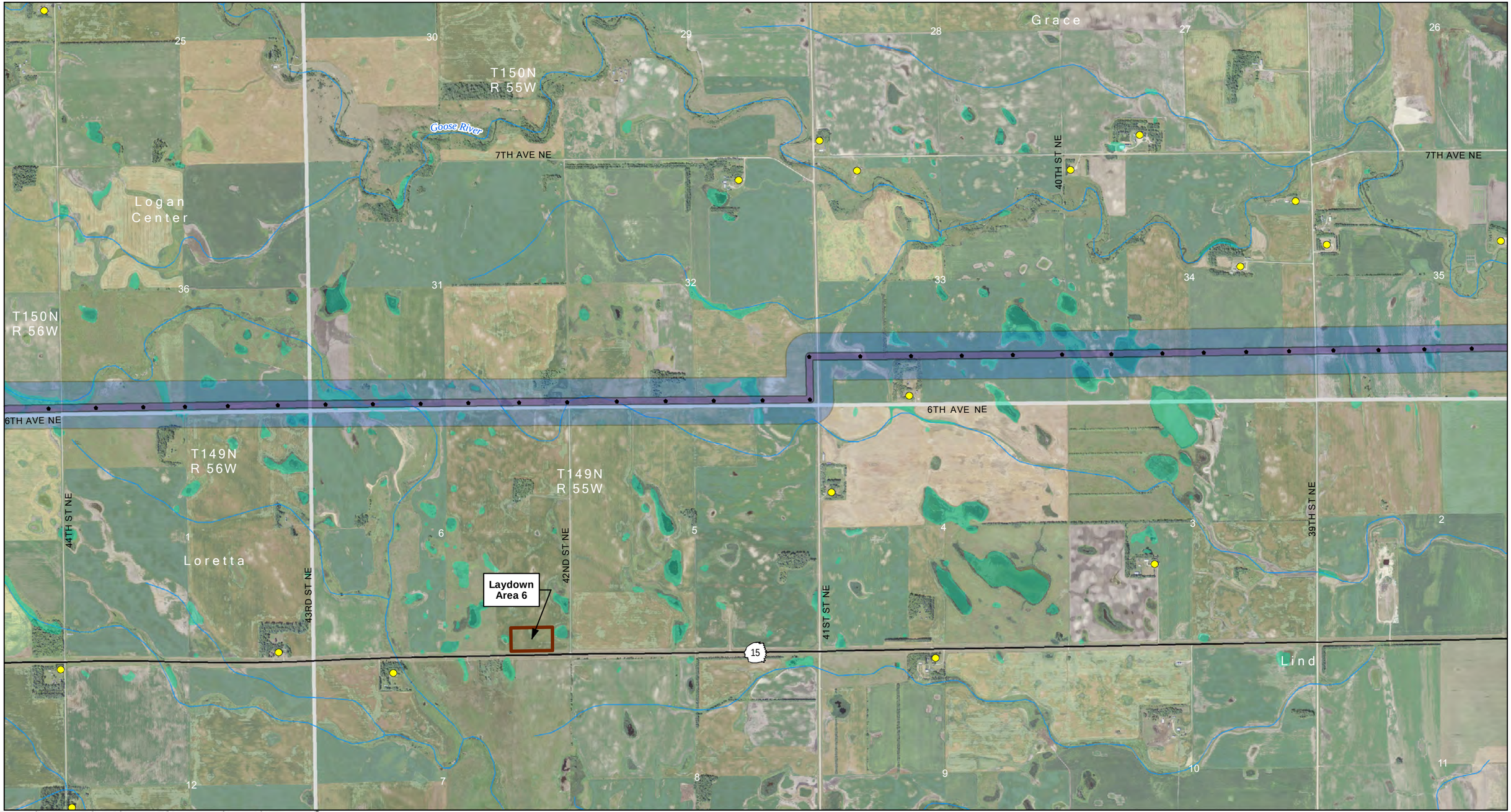
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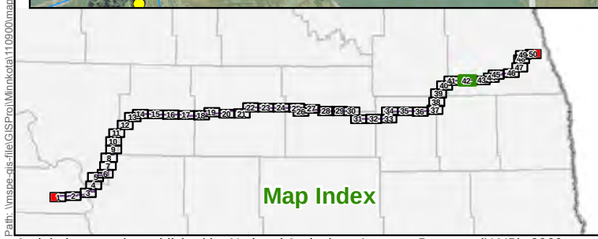
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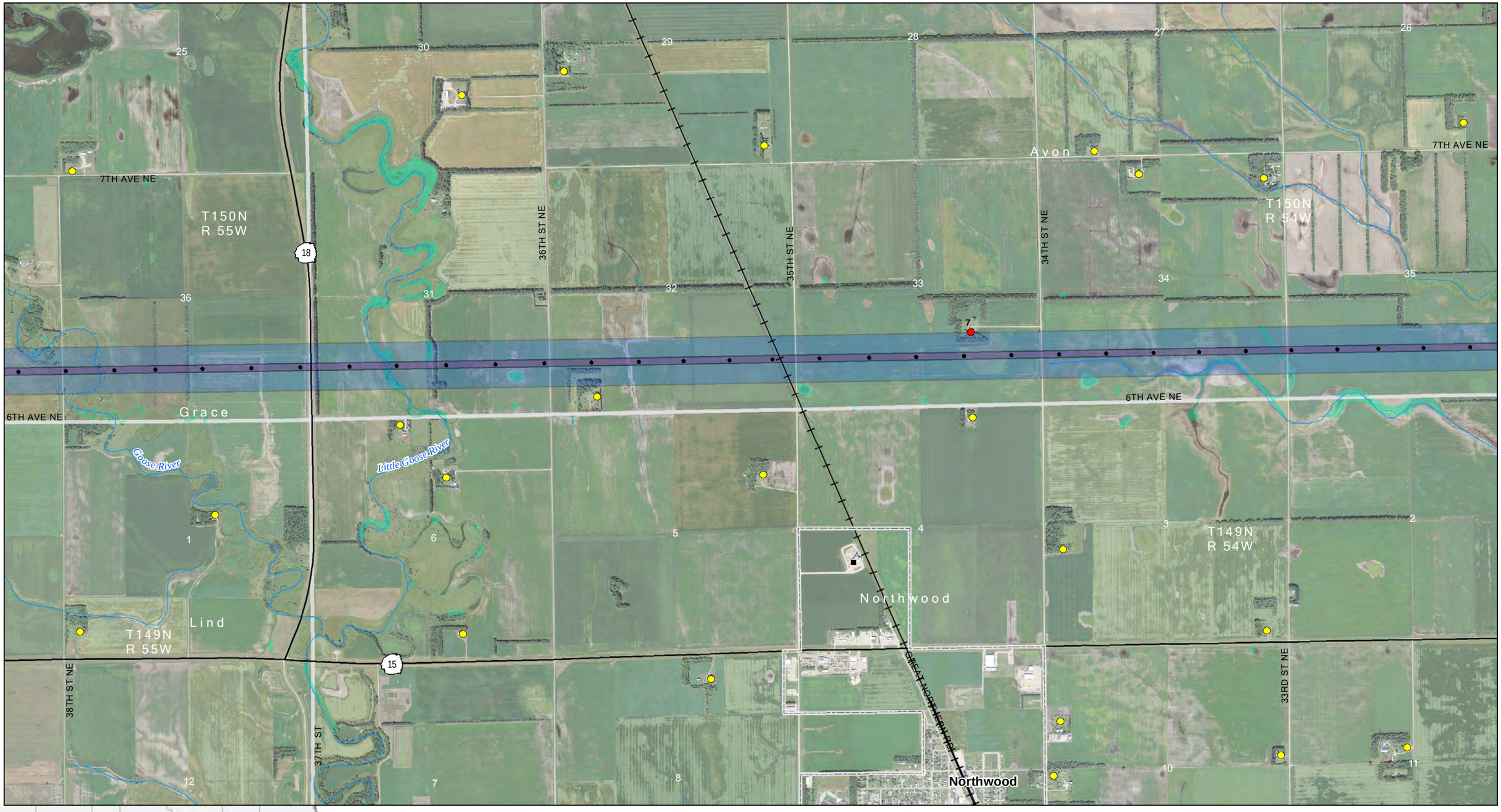
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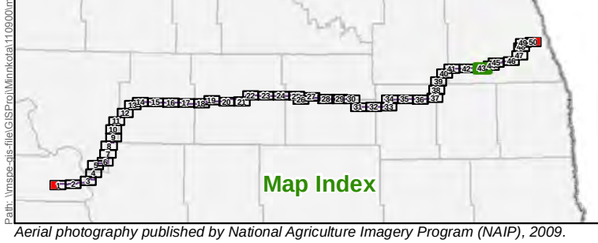
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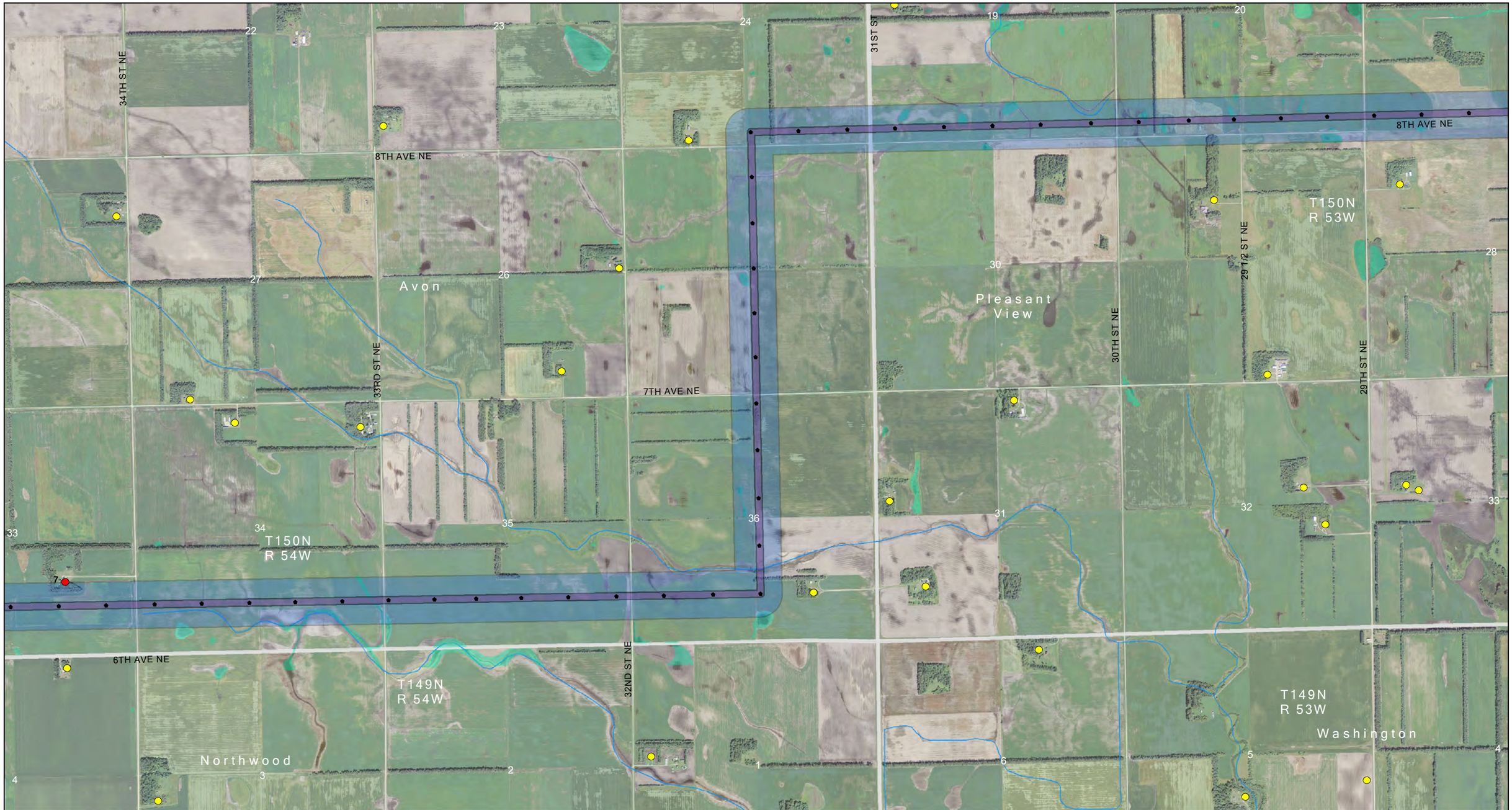
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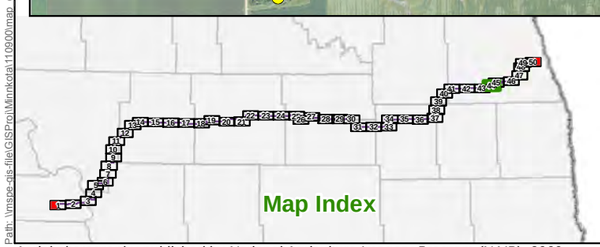
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Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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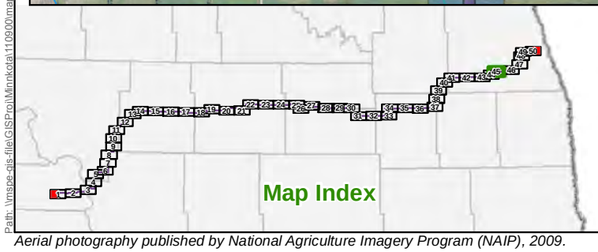
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Project Areas

- Project ROW
- Proposed Structure
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Fiber Optic Regeneration Station

Sensitive location information has been redacted from this Figure.

Exclusion Areas

- State Park, Recreation Area or Nature Preserve
- Piping Plover Critical Habitat

Avoidance Areas

- Occupiable Home within 500 ft of Transmission Facility
- Not Occupiable Home within 500 ft of Transmission Facility
- Occupiable Home beyond 500 ft of Transmission Facility
- School
- Business
- Irrigated Land
- USFWS NWR
- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 45 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

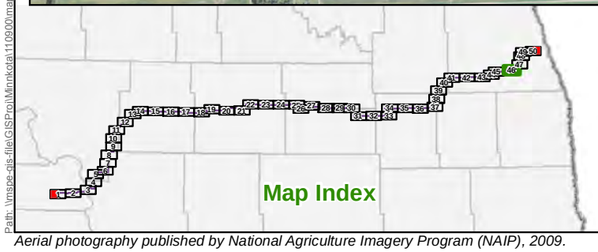
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Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Date: 11/28/2011

10TH AVE NE
9TH AVE NE
8TH AVE NE
7TH AVE NE
25TH ST
26TH ST NE
24TH ST NE
23RD ST NE
22ND ST NE
21ST ST NE
English Coulee
Pleasant View
Fairfield
T150N R 52W
T150N R 53W
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
15



Project Areas
- Project ROW
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- Business
- Irrigated Land
- USFWS NWR
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- USBOR Land - McClusky Canal
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Figure 3: Page 46 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet
Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Date: 11/28/2011

T151N
R 52W

T151N
R 51W

T150N
R 52W

T150N
R 51W

Oakville

Brenna

Allendale

Fairfield

Fresh Water Coulee

English Coulee

22ND ST NE

21ST ST NE

20TH ST NE

19TH ST NE

18TH ST NE

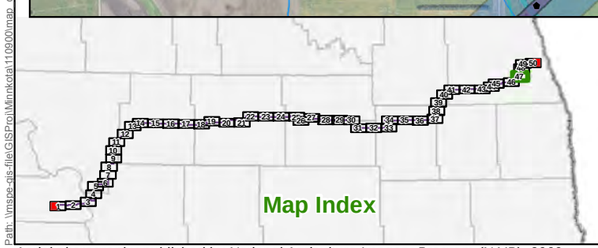
23RD ST NE

12TH AVE

11TH AVE NE

10TH AVE NE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



Project Areas

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- USFWS WPA or WDA
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- National Trail

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Figure 3: Page 47 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N

0 2,000 4,000 Feet

Scale 1:24,000

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Oakville

Brenna

T151N
R 52W

T151N
R 51W

15TH AVE NE

14TH AVE NE

13TH AVE NE

20 1/2 ST NE

21ST ST NE

22ND ST NE

19TH ST NE

18TH ST NE

17TH ST NE

English Coulee

Fresh Water Coulee

Salt Coulee

15 13 18 17 16 8 22 23 24 19 20 21 27 26 25 30 29 28 34 35 36 31 32 33

Map Index

Project Areas

- Project ROW
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- Proposed Modified Corridor – November 18, 2011
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- Laydown Area
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- USFWS WPA or WDA
- State WMA
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- National Trail

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Figure 3: Page 48 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Date: 11/28/2011

Salt Water Coulee

17TH AVE NE

20TH ST NE

T151N
R 51W

17TH AVE NE

DEMERS AVE

18TH ST NE

19TH ST NE

17TH ST NE

17TH AVE S

20 1/2 ST NE

16TH AVE NE

Oakville

10 11 12 7 8 9

15 14 13 18 17 16

Brenna

Fresh Water Coulee

15TH AVE NE

T151N
R 52W

21ST ST NE

32ND AVE S

15TH AVE NE

English Coulee

16TH ST

22 23 24 19 20 21

Map Index

Project Areas
- Project ROW
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- Business
- Irrigated Land
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- USFWS WPA or WDA
- State WMA
- USBOR Land - McClusky Canal
- National Trail

Figure 3: Page 49 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

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Path: \\mspe-gis-file\GIS\Proj\Minnkota\1109000\mxd_docs\PSC\RouteApp\CGFRPA_03_11x17L_50p_ExclAvoid.mxd

T151N
R 51W

T151N
R 50W

Brenna

Grand Forks

Prairie Substation

Laydown Area 7

English Coulee

17TH AVE NE

DEMERS AVE

15TH ST NE

14TH ST NE

62ND ST

8TH ST N

6TH AVE N

UNIVERSITY AVE

5TH AVE

4TH AVE

58TH ST N

11TH AVE

52ND ST

15TH AVE

17TH AVE S

16TH AVE NE

17TH ST NE

15TH AVE NE

16TH ST

32ND AVE S

48TH ST

40TH ST

29TH AVE

12TH ST NE

297

29

81

Map Index

Project Areas
- Project ROW
- Proposed Structure
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Fiber Optic Regeneration Station

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- USBOR Land - McClusky Canal
- National Trail

Aerial photography published by National Agriculture Imagery Program (NAIP), 2009.

Figure 3: Page 50 of 50
Route Exclusion and Avoidance Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2,000 4,000 Feet

Scale 1:24,000

Date: 11/23/2011

ARRODA LAKE STATE GAME MANAGEMENT AREA

T143N R 83W

T143N R 82W

T143N R 81W

T143N R 80W

T142N R 83W

T142N R 82W

T142N R 81W

T142N R 80W

OLIVER CO

MC LEAN CO

MISSOURI

POWERLINE

Painted Woods Lake

Wildwood Lake

Beaver Lake

Gravel Pit

Sanger

Wilton

MC LEAN CO
BURLEIGH CO

Strip Mines

Radio Towers

Painted Woods

BURLINGTON NORTHERN

Price

Horseshoe Butte

BURLEIGH CO
OLIVER CO

Square Butte

Gaging Station

Minnkota Landing Strip

Center 345 kV Substation

Laydown Area 1a

Laydown Area 1b

Milton R Young Powerplant

Twin Buttes

Map Index

1 2 3 4 5 6 7 8 9 10

Project ROW

Proposed Modified Corridor – November 18, 2011

Project Substation

Laydown Area

Figure 4: Page 1 of 10
USGS 1:100,000 Topographic Map
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles

Scale 1:100,000

Path: \\mpe-gis-file\GIS Proj\Minnkota\110900\map_docs\PSC\RouteApp\CGFRPA_04_11x17L_10p_topo.mxd

Date: 11/23/2011

T145N R 81W

T145N R.80W

T145N R 79W

Edgemont

T145N R 78W

John's Lake

T145N R 77W

MC LEAN CO

SHERIDAN CO

BURLEIGH CO

Gravel Pit

POWERLINE

T144N R 81W

T144N R 80W

T144N R 79W

T144N R 78W

Wilson

Steiber

Gaging Station

LOST LAKE NATIONAL WILDLIFE REFUGE

Merida

Map Index

1 2 3 4 5 6 7 8 9 10

Project ROW

Proposed Modified Corridor – November 18, 2011

Project Substation

Laydown Area

Figure 4: Page 2 of 10
USGS 1:100,000 Topographic Map
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles

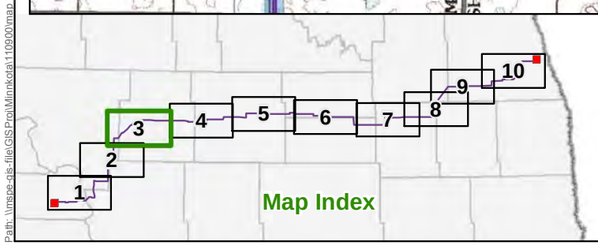
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Date: 11/23/2011

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Wise
Prophets
Mountain City
Hellman
Mercer
Pickard
McClusky
Lamont
Pickardville
Klinks Slope
Makeeff Landing Strip
NATIONAL WATERFOWL PRODUCTION AREA
Gravel Pit
Gravel Pits
Pelican L.
Blue Lake
Pelican Lake
Brush L.
Howells Lake
Prophets Mountain
Stem Lk.
MacClusky
Denhoff
Radio Tower
MC LEAN CO
SHERIDAN CO
NORTHERN
BURLINGTON
T147N R 79W
T147N R 78W
T147N R 77W
T147N R 76W
T146N R 79W
T146N R 78W
T146N R 77W
T146N R 76W
NWPA



Project ROW
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

Figure 4: Page 3 of 10
USGS 1:100,000 Topographic Map
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles
Scale 1:100,000

Date: 11/23/2011

Schiller
T148N
R 75W

Fairview
T148N
R 74W

Pony
Gulch
T148N
R 73W

Rusland
T148N
R 72W

St.
Anna
T148N
R 71W

Lone Tree
Lake

Gravel
Pit

NATIONAL WATERFOWL
PRODUCTION AREA

Laydown
Area 2

Frueh
Landing Field

Mertz
Slough

Mertz
Lake
T147N
R 75W

Boone
T147N
R 74W

Sandpit

SHERIDAN CO
WELLS CO

WELLS COUNTY
LIFE MANAGEMENT AREA

Crystal
Lake
T147N
R 73W

Crystal
Lake

Delger
T147N
R 72W

West
Ontario
T147N
R 71W

Lake
Ontario

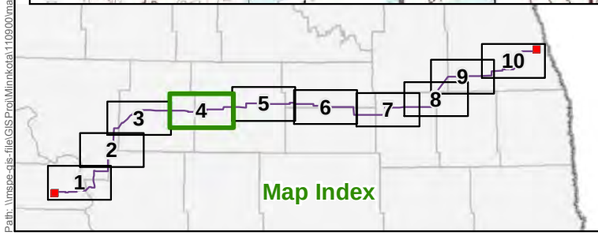
BURLINGTON
NORTHERN

Goodrich

Sewage Disposal

NATIONAL WATERFOWL
PRODUCTION AREA

NATIONAL WATERFOWL
PRODUCTION AREA



Project ROW

Proposed Modified Corridor
– November 18, 2011

Project Substation

Laydown Area

Figure 4: Page 4 of 10
USGS 1:100,000 Topographic Map
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles
Scale 1:100,000

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Date: 11/23/2011

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Fessenden
Sew Disp
St. Anna
Oshkosh
T148N R 71W
T148N R 70W
T148N R 69W
T148N R 68W
T148N R 67W
Germantown
Fairville
Rosefield
Emrick
James River
Burlington Jc
Gravel Pit
Pit
Rosefield Slough
Pipeline
Run
South Cottonwood
Cathay
Woodward
Birtsell
T147N R 71W
T147N R 70W
T147N R 69W
T147N R 68W
T147N R 67W
Rocky
Duck L
Cottonwood
Scotts
Wells Co
Foster Co
Line

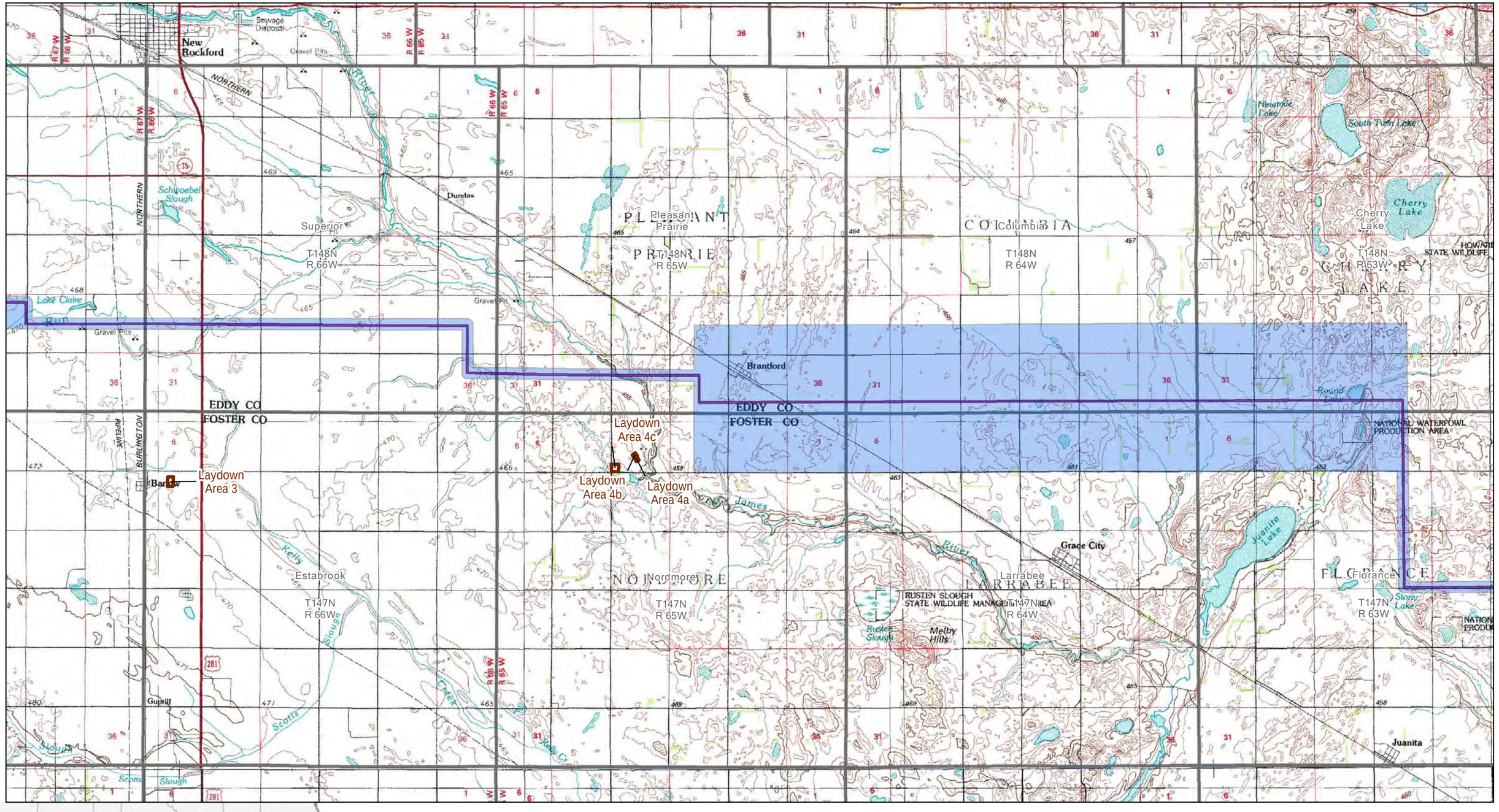
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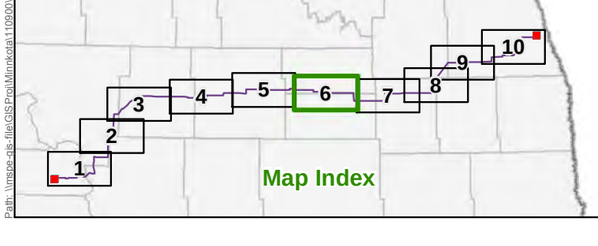
Project ROW
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

Figure 4: Page 5 of 10
USGS 1:100,000 Topographic Map
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles
Scale 1:100,000

Date: 11/23/2011





Project ROW

Proposed Modified Corridor – November 18, 2011

Project Substation

Laydown Area

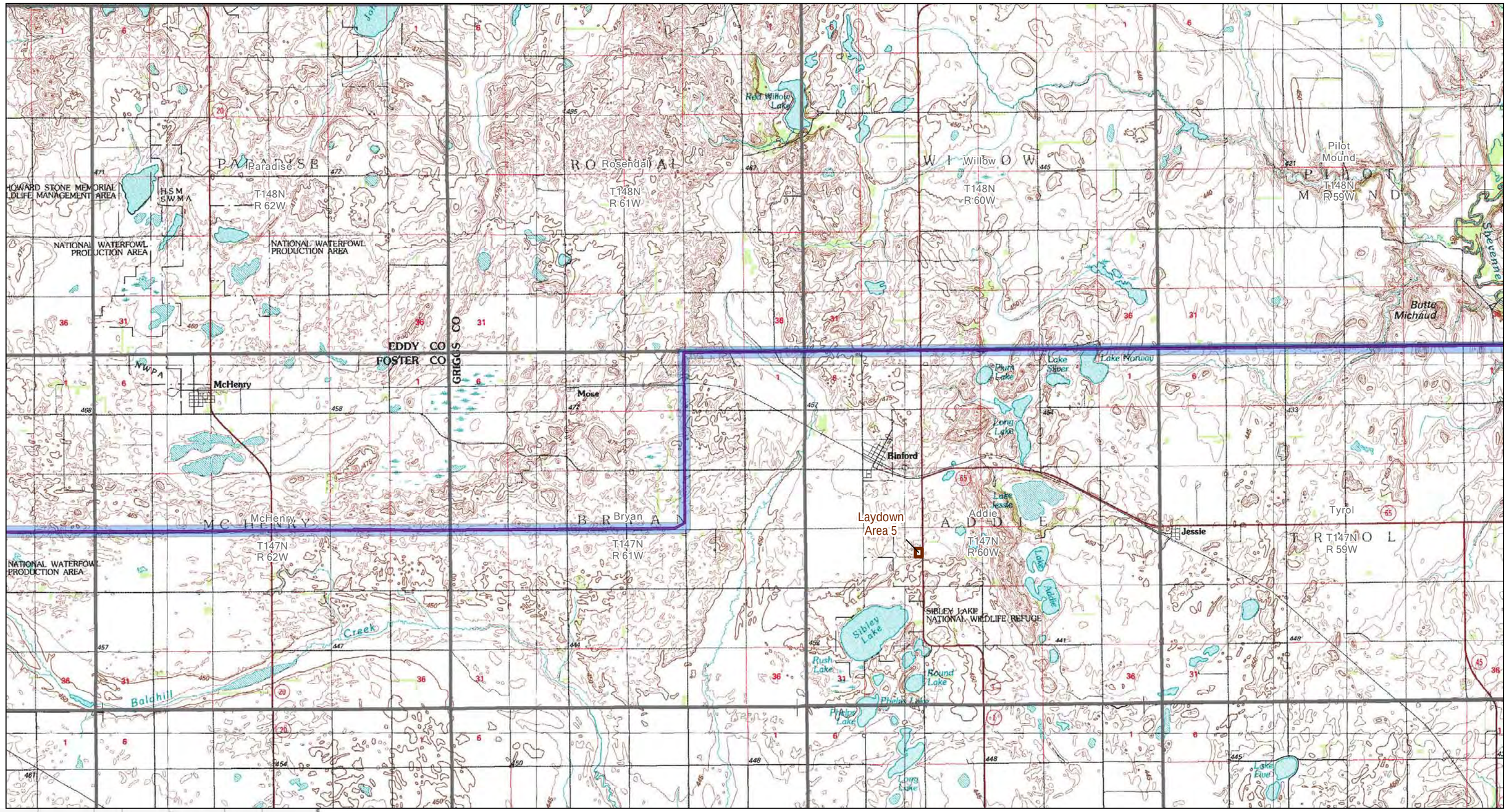
Figure 4: Page 6 of 10
USGS 1:100,000 Topographic Map
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

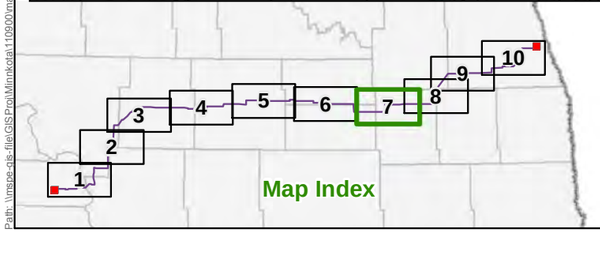
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Date: 11/23/2011





Project ROW

Proposed Modified Corridor – November 18, 2011

Project Substation

Laydown Area

Figure 4: Page 7 of 10
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Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles

Scale 1:100,000

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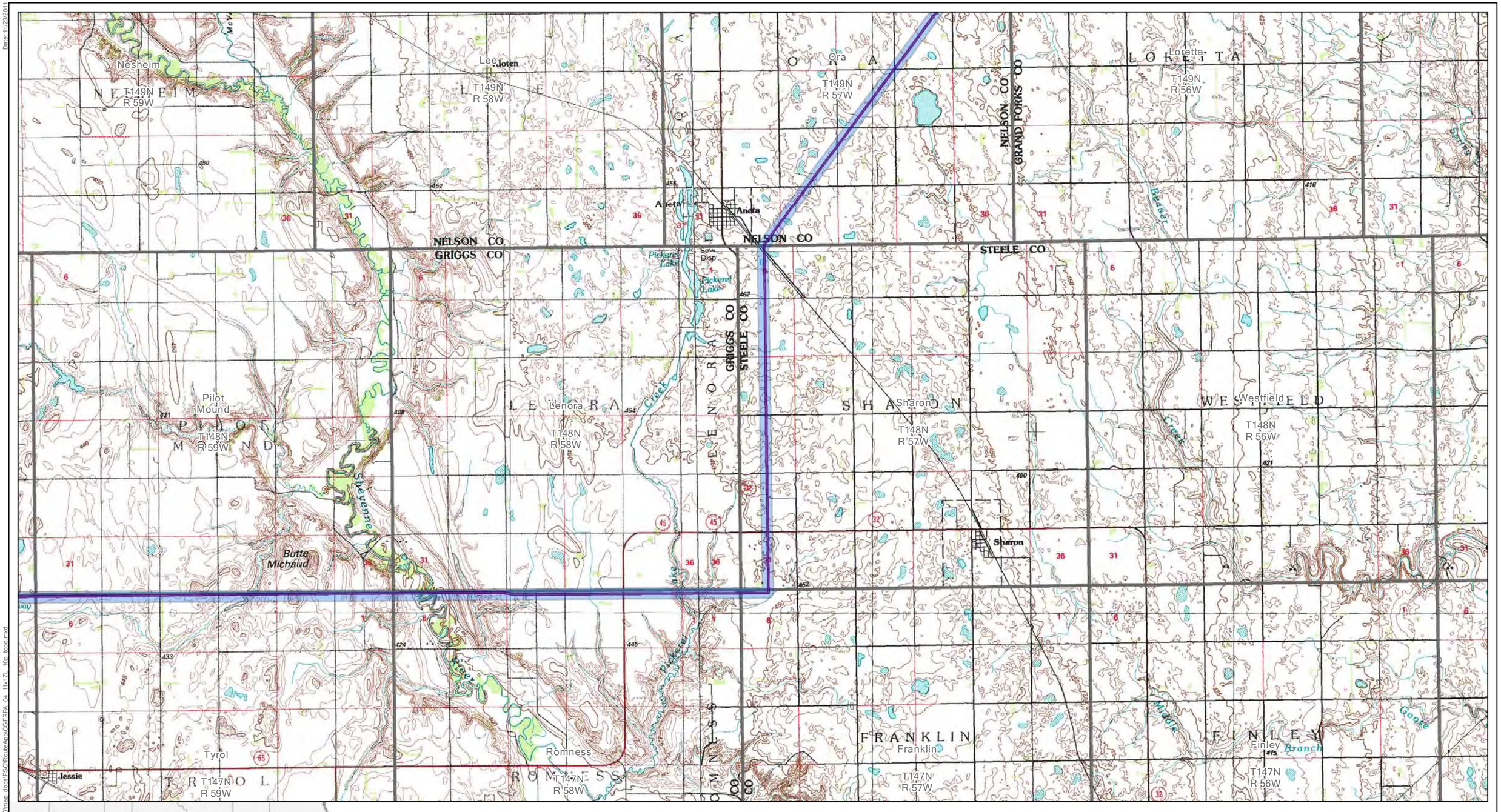


Figure 4: Page 8 of 10
USGS 1:100,000 Topographic Map
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

Date: 11/23/2011

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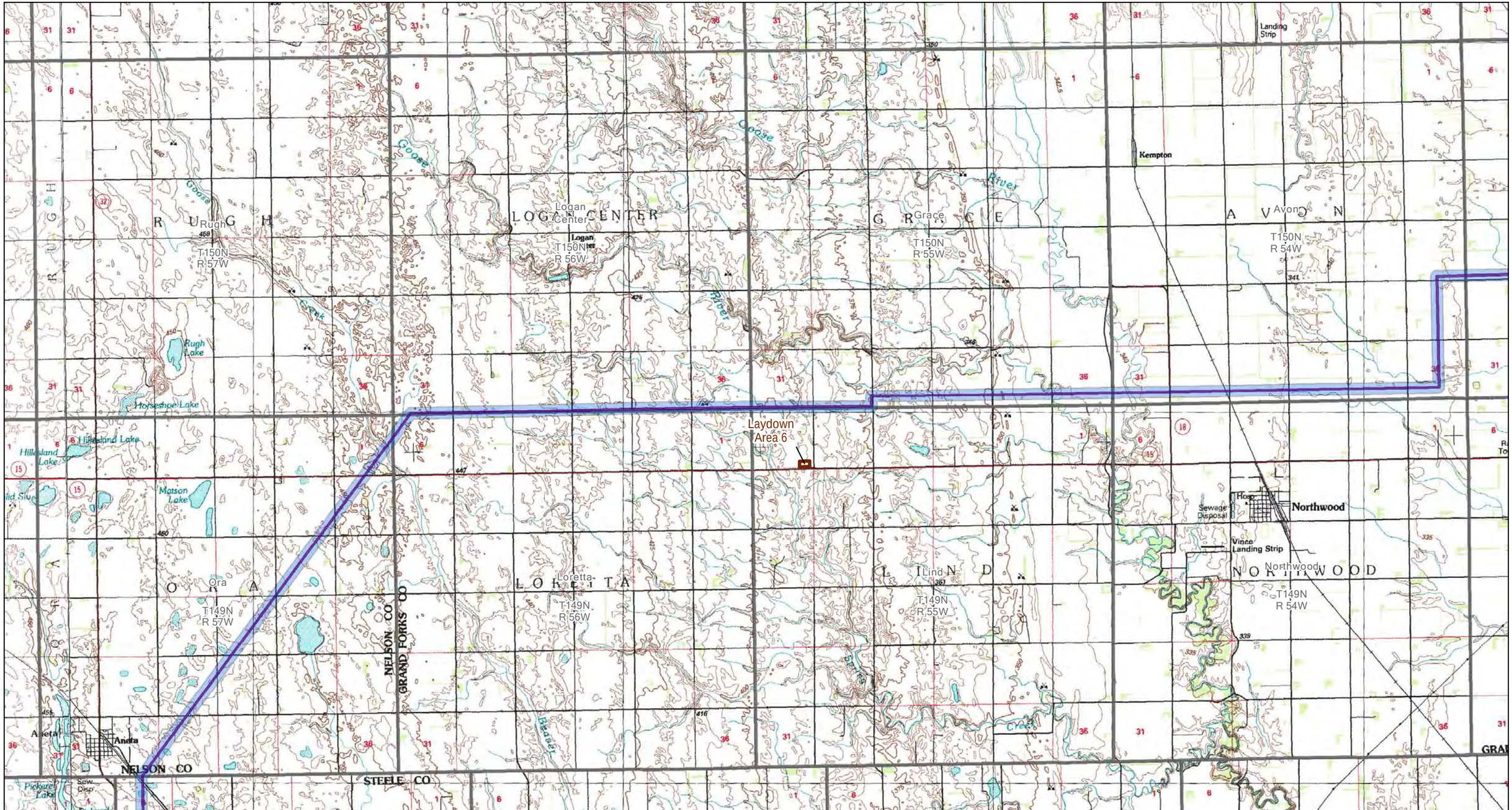


Figure 4: Page 9 of 10
USGS 1:100,000 Topographic Map
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

Date: 11/23/2011

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Prairie Substation

Laydown Area 7

ARVILLA
Arvilla
T151N R 54W

CHESTER
Chester
T151N R 53W

OAKVILLE
Oakville
T151N R 52W

BRENNA
Brenna
T151N R 51W

GRAND FORKS
Grand Forks
T151N R 50W

PLEASANT VIEW
Pleasant View
T150N R 53W

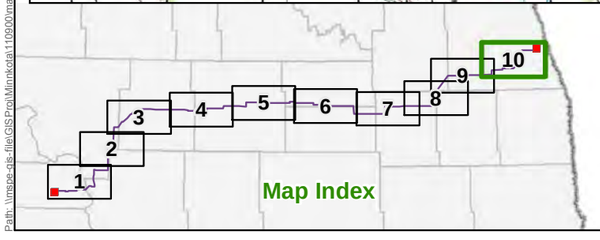
FAIRFIELD
Fairfield
T150N R 52W

ALLENDALE
Allendale
T150N R 51W

AVON
Avon
T150N R 54W

Arvilla
Emerado
Sandpit
Powell
Brenna
Flaat
Merrifield
Landing Strip
Radio Tower
Thompson
Grand Forks
Calspur
Disp
Substa

Turtle River State Park
Turtle River
Hazen Brook
Coulee
Salt Water Coulee
Fresh Water Coulee
English Coulee
Skit Water
Elm Creek
Drain No 4
Drain No 81



Project ROW

Proposed Modified Corridor – November 18, 2011

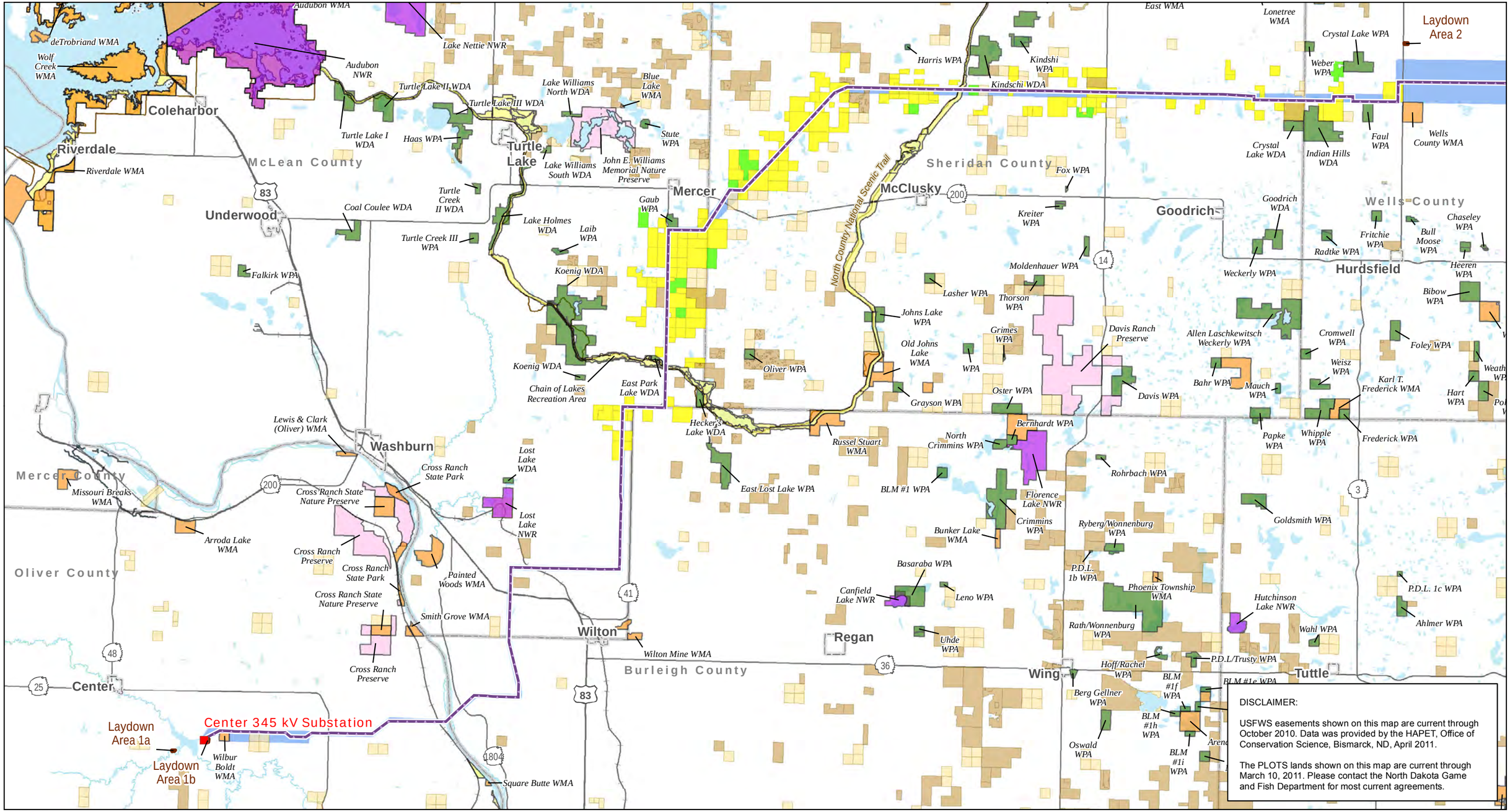
Project Substation

Laydown Area

Figure 4: Page 10 of 10
USGS 1:100,000 Topographic Map
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles

Scale 1:100,000



DISCLAIMER:

USFWS easements shown on this map are current through October 2010. Data was provided by the HAPET, Office of Conservation Science, Bismarck, ND, April 2011.

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Figure 5: Page 1 of 4
Managed Resource Lands
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

Data Sources: NCTA, NDGF, TNC, USACE, USFWS.

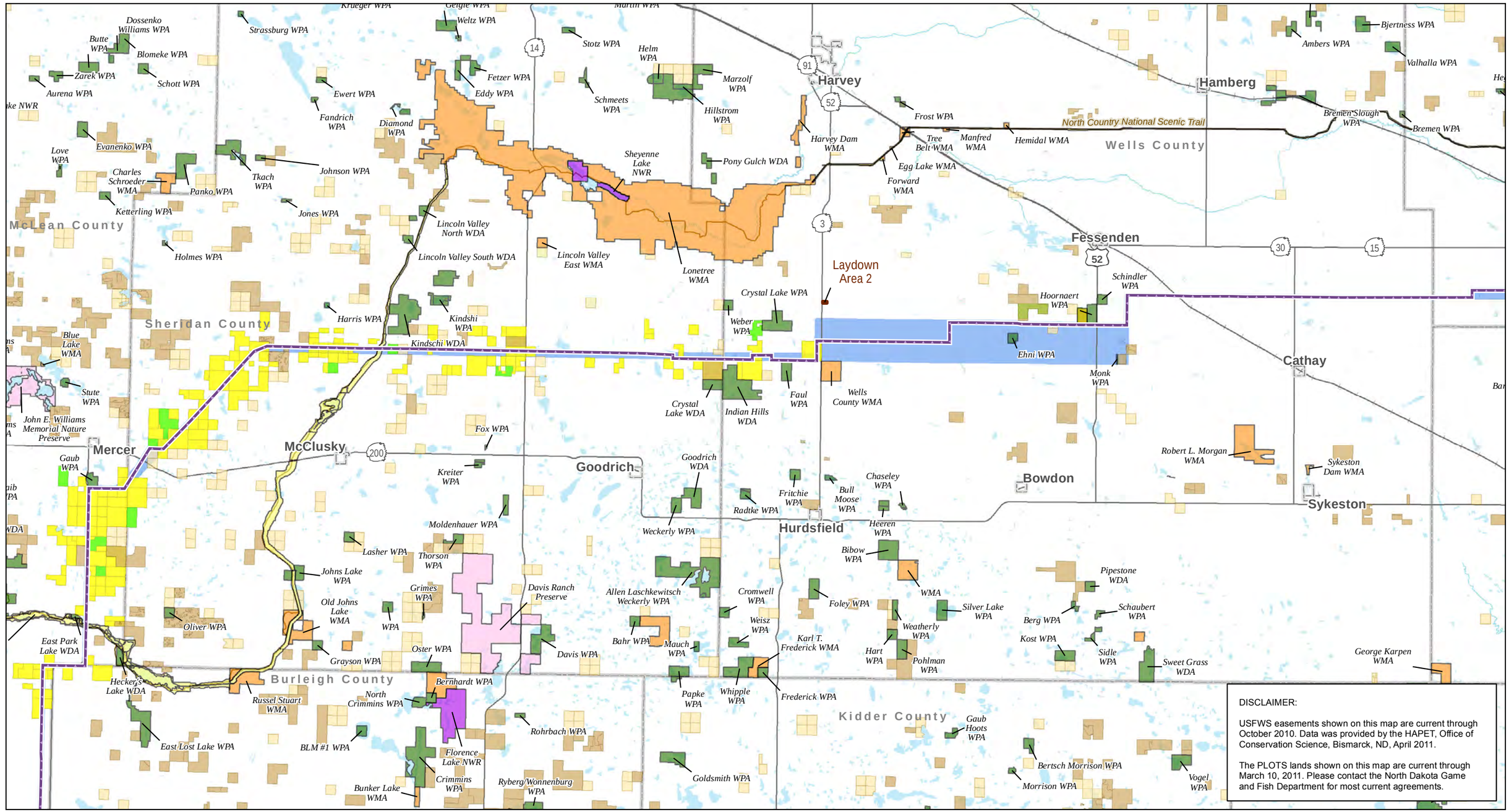
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Date: 11/23/2011

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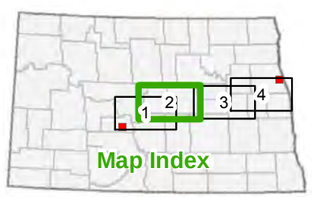
Data Sources: NCTA, NDGF, TNC, USACE, USFWS.



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- Project Route
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- North Country National Scenic Trail
- USFWS National Wildlife Refuge
- USFWS Waterfowl Production Area or Wildlife Development Area
- State Park, Recreation Area or Wildlife Management Area
- Bureau of Reclamation or Army Corps of Engineers Land
- The Nature Conservancy Preserve
- State Trust Land
- PLOTS Land
- UND Field Station
- USFWS Wetland Easement
- USFWS Grassland Easement

Figure 5: Page 2 of 4
Managed Resource Lands
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles

Scale 1:300,000

Date: 11/23/2011

Warsing Dam WMA
Goose Lake WPA
Bjertness WPA
Nash WPA
Sheyenne WPA
Sheyenne WMA
Wood WPA
Anderson WPA
Alfred & Jean Meeg WMA
Warwick Springs WMA
Langley WPA
Valhalla WPA
Hegland WPA
Myhre WPA
Munster WPA
Larson WPA
BLM WPA
Ziebart WPA
Bremen Slough WPA
Bremen WPA
Lake Washington WMA
Lake Coe WPA
Haley WPA
New Rockford
Columbia WPA
Eddy County
Howard Stone WMA
Swan Lake WPA
Wallace WPA
Laydown Area 3
Laydown Area 4b
Laydown Area 4c
Laydown Area 4a
Topp WPA
Grace City
Blue Cloud Lake WPA
Barlow WPA
Rusten Slough WMA
Bauers WPA
Wells County
Sykeston Dam WMA
Carrington
Glenfield
Zink WPA
Okert WPA
George Karpen WMA
Florhaug WPA
Foster County
Hawk's Nest WDA
Leobolt WPA
Kensal
Stutsman County
North Barnes Lake WPA
Mt. Moriah WPA
Barnes Lake WPA
Arrowwood NWR
Bower WPA
Pekin
McVille
North Country National Scenic Trail
Boostrom WPA
Goose Lake WDA
Rugh Lake WDA
Hofer Marsh WPA
Bothen WPA
Gerhart WPA
Quam WPA
Hanson WPA
Nelson County
Tuftland Lake WPA
Lavanger WPA
Aneta
Haven WPA
Johnson Lake NWR
Basswood Lake WPA
Rix WPA
Graving WPA
Guy WPA
Steele County
Sharon
Tande WPA
Delfs WPA
McHenry
Midgley WPA
Larson WPA
Johnson WPA
Binford
Laydown Area 5
Sibley Lake NWR
Lake Addie WPA
Zimprich WPA
Ronningen WPA
Fritz WPA
Finley
Evers WPA
Sibley Lake WMA
Helland WPA
Griggs County
Cooperstown
Campbell WPA
Dronen WPA
Hannaford
Larson WPA
Walum WPA
Wogsland WPA

DISCLAIMER:

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Map Index
1 2 3 4

Project Route
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

North Country National Scenic Trail
USFWS National Wildlife Refuge
USFWS Waterfowl Production Area or Wildlife Development Area
State Park, Recreation Area or Wildlife Management Area

Bureau of Reclamation or Army Corps of Engineers Land
The Nature Conservancy Preserve
State Trust Land
PLOTS Land

UND Field Station
USFWS Wetland Easement
USFWS Grassland Easement

Figure 5: Page 3 of 4
Managed Resource Lands
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles
Scale 1:300,000

Data Sources: NCTA, NDGF, TNC, USACE, USFWS.

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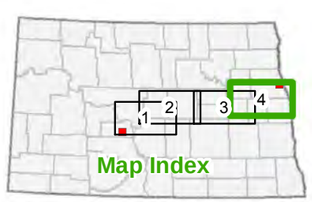
Date: 11/23/2011

Goldhammer WPA
Black Swan WMA
Lambs Lake NWR
Sateran WPA
Menge WPA
Lambs Lake WPA
Little Goose NWR
Little Goose WPA
Tennison WPA
Larimore
Turtle River State Park
2
Emerado
Kellys Slough NWR
Pender WPA
Oakville Prairie Field Station
Crawford WMA
Prairie-Substation
Grand Forks
297
81
Laydown Area 7
Hjelseth WPA
Bundy WPA
McVille WMA
Morken WPA
Grand Forks County
Boostrom WPA
Goose Lake WDA
Rugh Lake WDA
Hofer Marsh WPA
Pekin
15
McVille
Bothen WPA
Thompson
Northwood
Laydown Area 6
Gerhart WPA
Quam WPA
Hanson WPA
Nelson County
29
32
Tuftland Lake WPA
Lavanger WPA
Aneta
Reynolds
Basswood Lake WPA
Rix WPA
Graving WPA
Guy WPA
Hatton
18
Golden Lake WMA
Tande WPA
Sharon
Shaw WPA
Wigen WPA
Erickson WPA
Thykeson WPA
Buxton
Binford
65
45
Fritz WPA
Laydown Area 5
Sibley Lake NWR
Lake Addie WPA
Zimprich WPA
Ronningen WPA
Steele County
200
Finley
Traill County
Portland
Mayville
Evers WPA
Sibley Lake WMA
Helland WPA
Griggs County
North Country National Scenic Trail
NORTH DAKOTA
MINNESOTA
Cooperstown
200
1
Shaw WPA
Elken WPA

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Figure 5: Page 4 of 4
Managed Resource Lands
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles
Scale 1:300,000

Data Sources: NCTA, NDGF, TNC, USACE, USFWS.

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Date: 11/23/2011

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Ward County
McHenry County
Pierce County
Ramsey County
Walsh County
Benson County
Nelson County
Grand Forks County
McLean County
Sheridan County
Eddy County
Wells County
Foster County
Steele County
Traill County
Griggs County
Oliver County
Burleigh County
Kidder County
Stutsman County
Barnes County
Cass County
Morton County
Emmons County
Logan County

Velva
Bergen
Balfour
Drake
Anamoose
Kief
Ruso
Max
Butte
Esmond
Minnewaukan
Devils Lake
Maddock
Lakota
Michigan
Petersburg
Niagara
Manvel
Emerado
Grand Forks
Prairie Substation
Laydown Area 7
Laydown Area 6
Northwood
Thompson
Reynolds
Aneta
Tolna
Pekin
McVille
Warwick
Sheyenne
Harvey
Hamberg
Fessenden
New Rockford
Laydown Area 2
Laydown Area 3
Laydown Area 4a
Laydown Area 4b
Laydown Area 4c
Laydown Area 5
Grace City
McHenry
Cathay
Bowdon
Hurdsfield
Goodrich
McClusky
Carrington
Sykeston
Glenfield
Binford
Cooperstown
Sharon
Finley
Hatton
Buxton
Portland
Mayville
Hillsboro
Clifford
Galesburg
Grandin
Hope
Hannaford
Kensal
Courtenay
Wimbledon
Dazey
Pillsbury
Page
Hunter
Gardner
Arthur
Argusville
Amenia
Casselton
Mapleton
Buffalo
Valley City
Jamestown
Pingree
Buchanan
Woodworth
Robinson
Pettibone
Wing
Wilton
Regan
Tuttle
Center
Center 345 kV Substation
Laydown Area 1b
Laydown Area 1a
Riverdale
Underwood
Washburn
Turtle Lake
Mercer
Garrison
Mandan
Bismarck
Steele
Dawson
Tappen
Medina
Cleveland
Spiritwood Lake
Rogers
Barnes
Ransom
Richland County
Logan County

2007

Map Vicinity

Project Route
Project Substation
Laydown Area

AADT (Average Annual Daily Traffic) - 2500

COMMERCIAL TRUCK TRAFFIC - 150

THE TRAFFIC FIGURES ARE THE TOTAL AT THE CLOSEST HIGHWAY INTERSECTION OR TOWN.

TRAFFIC COUNT CYCLES

2008
2009
2007

Figure 6
Average Annual Daily Traffic
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 5 10 Miles
Scale 1:850,000

Base Map Source: NDDOT 2009.

Date: 11/23/2011

Path: \\mspe-gis-file\GIS\Proj\Minnkota\110900\map_docs\PSC\RouteApp\CGFRPA_07_11x17L_4pg_STATSGO.mxd

Riverdale
Coleharbor
Underwood
Turtle Lake
Mercer
McClusky
Sheridan County
Wells County
Goodrich
Hurdsfield
Laydown Area 2
McLean County
Washburn
Mercer County
Oliver County
Wilton
Center
Center 345 kV Substation
Laydown Area 1b
Laydown Area 1a
Kidder County

MUID	Soil Association	MUID	Soil Association	MUID	Soil Association	MUID	Soil Association
s3435	Perella-Colvin-Bearden (s3435)	s4741	Renshaw-Divide-Arvilla (s4741)	s4764	Svea-Cresbard (s4764)	s4797	Wilton-Williams-Temvik-Mandan (s479
s4719	Fargo (s4719)	s4743	Walum-Kensal-Brantford-Binford (s47	s4766	Svea-Cresbard-Cavour-Barnes (s4766)	s4798	Williams-Nutley (s4798)
s4722	Hegne-Fargo-Bearden (s4722)	s4745	Sioux-Marysland-Lohnes-Arvilla (s47	s4768	Heimdal-Fram-Emrick (s4768)	s4799	Williams-Tansem-Makoti (s4799)
s4726	Overly-Gardena (s4726)	s4747	Wyndmere-Barnes-Arvilla (s4747)	s4769	Heimdal-Fram-Emrick (s4769)	s4801	Bearden-Antler (s4801)
s4728	Glyndon (s4728)	s4749	Lohnes-Claire (s4749)	s4770	Heimdal-Esmond-Emrick (s4770)	s4811	Zahl-Zahill-Williams-Cabbart-Cabba
s4729	Tiffany-Hecla-Glyndon-Embden (s4729	s4750	Forman-Aastad (s4750)	s4771	Miranda-Larson-Heimdal-Emrick (s477	s4818	Rhoades-Heil (s4818)
s4730	Tiffany-Swenoda-Barnes (s4730)	s4751	Buse-Barnes (s4751)	s4779	La Prairie-Fairdale (s4779)	s4819	Wabek-Manning (s4819)
s4731	Towner-Swenoda (s4731)	s4752	Svea-Kloten-Edgeley (s4752)	s4780	Velva-LaDelle-Barnes-Arvilla (s4780	s4820	Wabek-Ruso (s4820)
s4732	Heimdal-Hecla-Embden-Egeland (s4732	s4754	Tonka-Svea-Hamerly-Barnes (s4754)	s4782	Lamoure-La Prairie-Heimdal-Emrick (	s4825	Trembles-Lohler-Havrelon (s4825)
s4733	Wyndmere-Hecla-Embden-Arvilla (s473	s4756	Vallers-Svea-Hamerly-Buse-Barnes (s	s4785	Ojata-Bearden (s4785)	s4829	Vebar-Reeder-Cabba-Amor (s4829)
s4736	Ulen-Hecla-Hamar (s4736)	s4758	Svea-Barnes (s4758)	s4786	Williams-Bowbells (s4786)	s6901	Overly-Great Bend-Beotia-Bearden (s
s4737	Towner-Swenoda-Hecla (s4737)	s4759	Svea-Hamerly-Barnes (s4759)	s4787	Zahl-Williams-Vida-Bowbells (s4787)	s8369	Water (s8369)
s4739	Lankin-Gilby-Antler (s4739)	s4760	Svea-Buse-Barnes (s4760)	s4792	Zahl-Williams (s4792)		
s4740	Renshaw-Overly-Lankin-Brantford (s4	s4762	Towner-Embden (s4762)	s4796	Wilton-Williams-Temvik (s4796)		

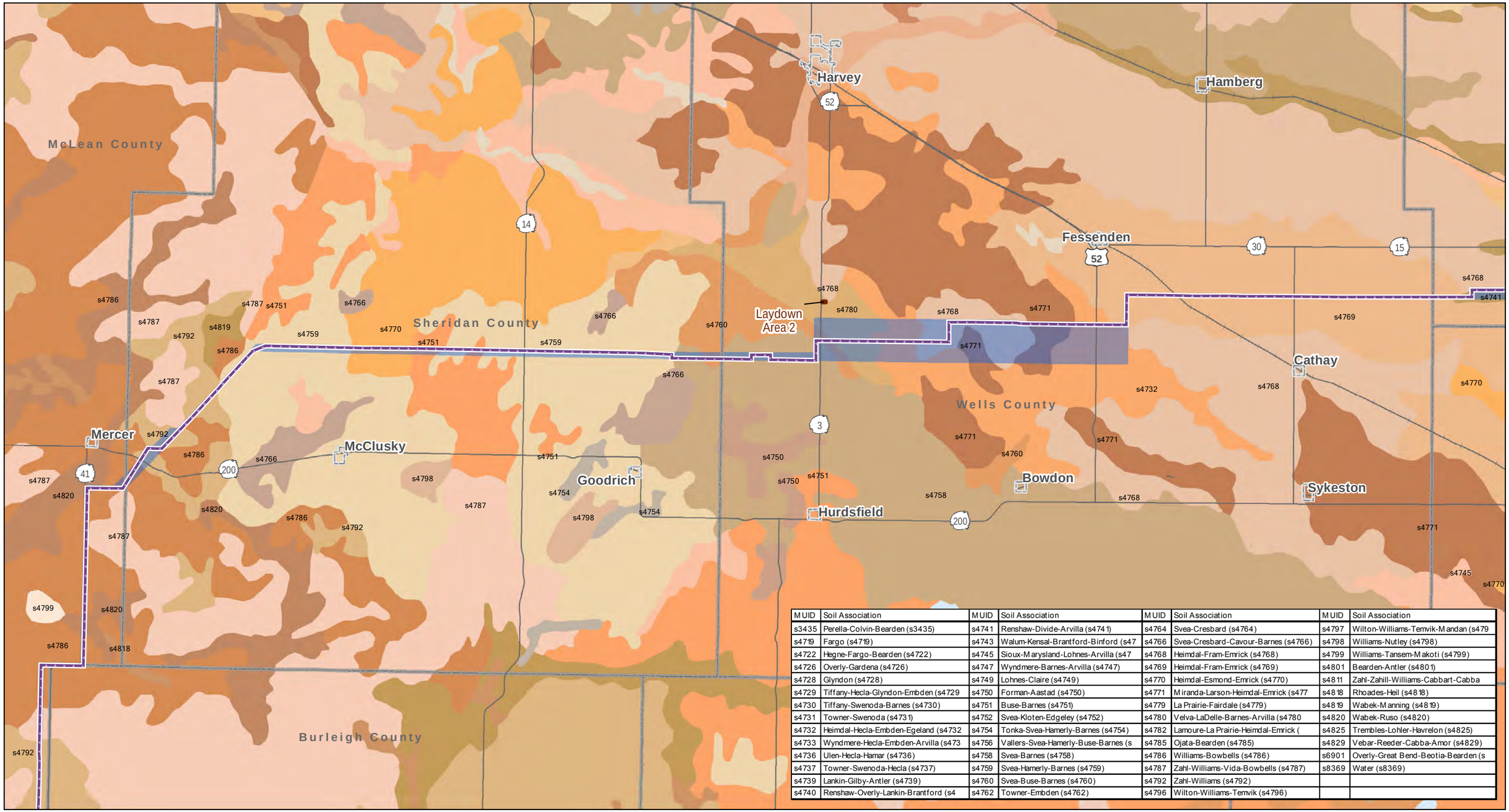
Map Index

Project Route
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

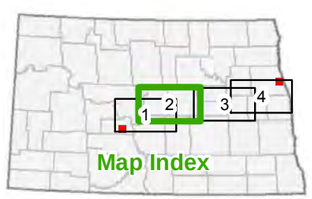
Figure 7: Page 1 of 4
State Soils Association (STATSGO)
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles
Scale 1:300,000

Date: 11/23/2011



MUID	Soil Association	MUID	Soil Association	MUID	Soil Association	MUID	Soil Association
s3435	Perella-Colvin-Bearden (s3435)	s4741	Renshaw-Divide-Arvilla (s4741)	s4764	Svea-Cresbard (s4764)	s4797	Wilton-Williams-Temvik-Mandan (s479
s4719	Fargo (s4719)	s4743	Walum-Kensal-Brantford-Binford (s47	s4766	Svea-Cresbard-Cavour-Barnes (s4766)	s4798	Williams-Nutley (s4798)
s4722	Hegne-Fargo-Bearden (s4722)	s4745	Sioux-Marysland-Lohnes-Arvilla (s47	s4768	Heimdal-Fram-Emrick (s4768)	s4799	Williams-Tansem-Makoti (s4799)
s4726	Overly-Gardena (s4726)	s4747	Wyndmere-Barnes-Arvilla (s4747)	s4769	Heimdal-Fram-Emrick (s4769)	s4801	Bearden-Antler (s4801)
s4728	Glyndon (s4728)	s4749	Lohnes-Claire (s4749)	s4770	Heimdal-Esmond-Emrick (s4770)	s4811	Zahl-Zahill-Williams-Cabbart-Cabba
s4729	Tiffany-Hecla-Glyndon-Embden (s4729	s4750	Forman-Aastad (s4750)	s4771	Miranda-Larson-Heimdal-Emrick (s477	s4818	Rhoades-Heil (s4818)
s4730	Tiffany-Swenoda-Barnes (s4730)	s4751	Buse-Barnes (s4751)	s4779	La Prairie-Fairdale (s4779)	s4819	Wabek-Manning (s4819)
s4731	Towner-Swenoda (s4731)	s4752	Svea-Kloten-Edgeley (s4752)	s4780	Velva-LaDelle-Barnes-Arvilla (s4780	s4820	Wabek-Ruso (s4820)
s4732	Heimdal-Hecla-Embden-Egeland (s4732	s4754	Tonka-Svea-Hamerly-Barnes (s4754)	s4782	Lamoure-La Prairie-Heimdal-Emrick (	s4825	Trembles-Lohler-Havrelon (s4825)
s4733	Wyndmere-Hecla-Embden-Arvilla (s473	s4756	Vallers-Svea-Hamerly-Buse-Barnes (s	s4785	Ojata-Bearden (s4785)	s4829	Vebar-Reeder-Cabba-Amor (s4829)
s4736	Ulen-Hecla-Hamar (s4736)	s4758	Svea-Barnes (s4758)	s4786	Williams-Bowbells (s4786)	s6901	Overly-Great Bend-Beotia-Bearden (s
s4737	Towner-Swenoda-Hecla (s4737)	s4759	Svea-Hamerly-Barnes (s4759)	s4787	Zahl-Williams-Vida-Bowbells (s4787)	s8369	Water (s8369)
s4739	Lankin-Gilby-Antler (s4739)	s4760	Svea-Buse-Barnes (s4760)	s4792	Zahl-Williams (s4792)		
s4740	Renshaw-Overly-Lankin-Brantford (s4	s4762	Towner-Embden (s4762)	s4796	Wilton-Williams-Temvik (s4796)		



- Project Route
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area

Figure 7: Page 2 of 4
State Soils Association (STATSGO)
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

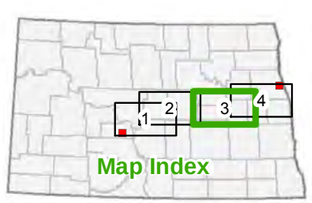
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Date: 11/23/2011

Pekin
McVille
Nelson County
Eddy County
New Rockford
Aneta
Sharon
Wells County
Laydown Area 3
Laydown Area 4b
Laydown Area 4a
Laydown Area 4c
Grace City
McHenry
Binford
Laydown Area 5
Finley
Foster County
Steele County
Carrington
Glenfield
Cooperstown
Griggs County
Kensal
Stutsman County

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s3435	Perella-Colvin-Bearden (s3435)	s4741	Renshaw-Divide-Arvilla (s4741)	s4764	Svea-Cresbard (s4764)	s4797	Wilton-Williams-Temvik-Mandan (s479
s4719	Fargo (s4719)	s4743	Walum-Kensal-Brantford-Binford (s47	s4766	Svea-Cresbard-Cavour-Barnes (s4766)	s4798	Williams-Nutley (s4798)
s4722	Hegne-Fargo-Bearden (s4722)	s4745	Sioux-Marysland-Lohnes-Arvilla (s47	s4768	Heimdal-Fram-Emrick (s4768)	s4799	Williams-Tansem-Makoti (s4799)
s4726	Overly-Gardena (s4726)	s4747	Wyndmere-Barnes-Arvilla (s4747)	s4769	Heimdal-Fram-Emrick (s4769)	s4801	Bearden-Antler (s4801)
s4728	Glyndon (s4728)	s4749	Lohnes-Claire (s4749)	s4770	Heimdal-Esmond-Emrick (s4770)	s4811	Zahl-Zahill-Williams-Cabbart-Cabba
s4729	Tiffany-Hecla-Glyndon-Embden (s4729	s4750	Forman-Aastad (s4750)	s4771	Miranda-Larson-Heimdal-Emrick (s477	s4818	Rhoades-Heil (s4818)
s4730	Tiffany-Swenoda-Barnes (s4730)	s4751	Buse-Barnes (s4751)	s4779	La Prairie-Fairdale (s4779)	s4819	Wabek-Manning (s4819)
s4731	Towner-Swenoda (s4731)	s4752	Svea-Kloten-Edgeley (s4752)	s4780	Velva-LaDelle-Barnes-Arvilla (s4780	s4820	Wabek-Ruso (s4820)
s4732	Heimdal-Hecla-Embden-Egeland (s4732	s4754	Tonka-Svea-Hamerly-Barnes (s4754)	s4782	Lamoure-La Prairie-Heimdal-Emrick (	s4825	Trembles-Lohler-Havrelon (s4825)
s4733	Wyndmere-Hecla-Embden-Arvilla (s473	s4756	Vallers-Svea-Hamerly-Buse-Barnes (s	s4785	Ojata-Bearden (s4785)	s4829	Vebar-Reeder-Cabba-Amor (s4829)
s4736	Ulen-Hecla-Hamar (s4736)	s4758	Svea-Barnes (s4758)	s4786	Williams-Bowbells (s4786)	s6901	Overly-Great Bend-Beotia-Bearden (s
s4737	Towner-Swenoda-Hecla (s4737)	s4759	Svea-Hamerly-Barnes (s4759)	s4787	Zahl-Williams-Vida-Bowbells (s4787)	s8369	Water (s8369)
s4739	Lankin-Gilby-Antler (s4739)	s4760	Svea-Buse-Barnes (s4760)	s4792	Zahl-Williams (s4792)		
s4740	Renshaw-Overly-Lankin-Brantford (s4	s4762	Towner-Embden (s4762)	s4796	Wilton-Williams-Temvik (s4796)		



Project Route

Proposed Modified Corridor – November 18, 2011

Project Substation

Laydown Area

Figure 7: Page 3 of 4
State Soils Association (STATSGO)
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

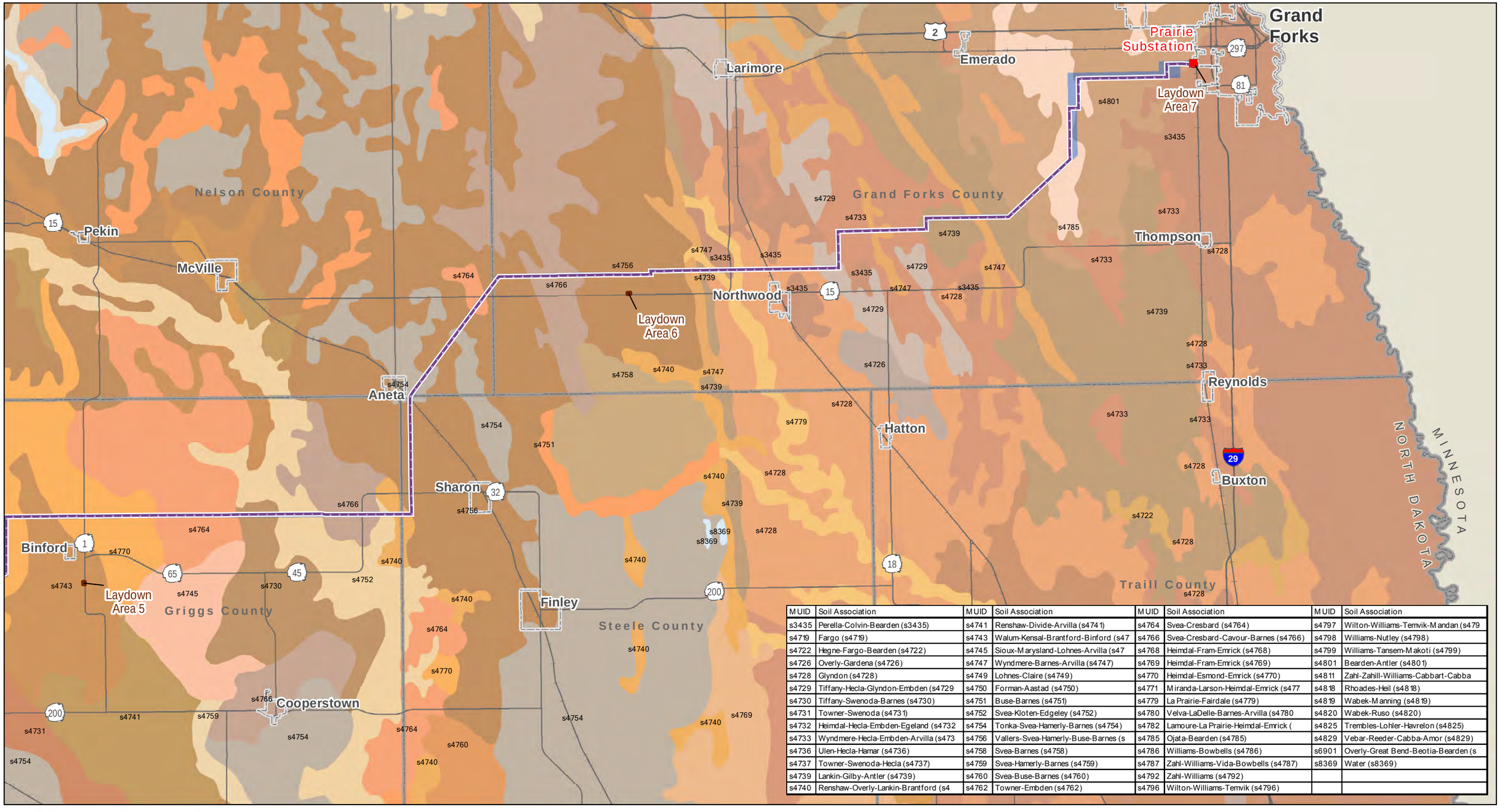
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Scale 1:300,000

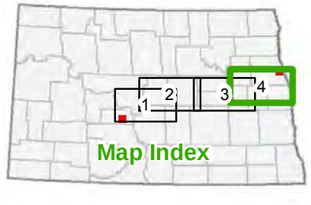
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Date: 11/23/2011

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MUID	Soil Association	MUID	Soil Association	MUID	Soil Association	MUID	Soil Association
s3435	Perella-Colvin-Bearden (s3435)	s4741	Renshaw-Divide-Arvilla (s4741)	s4764	Svea-Cresbard (s4764)	s4797	Wilton-Williams-Temvik-Mandan (s479
s4719	Fargo (s4719)	s4743	Walum-Kensal-Brantford-Binford (s47	s4766	Svea-Cresbard-Cavour-Barnes (s4766)	s4798	Williams-Nutley (s4798)
s4722	Hegne-Fargo-Bearden (s4722)	s4745	Sioux-Marysland-Lohnes-Arvilla (s47	s4768	Heimdal-Fram-Emrick (s4768)	s4799	Williams-Tansem-Makoti (s4799)
s4726	Overly-Gardena (s4726)	s4747	Wyndmere-Barnes-Arvilla (s4747)	s4769	Heimdal-Fram-Emrick (s4769)	s4801	Bearden-Antler (s4801)
s4728	Glyndon (s4728)	s4749	Lohnes-Claire (s4749)	s4770	Heimdal-Esmond-Emrick (s4770)	s4811	Zahl-Zahill-Williams-Cabbart-Cabba
s4729	Tiffany-Hecla-Glyndon-Embden (s4729	s4750	Forman-Aastad (s4750)	s4771	Miranda-Larson-Heimdal-Emrick (s477	s4818	Rhoades-Heil (s4818)
s4730	Tiffany-Swenoda-Barnes (s4730)	s4751	Buse-Barnes (s4751)	s4779	La Prairie-Fairdale (s4779)	s4819	Wabek-Manning (s4819)
s4731	Towner-Swenoda (s4731)	s4752	Svea-Kloten-Edgeley (s4752)	s4780	Velva-LaDelle-Barnes-Arvilla (s4780	s4820	Wabek-Ruso (s4820)
s4732	Heimdal-Hecla-Embden-Egeland (s4732	s4754	Tonka-Svea-Hamerly-Barnes (s4754)	s4782	Lamoure-La Prairie-Heimdal-Emrick (	s4825	Trembles-Lohler-Havrelon (s4825)
s4733	Wyndmere-Hecla-Embden-Arvilla (s473	s4756	Vallers-Svea-Hamerly-Buse-Barnes (s	s4785	Ojata-Bearden (s4785)	s4829	Vebar-Reeder-Cabba-Amor (s4829)
s4736	Ulen-Hecla-Hamar (s4736)	s4758	Svea-Barnes (s4758)	s4786	Williams-Bowbells (s4786)	s6901	Overly-Great Bend-Beotia-Bearden (s
s4737	Towner-Swenoda-Hecla (s4737)	s4759	Svea-Hamerly-Barnes (s4759)	s4787	Zahl-Williams-Vida-Bowbells (s4787)	s8369	Water (s8369)
s4739	Lankin-Gilby-Antler (s4739)	s4760	Svea-Buse-Barnes (s4760)	s4792	Zahl-Williams (s4792)		
s4740	Renshaw-Overly-Lankin-Brantford (s4	s4762	Towner-Embden (s4762)	s4796	Wilton-Williams-Temvik (s4796)		



Project Route

Proposed Modified Corridor – November 18, 2011

Project Substation

Laydown Area

Figure 7: Page 4 of 4
State Soils Association (STATSGO)
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles

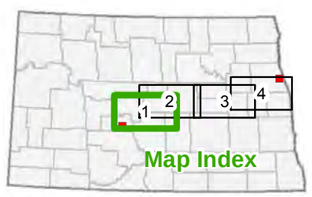
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Date: 11/23/2011

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Riverdale
Coleharbor
Underwood
Turtle Lake
Mercer
McClusky
Sheridan County
Goodrich
Wells County
Laydown Area 2
Hurdsfield
McLean County
Mercer County
Washburn
Oliver County
Center
Center 345 kV Substation
Laydown Area 1b
Laydown Area 1a
Wilton
Burleigh County
Regan
Wing
Tuttle
Kidder County

83 200 14 48 41 36 1804 25 3



Project Substation
Laydown Area
Project Route
Proposed Modified Corridor – November 18, 2011

SSURGO Prime Farmland
Prime Farmland
Prime Farmland if Drained
Farmland of Statewide Importance
Not Prime Farmland

Figure 8: Page 1 of 4
Prime Farmland and Soil Distribution (SSURGO)
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N

0 2 4 Miles
Scale 1:300,000

Date: 11/23/2011

McLean County

Sheridan County

Wells County

Burleigh County

Kidder County

Stutsman County

Harvey

Hamberg

Fessenden

Cathay

Laydown Area 2

Mercer

McClusky

Goodrich

Bowdon

Sykeston

Hurdsfield

14

52

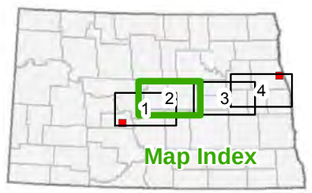
30

15

41

200

3



Project Substation

Laydown Area

Project Route

Proposed Modified Corridor – November 18, 2011

SSURGO Prime Farmland

Prime Farmland

Prime Farmland if Drained

Farmland of Statewide Importance

Not Prime Farmland

Figure 8: Page 2 of 4
Prime Farmland and Soil Distribution (SSURGO)
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N

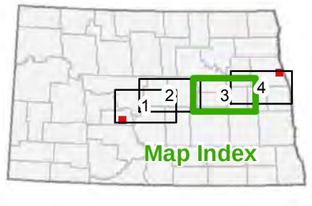
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Date: 11/23/2011

Pekin
McVille
Nelson County
Eddy County
New Rockford
Aneta
Sharon
Laydown Area 3
Laydown Area 4b
Laydown Area 4a
Laydown Area 4c
McHenry
Wells County
Grace City
Binford
Laydown Area 5
Finley
Foster County
Steele County
Carrington
Glenfield
Griggs County
Cooperstown
Hannaford
Kensal
Stutsman County
Luverne



Project Substation
Laydown Area
Project Route
Proposed Modified Corridor – November 18, 2011

SSURGO Prime Farmland
Prime Farmland
Prime Farmland if Drained
Farmland of Statewide Importance
Not Prime Farmland

Figure 8: Page 3 of 4
Prime Farmland and Soil Distribution (SSURGO)
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles
Scale 1:300,000

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Date: 11/23/2011

Path: \\mpe-gis-file\GIS\Proj\Minnkota\110900\mxp_docs\PSC\RouteApp\CGFRPA_08_11x17L_4pp_PrimeFarmland.mxd

Grand Forks

Prairie Substation

Laydown Area 7

Larimore

Emerado

Nelson County

Grand Forks County

Pekin

McVille

Thompson

Northwood

Laydown Area 6

Reynolds

Aneta

Hatton

Sharon

Buxton

MINNESOTA

NORTH DAKOTA

Binford

Laydown Area 5

Griggs County

Traill County

Finley

Steele County

Portland

Mayville

Cooperstown

Hillsboro

Map Index

1 2 3 4

Project Substation

Laydown Area

Project Route

Proposed Modified Corridor – November 18, 2011

SSURGO Prime Farmland

Prime Farmland

Prime Farmland if Drained

Farmland of Statewide Importance

Not Prime Farmland

Figure 8: Page 4 of 4
Prime Farmland and Soil Distribution (SSURGO)
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N

0 2 4 Miles

Scale 1:300,000

Date: 11/23/2011

Path: \\mpe-gis-file\GIS Proj\Minnkota\110900\map_docs\PSC\RouteApp\CGFRPA_09_11x17L_4pg_Water.mxd

Laydown Area 2

Coleharbor
Riverdale
Underwood
Turtle Lake
Mercer
McClusky
Goodrich
Hurdsfield
Washburn
Wilton
Regan
Wing
Tuttle
Center

Sheridan County
Wells County
McLean County
Burleigh County
Mercer County
Oliver County
Kidder County

Lake Nettie
Mud Lake
Lake Audubon
Nelson Lake
Kasper Slough
Nygaard Slough
Turtle Lake
Lake Brekken
Lake Holmes
Lake Williams
Hanson Slough
Lake Ordway
Blue Lake
Pelican Lake
Peterson Lake
Brush Lake
Howells Lake
Postel Lake
Kindschi Lake
Jones Lake
Crystal Lake
Weller Slough
Coal Lake
Heckers Lake
Pop Lake
Horse Lake
North Lake
West Lake
Sperry Lake
Salt Lake
Florence Lake
Woodhouse Lake
Senior Lake
Painted Woods Creek
Lost Lake
Mandan Lake
Painted Woods Lake
Grass Lake
OBrien Lake
Bunker Lake
Horseshoe Lake
Lonetree Lake
Canfield Lake
Camel Slough
Mitchell Lake
Twin Lakes
Lake Helen
Long Alkaline
Rush Lake
Hutchinson Lake
Lake Josephine
Harriet Lake
Yanktonai Lake
Nelson Lake
Cherry Lake

Missouri River
Wolf Creek
Aggie Brown Coulee
Turtle Creek
Brittons Slough
Coal Lake Coulee
Buffalo Creek
McClusky Canal
Sheyenne River
Alderin Creek
Goose Creek
Yanktonai Creek
Square Butte Creek
Sherk Creek
Hagel Creek
East Branch Apple Creek

83
200
41
1804
36
48
25
14
3

Laydown Area 1a
Laydown Area 1b
Center 345 kV Substation

Map Index
1 2 3 4

Project Route
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

USGS Mapped Waterways
Perennial River or Stream
Intermittent Stream, Ditch or Canal

NWI Wetlands
Lake, Pond or River
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland

Figure 9: Page 1 of 4
Surface Waters and Wetlands
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N
0 2 4 Miles
Scale 1:300,000

Date: 11/23/2011

Laydown Area 2

Harvey
Hamberg
Fessenden
Cathay
Sykeston
Bowdon
Hurdsfield
Goodrich
McClusky
Mercer

McLean County
Wells County
Sheridan County
Burleigh County
Kidder County
Stutsman County

Big Slough
Norway Lake
Zumpf Lake
Shroyer
Johnson Lake
Sorenson Lake
Egg Lake
New Rockford Canal
James River
Mud Lake
Wolf Lake
Randt Lake
Ebel Lake
Moosner Lake
Moorehead Lake
Sandy Lake
Guyes Lake
Krueger Lake
Skogmo Lake
Siebold Lake
Sheyenne River
Sheyenne Lake
Coal Mine Lake
Lone Tree Lake
Alkali Lake
Bentz Lake
McClusky Canal
Cherry Lake
Postel Lake
Kindschi Lake
Hirshkorn Lake
Rocky Run
Scotts Slough
Blue Lake
Pelican Lake
Brush Lake
Howells Lake
Jones Lake
Crystal Lake
Duck Lake
Cottonwood Lake
Lake Ontario
Pipestem Creek
Lake Hiawatha
Little Pipestem Creek
Pop Lake
Horse Lake
North Lake
West Lake
Sperry Lake
Heckers Lake
Salt Lake
Florence Lake
Painted Woods Creek
OBrien Lake
Bunker
Grass Lake
Woodhouse Lake
Senior Lake
Swan Lake
Willow Lake
Lake Helen
Long Alkaline Lake
Barnes Lake

Map Index

Project Route
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

USGS Mapped Waterways
Perennial River or Stream
Intermittent Stream, Ditch or Canal

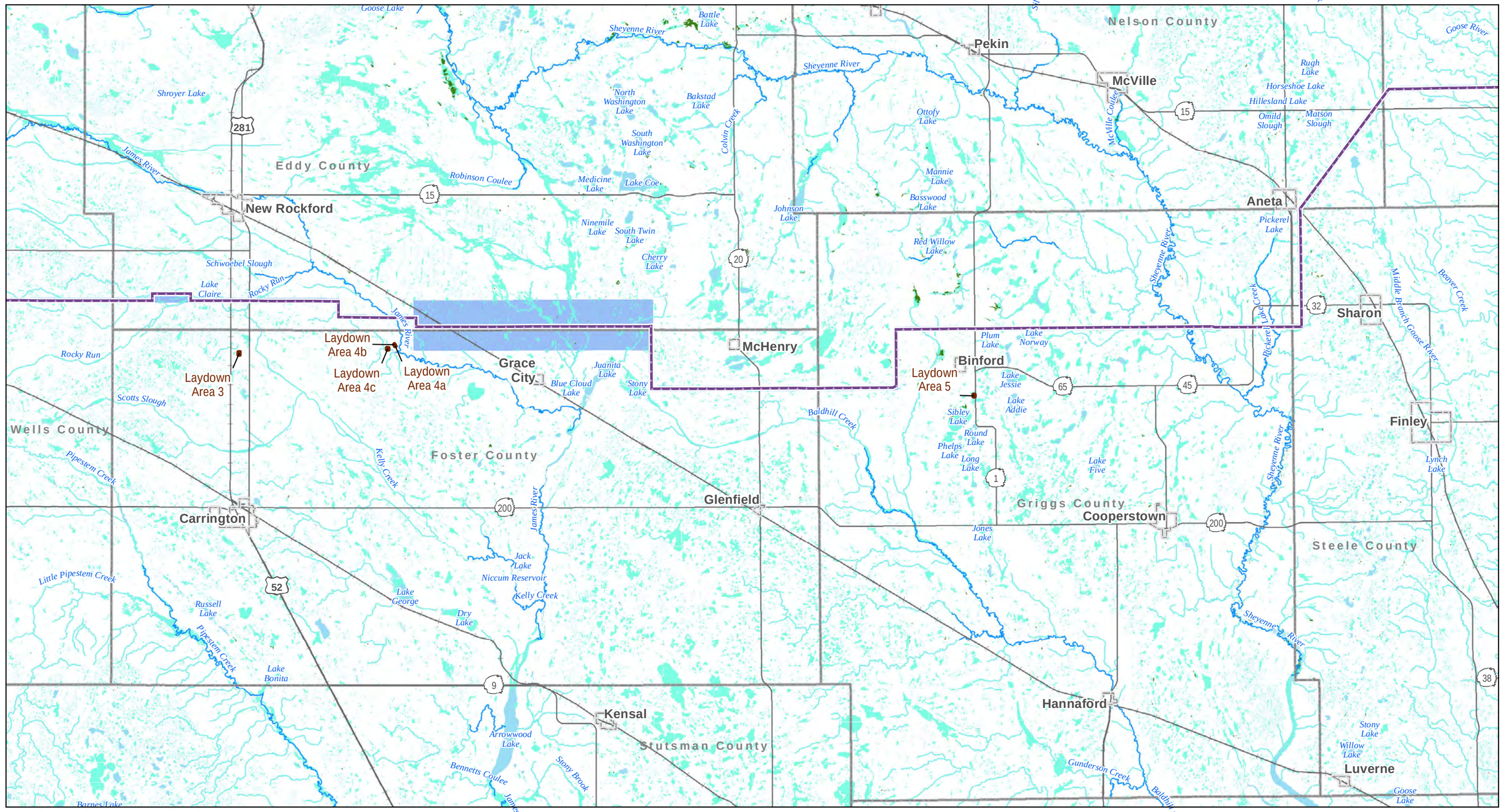
NWI Wetlands
Lake, Pond or River
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland

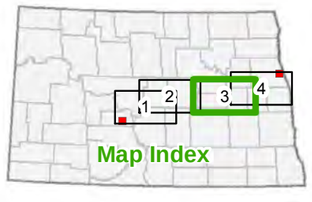
Figure 9: Page 2 of 4
Surface Waters and Wetlands
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles
Scale 1:300,000

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Date: 11/23/2011





- Project Route
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area

USGS Mapped Waterways
- Perennial River or Stream
- Intermittent Stream, Ditch or Canal

NWI Wetlands
- Lake, Pond or River
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

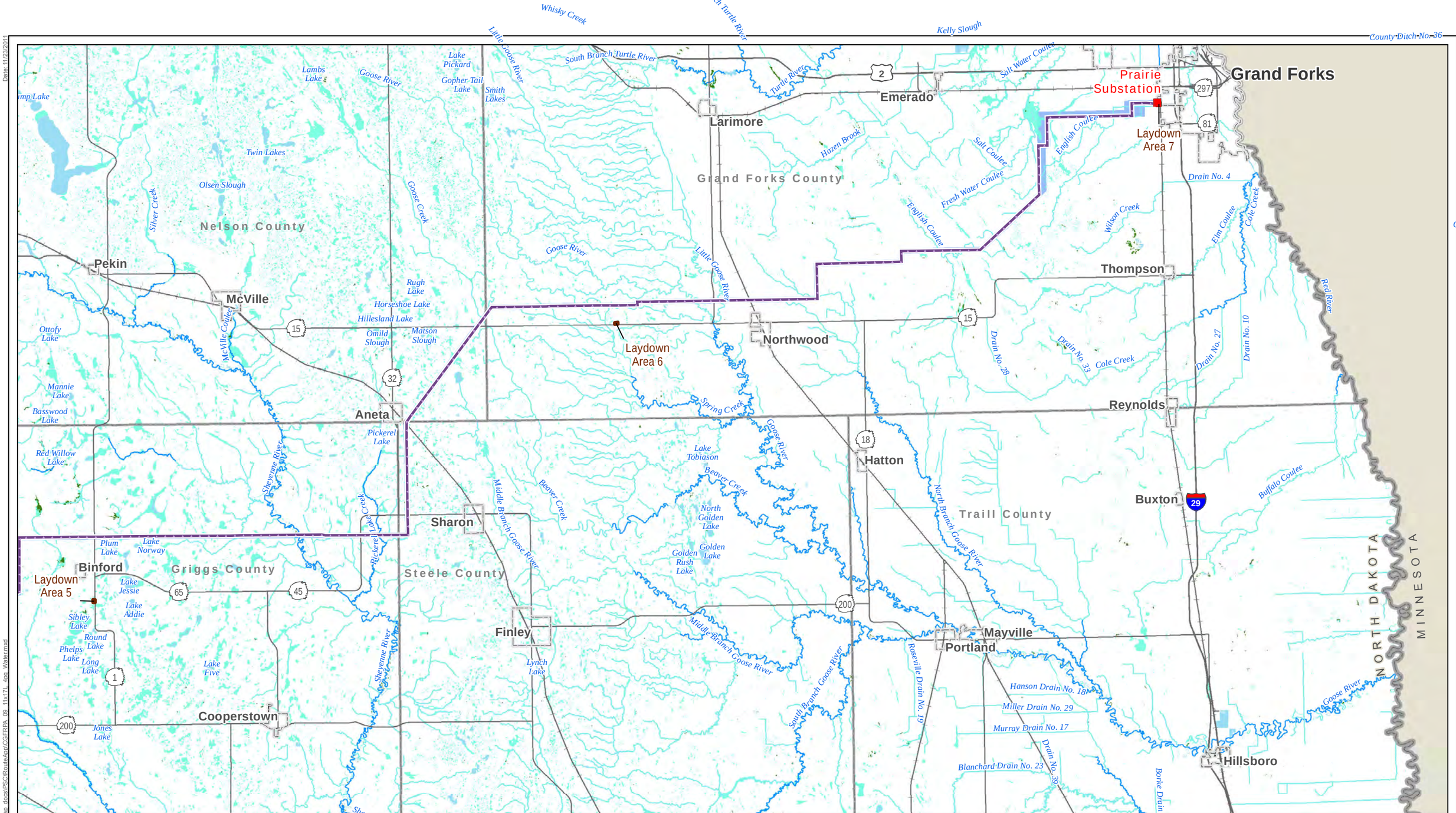
Figure 9: Page 3 of 4
Surface Waters and Wetlands
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

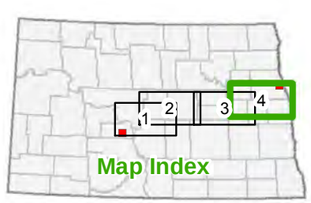
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Date: 11/23/2011

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Project Route

Proposed Modified Corridor – November 18, 2011

Project Substation

Laydown Area

USGS Mapped Waterways

Perennial River or Stream

Intermittent Stream, Ditch or Canal

NWI Wetlands

Lake, Pond or River

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Figure 9: Page 4 of 4
Surface Waters and Wetlands
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

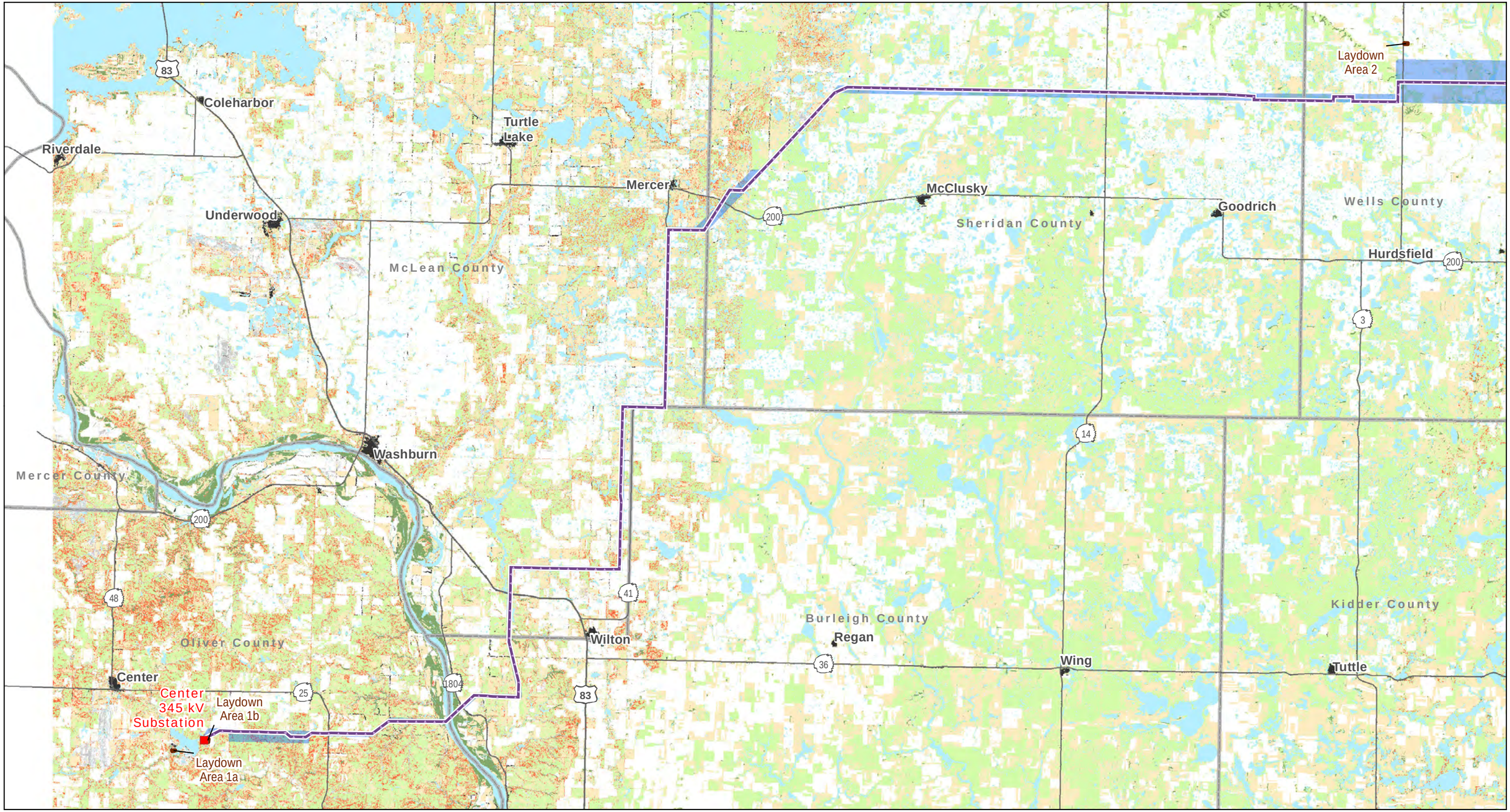
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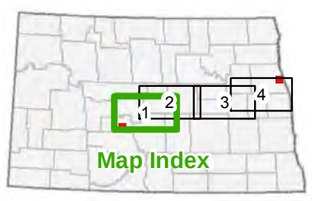
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- Project Route
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area

2004 GAP Land Cover

- Barren/Sparse Vegetation
- Cropland
- Developed
- Pasture
- Prairie
- Shrubland
- Wetland
- Woodland

Figure 10: Page 1 of 4
Land Cover
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N

0 2 4 Miles

Scale 1:300,000

Date: 11/23/2011

Harvey
Hamberg
McLean County
14
Fessenden
30
15
52
Sheridan County
Laydown Area 2
Cathay
Wells County
Mercer
McClusky
41
200
Goodrich
3
Bowdon
Sykeston
Hurdsfield
200
Burleigh County
Kidder County
Stutsman County

Map Index
1
2
3
4

Project Route
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

2004 GAP Land Cover
Barren/Sparse Vegetation
Cropland
Developed
Pasture
Prairie
Shrubland
Wetland
Woodland

Figure 10: Page 2 of 4
Land Cover
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N
0 2 4 Miles
Scale 1:300,000

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Date: 11/23/2011

Pekin
McVille
Nelson County
Eddy County
New Rockford
Aneta
Sharon
McHenry
Laydown Area 3
Laydown Area 4b
Laydown Area 4a
Laydown Area 4c
Grace City
Wells County
Binford
Laydown Area 5
Finley
Foster County
Carrington
Glenfield
Steele County
Griggs County
Cooperstown
Hannaford
Kensal
Stutsman County
Luverne

Map Index

Project Route
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

2004 GAP Land Cover
Barren/Sparse Vegetation
Cropland
Developed
Pasture
Prairie
Shrubland
Wetland
Woodland

Figure 10: Page 3 of 4
Land Cover
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles
Scale 1:300,000

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Date: 11/23/2011

Grand Forks
Prairie Substation
Laydown Area 7
Larimore
Emerado
Nelson County
Grand Forks County
Pekin
McVille
Thompson
Northwood
Laydown Area 6
Aneta
Reynolds
Hatton
Buxton
MINNESOTA
NORTH DAKOTA
Sharon
Binford
Laydown Area 5
Griggs County
Finley
Steele County
Traill County
Portland
Mayville
Cooperstown
Hillsboro

Map Index

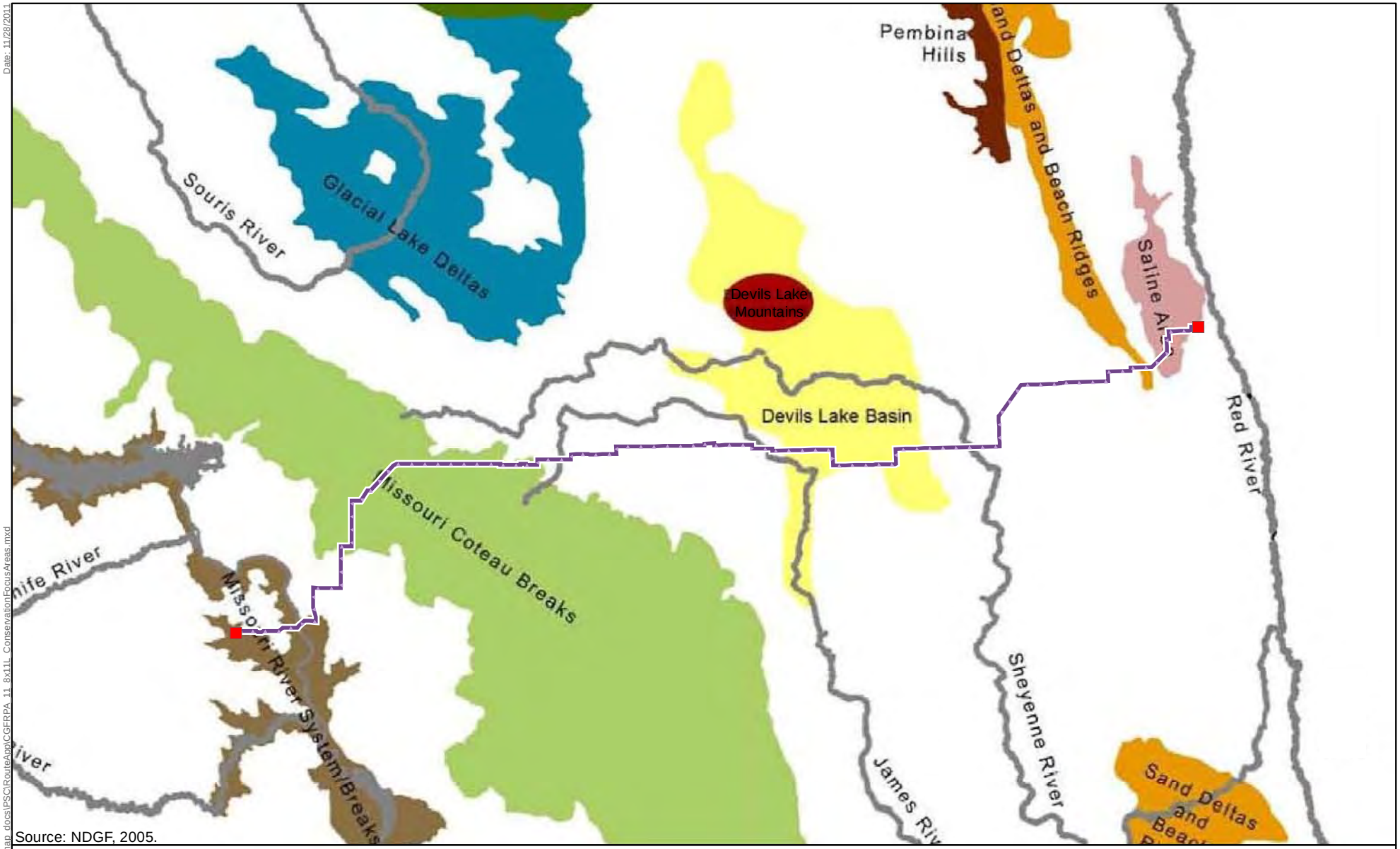
Project Route
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

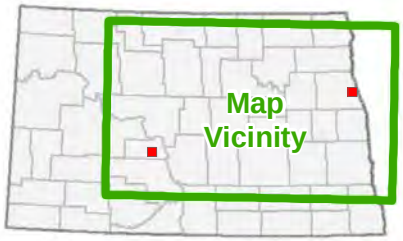
2004 GAP Land Cover
Barren/Sparse Vegetation
Cropland
Developed
Pasture
Prairie
Shrubland
Wetland
Woodland

Figure 10: Page 4 of 4
Land Cover
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles
Scale 1:300,000

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Project Route

Project Substation

Figure 11
North Dakota Conservation Focus Areas
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 10 20 Miles

Scale 1:1,700,000

Date: 11/28/2011

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Date: 11/23/2011

Coleharbor
Riverdale
Turtle Lake
Mercer
Underwood
83
McClusky
200
Sheridan County
Goodrich
Laydown Area 2
Approx. 75%
Hurdsfield
Wells County
McLean County
Washburn
Mercer County
200
Approx. 50%
3
14
Burleigh County
41
1804
Wilton
Regan
Oliver County
48
36
Wing
Tuttle
36
25
Center
83
Kidder County
Center 345 kV Substation
Laydown Area 1a
Laydown Area 1b

Map Index
1 2 3 4

Project Route
Proposed Modified Corridor – November 18, 2011
Project Substation
Laydown Area

Sensitive information has been redacted from this Figure.

Federally Threatened or Endangered Species
NHI Species of Concern
Threatened or Endangered Species

Impaired or Vulnerable Terrestrial Community
Piping Plover Critical Habitat

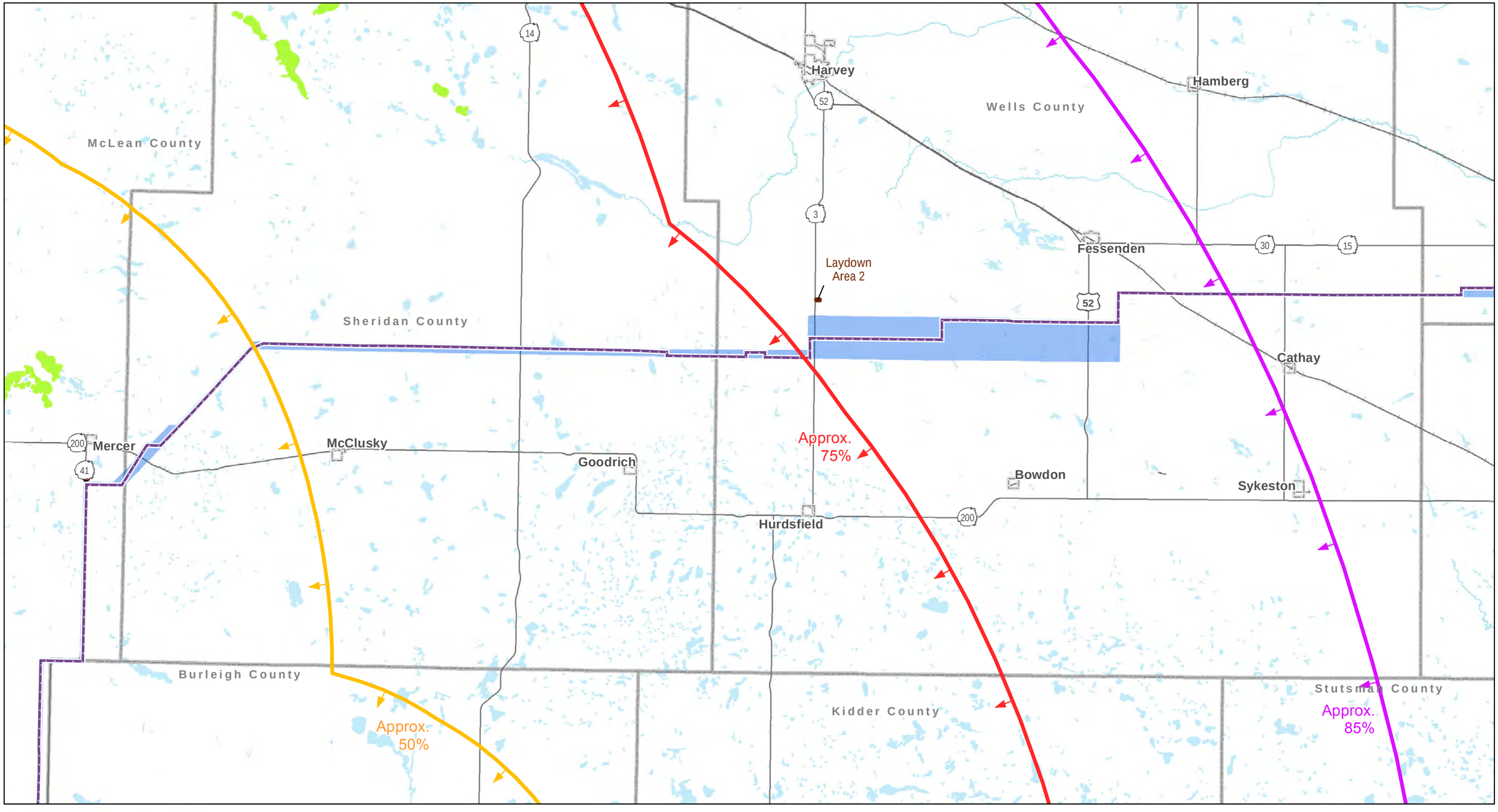
Whooping Crane Sighting Corridor
Approx. 50%
Approx. 75%
Approx. 85%
Approx. 95%

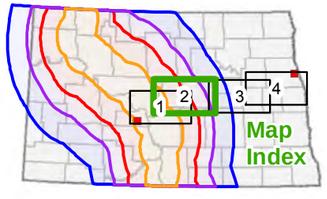
Figure 12: Page 1 of 4
Sensitive Natural Resources
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N
0 2 4 Miles
Scale 1:300,000

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Date: 11/23/2011





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- Project Route
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Federally Threatened or Endangered Species
- NHI Species of Concern
- Threatened or Endangered Species
- Impaired or Vulnerable Terrestrial Community
- Piping Plover Critical Habitat

Whooping Crane Sighting Corridor

- Approx. 50%
- Approx. 75%
- Approx. 85%
- Approx. 95%

Figure 12: Page 2 of 4
Sensitive Natural Resources
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles
Scale 1:300,000

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Date: 11/23/2011

Path: \\mpgc-gis-file\GIS Proj\Minnkota\110900\mxd_docs\PSC\RouteApp\CGFRPA_12_11x17L_4pg_SensitiveNatRes.mxd

Eddy County
Wells County
Foster County
Stutsman County
Nelson County
Griggs County
Steele County

New Rockford
Carrington
Grace City
McHenry
Kensal
Glenfield
Pekin
McVille
Aneta
Sharon
Binford
Finley
Cooperstown
Hannaford
Luverne

Laydown Area 3
Laydown Area 4b
Laydown Area 4c
Laydown Area 4a
Laydown Area 5

Approx. 95%
Approx. 85%

281 15 20 32 52 9 200 65 45 1 38

Map Index

Sensitive information has been redacted from this Figure.

- Project Route
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Federally Threatened or Endangered Species
- NHI Species of Concern
- Threatened or Endangered Species
- Impaired or Vulnerable Terrestrial Community
- Piping Plover Critical Habitat

Whooping Crane Sighting Corridor
- Approx. 50%
- Approx. 75%
- Approx. 85%
- Approx. 95%

Figure 12: Page 3 of 4
Sensitive Natural Resources
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles
Scale 1:300,000

Date: 11/23/2011

Grand Forks

Prairie Substation

Laydown Area 7

Emerado

Larimore

Grand Forks County

Nelson County

Pekin

McVille

Thompson

Northwood

Laydown Area 6

Aneta

Reynolds

Hatton

Buxton

Sharon

Griggs County

Binford

Laydown Area 5

Steele County

Finley

Portland

Mayville

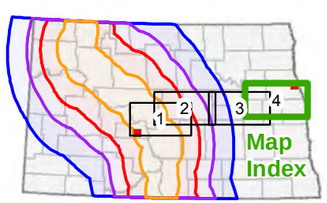
Trail County

NORTH DAKOTA

MINNESOTA

Cooperstown

Hillsboro



Sensitive information has been redacted from this Figure.

- Project Route
- Proposed Modified Corridor – November 18, 2011
- Project Substation
- Laydown Area
- Federally Threatened or Endangered Species
- NHI Species of Concern
- Threatened or Endangered Species
- Impaired or Vulnerable Terrestrial Community
- Piping Plover Critical Habitat

Whooping Crane Sighting Corridor

- Approx. 50%
- Approx. 75%
- Approx. 85%
- Approx. 95%

Figure 12: Page 4 of 4
Sensitive Natural Resources
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 2 4 Miles

Scale 1:300,000

Path: \\mspe-gis-file\GIS Proj\Minnkota\110900\map_docs\PSC\RouteApp\CGFRPA_12_11x17L_4pg_SensitiveNatRes.mxd

Appendix A
Design Data Report

DESIGN DATA REPORT

Project

- Approximately 250-mile transmission line.
- Final layout and structure types to be completed after design is finalized.

TRANSMISSION LINE GENERAL SPECIFICATIONS	
345 kV Transmission Line	Details
Voltage (kV)	345
Average Height Range (feet)	95 - 180
Capacity (MW)	598 MW
Operating Capacity (MW)	292 MW summer/404 MW winter
Average Span Length (feet)	1,000
Structure Types	- Single Pole self-supporting Davit Arm - Two Pole self-supporting H-frame (South of GFI Airport) - Three Pole self-supporting (Missouri River Crossing)
Conductor Size	Two 959.6 kcmil (thousand circular mils) Suwannee TW (trapezoidal wire) type ACSR (aluminum conductor steel reinforced)
Shield Wire	Optical ground wire (OPGW) and 0.5-inch Extra High Strength (EHS)
Right-of-Way (feet)	150-feet-wide and 250-feet-wide (Missouri River Crossing)
Average Footing Depth (feet)	30 - 40
Average Footing Diameter (feet)	7 - 15
Foundation Type	Drilled pier

ASSOCIATED FACILITIES GENERAL SPECIFICATIONS	
Center 345 kV Substation Upgrades	
Equipment	This will involve installing new 345 kV circuit breakers, 345 kV dead-end structures, one new and one replacement 345/230 kV transformer and associated bus work, new 345 kV switches and associated foundations, steel structures, and control panels. A line reactor for open line voltage control will also be required.
Right-of-Way to be Acquired	N/A. Upgrades will occur within existing substation's fenced boundary (ownership shared with Otter Tail Power Company). Reactor will require a 22,500-square-foot (0.5 acre) expansion to north end of substation, beyond existing fenced boundary but on Minnkota-owned property.
New 230 kV Tie Line	
Equipment	1,500-foot-long 230 kV Tie Line to parallel existing tie line.
Right-of-Way to be Acquired	N/A. Activity completed on Minnkota-owned property.
Existing 230 kV Tie Line Upgrades	
Equipment	The existing Square Butte 230 kV Substation to Center 345 kV Substation Tie Line modifications will include: terminating the existing line to a new transformer (T2) terminal at the Center 345 kV Substation, new 1272/Pheasant ASCR aluminum conductor, steel overhead ground wire and associated line hardware, installing 1 new deadend structure for the T2 terminal location, removal of an existing deadend structure at the T1 terminal location.

ASSOCIATED FACILITIES GENERAL SPECIFICATIONS	
Right-of-Way to be Acquired	N/A. Activity completed on Minnkota-owned property.
Square Butte 230 kV Substation	
Equipment	Existing 230 kV circuit breakers and line terminal equipment re-allocated from existing HVDC tie line to new 345 kV interconnect.
Right-of-Way to be Acquired	N/A. Activity completed within existing substation footprint.
Prairie Substation Upgrades	
Equipment	Installing new 345 kV circuit breakers, 345 kV dead-end structures, one new and one relocated 345/230 kV transformer and associated bus work, new 345 kV switches and associated foundations, steel structures, and control panels. New 230 kV circuit breakers added to accommodate interconnecting with the existing 230 kV ring bus. Existing transmission line termination moved to convert ring bus into breaker-and-a-half bus arrangement.
Right-of-Way to be Acquired	N/A. Upgrades occur on existing Minnkota-operated substation's fenced boundary.
Fiber Optic Regeneration Stations	
Equipment	Four fiber optic regeneration stations will be required along the transmission line route to re-amplify the protection and control signals carried in the OPGW. The stations will be about 50 to 55 miles apart. Permanent access roads will be constructed for each fiber optic regeneration station.
Right-of-Way to be Acquired	Will be located within the 150-foot-wide Project ROW adjacent to a transmission structure

Appendix B
A Legal Description for the Project Route

Table B-1. Project Route Legal Description

County	PLSS Township	Section	Civil Township
Burleigh	T142N R80W	6, 7, 18, 19	Painted Woods
	T142N R81W	1, 13, 14, 22, 23, 24, 27	Painted Woods
	T144N R79W	5, 6	Wilson
Eddy	T148N R63W	31, 32, 33, 34	Cherry Lake
	T148N R64W	31, 32, 33, 34, 35, 36	Columbia
	T148N R65W	31, 32, 33, 34, 35, 36	Pleasant Prairie
	T148N R66W	25, 26, 27, 28, 29, 30, 36	Superior
	T148N R67W	25, 26, 27, 28, 29, 30	Rosefield
Foster	T147N R62W	13, 14, 15, 16, 17, 18	McHenry
	T147N R63W	3, 10, 13, 14, 15	Florance
Grand Forks	T149N R56W	6	Loretta
	T150N R52W	1, 10, 11, 12, 15, 16, 19, 20, 21	Fairfield
	T150N R53W	19, 20, 21, 22, 23, 24	Pleasant View
	T150N R54W	24, 25, 31, 32, 33, 34, 35, 36	Avon
	T150N R55W	31, 32, 33, 34, 35, 36	Grace
	T150N R56W	31, 32, 33, 34, 35, 36	Logan Center
	T151N R51W	11, 12, 14, 15, 16, 17, 18	Brenna
	T151N R52W	13, 24, 25, 36	Oakville
Griggs	T147N R58W	1, 2, 3, 4, 5, 6	Romness
	T147N R59W	1, 2, 3, 4, 5, 6	Tyrol
	T147N R60W	1, 2, 3, 4, 5, 6	Addie
	T147N R61W	1, 2, 3, 10, 15, 16, 17, 18	Bryan
McLean	T143N R80W	1, 12, 13, 14, 15, 16, 17, 18	Unorganized Territory
	T143N R81W	13, 24, 25, 36	Unorganized Territory
	T144N R80W	1, 12, 13, 24, 25, 36	Unorganized Territory
	T145N R79W	2, 11, 14, 23, 26, 35	Unorganized Territory
	T146N R79W	13, 23, 24, 26, 35	Mercer
Nelson	T149N R57W	1, 11, 12, 14, 15, 22, 23, 27, 28, 32, 33	Ora
Oliver	T142N R81W	27, 28, 29, 30	Unorganized Territory
	T142N R82W	25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36	Unorganized Territory
	T142N R83W	26, 27, 33, 34, 35, 36	Unorganized Territory
Sheridan	T146N R78W	4, 5, 7, 8, 18	Pickard
	T147N R74W	7, 8, 9, 10, 11, 12	Boone
	T147N R75W	7, 8, 9, 10, 11, 12	Unorganized Territory
	T147N R76W	7, 8, 9, 10, 11, 12	Unorganized Territory
	T147N R77W	7, 8, 9, 10, 11, 12, 18	Unorganized Territory

County	PLSS Township	Section	Civil Township
	T147N R78W	13, 23, 24, 26, 27, 33, 34	Prophets
Steele	T147N R57W	6	Franklin
	T148N R57W	6, 7, 18, 19, 30, 31	Sharon
Wells	T147N R70W	4, 5, 6	South Cottonwood
	T147N R71W	1, 2, 3, 4	West Ontario
	T147N R72W	1, 2, 3, 4, 5, 6	Delger
	T147N R73W	1, 2, 7, 8, 9, 10, 11	Crystal Lake
	T148N R68W	25, 26, 27, 28, 29, 30	Fairville
	T148N R69W	25, 26, 27, 28, 29, 30	Germantown
	T148N R70W	25, 26, 27, 28, 33	Oshkosh
	T148N R71W	31, 32, 33, 34	St. Anna
	T148N R72W	36	Rusland

Appendix C
Programmatic Agreement

PROGRAMMATIC AGREEMENT
AMONG
THE RURAL UTILITIES SERVICE,
THE U.S. FISH AND WILDLIFE SERVICE,
AND
THE NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICE
REGARDING
THE CENTER TO GRAND FORKS 345 kV TRANSMISSION LINE PROJECT
FOR
OLIVER, BURLEIGH, MCLEAN, SHERIDAN, WELLS, FOSTER, EDDY, GRIGGS, NELSON, STEELE, AND GRAND FORKS COUNTIES, NORTH DAKOTA

WHEREAS, in accordance with the Rural Electrification Act of 1936 (7 U.S.C. §§ 901-950b), the Rural Utilities Service (RUS) is authorized to provide federal financial assistance in the development of infrastructure in rural America; and,

WHEREAS, Minnkota Power Cooperative, Inc. (Minnkota) has applied to RUS for assistance to construct approximately 250 miles of 345 kilovolt (kV) transmission line in North Dakota, with associated aboveground facilities, such as substations, and ancillary facilities, such as temporary construction work and staging areas (CGF Project); and

WHEREAS, RUS may fund the Project thereby making the Project an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800); and

WHEREAS, the U.S. Fish and Wildlife Service (USFWS) may issue an approval for the Project to cross easements held by that federal agency, thereby making the CGF Project an undertaking subject to review under 36 CFR Part 800; and

WHEREAS, RUS and USFWS agree that the RUS will be the lead federal agency for purposes of Section 106 in accordance with 36 CFR § 800.2(a)(2); and

WHEREAS, based on the analysis conducted pursuant to 7 CFR Part 1794, RUS will select a 1,000-foot-wide corridor for the CGF Project; and

WHEREAS, the North Dakota Public Service Commission will select a 150-foot-wide right-of-way (ROW), which should be located within the corridor chosen by RUS, for construction of the CGF Project; and

WHEREAS, RUS has determined that the area of potential effects (APE) for the undertaking includes the 1,000-foot-wide corridor beginning near Center, North Dakota at the Milton R. Young Station and terminating in Grand Forks, North Dakota that should contain the Project ROW as well as all Project-related access roads, transmission facilities and corridors, environmental crossings, temporary work spaces, construction areas, and appurtenant facilities that may be located outside of the ROW and may not be contiguous (**Attachment 1**); and

WHEREAS, RUS also has established an APE for visual effects that is one-half mile wide where the CGF Project structures will be 200 feet or less in height, and one mile whenever a structure exceeds 200 feet in height (**Attachment 2**); and

WHEREAS, RUS is phasing identification and evaluation of historic properties, and application of the criteria of adverse effect in accordance with 36 CFR § 800.4(b)(2) and 36 CFR § 800.5(a)(3), respectively, because the Project consists of a large area where access to land in order to complete necessary studies is restricted; and

WHEREAS, in accordance with 36 CFR § 800.14(b)(1)(ii), execution of a Programmatic Agreement (PA) is appropriate because effects on historic properties cannot be fully determined prior to approval of the Project; and

WHEREAS, RUS, in consultation with the North Dakota State Historic Preservation Office (SHPO), has determined that the Project might have an adverse effect on historic properties, which are properties listed on or eligible for listing on the National Register of Historic Places (NRHP); and

WHEREAS, on September 10, 2009, RUS invited the Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, the Bois Forte Ojibwe, the Cheyenne River Sioux Tribe, the Crow Creek Sioux Tribe, the Flandreau Santee Sioux Tribe, the Fond du Lac Band of Lake Superior Chippewa, the Grand Portage Band of Lake Superior Chippewa, the Leech Lake Band of Ojibwe, the Lower Brule Sioux Tribe, the Lower Sioux Indian Community, the Mille Lacs Band of Ojibwe, the Northern Cheyenne Nation, the Oglala Sioux Tribe, the Prairie Island Indian Community, the Red Lake Band of Chippewa Indians, the Rosebud Sioux Tribe, the Santee Sioux Nation, the Sisseton Wahpeton Oyate of the Lake Traverse Reservation, the Spirit Lake Tribe, the Standing Rock Sioux Tribe, the Three Affiliated Tribes of the Fort Berthold Reservation, the Turtle Mountain Band of Chippewa, the Upper Sioux Indian Community and the White Earth Band of Ojibwe to participate in government-to-government consultation for the CGF Project; and

WHEREAS, the following Indian tribes responded affirmatively to this invitation - the Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, the Cheyenne River Sioux Tribe, the Mille Lacs Band of Ojibwe, the Northern Cheyenne Nation, the Rosebud Sioux Tribe, the Santee Sioux Nation, the Sisseton Wahpeton Oyate, the Standing Rock Sioux Tribe, the Upper Sioux Indian Community and the White Earth Band of Ojibwe; and

WHEREAS, the Mille Lacs Band of Ojibwe, the Sisseton Wahpeton Oyate and the Standing Rock Sioux Tribe have directly participated in consultation; and

WHEREAS, RUS has invited the following Indian tribes to sign this PA as concurring parties - the Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, the Cheyenne River Sioux Tribe, the Mille Lacs Band of Ojibwe, the Northern Cheyenne Nation, the Rosebud Sioux Tribe, the Santee Sioux Nation, the Sisseton Wahpeton Oyate, the Standing Rock Sioux Tribe, the Upper Sioux Indian Community and the White Earth Band of Ojibwe; and

WHEREAS, Minnkota has participated in consultation and has been invited by RUS to sign this PA as an invited signatory; and

WHEREAS, the Wahpekute, a non-federally recognized Indian tribe, has participated in consultation and has been invited to sign this PA as a concurring party; and

WHEREAS, RUS has invited Mr. Tim Mentz to participate in consultation and sign this PA as a concurring party; and

WHEREAS, on May 25, 2011, RUS notified the Advisory Council on Historic Preservation (ACHP), in accordance with 36 CFR § 800.6(a)(1)(i)(C), providing the specified documentation; and

WHEREAS, on June 14, 2011 the ACHP elected not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii);

NOW, THEREFORE, RUS, USFWS and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

The RUS shall ensure that the following stipulations are carried out.

I. STANDARDS AND CONDITIONS

A. All studies and work required under the terms of this PA will be carried out by or under the direct supervision of a professional who, at a minimum, meets the Secretary of the Interior's *Professional Qualification Standards* (48 FR 44716, September 29, 1983) in the appropriate field.

B. With the exception of transmission structure foundations, Minnkota will not initiate construction of any component of the CGF Project until Section 106 review conducted in accordance with the terms of this PA have been met for that component.

C. Even if the terms of Stipulations II and III have been met for the site of a transmission structure, construction of that structure remains subject to the requirements of Stipulation IV.

D. Implementation of Stipulation IV will take place during excavation for CGF Project transmission structure foundations.

E. Minnkota will establish and facilitate open communication between consulting archeologists and engineers during the performance of archeological field testing, treatment and construction to ensure that the terms of this PA are properly implemented.

II. IDENTIFICATION

A. Minnkota has completed the following studies: *Draft Class I Literature Search for the Proposed Minnkota Power Cooperative, Inc. Center to Grand Forks 345 kV*

Transmission Line" (March 2010); and *Geomorphological Model for Locating Areas with Potential for Deeply Buried Archaeological Deposits Along the Center to Grand Forks 345 KV Transmission Line Corridor in North Dakota* (January 2011).

B. Upon completion of archeological identification efforts and pedestrian survey (Class III CRI), which began in October 2010, Minnkota will prepare and submit a draft report describing data gathering and analysis to RUS for review and approval.
    1. The draft report will contain maps showing the geographic relationship between the APE, the ROW, identified archeological resources, and proposed structures and other CGF Project-related ground disturbance.
    2. The draft report also will include recommendations regarding the NRHP eligibility of identified archeological resources; identify those resources for which additional study might be needed; and propose treatment, including those measures that might avoid adverse effects.
    3. When it is acceptable, RUS will submit the draft report to the SHPO and consulting parties for review. The consulting parties will have thirty (30) days from receipt to provide written comments to RUS on the draft report. RUS will ensure that written comments submitted in a timely manner are considered in preparation of the final report.

C. Minnkota will conduct a study of the APE to identify NRHP listed or eligible architectural resources which might be affected by the CGF Project.
    1. The draft report will contain maps showing the geographic relationship between the APE, the ROW, identified properties and resources, and the proposed structures.
    2. When it is acceptable, RUS will submit the draft report to the SHPO and consulting parties for review. The consulting parties will have thirty (30) days from receipt to provide written comments to RUS on the draft report. RUS will ensure that written comments submitted in a timely manner are considered in preparation of the final report.

D. Each and every change in the location of CGF Project components is subject to review under the terms of this PA.

III. TREATMENT

A. Avoidance of impacts to identified archeological or architectural resources is the preferred alternative. Minnkota will seek agreement with the SHPO and consulting tribes on the identification and implementation of appropriate and reasonable avoidance measures.
    1. Whenever the parties agree, Minnkota will incorporate agreed upon avoidance measures into the CGF Project plans and specifications.
    2. Wherever the parties cannot agree, RUS will consult with the SHPO and other consulting parties to identify appropriate treatment in accordance with Stipulation III.B.

B. Prior to developing treatment measures, Minnkota will conduct evaluation studies, as appropriate, in accordance with 36 CFR § 800.4(c)(1). When RUS and the SHPO agree, an identified resource may be treated as eligible for listing on the NRHP for

the purposes of Section 106 under the terms of this PA. Such treatment does not apply to identified resources located on federal land.

1. If historic properties are identified pursuant to 36 CFR § 800.4(c)(2), RUS will apply the criteria of adverse effect in accordance with 36 CFR § 800.5(a).
2. When RUS determines that there may be an adverse effect, RUS will consult with the SHPO and Indian tribes to identify appropriate measures that are in the public interest to minimize or mitigate adverse effects to historic properties.

C. When RUS and the consulting parties agree on reasonable treatment measures, Minnkota will prepare a Treatment Plan (Plan) describing the agreed upon measures, the manner in which they will be carried out, and a schedule for their implementation.
   1. When treatment consists of or includes data recovery, the Plan will identify the specific research questions to be addressed by data recovery with an explanation of their relevance, the archeological methods to be used, and provisions for public interpretation and education subject to restrictions established by 36 CFR § 800.6(a)(5).
   2. Minnkota will submit the Plan to the SHPO and consulting tribes for review. These parties will have thirty (30) days from receipt to submit a written review. RUS will ensure that the approved Plan takes into account timely comments and recommendations submitted by the consulting parties.

D. To prevent damage to them, Minnkota will mark and fence all identified rock features during construction of the CGF Project. In addition, to help protect these resources post-construction, Minnkota will designate the location of all rock features as restricted or sensitive locations on Operation and Maintenance maps.

E. RUS will ensure that Minnkota implements all approved Plans prior to beginning any construction activities for that Project component.

IV. BORING FOR TRANSMISSION STRUCTURE FOUNDATIONS

A. Minnkota will compare the locations of all proposed transmission structures with the high potential areas identified in the January 2011 geomorphological report and shown in **Attachment 2**.

B. Minnkota will notify the SHPO in writing whenever a location will contain a structure and has a high potential for deeply buried archeological sites.
   1. Such locations will be subject to the measures described in **Attachment 3**.
   2. Monitoring of foundation boring to be conducted pursuant to **Attachment 3** will be performed by a professional archeologist with training in geomorphology.

V. U.S. FISH AND WILDLIFE SERVICE LANDS

Prior to initiating construction of any component of CGF Project that will cross USFWS lands, Minnkota must document for RUS the successful conclusion of Section 106 review conducted in accordance with 36 CFR §§ 800.3 through 800.7 to meet the

requirements of the USFWS. When RUS finds that Section 106 review for that segment has been successfully concluded, RUS may approve construction of that segment.

VI. CURATION

A. Any artifacts, materials, or records removed from USFWS land that are not subject to the Native American Graves Protection and Repatriation Act (NAGPRA) will be curated by the USFWS in accordance with 36 CFR Part 79.

B. Minnkota will return all artifacts and materials recovered through implementation of the terms of this PA to the respective landowner.

VII. OTHER MONITORING

A. Minnkota may elect to offer an opportunity for one tribal monitor identified and agreed to by the consulting tribes to monitor implementation of identification field studies, treatment and construction. The absence of the tribal monitor at any time will not delay the progress of studies, treatment or construction.

B. Historic properties discovered or unanticipated effects discovered during this monitoring will be treated in accordance with Stipulation IX.

C. Upon written request, Minnkota will grant RUS and SHPO access to the work site to observe construction.

VIII. CONFIDENTIALITY

RUS will protect information about historic properties of religious and cultural significance to Indian tribes, including location information or information provided by Indian tribes to assist in the identification of such properties, to the extent allowed by Section 304 of the National Historic Preservation Act [16 U. S. C. 470w3], 36 CFR § 800.11(c) and other applicable laws.

IX. POST- REVIEW UNANTICIPATED DISCOVERIES

A. If previously unidentified historic properties or unanticipated effects to historic properties are discovered during CGF Project construction, the construction contractor will immediately halt all activity within a one hundred (100) foot radius of the discovery, notify Minnkota (see **Attachment 4**) of the discovery and implement interim measures to protect the discovery from looting and vandalism.

B. Immediately upon receipt of the notification required in Stipulation IX.A, Minnkota will inspect the construction site to determine the extent of the discovery and ensure that construction activities have halted, clearly mark the area of the discovery, implement additional measures, as appropriate, to protect the discovery from looting and vandalism, and notify RUS, SHPO/State Historical Society of North Dakota (SHSND) and the following Indian tribes - the Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, the Cheyenne River Sioux Tribe, the Mille Lacs Band of Ojibwe, the Northern Cheyenne Nation, the Rosebud Sioux Tribe, the Santee Sioux Nation, the Sisseton Wahpeton Oyate, the Standing Rock Sioux Tribe, the Upper Sioux Indian Community and the White Earth Band of Ojibwe.

C. Upon receipt of notification, the RUS shall treat the discovery in accordance with 36 CFR § 800.13(b)(3) and (c).

D. Treatment of Human Remains
   1. When the discovery contains human remains and is located on USFWS land, NAGPRA [25 U.S.C. 3001 et. seq.] and its implementing regulations (43 CFR Part 10) apply.
   2. If the construction contractor believes that a discovery contains human remains and the discovery is not located on federal lands, the contractor will comply with Stipulation IX.A. Immediately upon receipt of such notification, Minnkota will
      a. comply with the procedures required by North Dakota Century Code § 23-06-27 and administrative rules North Dakota Administrative Code Chapter 40-02-03, Protection of Prehistoric and Historic Human Burial Sites, Human Remains, and Burial Goods,
      b. halt construction activities within a 100 foot radius from the point of discovery;
      c. implement measures to protect the discovery from looting and vandalism until the completion of requirements under state law; and
      d. notify the local law enforcement agency, the SHPO/SHSND, the North Dakota Department of Health (NDDH), RUS and the tribes identified in Stipulation IX.B of the discovery.
   3. If local law enforcement determines that the remains are not associated with a crime, RUS will determine if it is prudent and feasible to avoid disturbing the remains. If RUS in consultation with SHPO/SHSND determines that disturbance cannot be avoided, Minnkota will remove and reinter the human remains in accordance with rules adopted by, and in consultation with the SHPO/SHSND and the NDDH.
   4. Minnkota may resume construction activities in the area of the discovery once implementation of the measures required by the SHPO/SHSND and the NDDH has been completed.

E. Minnkota will ensure that the requirements of Stipulation VII are incorporated into all construction contracts.

X. REPORTING

A. Every six (6) months following the execution of this PA until construction is complete, Minnkota will submit a written report to RUS and the SHPO describing progress on implementation of the terms of its terms, the development of construction plans and specifications, construction completed during the period covered by the report, implementation of Plans, the schedule for completion of construction and the terms of the PA, the treatment of any post-review discoveries pursuant to Stipulation IX, any scheduling changes proposed, any problems encountered, and any disputes addressed pursuant to Stipulation XI.

B. This report will be submitted electronically to RUS and the SHPO.

XI. DISPUTE RESOLUTION

A. Should any signatory or concurring party to this PA object in writing at any time to any actions proposed or the manner in which the terms of this PA are implemented, RUS and the USFWS, within the limits of their authority, will consult with such party to resolve the objection. If RUS and the USFWS determine that the objection cannot be resolved, that agency will forward all documentation relevant to the dispute, including the resolution proposed by RUS or the USFWS, as appropriate, to the ACHP. The ACHP will
   1. Provide the RUS and the USFWS with its advice, pursuant to 36 CFR § 800.2(b)(2), on the resolution of the objection within thirty (30) days of receiving adequate documentation.
   2. Prior to reaching a final decision on the dispute, RUS or the USFWS, as appropriate, will prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. RUS or the USFWS, as appropriate, will then proceed according to its final decision.
   3. If the ACHP does not provide its advice regarding the dispute within thirty (30) days, RUS or the USFWS, as appropriate, may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the respective federal agency will prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the PA, and provide them and the ACHP with a copy of such written response.

B. The responsibility of RUS and the USFWS to carry out all other actions subject to the terms of this PA that are not the subject of the dispute remain unchanged.

C. If at any time during the implementation of the measures stipulated in this PA an objection should be raised by the public, RUS will notify the signatories to this PA and consult with the objecting party to seek resolution. If RUS and the USFWS determine that the objection cannot be resolved, that agencies will seek the advice or comment of ACHP in accordance with Stipulation IX.A.

XII. TERM OF AGREEMENT

A. The term of this PA will be five (5) years from the date of execution by the signatories unless the signatories agree to extend its term. If its stipulations have not been carried out, and prior to work continuing on the CGF Project, RUS and the USFWS will either (a) execute another agreement pursuant to 36 CFR § 800.6, or request, take into account and respond to the comments of the ACHP pursuant to 36 CFR § 800.7.

B. Six (6) months prior to the date on which the PA will expire, Minnkota will notify the other signatories of the impending expiration. RUS and the USFWS may consult with the other signatories to reconsider the terms of the PA and amend it in accordance with Stipulation XI. RUS and the USFWS will notify the signatories as to the course each will pursue.

XIII. AMENDMENT

This PA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date it is executed by all of the signatories and filed with ACHP.

XIV. TERMINATION

A. If any signatory to this PA determines that its terms will not, or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation XI. If within thirty (30) days an amendment cannot be reached, any signatory may terminate the PA upon written notification to the other signatories.

B. Once the PA is terminated, and prior to work continuing on the CGF Project, RUS and the USFWS must either (a) execute an agreement pursuant to 36 CFR § 800.6, or (b) request, take into account, and respond to the comments of ACHP under 36 CFR § 800.7. RUS and the USFWS will notify the signatories as to the course of action each will pursue.

EXECUTION of this PA by RUS, USFWS and the North Dakota SHPO, and implementation of its terms evidence that RUS has taken into account the effects of this undertaking on historic properties and afforded ACHP a reasonable opportunity to comment.

Signatories:

US Department of Agriculture Rural Utilities Service

By: Mark S. Plank Date: 8/22/11

Mark S. Plank, Director
Engineering and Environmental Staff
Water and Environmental Programs

US Fish and Wildlife Service

By: Lloyd Jones Date: 8/24/11

Lloyd Jones
Project Leader
Audubon National Wildlife Refuge

North Dakota State Historic Preservation Office

By: Merlan E. Paaverud Jr. Date: 8-25-11

Merlan E. Paaverud, Jr.
State Historic Preservation Officer

Invited signatory:

Minnkota Power

By: John T. Graves Date: 8/29/11

John T. Graves
Environmental Manager

Tribal concurring parties:

Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation

By: _____Date:_____
[Name and Title of Concurring Party]

Cheyenne River Sioux Tribe

By: _____Date:_____
[Name and Title of Concurring Party]

Mille Lacs Band of Ojibwe

By: _____Date:_____
[Name and Title of Concurring Party]

Northern Cheyenne Nation

By: _____Date:_____
[Name and Title of Concurring Party]

Rosebud Sioux Tribe

By: _____Date:_____
[Name and Title of Concurring Party]

Santee Sioux Nation

By: _____Date:_____
[Name and Title of Concurring Party]

Sisseton Wahpeton Oyate of the Lake Traverse Reservation

By: _____Date:_____
[Name and Title of Concurring Party]

Standing Rock Sioux Tribe

By: _____Date:_____
[Name and Title of Concurring Party]

Upper Sioux Community

By: _____Date:_____
[Name and Title of Concurring Party]

White Earth Band of Ojibwe

By: _____Date:_____
[Name and Title of Concurring Party]

Other concurring parties:

Wahpekute

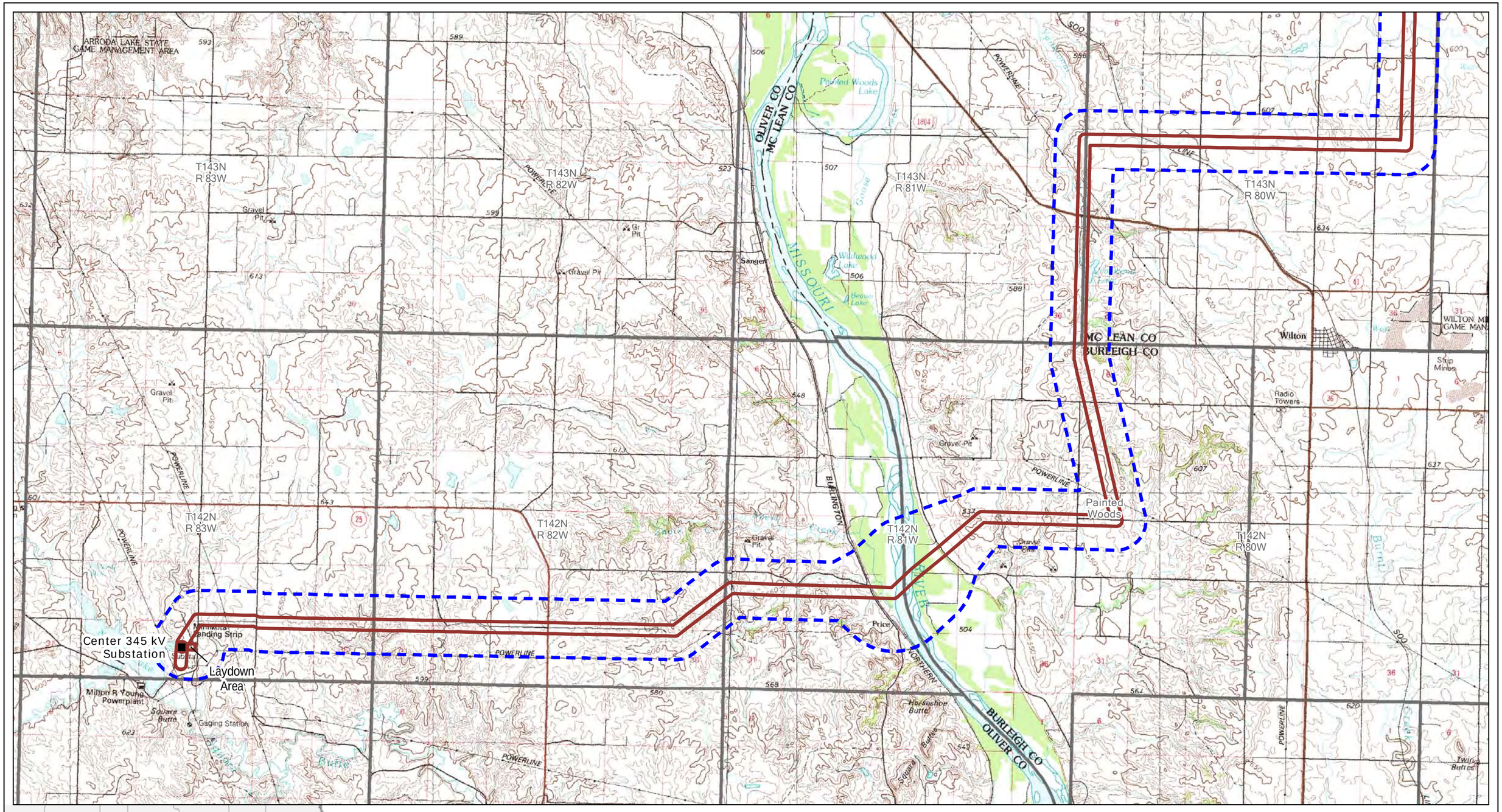
By: _____Date:_____
[Name and Title of Concurring Party]

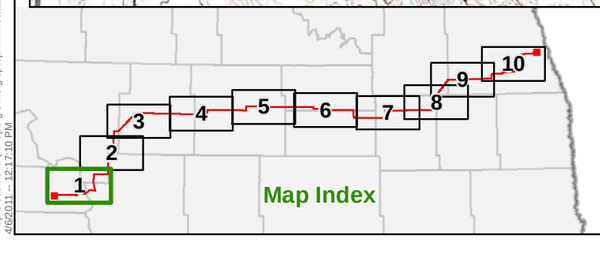
Mr. Tim Mentz

By: _____Date:_____

Mr. Tim Mentz
Member, Standing Rock Sioux Tribe

ATTACHMENT 1





Direct Effects APE for Archaeological Properties

Visual Effects APE for Historic Buildings

Project Substation

Figure 1: Page 1 of 10
Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles

Scale 1:100,000

Map Document: (\\Mspe-gis-file\gisproj\Minnkota\110900\map_docs\Cultural\PAICGFPA_01_11x17L_10p_topo.mxd)
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Laydown Area

T145N R 81W

T145N R 80W

T145N R 79W

T145N R 78W

T145N R 77W

Edgemont

Johns Lake

BURLEIGH CO

MC LEAN CO

SHERIDAN CO

POWERLINE

Gravel Pit

Gaging Station

LOST LAKE NATIONAL WILDLIFE REFUGE

Merida

T144N R 81W

T144N R 80W

T144N R 79W

T144N R 78W

Wilson

Steiber

Map Index

1 2 3 4 5 6 7 8 9 10

Direct Effects APE for Archaeological Properties

Visual Effects APE for Historic Buildings

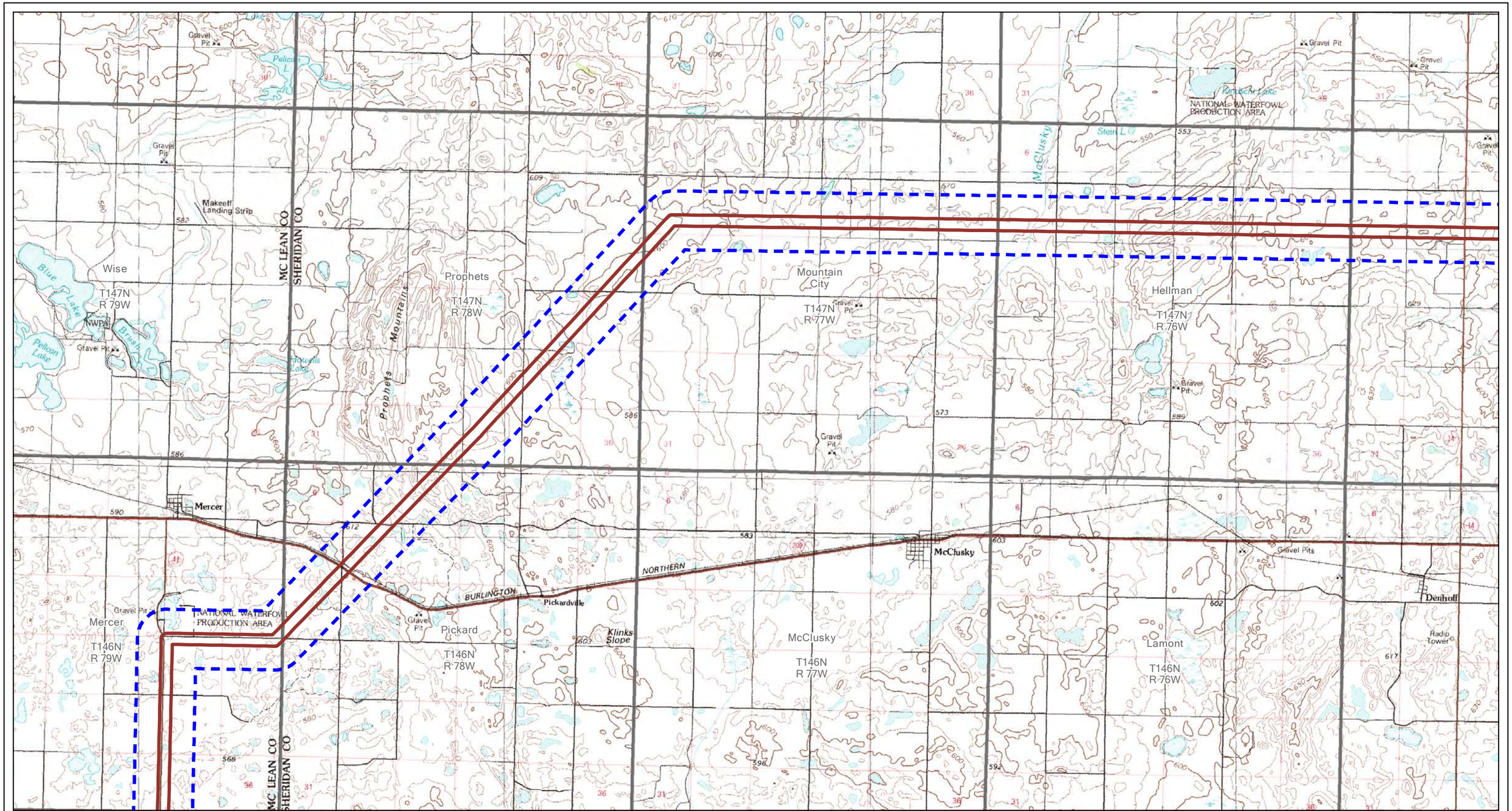
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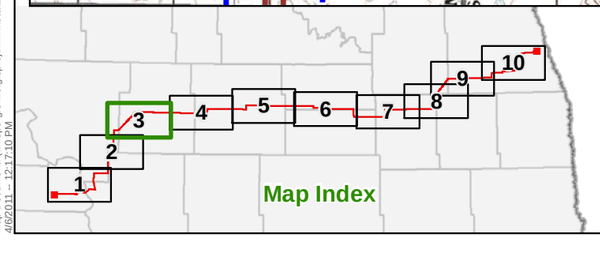
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Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles

Scale 1:100,000

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Direct Effects APE for Archaeological Properties

Visual Effects APE for Historic Buildings

Project Substation

Figure 1: Page 3 of 10
Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles

Scale 1:100,000

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Laydown Area

Schiller
T148N R 75W

Fairview
T148N R 74W

Pony Gulch
T148N R 73W

Rusland
T148N R 72W

St. Anna
T148N R 71W

Mertz
T147N R 75W

Boone
T147N R 74W

Crystal Lake
T147N R 73W

Delger
T147N R 72W

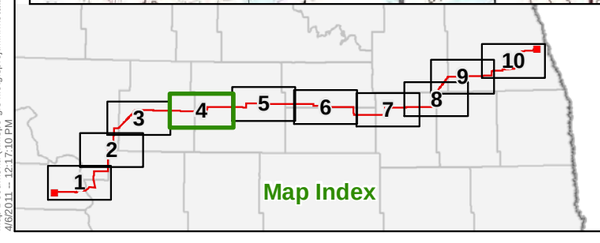
West Ontario
T147N R 71W

Lone Tree Lake
Missouri River
James River
Hiratchum Lake
Crystal Lake
Lake Ontario

NATIONAL WATERFOWL PRODUCTION AREA
WELLS COUNTY LIFE MANAGEMENT AREA
SHERIDAN CO
WELLS CO

Gravel Pit
Sandpit
Sewage Disposal
Goodrich
Merz Slough
Landing Field

BURLINGTON NORTHERN



Direct Effects APE for Archaeological Properties

Visual Effects APE for Historic Buildings

Project Substation

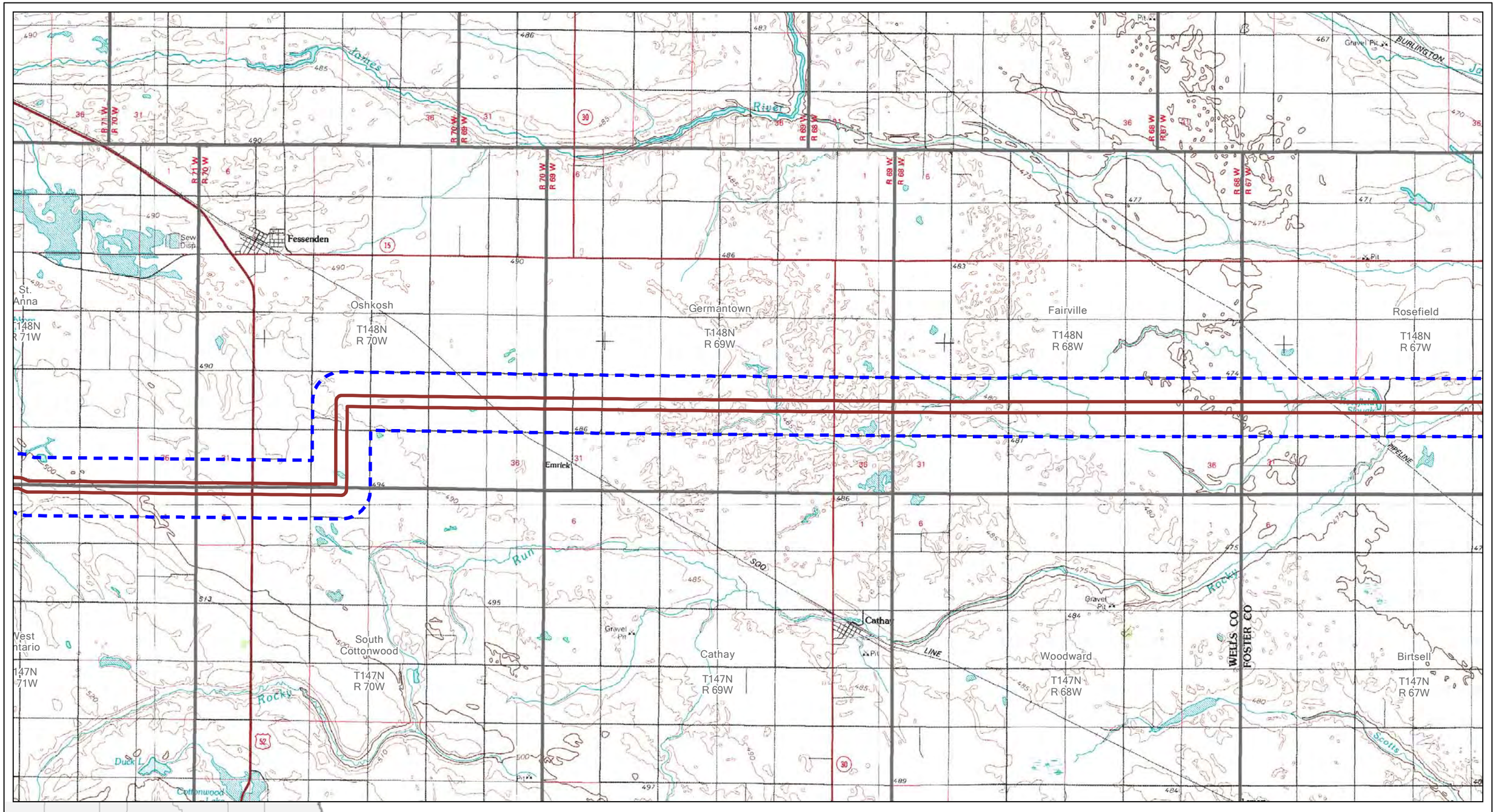
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Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

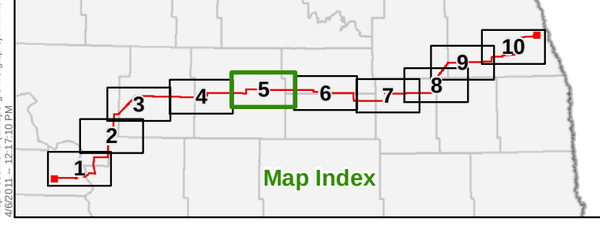
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Direct Effects APE for Archaeological Properties

Visual Effects APE for Historic Buildings

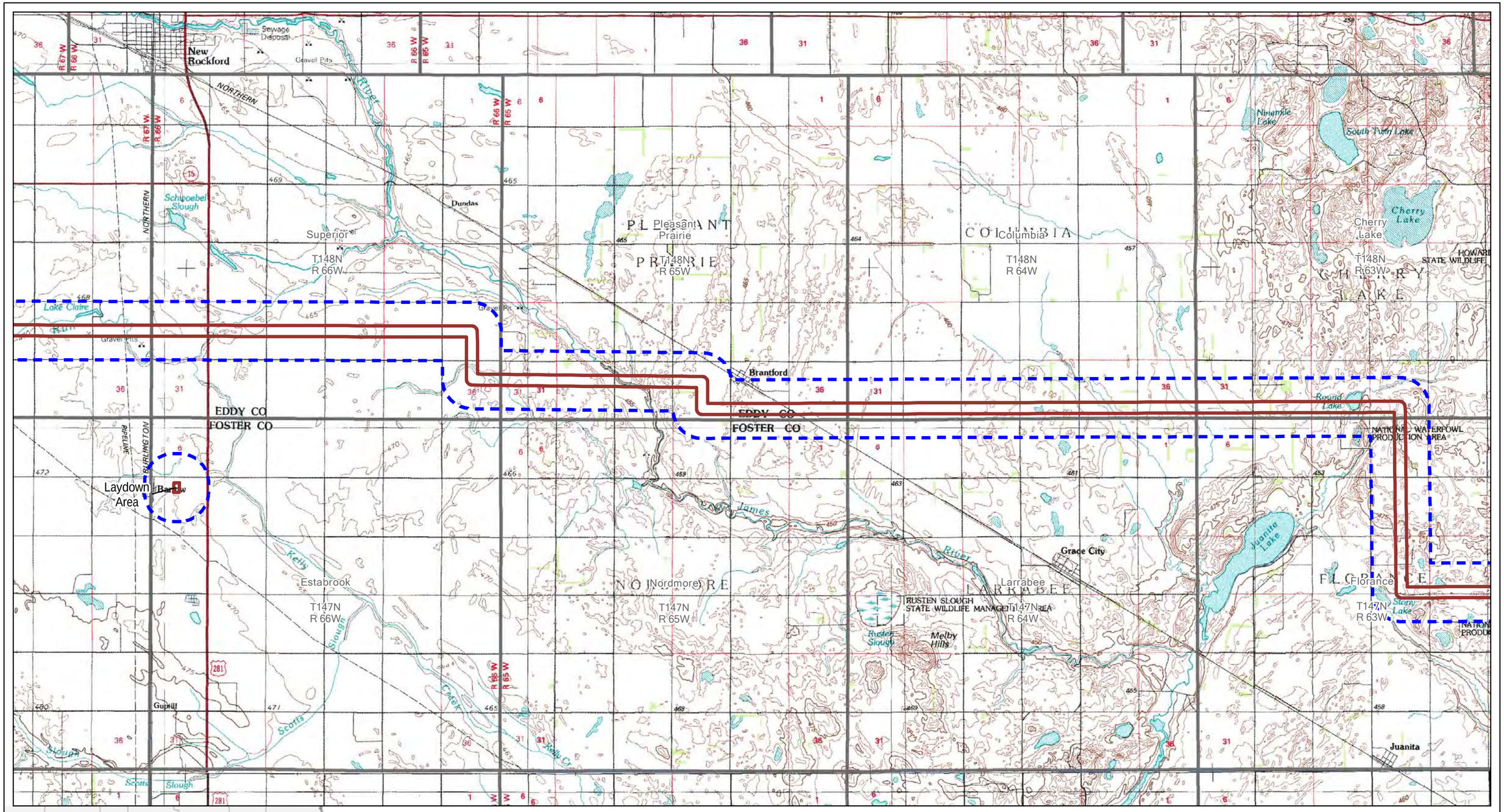
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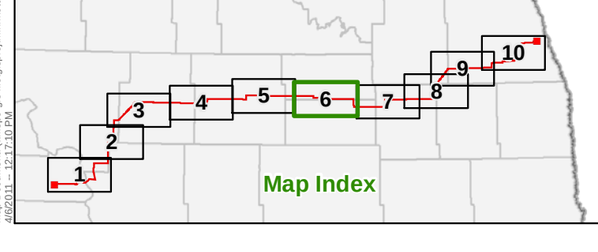
Figure 1: Page 5 of 10
Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 1 2 Miles

Scale 1:100,000

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Direct Effects APE for Archaeological Properties

Visual Effects APE for Historic Buildings

Project Substation

Figure 1: Page 6 of 10
Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

N

0 1 2 Miles

Scale 1:100,000

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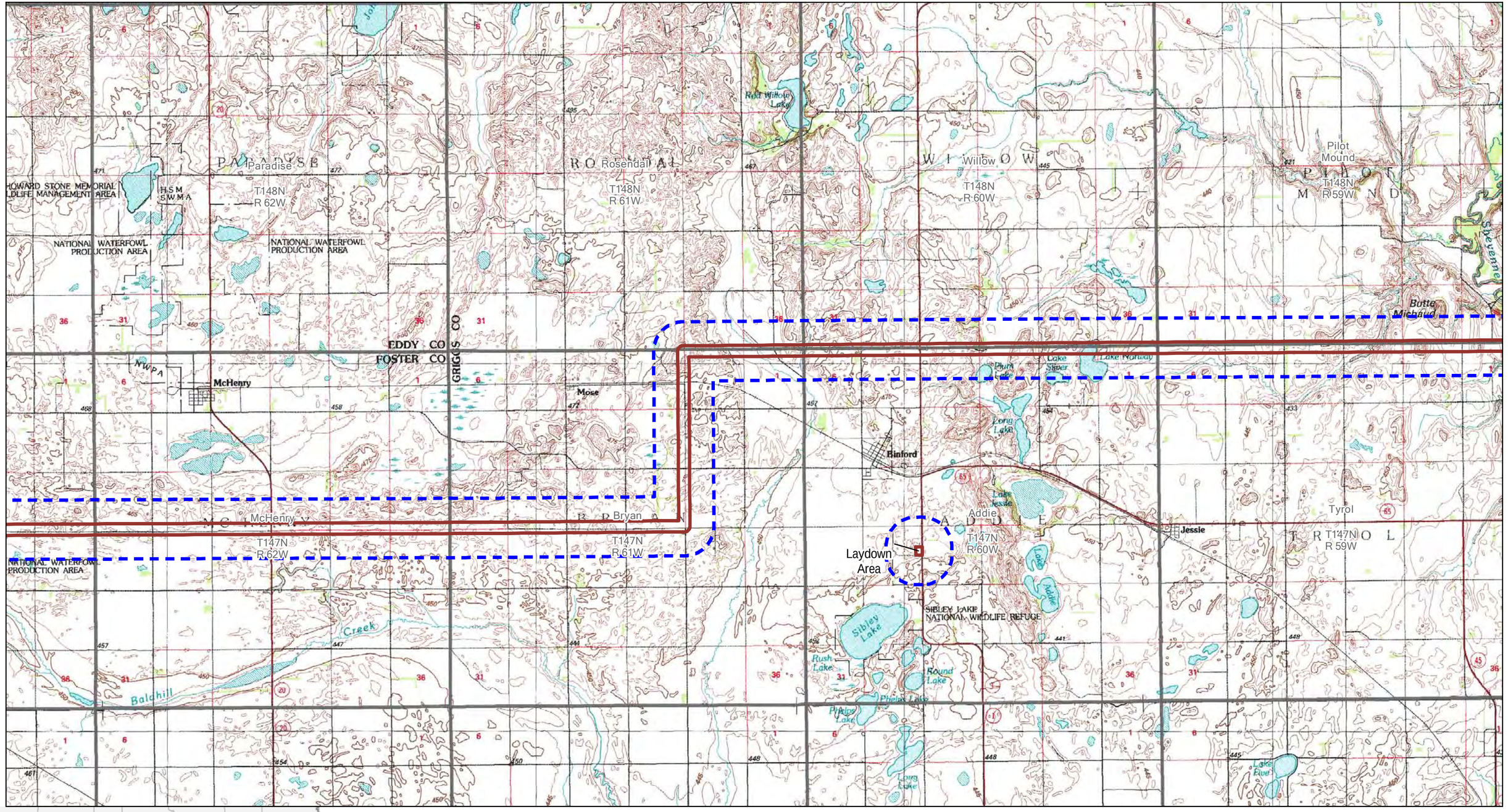


Figure 1: Page 7 of 10
Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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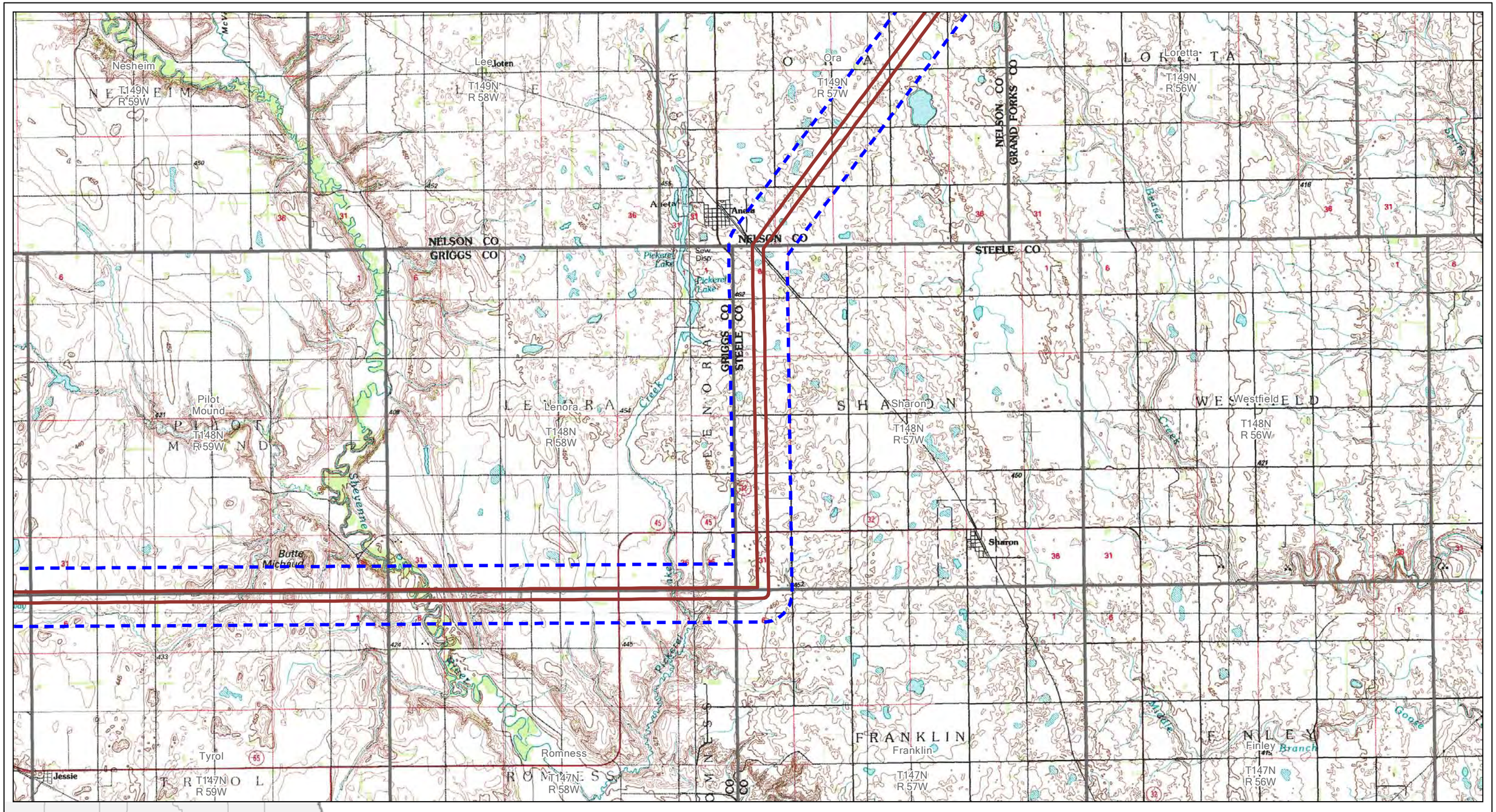


Figure 1: Page 8 of 10
Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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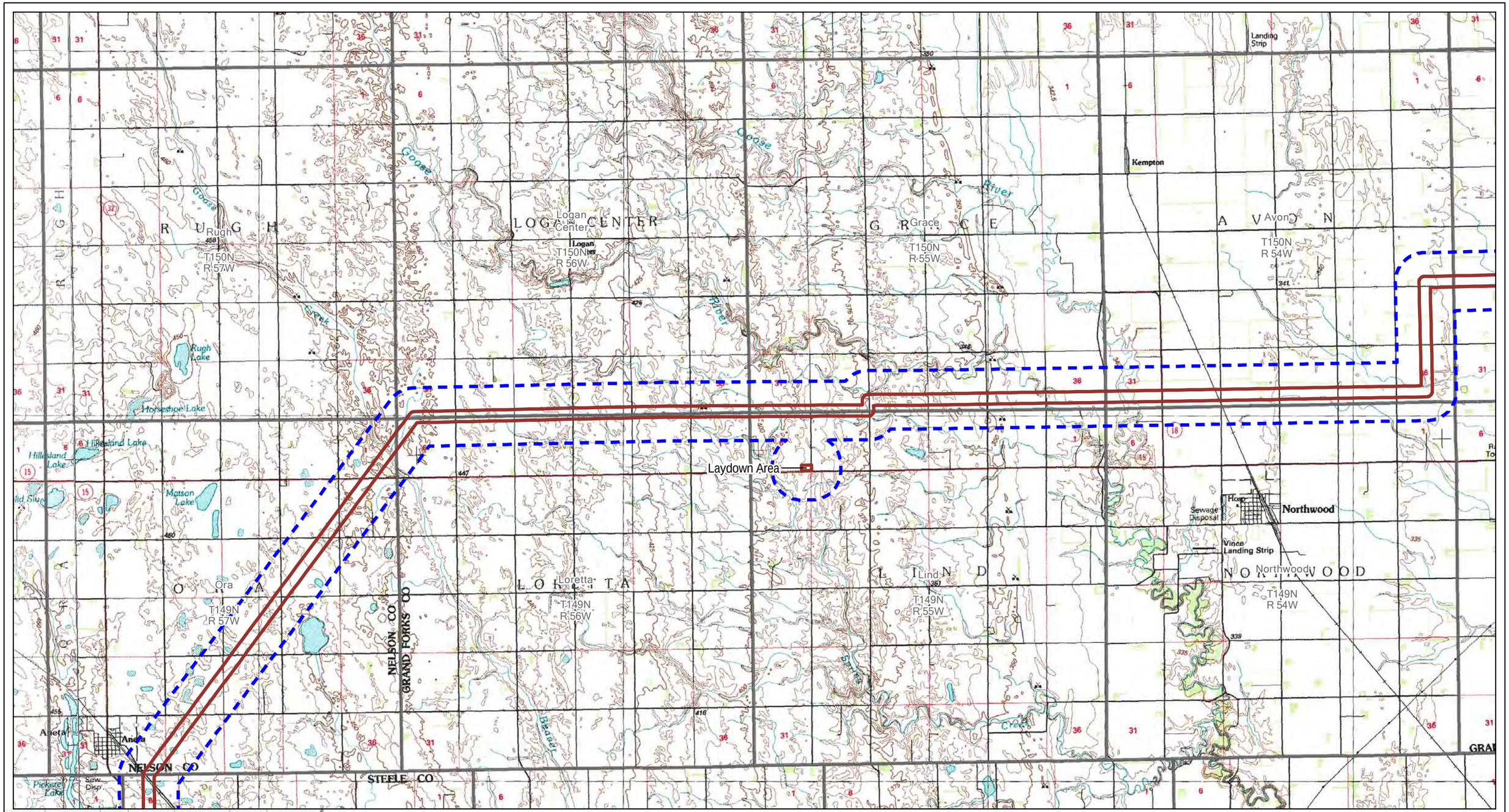


Figure 1: Page 9 of 10
Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Prairie Substation

Direct Effects APE for Archaeological Properties

Visual Effects APE for Historic Buildings

Project Substation

Figure 1: Page 10 of 10
Areas of Potential Effects for Historic Properties
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

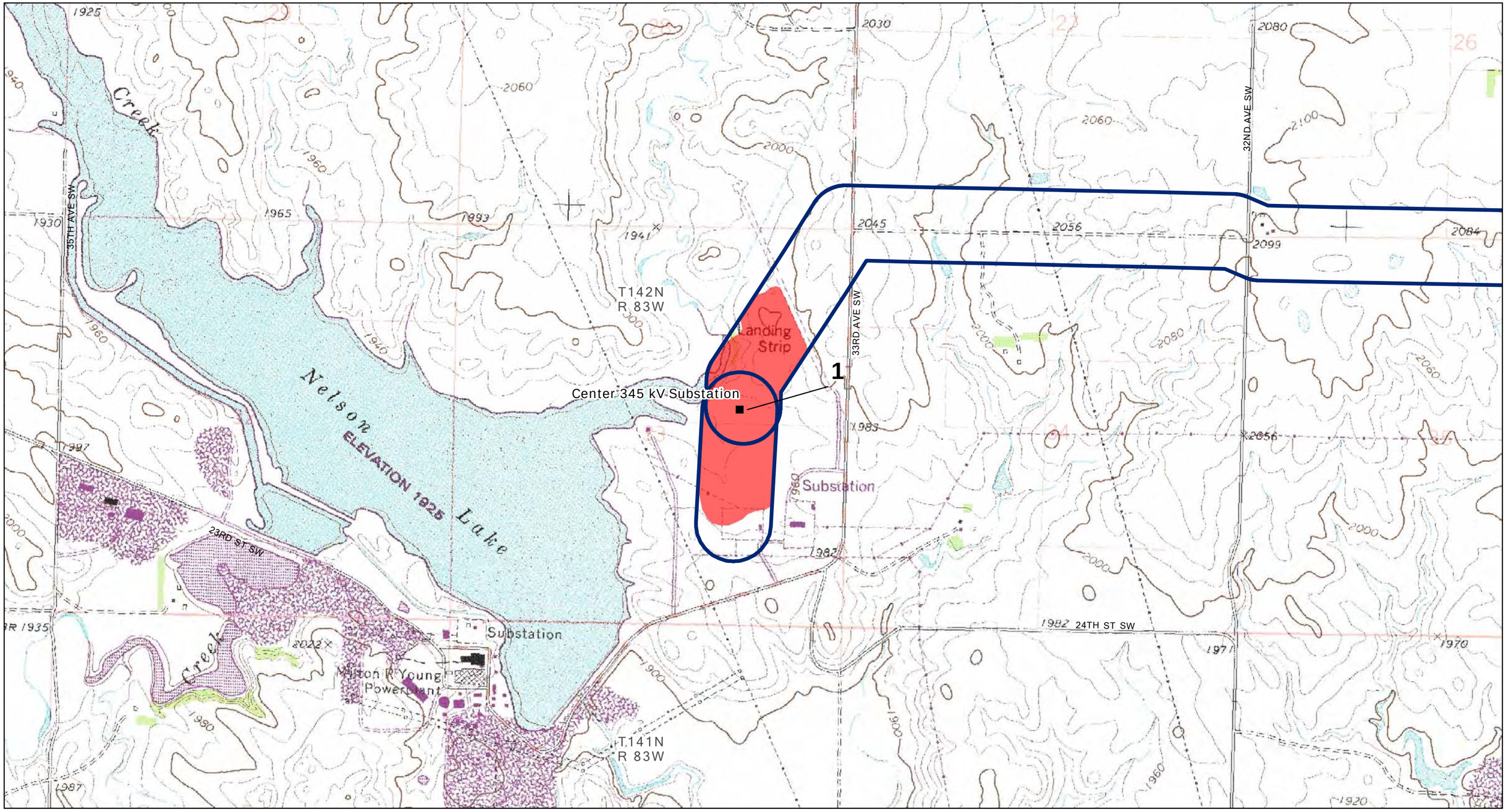
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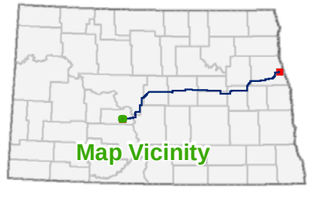
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ATTACHMENT 2





Project Substation

Project Corridor
- March 17, 2011

Geologic Potential

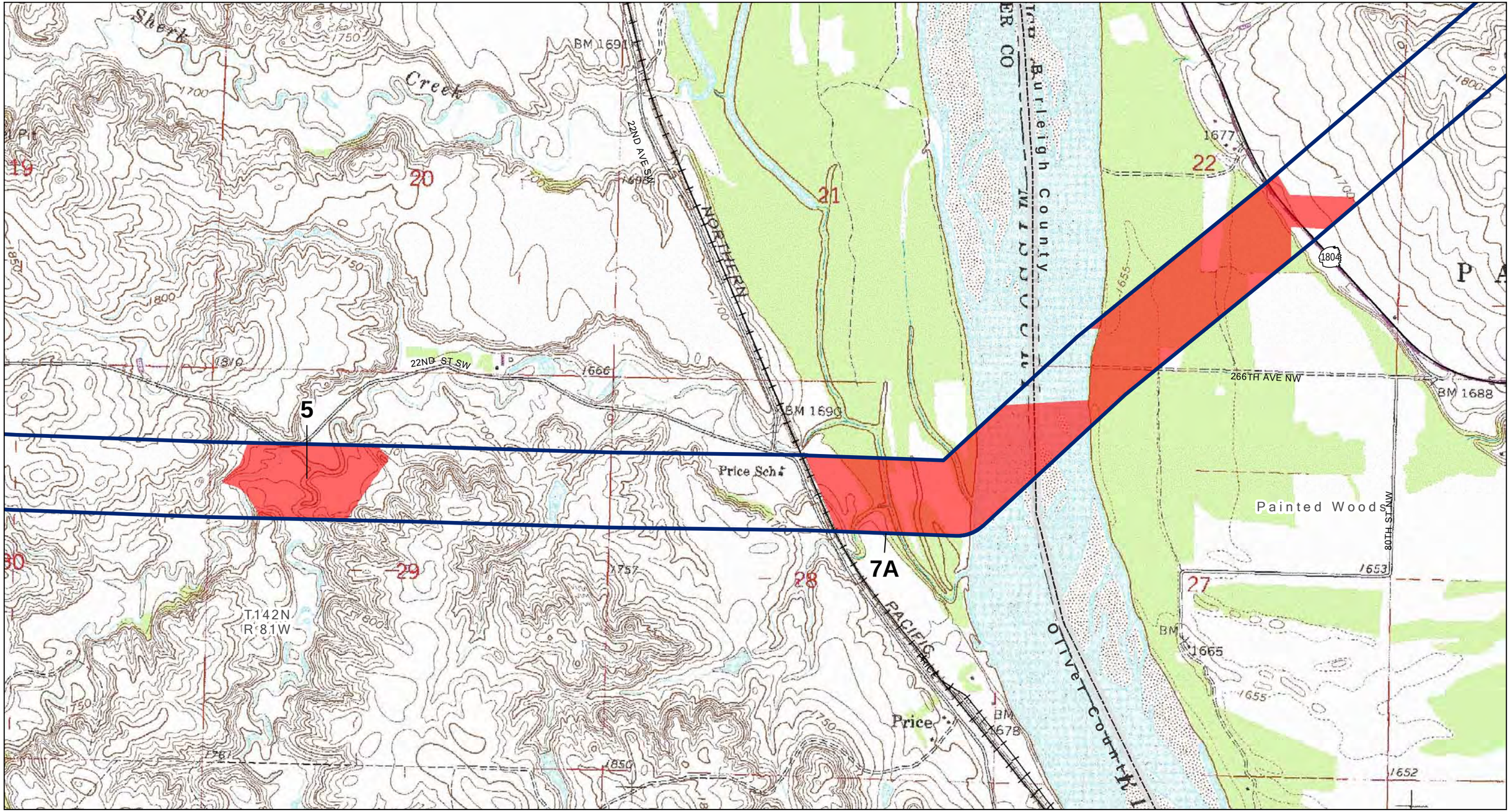
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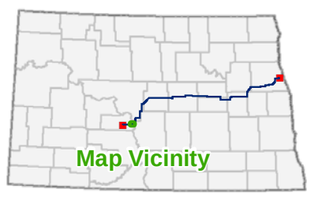
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Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:15,000

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■ Project Substation

Project Corridor
- March 17, 2011

Geologic Potential

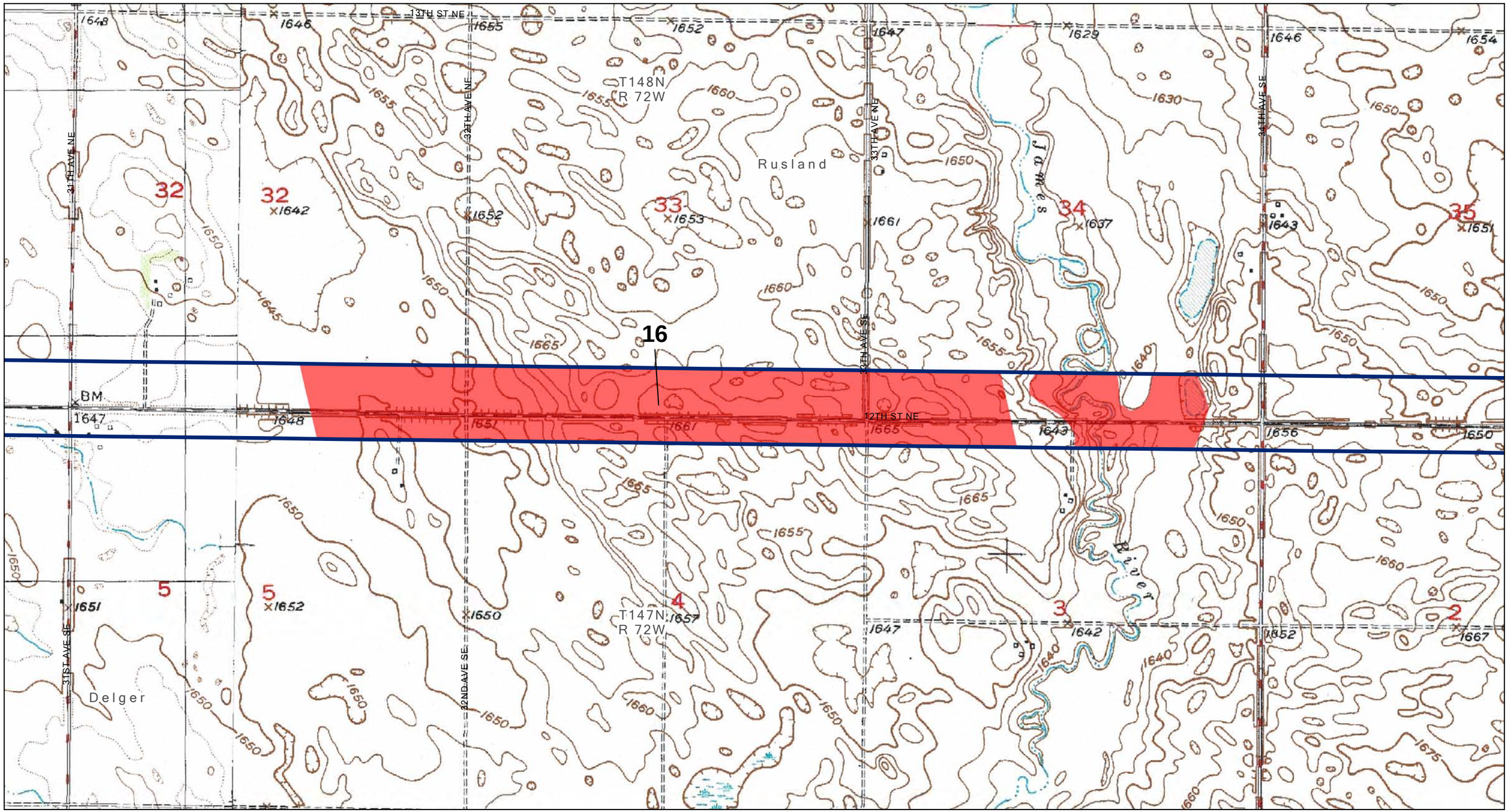
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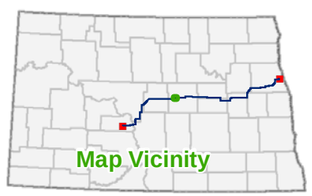
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High Potential Areas for Deeply Buried Sites
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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■ Project Substation

Project Corridor
- March 17, 2011

Geologic Potential

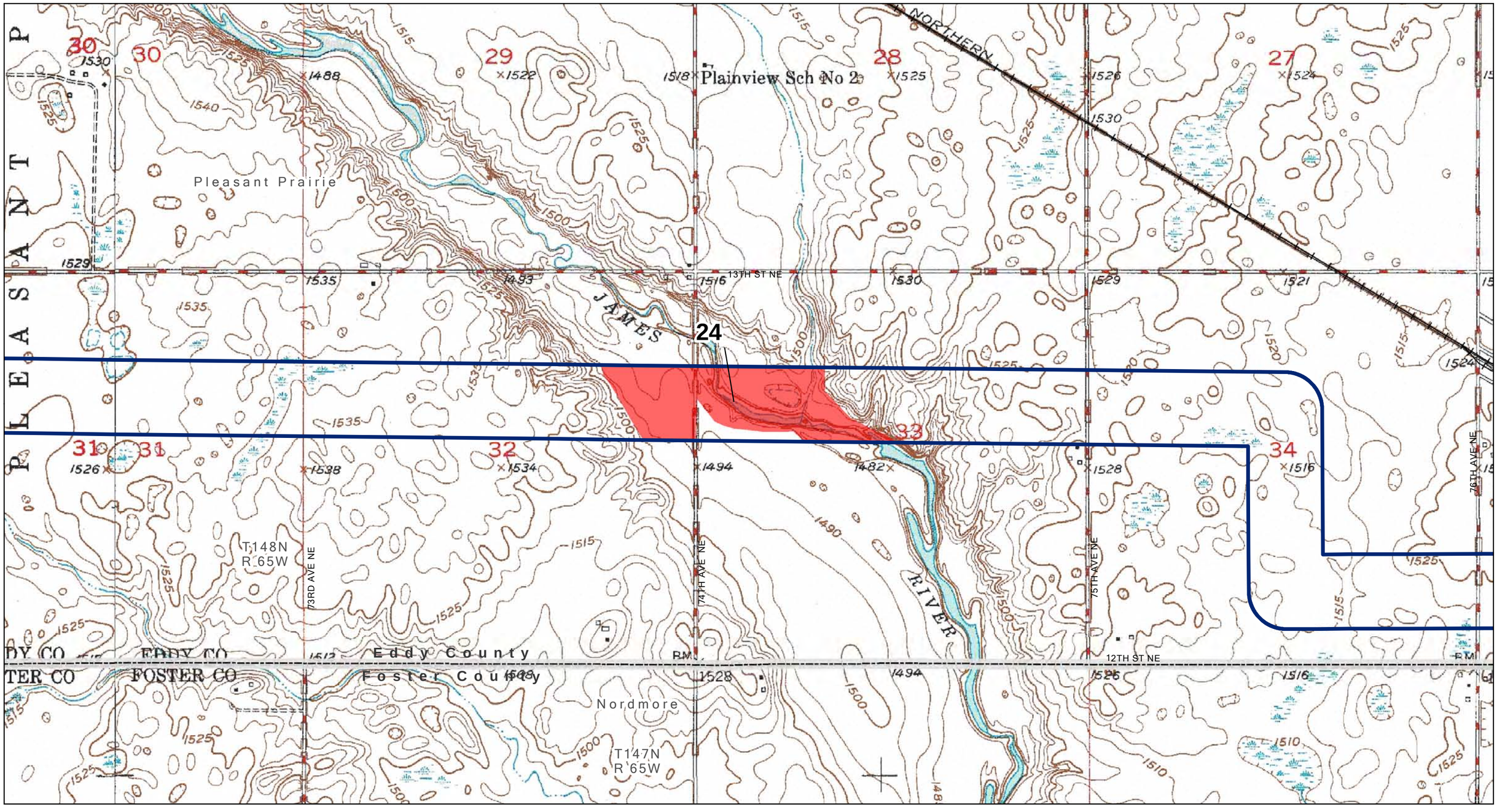
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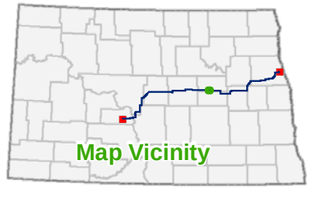
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High Potential Areas for Deeply Buried Sites
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 500 1,000 Feet

Scale 1:15,000

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Project Substation

Project Corridor
- March 17, 2011

Geologic Potential

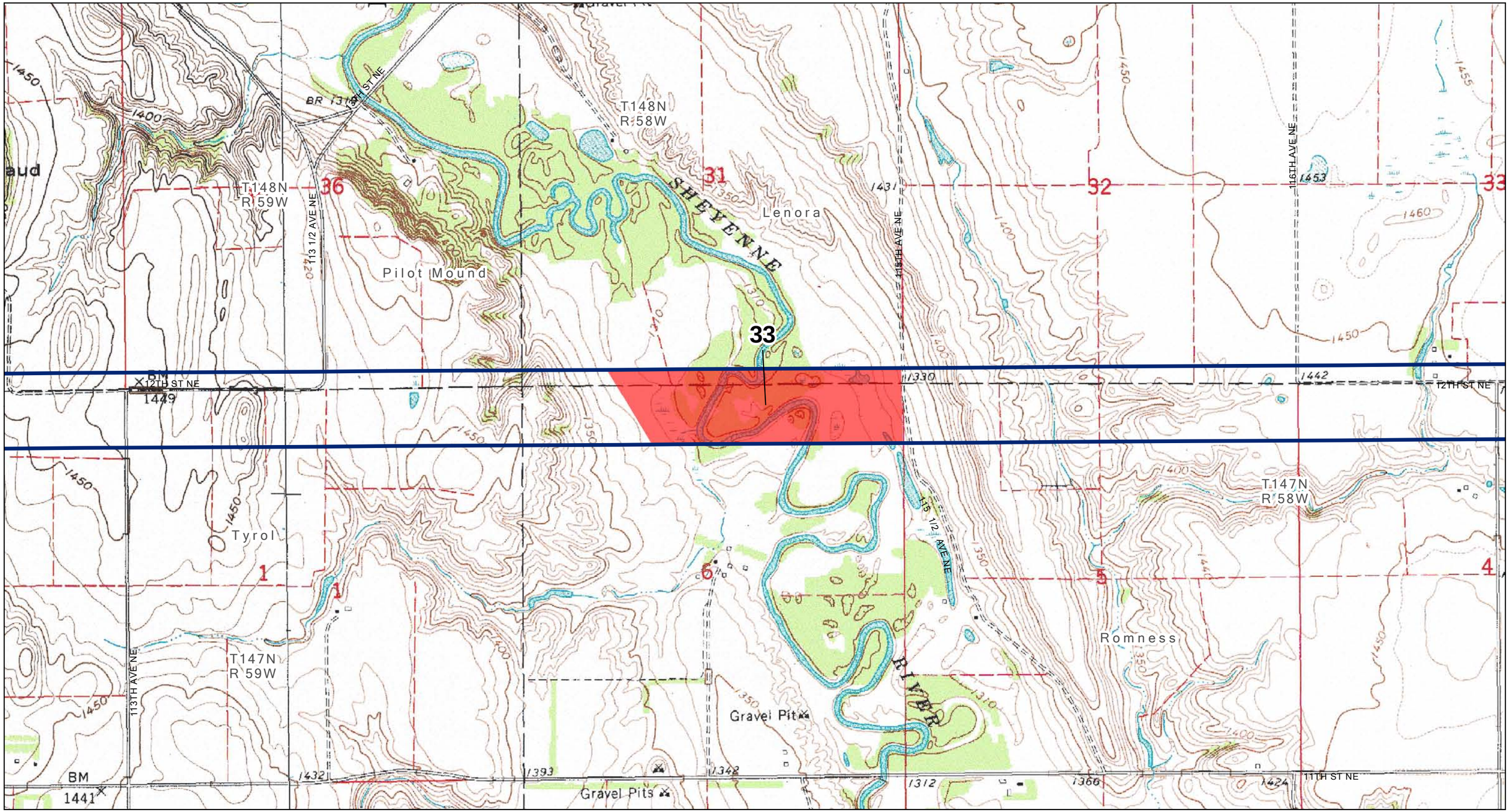
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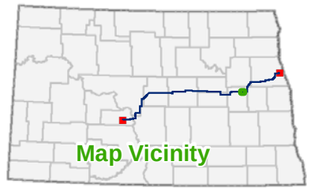
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Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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■ Project Substation

Project Corridor
- March 17, 2011

Geologic Potential

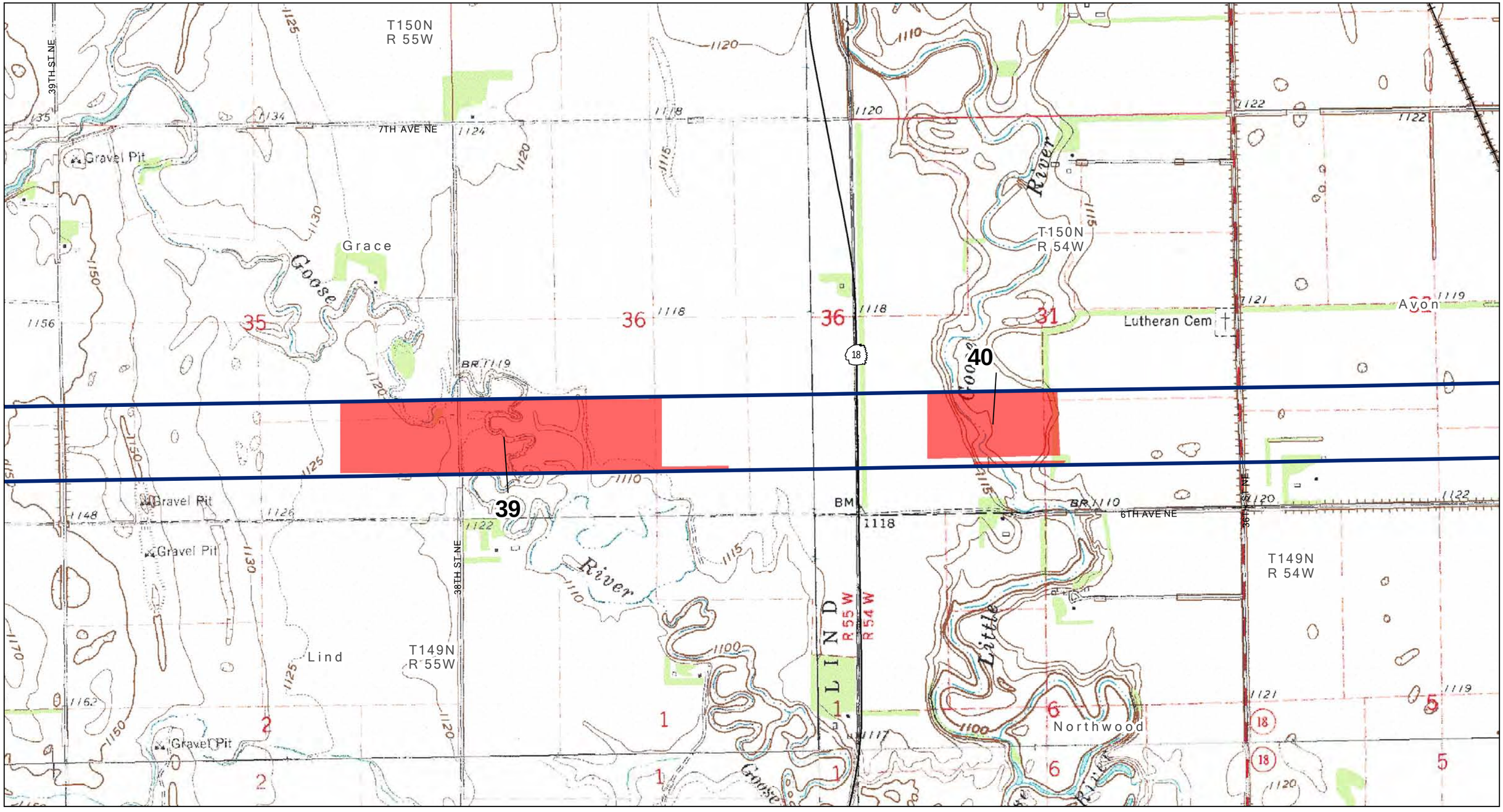
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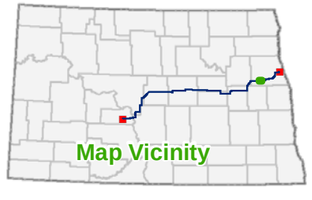
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Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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Scale 1:15,000

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■ Project Substation

Project Corridor
- March 17, 2011

Geologic Potential

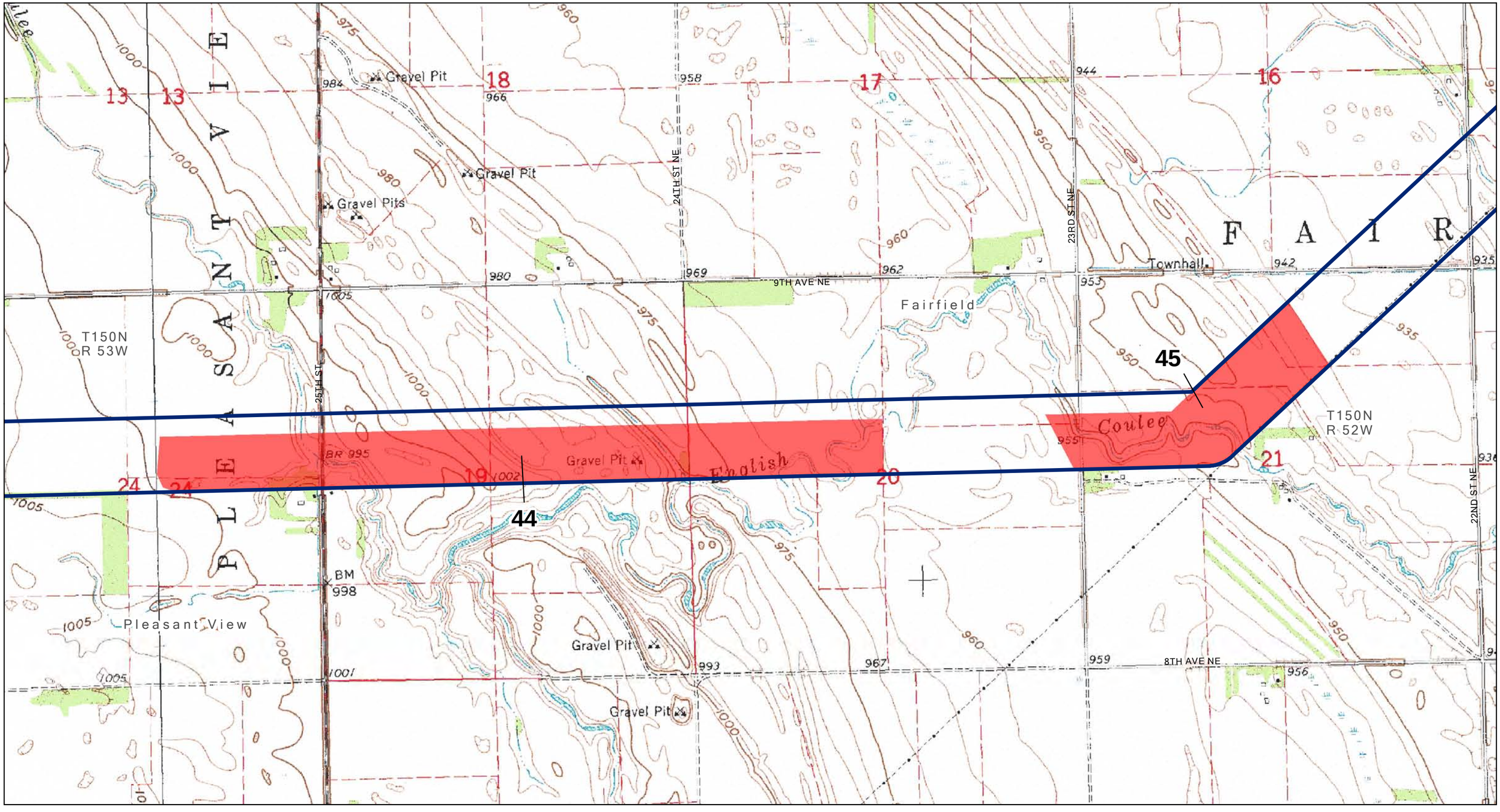
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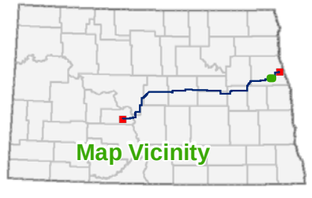
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High Potential Areas for Deeply Buried Sites
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Minnkota Power Cooperative, Inc.

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■ Project Substation

Project Corridor
- March 17, 2011

Geologic Potential

High

Localities 44 and 45
High Potential Areas for Deeply Buried Sites
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

0 500 1,000 Feet

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ATTACHMENT 3

Methods for Addressing Deeply Buried Archaeological Resources for the Center to Grand Forks 345 kV Transmission Line in North Dakota

In January 2011, Strata Morph Geoexplorations (Strata Morph) prepared an assessment for Minnkota Power Cooperative, Inc. (Minnkota) concerning the potential for deeply buried soil horizons that could possibly hold archaeological resources along the preferred route for the proposed 345 kV transmission line between Center and Grand Forks, North Dakota (Project) (Attachment A; Kolb 2011).

Archaeological sites are, by definition, buried cultural deposits. Over time, soils accumulate and bury artifacts associated with human occupation. In some environments, the overlying deposits can be quite deep. For example, Late Plains Archaic, Early Plains Woodland, Middle Plains Woodland, and Plains Village settlements are characteristically contained within deeply buried soils (paleosols) in the Late Holocene floodplain sediments of the James River Valley in North Dakota (Picha and James, 1993).

The Strata Morph assessment analyzed the likelihood that particular geologic environments along the preferred route were stable enough to have been occupied by early Americans and that these geologic environments were later buried by soils (sand, silt, loess) deposited by water or wind. A deeply buried surface soil in this context is one that is 50 centimeters or deeper from today's surface. The assessment addressed the entire1000-foot route, and categorized the various environments into high, moderate, and low potential to have preserved, buried soils (paleosols). If present, some of these soils could contain archaeological materials. The Strata Morph geomorphologic assessment is appended to this document.

Strata Morph identified 51 discrete areas along the route that had some potential for buried paleosols (Appendix A). Of these, 12 were ranked as having high potential, 25 ranked as having moderate potential, and 13 ranked as having moderate-to-low potential. Table 1, below, lists the cumulative length of these potential areas. Because of shifts to the design, 15.7 miles of corridor that now fall outside the assessed corridor were not classified. These areas, and others that may result from alignment shifts, will be reassessed as the project proceeds. Most of the corridor has little to no potential for deeply buried surface soils.

Table 1

Geologic Potential	Length (miles)
High	7.0
Moderate	10.4
Moderate - Low	2.3
Low - None	212.4
Outside original assessment area	15.7
Total	247.8

Excavation for transmission structure foundations could potentially adversely affect deeply buried archaeological deposits, if present. Ideally, each proposed structure site would be located in an area previously tested and not containing buried archaeological deposits. Several techniques can be used to identify archaeological deposits that are deeply buried. These include geophysical testing (magnetometry and/or resistivity testing), trenching with backhoes, and auger probing. Each of these techniques can be suitable depending on the situation. However, at this time, it is not feasible to test each location prior to construction because exact structure locations are unknown and because there are large areas along the route that have potential for buried sites Testing with any of the aforementioned methods along a route as large as the proposed Project would be prohibitively expensive and time-consuming. Another factor complicating the issue is that the proposed Project is also constrained by landowners who may be unwilling to have structure locations shift to areas other than those previously agreed to during negotiations with right-of-way agents.

The proposed transmission line structures are to be attached to concrete foundations that could be 7 to 10 feet in diameter, and between 27and 45 feet deep for tangent structures, or 9 to 15 feet in diameter and 45 to 87 feet deep for dead-end structures, depending on soil conditions. Construction will involve excavation for cylindrical foundations done by a large auger. Augering allows the surrounding soils to retain their strength, which prevents the foundation from "tipping over." Traditional archaeological sampling to identify deeply buried sites at the foundation locations would entail large excavations in order to accommodate an investigation. This would require subsequent installation of an engineered backfill. The engineered backfill would require compaction of the soils for the entire depth before augering the foundation; this would require further disruption of any adjacent soils to an even larger area.

Moving a foundation site does not address the problem as there is limited site flexibility, and the same situation may reoccur. Even a relatively small move, such as shifting a foundation 5 feet in any direction, could necessitate a redesign and resultant relocation of several structures in both directions. It is not as simple as just moving one structure 20 feet; it is likely that for any adjustment, 5 structure locations would need to move/adjust. If any of these are already in place, this would create a significant issue in terms of cost and constructability.

Minnkota has already made efforts to identify archaeological sites along the proposed route and is willing to avoid affecting sites if possible. If construction cannot be designed to avoid a site, that site should be evaluated for its eligibility for listing on the National Register of Historic Places. Because of the magnitude of effort that would be required to test every potential deeply buried soil area for archaeological deposits prior to construction, it is proposed that a program

be implemented whereby archaeologists monitor soil augering at each foundation location during construction within the high potential areas to identify and record any historic properties that may be affected.

The North Dakota State Historic Preservation Office (SHPO) already received a copy of a Class I Literature Search for historic properties, and a predictive model for identifying prehistoric archaeological properties, for the transmission line's area of potential effect. Based on the model, survey efforts to find surface and shallowly buried sites have begun. The survey and predictive model are being refined as results are made available. A full Class III Cultural Resources Inventory report will be provided to the Rural Utility Service (RUS), SHPO and consulting parties upon completion. Additionally, as construction nears completion, Minnkota will supply the RUS and SHPO with the results of construction monitoring at the areas identified as having high probability for deeply buried paleosols.

Each auger location will be monitored or evaluated by an archaeological monitor to observe mechanical augering for foundations within high potential areas as shown on figures in Appendix A. (Monitoring would only be required to the depth of the Holocene soils. Augering may proceed without a monitor present if the monitor determines that close examination is not necessary based upon new information and consultation with RUS and SHPO. New information may include previous monitor data, soil characteristics, information provided to or by Minnkota that may require immediate augering, Monitors will examine backdirt and exposed soil profiles to the extent conditions permit. Monitors will have the authority to temporarily stop work if archaeological deposits are discovered, in order to record artifacts and cultural features, and to assess and evaluate the find. The following protocol will be followed:

1. The monitor directs the construction foreman to stop work.
2. The construction foreman secures the area and places the work site into a safe condition.
3. The monitor notifies Minnkota and prepares a memo describing the discovery.
4. Minnkota notifies RUS and SHPO, and provides the memo describing any archaeological resources identified as part of a weekly summary report.
5. The monitor records the discovery by means of field notes, photographs, sketch maps, artifact or feature descriptions, completes a site form, and allows construction to proceed when documentation is complete.

A procedure for addressing unanticipated discoveries and human remains is outlined in the Programmatic Agreement for this Project. As per stipulations in the Programmatic Agreement, Minnkota, RUS, and North Dakota SHPO would be notified of the discovery, which would be carefully recorded and documented in the field pursuant to appropriate state law (North Dakota Century Code § 23-06-27 and administrative rules North Dakota Administrative Code Chapter 40-02-03, "Protection of Prehistoric and Historic Human Burial Sites, Human Remains, and Burial Goods"). Construction would be delayed pending completion of these legal requirements. Archaeological monitors will prepare daily reports to document their activities and observations. Each week the monitor(s) will submit a summary report describing their activities and observations along with any actions taken and their outcome. The report will be submitted to Minnkota who will forward copies to SHPO and RUS.

References

Michael F. Kolb

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ATTACHMENT 4

Contacts

Rural Utilities Service

Dennis Rankin
Environmental Protection Specialist
1400 Independence Avenue, SW
Washington, D.C. 20250

202-720-1953
202-690-0649 (fax)

dennis.rankin@wdc.usda.gov

Minnkota

John Graves
Minnkota Power Cooperative, Inc.
P.O. Box 13200
Grand Forks, North Dakota 58208-3200

701-795-4221
701-391-3654 (cell)

jgraves@Minnkota.com

June 1, 2011

Jeff Towner
Field Supervisor
U. S. Fish and Wildlife Service
3425 Miriam Avenue
Bismarck, North Dakota 58501

RE: Center to Grand Forks 345 kV Transmission Line Project
North Dakota

Dear Mr. Towner:

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Should you have any questions or need additional information, please contact Dennis Rankin, the project manager at 202-720-1953 or via email at dennis.rankin@wdc.usda.gov.

Sincerely,

for Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures
Cc: Laura Dean:EES/Dennis Rankin:EES

June 1, 2011

Barry Williams
Region 6 – Dakotas Zone Archaeologist
preservationU. .S. Fish and Wildlife Service
3425 Miriam Avenue
Bismarck, North Dakota 58501

RE: Center to Grand Forks 345 kV Transmission Line Project
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Sincerely,

Mark S. Plank
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Enclosures

Cc: Laura Dean:EES/Dennis Rankin:EES

May 25, 2011

Reid Nelson, Director
Office of Federal Agency Programs
Advisory Council on Historic Preservation
1100 Pennsylvania Avenue, NW
Suite #803
Washington, D.C. 20002

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Sincerely,

Mark S. Plank
Director
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Water and Environmental Programs

Enclosures

Cc: Laura Dean:EES/Dennis Rankin:EES

Tribal Historic Preservation Office

P.O. Box 121

205 Oak St. East, Suite 207

Sisseton, SD 57262

(605) 698-4972 phone
(605) 698-7054 fax

October 1, 2010

Laura Dean, PhD
Federal Preservation Officer/Archeologist
Rural Utilities Service
1400 Independence Avenue, SW
Mail Stop 1571
Washington, DC 20250-1571

Re: ***Minnkota Center to Grand Forks Transmission Line***

Dear Ms. Dean,

I am writing with regard to the above mentioned project. First of all, we would like to voice our dismay with your office and the contractor representative John Graves, during the last meeting with the tribes via conference call which was held at Standing Rock on Aug 17, 2010. The tribes are unhappy with the fact that the contractor John Graves of Minnkota was in your office during the conference call and that you and he had predetermined the outcome of the so called Tribal consultation meeting and informed tribes of Rural Utilities Service' and Minnkota's decision prior to the tribal consultation conference call. The tribes in attendance again stressed to RUS our deep concern about using a predictive model to determine the areas to be surveyed. The tribes from the very beginning have requested a 100% survey of the entire corridor. The reason for this being the disturbance area is not just where the tower pads are located, the entire corridor will be disturbed (cultural resources destroyed) by the construction of the transmission towers and the cable installation process. Even though towers are spaced at 1000 ft apart all the areas i.e. staging areas, roads for heavy equipment such as excavators, cranes, semi tractors and bulldozers etc. the whole area within the corridor/APE is basically disturbed (cultural resources destroyed) during the construction phase. The information we requested as to the construction plan blueprints etc. have not been forthcoming as requested. The SWO THPO feels it would not be in

our best interest to provide a monitor until a 100% survey is agreed upon. As far as we are concerned the consultation process has not been a good faith effort on the part of RUS and we would request you reconsider the tribes' concerns regarding a 100% survey. By the tribes allowing a monitor to participate on a small portion of the arch survey process would only give the contractor and RUS the opportunity to say that tribal participation was afforded that is why we cannot accept the offer to put a monitor in the field at this time. Please feel free to call to discuss our concerns.

Respectfully,

Dianne Desrosiers

Dianne Desrosiers
Tribal Historic Preservation Officer
Sisseton Wahpeton Oyate

Cc: Waste Win Young, SRST THPO
Dennis Gill Sr. Wahpekute
Natalie Weyaus, MBO THPO
Russell Eagle Bear, RST THPO
Franky Jackson, Santee Sioux Tribe, THPO
Perry Brady, Three Affiliated Tribes THPO
Darrell Smith, Spirit Lake Nation
Michael Justin, HDR
Val Hauser, ACHP

May 25, 2011

Merlan E. Paaverud, Jr.
State Historic Preservation Officer
The Historical Society of North Dakota
612 East Boulevard Avenue
Bismarck, North Dakota 58505-0830

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Mr. Paaverud:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 250 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be constructed primarily using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this project – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks. RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

RUS has determined that the area of potential effects (APE) includes the 1000-foot wide preferred corridor, which should contain the route right-of-way (ROW), beginning near Center, North Dakota at the Milton R. Young Station and terminating in Grand Forks, North Dakota as well as all related access roads, construction work and staging areas and appurtenant facilities which may be located outside of the ROW and may not be contiguous. Because the transmission line structures average about 150 feet tall, RUS has identified an APE for visual effects that extends approximately one-half mile. If any structures will be 200 feet or taller, RUS will extend the APE to one mile.

In addition to the involvement of RUS, the Project may require a permit from the U.S. Army Corps of Engineers (USACE). The Project also may require approval from the U.S. Fish and Wildlife Service (USFWS) to cross easements held by that agency. RUS understands that the USACE has decided to meet its responsibilities for Section 106 review independent of RUS. However, the USFWS has designated RUS as the lead agency for the purposes of Section 106 review pursuant to 36 CFR § 800.2(a)(2).

In conducting Section 106 review for the CGF Project, RUS has tried to involve Indian tribes and gather information from them as early as possible in project planning. On September 10, 2009, RUS initiated government-to-government consultation with twenty-four Indian tribes. A more detailed description of the consultation efforts of RUS can be found in the enclosed letter to the Advisory Council on Historic Preservation (ACHP) dated May 25, 2011.
In order to identify historic properties in the APE, Minnkota first conducted a literature review titled, Draft *Class I Literature Search for the Proposed Center to Grand Forks 345 kV Transmission Line* (March 2010). On the basis of this study and other factors, including professional experience, Minnkota designed a predictive model to direct the identification of significant archeological resources. In October 2010, Minnkota initiated archeological field testing based on the predictive model. That testing should resume in May 2011. In addition to these efforts, Minnkota also has completed a geomorphological study of the APE titled, *Geomorphological Model for Locating Areas with Potential for Deeply Buried Archaeological Deposits Along the Center to Grand Forks 345 KV Transmission Line Corridor in North Dakota* (January 2011). RUS provided an opportunity for your office to review and comment on all of these documents.

Throughout consultation, RUS has sought specific information from Indian tribes about the nature and location of historic properties of religious and cultural significance to them that might be affected by this project. As demonstrated by the enclosed letter, the Sisseton Wahpeton Oyate has asserted that survey of 100% of the APE is needed to accomplish this identification. RUS considered this recommendation, but found that it did not comport with the requirements of 36 CFR Part 800 and was inconsistent with ACHP guidance (see enclosed response from RUS dated November 24, 2010).

Because the CGF Project consists of a long and wide corridor where access to land in order to complete necessary studies and other pre-construction activities is restricted, RUS has elected to phase the identification and evaluation of historic properties, and application of the criteria of adverse effect in accordance with 36 CFR § 800.4(b)(2) and 36 CFR § 800.5(a)(3), respectively. RUS has revised the initial draft of the Programmatic Agreement (PA) for the referenced project in response to the recommendations provided by your office, and to more accurately reflect project circumstances and procedures. The result of this revision is the enclosed PA which establishes the procedures for a phased approach, clarifying that construction may not begin on any component of the

project until the requirements of the agreement have been met. With the enclosed letter, RUS notified the ACHP of the development of this PA in accordance with 36 CFR § 800.6(a)(1)(i)(C).

Please review the enclosed final draft PA and provide RUS with your written comments within thirty days of receipt. Send your comments to Dennis Rankin at 1400 Independence Avenue, SW, Mail Stop 1571, Room 2244, Washington, D.C. 20250-1571 or via email to dennis.rankin@wdc.usda.gov. On June 15th prior to the close of the review period, RUS will host a teleconference to discuss your recommendations.

Should you have any questions or require additional information, please contact Dennis Rankin at 1400 Independence Avenue, SW, Mail Stop 1571, Room 2244, Washington, D.C. 202-720-1953 or via email to dennis.rankin@wdc.usda.gov. RUS appreciates your attention to this matter.

Sincerely,

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

Cc: Dennis Rankin:EES/Laura Dean:EES

Tribal Historic Preservation Office

P.O. Box 121

205 Oak St. East, Suite 207

Sisseton, SD 57262

(605) 698-4972 phone
(605) 698-7054 fax

October 1, 2010

Laura Dean, PhD
Federal Preservation Officer/Archeologist
Rural Utilities Service
1400 Independence Avenue, SW
Mail Stop 1571
Washington, DC 20250-1571

Re: *Minnkota Center to Grand Forks Transmission Line*

Dear Ms. Dean,

I am writing with regard to the above mentioned project. First of all, we would like to voice our dismay with your office and the contractor representative John Graves, during the last meeting with the tribes via conference call which was held at Standing Rock on Aug 17, 2010. The tribes are unhappy with the fact that the contractor John Graves of Minnkota was in your office during the conference call and that you and he had predetermined the outcome of the so called Tribal consultation meeting and informed tribes of Rural Utilities Service' and Minnkota's decision prior to the tribal consultation conference call. The tribes in attendance again stressed to RUS our deep concern about using a predictive model to determine the areas to be surveyed. The tribes from the very beginning have requested a 100% survey of the entire corridor. The reason for this being the disturbance area is not just where the tower pads are located, the entire corridor will be disturbed (cultural resources destroyed) by the construction of the transmission towers and the cable installation process. Even though towers are spaced at 1000 ft apart all the areas i.e. staging areas, roads for heavy equipment such as excavators, cranes, semi tractors and bulldozers etc. the whole area within the corridor/APE is basically disturbed (cultural resources destroyed) during the construction phase. The information we requested as to the construction plan blueprints etc. have not been forthcoming as requested. The SWO THPO feels it would not be in

our best interest to provide a monitor until a 100% survey is agreed upon. As far as we are concerned the consultation process has not been a good faith effort on the part of RUS and we would request you reconsider the tribes' concerns regarding a 100% survey. By the tribes allowing a monitor to participate on a small portion of the arch survey process would only give the contractor and RUS the opportunity to say that tribal participation was afforded that is why we cannot accept the offer to put a monitor in the field at this time. Please feel free to call to discuss our concerns.

Respectfully,

Dianne Desrosiers

Dianne Desrosiers
Tribal Historic Preservation Officer
Sisseton Wahpeton Oyate

Cc: Waste Win Young, SRST THPO
Dennis Gill Sr. Wahpekute
Natalie Weyaus, MBO THPO
Russell Eagle Bear, RST THPO
Franky Jackson, Santee Sioux Tribe, THPO
Perry Brady, Three Affiliated Tribes THPO
Darrell Smith, Spirit Lake Nation
Michael Justin, HDR
Val Hauser, ACHP

Dianne Derosiers
Tribal Historic Preservation Officer
Sisseton Wahpeton Oyate
205 Oak Street East, Suite 207
Sisseton, South Dakota 57262

RE: Proposed Center to Grand Forks Transmission Line
Minnkota Power Cooperative
North Dakota

Dear Ms. Derosiers:

In your letter to the Rural Utilities Service (RUS) dated October 1, 2010, you expressed dismay about the outcome of the August 17, 2010 consultation meeting conducted via teleconference to discuss the proposed Center to Grand Forks Transmission Line (Project). Minnkota Power Cooperative has applied to RUS requesting financial assistance for the construction of this Project. Because RUS may provide financial assistance to this proposal, it is considered an undertaking subject to review under Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

In your October 1, 2010 letter, you state that RUS had predetermined the outcome of this meeting. This assumption appears to be based on the simple coincidence that Minnkota's representative, Mr. John Graves, was in Washington, D.C. with the RUS National Office staff when he participated in this meeting. It is not at all clear from your letter how Mr. Graves' mere presence at the table with RUS staff might preordain the outcome of the consultation meeting. In fact, Mr. Graves elected to visit the National Office to discuss various aspects of the environmental review of the referenced project, not just Section 106.

In conducting Section 106 review for this Project, RUS has made a concerted effort to involve Indian tribes and gather information from them as early as possible in Project planning. RUS believes the information provided by tribes to be essential to informed decision making about the level of effort needed to identify historic properties. Accordingly, RUS invited the Sisseton Wahpeton Oyate and other Indian tribes to an on-site meeting to discuss the Project and visit the proposed crossings of the Missouri and Sheyenne Rivers prior to conducting any archeological field survey of the area of potential effects (APE). Unfortunately due to limited resources, RUS only afforded Indian tribes about three weeks to respond to this invitation. However, to facilitate participation, even with short notice, Minnkota offered to reimburse interested tribes for their travel to this meeting. As promised and as requested by tribes, RUS traveled to North Dakota to conduct this face-to-face consultation meeting. To the dismay of this agency, no tribes attended this meeting and the only responses received by RUS to its invitation were complaints about the procedures established by Minnkota for reimbursement.

Following this effort, RUS continued its review of this Project, but before proceeding with any archeological field survey RUS again invited the Sisseton Wahpeton Oyate and other Indian tribes to participate in consultation meetings held in North Dakota. The first meeting hosted by RUS was held on April 22, 2010. The next meeting held on June 10, 2010, which also was hosted by RUS, was preceded by two days of tours of the Project corridor, with a special focus on those alternatives proposed for crossing the Missouri and Sheyenne Rivers. During these consultation meetings, RUS had hoped that the Sisseton Wahpeton Oyate and other consulting Indian tribes would provide specific information about the nature and location of historic properties of religious and cultural significance to them that might be found in the APE. Because, the specific information requested was not forthcoming at these meetings and access to the APE at this time is limited, Minnkota offered interested tribes an opportunity to participate in a reconnaissance survey of the APE that would be conducted from a helicopter. It is my understanding that this offer has been declined by the Sisseton Wahpeton Oyate and other tribes largely because RUS will not conduct a 100% archeological survey of the APE.

Your October 1, 2010 letter, which reiterates the request that RUS conduct a 100% archeological survey of the APE, also provides the basis for this recommendation. You argue that a 100% archeological survey is needed because the entire APE will be disturbed by Project construction. As such, this assessment focuses solely on the nature and extent of potential effects of the Project, as if archeological sites and other resources listed or eligible for listing on the National Register of Historic Places are spread evenly across the landscape.

On the contrary, the distribution of archeological sites and other cultural resources across the landscape is, and always been, influenced by a number of factors. This means that archeological sites are not distributed evenly but are found only in those places marked by the convergence of environmental and other factors conducive for human habitation and exploitation at a particular time in the past. Furthermore, archeological sites are not always found where the convergence of these factors maximizes the likelihood for human occupation. For these reasons, when making a decision about what is a reasonable level of effort for archeological survey, RUS is obliged to weigh and consider the nature and extent of the Project effects, i.e. disturbance, along with other factors, such as previous research, and the nature and location of the historic properties that might be present. The weighing and vetting of these several factors together by RUS, in accordance with 36 CFR § 800.4(b)(1), is what is required to meet the reasonable and good faith regulatory standard for Section 106 review.

Guidance provided by the Advisory Council on Historic Preservation (ACHP) makes it clear that 100% archeological survey is not required to meet the reasonable and good faith regulatory standard. In its *Section 106 Archaeology Guidance* (2009), the ACHP states that a federal agency *"is not expected to conduct a 100 percent survey of the area of potential effects"* (Question #22, pg. 16). Recently, the ACHP reaffirmed this interpretation in a letter to the Iowa State Historic Preservation Office dated August 20, 2010. Furthermore, in response to recent litigation against the U.S. State Department, the U.S. District Court, Central Division, also did not find 100% archeological survey to be a requirement of Section 106 review stating that "[i]*t is clear, then, that there is no requirement that a survey of 100% of the area to be developed be conducted*" (Memorandum Order and Opinion, CIV 08-3021, filed September. 29,

2009). While it may appear to you that the decision by RUS not to conduct 100% survey is predetermined, in fact, it is based upon a legal decision, and policy and guidance developed by the ACHP, the agency which promulgated the Section 106 regulations.

RUS has considered your recommendation, but has decided to proceed with an archeological survey that covers less than 100% of the APE. This survey is being guided by a predictive model which was developed based on an evaluation of previous research and is being tested through implementation. In its ongoing effort to involve you in consultation, RUS will request that the Sisseton Wahpeton Oyate and other consulting tribes review the findings of this archeological survey before proceeding to the next step in Section 106 review.

RUS understands the importance of face-to-face consultation meetings to the Sisseton Wahpeton Oyate and other Indian tribes. However, such meetings are not always needed or advisable given the nature of the historic properties or an undertaking's effects. Furthermore, as you have been advised, the administrative budget of RUS is such that the agency does not have unlimited funding for staff travel. This situation necessitates that all participants in Section 106 maximize consultation efficiencies where possible.

Should you have any questions or require additional clarification, please contact Dennis Rankin and Lauren McGee at dennis.rankin@wdc.usda.gov and lauren.mcgee@wdc.usda.gov, respectively.

Sincerely,

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

CC:

Waste Win Young
Tim Mentz, Sr.
Dennis Gill Sr
Natalie Weyaus
Russell Eagle Bear
Franky Jackson
Perry Brady
Darrell Smith
Valerie Hauser
Charlene Vaughn
John Graves

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Mr. Darrell Youpee
Tribal Historic Preservation Officer
Assinboine and Sioux Tribes of the Fort Peck Reservation
5012 Medicine Bear Road
P.O. Box 1027
Poplar, Montana 59255

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Mr. Youpee:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

RUS has determined that the area of potential effects (APE) includes the 1000-foot wide preferred corridor, which should contain the route ROW, beginning near Center, North Dakota at the Milton R. Young Station and terminating in Grand Forks, North Dakota as well as all related access roads, construction work and staging areas and appurtenant facilities which may be located outside of the ROW and may not be contiguous. Because the transmission line structures average about 150 feet tall, RUS has identified an APE for visual effects that extends approximately one-half mile. If any structures will be 200 feet or taller, RUS will extend the APE to one mile.

RUS has offered your tribe several opportunities to participate in consultation, specifically soliciting your assistance in determining the level of effort needed to identify historic properties which might be affected by the project. A more detailed description of the consultation efforts of RUS can be found in the enclosed letter to the Advisory Council on Historic Preservation dated May 25, 2011. In order to identify historic properties in the APE, Minnkota first conducted a literature review titled, Draft *Class I Literature Search for the Proposed Center to Grand Forks 345 kV Transmission Line* (March 2010). On the basis of this study and other factors, including professional

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experience, Minnkota designed a predictive model to direct the identification of significant archeological resources. In October 2010, Minnkota initiated archeological field testing based on the predictive mode. That testing should resume in May 2011. In addition to these efforts, Minnkota also has completed a geomorphological study of the APE titled, *Geomorphological Model for Locating Areas with Potential for Deeply Buried Archaeological Deposits Along the Center to Grand Forks 345 KV Transmission Line Corridor in North Dakota* (January 2011).

Because the CGF Project consists of a long and wide corridor where access to land in order to complete necessary studies and other pre-construction activities is restricted, RUS has elected to phase the identification and evaluation of historic properties, and application of the criteria of adverse effect in accordance with 36 CFR § 800.4(b)(2) and 36 CFR § 800.5(a)(3), respectively. An initial Programmatic Agreement (PA) drafted by RUS was sent to you electronically on April 9, 2010. RUS revised this initial draft in response to recommendations from the North Dakota State Historic Preservation Office (SHPO), and to more accurately reflect project circumstances and procedures. The result of this revision is the enclosed PA which establishes the procedures for a phased approach, clarifying that construction may not begin on any component of the project until the requirements of the agreement have been met.

Please review the enclosed final draft PA and provide RUS with your written comments within thirty days of receipt. Send your comments to Dennis Rankin at 1400 Independence Avenue, SW, Mail Stop 1571, Room 2244, Washington, D.C. 20250-1571 or via email to dennis.rankin@wdc.usda.gov. On June 22, 2011 prior to the close of the review period RUS will host a teleconference to discuss your recommendations.

Should you have any questions or require additional information, please contact Dennis Rankin at 1400 Independence Avenue, SW, Mail Stop 1571, Room 2244, Washington, D.C. 202-720-1953 or via email to dennis.rankin@wdc.usda.gov.. RUS appreciates your attention to this matter.

Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Ms. Donna Ray Peterson
Tribal Historic Preservation Officer
Cheyenne River Sioux Tribe
P.O. Box 590
Eagle Butte, South Dakota 57625

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Ms. Peterson:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

RUS has determined that the area of potential effects (APE) includes the 1000-foot wide preferred corridor, which should contain the route ROW, beginning near Center, North Dakota at the Milton R. Young Station and terminating in Grand Forks, North Dakota as well as all related access roads, construction work and staging areas and appurtenant facilities which may be located outside of the ROW and may not be contiguous. Because the transmission line structures average about 150 feet tall, RUS has identified an APE for visual effects that extends approximately one-half mile. If any structures will be 200 feet or taller, RUS will extend the APE to one mile.

RUS has offered your tribe several opportunities to participate in consultation, specifically soliciting your assistance in determining the level of effort needed to identify historic properties which might be affected by the project. A more detailed description of the consultation efforts of RUS can be found in the enclosed letter to the Advisory Council on Historic Preservation dated May 25, 2011. In order to identify historic properties in the APE, Minnkota first conducted a literature review titled, Draft *Class I Literature Search for the Proposed Center to Grand Forks 345 kV Transmission Line* (March 2010). On the basis of this study and other factors, including professional

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Please review the enclosed final draft PA and provide RUS with your written comments within thirty days of receipt. Send your comments to Dennis Rankin at 1400 Independence Avenue, SW, Mail Stop 1571, Room 2244, Washington, D.C. 20250-1571 or via email to dennis.rankin@wdc.usda.gov. On June 22, 2011 prior to the close of the review period RUS will host a teleconference to discuss your recommendations.

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Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Ms. Elisse Aune
Tribal Historic Preservation Officer
Mille Lacs Band of Ojibwe
43408 Oodena Drive
Onamia, Minnesota 56359

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Ms. Auna:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

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Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Mr. Linwood Tallbull
Tribal Historic Preservation Officer
Northern Cheyenne Tribe
p.O. Box 128
Lame Deer, Montana 59043

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Mr. Tallbull:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

RUS has determined that the area of potential effects (APE) includes the 1000-foot wide preferred corridor, which should contain the route ROW, beginning near Center, North Dakota at the Milton R. Young Station and terminating in Grand Forks, North Dakota as well as all related access roads, construction work and staging areas and appurtenant facilities which may be located outside of the ROW and may not be contiguous. Because the transmission line structures average about 150 feet tall, RUS has identified an APE for visual effects that extends approximately one-half mile. If any structures will be 200 feet or taller, RUS will extend the APE to one mile.

RUS has offered your tribe several opportunities to participate in consultation, specifically soliciting your assistance in determining the level of effort needed to identify historic properties which might be affected by the project. A more detailed description of the consultation efforts of RUS can be found in the enclosed letter to the Advisory Council on Historic Preservation dated May 25, 2011. In order to identify historic properties in the APE, Minnkota first conducted a literature review titled, Draft *Class I Literature Search for the Proposed Center to Grand Forks 345 kV Transmission Line* (March 2010). On the basis of this study and other factors, including professional

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Because the CGF Project consists of a long and wide corridor where access to land in order to complete necessary studies and other pre-construction activities is restricted, RUS has elected to phase the identification and evaluation of historic properties, and application of the criteria of adverse effect in accordance with 36 CFR § 800.4(b)(2) and 36 CFR § 800.5(a)(3), respectively. An initial Programmatic Agreement (PA) drafted by RUS was sent to you electronically on April 9, 2010. RUS revised this initial draft in response to recommendations from the North Dakota State Historic Preservation Office (SHPO), and to more accurately reflect project circumstances and procedures. The result of this revision is the enclosed PA which establishes the procedures for a phased approach, clarifying that construction may not begin on any component of the project until the requirements of the agreement have been met.

Please review the enclosed final draft PA and provide RUS with your written comments within thirty days of receipt. Send your comments to Dennis Rankin at 1400 Independence Avenue, SW, Mail Stop 1571, Room 2244, Washington, D.C. 20250-1571 or via email to dennis.rankin@wdc.usda.gov. On June 22, 2011 prior to the close of the review period RUS will host a teleconference to discuss your recommendations.

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Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Mr. Russell Eagle Bear
Tribal Historic Preservation Officer
Rosebud Sioux Tribe of the Rosebud Indian Reservation
P.O. Box 809
Rosebud, South Dakota 57470

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Mr. Eagle Bear:

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Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Mr. Roger Trudell
Tribal Chairman/Leader
Santee Sioux of Nebraska
108 Spirit Avenue
Niobrara, Nebraska 68760

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Mr. Trudell:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

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Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Ms. Dianne Derosiers
Tribal Historic Preservation Officer
Sisseton Wahpeton Oyate
205 Oak Street, Suite 207
Sisseton, South Dakota 57262

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Ms. Derosiers:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

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Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Mr. Kevin Jensvold
Chairman
Upper Sioux Community of Minnesota
5722 Travers Lane
Granite Falls, Minnesota 56241

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Mr. Jensvold:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

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Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Mr. Tom McCauley
Tribal Historic Preservation Officer
White Earth Band of Minnesota Chippewa
p.O. Box 418
White Earth, Minnesota 56591

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Mr. McCauley:

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Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

United States Department of Agriculture
Rural Development

May 31, 2011

Ms. Waste Win
Tribal Historic Preservation Office
Standing Rock Sioux Tribe of North and South Dakota
P.O. Box D
Fort Yates, North Dakota 58538

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Ms. Win:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

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Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

May 31, 2011

Mr. Dennis Gill, Sr.
Wahpekute Band of the Dakota
3322 Gill Road
Waubay, South Dakota 57501

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Mr. Gill:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

RUS has determined that the area of potential effects (APE) includes the 1000-foot wide preferred corridor, which should contain the route ROW, beginning near Center, North Dakota at the Milton R. Young Station and terminating in Grand Forks, North Dakota as well as all related access roads, construction work and staging areas and appurtenant facilities which may be located outside of the ROW and may not be contiguous. Because the transmission line structures average about 150 feet tall, RUS has identified an APE for visual effects that extends approximately one-half mile. If any structures will be 200 feet or taller, RUS will extend the APE to one mile.

RUS has offered your tribe several opportunities to participate in consultation, specifically soliciting your assistance in determining the level of effort needed to identify historic properties which might be affected by the project. A more detailed description of the consultation efforts of RUS can be found in the enclosed letter to the Advisory Council on Historic Preservation dated May 25, 2011. In order to identify historic properties in the APE, Minnkota first conducted a literature review titled, Draft *Class I Literature Search for the Proposed Center to Grand Forks 345 kV Transmission Line* (March 2010). On the basis of this study and other factors, including professional

experience, Minnkota designed a predictive model to direct the identification of significant archeological resources. In October 2010, Minnkota initiated archeological field testing based on the predictive mode. That testing should resume in May 2011. In addition to these efforts, Minnkota also has completed a geomorphological study of the APE titled, *Geomorphological Model for Locating Areas with Potential for Deeply Buried Archaeological Deposits Along the Center to Grand Forks 345 KV Transmission Line Corridor in North Dakota* (January 2011).

Because the CGF Project consists of a long and wide corridor where access to land in order to complete necessary studies and other pre-construction activities is restricted, RUS has elected to phase the identification and evaluation of historic properties, and application of the criteria of adverse effect in accordance with 36 CFR § 800.4(b)(2) and 36 CFR § 800.5(a)(3), respectively. An initial Programmatic Agreement (PA) drafted by RUS was sent to you electronically on April 9, 2010. RUS revised this initial draft in response to recommendations from the North Dakota State Historic Preservation Office (SHPO), and to more accurately reflect project circumstances and procedures. The result of this revision is the enclosed PA which establishes the procedures for a phased approach, clarifying that construction may not begin on any component of the project until the requirements of the agreement have been met.

Please review the enclosed final draft PA and provide RUS with your written comments within thirty days of receipt. Send your comments to Dennis Rankin at 1400 Independence Avenue, SW, Mail Stop 1571, Room 2244, Washington, D.C. 20250-1571 or via email to dennis.rankin@wdc.usda.gov. On June 22, 2011 prior to the close of the review period RUS will host a teleconference to discuss your recommendations.

Should you have any questions or require additional information, please contact Dennis Rankin at 1400 Independence Avenue, SW, Mail Stop 1571, Room 2244, Washington, D.C. 202-720-1953 or via email to dennis.rankin@wdc.usda.gov.. RUS appreciates your attention to this matter.

Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

USDA Rural Development

United States Department of Agriculture
Rural Development

May 31, 2011

Mr. Tim Mentz, Sr.
Standing Rock Sioux Tribe
P.O. Box D
Fort Yates North Dakota 58538

RE: Proposed Center-Grand Forks 345 kV Transmission Project
North Dakota

Dear Mr. Mentz:

The Rural Utilities Service (RUS) is considering an application for financial assistance from Minnkota Power Cooperative (Minnkota) for the construction of an approximately 260 mile long 345 kV electric transmission line and associated facilities to deliver power from the Milton R. Young Station Unit 2 (Young 2) power plant located near Center, North Dakota, to a delivery point in Minnkota's service area near Grand Forks, North Dakota. The line would be primarily constructed using single pole steel structures. Various modifications to associated substations in the area would also be required. The following counties could be affected by this proposal – Oliver, Burleigh, McLean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks.RUS is considering funding this application, thereby making the proposal an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800).

RUS has determined that the area of potential effects (APE) includes the 1000-foot wide preferred corridor, which should contain the route ROW, beginning near Center, North Dakota at the Milton R. Young Station and terminating in Grand Forks, North Dakota as well as all related access roads, construction work and staging areas and appurtenant facilities which may be located outside of the ROW and may not be contiguous. Because the transmission line structures average about 150 feet tall, RUS has identified an APE for visual effects that extends approximately one-half mile. If any structures will be 200 feet or taller, RUS will extend the APE to one mile.

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experience, Minnkota designed a predictive model to direct the identification of significant archeological resources. In October 2010, Minnkota initiated archeological field testing based on the predictive mode. That testing should resume in May 2011. In addition to these efforts, Minnkota also has completed a geomorphological study of the APE titled, *Geomorphological Model for Locating Areas with Potential for Deeply Buried Archaeological Deposits Along the Center to Grand Forks 345 KV Transmission Line Corridor in North Dakota* (January 2011).

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Sincerely,

Mark S. Plank

Mark S. Plank
Director
Engineering and Environmental Staff
Water and Environmental Programs

Enclosures

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

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Department of Transportation

Merlan E. Paaverud, Jr.
Director

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June 7, 2011

Mr. Mark S. Plank Director
Engineering and Environmental Staff
Rural Development-Rural Utilities Service
United States Department of Agriculture
1400 Independence Avenue SW
Mail Stop 1571 Room 2244
Washington, DC 20250-1571

NDSHPO REF.: 10-0173 USDA-RUS/PSC Center to Grand Forks 345 kV Transmission Line Project: Programmatic Agreement (PA)

Dear Mr. Plank:

We have received and reviewed correspondence and documentation for: 10-0173 **USDA-RUS/PSC Center to Grand Forks 345 kV Transmission Line Project: Programmatic Agreement (PA)** and offer the attached comments on the draft document.

Thank you for the opportunity to review the project, and we look forward to the review of (outstanding) project documentation, and to further consultation on it. If you have questions please contact either Susan Quinnell at (701) 328-3576 or squinnell@nd.gov or Paul Picha at ppicha@nd.gov or (701) 328-3574.

Sincerely,

for Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)
and
Director, State Historical Society of North Dakota
c: Dennis Rankin, RUS, Washington, DC
c: Barry G. Williams, USFWS, Bismarck
c: Patrick Fahn, ND PSC, Bismarck

10-0173

June 7, 2011 Paul R. Picha

NDSHPO REF.: 10-0173 USDA-RUS/PSC Center to Grand Forks 345 kV Transmission Line Project: Programmatic Agreement (PA)

Page	Para/Line	Comment
4	II.B/1	Please change to: archaeological survey (Class III CRI)
5	IV.B/2-4	Identified resources that are being considered/treated as National Register eligible (Historic Properties) should be or have been formally evaluated for significance and eligibility in some manner to substantiate/support their respective determination of eligibility. Please change to: following evaluation.
7	IX.B/1	Please change to: SHPO/ State Historical Society of North Dakota (SHSND)
7	IX.D.2.d/2	Please change to: State Historical Society of North Dakota (SHSND)/ North Dakota SHPO The SHSND is the entity that is specifically referred to in the NDCC and NDAC
7	IX.D.3/5	Please change to SHSND/SHPO
7	IX.D.4/2	Please change to SHSND/SHPO

PROGRAMMATIC AGREEMENT
AMONG
THE RURAL UTILITIES SERVICE,
THE U.S. FISH AND WILDLIFE SERVICE,
AND
THE NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICE
REGARDING
THE CENTER TO GRAND FORKS 345 kV TRANSMISSION LINE PROJECT
FOR
OLIVER, BURLEIGH, MCLEAN, SHERIDAN, WELLS, FOSTER, EDDY, GRIGGS, NELSON, STEELE, AND GRAND FORKS COUNTIES, NORTH DAKOTA

WHEREAS, in accordance with the Rural Electrification Act of 1936 (7 U.S.C. §§ 901-950b), the Rural Utilities Service (RUS) is authorized to provide federal financial assistance in the development of infrastructure in rural America; and,

WHEREAS, Minnkota Power Cooperative, Inc. (Minnkota) has applied to RUS for assistance to construct approximately 250 miles of 345 kilovolt (kV) transmission line in North Dakota, with associated aboveground facilities, such as substations, and ancillary facilities, such as temporary construction work and staging areas (CGF Project); and

WHEREAS, RUS may fund the Project thereby making the Project an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800); and

WHEREAS, the U.S. Fish and Wildlife Service (USFWS) may issue an approval for the Project to cross easements held by that federal agency, thereby making the CGF Project an undertaking subject to review under 36 CFR Part 800; and

WHEREAS, RUS and USFWS agree that the RUS will be the lead federal agency for purposes of Section 106 in accordance with 36 CFR § 800.2(a)(2); and

WHEREAS, based on the analysis conducted pursuant to 7 CFR Part 1794, RUS will select a 1,000-foot-wide corridor for the CGF Project; and

WHEREAS, the North Dakota Public Service Commission will select a 150-foot-wide right-of-way (ROW), which should be located within the corridor chosen by RUS, for construction of the CGF Project; and

WHEREAS, RUS has determined that the area of potential effects (APE) for the undertaking includes the 1,000-foot-wide corridor beginning near Center, North Dakota at the Milton R. Young Station and terminating in Grand Forks, North Dakota that should contain the Project ROW as well as all Project-related access roads, transmission facilities and corridors, environmental crossings, temporary work spaces, construction areas, and appurtenant facilities that may be located outside of the ROW and may not be contiguous (**Attachment 1**); and

WHEREAS, RUS also has established an APE for visual effects that is one-half mile wide where the CGF Project structures will be 200 feet or less in height, and one mile whenever a structure exceeds 200 feet in height (**Attachment 2**); and

WHEREAS, RUS is phasing identification and evaluation of historic properties, and application of the criteria of adverse effect in accordance with 36 CFR § 800.4(b)(2) and 36 CFR § 800.5(a)(3), respectively, because the Project consists of a large area where access to land in order to complete necessary studies is restricted; and

WHEREAS, in accordance with 36 CFR § 800.14(b)(1)(ii), execution of a Programmatic Agreement (PA) is appropriate because effects on historic properties cannot be fully determined prior to approval of the Project; and

WHEREAS, RUS, in consultation with the North Dakota State Historic Preservation Office (SHPO), has determined that the Project might have an adverse effect on historic properties, which are properties listed on or eligible for listing on the National Register of Historic Places (NRHP); and

WHEREAS, on September 10, 2009, RUS invited the Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, the Bois Forte Ojibwe, the Cheyenne River Sioux Tribe, the Crow Creek Sioux Tribe, the Flandreau Santee Sioux Tribe, the Fond du Lac Band of Lake Superior Chippewa, the Grand Portage Band of Lake Superior Chippewa, the Leech Lake Band of Ojibwe, the Lower Brule Sioux Tribe, the Lower Sioux Indian Community, the Mille Lacs Band of Ojibwe, the Northern Cheyenne Nation, the Oglala Sioux Tribe, the Prairie Island Indian Community, the Red Lake Band of Chippewa Indians, the Rosebud Sioux Tribe, the Santee Sioux Nation, the Sisseton Wahpeton Oyate of the Lake Traverse Reservation, the Spirit Lake Tribe, the Standing Rock Sioux Tribe, the Three Affiliated Tribes of the Fort Berthold Reservation, the Turtle Mountain Band of Chippewa, the Upper Sioux Indian Community and the White Earth Band of Ojibwe to participate in government-to-government consultation for the CGF Project; and

WHEREAS, the following Indian tribes responded affirmatively to this invitation - the Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, the Cheyenne River Sioux Tribe, the Mille Lacs Band of Ojibwe, the Northern Cheyenne Nation, the Rosebud Sioux Tribe, the Santee Sioux Nation, the Sisseton Wahpeton Oyate, the Standing Rock Sioux Tribe, the Upper Sioux Indian Community and the White Earth Band of Ojibwe; and

WHEREAS, the Mille Lacs Band of Ojibwe, the Sisseton Wahpeton Oyate and the Standing Rock Sioux Tribe have directly participated in consultation; and

WHEREAS, RUS has invited the following Indian tribes to sign this PA as concurring parties - the Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, the Cheyenne River Sioux Tribe, the Mille Lacs Band of Ojibwe, the Northern Cheyenne Nation, the Rosebud Sioux Tribe, the Santee Sioux Nation, the Sisseton Wahpeton Oyate, the Standing Rock Sioux Tribe, the Upper Sioux Indian Community and the White Earth Band of Ojibwe; and

WHEREAS, Minnkota has participated in consultation and has been invited by RUS to sign this PA as an invited signatory; and

WHEREAS, the Wahpekute, a non-federally recognized Indian tribe, has participated in consultation and has been invited to sign this PA as a concurring party; and

WHEREAS, RUS has invited Mr. Tim Mentz to participate in consultation and sign this PA as a concurring party; and

WHEREAS, on May 25, 2011, RUS notified the Advisory Council on Historic Preservation (ACHP), in accordance with 36 CFR § 800.6(a)(1)(i)(C), providing the specified documentation; and

WHEREAS, on June 14, 2011 the ACHP elected not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii);

NOW, THEREFORE, RUS, USFWS and the North Dakota SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

The RUS shall ensure that the following stipulations are carried out.

I. STANDARDS AND CONDITIONS

A. All studies and work required under the terms of this PA will be carried out by or under the direct supervision of a professional who, at a minimum, meets the Secretary of the Interior's *Professional Qualification Standards* (48 FR 44716, September 29, 1983) in the appropriate field.

B. With the exception of transmission structure foundations, Minnkota will not initiate construction of any component of the CGF Project until Section 106 review conducted in accordance with the terms of this PA have been met for that component.

C. Even if the terms of Stipulations II and III have been met for the site of a transmission structure, construction of that structure remains subject to the requirements of Stipulation IV.

D. Implementation of Stipulation IV will take place during excavation for CGF Project transmission structure foundations.

E. Minnkota will establish and facilitate open communication between consulting archeologists and engineers during the performance of archeological field testing, treatment and construction to ensure that the terms of this PA are properly implemented.

II. IDENTIFICATION

A. Minnkota has completed the following studies: *Draft Class I Literature Search for the Proposed Minnkota Power Cooperative, Inc. Center to Grand Forks 345 kV*

Transmission Line" (March 2010); and *Geomorphological Model for Locating Areas with Potential for Deeply Buried Archaeological Deposits Along the Center to Grand Forks 345 KV Transmission Line Corridor in North Dakota* (January 2011).

identification efforts & Pedestrian survey

B. Upon completion of archeological ~~field testing~~ (Class III CRI), which began in October 2010, Minnkota will prepare and submit a draft report describing data gathering and analysis to RUS for review and approval.

1. The draft report will contain maps showing the geographic relationship between the APE, the ROW, identified archeological resources, and proposed structures and other CGF Project-related ground disturbance.
2. The draft report also will include recommendations regarding the NRHP eligibility of identified archeological resources; identify those resources for which additional study might be needed; and propose treatment, including those measures that might avoid adverse effects.
3. When it is acceptable, RUS will submit the draft report to the SHPO and consulting parties for review. The consulting parties will have thirty (30) days from receipt to provide written comments to RUS on the draft report. RUS will ensure that written comments submitted in a timely manner are considered in preparation of the final report.

C. Minnkota will conduct a study of the APE to identify NRHP listed or eligible architectural resources which might be affected by the CGF Project.

1. The draft report will contain maps showing the geographic relationship between the APE, the ROW, identified properties and resources, and the proposed structures.
2. When it is acceptable, RUS will submit the draft report to the SHPO and consulting parties for review. The consulting parties will have thirty (30) days from receipt to provide written comments to RUS on the draft report. RUS will ensure that written comments submitted in a timely manner are considered in preparation of the final report.

D. Each and every change in the location of CGF Project components is subject to review under the terms of this PA.

III. TREATMENT

A. Avoidance of impacts to identified archeological or architectural resources is the preferred alternative. Minnkota will seek agreement with the SHPO and consulting tribes on the identification and implementation of appropriate and reasonable avoidance measures.

1. Whenever the parties agree, Minnkota will incorporate agreed upon avoidance measures into the CGF Project plans and specifications.
2. Wherever the parties cannot agree, RUS will consult with the SHPO and other consulting parties to identify appropriate treatment in accordance with Stipulation III.B.

B. Prior to developing treatment measures, Minnkota will conduct evaluation studies, as appropriate, in accordance with 36 CFR § 800.4(c)(1). When RUS and the SHPO agree, an identified resource may be treated as eligible for listing on the NRHP for

the purposes of Section 106 under the terms of this PA. Such treatment does not apply to identified resources located on federal land.

1. If historic properties are identified pursuant to 36 CFR § 800.4(c)(2), RUS will apply the criteria of adverse effect in accordance with 36 CFR § 800.5(a).
2. When RUS determines that there may be an adverse effect, RUS will consult with the SHPO and Indian tribes to identify appropriate measures that are in the public interest to minimize or mitigate adverse effects to historic properties.

C. When RUS and the consulting parties agree on reasonable treatment measures, Minnkota will prepare a Treatment Plan (Plan) describing the agreed upon measures, the manner in which they will be carried out, and a schedule for their implementation.
   1. When treatment consists of or includes data recovery, the Plan will identify the specific research questions to be addressed by data recovery with an explanation of their relevance, the archeological methods to be used, and provisions for public interpretation and education subject to restrictions established by 36 CFR § 800.6(a)(5).
   2. Minnkota will submit the Plan to the SHPO and consulting tribes for review. These parties will have thirty (30) days from receipt to submit a written review. RUS will ensure that the approved Plan takes into account timely comments and recommendations submitted by the consulting parties.

D. To prevent damage to them, Minnkota will mark and fence all identified rock features during construction of the CGF Project. In addition, to help protect these resources post-construction, Minnkota will designate the location of all rock features as restricted or sensitive locations on Operation and Maintenance maps.

E. RUS will ensure that Minnkota implements all approved Plans prior to beginning any construction activities for that Project component.

IV. BORING FOR TRANSMISSION STRUCTURE FOUNDATIONS

A. Minnkota will compare the locations of all proposed transmission structures with the high potential areas identified in the January 2011 geomorphological report and shown in **Attachment 2**.

B. Minnkota will notify the SHPO in writing whenever a location will contain a structure and has a high potential for deeply buried archeological sites.
   1. Such locations will be subject to the measures described in **Attachment 3**.
   2. Monitoring of foundation boring to be conducted pursuant to **Attachment 3** will be performed by a professional archeologist with training in geomorphology.

V. U.S. FISH AND WILDLIFE SERVICE LANDS

Prior to initiating construction of any component of CGF Project that will cross USFWS lands, Minnkota must document for RUS the successful conclusion of Section 106 review conducted in accordance with 36 CFR §§ 800.3 through 800.7 to meet the

requirements of the USFWS. When RUS finds that Section 106 review for that segment has been successfully concluded, RUS may approve construction of that segment.

VI. CURATION

A. Any artifacts, materials, or records removed from USFWS land that are not subject to the Native American Graves Protection and Repatriation Act (NAGPRA) will be curated by the USFWS in accordance with 36 CFR Part 79.

B. Minnkota will return all artifacts and materials recovered through implementation of the terms of this PA to the respective landowner.

VII. OTHER MONITORING

A. Minnkota may elect to offer an opportunity for one tribal monitor identified and agreed to by the consulting tribes to monitor implementation of identification field studies, treatment and construction. The absence of the tribal monitor at any time will not delay the progress of studies, treatment or construction.

B. Historic properties discovered or unanticipated effects discovered during this monitoring will be treated in accordance with Stipulation IX.

C. Upon written request, Minnkota ~~may~~ shall grant RUS and SHPO access to the work site to observe construction.

VIII. CONFIDENTIALITY

RUS will protect information about historic properties of religious and cultural significance to Indian tribes, including location information or information provided by Indian tribes to assist in the identification of such properties, to the extent allowed by Section 304 of the National Historic Preservation Act [16 U. S. C. 470w3], 36 CFR § 800.11(c) and other applicable laws.

IX. POST- REVIEW UNANTICIPATED DISCOVERIES

A. If previously unidentified historic properties or unanticipated effects to historic properties are discovered during CGF Project construction, the construction contractor will immediately halt all activity within a one hundred (100) foot radius of the discovery, notify Minnkota (see **Attachment 4**) of the discovery and implement interim measures to protect the discovery from looting and vandalism.

B. Immediately upon receipt of the notification required in Stipulation IX.A, Minnkota will inspect the construction site to determine the extent of the discovery and ensure that construction activities have halted, clearly mark the area of the discovery, implement additional measures, as appropriate, to protect the discovery from looting and vandalism, and notify RUS, SHPO/State Historical Society of North Dakota (SHSND) and the following Indian tribes - the Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, the Cheyenne River Sioux Tribe, the Mille Lacs Band of Ojibwe, the Northern Cheyenne Nation, the Rosebud Sioux Tribe, the Santee Sioux Nation, the Sisseton Wahpeton Oyate, the Standing Rock Sioux Tribe, the Upper Sioux Indian Community and the White Earth Band of Ojibwe.

C. Upon receipt of notification, the RUS shall treat the discovery in accordance with 36 CFR § 800.13(b)(3) and (c).

D. Treatment of Human Remains
   1. When the discovery contains human remains and is located on USFWS land, NAGPRA [25 U.S.C. 3001 et. seq.] and its implementing regulations (43 CFR Part 10) apply.
   2. If the construction contractor believes that a discovery contains human remains and the discovery is not located on federal lands, the contractor will comply with Stipulation IX.A. Immediately upon receipt of such notification, Minnkota will
      a. comply with the procedures required by North Dakota Century Code § 23-06-27 and administrative rules North Dakota Administrative Code Chapter 40-02-03, Protection of Prehistoric and Historic Human Burial Sites, Human Remains, and Burial Goods,
      b. halt construction activities within a 100 foot radius from the point of discovery;
      c. implement measures to protect the discovery from looting and vandalism until the completion of requirements under state law; and
      d. notify the local law enforcement agency, the SHSND/SHPO, the North Dakota Department of Health (NDDH), RUS and the tribes identified in Stipulation IX.B of the discovery.
   3. If local law enforcement determines that the remains are not associated with a crime, RUS will determine if it is prudent and feasible to avoid disturbing the remains. If RUS determines that disturbance cannot be avoided, Minnkota will remove and reinter the human remains in accordance with rules adopted by the SHSND/SHPO and the NDDH.
   4. Minnkota may resume construction activities in the area of the discovery once implementation of the measures required by the SHSND/SHPO and the NDDH has been completed.

In consultation with SHSND/NDSHPO

+ in consultation w/ SHPO

E. Minnkota will ensure that the requirements of Stipulation VII are incorporated into all construction contracts.

X. REPORTING

A. Every six (6) months following the execution of this PA until construction is complete, Minnkota will submit a written report to RUS and the SHPO describing progress on implementation of the terms of its terms, the development of construction plans and specifications, construction completed during the period covered by the report, implementation of Plans, the schedule for completion of construction and the terms of the PA, the treatment of any post-review discoveries pursuant to Stipulation IX, any scheduling changes proposed, any problems encountered, and any disputes addressed pursuant to Stipulation XI.

B. This report will be submitted electronically to RUS and the SHPO.

XI. DISPUTE RESOLUTION

A. Should any signatory or concurring party to this PA object in writing at any time to any actions proposed or the manner in which the terms of this PA are implemented, RUS and the USFWS, within the limits of their authority, will consult with such party to resolve the objection. If RUS and the USFWS determine that the objection cannot be resolved, that agency will forward all documentation relevant to the dispute, including the resolution proposed by RUS or the USFWS, as appropriate, to the ACHP. The ACHP will

1. Provide the RUS and the USFWS with its advice, pursuant to 36 CFR § 800.2(b)(2), on the resolution of the objection within thirty (30) days of receiving adequate documentation.
2. Prior to reaching a final decision on the dispute, RUS or the USFWS, as appropriate, will prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. RUS or the USFWS, as appropriate, will then proceed according to its final decision.
3. If the ACHP does not provide its advice regarding the dispute within thirty (30) days, RUS or the USFWS, as appropriate, may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the respective federal agency will prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the PA, and provide them and the ACHP with a copy of such written response.

B. The responsibility of RUS and the USFWS to carry out all other actions subject to the terms of this PA that are not the subject of the dispute remain unchanged.

C. If at any time during the implementation of the measures stipulated in this PA an objection should be raised by the public, RUS will notify the signatories to this PA and consult with the objecting party to seek resolution. If RUS and the USFWS determine that the objection cannot be resolved, that agencies will seek the advice or comment of ACHP in accordance with Stipulation IX.A.

XII. TERM OF AGREEMENT

A. The term of this PA will be five (5) years from the date of execution by the signatories unless the signatories agree to extend its term. If its stipulations have not been carried out, and prior to work continuing on the CGF Project, RUS and the USFWS will either (a) execute another agreement pursuant to 36 CFR § 800.6, or request, take into account and respond to the comments of the ACHP pursuant to 36 CFR § 800.7.

B. Six (6) months prior to the date on which the PA will expire, Minnkota will notify the other signatories of the impending expiration. RUS and the USFWS may consult with the other signatories to reconsider the terms of the PA and amend it in accordance with Stipulation XI. RUS and the USFWS will notify the signatories as to the course each will pursue.

XIII. AMENDMENT

This PA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date it is executed by all of the signatories and filed with ACHP.

XIV. TERMINATION

A. If any signatory to this PA determines that its terms will not, or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation XI. If within thirty (30) days an amendment cannot be reached, any signatory may terminate the PA upon written notification to the other signatories.

B. Once the PA is terminated, and prior to work continuing on the CGF Project, RUS and the USFWS must either (a) execute an agreement pursuant to 36 CFR § 800.6, or (b) request, take into account, and respond to the comments of ACHP under 36 CFR § 800.7. RUS and the USFWS will notify the signatories as to the course of action each will pursue.

EXECUTION of this PA by RUS, USFWS and the North Dakota SHPO, and implementation of its terms evidence that RUS has taken into account the effects of this undertaking on historic properties and afforded ACHP a reasonable opportunity to comment.

Signatories:

US Department of Agriculture Rural Utilities Service

By: Mark S. Plank Date: 8/22/11

Mark S. Plank, Director
Engineering and Environmental Staff
Water and Environmental Programs

US Fish and Wildlife Service

By:_____ Date:_____

Lloyd Jones
Project Leader
Audubon National Wildlife Refuge

North Dakota State Historic Preservation Office

By:_____ Date:_____

Merlan E. Paaverud, Jr.
State Historic Preservation Officer

Invited signatory:

Minnkota Power

By:_____Date:_____
[Name and Title of Representative of Applicant]

Tribal concurring parties:

Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation

By: _____Date:_____
[Name and Title of Concurring Party]

Cheyenne River Sioux Tribe

By: _____Date:_____
[Name and Title of Concurring Party]

Mille Lacs Band of Ojibwe

By: _____Date:_____
[Name and Title of Concurring Party]

Northern Cheyenne Nation

By: _____Date:_____
[Name and Title of Concurring Party]

Rosebud Sioux Tribe

By: _____Date:_____
[Name and Title of Concurring Party]

Santee Sioux Nation

By: _____ Date: _____
[Name and Title of Concurring Party]

Sisseton Wahpeton Oyate of the Lake Traverse Reservation

By: _____ Date: _____
[Name and Title of Concurring Party]

Standing Rock Sioux Tribe

By: _____ Date: _____
[Name and Title of Concurring Party]

Upper Sioux Community

By: _____ Date: _____
[Name and Title of Concurring Party]

White Earth Band of Ojibwe

By: _____ Date: _____
[Name and Title of Concurring Party]

Other concurring parties:

Wahpekute

By: _____ Date: _____
[Name and Title of Concurring Party]

Mr. Tim Mentz

By: _____ Date: _____

Mr. Tim Mentz
Member, Standing Rock Sioux Tribe

ATTACHMENT 1

ATTACHMENT 2

ATTACHMENT 3

Methods for Addressing Deeply Buried Archaeological Resources for the Center to Grand Forks 345 kV Transmission Line in North Dakota

In January 2011, Strata Morph Geoexplorations (Strata Morph) prepared an assessment for Minnkota Power Cooperative, Inc. (Minnkota) concerning the potential for deeply buried soil horizons that could possibly hold archaeological resources along the preferred route for the proposed 345 kV transmission line between Center and Grand Forks, North Dakota (Project) (Attachment A; Kolb 2011).

Archaeological sites are, by definition, buried cultural deposits. Over time, soils accumulate and bury artifacts associated with human occupation. In some environments, the overlying deposits can be quite deep. For example, Late Plains Archaic, Early Plains Woodland, Middle Plains Woodland, and Plains Village settlements are characteristically contained within deeply buried soils (paleosols) in the Late Holocene floodplain sediments of the James River Valley in North Dakota (Picha and ~~James~~ Gregg, 1993).

The Strata Morph assessment analyzed the likelihood that particular geologic environments along the preferred route were stable enough to have been occupied by early Americans and that these geologic environments were later buried by soils (sand, silt, loess) deposited by water or wind. A deeply buried surface soil in this context is one that is 50 centimeters or deeper from today's surface. The assessment addressed the entire1000-foot route, and categorized the various environments into high, moderate, and low potential to have preserved, buried soils (paleosols). If present, some of these soils could contain archaeological materials. The Strata Morph geomorphologic assessment is appended to this document.

Strata Morph identified 51 discrete areas along the route that had some potential for buried paleosols (Appendix A). Of these, 12 were ranked as having high potential, 25 ranked as having moderate potential, and 13 ranked as having moderate-to-low potential. Table 1, below, lists the cumulative length of these potential areas. Because of shifts to the design, 15.7 miles of corridor that now fall outside the assessed corridor were not classified. These areas, and others that may result from alignment shifts, will be reassessed as the project proceeds. Most of the corridor has little to no potential for deeply buried surface soils.

Table 1

Geologic Potential	Length (miles)
High	7.0
Moderate	10.4
Moderate - Low	2.3
Low - None	212.4
Outside original assessment area	15.7
Total	247.8

Excavation for transmission structure foundations could potentially adversely affect deeply buried archaeological deposits, if present. Ideally, each proposed structure site would be located in an area previously tested and not containing buried archaeological deposits. Several techniques can be used to identify archaeological deposits that are deeply buried. These include geophysical testing (magnetometry and/or resistivity testing), trenching with backhoes, and auger probing. Each of these techniques can be suitable depending on the situation. However, at this time, it is not feasible to test each location prior to construction because exact structure locations are unknown and because there are large areas along the route that have potential for buried sites Testing with any of the aforementioned methods along a route as large as the proposed Project would be prohibitively expensive and time-consuming. Another factor complicating the issue is that the proposed Project is also constrained by landowners who may be unwilling to have structure locations shift to areas other than those previously agreed to during negotiations with right-of-way agents.

The proposed transmission line structures are to be attached to concrete foundations that could be 7 to 10 feet in diameter, and between 27and 45 feet deep for tangent structures, or 9 to 15 feet in diameter and 45 to 87 feet deep for dead-end structures, depending on soil conditions. Construction will involve excavation for cylindrical foundations done by a large auger. Augering allows the surrounding soils to retain their strength, which prevents the foundation from "tipping over." Traditional archaeological sampling to identify deeply buried sites at the foundation locations would entail large excavations in order to accommodate an investigation. This would require subsequent installation of an engineered backfill. The engineered backfill would require compaction of the soils for the entire depth before augering the foundation; this would require further disruption of any adjacent soils to an even larger area.

Moving a foundation site does not address the problem as there is limited site flexibility, and the same situation may reoccur. Even a relatively small move, such as shifting a foundation 5 feet in any direction, could necessitate a redesign and resultant relocation of several structures in both directions. It is not as simple as just moving one structure 20 feet; it is likely that for any adjustment, 5 structure locations would need to move/adjust. If any of these are already in place, this would create a significant issue in terms of cost and constructability.

Minnkota has already made efforts to identify archaeological sites along the proposed route and is willing to avoid affecting sites if possible. If construction cannot be designed to avoid a site, that site should be evaluated for its eligibility for listing on the National Register of Historic Places. Because of the magnitude of effort that would be required to test every potential deeply buried soil area for archaeological deposits prior to construction, it is proposed that a program

be implemented whereby archaeologists monitor soil augering at each foundation location during construction within the high potential areas to identify and record any historic properties that may be affected.

The North Dakota State Historic Preservation Office (SHPO) already received a copy of a Class I Literature Search for historic properties, and a predictive model for identifying prehistoric archaeological properties, for the transmission line's area of potential effect. Based on the model, survey efforts to find surface and shallowly buried sites have begun. The survey and predictive model are being refined as results are made available. A full Class III Cultural Resources Inventory report will be provided to the Rural Utility Service (RUS), SHPO and consulting parties upon completion. Additionally, as construction nears completion, Minnkota will supply the RUS and SHPO with the results of construction monitoring at the areas identified as having high probability for deeply buried paleosols.

Each auger location will be monitored or evaluated by an archaeological monitor to observe mechanical augering for foundations within high potential areas as shown on figures in Appendix A. (Monitoring would only be required to the depth of the Holocene soils. Augering may proceed without a monitor present if the monitor determines that close examination is not necessary based upon new information and consultation with RUS and SHPO. New information may include previous monitor data, soil characteristics, information provided to or by Minnkota that may require immediate augering, Monitors will examine backdirt and exposed soil profiles to the extent conditions permit. Monitors will have the authority to temporarily stop work if archaeological deposits are discovered, in order to record artifacts and cultural features, and to assess and evaluate the find. The following protocol will be followed:

1. The monitor directs the construction foreman to stop work.
2. The construction foreman secures the area and places the work site into a safe condition.
3. The monitor notifies Minnkota and prepares a memo describing the discovery.
4. Minnkota notifies RUS and SHPO, and provides the memo describing any archaeological resources identified as part of a weekly summary report.
5. The monitor records the discovery by means of field notes, photographs, sketch maps, artifact or feature descriptions, completes a site form, and allows construction to proceed when documentation is complete.

A procedure for addressing unanticipated discoveries and human remains is outlined in the Programmatic Agreement for this Project. As per stipulations in the Programmatic Agreement, Minnkota, RUS, and North Dakota SHPO would be notified of the discovery, which would be carefully recorded and documented in the field pursuant to appropriate state law (North Dakota Century Code § 23-06-27 and administrative rules North Dakota Administrative Code Chapter 40-02-03, "Protection of Prehistoric and Historic Human Burial Sites, Human Remains, and Burial Goods"). Construction would be delayed pending completion of these legal requirements. Archaeological monitors will prepare daily reports to document their activities and observations. Each week the monitor(s) will submit a summary report describing their activities and observations along with any actions taken and their outcome. The report will be submitted to Minnkota who will forward copies to SHPO and RUS.

References

Michael F. Kolb

2011 *Geomorphological Model for Locating Areas with Potential for Deeply Buried Archaeological Deposits along the Center to Grand Forks 345 kV Transmission Line Corridor in North Dakota.* Strata Morph Geoexploration Report of Investigation No. 199. Strata Morph Geoexploration, Inc. Sun Prairie, WI.

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ATTACHMENT 4

Contacts

Rural Utilities Service

Dennis Rankin
Environmental Protection Specialist
1400 Independence Avenue, SW
Washington, D.C. 20250

202-720-1953
202-690-0649 (fax)

dennis.rankin@wdc.usda.gov

Minnkota

John Graves
Minnkota Power Cooperative, Inc.
P.O. Box 13200
Grand Forks, North Dakota 58208-3200

701-795-4221
701-391-3654 (cell)

jgraves@Minnkota.com

Appendix D
Deeply Buried Site Report

GEOMORPHOLOGICAL MODEL FOR LOCATING AREAS WITH POTENTIAL FOR DEEPLY BURIED ARCHAEOLOGICAL DEPOSITS ALONG THE CENTER TO GRAND FORKS 345 KV TRANSMISSION LINE CORRIDOR IN NORTH DAKOTA.

Prepared by:
Michael F. Kolb, Ph.D.
Geomorphologist
Strata Morph Geoexploration, Inc.
1648 Calico Court
Sun Prairie, WI 53590

January 2011

Strata Morph Geoexploration Report of Investigation No. 199

Prepared for
HDR
Minneapolis, Minnesota

INTRODUCTION

Geomorphological modeling of the proposed Center to Grand Forks Transmission Line corridor is focused on the identification and mapping of landforms and/or deposits that may have potential to contain deeply buried (>0.5 m below the modern surface) archaeological deposits. Potential is a qualitative measure of the likelihood that a particular geologic environment will contain archaeological deposits in primary context. During the assessment, archaeological variables (settlement and subsistence patterns for example) are not considered. Rather, three major geomorphic criteria are used when assigning a level of potential: (1) age of the deposits, (2) depositional environment, and (3) post-depositional modifications (Hudak and Hajic 2002). Human occupation within the project area occurred from the Late Pleistocene through Holocene (<14,000 ^{14}C yrs BP). Consequently, sediments deposited during this time span are considered as having chronological potential. Depositional environments most conducive to burying and preserving the primary context of the archaeological assemblage are eolian (dunes, sand sheets, loess sheets), fluvial vertical accretion (floodplains, terraces, alluvial fans), near shore lacustrine, sheet wash colluvium, and mass-wasting off slopes. Post depositional modifications that may disturb the context of the archaeological deposits are pedogenic processes such as bioturbation and shrink-swell in clayey soils, and historic anthropogenic activities such as mining, agriculture, and various construction activities.

The three levels of potential and the criteria for there selection are listed below (modified from Hudak and Hajic 2002, Monaghan et al. 2006, Mayer and McFaul 2008)

> **High Potential:** depositional style yields stratigraphic sequences that are conducive to preserving buried archaeological deposits in primary contexts and with the potential for separation of some of the archaeological components in stacked paleosols or in accretionary deposits with relatively high sedimentation rates.
>
> **Moderate Potential:** (1) depositional style yields stratigraphic sequences that are conducive to preserving buried archaeological deposits but with possible physical modifications to the primary cultural context or; (2) landforms that are likely to have potential for buried archaeological deposits but the stratigraphic contexts of these landforms is unknown or geographically variable.
>
> **Low Potential:** deposits that are too old or too thin to contain buried archaeological deposits in primary context or deposits that accumulated in high-

energy depositional environments, fluvial channels for example, where any contained archaeological deposits are not in primary context.

PREVIOUS RESEARCH

Previous research covers investigations of geologic environments where archaeological deposits may be preserved. In North Dakota most of the deposits of Late Wisconsinan and Holocene age are classified as the Oahe Formation (Clayton et al. 1980). The one exception pointed out by Clayton et al (1980) and relevant here are the early Holocene Lake Agassiz beach deposits that are, because of there grain-size and lack of organics, a part of the Coleharbor Group which underlies the Oahe Formation. The Oahe Formation includes sediment deposited in eolian, fluvial, and lacustrine/paludal depositional environments. The Oahe Formation is subdivided into four members (oldest to youngest): (1) Mallard Island, (2) Aggie Brown, (3) Pick City, and (4) Riverdale (Clayton et al 1980, Clayton and Moran 1976). The Mallard Island Member is Late Wisconsinan in age and tends to occur in areas not glaciated during the Late Wisconsinan and in lacustrine environments (Clayton et al 1976 and 1980). The Aggie Brown Member is Late Wisconsinan through middle Holocene in age and is often marked by the distinctive Leonard Paleosol in eolian depositional environments. The Pick City Member is middle Holocene in age and the Riverdale Member is late Holocene in age (Clayton et al 1980). The Riverdale Member contains the Thompson paleosol in its lower part. Characteristics of the Oahe Formation vary in the different depositional settings in which it occurs with reference to presence and strength of development of paleosols, texture, and fossil content.

Eolian Environments

The eolian deposits of the Oahe Formation consist of relatively well-sorted sand in dunes and sand sheet, and silt (loess) that forms a blanket-type deposit on uplands and high terraces (Clayton et al. 1976). The Oahe Formation is most complete in eolian depositional settings where thick sequences of loess occur. Thick loess sequences are not ubiquitous but are preserved in landscape positions where slopes are less than about 5° (Clayton et al 1976) and on the lee side of ridges (southeast, east and south sides) and in swales and lows on uplands. In general the upland eolian deposits are thickest (1-2 m) along Missouri River valley (and to the west outside of the project corridor) and thin to the east where they are 0.2 to 1 meter thick (see map in Clayton et al. 1976). Dunes occur where there is a sand source especially on outwash plains and in spillways/meltwater stream valleys.

Lacustrine Environments

The Oahe Formation has been documented in lakes, ponds and sloughs especially in central and eastern North Dakota (Clayton et al 1980, Bickley and Clayton 1972). The members above the Mallard Island Member are mostly silt and clay textured, stratified lacustrine deposits that often contain fossils. Water levels in these small basins certainly fluctuated with broad climatic shifts and wet and dry period on a century to decadal scale (Last 1984, Laird et al. 1996, Yansa 1998) causing the shorelines' positions to fluctuate up and down (mini- regressions and transgressions).

Fluvial

River and alluvial fan sediments in the Oahe Formation are stratified channel and overbank deposits that contain weakly developed paleosols (Clayton et al 1980). Most of the exposed river sediment is a part of the Riverdale Member (Clayton et al 1980, Running 1996).

Geoarchaeology

The Oahe Formation is the stratigraphic framework for understanding context where buried archaeological sites may and do occur. A thorough review of geoarchaeological research in North Dakota as well as the historic context of that research is presented by Artz (1995, 2000) Archaeological deposits have been documented in fluvial and eolian members of the Oahe Formation. Geologic contexts of many of these sites are summarized by Artz (1995) with details in the archaeological literature.

METHODS

Four data sets are used to determine the level of potential for landforms in the study area: (1) extant geological and geoarchaeological publications and maps, (2) contour maps (1:24,000 scale), (3) NRCS soil maps on Web Soil Survey (USDA nd), and (4) aerial photographs.

Data sources have some limitations when applied to locating buried archaeological deposits and especially when trying to assess the potential conditions of the archaeological record at a particular locality. Surficial geology map units are small-scale making them limited at the scale of archaeological phenomena but do provide a broad landscape context for understanding landforms and deposits. Soil maps are larger scale but still too small scale to capture detail in many of the depositional settings where buried archaeological sites may occur. Soil mapping is based on the idea of a type soil (soil series) that is tied to a landscape segment and parent

material defined at the type section. The soil is then mapped by essentially extrapolating to similar landscape segments over a large area with minimal field verification (Soil Survey Staff 1951, see Holliday 2004, p. 57 for limitations of soil surveys for soil-stratigraphic studies). However, soil maps, especially when used with topographic maps, are a widespread and relatively accurate proxy for determining depositional environments that is critical in predicting the potential for buried archaeological deposits.

Landforms and deposits that have potential to contain buried archaeological deposits are not all equally "visible" using the above non-field techniques of identification. Landforms with high visibility have distinctive well-defined morphology and soil types, and therefore can be plotted relatively accurately using maps and aerial photographs. These include river valley bottoms and associated macro-landforms (terraces and channel belts for example), dune fields, alluvial fans, and colluvial slopes.

Landforms with moderate visibility have poorly defined morphology with multiple soil series and/or are too small to be captured in the soil mapping and therefore their boundaries will be gradational because the geologic phenomena is gradational or because the topographic-soils-aerial photo data resolution is too low. These include isolated low dunes, vertical accretion tributary alluvium, some meso-scale alluvial landforms on low terraces and floodplains. Field observations and probably subsurface investigation would be necessary to more accurately delineate the landform boundaries at an archaeological scale of investigation.

Landforms with low visibility have almost no morphological expression and are not visible on soil maps due to their generic parent material or small size. The existence of these landforms/deposits has been noted by other researchers based on field investigations and may or may not be geographically extensive. These are the loess sheets and sand sheets.

The first step in the process of mapping the potential for buried archaeological deposits is to examine the extant literature and determine (1) the context of known buried archaeological deposits, and, where possible, (2) the nature and location of Late Pleistocene and Holocene landforms. The second step uses soil maps/aerial photos and 1:24,000 scale topographic maps to determine where along the corridor landforms with potential for buried archaeological sites are located. This is an iterative process that involved finding landforms on topographic maps, such

as stream valleys or paleoshorelines, checking the soil types in those areas, then delineating the portion of the landscape where potential for deeply buried sites occurs.

Each landform will be assigned a level of potential for the presence of buried archaeological sites using the context of known buried sites and reconstructions from the literature of Holocene and late Pleistocene depositional environments and stratigraphic sequences.

The third step is to plot localities with high and moderate potential for buried archaeological deposits within the 1000 ft wide study corridor on 1:24,000 topographic maps. Landforms are determined by morphology as expressed on the topographic maps and by the distribution of soil series associated with those landforms and are listed in Table 1. Tonal changes on aerial photos will also be used to aid in the placement of landform boundaries.

RESULTS

The proposed transmission line corridor crosses North Dakota west to east from the older glaciated terrain of the Missouri Plateau near Center, across the Missouri River valley, then across the Late Wisconsinan glacial deposits on the Missouri Coteau and in the lowlands to the east, and then across the abandoned basin of Lake Agassiz to Grand Forks. Due to differences in age and the dominant geologic processes the landscapes these different physiographic regions are very different.

Localities with high, moderate, and moderate to low potential for deeply buried archaeological deposits are plotted on the 1:24,000 scale maps provided by the client (see Appendix B). These potentials are also shown in table form in Appendix A. Low potential localities were eliminated during the first pass through the data.

Eolian Landforms and Depositional Environments

Three eolian landforms occur in the project corridor: (1) loess blankets, (2) dunes, and (3) sand sheets. Loess blankets and sand sheets have very subtle morphological expression making them difficult to delineate on 1:24,000 topographic maps. Boundaries must be estimated from geologic maps and soil maps. Loess occurs in varying thicknesses along the entire corridor due to differential preservation. As stated earlier the thicker loess occurs near the Missouri River valley on slopes of less than 5° and on the lees side of ridges and in saddles and swales in

uplands. Well-developed paleosols occur in the thicker sequences indicating prolonged periods of geomorphic stability. Paleosols have high potential for buried archaeological deposits. In the thinner loess deposits paleosols soils may be welded with the surface soils creating a thick dark upper solum that also may contain buried archaeological deposits.

Dunes have a distinctive morphological expression especially if they occur in dune fields. Sand sheets do not have a distinct morphology but can often be detected by the soil type present. Geomorphic stability of sandy deposits is dependent on a number of geomorphic variables that are often tied to climate and land-use through their effects on vegetative cover.

Fluvial Landforms and Depositional Environments

Fluvial landforms are channel belts, floodplains, alluvial terraces, meltwater stream terraces and alluvial fans. In the lower order streams channel belts, floodplains, and low terraces cannot be separated using the data at hand so are referred to as valley bottoms. These landforms can likely be differentiated in the field. Small alluvial fans also cannot necessarily be delineated with the data at hand but they are assumed (for the purpose of this report) to be present at the mouths of tributary valleys along valley margins. These areas should be deep tested. Larger fans are visible on the 1:24,000 scale maps and do contain buried sites in fluvial and other depositional contexts (Running 1996).

Lacustrine Landforms and Depositional Environments

Two lacustrine geomorphic settings with potential for deeply buried archaeological deposits are present within the transmission line corridor: (1) shoreline zones around small lakes, ponds, and sloughs of glacial origin, and (2) shoreline complexes formed in proglacial Lake Agassiz. Small inland water bodies are resource loci that are utilized by human populations. Water levels in these lakes have fluctuated over the time span of the Holocene creating a shoreline zone where transgressions and regressions have occurred. Archaeological sites in the shoreline zone associated with low water can be buried and preserved during periods of high water. Intensive review of paleoenvironmental studies of lakes in the northern plains would likely provide data on the width of the active shoreline zone in different types of lakes.

Lake Agassiz was established in the southern end of the basin during the Cass and Lockhart Phases between 11,600 and 11,000 BP at which time its outlet was to the south through River Warren (Minnesota River valley) (Teller 1985). Beaches crossed by the transmission line

corridor formed during this time period. During the Moorehead Phase (11,000 and 9900 BP) the retreat of the glacial ice opened outlets to the east causing water levels drop precipitously exposing the former lake bottom to subaerial processes including soil formation and possibly human settlement. A re-advance of the glacier during the Emerson Phase (9900-9500 BP) cause water levels to rise in the southern part of the basin and the outlet again became the River Warren. During this time the lower beaches crossed by the transmission line corridor were formed. Archaeological deposits could be buried at these shoreline locations by nearshore lacustrine processes when Lake Agassiz was present or after the shorelines were abandoned by eolian or fluvial processes.

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Appendix A

Deep Test Locality Soil and Geomorphic Data

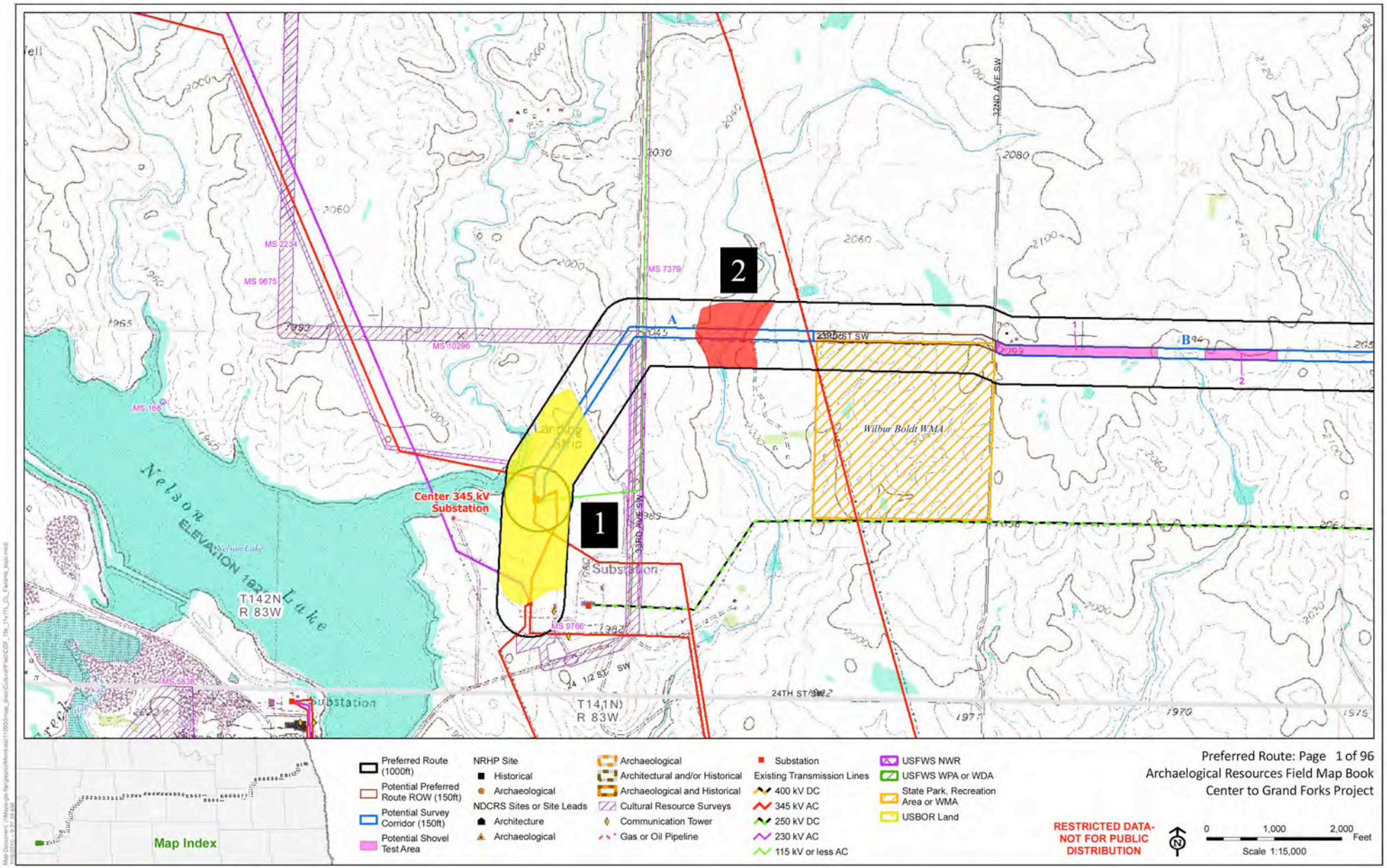
Locality #	Locality Name	HDR Page #	Landform	Soil Series	Deposits	Geologic Potential
1	Nelson Lake	1	terace & alluvial fans	Arnegard, Williams	alluvium & till	moderate
2	Intermittent Stream 1	1	valley bottom	Belfield, Daglum	allivium	moderate - low
3	Missouri River Trib 1	4	alluvial fans/valley margin & valley bottom	Straw, Arnegard	alluvium	moderate
4	Sherk Creek	4 & 5	valley bottom & alluvial fans	Regan, Straw	alluvium	high
5	Missouri River Trib 2	4	valley bottom, alluvial fans, terrace	Lehr, Straw, Arnegard	alluvium	high
6	Missouri River N	5	channel belt, floodplain & terraces	Havrelon, Mandan	alluvium	high
7	Missouri River S	5	alluvial fan, channel belt, floodplain & terraces	Havrelon, Harriet	alluvium	high
8	Missouri River East Uplands	6,7 & 8	valley bottoms & uplands with < 5° slopes	Temvik, Linton, Mandan and others	loess & alluvial	moderate
9	Intermittent Stream 2	7	valley bottom & alluvial fan	Temvik, Arnegard	alluvium	moderate
10	Yanktonai Lake	9	valley bottom, high terrace and upland	Temvik, Harriet, Rhodes Complex	alluvium & loess	moderate
11	Yanktonai Creek	9	valley bottom & high terrace	Harriet	alluvial & loess	moderate
12	Grass Lake Inlet	13	valley bottom	Heil, Arnegard	alluvial	moderate
13	Painted Woods Creek	14 & 15	valley bottom	Harriet, Grail, Arnegard	eoilan & alluvial	moderate
14	ephemeral stream/wetland	26	lake edge & alluvail fan	Southham	lacustrine/colluvial & alluvial	moderate
15	Mertz Slough Shoreline & Inlet	32	lake edge & valley bottom	Parnell	lacustrine & alluvial	moderate
16	James River 1	38	valley bottom, dunes & high terraces	Lowe, Egeland, Embden, Arvilla	alluvial & eolian	high
17	Alluvial Fan	40	alluvial fan	Emrick, Larson	alluvium	moderate
18	Rosefield Slough 1	48	valley bottom	Lowe	alluvial	moderate-low
19	Rosefield Slough 2	48	valley bottom & margin (dammed lake)	Lowe & Hecia	(dammed lake) alluvial & eolian	moderate - low
20	Rocky Run 1	49	valley bottom	Lowe	alluvial	moderate to low

21	Rocky Run 2	50	valley bottom	Lowe	alluvial	moderate to low
22	Rocky Run 3	50	valley bottom	Lowe	alluvial	moderate to low
23	Trib James River	52	valley bottom	Lowe	alluvial	moderate
24	James River 2	52	channel belt, floodplain terrace, alluvial fan	Ludden, La Prairie	alluvium	high
25	Intermittent Stream3	55	valley bottom	Lowe	alluvial	moderate to low
26	Intermittent Stream 4	56	valley bottom & dunes ?	Lowe, Hecia, Towner	alluvial & eolian	moderate
27	Spillway Wetland	57	valley bottom/lake	Southham	alluvial & lacustrine	moderate
28	Baldhill Ceek	64	valley bottom	Lowe	alluvial	moderate to low
29	Spillway Wetland	66	abandoned lake & alluvial fans?	Southham	alluvial & lacustrine	moderate
30	Lake Norway	67	lake/shorelines	NA	lacustrine	moderate to low
31	Trib Sheyenne River	70	high terrace & valley bottom	Walsh, Swenoda, Barnes, Embden, Dicky	alluvial & eolian	moderate
32	Sheyenne River S	70	high terrace, floodplain, channel belt & alluvail fans	LaDelle, Ludden, Walsh	alluvial	high
33	Sheyenne River N	71	high terrace, floodplain, channel belt	LaDelle, Ryan, Ludden	alluvial	high
34	Pickeral Lake Creek	72	valley bottom	Lowe	alluvial	moderate to low
35	Goose Creek	80	valley bottom	Lowe	alluvial	moderate to low
36	Spring Creek 1	82	valley bottom	Lowe	alluvial	moderate to low
37	Spring Creek 2	81	valley bottom	Lowe	alluvial	moderate to low
38	Lake Aggassiz Shoreline	83 & 84	paleoshoreline	Antler, Renshaw, Divide, Colvin	nearshore lacustrine, eolian	moderate
39	Goose River	84	valley bottom	LaDella, Zell	alluvial	high
40	Little Goose River	84	valley bottom	LaDella, Lamoure	alluvial	high
41	L. Agassiz shoreline	87	paleoshoreline	Wyndmere, Hecia, Maddlock, Bearden, Antler, Renshaw, Divide, Covin	nearshore lacustrine, eolian	moderate

42	L. Agassiz Shoreline N	88	paleoshoreline	Hecia, Maddock, Hamar, Marysland, Arvilla, Tiffany	nearshore lacustrine, eolian	moderte
43	L. Agassiz Shoreline S	88	paleoshoreline	Hecia, Maddock, Hamar, Marysland, Arvilla, Tiffany	nearshore lacustrine, eolian	moderate
44	EnglishCouleer/Lake Agassiz Shoreline Complex	89	paleoshoreline & valley bottom	Towner, Marysland, Arvilla, Antler, Velva	alluvial, eolian and near shore lacustrine	high
45	L. Agassiz Shoreline/English Coulee	90	valley bottom & paleoshorelne	Arvilla, Antler, Rockwell, Gilby, Sioux	alluvial and near shore lacustrine	high
46	L. Agassiz Shoreline/ English Coulee trib	90	valley bottom & paleoshorelne	Arvilla, Antler, Rauville	alluvial and near shore lacustrine	moderate
47	Lake Agassiz Shoreline	91	paleoshoreline	Arvilla, Embden, Antler	near shore lacustrine	
48	English Coulee Trib	92	valley bottom & upland margin	Ojata, Zell-La Delle, Renshaw	alluvial	moderate
49	Intermittent stream/paleochannel	94	valley bottom & upland margin	Bearden, Lallie	alluvial	moderate
50	English Coulee Ditch	95	valley bottom & upland margin	Bearden, Ojata	alluvial	moderate

Appendix B

Location of Deep Test Localities on 1:24,000 Topographic Maps

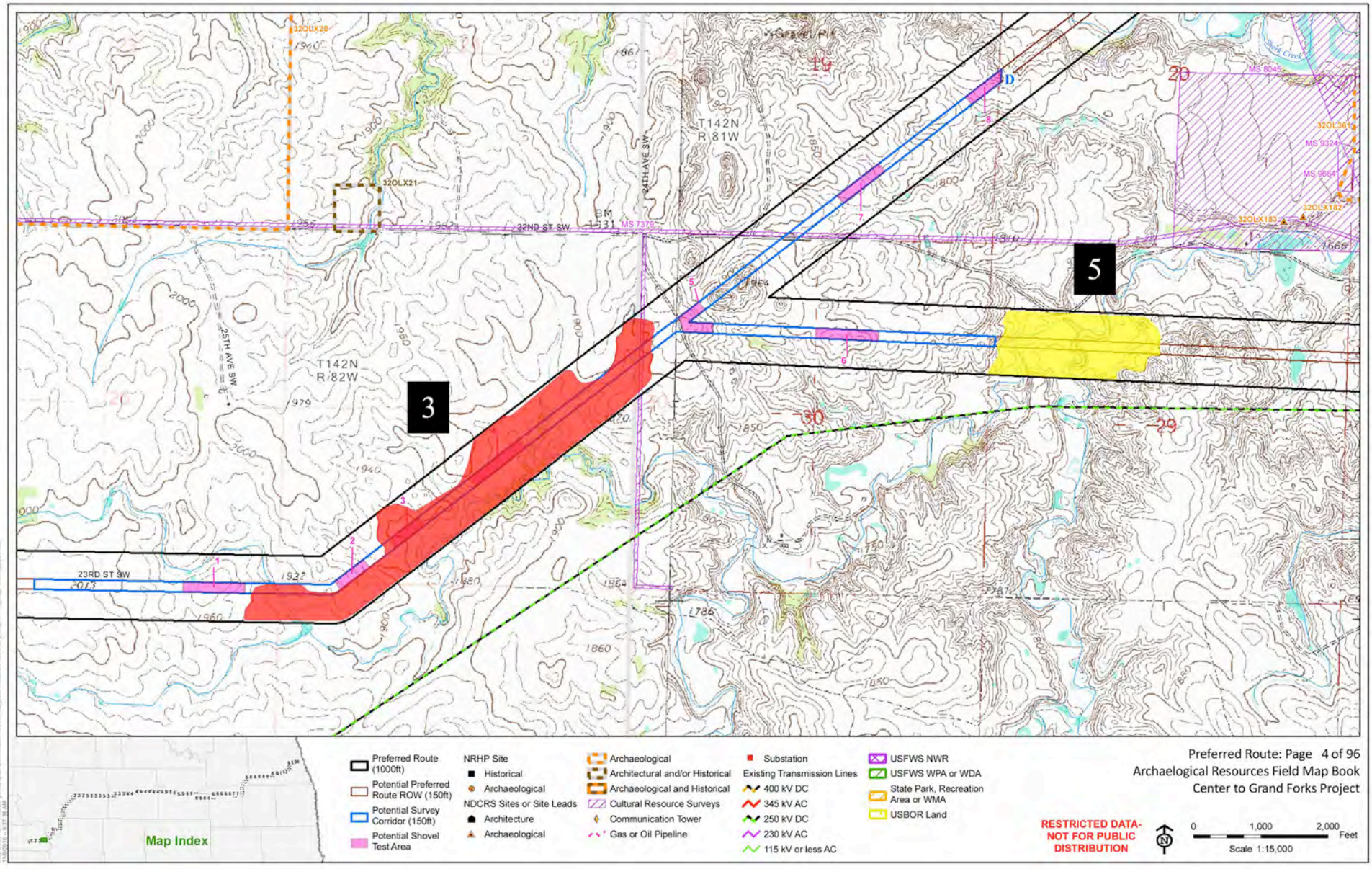


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Center to Grand Forks Project

High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential

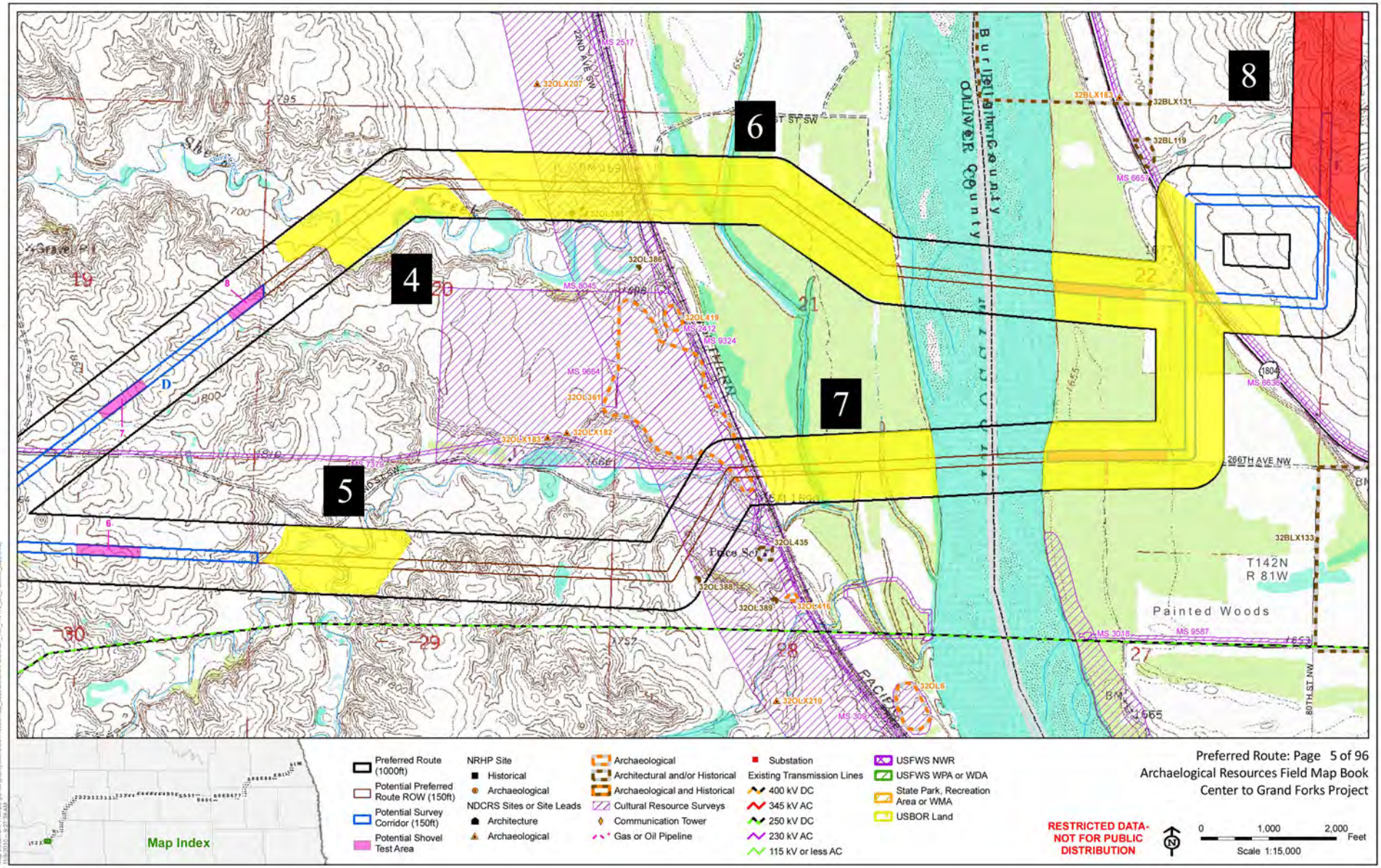


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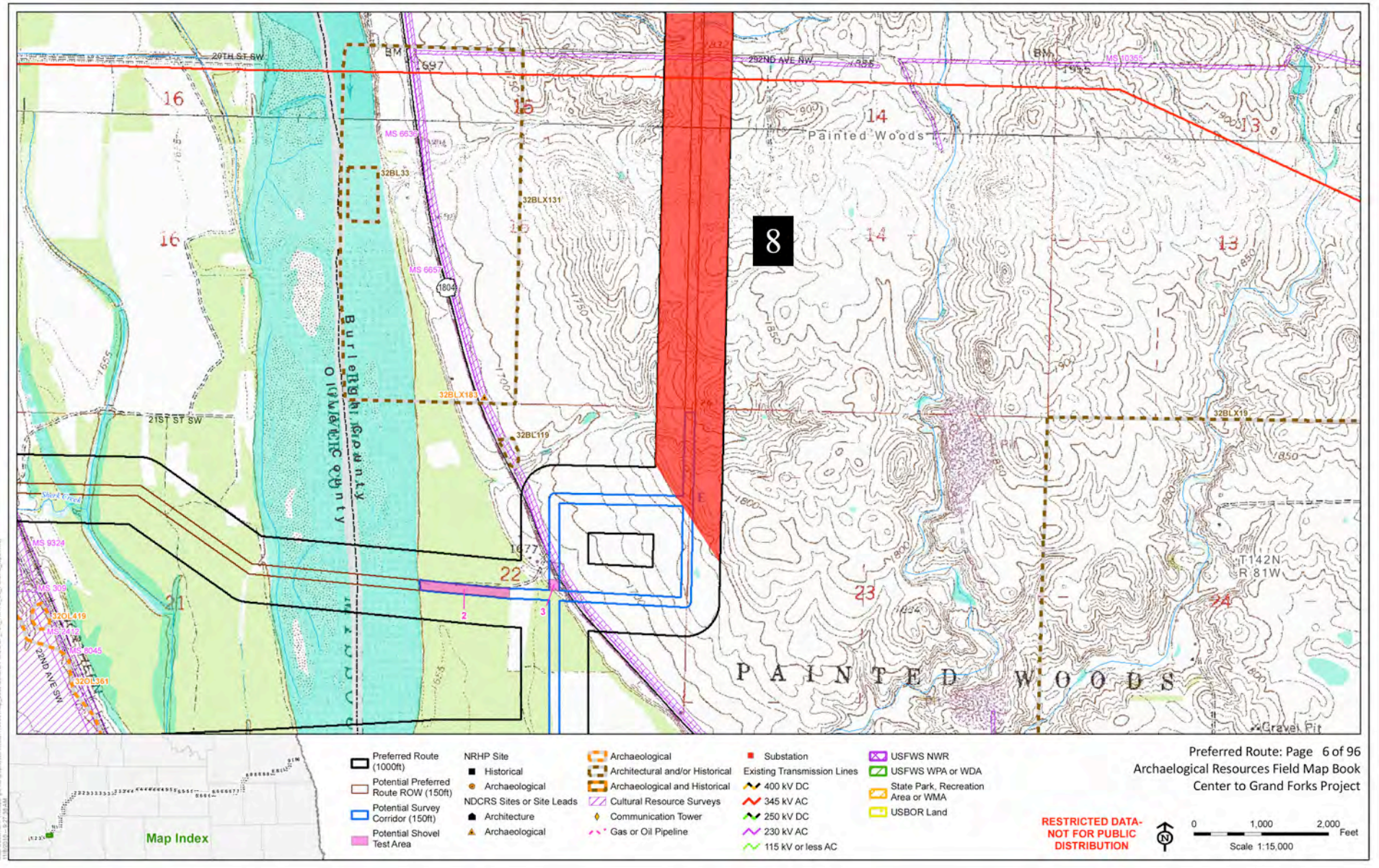
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High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential

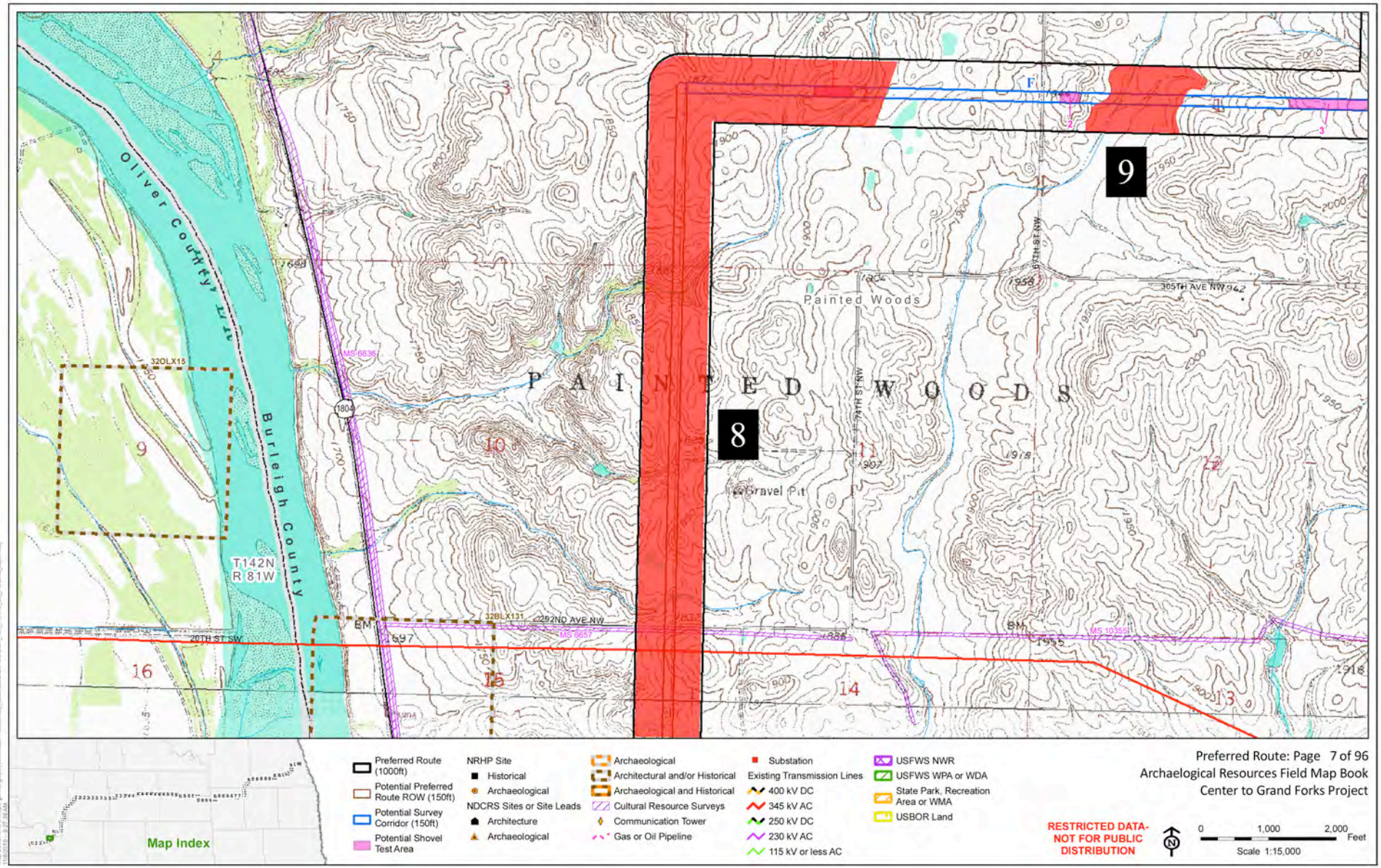


Preferred Route: Page 6 of 96
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Center to Grand Forks Project

High Geologic Potential

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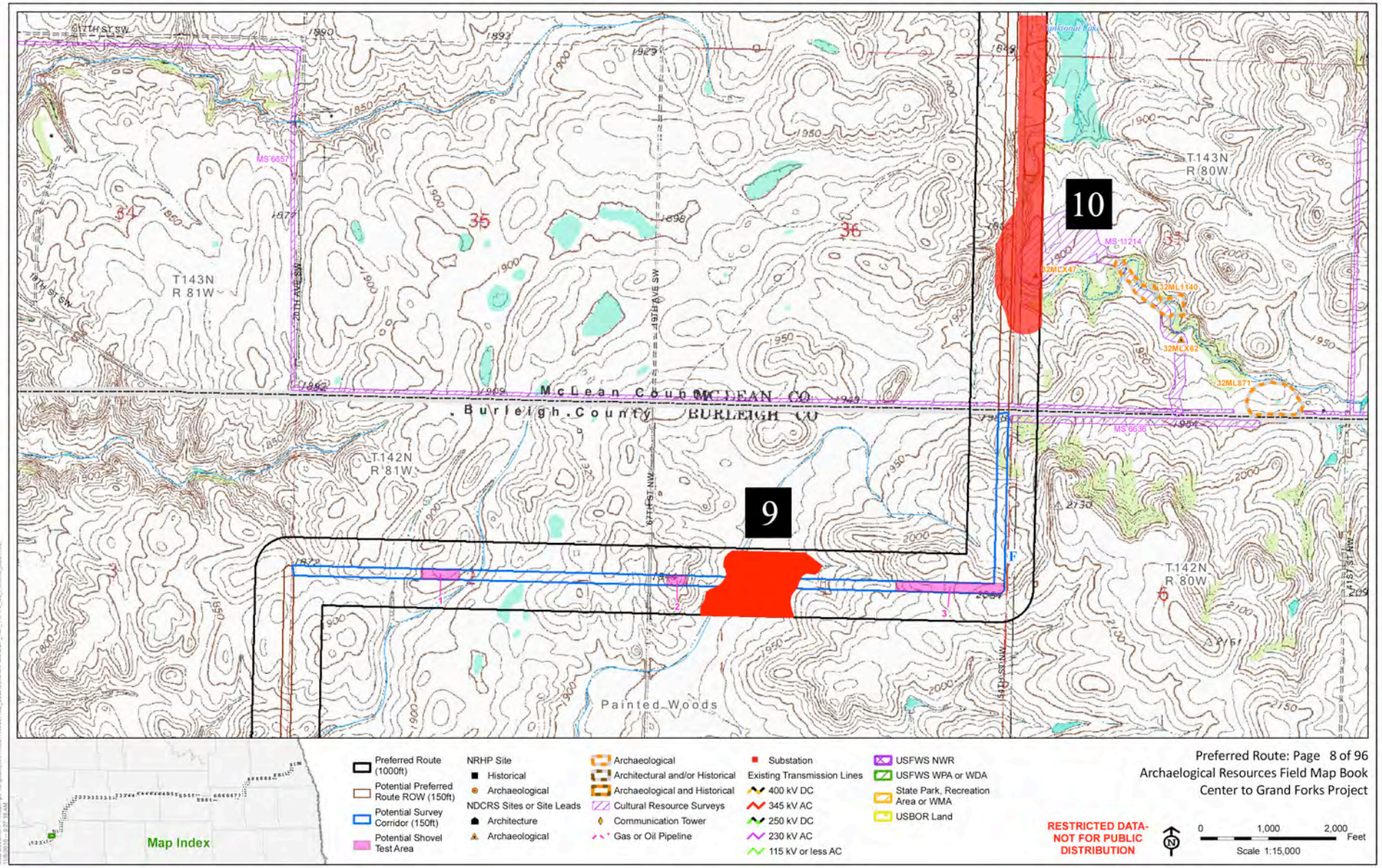


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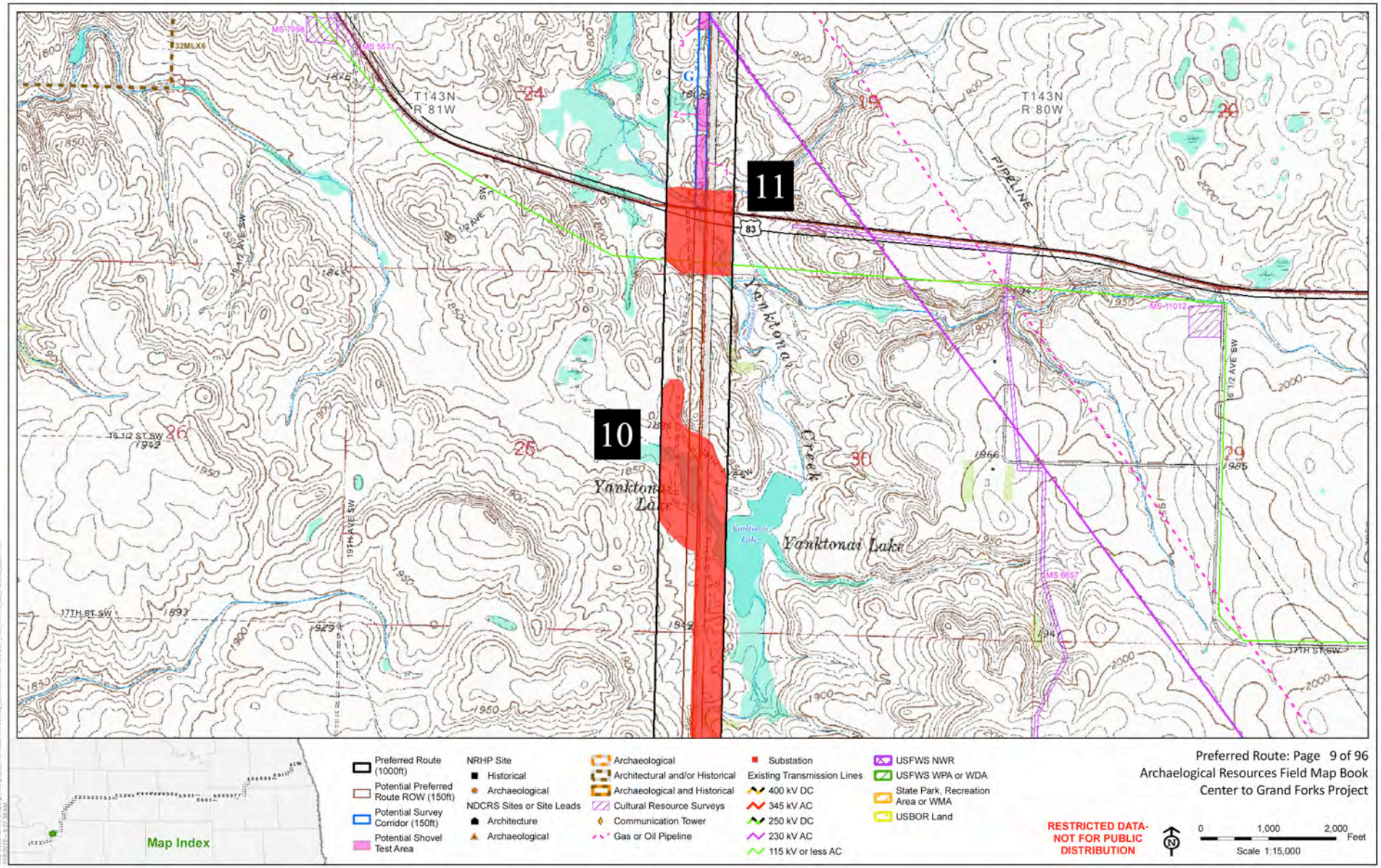


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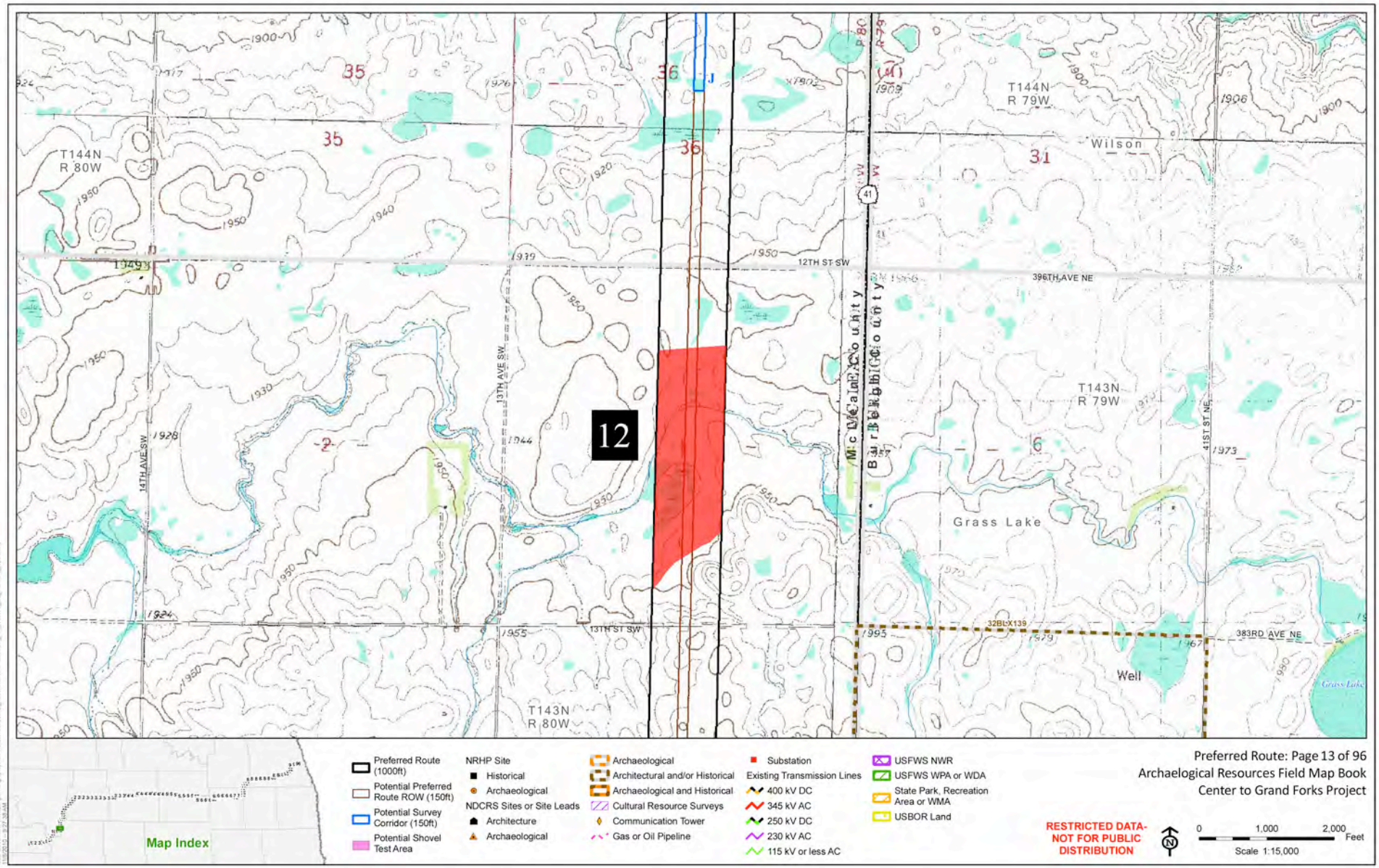


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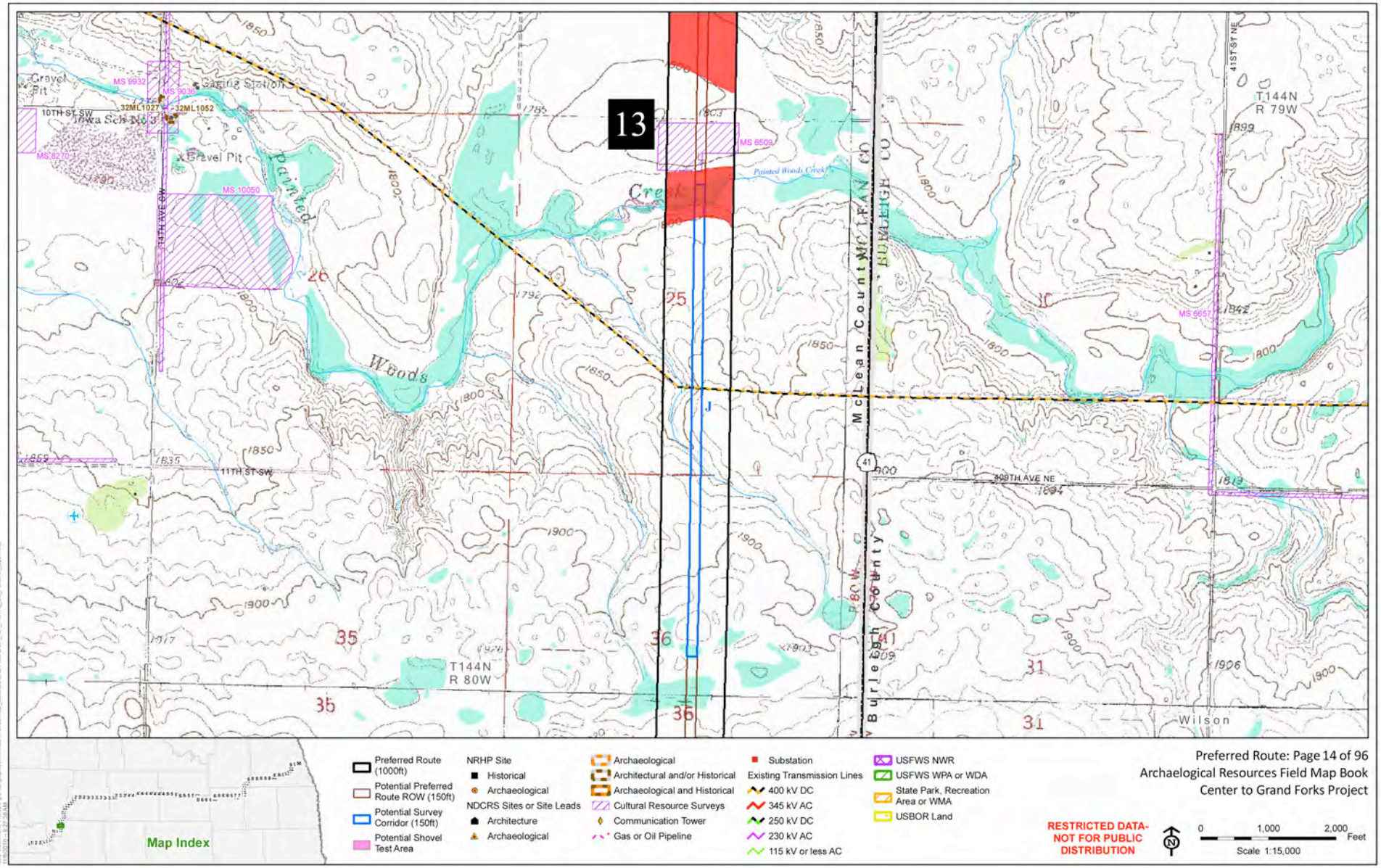
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High Geologic Potential

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Moderate - Low Geologic Potential

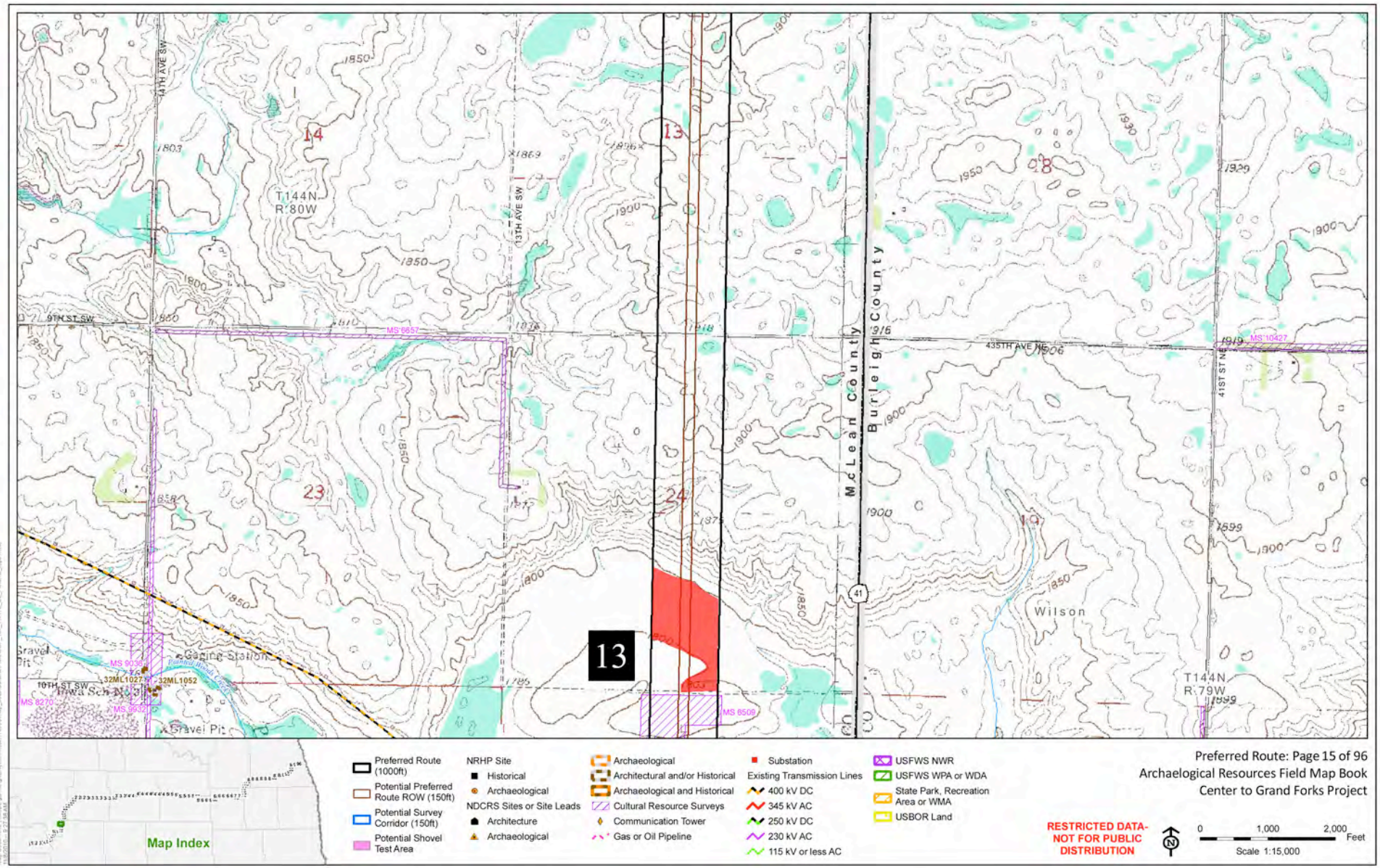


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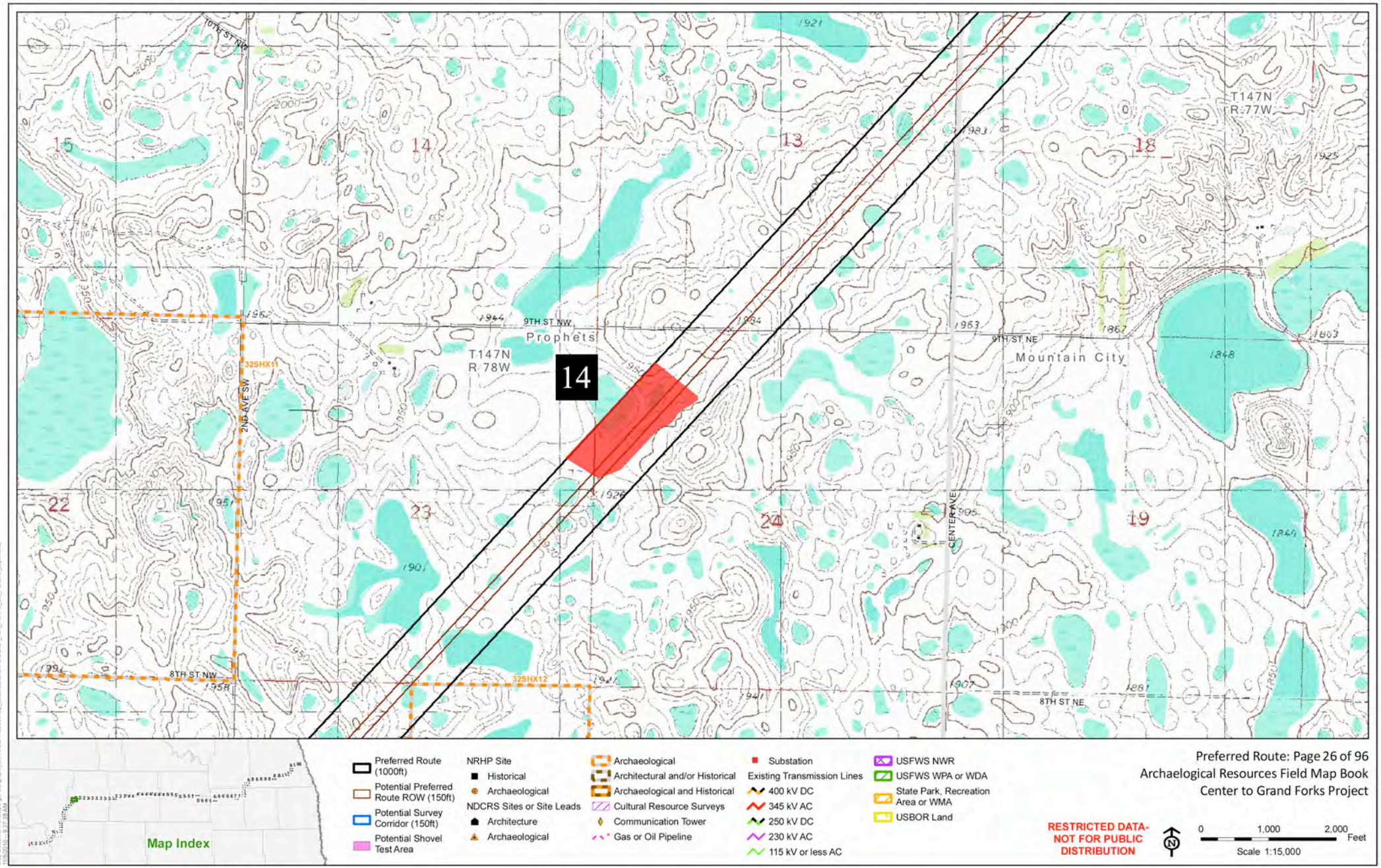
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High Geologic Potential

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Moderate - Low Geologic Potential

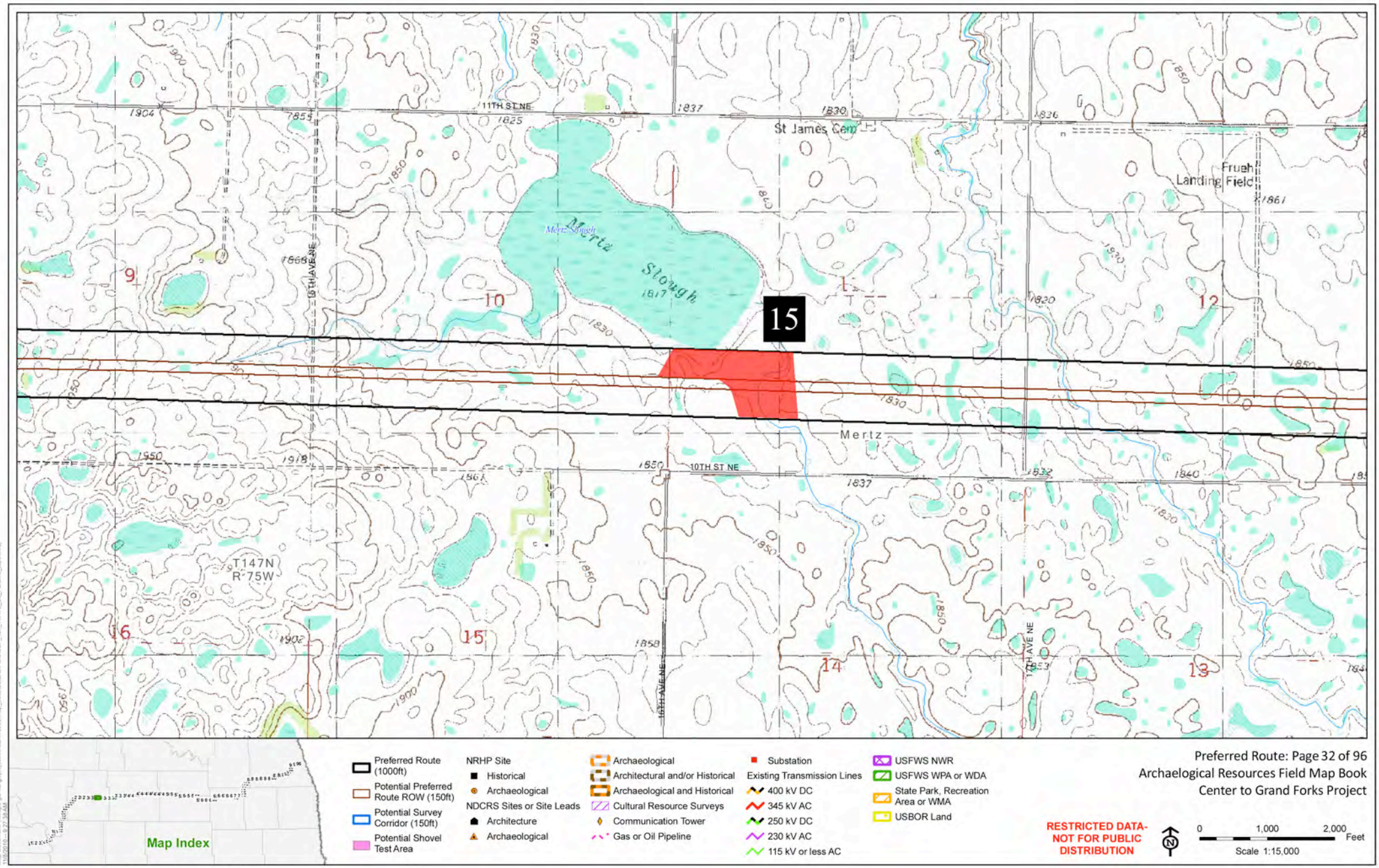


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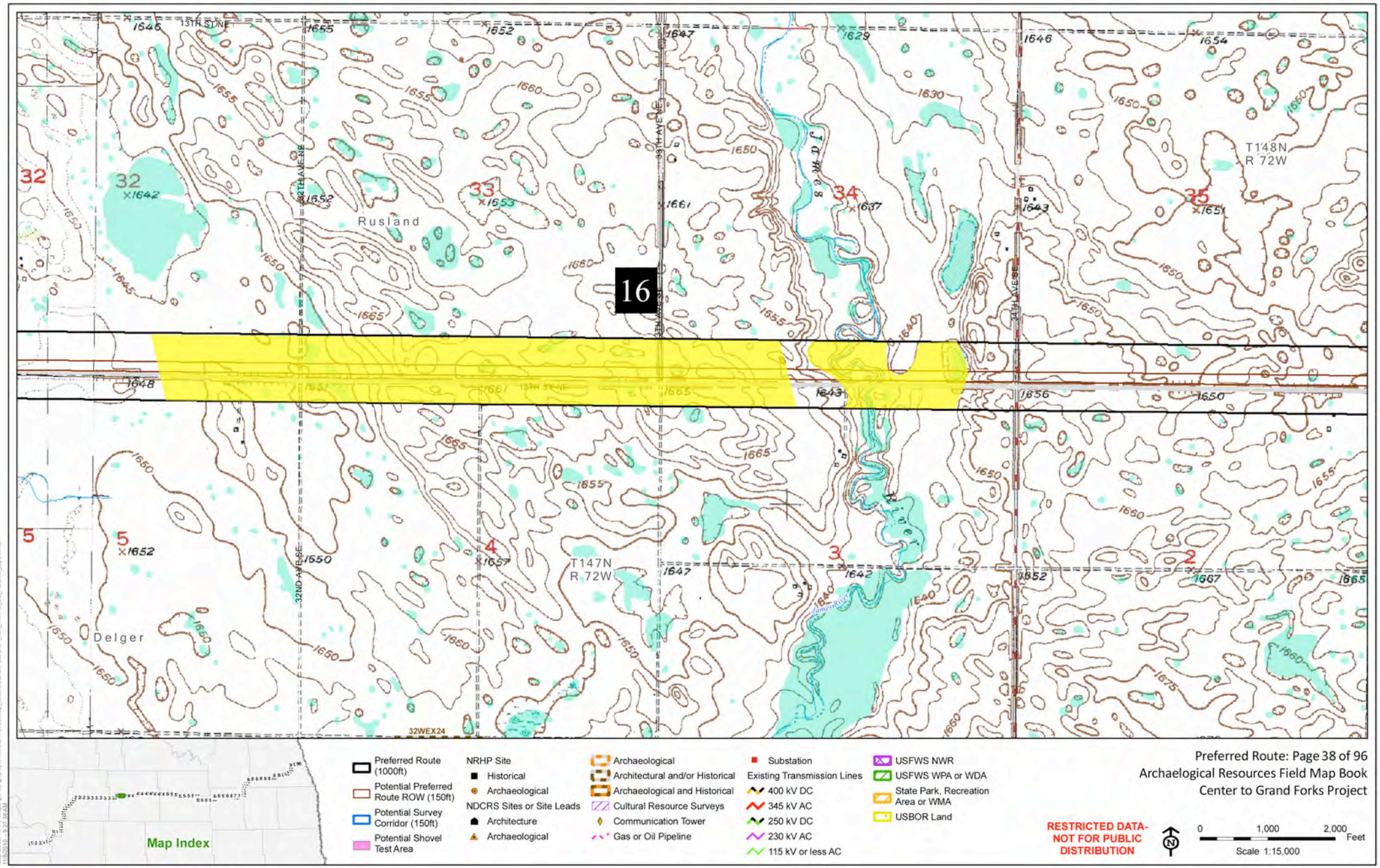


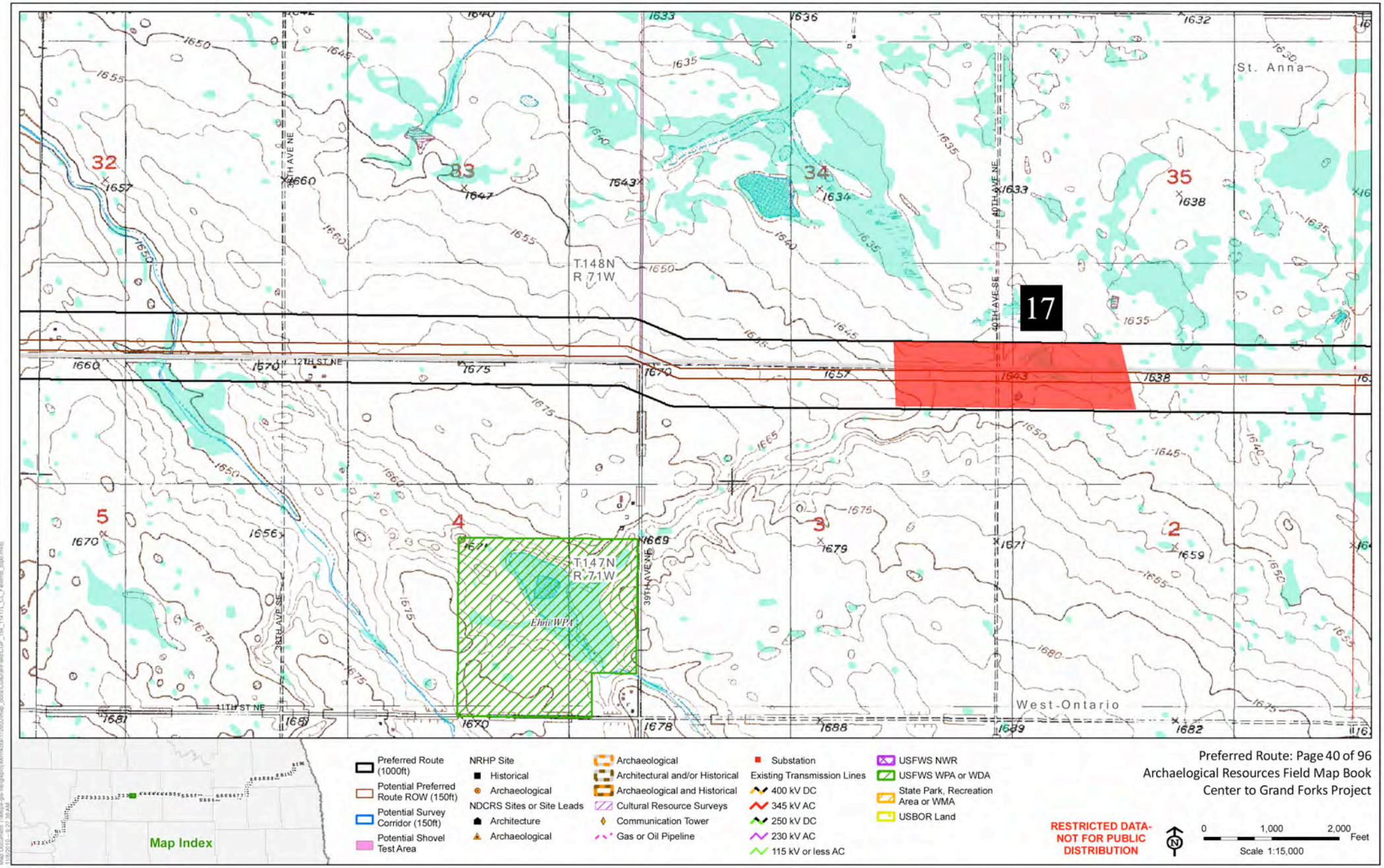
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High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential

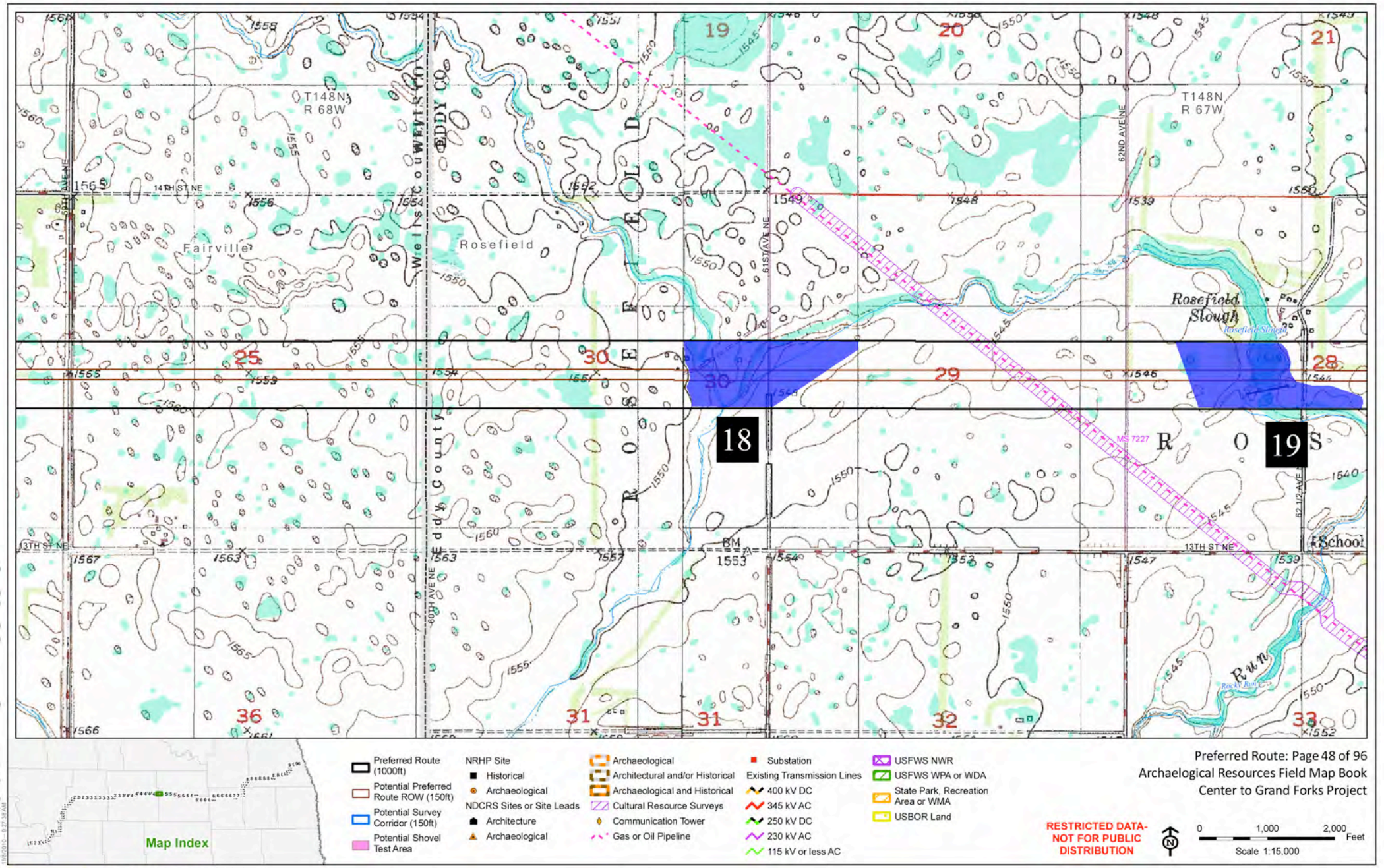

Rusland
Delger
T148N
R 72W
T147N
R 72W
16
32
33
34
35
5
4
3
2
32WEX24
Preferred Route (1000ft)
Potential Preferred Route ROW (150ft)
Potential Survey Corridor (150ft)
Potential Shovel Test Area
NRHP Site
Historical
Archaeological
NDCRS Sites or Site Leads
Architecture
Archaeological
Archaeological
Architectural and/or Historical
Archaeological and Historical
Cultural Resource Surveys
Communication Tower
Gas or Oil Pipeline
Substation
Existing Transmission Lines
400 kV DC
345 kV AC
250 kV DC
230 kV AC
115 kV or less AC
USFWS NWR
USFWS WPA or WDA
State Park, Recreation Area or WMA
USBOR Land
Map Index
Preferred Route: Page 38 of 96
Archaeological Resources Field Map Book
Center to Grand Forks Project
RESTRICTED DATA- NOT FOR PUBLIC DISTRIBUTION
0 1,000 2,000 Feet
Scale 1:15,000
High Geologic Potential
Moderate Geologic Potential
Moderate - Low Geologic Potential



High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential



Map Index

- Preferred Route (1000ft)
- Potential Preferred Route ROW (150ft)
- Potential Survey Corridor (150ft)
- Potential Shovel Test Area

NRHP Site
- Historical
- Archaeological

NDCRS Sites or Site Leads
- Architecture
- Archaeological

- Archaeological
- Architectural and/or Historical
- Archaeological and Historical
- Cultural Resource Surveys
- Communication Tower
- Gas or Oil Pipeline

- Substation

Existing Transmission Lines
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- 230 kV AC
- 115 kV or less AC

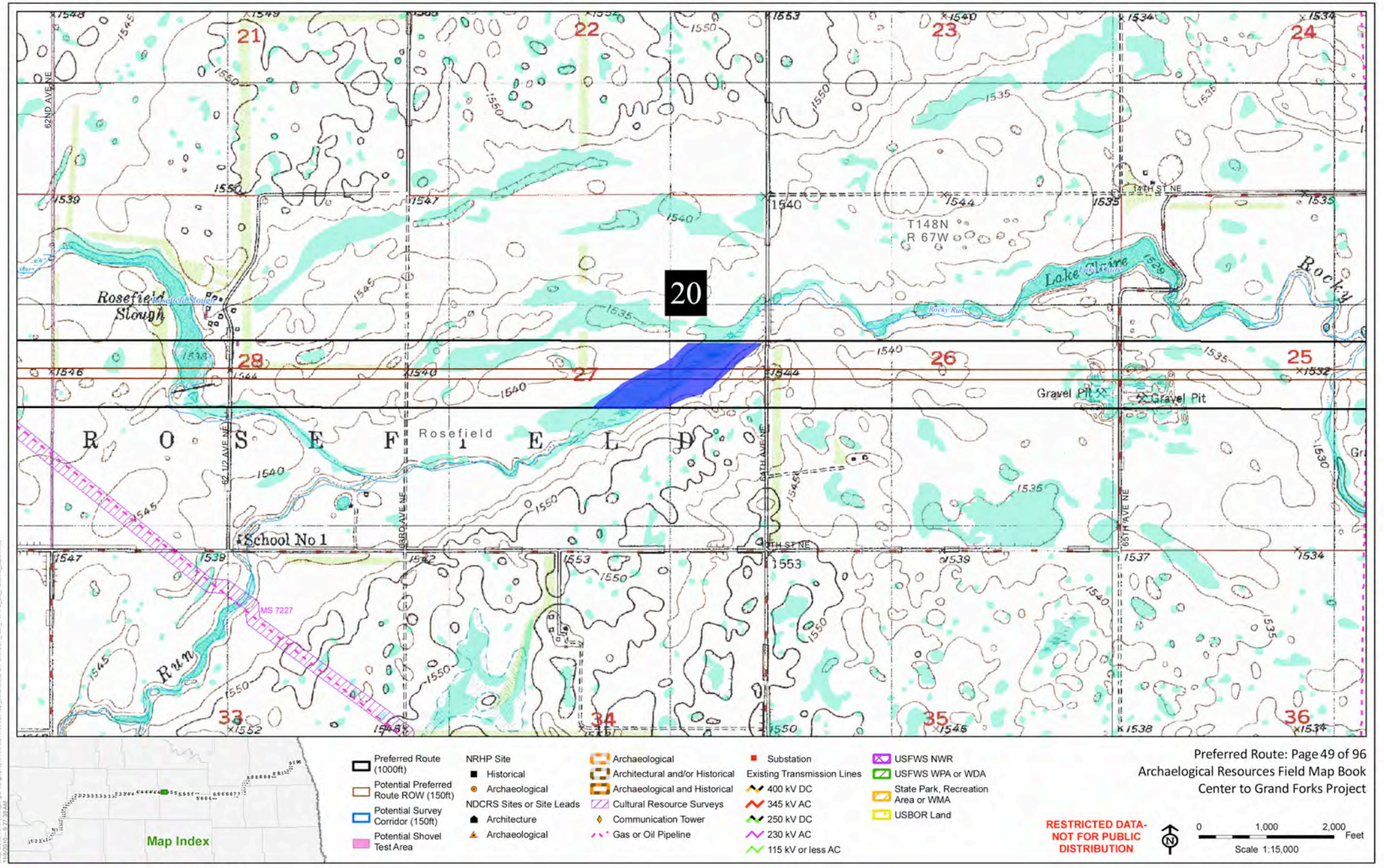
- USFWS NWR
- USFWS WPA or WDA
- State Park, Recreation Area or WMA
- USBOR Land

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Archaeological Resources Field Map Book
Center to Grand Forks Project

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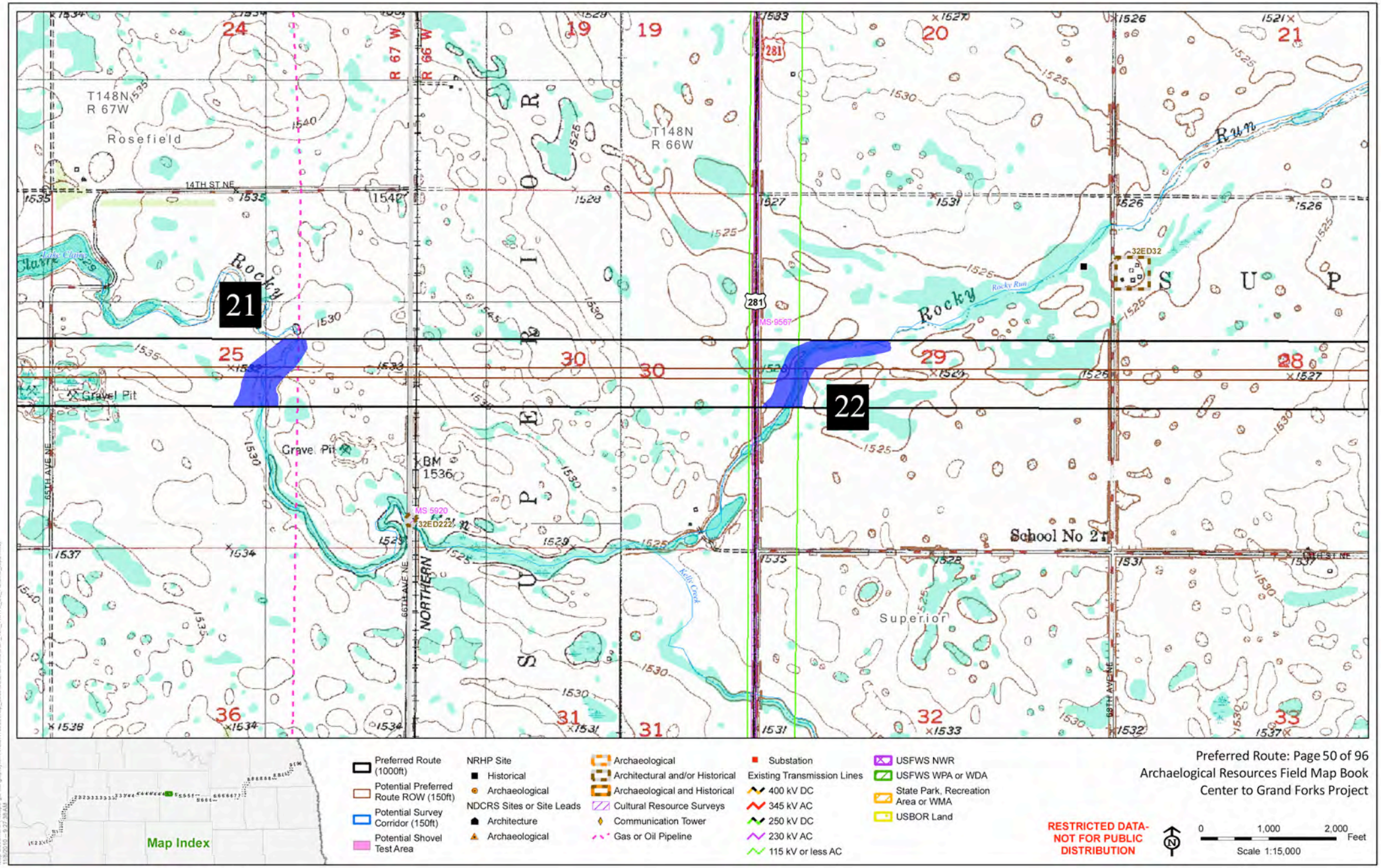
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- Moderate - Low Geologic Potential

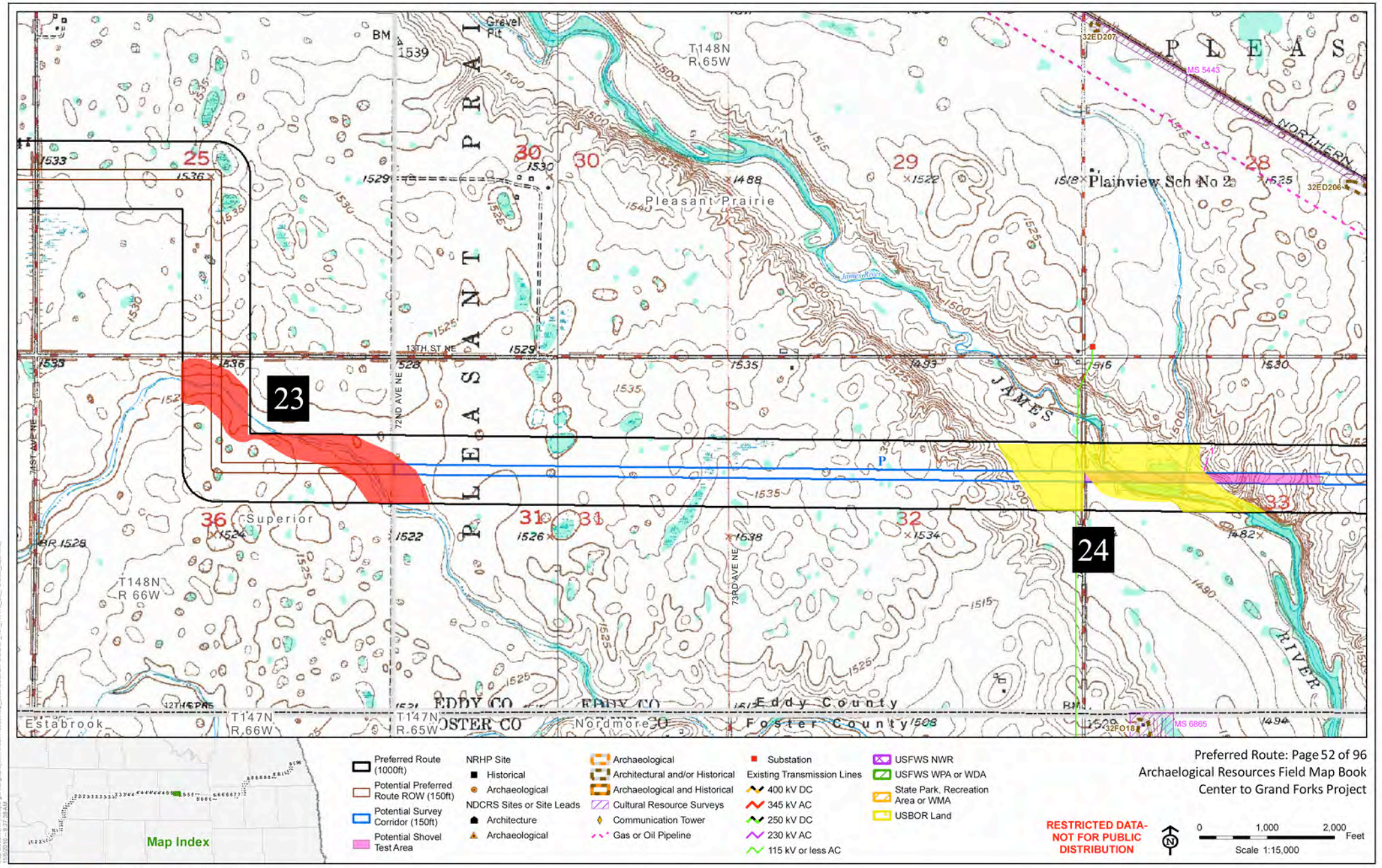


High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential


T148N
R 67W
Rosefield
T148N
R 66W
14TH ST NE
Rocky
Rocky Run
21
22
25
30
29
28
36
31
32
33
Gravel Pit
Grave Pit
BM
1536
MS 5920
32ED222
MS-9567
32ED32
65TH AVE NE
66TH AVE NE
68TH AVE NE
NORTHERN
PACIFIC
R 67 W
R 66 W
281
School No 21
Superior
Kelly Creek
Map Index
Preferred Route (1000ft)
Potential Preferred Route ROW (150ft)
Potential Survey Corridor (150ft)
Potential Shovel Test Area
NRHP Site
Historical
Archaeological
NDCRS Sites or Site Leads
Architecture
Archaeological
Archaeological
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400 kV DC
345 kV AC
250 kV DC
230 kV AC
115 kV or less AC
USFWS NWR
USFWS WPA or WDA
State Park, Recreation Area or WMA
USBOR Land
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Moderate - Low Geologic Potential

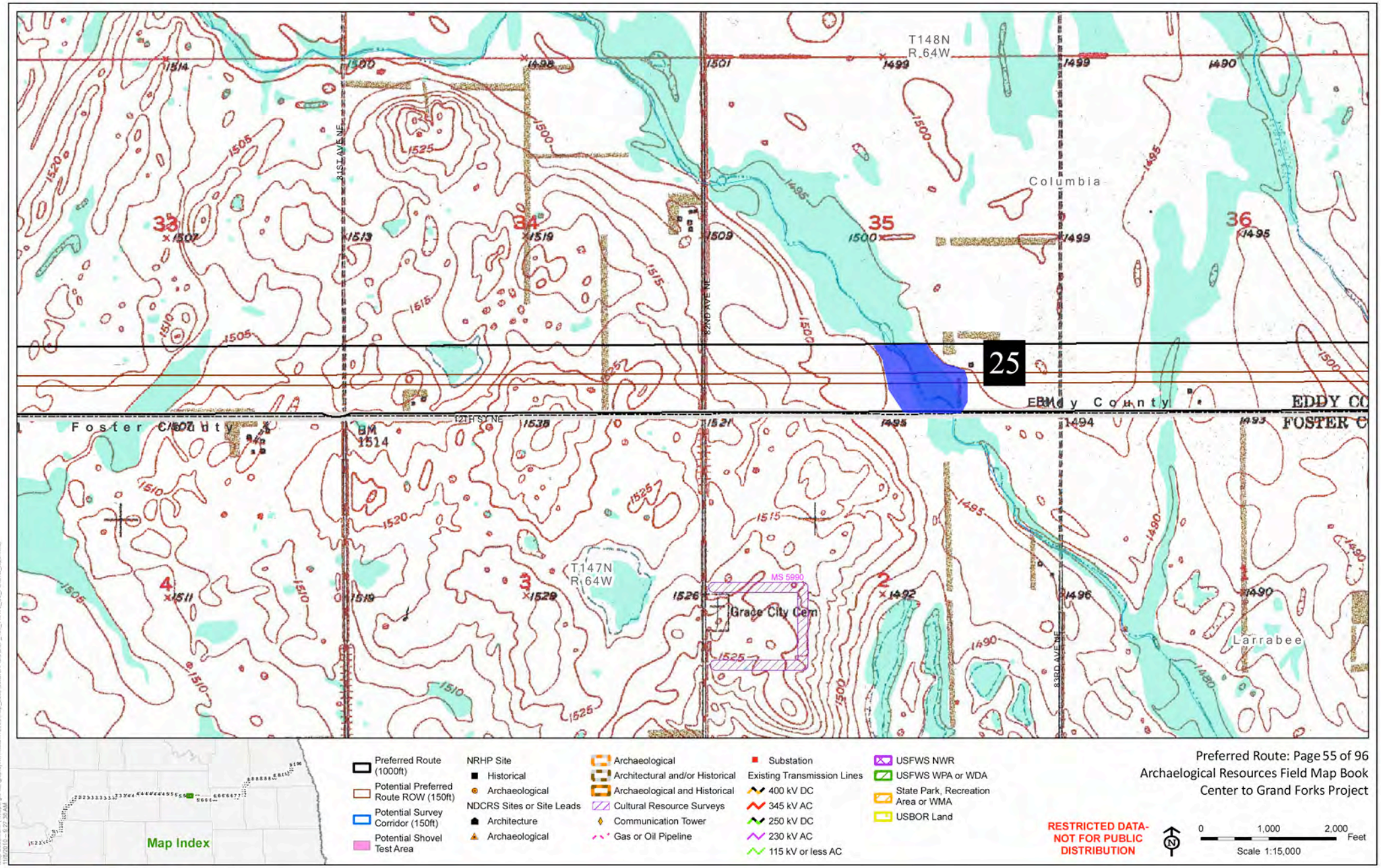


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High Geologic Potential

Moderate Geologic Potential

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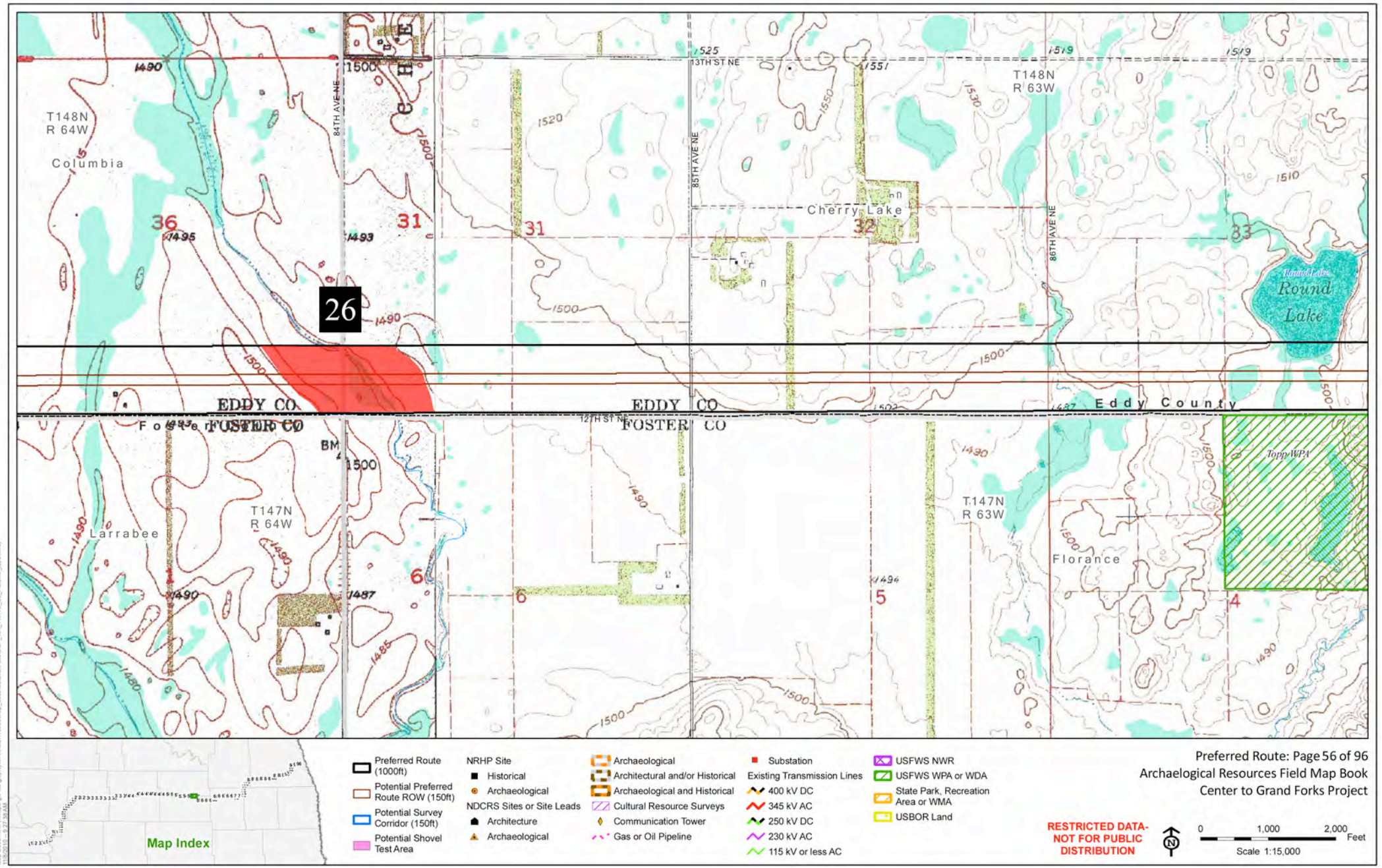


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Center to Grand Forks Project

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Moderate Geologic Potential

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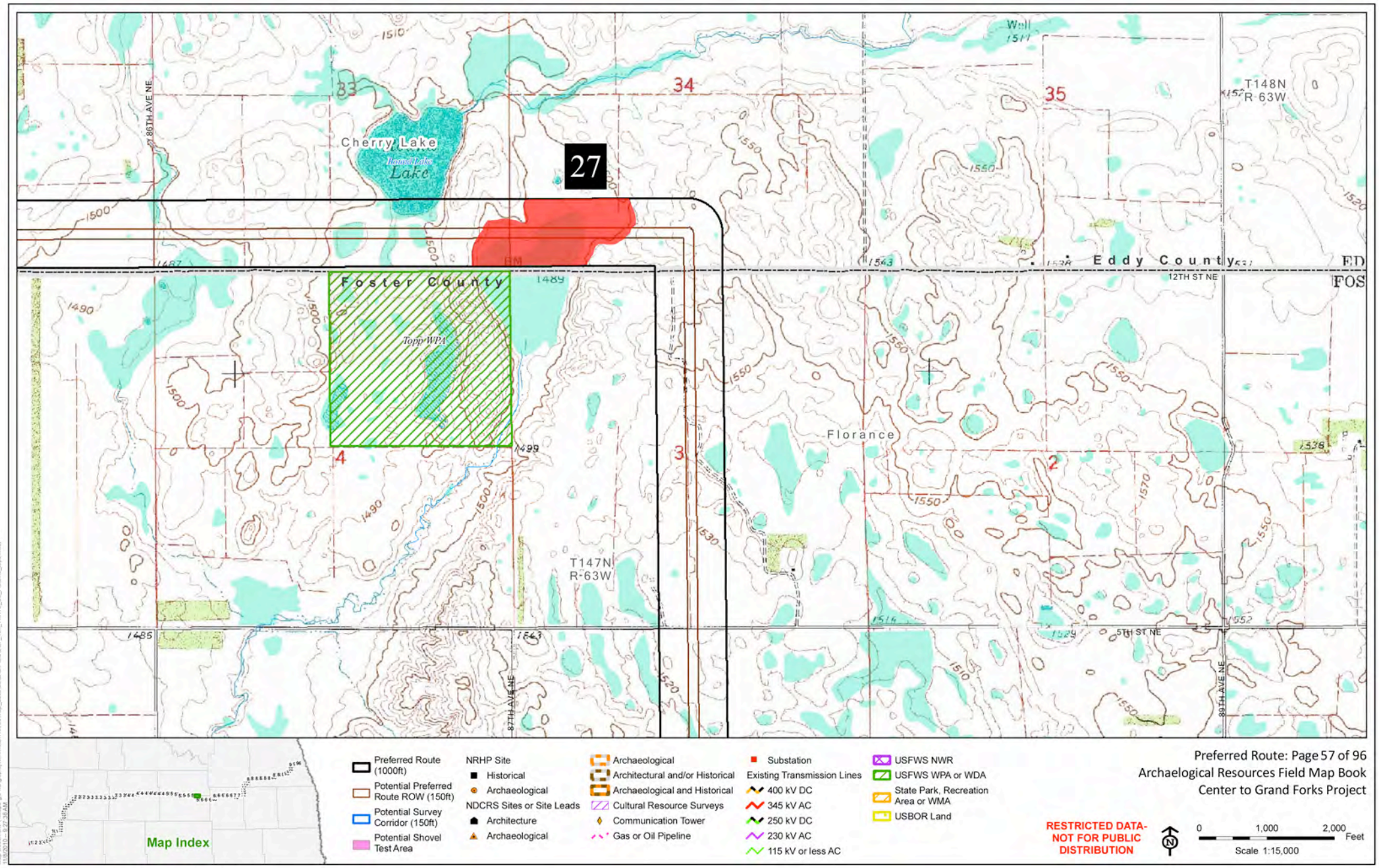


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High Geologic Potential

Moderate Geologic Potential

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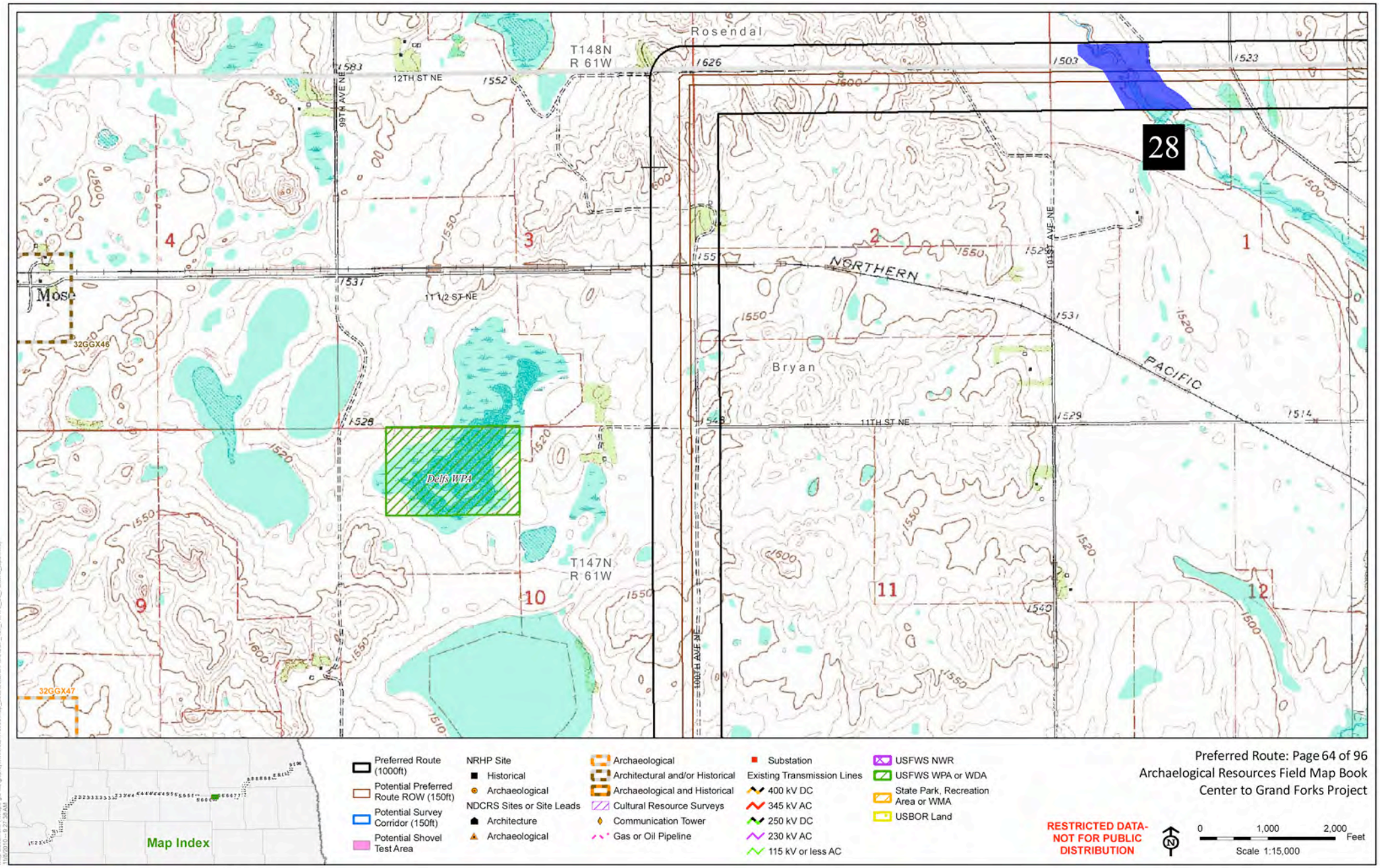


Preferred Route: Page 57 of 96
Archaeological Resources Field Map Book
Center to Grand Forks Project

High Geologic Potential

Moderate Geologic Potential

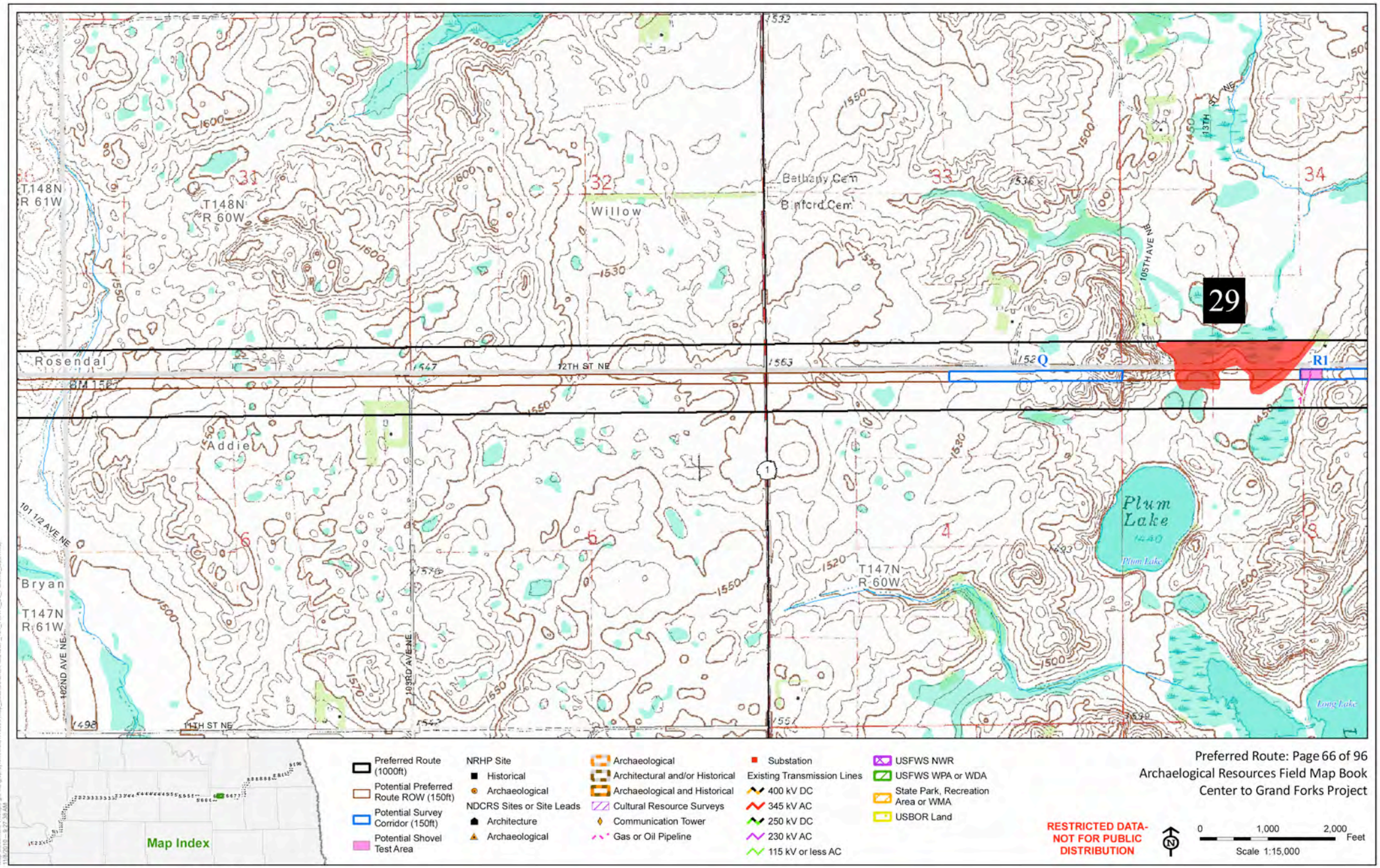
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High Geologic Potential

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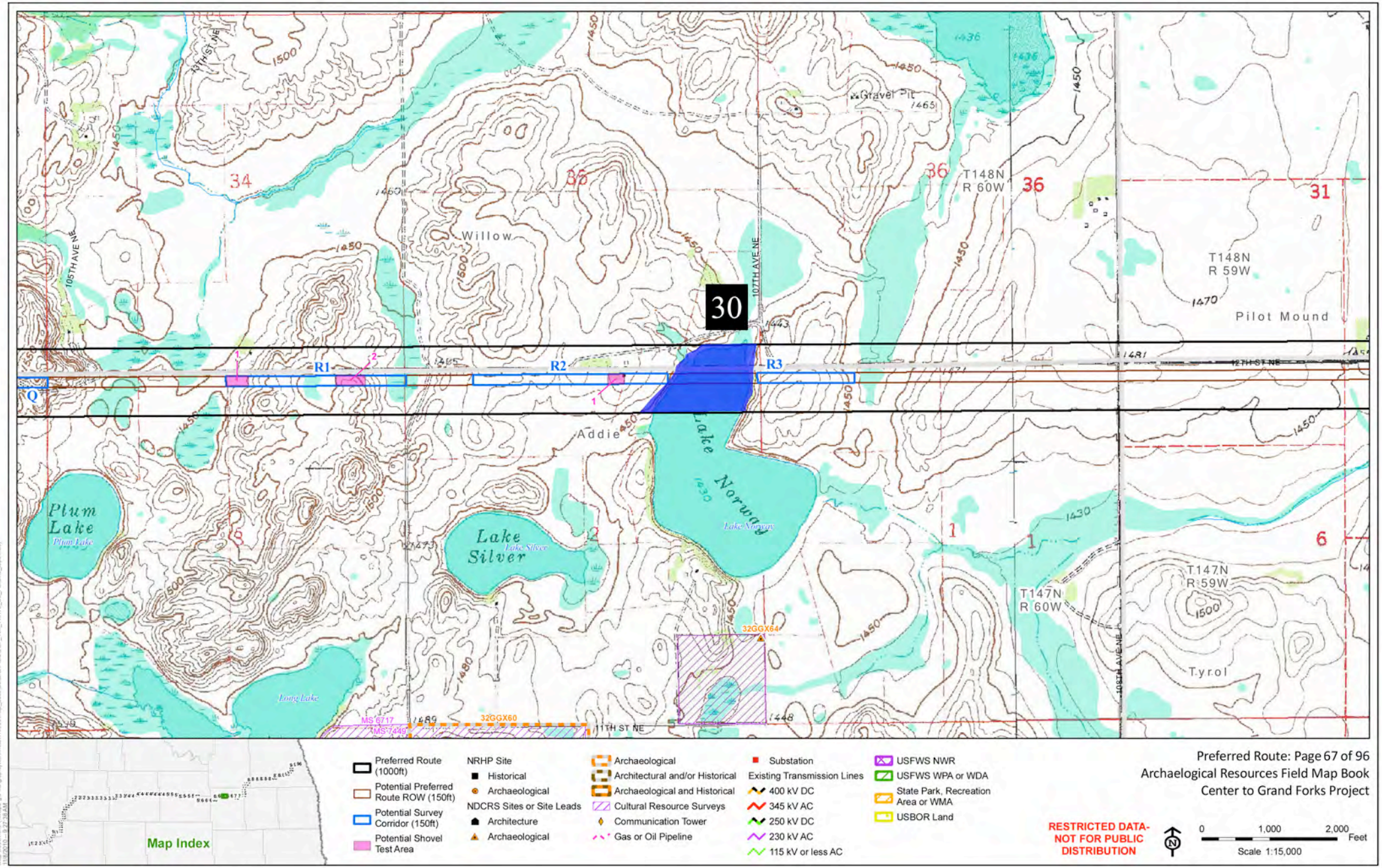


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High Geologic Potential

Moderate Geologic Potential

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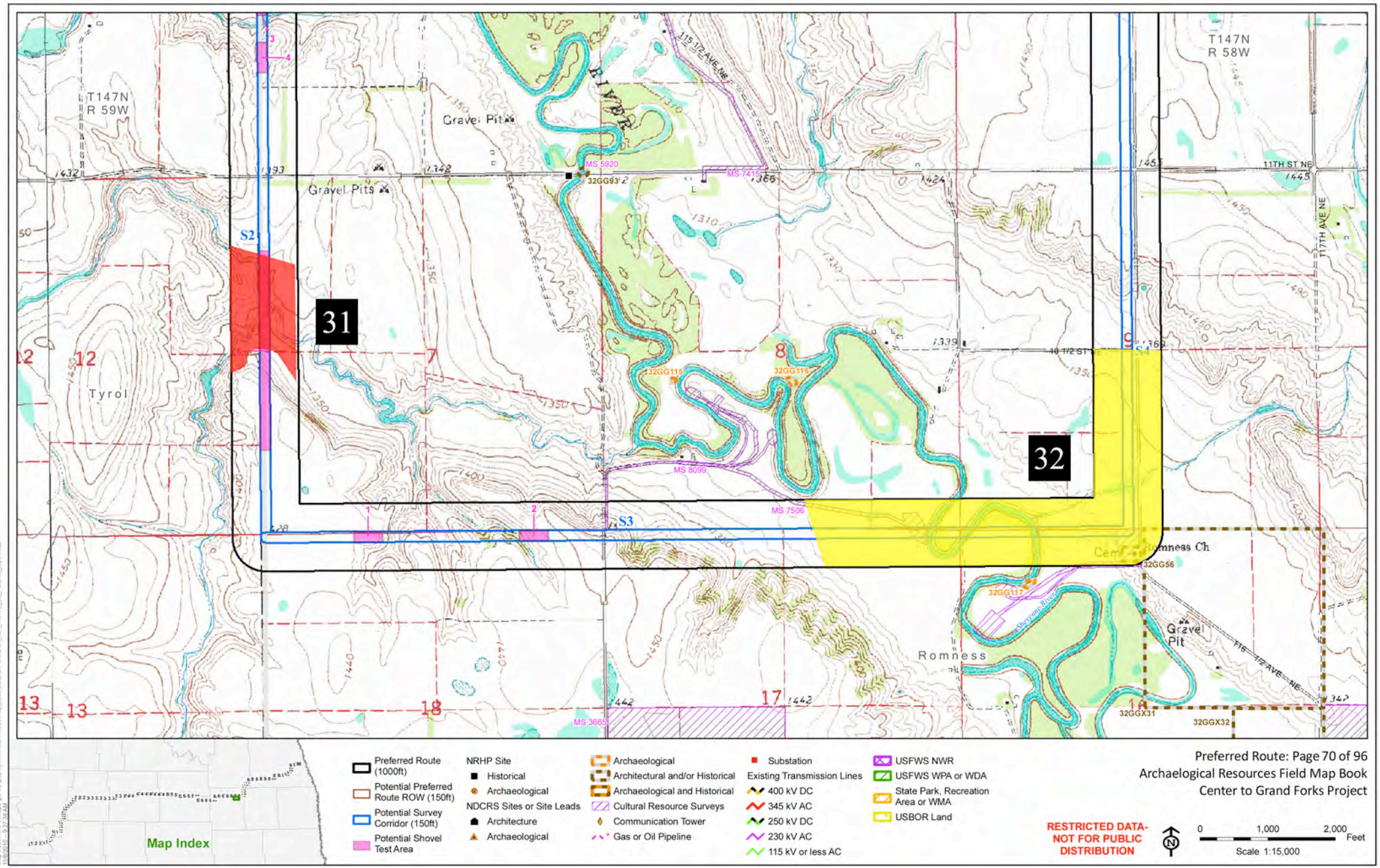


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High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential

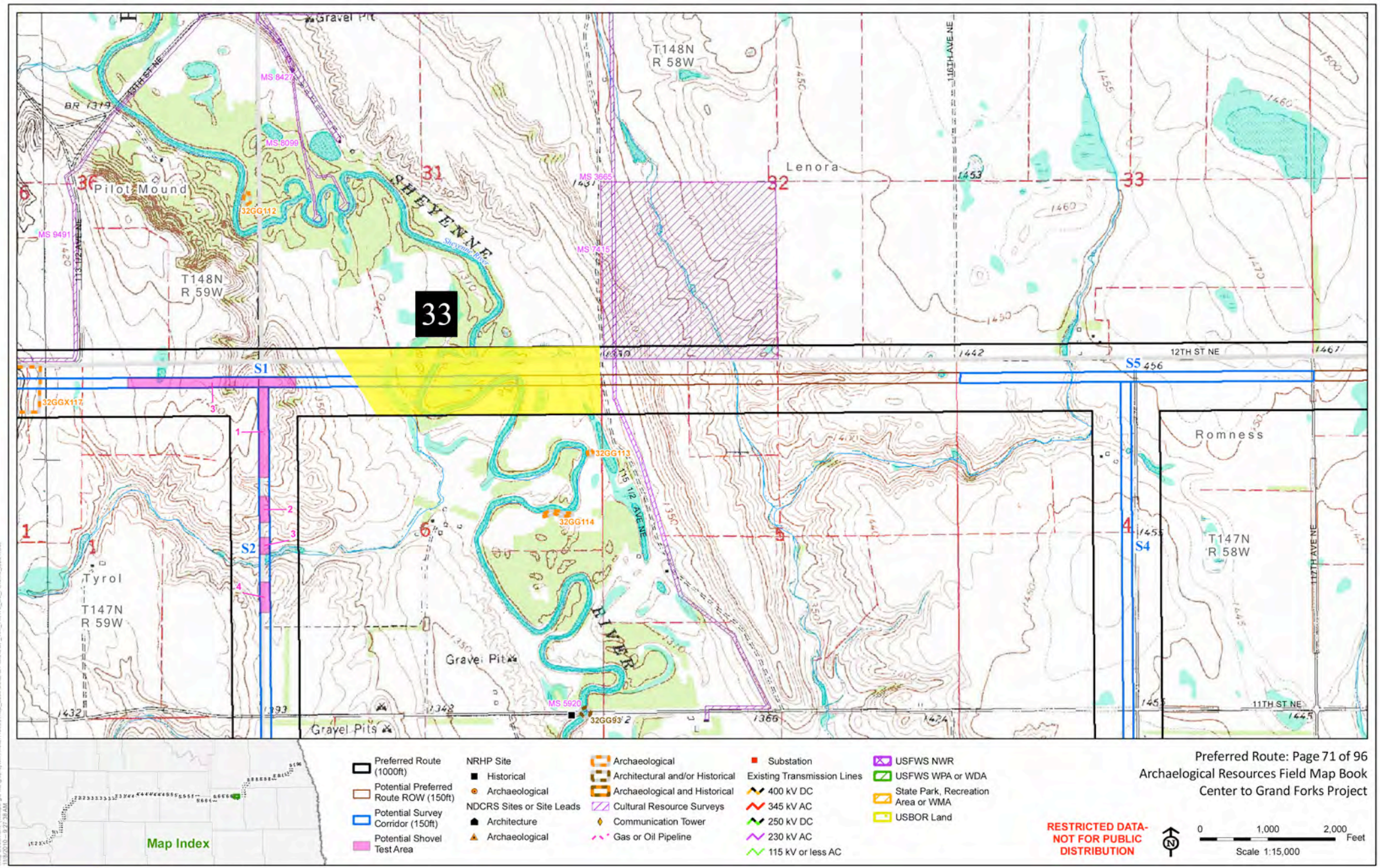


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High Geologic Potential

Moderate Geologic Potential

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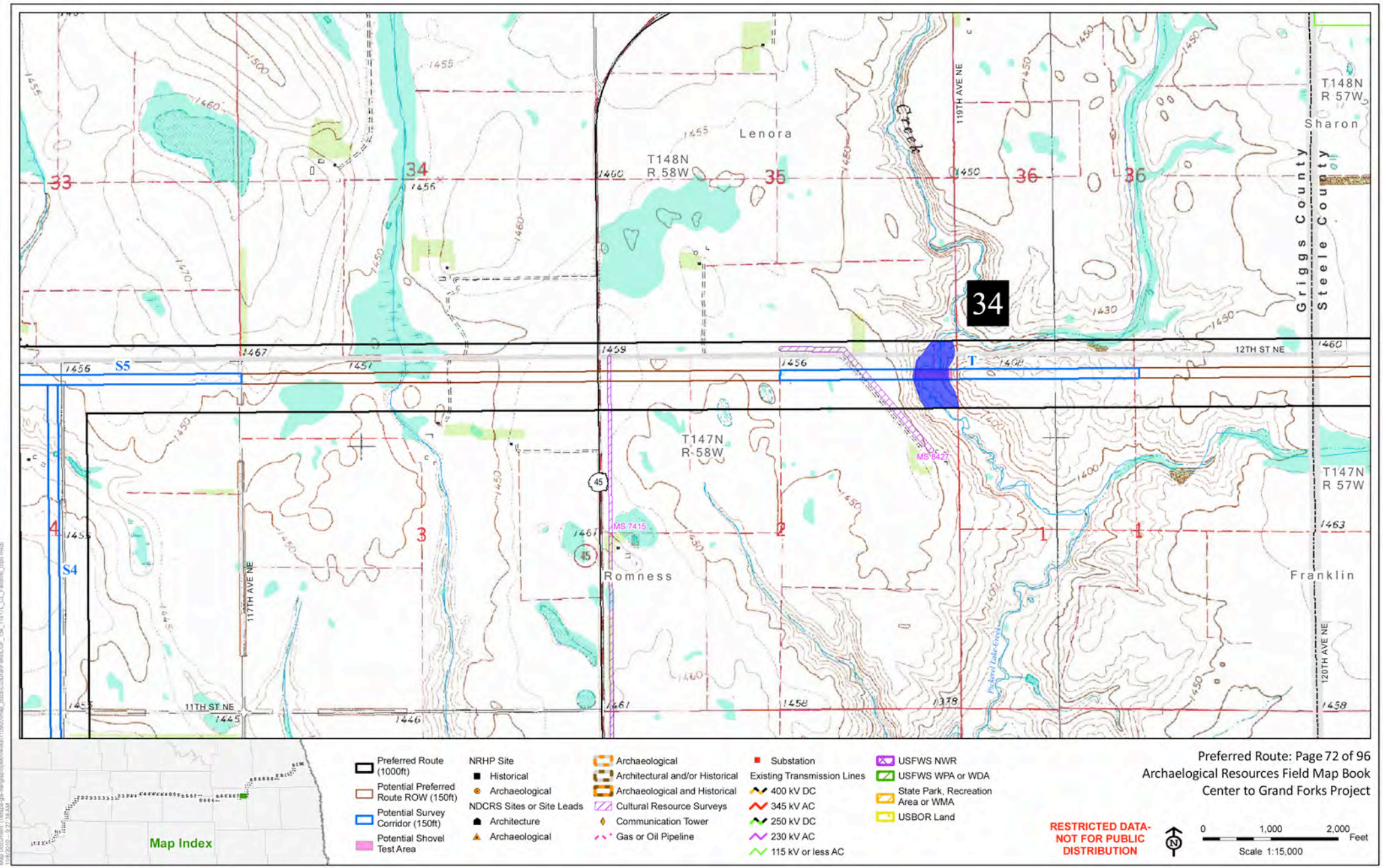


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High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential

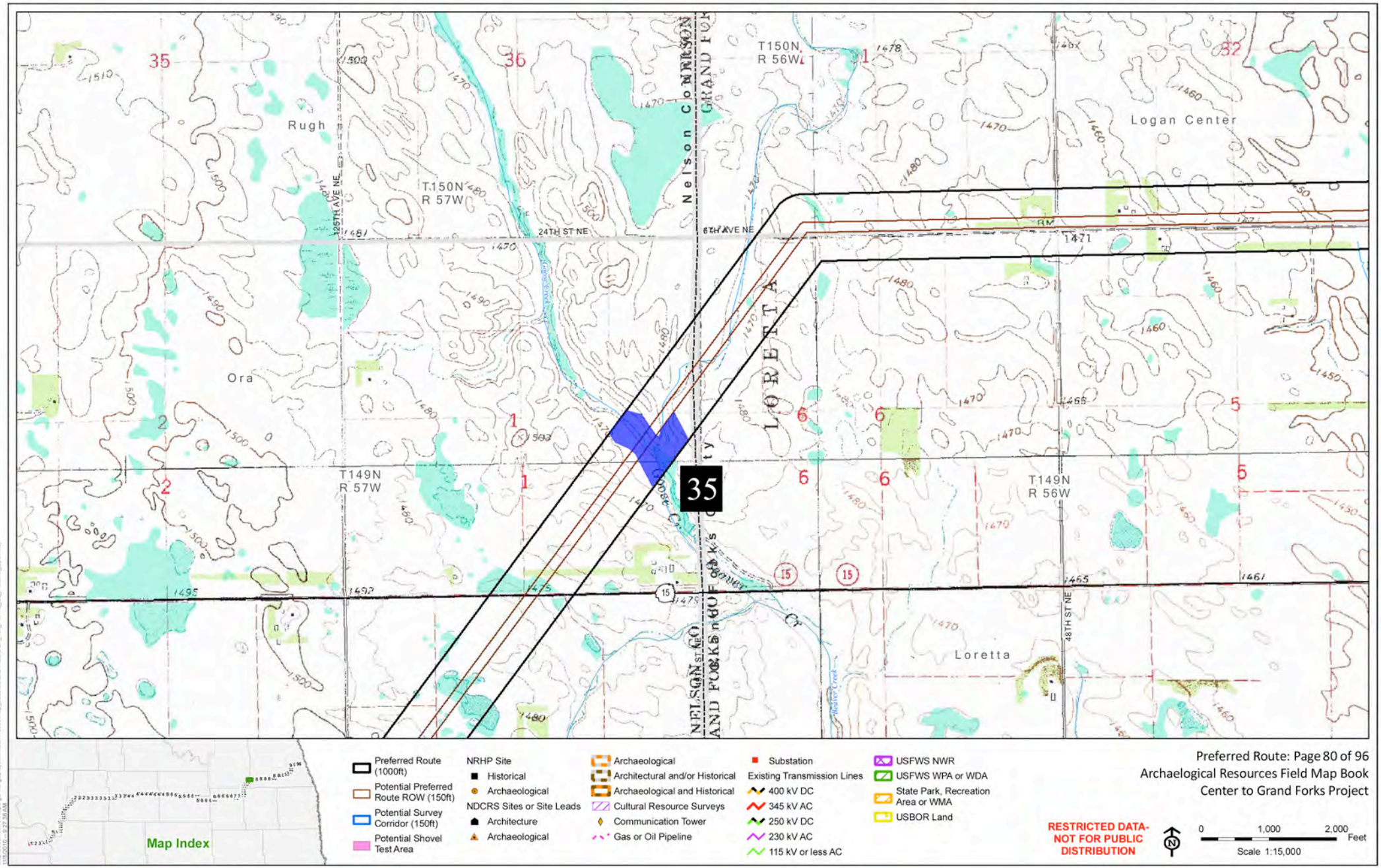


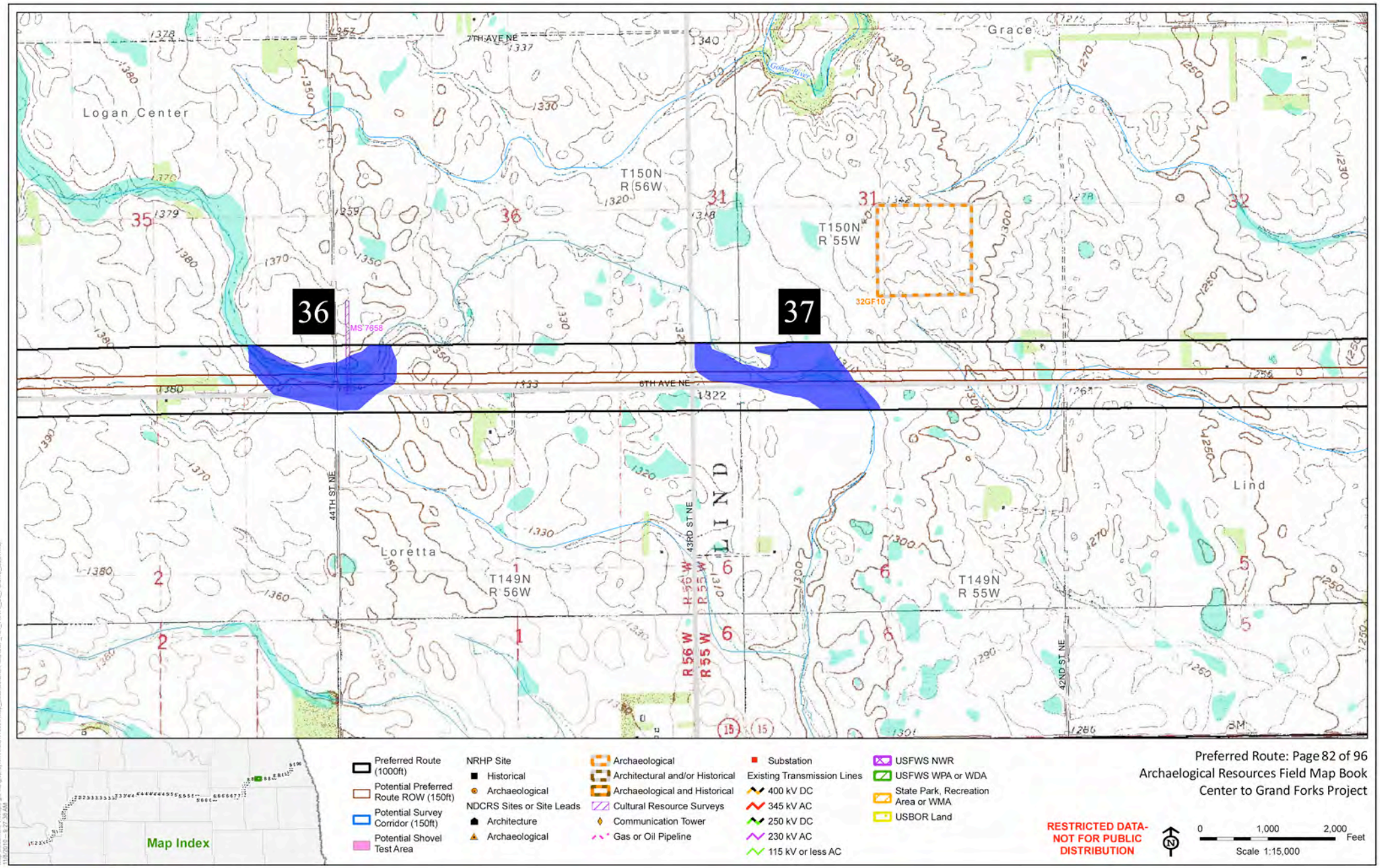
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High Geologic Potential

Moderate Geologic Potential

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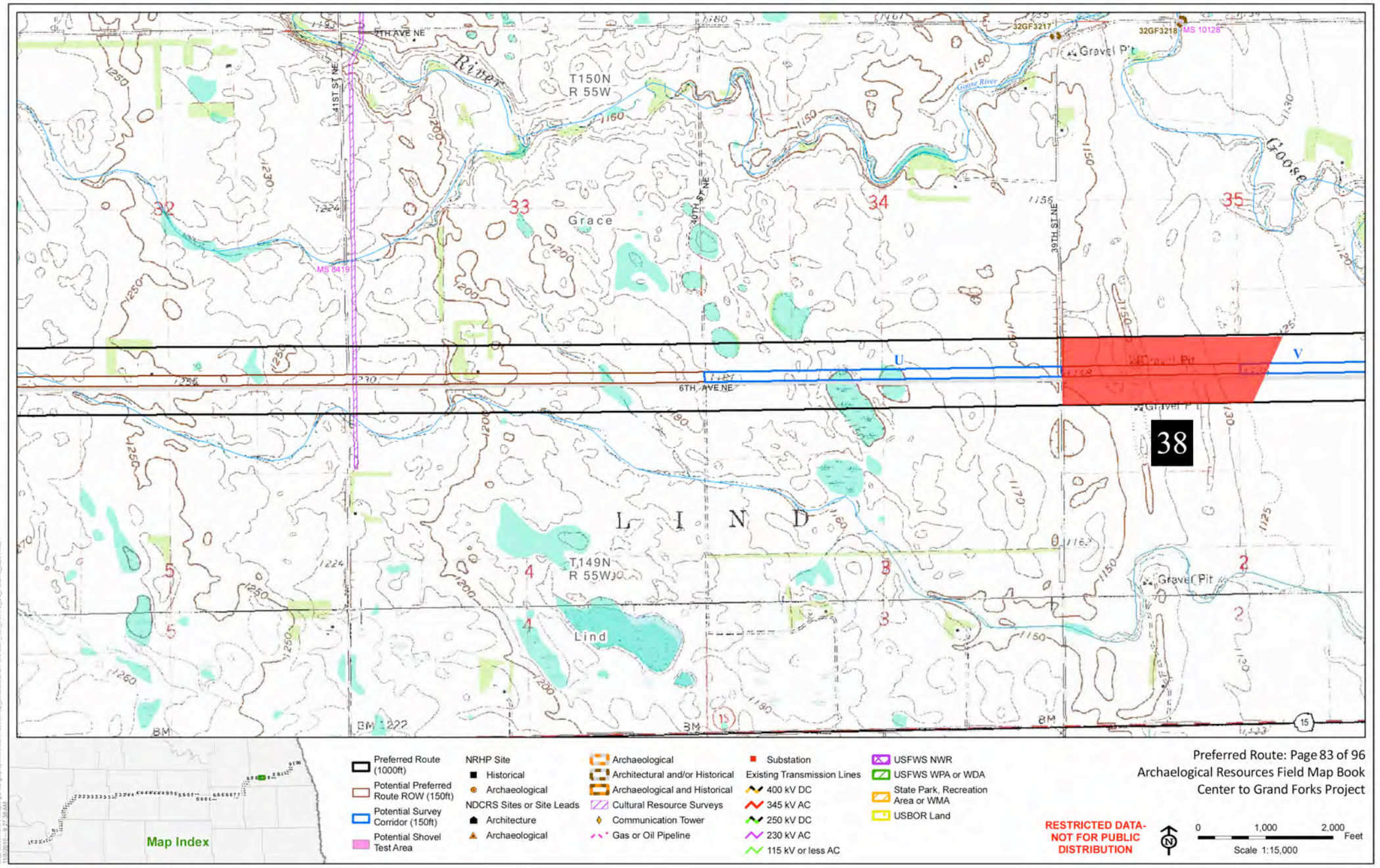

35
36
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R 56W
T150N
R 57W
T149N
R 57W
T149N
R 56W
Rugh
Ora
Logan Center
Loretta
Nelson County
Grand Forks County
LORETTA
24TH ST NE
125TH AVE NE
48TH ST NE
Preferred Route (1000ft)
Potential Preferred Route ROW (150ft)
Potential Survey Corridor (150ft)
Potential Shovel Test Area
NRHP Site
Historical
Archaeological
NDCRS Sites or Site Leads
Architecture
Archaeological
Archaeological
Architectural and/or Historical
Archaeological and Historical
Cultural Resource Surveys
Communication Tower
Gas or Oil Pipeline
Substation
Existing Transmission Lines
400 kV DC
345 kV AC
250 kV DC
230 kV AC
115 kV or less AC
USFWS NWR
USFWS WPA or WDA
State Park, Recreation Area or WMA
USBOR Land
Map Index
Preferred Route: Page 80 of 96
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RESTRICTED DATA- NOT FOR PUBLIC DISTRIBUTION
0
1,000
2,000
Feet
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Moderate - Low Geologic Potential



High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential

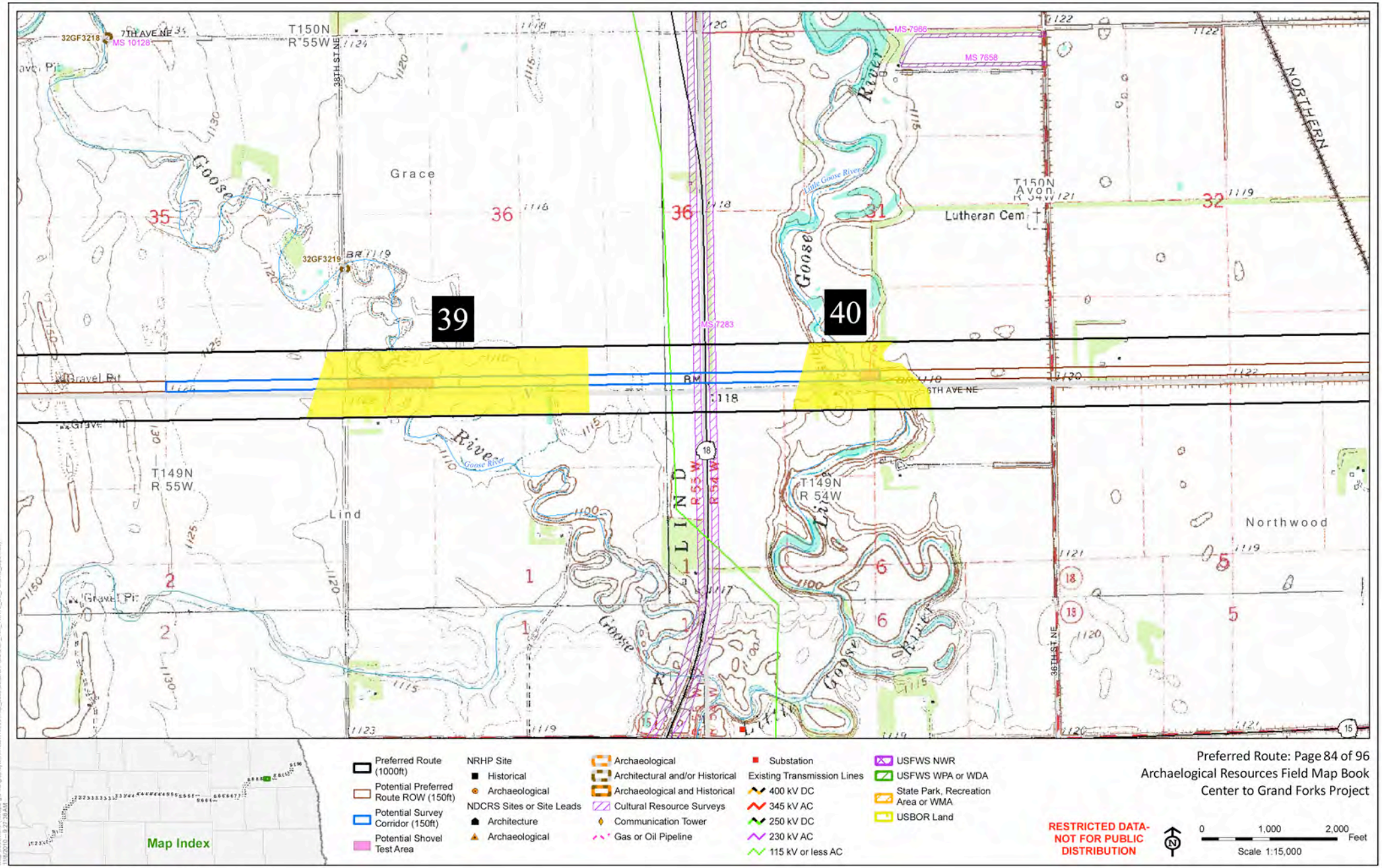


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High Geologic Potential

Moderate Geologic Potential

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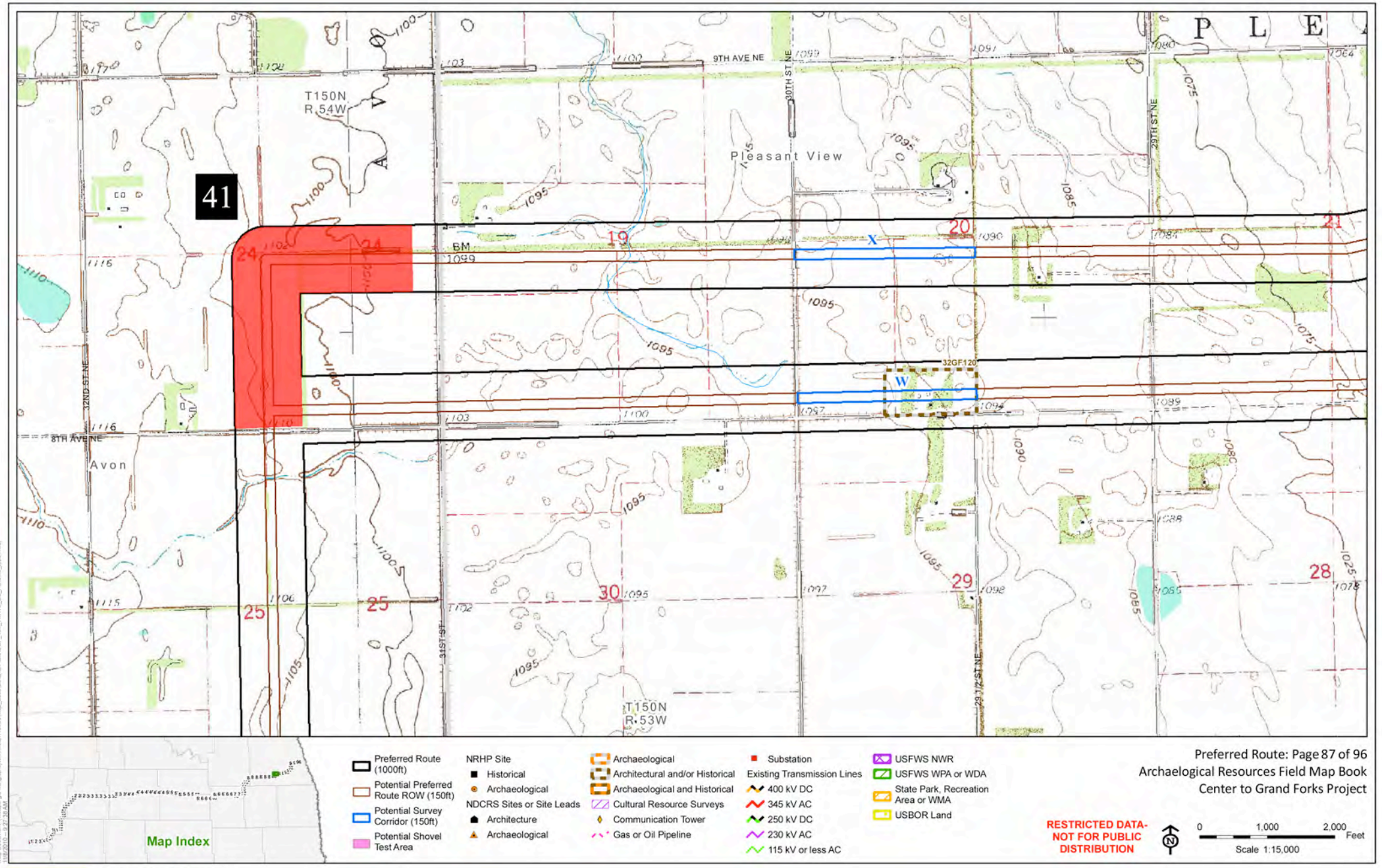


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High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential

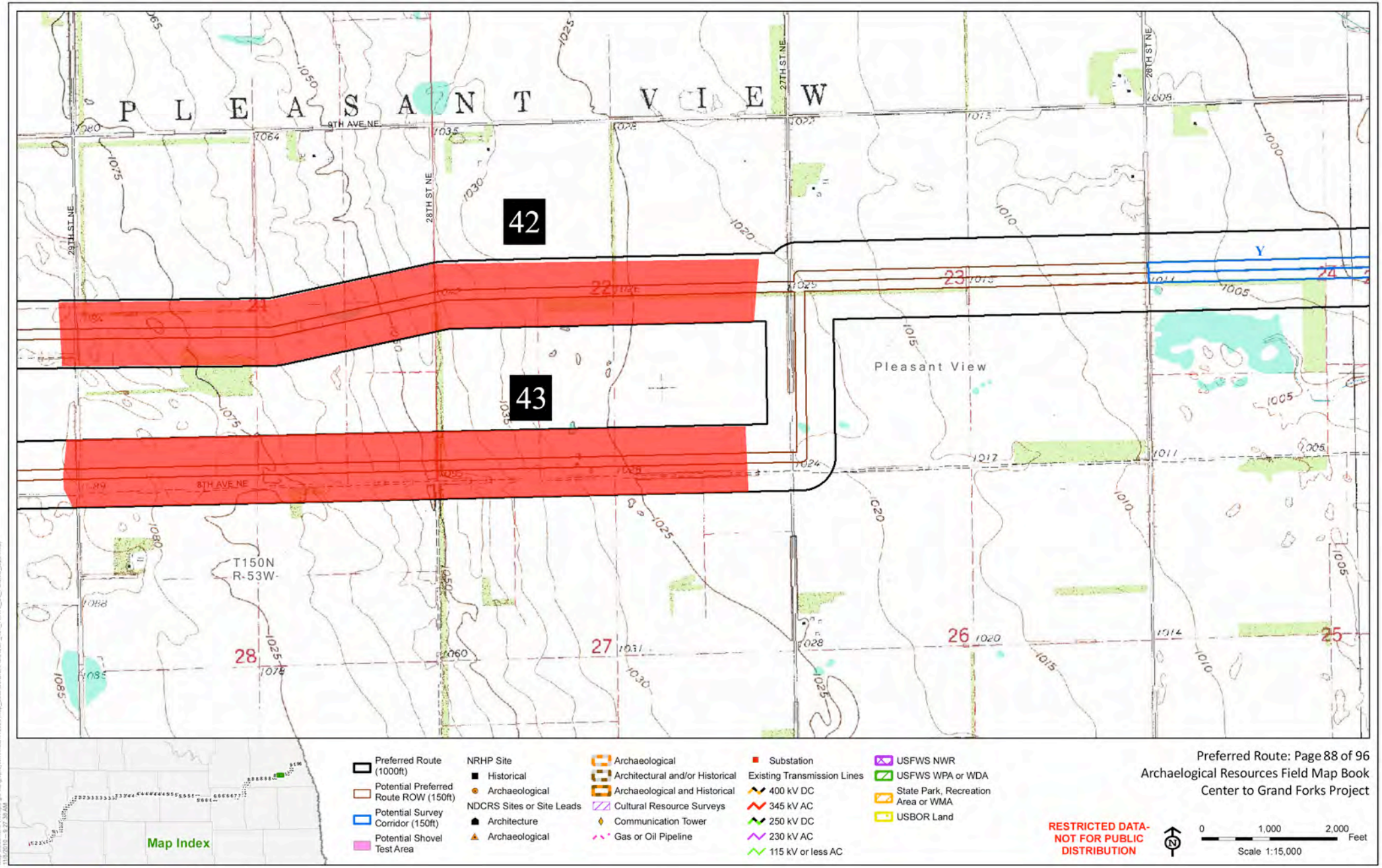


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Center to Grand Forks Project

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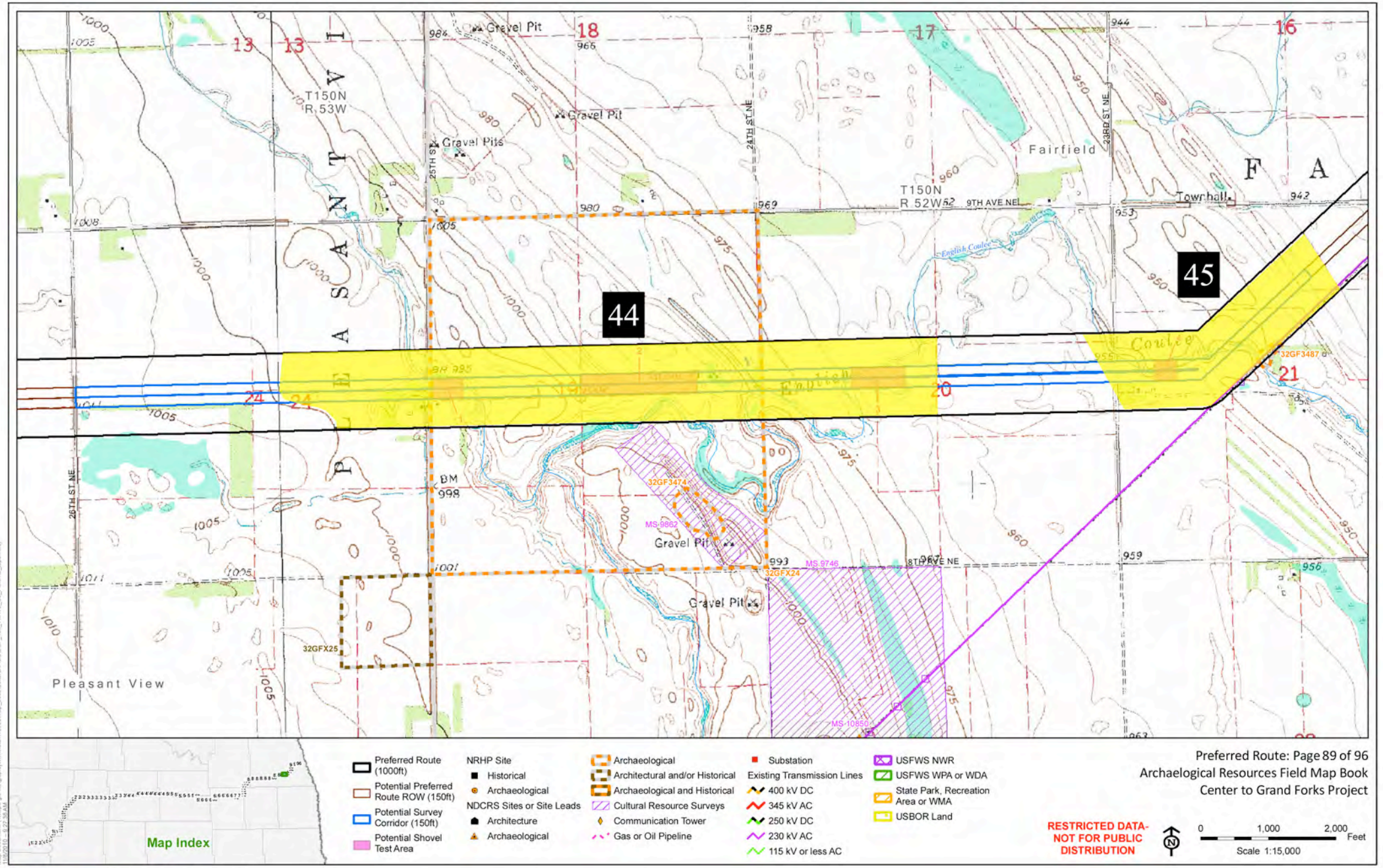


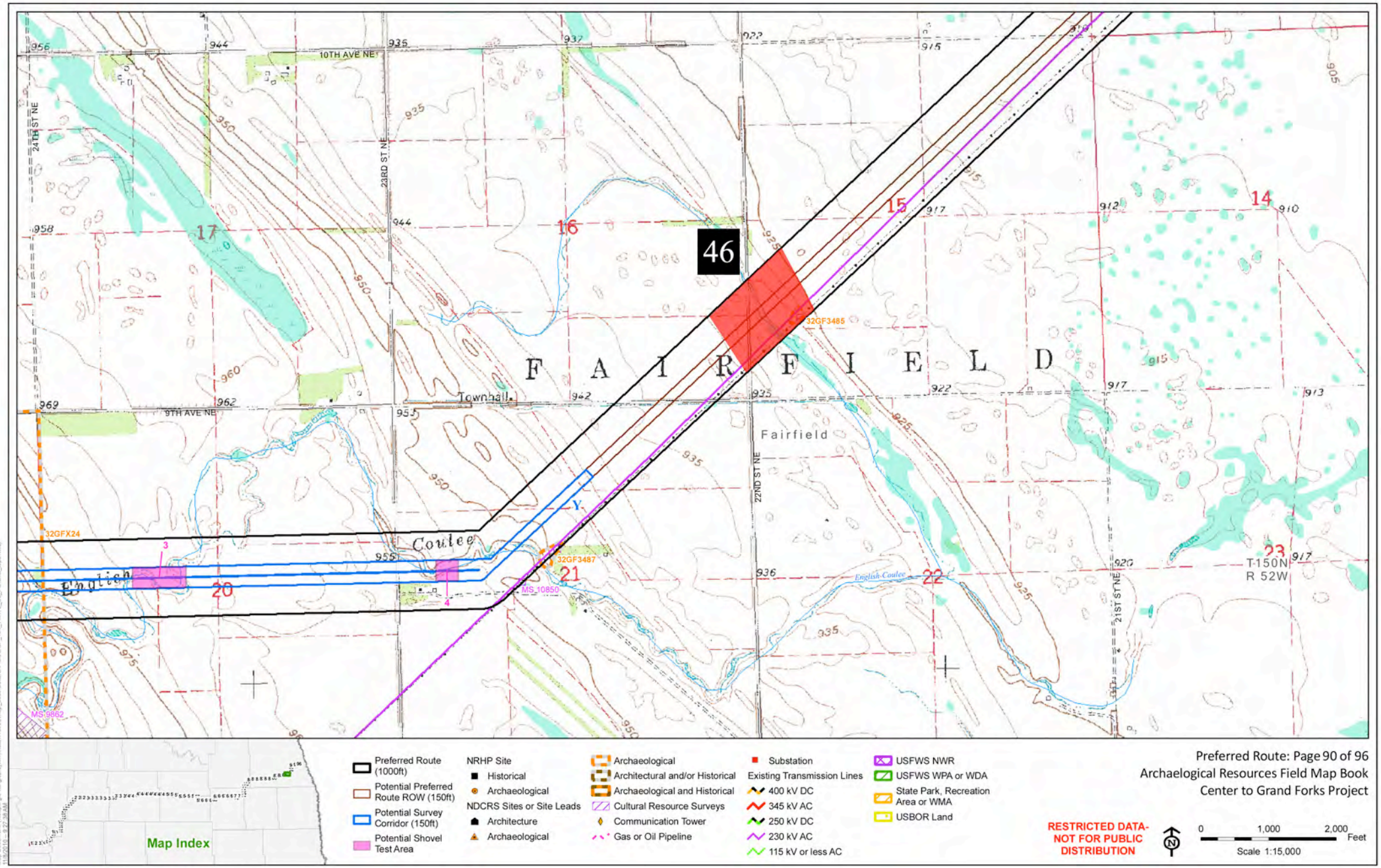
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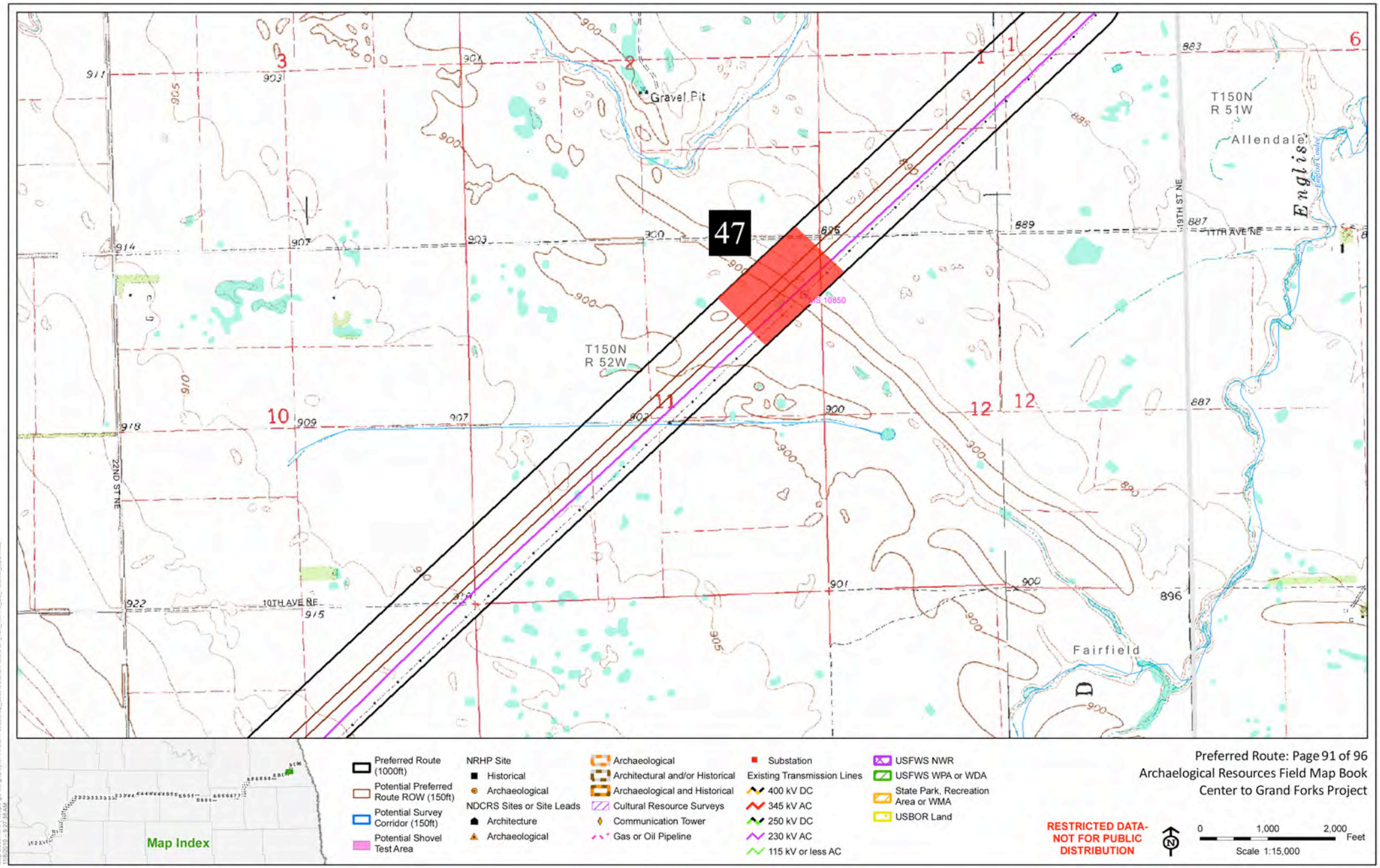
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T150N
R 53W
T150N
R 52W
Fairfield
Townhall
Pleasant View
Gravel Pit
Gravel Pits
44
45
32GF3474
32GF3487
32GFX24
32GFX25
MS-9862
MS-9746
MS-10850
BM
998
9TH AVE NE
8TH AVE NE
24TH ST NE
25TH ST
26TH ST NE
23RD ST NE
English Coulee
Preferred Route (1000ft)
Potential Preferred Route ROW (150ft)
Potential Survey Corridor (150ft)
Potential Shovel Test Area
NRHP Site
Historical
Archaeological
NDCRS Sites or Site Leads
Architecture
Archaeological
Archaeological
Architectural and/or Historical
Archaeological and Historical
Cultural Resource Surveys
Communication Tower
Gas or Oil Pipeline
Substation
Existing Transmission Lines
400 kV DC
345 kV AC
250 kV DC
230 kV AC
115 kV or less AC
USFWS NWR
USFWS WPA or WDA
State Park, Recreation Area or WMA
USBOR Land
Map Index
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RESTRICTED DATA-
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High Geologic Potential
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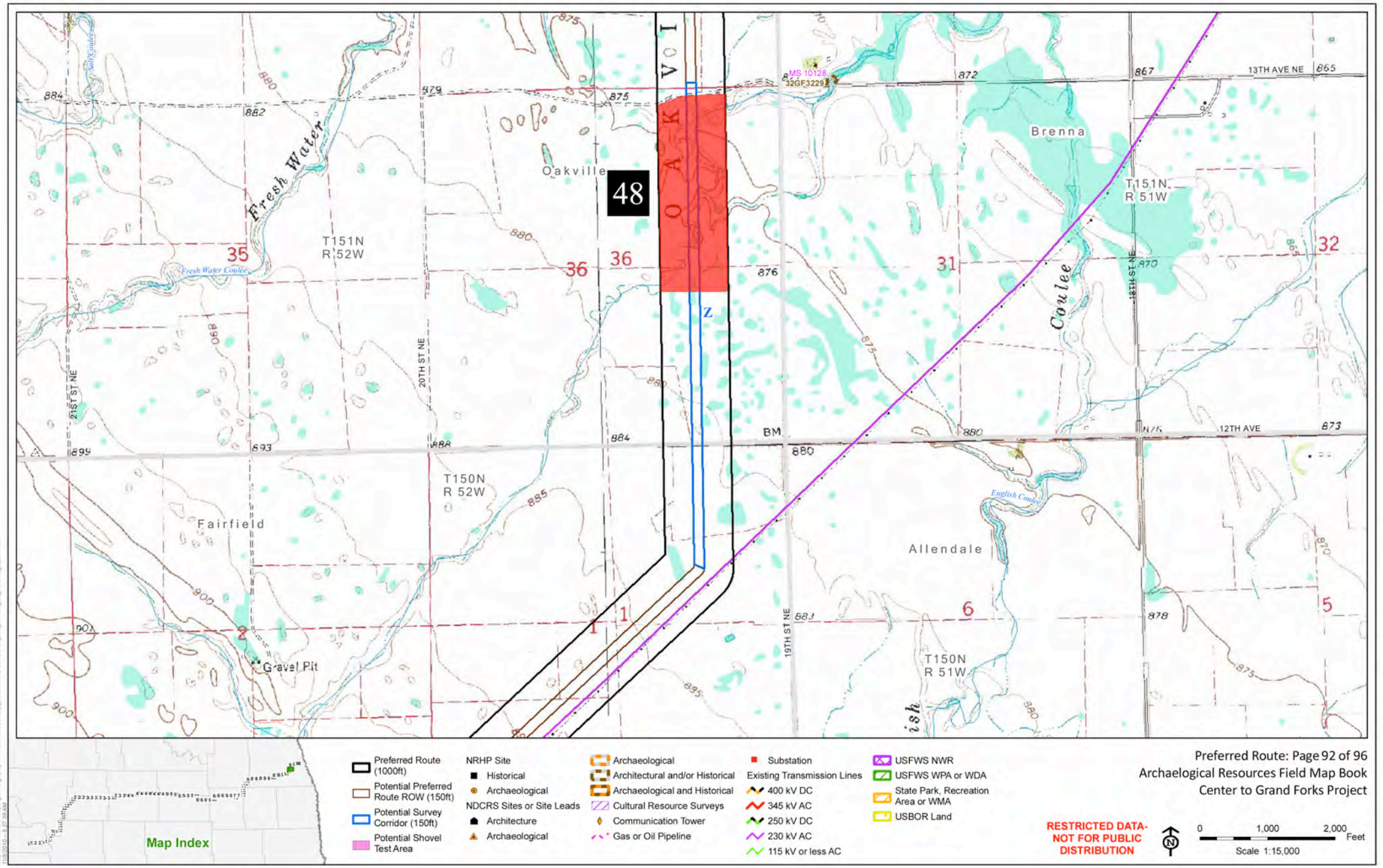


Preferred Route: Page 91 of 96
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Center to Grand Forks Project

High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential



Map Index

Preferred Route (1000ft)
Potential Preferred Route ROW (150ft)
Potential Survey Corridor (150ft)
Potential Shovel Test Area

NRHP Site
Historical
Archaeological
NDCRS Sites or Site Leads
Architecture
Archaeological

Archaeological
Architectural and/or Historical
Archaeological and Historical
Cultural Resource Surveys
Communication Tower
Gas or Oil Pipeline

Substation
Existing Transmission Lines
400 kV DC
345 kV AC
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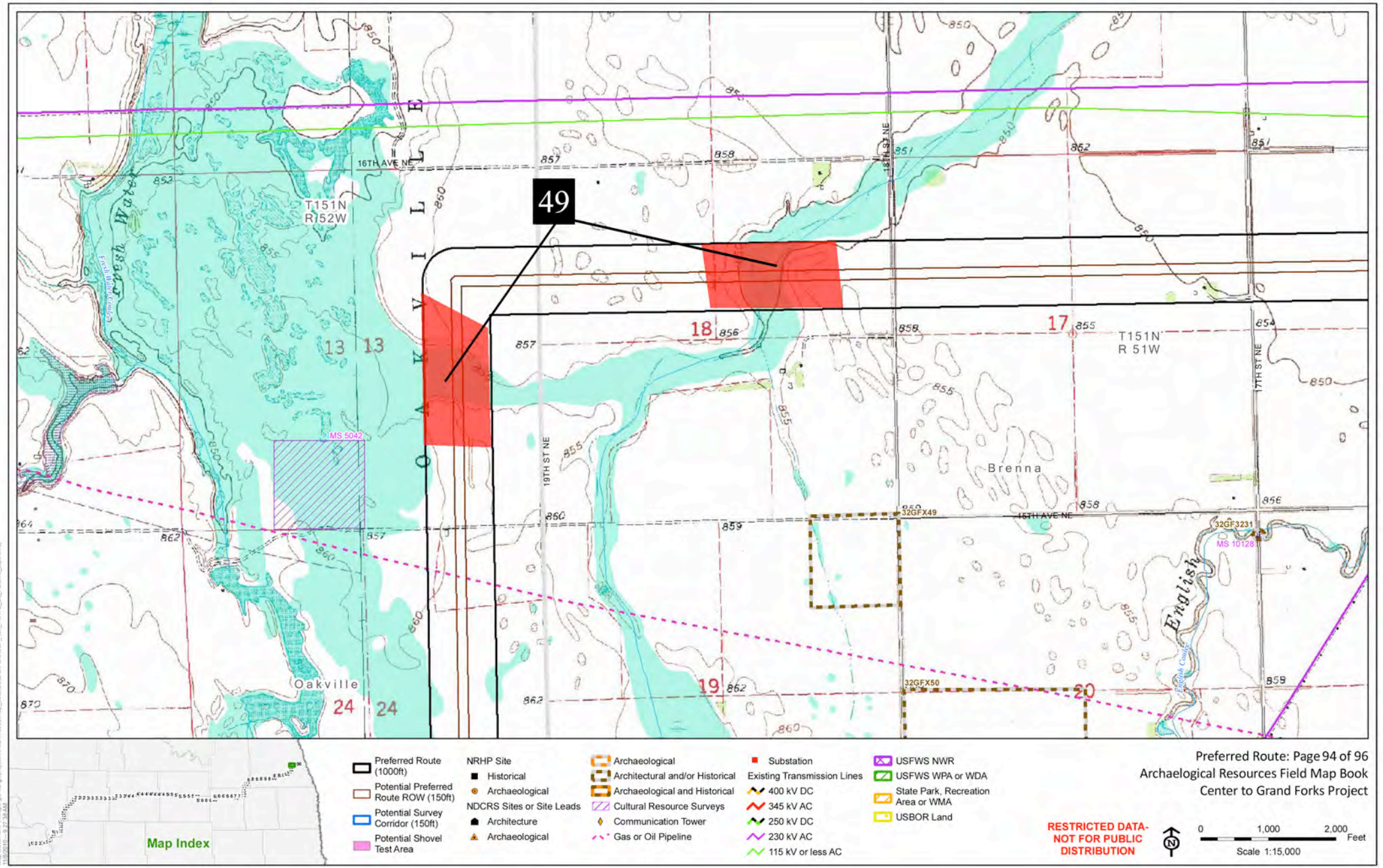
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USFWS WPA or WDA
State Park, Recreation Area or WMA
USBOR Land

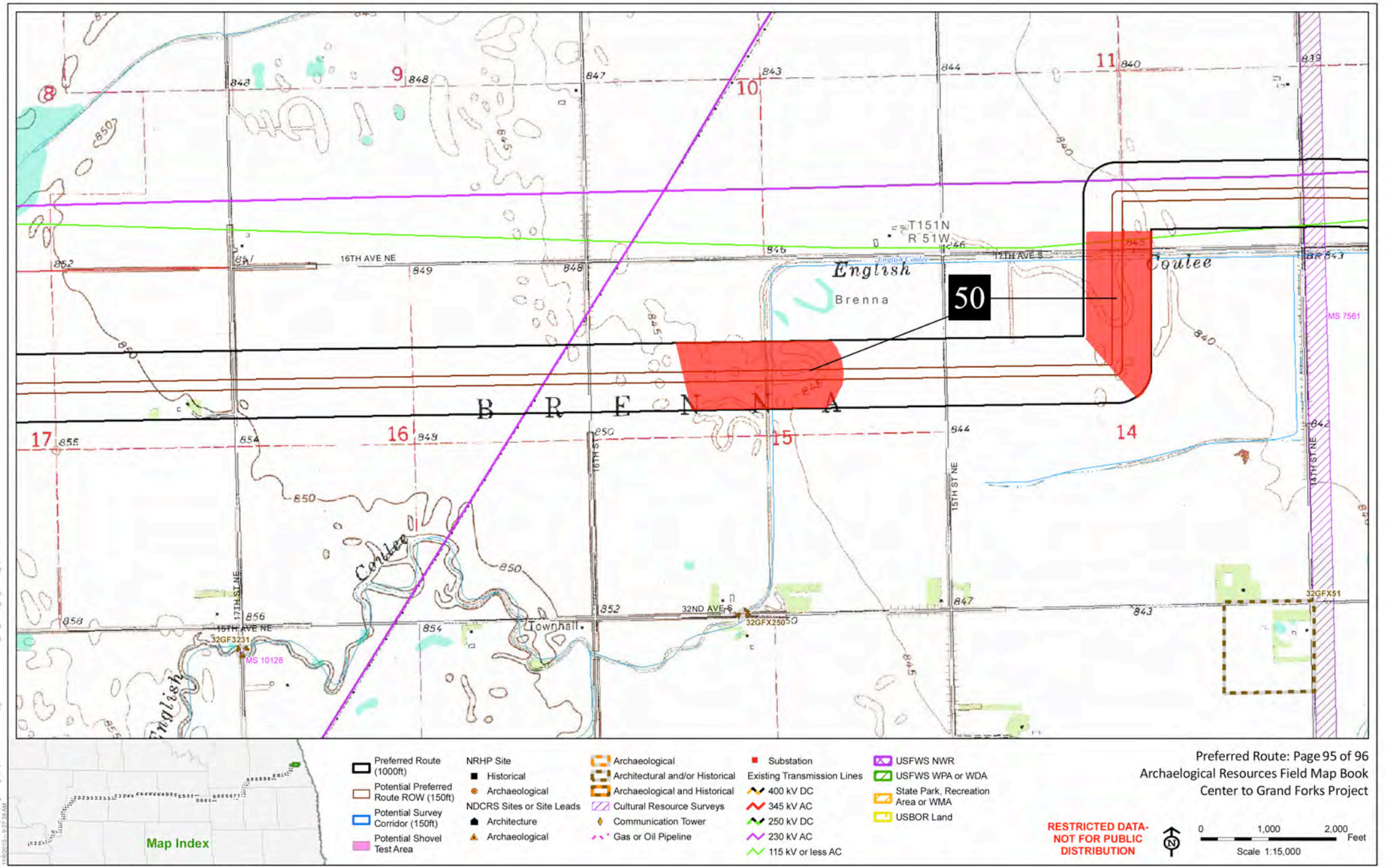
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Center to Grand Forks Project

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49
T151N
R52W
T151N
R 51W
Oakville
Brenna
16TH AVE NE
15TH AVE NE
18TH ST NE
19TH ST NE
17TH ST NE
MS 5042
MS 10128
32GFX49
32GFX50
32GF3231
Ash Water
English
Map Index
Preferred Route (1000ft)
Potential Preferred Route ROW (150ft)
Potential Survey Corridor (150ft)
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High Geologic Potential
Moderate Geologic Potential
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High Geologic Potential

Moderate Geologic Potential

Moderate - Low Geologic Potential

Appendix E

Historic Building Inventory and Evaluation of the Proposed Route of a 345 kV Electrical Transmission Line from Center to Grand Forks in North Dakota and SHPO Concurrence Letter

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

Jack Dalrymple
Governor of North Dakota

North Dakota State Historical Board

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Valley City - President

Calvin Grinnell
New Town - Vice President

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Sara Otte Coleman
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Tourism Division

Kelly Schmidt
State Treasurer

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Mark Zimmerman
Director
Parks and Recreation Department

Francis Ziegler
Director
Department of Transportation

Merlan E. Paaverud, Jr.
Director

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September 8, 2011

Mr. Dennis Rankin
Environmental Protection Specialist
USDA Rural Utilities Service
1400 Independence Avenue SW
Stop 1571
Washington ND 20250-1571

ND SHPO REF: 10-0173A USDA RD/ND PSC Center to Grand Forks 345kV Electrical Transmission Line "Historic Building Inventory and Evaluation of the Proposed Route of a 345 kV Electrical Transmission Line from Center to Grand Forks in North Dakota"

Dear Mr. Rankin,

We reviewed "Historic Building Inventory and Evaluation of the Proposed Route of a 345 kV Electrical Transmission Line from Center to Grand Forks in North Dakota," by Kevin Palmer of HDR Engineering (Minneapolis) and find the Class II report acceptable for content. We concur with the list of sites determined eligible and that only site 32NE80 (HDR number 26404/42854) involves an "Adverse Effect." We concur with the proposed mitigation efforts, screening between the transmission line and the historic site.

Thank you for the opportunity to review this project to date. Please include the ND SHPO Reference number listed above in any further correspondence for this project. If you have any questions please contact Susan Quinnell, Review and Compliance Coordinator at (701)328-3576 or squinnell@nd.gov

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)
and
Director
State Historical Society of North Dakota

Historic Building Inventory and Evaluation of the Proposed Route of a 345 kV Electrical Transmission Line from Center to Grand Forks in North Dakota

SHPO R&C # 2007-1273 MOA

Prepared by:
Kevin (Lex) Palmer – Principal Investigator
HDR Engineering, Inc.
701 Xenia Avenue South, Suite 600
Minneapolis, MN 55416

Prepared for:
U.S. Department of Agriculture, Rural Utilities Service
1400 Independence Avenue, SW
Washington, DC 20250-1571

On Behalf of:

Minnkota Power Cooperative, Inc.

August 2011

HDR

Table 7: Effects Analysis Summary

Site Number	Effects Analysis
HDR 11932/41403 Eddy County, Rosefield Township	The proposed project will impact this historic period site, but the effects are not considered adverse.
HDR 14762 Grand Forks County, Fairfield Township	The proposed project will impact this historic period site, but the effects are not considered adverse
HDR 14789/42562 Grand Forks County, Pleasant View Township	This property will not be adversely affected.
HDR 14830/42627 Grand Forks County, Avon Township	The property will not be adversely affected.
HDR 26389/41731 Nelson County, Ora Township	This property will not be adversely affected.
HDR 26400/42860 Nelson County, Ora Township	This property will not be adversely affected.
HDR 26404/42854 Nelson County, Ora Township	This property will be adversely affected.
HDR 30541 Sheridan County, Prophets Township	The proposed project will impact this historic period site, but the effects are not considered adverse
HDR 39655/41367 Wells County, Germantown Township	The proposed project will impact this historic period site, but the effects are not considered adverse
32ED32 Sylvanus Marriage Octagonal Barn Eddy County	The proposed project will impact this historic period site, but the effects are not considered adverse

USDA Rural Development

United States Department of Agriculture
Rural Development

August 26, 2011

Susan Quinnell
Review and Compliance Coordinator
ND State Historic Preservation Office
State Historical Society of North Dakota
North Dakota Heritage Center
612 East Boulevard Avenue
Bismarck, ND 58505-0830

Re: Historic Building Inventory and Evaluation of the Proposed Route
Center to Grand Forks 345 kV Electrical Transmission Line
Oliver, McLean, Burleigh, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks Counties, North Dakota

Dear Ms. Quinnell,

The Rural Utilities Service (RUS) is submitting the enclosed report titled *Historic Building Inventory and Evaluation of the Proposed Route of a 345 kilovolt (kV) transmission line from Center to Grand Forks in North Dakota* (2007-1273MOA) to the North Dakota State Historic Preservation Office (SHPO) for review. This report is being submitted to you in accordance with Stipulation II.C of the *Programmatic Agreement Among the Rural Utilities Service, the U.S. Fish and Wildlife Service, and the North Dakota State Historic Preservation Office Regarding the Center to Grand Forks 345 kV Transmission Line Project for Oliver, Burleigh, Mclean, Sheridan, Wells, Foster, Eddy, Griggs, Nelson, Steele, and Grand Forks Counties, North Dakota* executed on August 25, 2011. RUS is seeking your concurrence on each determination of eligibility and the proposed finding of adverse effect as recommended by the report. The report also includes proposed mitigation measures; we request your review for these recommended measures. RUS has not to date discussed the proposed mitigation measures with the landowner, but plans to do so.

The referenced proposal is currently at the stage in which the North Dakota Public Services Commission (ND PSC) will soon make a decision on the route proposed by Minnkota. Additional information on the referenced proposal can be found at the proposal website, http://minnkotacgf.com/.

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1400 Independence Avenue, S.W., Washington, DC 20250-9410 or call (800) 795-3272 (Voice) or (202) 720-6382 (TDD).

Questions and comments should be directed to the project manager, Dennis Rankin, Environmental Protection Specialist, USDA Rural Utilities Service, 1400 Independence Avenue, SW., Stop 1571, Washington, DC 20250–1571, or e-mail: dennis.rankin@wdc.usda.gov.

Sincerely,

Mark S. Plank

Mark S. Plank
USDA Rural Utilities Service
Director, Engineering & Environmental Staff

Cc:
Barry Williams, US Fish & Wildlife Service
John Graves, Minnkota Electric Power Cooperative

Historic Building Inventory and Evaluation of the Proposed Route of a 345 kV Electrical Transmission Line from Center to Grand Forks in North Dakota

SHPO R&C # 2007-1273 MOA

Prepared by:
Kevin (Lex) Palmer – Principal Investigator
HDR Engineering, Inc.
701 Xenia Avenue South, Suite 600
Minneapolis, MN 55416

Prepared for:
U.S. Department of Agriculture, Rural Utilities Service
1400 Independence Avenue, SW
Washington, DC 20250-1571

On Behalf of:

Minnkota Power Cooperative, Inc.

August 2011

HDR

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Appendix A – Sites Not NRHP-Eligible

List of Acronyms and Abbreviations

CBQ	Chicago, Burlington and Quincy Railroad
GLO	General Land Office
MAF	missile alert facilities
NMPA	Northern Municipal Power Agency
PLS	public land survey
PPA	power purchase agreement
RRVRC	Red River Valley Railroad Company
SMW	Strategic Missile Wing
SP&P	St. Paul and Pacific Railroad Company
SP&S	Spokane, Portland and Seattle Railroad
SPM&M	St. Paul, Minneapolis and Manitoba Railway Company

1.0 Abstract/Management Summary

This report summarizes the findings of the visual inspection of approximately 247.8 miles of the proposed alignment for a new high voltage power line between Center and Grand Forks Rapids in Oliver, Burleigh, McLean, Sheridan, Wells, Eddy, Foster, Griggs, Nelson, Steele, and Grand Forks Counties of North Dakota (Project). Approximately 461 points are found to contain buildings and structures within the Area of Potential Effect (APE) of approximately 159,164 acres. Many of these points contain multiple buildings and structures. The buildings and structures within the APE were visually inspected for their potential to be determined as historic properties. Of these, one listed historic property, and nine historic period sites are recommended as eligible for listing on the National Register of Historic Places (NRHP), are discussed in detail for their potential to be affected by the proposed Project. One site is identified as being adversely affected as a result of the Project.

2.0 Introduction

Minnkota is a wholesale electric generation and transmission cooperative headquartered in Grand Forks, North Dakota. Incorporated on March 28, 1940, Minnkota provides, on a nonprofit basis, wholesale electric service to 11 retail/member-owner distribution cooperatives, which are the members and owners of Minnkota. The member systems' service areas encompass 34,500 square miles in northwestern Minnesota and the eastern third of North Dakota. The member systems serve approximately 125,000 of the 300,000 residents in the area. These cooperatives also serve more than 116,000 retail customers, including many of the region's schools, farms, homes, and businesses.

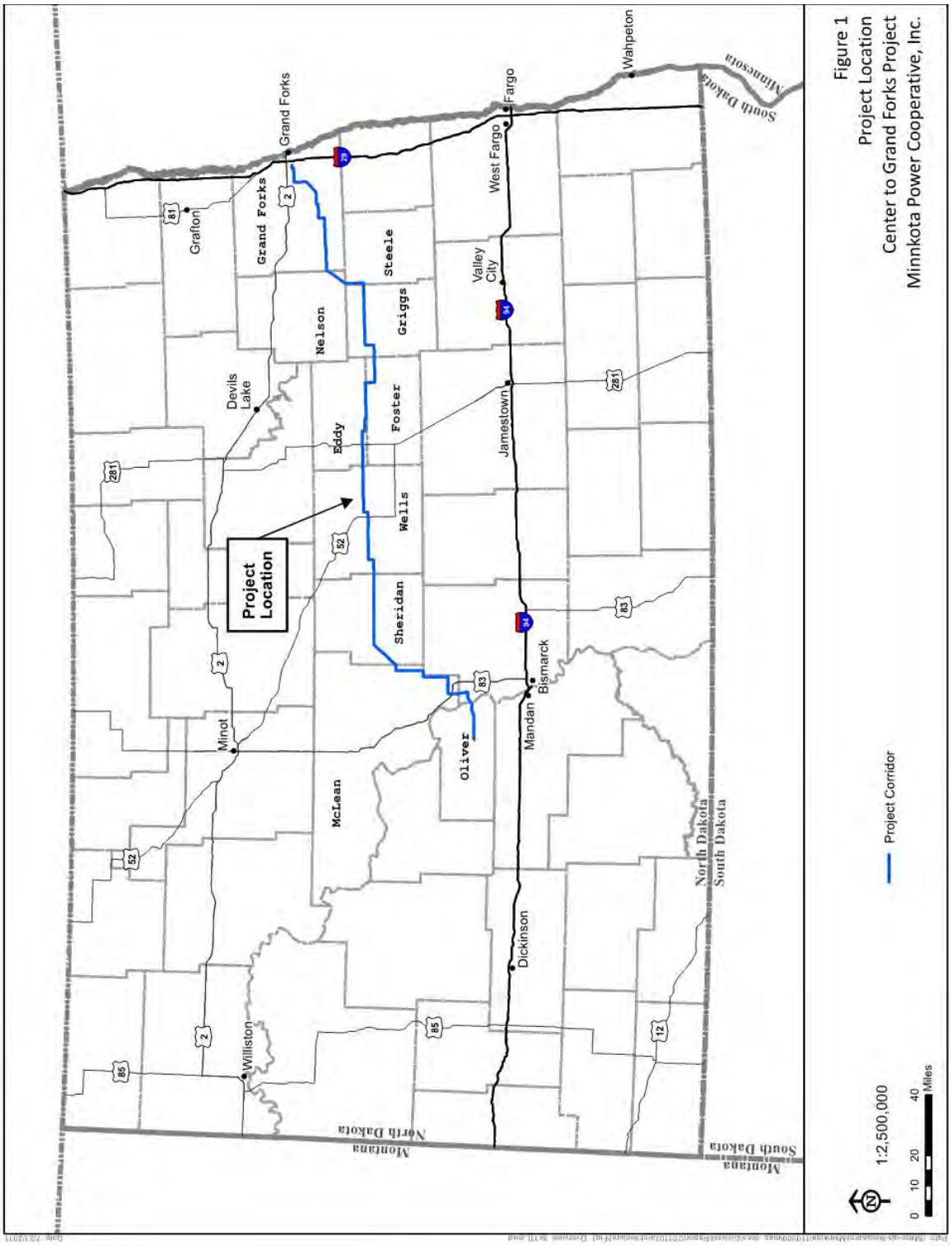
The primary source of baseload generation for the rural cooperatives is the Milton R. Young Generation Station located approximately 24 miles northwest of Bismarck, North Dakota, near the community of Center, North Dakota. As operating agent for the Northern Municipal Power Agency (NMPA) members, Minnkota also represents NMPA's 30 percent share of the output from the Coyote Station near Beulah, North Dakota. NMPA is the energy supplier for 12 municipal utilities located within the Minnkota service area. In addition, Minnkota has acquired, through power purchase agreements (PPAs) with large wind developers, significant North Dakota-based wind energy resources, totaling about 357 megawatt (MW) nameplate capacity.

Minnkota proposes to build an approximately 248-mile-long, 345 kilovolt (kV) Transmission Line (Project) from the Center 345 kV Substation, near Center, North Dakota, to the Prairie Substation, located just west of Grand Forks, North Dakota (Figure 1). RUS is considering a request for funding for the project. RUS has determined that the Project constitutes an undertaking which requires consultation under Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 Code of Federal Regulations (CFR) Part 800). Section 106 requires federal agencies to consider the potential effects of undertakings within their jurisdictions on properties listed, or eligible for listing, on the National Register of Historic Places (NRHP). The project also requires consideration of cultural resources under Section 101(b) of the National Environmental Policy Act (NEPA). RUS must complete an environmental analysis and prepare an Environmental Assessment with scoping (EA) in accordance with its Environmental Policy and Procedures for Implementing the National Environmental Policy Act (7 CFR Part 1794) before the proposed Project can be considered for financing assistance. The draft EA was published in November 2010, prior to the completion of historic property identification studies; however, a Programmatic Agreement was created to address the identification and treatment of historic properties to comply with Section 106 regulations.

Following RUS guidance, Minnkota began the project development process by preparing an Alternative Evaluation Study (AES) to identify the proposed Project's purpose, need, and alternatives for meeting capacity requirements and also prepared a Macro-Corridor

Study (MCS) to begin the process of identifying a corridor for potential routes. A scoping process was initiated to provide the public, federal and state agencies, and local governments with information regarding the description, need, and potential project locations or routing, to identify concerns about the proposed Project, to discuss compliance and permitting requirements, and to gather information to be addressed in the RUS environmental review and documentation. Comments received during the scoping process are summarized in a Scoping Report. The MCS, AES, and Scoping Report prepared for the proposed Project can be found at: http://www.rurdev.usda.gov/UWP-EA-MinnkotaPower.html.

Figure 1. Project Location Map and Area of Potential Effect



3.0 Research Design & Methodology

The goal of this historic building inventory and evaluation was to develop and make recommendations concerning whether the construction of the Project would have an adverse visual or direct effect on historic properties in its vicinity. An adverse effect to historic property might occur due to direct effects such as demolition, or indirect effects such as visual intrusion. The recommendations are presented on behalf of RUS.

This evaluation was completed by Mr. Kevin (Lex) Palmer, an employee of HDR Engineering, Inc. (HDR). Mr. Palmer is an architectural historian and historian who meets the secretary of the interior's Professional Qualification Standards, published in 36 CFR § 61, to perform such an evaluation. Mr. Steve Sabatke, a professional archaeologist with HDR, provided assistance during the field reconnaissance for the evaluation. All of the building photographs that illustrate this report were taken in April and May of 2011 by Mr. Palmer. Metcalf Archaeological Consultants, Inc., of Bismarck, provided data collection support to HDR on this project in June 2011.

This evaluation documents the fieldwork and analysis conducted to provide professional recommendations regarding the presence of previously unevaluated historic sites that may be eligible for listing on the National Register, and the potential for the proposed Project to have an adverse effect on National Register-listed or list-eligible properties within the Project APE. For this Project, buildings approaching 50 years in age or older were defined as being of historic age. Vintage buildings with a connection to at least one National Register criteria and that also retained sufficient integrity of location, design, setting, materials, workmanship, feeling, and association were recommended to be identified as historic property. "Historic property" is defined at 36 CFR § 800.16(l)(1) as:

> Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

For a visual intrusion to rise to the level of an adverse effect, the visual intrusion would have to impair the ability of a historic property to convey its sense of time and place by significantly changing the feeling and setting of the historic property. Location refers to the place where an event occurred or a property was originally built. Feeling is the property's expression of the aesthetic or historic sense of a particular period of time. The sense of feeling is conveyed by physical features that express a property's historic character. Setting is the character of the place in which the property played its historic role. The sense of setting is conveyed by how the property is situated and the relationship between the property, its surrounding features, and open space. The aspects of both

feeling and setting can be negatively impacted by the introduction of modern elements into a historic period site.

HDR developed and recommended the 159,164-acre project APE, in consultation with the North Dakota State Historic Preservation Officer (ND SHPO) and RUS for direct and visual effects, which extends one-half mile on either side of the project centerline, and 1 mile on either side of the Project centerline at the Missouri River crossing point. The project extends for approximately 247.8 miles between Center and Grand Forks in Oliver, Burleigh, McLean, Sheridan, Wells, Eddy, Foster, Griggs, Nelson, Steele, and Grand Forks Counties of North Dakota (Figure 1). Approximately 461 points comprising 260 locations within the APE contain buildings and structures. These 260 locations contain multiple buildings and structures, with many farmsteads containing 10 or more.

The buildings and structures within the APE were visually inspected for their potential to be determined historic properties. The APE predominantly consists of agricultural land with some open water (primarily rivers and wetland). The primary agricultural activity is large-scale farming of a variety of crops, including wheat, corn, sunflowers, canola, flax, and barley as well as cattle ranching. The eastern portion of the APE is predominantly devoted to cropland; however, the agricultural activity trends to ranching toward the western, drier portion of the APE. Modern (i.e., less than 50 years of age) buildings and structures tend to dominate the built environment of the APE.

HDR conducted this evaluation of historic architectural resources (buildings and structures) within the APE on behalf of Minnkota and RUS. HDR prepared this technical report in accordance with the recommendations contained in the applicable portions of the *North Dakota SHPO Guidelines Manual for Cultural Resource Inventory Projects.* Until now, there had not been a formal assessment of the various historic architectural resources within the APE; therefore, HDR implemented an inventory strategy relying on a combination of field reconnaissance and archival research.

The approach entailed physical visual inspection of identified locations, to provide information regarding the nature and extent of historic buildings, structures, and/or historic districts within one-half-mile (1 mile at the Missouri River crossing) of the project centerline. ND SHPO concurred with the architectural APE during a conference call held on December 29, 2010.

Archival research was conducted at the ND SHPO offices and the North Dakota State Archives in Bismarck. HDR also used county and local historic preservation commission resources and academic libraries as available to augment our understanding of the history of the area, the builders and developers, and historical trends that shaped the built environment of the project APE.

The primary tasks included:

- HDR conducted a field reconnaissance, via automobile, to identify and evaluate the historic significance of the built environment (building and structures) within the APE. Sites in the APE previously reported to contain potentially historic buildings and/or structures, but found no longer extant during the field survey were noted and not carried forward in this evaluation.

- HDR's principal investigator (PI) for the evaluation of potentially historic structures conducted the preliminary reconnaissance survey. Sites that, in the professional opinion of the PI, lacked the potential for historic significance due to their age or a readily apparent loss of historic integrity were noted and photographed but not carried forward for evaluation. This information is presented in Appendix A. Sites that merited consideration as potentially National Register-eligible were carried forward for evaluation and documentation.

- HDR completed a North Dakota Historic Property Inventory Form to document each property found within the APE that was previously identified to ND SHPO as potentially historic. Inventory forms were also prepared to document each additional property within the APE that, in the professional opinion of the PI, merited consideration as being potentially National Register-eligible. Each form includes at least one digital photograph of the property, along with written comments that address estimated construction dates, major architectural styles, construction materials, aesthetics, and the historic integrity of the buildings and/or structures on the property.

- HDR used Geographic Information System (GIS) technology to manage the spatial data for this project. County data and other information were used to generate maps for field use. Maps that showed the relationship between buildings and other major features were generated for each of the sites selected for detailed evaluation.

- HDR visited a number of county assessor's offices because their data cannot be accessed online. HDR collected supplemental parcel property information such as number and type of buildings on the parcel, their year built, major changes, etc. When possible, the research at assessor's offices was conducted during the fieldwork.

- HDR provided the results of the inventory in a report that meets Secretary of the Interior's standards found at 48 CFR 44716 and provides professional opinions regarding National Register eligibility of the historic sites found in the project APE.

4.0 Thematic Research and Preliminary Field Results

Several historic contexts provided useful information in the analysis of the buildings and structures identified within the project APE:

- National Register of Historic Places Multiple Property Documentation Form – Railroads in North Dakota, 1872-1956;
- National Register of Historic Places Multiple Property Documentation Form – Historic Bridges in South Dakota, 1893-1943.
- National Historic Landmark Nomination – Frederick A. and Sophia Bagg Bonanza Farm 32RI5
- National Register of Historic Places, Multiple Property Documentation Form Bonanza Farming in North Dakota
- National Register of Historic Places Inventory – Nomination Form for the Adams-Fairview Bonanza Farm
- National Register of Historic Places Inventory – Nomination Form for the Sylvanus Marriage Octagonal Barn
- National Register of Historic Places Inventory – Nomination Form for the Zion Lutheran Cemetery, Wrought-Iron Cross Site.

Under the National Register significance evaluation criteria, no works of important architects, engineers, or builders were identified within the APE (Criterion C). Only one of the sites within the APE, HDR 26400/42860, was identified as being associated with notable people in community history (Criterion B)—the Sundquist pioneer family in Ora Township within Nelson County. The general history of the development of the 11 counties and their associated cities within the APE are generally well understood by ND SHPO.

The counties crossed by the Project and the National Register listed property found within them are summarized in the following table. Listed properties within 2 miles of the Project centerline are shown in **bold type**. Detailed information on the listed properties in these counties is available online via the National Register of Historic Places Database (http://www.nps.gov/nr/research/). Detailed information on the history of these 11 counties and their associated cities is also available at the ND SHPO office in Bismarck.

Table 1: County Summary*

County	Year Established	National Register Listed Property	Comments
Oliver	1885	Cross Ranch Archeological District	County Seat: Center County population peaked in 1920 at 4,425 persons.
Burleigh	1873	Bismarck Cathedral Area Historic District Bismarck Civic Auditorium Bismarck Tribune Building Brandt House Burleigh County Courthouse Camp Hancock Site Chief Looking's Village Site Double Ditch Earth Lodge Village Site Downtown Bismarck Historic District Former North Dakota Executive Mansion Grady House Liberty Memorial Bridge Lundquist House	County Seat: Bismarck Bismarck founded in 1872 The population of Burleigh County has continually grown throughout its history. Burleigh County had a population of 69,416 in 2000.
McLean	1883	Former McLean County Courthouse Holy Trinity Ukrainian Greek Orthodox Church Ingersoll School McLean County Courthouse Semevolos Farm Soo Line Depot **Zion Lutheran Church, Wrought-Iron Cross Site**	County Seat: Washburn County population peaked in 1950 at 18,824 persons
Sheridan	1908	Sheridan County Courthouse Winter House	County Seat: McClusky Originally established in 1873; however, lack of settlement resulted in county being administered by adjacent McLean County. Sheridan County was officially recreated in 1908. County population peaked in 1910 at 8,103 persons
Wells	1873	Beiseker Mansion Hurd Round House Vang Evangelical Church Wells County Courthouse Wells County Fairgrounds	County Seat: Fessenden County population peaked in 1930 at 13,285 persons

County	Year Established	National Register Listed Property	Comments
Eddy	1885	Eddy County Courthouse **Sylvanus Marriage Octagonal Barn** Jens Myhre Round Barn New Rockford Bridge New Rockford Post Office	County Seat: New Rockford County population peaked in 1920 at 6,493 persons
Foster	1883	Foster County Courthouse Grace City Bridge Ralph Hall Farm District Lincoln Building McHenry Railroad Loop Putnam House Carrington Post Office	County Seat: Carrington County population peaked in 1930 at 6,353 persons
Griggs	1881	Griggs County Courthouse Northern Lights Masonic Lodge Oscar-Zero Missile Alert Facility **Romness Bridge**	County Seat: Cooperstown County population peaked in 1920 at 7,402 persons
Nelson	1883	Nesheim Bridge Tofthagen Library Museum	County Seat: Lakota County population peaked in 1920 at 10,362 persons
Steele	1883	Baldwin's Arcade Beaver Creek Bridge First Presbyterian Church of Baldwin Steele County Courthouse	County Seat: Finley County population peaked in 1910 at 7,616 persons
Grand Forks	1873	Avalon Theater Beare House R.S. Blome Granitoid Pavement in Grand Forks 201 S. Third Street Building 205 DeMers Avenue Building 312 Kittson Avenue Building 317 S. Third Street Building Campbell House Clifford House Dakota Block DeRemer House Dinnie Apartments Downtown Grand Forks Historic District Edgar Building Finks and Gokey Block First National Bank Funseth Round Barn	County Seat: Grand Forks Grand Forks founded in 1870 The population of Grand Forks County has continually grown throughout its history. Grand Forks County had a population of 66,414 in 2009.

County	Year Established	National Register Listed Property	Comments
		Grand Forks City Hall Grand Forks County Courthouse Grand Forks County Fairgrounds WPA Structures Grand Forks Herald Grand Forks Mercantile Building 1898 Grand Forks Mercantile Co. Grand Forks Near Southside Historic District Grand Forks Riverside Neighborhood Historic District Grand Forks Woolen Mills Great Northern Freight Warehouse and Depot Hook and Ladder No. 1 and Hose Co. No. 2 1648 Riverside Drive House Iddings Block Nelson House Larimore City Hall **Linwell House** Lyons Garage Masonic Temple Metropolitan Opera House Midway Bridge New Hampshire Apartments North Dakota Mill and Elevator Northern Pacific Depot and Freight House Northwood Bridge Odd Fellows Block Ost Valle Bridge Oxford House Roller Office Supply Sorlie Memorial Bridge South Junior High School Speed Printing St. John's Block Commercial Exchange St. Michael's Church St. Michael's Hospital and Nurses' Residence Stratford Building Telephone Co. Building	

County	Year Established	National Register Listed Property	Comments
		U.S. Post Office and Courthouse United Lutheran Church University of North Dakota Historic District Viets Hotel Washington School Wheeler House Wright Block	

Sources: National Register of Historic Places database review 2011; ND SHPO 2010
Sites in **bold type are located within two miles of the proposed centerline for this Project.*

ND SHPO completed a search of their database for the project area in 2010. Table 2 lists the buildings and structures that are identified in their database as being within 2 miles of the project centerline. It should be noted that there are limitations on the ND SHPO data; buildings and structures remain in the ND SHPO database even if they are no longer extant, and the spatial information for many of the earlier entries may have locational errors in excess of 100 meters. More recent entries, made using modern mapping and GPS technology, do not typically suffer from serious spatial error.

Table 2. 2010 North Dakota SHPO Database Search Results*

Site Number	Distance to Centerline (miles)	Site Name	Type	Comments
Oliver County				
32OLX15	1.24	Lewis and Clark Camp	n/a	
32OLX21	0.72	n/a	n/a	
32OL128	1.41	Hans Herter Homestead	n/a	
32OL129	1.28	Henry Johnson Homestead	Farm/farmstead	
32OL259	1.71	Kasperson	Farm/farmstead	
32OL385	0.97	n/a	Farm/farmstead	
32OL386	0.84	n/a	Farm/farmstead	
32OL388	**0.02**	**n/a**	**Farm/farmstead**	**No standing structures**
32OL389	**0.07**	**n/a**	**Farm/farmstead**	**No standing structures**
32OL434	1.14	n/a	Farm/farmstead	
32OL435	**0.03**	**Price School**	**n/a**	**Building is no longer extant**
32OL436	**0.52**	**Price town site**	**n/a**	**Extant, no changes**
Burleigh County				
32BLX19	0.99	Hoiland House	n/a	

Site Number	Distance to Centerline (miles)	Site Name	Type	Comments
32BL33	0.89	Abner O'Neal Steamboat	Museum, gallery and other	
32BL119	**0.41**	**n/a**	**Farm/farmstead**	**Building is no longer extant**
32BL124	1.42	n/a	Farm/farmstead	
32BLX131	**0.49**	**Mercer's Ranch**	**n/a**	**No standing structures**
32BLX132	1.58	n/a	n/a	
32BLX133	0.52	Painted Woods Post Office	n/a	
32BLX139	**0.48**	**Grads Lake Post Office**	**n/a**	**Building is no longer extant**
32BLX147	**0.49**	**Issac Post Office**	**n/a**	**Building is no longer extant**
32BL651	0.69	School No. 2, Wilson Township	Church school, school	
McLean County				
32MLX6	1.49	Nedelman Townsite	n/a	
32MLX8	1.39	Falconer Post Office	n/a	
32ML293	0.97	Zion Lutheran Cemetery	Cemetery/mortuary	
32ML885	**0.47**	**n/a**	**Mine/quarry**	**No standing structures**
32ML923	1.97	SS Peter and Paul & Sacred Heart Cemeteries	n/a	
32ML1027	1.51	Bridge	n/a	
32ML1052	1.47	Iowa School No. 3	Church school, school	
Sheridan County				
32SH193	1.97	n/a	Farm/farmstead	
32SH197	0.89	n/a	Dump/sanitary land fill/sewage treatment plant	
32SH198	0.78	n/a	Farm/farmstead	
32SH199	1.69	n/a	Farm/farmstead	
32SH334	1.53	n/a	Museum, gallery and other	
32SH335	0.81	n/a	Farm/farmstead	
32SH344	0.69	Hellman School No. 2	Church school, school	
32SH348	**0.16**	**n/a**	**Farm/farmstead**	**Private property, access not allowed by owner. Extant buildings viewed from right-of-way but in ruinous condition**

Site Number	Distance to Centerline (miles)	Site Name	Type	Comments
32SH403	1.84	Radio tower	n/a	
Wells County				
32WEX24	1.03	Delger Post Office	n/a	
32WEX26	0.99	Emrick (Doland) Townsite	n/a	
32WEX33	1.50	Oshkosh Post Office	n/a	
32WEX38	**0.00**	**Stavenger Lutheran Church**	**n/a**	**No standing structures, no evidence of site.**
32WE43	0.82	n/a	Corral/enclosure/ pen	
32WE44	0.74	n/a	n/a	
32WE60	0.91	n/a	Dump/sanitary land fill/sewage treatment plant	
Eddy County				
32EDX1	1.56	Dallas Post Office/Township	n/a	
32EDX2	**0.31**	**Brantford Townsite**	**n/a**	**Ruins adjacent to APE only**
32ED32	**0.24**	Sylvanus Marriage Octagonal Barn	**Barn**	**Octagonal barn only listed property in complex of 19 buildings. No changes since most recent site record**
32GGX46	1.72	Mose (Lewis) Townsite	n/a	
32ED206	0.80	n/a	Farm/farmstead	
32ED207	1.25	n/a	Dump/sanitary land fill/sewage treatment plant	
32ED222	**0.39**	**Rocky Run**	**n/a**	**Vehicular bridge that was recorded has been replaced with culverts. This was noted by recorder on existing site record**
Foster County				
32FO9	0.92	n/a	Dump/sanitary land fill/sewage treatment plant	
32FO18	0.68	n/a	Farm/farmstead	
32FO34	1.19	n/a	Church school/school	
32FO45	1.97	Old Lutheran Church	n/a	

Site Number	Distance to Centerline (miles)	Site Name	Type	Comments
32FO46	1.97	Our Savior Lutheran Church	n/a	
32FO47	1.97	St. Peter & Paul Catholic Church	n/a	
Griggs County				
32GGX31	1.94	Romners Post Office	n/a	
32GGX35	1.97	Log Shelter and Mail	n/a	
32GGX36	1.97	n/a	n/a	
32GGX37	1.97	Jessie Post Office	n/a	
32GGX48	1.44	Huso School	n/a	
32GG56	1.99	Romness Methodist Church	n/a	
32GG74	1.05	Ottawa Church	n/a	
32GG81	**0.37**	**n/a**	**Farmstead**	**House in ruinous condition**
32GG93	0.92	Romness Bridge	n/a	National Register Listed
32GGX107	1.15	n/a	Highway/road/trail/ railroad grade/tracks/siding/ spur	
32GG154	1.68	Binford Gospel Tabernacle	n/a	
32GG155	1.64	Bethany Free Church	n/a	
32GG156	1.52	Trinity Lutheran Church	n/a	
32GG165	1.74	Northern Pacific	Highway/road/trail/ railroad grade/tracks/siding/ spur	
Nelson County				
32NEX1	**0.22**	**Aneta Post Office**	**n/a**	**No standing structures**
32NE4	0.77	Sundahl Lutheran Church	n/a	
32NE5	0.71	Aneta Community Church	n/a	
32NE6	0.80	Sacred Heart Catholic Church	n/a	
32NEX61	0.75	Aneta	Residence	Extant
32NEX69	0.75	Aneta	Residence	Extant
32NE70	0.87	Burlington Northern & Santa Fe	Highway/road/trail/ railroad grade/tracks/siding/ spur	

Site Number	Distance to Centerline (miles)	Site Name	Type	Comments
32NEX70	0.75	Aneta	Residence	Updated site record prepared to enable architectural evaluation context
32NEX71	0.75	Aneta	Residence	Updated site record prepared to enable architectural evaluation context
32NEX72	0.75	Aneta	Residence	Updated site record prepared to enable architectural evaluation context
Steele County				
32ST173	0.64	Burlington Northern Santa Fe	Highway/road/trail/ railroad grade/tracks/siding/spur	
Grand Forks County				
32GFX14	1.03	Cable Post Office	n/a	
32GFX25	0.58	McRae Post Office	n/a	
32GFX28	1.05	n/a	n/a	
32GFX29	0.97	Fergus Townsite/P.O. Fergus	Town/City/Colony/ Settlement	
32GFX49	0.67	n/a	n/a	
32GFX50	1.16	Bjorn Post Office	n/a	
32GFX51	0.72	n/a	n/a	
32GF120	**0.00**	**Gronlie Octagonal Gr.**	**Farm/farmstead**	**No longer extant. Only Quonset building remains of four recorded buildings. Updated site record prepared**
32GFX250	0.66	n/a	n/a	
32GF3217	0.75	Bridge	n/a	
32GF3218	0.79	Bridge	n/a	
32GF3219	**0.13**	**Bridge**	**n/a**	**Extant, no changes from previous site recordation**
32GF3229	**0.38**	**Bridge**	**n/a**	**Extant, no changes from previous site recordation**
32GF3231	0.73	Bridge	n/a	

Source: ND SHPO 2010

**Sites in bold font are within the Project APE*

Of the sites identified within the ND SHPO database, 19 are located within the Project APE. Of these:

- Buildings and structures on 15 of the recorded sites have been demolished and the buildings are no longer extant.
- None of the sites in the ND SHPO database appear to merit consideration as a historic property based on the poor condition of the buildings, lack of extant structures, or previous National Register evaluations by consultants.

The following section presents an overview of contextual topics that reflect the survey corridor and the nine recorded new sites. The section begins with an overview of North Dakota history, and then more specific topics are examined that are applicable to the development of the sites within the project corridor.

4.1 North Dakota History Overview

The following North Dakota historic overview has been adapted from *The Early History of North Dakota: Essential Outlines of American History* (Lounsberry 1919), *Out Where the West Begins: Early and Romantic History of North Dakota* (Trinka 1920), and the chapter "North Dakota History: Overview and Summary" from the *North Dakota Blue Book* (Remele 1998).

Pierre Gaultier de la Verendrye became the first recorded Euro-American to visit what is now the state of North Dakota. An explorer and fur trader, he first visited Mandan villages near the Missouri River in 1738. The Canadian North West Company and Hudson's Bay Company began erecting trading posts in the 1790s, and the U.S.-sponsored Lewis and Clark expedition passed through the territory in 1804 and 1805. Over time, more explorers and fur traders traveled to the area, establishing settlements and forts in key fur procurement areas. One early fur trade settlement near Pembina was set up in 1812. The Red River Valley was also occupied by the Metis, a group of people of mixed European and Native American ancestry. The Metis were active in the fur trade in the region, carrying furs and merchandise between Winnipeg, Canada, and St. Paul, Minnesota, by oxcart. By 1859 steamboats were being used to transport goods between the two cities.

Military confrontation defined the period between 1862 and 1870, when settlement slowed down as people grew apprehensive of the conflict between the Dakota tribe and the U.S. government. An unfulfilled treaty between the federal government and the Dakota led to a violent uprising in Minnesota in 1862. This in turn led to major military expeditions by the U.S. government in 1863, 1864, and 1865. Battles in North Dakota at Whitestone Hill and Killdeer Mountain in 1863, and in the Badlands in 1864, diminished Dakota resistance. Despite the military confrontations, strained relations between federal entities and Dakota populations existed well into the 1890s.

The American Settlement era ran from 1861 through North Dakota's statehood in 1889. The settlement of North Dakota was directly tied to the creation of railroads and railroad lines across the state. In 1862 gold was discovered in present day Montana and Idaho, leading to waves of settlers traveling west across North Dakota. In 1864, the U.S. government granted the Northern Pacific Railway Company (Northern Pacific) the right to build a railroad through the territory, and in 1871 an expedition with a military escort was sent out to scout and survey potential routes. By 1872 the Northern Pacific was built as far as Bismarck, and by the end of the 1870s, railroad links from the east brought homesteaders, including many Norwegian and German immigrants, to the state. Throughout the 1870s and 1880s towns and settlements developed to serve the homesteaders, frontier citizens, and railroad crews working in the territory.

Around 1879, a population boom occurred that had direct ties to the development of organized, highly mechanized, large bonanza farms. These bonanza farms had a dramatic effect on the landscape. For the first time, large sections of what is now the project area were cultivated. On November 2, 1889, President Benjamin Harrison approved the admission of North Dakota to the United States. The new state was a Republican stronghold, with the state government dealing with issues concerning large amounts of resources and wealth being extracted from the state with no reinvestment. This eventually led to the Democratic Party winning elections and in turn reinvesting wealth and resource back into the state.

In the 1910s, agriculture boomed in North Dakota as settlers took advantage of the Enlarged Homestead Act and farmers planted "fence row to fence row," supplying a warring Europe with food. The boom was short lived.

During the Great Depression (1929 - 1940), a slowing national economy, heavy debt, low prices for agricultural goods, crop failures, dust storms, and extreme weather resulted in series of farm forecloses, bank failures, and abandonment of residential dwellings and businesses. This period resulted in the establishment of tree shelterbelts, city parks, and civic improvements through Works Progress Administration and Civilian Conservation Corps work relief projects.

Historian Larry Remele defines the ensuing period from the 1940s to 1960s as the modern industrial development phase. During this time, a post-war economy drove development of large industrial facilities in order to change raw materials into products for local and national consumption. Large, federally funded dam building and reservoir construction projects allowed farms, corporations, and North Dakota citizens to control their access to water resources throughout the year. The discovery of mineral resources, such as oil and coal, allowed for the development of these industries in the state. Additionally, the beginnings of Cold War stress between the U.S. and foreign governments generated a perceived need for strategic placement of military bases, and in 1960 two large Air Force bases were built at Grand Forks and Minot.

The following sections trace the historical development of topics that influenced the project area. They include railroads, wheat farming, bonanza farms, schoolhouse development, and the Cold War Minuteman strategic missile system.

4.2 North Dakota Railroads

By far the biggest influence on the early settlement of the state was the construction of railroads, which affected settlement patterns, farming, and architecture in the project area. While there are no railroad buildings or structures in the project area, the lines directly influenced the project-area built environment. They are responsible for enabling settlement, helping foster wheat growing and milling, and facilitating shipment of building materials into the project area and agricultural products out to cities for processing and consumption.

In 1872, the Northern Pacific built the first line into the northern Dakota Territory entering from Moorhead, Minnesota, through Fargo. The goal was to build a northern transcontinental line. In September of 1873, Jay Cooke & Company (a major funder of the Northern Pacific) filed for bankruptcy, sending the entire country into a financial crisis. Between 1873 and 1880, construction in the state stalled as the nation recovered financially. The Northern Pacific began selling land granted to it as a federal subsidy for railroad construction, promoting it as excellent wheat land. The wheat crop bonanza in the Red River Valley encouraged land buyers, giving the Northern Pacific the financial funding to continue construction through North Dakota.

The prospect of profits from the wheat boom encouraged other railways to build in the valley. In 1880, the St. Paul, Minneapolis and Manitoba Railway Company (SPM&M) made its way into the state through Grand Forks. Construction peaked in 1888, with an average of 165 miles of track laid a year. Construction continued at a slower pace in the 1890s. By 1898 more than 2,700 miles of track had been built in the state, including parts of two transcontinental lines, the Northern Pacific and the Great Northern Railway (Great Northern). In 1916, construction had reached its greatest extent with a total of 6,100 miles of track. Seven major companies, including the Northern Pacific; the Great Northern; the Minneapolis, St. Paul and Sault Ste. Marie (Soo); the Chicago, Milwaukee and St. Paul (Milwaukee); the Midland Continental; the Farmers Grain and Shipping Company; and the Chicago and North Western, operated in the state, along with several smaller regional companies. Most lines also provided passenger service, although the shipment of agricultural produce and raw materials dominated.

The Farmers Grain and Shipping Company, a farmer-owned railroad line, was established in 1902 to accommodate the wheat farmers in the eastern part the state with lower shipping rates. The main commodity in North Dakota continued to be wheat, with nearly 159 million bushels produced in 1915. Although wheat dominated the agricultural markets, agricultural commodities shipped from North Dakota also included flax, corn,

and cattle. Other raw materials included ore, coal, and timber produced in the western part of the state. (Schmidt 2002: 5-31)

The mid-twentieth century presented several challenges for the railroad companies in North Dakota. Between 1920 and 1960, railroads lost most of their passenger and half of their freight service to competition with automobiles, trucks, and airplanes. North Dakota wheat production decreased dramatically during the 1930s Dust Bowl with production falling to 19 million bushels in 1936 from a high of 159 million bushels in 1915. Railroad companies abandoned low-profit branch lines. By 1940, trackage in North Dakota dropped to around 5,200 miles. With the United States' entry into the Second World War in 1941, the railroads across the nation experienced improved profitability because of the military demand for trains. Civilian demand also increased due to fuel rationing. Postwar, railroads continued their previous decline because of increased competition from other modes of transportation. Interstate highway construction in the 1950s put a greater strain on the railroad companies in the state. This led to a period of railroad consolidation, and today only the Burlington Northern Santa Fe and the Canadian Pacific serve the state (Schmidt 2002: 31-35).

The following sections examine the three main railroads that ran through the project area. These were the Northern Pacific, the Great Northern, and Soo Line.

Northern Pacific Railway Company

The Northern Pacific Railroad Company was founded on July 2, 1864, when President Abraham Lincoln signed an Act of Congress allowing the creation of the company. With the Act, the Northern Pacific received a grant of 50 million acres of land. This gave the company land for ancillary facilities, as well as for selling to pay for construction costs. The company was also granted 200 feet of right-of-way on either side of the track through public land (Burlington Northern Santa Fe 1999: 21). The goal of the act was the construction of a transcontinental line through the northern states, to begin somewhere near Lake Superior in either Minnesota or Wisconsin, and end at the Puget Sound in Washington. A group of investors from Boston, with the support of the banking house Jay Cooke & Co., later wrote a new charter to allow the company to finance the construction. In 1870, President Grant signed the resolution, and on February 15, a groundbreaking ceremony was held in Carlton, Minnesota. Six months later the company began construction.

The line reached the eastern border of present-day North Dakota at Fargo in 1872 and by June 1873 had reached Bismarck. However, in September of 1873 a major financial panic hit the country when Jay Cooke & Co. filed for bankruptcy. Bond sales dropped, the company lost its hold on the SP&P, service halted between Fargo and Bismarck for a year, and several leadership changes took place. Business improved by 1879 and by 1881 the line crossed into Montana just west of Beach, North Dakota. In 1882, the company began constructing branch lines and acquiring smaller companies in the territory.

In 1883 the company went into bankruptcy again, and James J. Hill of the Great Northern gained control. Under his leadership, the Northern Pacific; the Great Northern, and the Chicago, Burlington and Quincy Railroad (CBQ) formed the trust Northern Securities Company to control shipping rates between competing companies. It was dissolved in 1904 when the U.S. Supreme Court found the partnership in violation of the Sherman Antitrust Act.

In the years following, the Northern Pacific continued to build branch lines throughout North Dakota. The company built its last branch in the state in 1945 (Figure 2). In 1970, the Northern Pacific merged with the CBQ, the Great Northern, and the Spokane, Portland and Seattle Railroad (SP&S) to become the Burlington Northern Railroad. The Burlington Northern and the Atchison, Topeka and Santa Fe Railroad merged and became the Burlington Northern Santa Fe Railway Company (BNSF) in 1995. The BNSF is still running through North Dakota along the old Northern Pacific lines (Figure 3).

Figure 2: Extent of the Northern Pacific Railway Company's Track System in North Dakota. Project area counties are outlined. Modified from Schmidt and Vermeer 2002: 202.

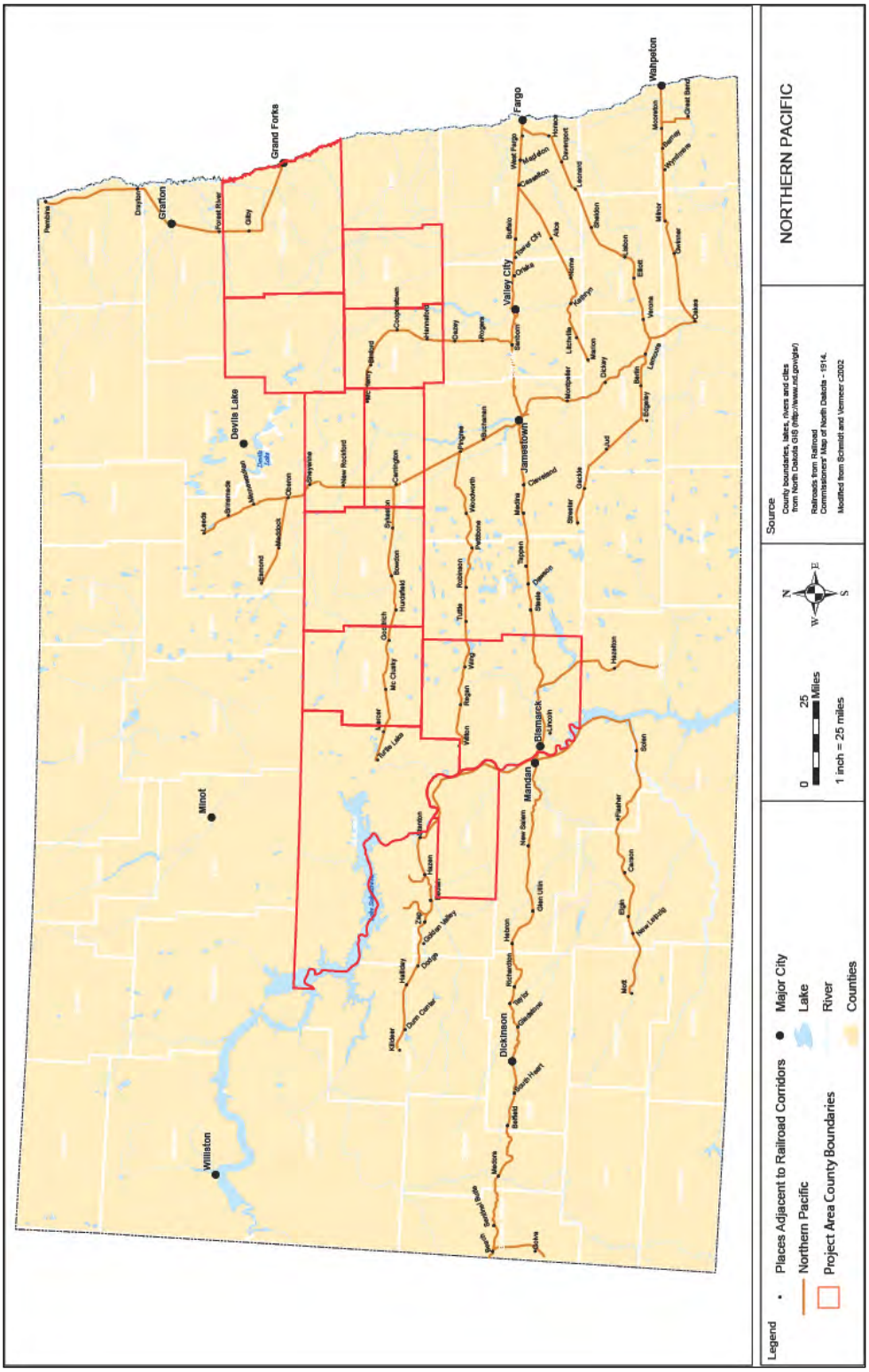
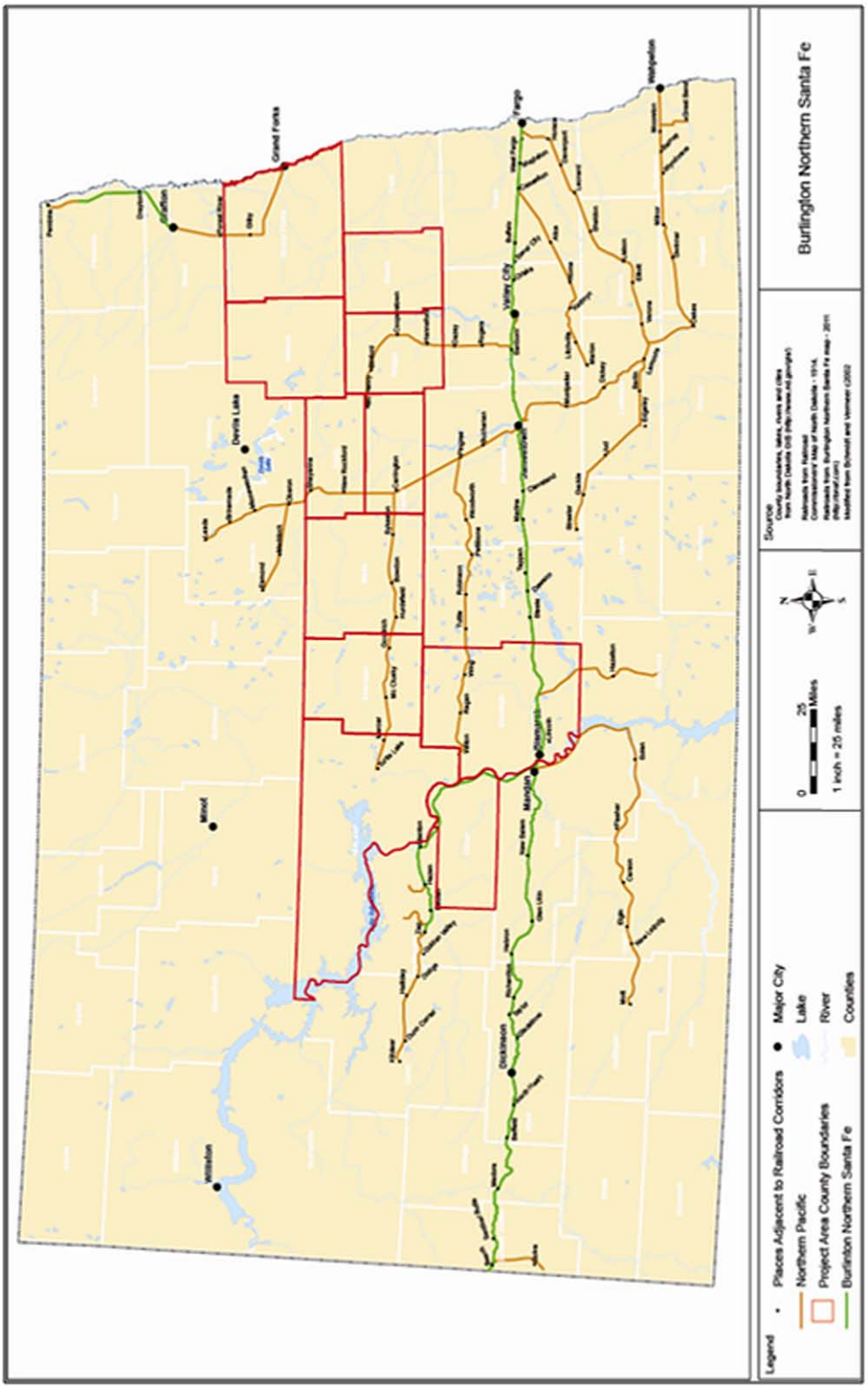


Figure 3: Abandoned Northern Pacific Lines and In-Use Burlington Northern Santa Fe Lines.
Project area counties are outlined. Modified from Schmidt and Vermeer 2002: 202.



Great Northern Railway Company

The Great Northern did not begin service North Dakota until the company purchased the SPM&M in 1907 under the leadership of James J. Hill. It was this company that led the way through the state with its lines. The SPM&M was formed in 1879 to consolidate railroad companies with connections between the Twin Cities and western markets, namely the Red River Valley in the eastern part of the northern Dakota Territory. Hill began his ventures in the valley in 1871 with a steamboat company that later incorporated as the Red River Valley Railroad Company (RRVRC). Furs were the initial goods transported, with a shift to wheat. In 1879, RRVRC merged with SPM&M, beginning SPM&M's dominance of the valley. In 1882 Hill became president of SPM&M and began pushing for more construction and market diversification. Between 1879 and 1887 the company saw its greatest period of construction through the territory. During this period SPM&M began construction of its main line through the state heading west from Grand Forks, as well as several north-south main and branch lines. In 1887, the company completed its east-west line through the state ending near Buford. In 1890, SPM&M began leasing its properties to the Great Northern, also controlled by Hill.

SPM&M officially merged with Great Northern on November 1, 1907. Hill resigned as president the same year, and leadership was transferred to his son Luis, but he continued as chairman of the board. From 1907 to 1912 the company constructed four railroads in North Dakota. The largest of them began in Fargo and ended in Surrey, near Minot. Like the Northern Pacific, the company faced ups and downs during and after the wars. In 1970, the Great Northern merged with the Northern Pacific and the CBQ to become the Burlington Northern, which later became the Burlington Northern Santa Fe (BNSF). BNSF continues to use several of the Great Northern lines in North Dakota, including the main east-west line from Grand Forks through Williston, and the north-south line from Fargo to Surrey (Figure 4).

Burlington Northern Santa Fe Railway Company within the Project Area

Currently, the BNSF uses lines built by Northern Pacific and Great Northern railroads. Within the project area, BNSF lines run through Oliver, Burleigh, Wells, Eddy, Foster, Nelson, Griggs, Steele, and Grand Forks Counties (Figure 5). Major population areas along the lines include Bismarck, Hamburg, New Rockford, Glenfield, Tolna, Finley, Larimore, and Grand Forks.

Figure 4: Extent of the Great Northern Railway Company's Track System in North Dakota. Project area counties are outlined. Modified from Schmidt and Vermeer 2002: 199.

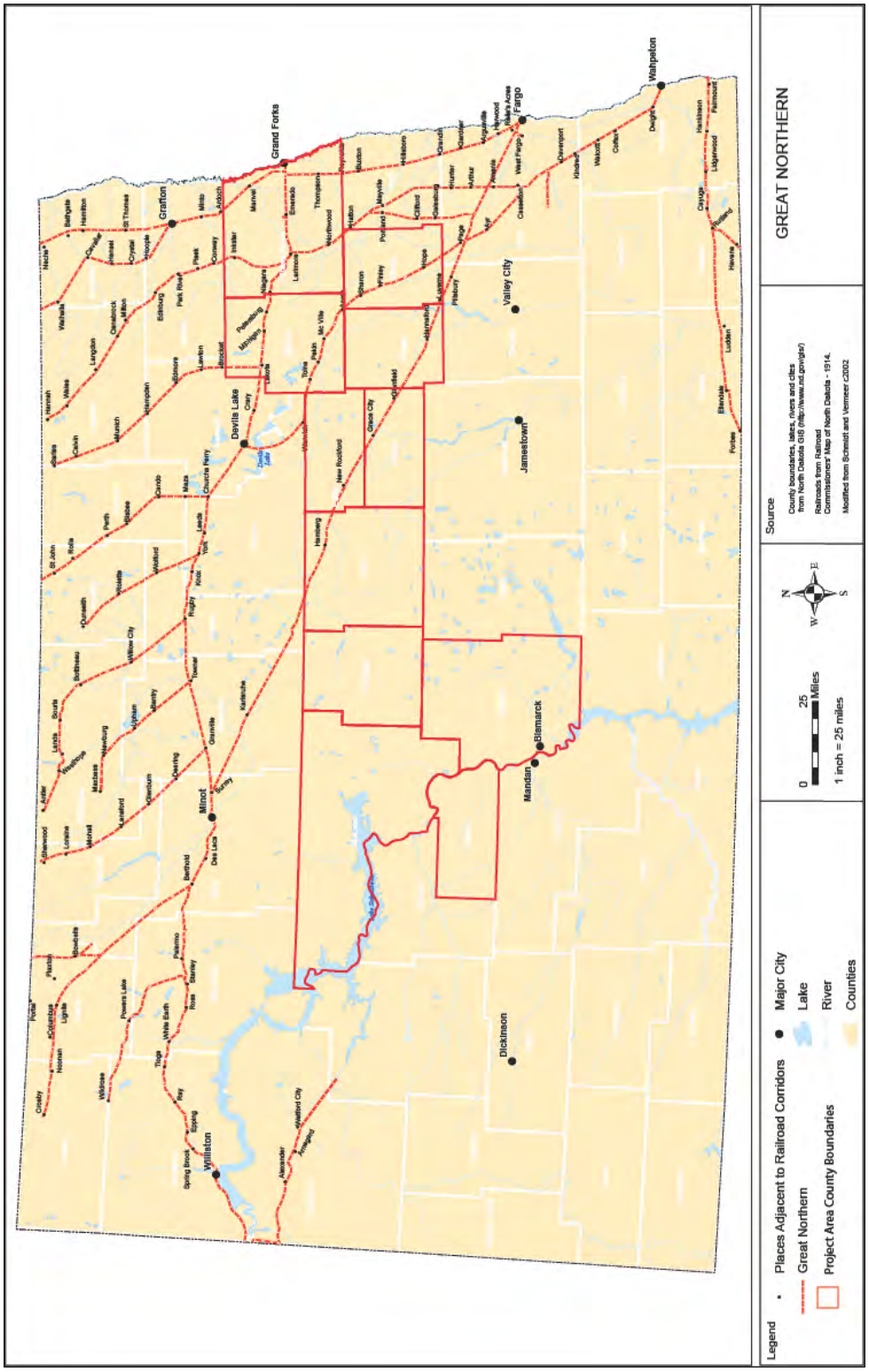
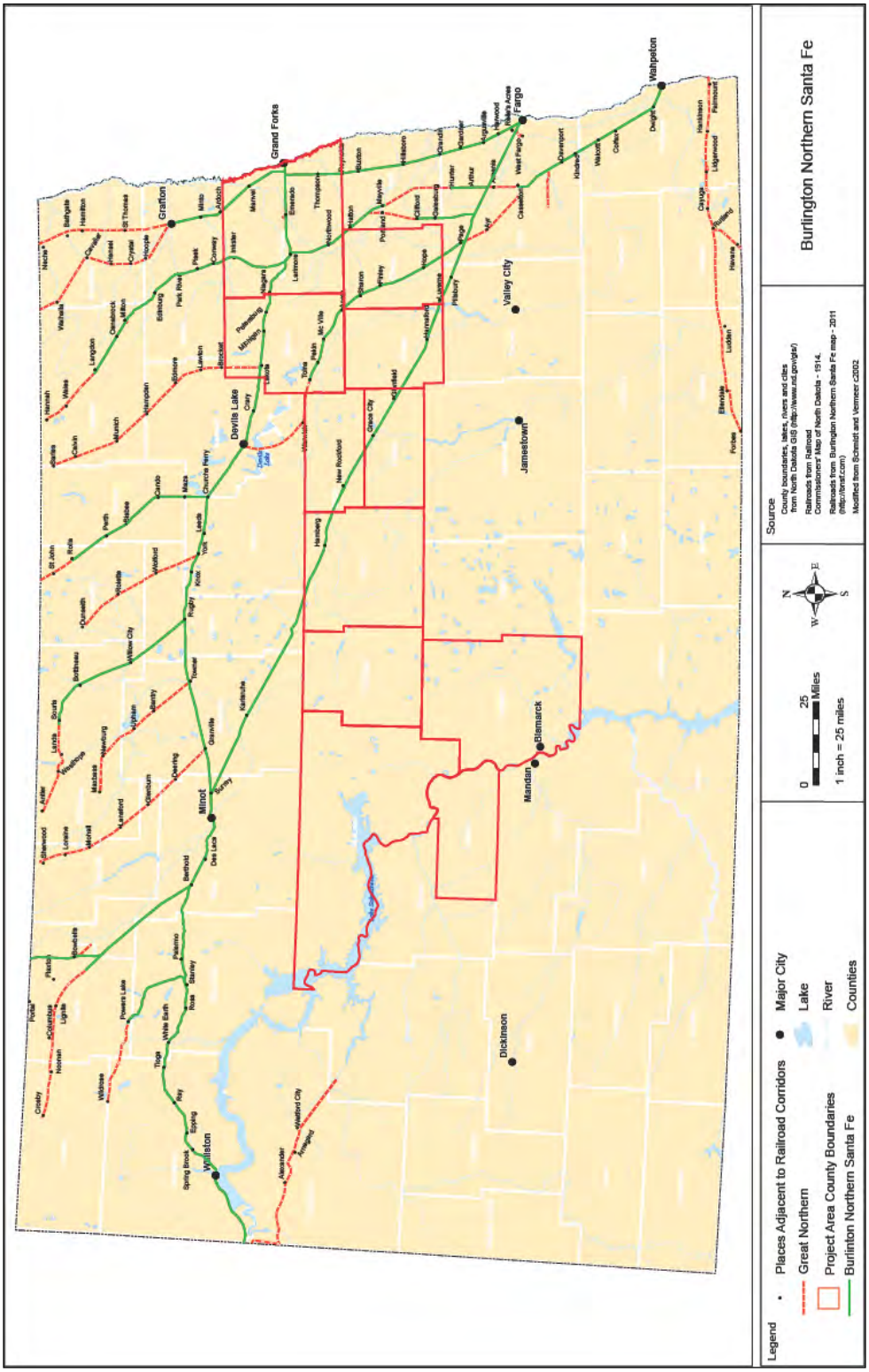


Figure 5: Abandoned Great Northern Railway lines and In-Use Burlington Northern Santa Fe lines. Project area counties are outlined. Modified from Schmidt and Vermeer 2002: 199.

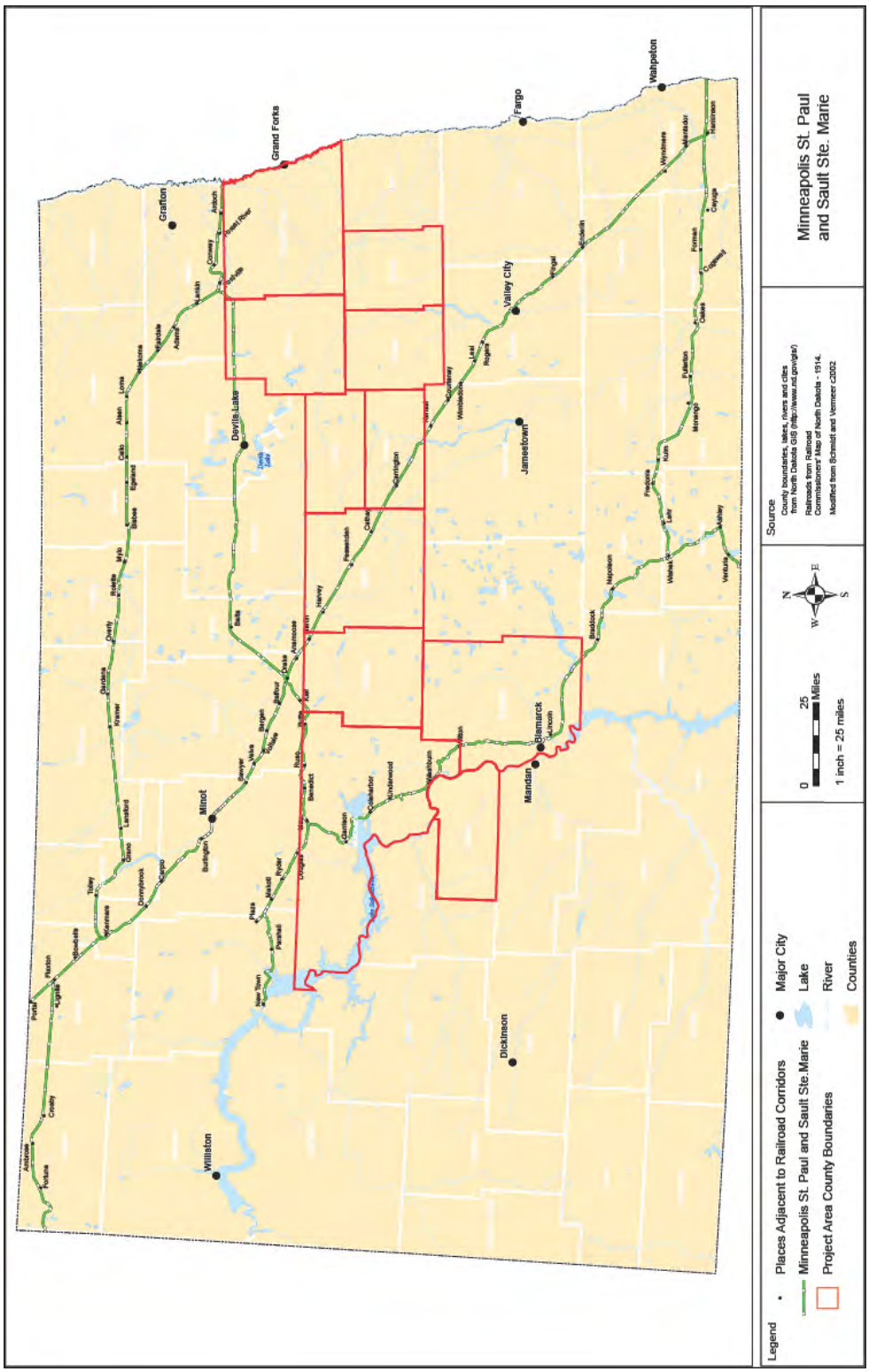


Minneapolis St. Paul and Sault Ste. Marie Railway Company

The Minneapolis St. Paul and Sault Ste. Marie Railway Company (Soo Line) was developed by the grain milling industry of Minneapolis. During the 1880s, a number of conditions led to a decline in Minneapolis milling operations. Other railroads began building lines that bypassed Minneapolis, and Chicago-based lines were setting rates that favored their city. In 1883 and 1884 the Soo Line was incorporated out of the Minneapolis and St. Croix Railway Company; the Minneapolis, Sault Ste. Marie and Atlantic Railway Company; and the Minneapolis and Pacific Railway. The merger of these three railroads allowed Minneapolis to regain competitiveness in receiving wheat shipments from the Dakotas and in trans-shipping to eastern markets. In 1888 the railroad consolidated with the Aberdeen, Bismarck and Northwestern Railway Company controlled by the Canadian Pacific. In 1893, this railroad became the third transcontinental railway when the line was connected to the main Canadian Pacific line via Portal, North Dakota.

The Soo Line was the third largest railroad in North Dakota (behind the Northern Pacific and Great Northern companies), after a period of expansion between 1890 and 1910. The Soo Line transported agricultural products, iron ore, coal, lumber, and passengers, though they began cutting back passenger service in the 1920s due to falling revenues. Between 1947 and 1953, the Soo Line gained additional revenue by becoming the sole railhead for materials and laborers for the construction of the Garrison Dam in McLean County. In 1961 the company merged with the Wisconsin Central and the Duluth South Shore and Atlantic Railroads, and officially renamed itself the Soo Line Company. By the end of the 1960s, the Soo Line discontinued passenger service to concentrate on freight. During the 1980s, the company acquired the Minneapolis, Northfield and Southern Railway, and the Chicago, Milwaukee, St. Paul and Pacific Railroad, substantially increasing the company's territory (Figure 6). During the 1990s, the Canadian Pacific acquired all outstanding Soo Line stock, and the Soo Line became a wholly owned subsidiary of the Canadian Pacific. The Canadian Pacific still uses the lines running from Hankinson to Portal, Hankinson to Oakes, and Drake to New Town.

Figure 6: Minneapolis-St. Paul and Sault Ste. Marie Railway Company's Track System in North Dakota.
Project area counties are outlined. Modified from Schmidt and Vermeer 2002: 201.

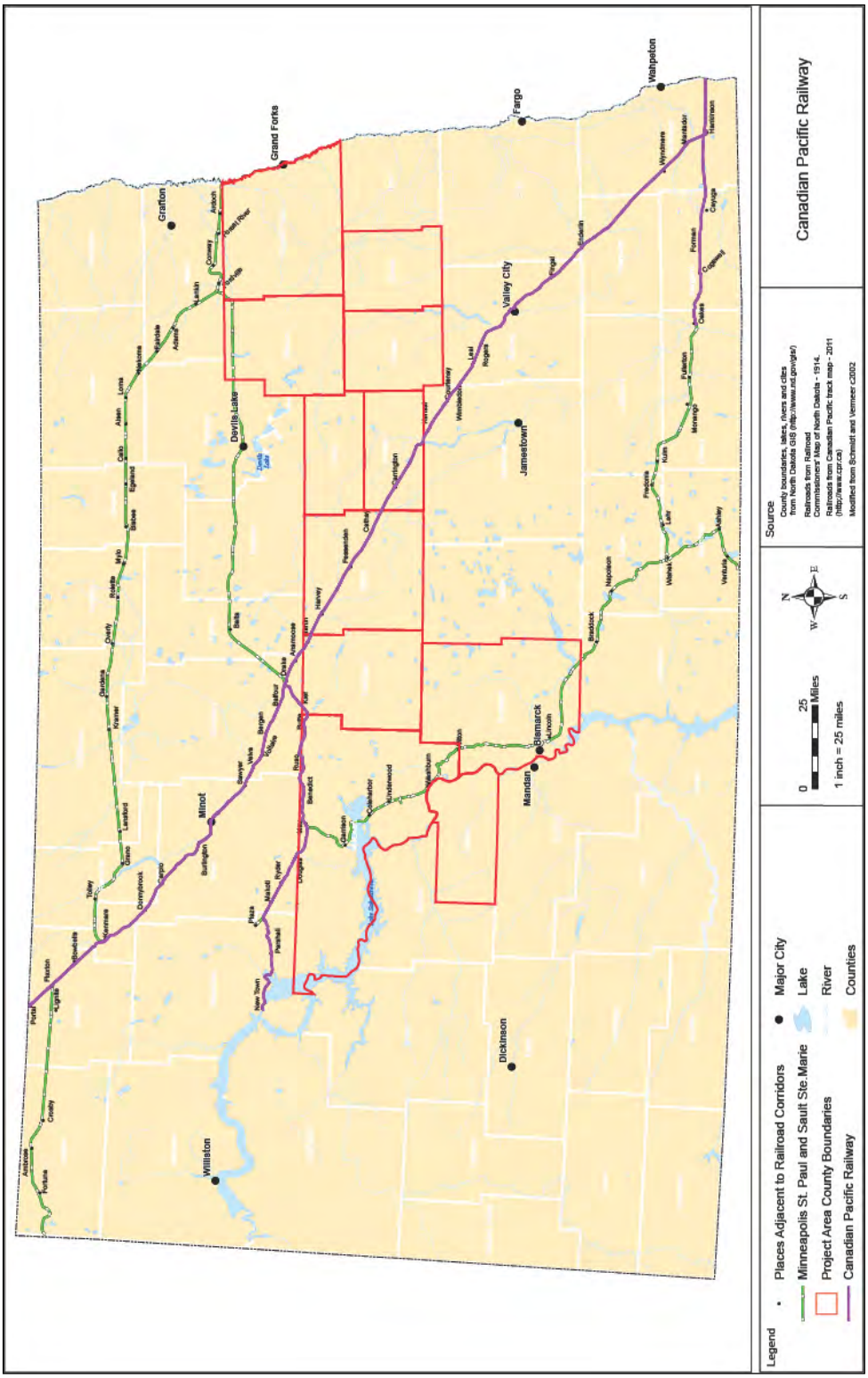


The Soo Line helped shape North Dakota during the late nineteenth and early twentieth centuries. The railroad was one of the state's major employers and had a division headquarters in Enderlin, engine houses and yards in Harvey, Kenmare, Portal, Wishek, and Bismarck, and more than 100 line elevators along the North Dakota routes. The Soo Line, like many other railroads, platted towns as they extended their lines, but because the Soo Line lacked federal land grants, it platted at a greater rate than other lines to offset construction costs. In 1905, the Soo Line's affiliated land development company, Minnesota Loan & Trust Company, platted 25 new town sites along its Wheat Line-to-Kenmare route.

Within the project area, the Canadian Pacific runs from south to north through Eddy, Wells, the very northeast corner of Sheridan, and along the northern border of McLean County (Figure 7). The line passes through the towns of Carrington, Cathay, Fessenden, Harvey, and Martin, and roughly parallels Hwy 52. The line goes through Germantown Township in Wells County in the project area.

The Northern Pacific set the stage for railroad development in North Dakota. Though initially built to connect the west coast to the east, the Northern Pacific and the companies that followed found North Dakota to be profitable, largely because farms, specifically the wheat farms, were dependent on the railroad. Throughout much of the state's history, wheat has been economically important.

Figure 7: Abandoned Minneapolis St. Paul and Sault Ste. Marie Lines, and In-Use Canadian Pacific Lines. Project area counties are outlined. Modified from Schmidt and Vermeer 2002: 201.



4.3 Wheat Farming and Bonanza Farms

After the decline of the fur trade in the Red River Valley of northern Dakota Territory, early settlers saw wheat as a viable commodity. The region provided ideal conditions to grow wheat crops and soon the Northern Pacific Railway began to advertise small farms along its tracks to entice buyers. Their initial strategy did not work well because settlers could obtain cheaper government land near the railroad's land. These early farmers faced hard conditions during their first years due to grasshopper infestations and low yields. The Northern Pacific and the rest of the nation fell into a financial crisis in September of 1873. The railroad sought a better way to promote the sale of land and the solution was to set up wheat bonanza farms. In 1874 the first bonanza farm in the territory began.

Bonanza farms are generally defined as being several thousand acres in size, devoted to cultivating wheat, and were run by a large labor force with the latest equipment (initially horse drawn, followed by mechanized). In order to qualify as a bonanza farm, minimum size had to be between 1,000 and 3,000 acres. By 1890, 323 farms in North Dakota met the 1,000 acre minimum; 91 had more than 3,000 acres. The largest farms had between 20,000 and 200,000 acres, but these constituted only a small percentage of the total. Bonanza farms all required a large labor force to keep the operation running at maximum efficiency. The amount of labor needed fluctuated with the season, with the most needed during harvest. Bonanza farms also required staff to run day-to-day activities, including bookkeepers, housekeepers, blacksmiths, and mechanics. Large amounts of equipment were necessary as well. One historian described a harvest as including a "parade of horse and mule drawn binders" (Lesher 1990: np).

As the agricultural economy waned in the 1920s Bonanza farms began to decline, but wheat farming continued to be a large part of North Dakota agriculture. Drought and dropping wheat prices slowed the industry for the next two decades, but wheat remains a major commodity in the state.

The Red River Valley in eastern North Dakota provided suitable land for farmers growing wheat. The land was flat, treeless, and virtually free of stones, which made it very easy to till (Drache 1964: 4). Early farmers in the area found that wheat adapted easily to the drier, cooler climate, and was more productive because of the environmental conditions. Compared to eastern U.S. farmland, the soil proved to be more fertile because it had not been continually farmed. During the latter half of the nineteenth century, farmers in the eastern U.S. faced infertile and scarce cropland and rising costs. Insects and diseases also threatened eastern crops, particularly wheat (McCroskey 1990: E-4). Although wheat farming took place on the eastern side of the Red River in Minnesota, the western side of the northern Dakota Territory lent itself to wheat bonanza farming because it was slightly higher and drier (preferred by wheat). The less-settled area also allowed for greater expansion. Tillable land, fertile soil, and room to grow made North

Dakota an ideal location to grow wheat. The wheat produced also proved to be a higher quality than wheat grown in the eastern U.S.

Industrial-sized production of wheat was not dependent on favorable geographic conditions alone. Before the beginning of the bonanza boom, key technological advancements occurred in the grain industry. First, Edmond N. LaCroix developed the middling purifier process, or "shaker" process (Drache 1964: 13; Vulte 1914: 49, 56). This allowed mills to make better use of spring wheat and produce better quality flour. Second, the industry adopted steel rollers, which greatly decreased the milling time and again accommodated harder wheat varieties. Additionally, mills began using a gradual reduction technique that was used in conjunction with the middling purifiers (Drache 1964: 14).

Accessible transportation from the fields to the mills was vital to the North Dakota bonanza farms, but railroads were reluctant to enter a settled area. However, in the northern Dakota Territory, bonanza farms came into existence because of railroad companies. In 1864, the U.S. Congress awarded the Northern Pacific the largest railroad land grant, nearly 50 million acres of land.

After the bankruptcy of Jay Cooke & Company in 1873, the Northern Pacific devised a way to generate revenue with land sales. James Power, the company's land commissioner for the Dakota region, pushed the idea to use the land in northern Dakota Territory as propaganda to encourage land sales. He persuaded General George W. Cass (president of the Northern Pacific) and Benjamin Cheney (member of the board of directors for the Northern Pacific) to exchange their bonds and secure 13,440 acres along the railroad in the Red River Valley approximately twenty miles west of Fargo. This became the first wheat bonanza farm in the area. Originally called the Cass-Cheney farm, it became known as the Dalrymple farm when management was given over to Oliver Dalrymple of Minnesota in 1875. Dalrymple already had experience in wheat production, and under his management the farm produced 32,000 bushels in 1877 (Hagen et al. 2002: 36; McCroskey 1990: E-3). The farm proved to be a success, not just in producing bountiful harvests, but also in promoting the sale of Northern Pacific's lands. Stock holders began trading in the bonds for land, and those promising to develop farms were given special rebates and discounts. With wheat farming enthusiasm growing in the area, speculators and small farmers began buying railroad land or homesteading government land in the Red River Valley.

As production of and demand for North Dakota wheat grew, so did the demand for transportation and storage. Several railroad companies, including the Northern Pacific, the Great Northern, and the Soo Line, took advantage of the bonanza boom and built main and branch lines throughout the region. Hundreds of grain elevators and warehouses were built along the lines to make trans-shipping more efficient. This trend can be seen in every town that a railroad line passes through in the project area. The railroads would

often transport field hands free of charge because they knew that they could make a better profit off of successful harvests (Hagen et al. 2002: 39). Farm owners constructed farmhand bunk houses at some of the recorded sites in the project corridor which reflected this development by the railroad companies. After the initial wheat farm promotion by Powers, the railroads and the wheat farms were interdependent.

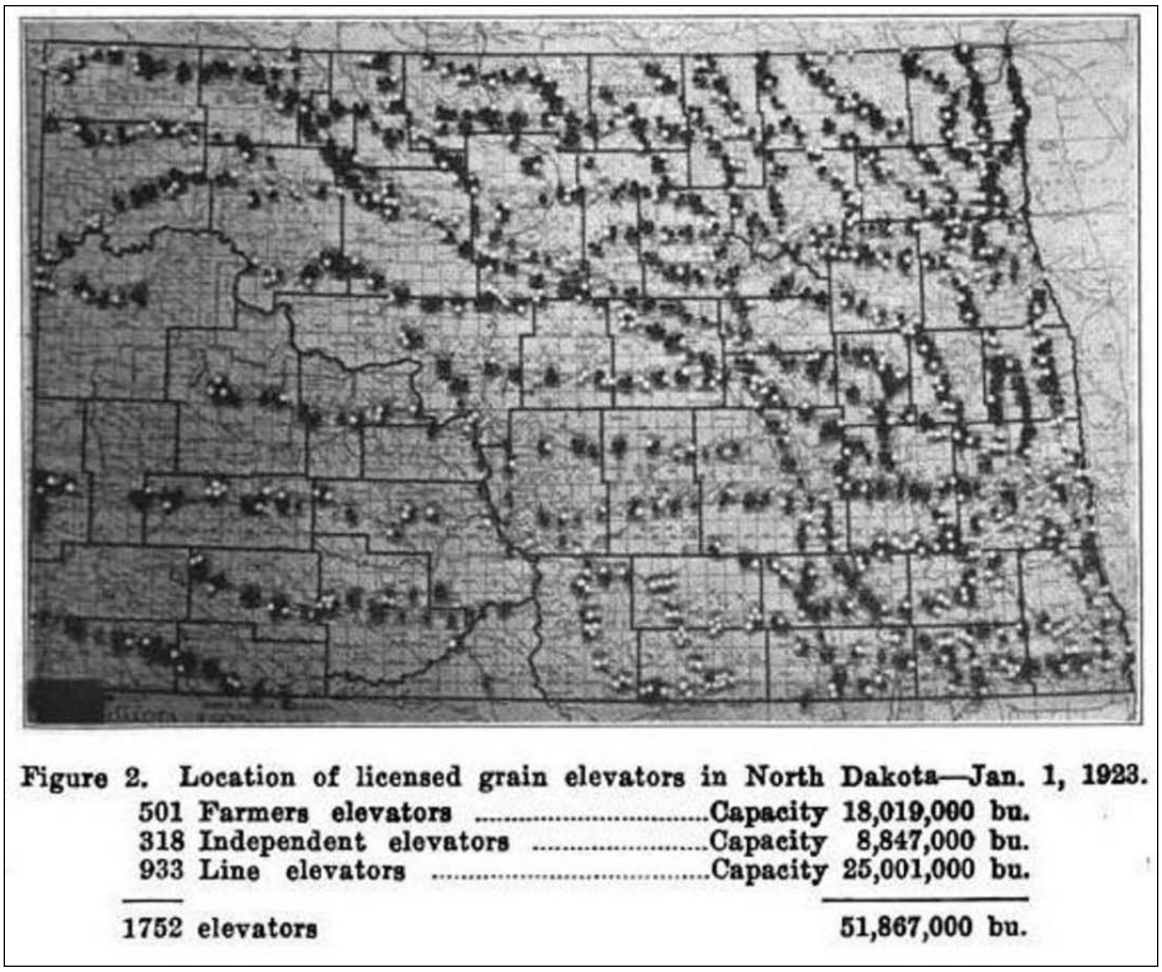


Figure 2. Location of licensed grain elevators in North Dakota—Jan. 1, 1923.

501 Farmers elevators	Capacity	18,019,000 bu.
318 Independent elevators	Capacity	8,847,000 bu.
933 Line elevators	Capacity	25,001,000 bu.
1752 elevators		51,867,000 bu.

Figure 8: Number of Grain Elevators in the State in 1923.
The locations roughly match railroad track locations. (Benton 1924: 5)



Figure 9. Postcard Showing a Line of Grain Elevators along Great Northern Track near Wolford. Image courtesy of North Dakota State University Libraries, Institute for Regional Studies. Ronald Olin North Dakota Postcard Collection, 2000. Item number 2000.536.4. http://digitalhorizonsonline.org/u?/uw,4762.

The bonanza boom did not last long in North Dakota and began to wane by the 1920s. One of the main reasons this type of farming ended was the lack of diversification in crops. Smaller farms could adjust to the disadvantages of less rainfall, disease, or over use by switching to other crops or grazing. In general, farmers were making a switch from single-crop to multi-crop cultivation once they realized that the valley could sustain crops other than wheat. Another factor leading to the decline in bonanza farming was the use of large labor forces. Bonanza farms spent a large portion of revenue hiring, housing, and feeding the people needed to run the operation. In contrast, the small farms spent little money on operating costs because they mostly relied on their own family unit and raised some of their food.

Most bonanza farms were in the Red River Valley in the eastern part of the state, specifically in Cass, Grand Forks, Richmond, and Traill Counties. The first, the Cass-Cheney or Dalrymple farm, was located in Cass County. Others in that county include the Amenia and Sharon Land Co., the Boston farm, and the Houston farm. In Richland County, two bonanza farms are listed in the National Register. The older of the two is the Adams-Fairview Bonanza Farm, established c. 1880. The land was originally purchased by John Quincy Adams and his son William P. Adams of Illinois. During its historic period, the farm consisted of 9,000 acres devoted to wheat and oats (McCroskey 1990:

8-1). The second National Register-listed farm is the Frederick A. and Sophia Bagg Bonanza Farm. This farm was also nominated as a National Historic Landmark. The Bagg farm was established in 1915 at Carrington by Frederick A. Bagg. He began as a manager of the Downing farm (approximately 2 miles from his own farm), but moved on to start his own farm. The Bagg farm was approximately 6,000 acres of wheat, but later diversified to include alfalfa, sweet clover, and corn. Bagg also raised pigs and had as many as 1,500 head at one time. The Bagg family discontinued farming the land in the 1950s (National Park Service 1985: Section 8, 7-9)

Very little remains of bonanza farms in the project area. Historically, Burleigh County had the Clarke farm (near Bismarck) and the Betz Farm (approximately 40 miles north of Bismarck). In Wells County, Richard Sykes established his own bonanza farm. Near Carrington in Foster County was the Carrington and Casey bonanza farm, which consisted of 35,756 acres. The Cooper brothers of Chicago established their bonanza farm of 37,000 acres in Griggs and Barnes counties (Drache 1964: 75). In Grand Forks County, bonanza farms included the Kentucky farm, New York farm, Elk Valley Farm Company, and the Hersey–Crystal Springs Farm.

Agricultural-related National Register listings in the project area counties include the following located on the National Register Information System:

4.3.1 Eddy County

Sylvanus Marriage Octagonal Barn (32ED32)



Figure 10. The octagonal barn on the right as it appeared in April 2011.

The barn was built for Sylvanus Marriage in circa 1902, near New Rockford. The barn was originally used to store farm equipment. The barn is significant because it is an example of octagonal barn construction and because of its continued use and maintenance.

4.3.2 Foster County

Ralph Hall Farm District



Figure 11. The Ralph Hall Farm Residence and House HDR 26400/42860
The Ralph Hall Farm residence in Carrington (on left) is similar in style to the house recorded at HDR 26400/42860 (on right) in Ora Township within Nelson County.

The Ralph Hall, or Harmon Farm, site includes a house, a banked barn, and a garage. The farm is approximately three miles north of Carrington, and had historical ties to the town. The original owner, Ralph Hall, came to the area in 1880 as a surveyor. Hall was eventually appointed sheriff for Foster County, and then served in the state legislature from 1890 to 1893. In 1893, President Grover Cleveland appointed Hall as Indian agent at Fort Totten. He returned to the Carrington area in 1898 to pursue farming. The barn was built in 1898, and is a banked/basement barn (access is provided to two floor levels). The house was built in 1910, and exhibits neoclassical design elements.

4.3.3 Grand Forks County

Carlott Funseth Round Barn

The Carlott Funseth barn was built in 1909 near Kempton. Svend and his son, Ole Olson, built the barn after their octagonal barn was destroyed. The barn is two stories and has two gabled hay roof dormers. The barn is significant because of its continued use and as the only surviving round barn out of four within a 15 mile radius.

North Dakota Mill and Elevator

Construction at the North Dakota Mill and Elevator complex began in 1920, and in 1922 the complex was mostly completed. Original construction was done by the Fegles Construction Company of Minneapolis and Fort Williams, and the Northern Construction Company of Grand Forks. The mill was constructed more than three decades after the Farmers' Alliance passed resolutions demanding a publicly-owned grain terminal to circumvent the questionable business practices of other mills that hurt North Dakota grain

farmers. Several state bills were passed to open a state-owned grain terminal, but nothing came to fruition until 1916 when the Nonpartisan League came to power. They developed the Industrial Commission and began its grain elevator and mill plan by building a small mill in Drake. The second part of this plan was to build a major terminal facility. Grand Forks was a contender because of its ideal location and already established transportation infrastructure, but the city was divided. The major newspaper was anti-League and the farmers were in disagreement with the politics. It was a farmer-owned newspaper that supported bringing the state-owned mill to the city. The city eventually fought for the mill, and the Industrial Commission selected Grand Forks. Elements were added in later decades and the complex currently includes eleven buildings.

Once farmers and investors realized the adaptability of wheat to the northern plains, the crop became pivotal to North Dakota development. With the influx of workers to take advantage of the wheat boom, the need for educational facilities for their children grew.

4.4 One-room Schoolhouses

There are two one-room, early twentieth century schoolhouses in the project corridor. Early North Dakota schools were constructed of various building materials; however, most were made of wood and painted white, like those in the project area (Henke and Albers, 1998: iv). The Fairfield Township and Prophets Township one-room schoolhouses mirror North Dakota schoolhouse establishment and abandonment trends. One-room schoolhouses became more prevalent during the early 1900s as the population increased with the wheat boom. Predictably, the number fell with the decline of the agricultural economy during the 1930s Great Depression. One source notes that many one-room schoolhouses closed due to economic hardships (Henke and Albers, 1998: 63). This trend continued due to subsequent economic recessions and the twentieth-century trend of Americans moving away from rural areas to urban centers. From 1935 to 1960, North Dakota one-room schoolhouses declined in number, and by the 1960s, only two percent of North Dakota students attended school in them (Henke and Albers, 1998: v).

After World War II, the military found that the northern plains states could be used for more than just wheat farming. Because of the geographical location and the vast amount of land between population centers, North Dakota played a crucial part in U.S. defense efforts during the Cold War.

4.5 Grand Forks Air Force Base Cold War Minuteman Sites

There are four former Minuteman launch sites in the project area. Contention between the United States and the Soviet Union began shortly after the end of World War II. In August 1949 the Soviets tested their first nuclear bomb, setting in motion a series of events that led both the U.S. and the Soviets to develop more powerful and more numerous weapons. The U.S. began their development of Intercontinental Ballistic Missiles (ICBMs) as a means to fire nuclear warheads toward the Soviets. By the early

1960s, the U.S. had operational ICBMs in the form of the Atlas and Titan liquid-fuel missiles. Some of the problems associated with these missiles were that the liquid fuel increased weight, decreased the range, and was dangerous to work with. Most importantly, the liquid fuel slowed the launch process in response to a Soviet missile attack. This prompted the development of a solid-fuel ICBM, the Minuteman.

The first Minuteman prototype (Minuteman I) test occurred on September 15, 1959. It successfully demonstrated that the missile could be launched from an underground silo. By 1961, Malmstrom Air Force Base in Montana began constructing facilities to store and launch 150 Minuteman I missiles. The U.S. Air Force went through a rigorous process of selecting sites to launch the missiles. In the end, the northern plains states proved ideal for the Minuteman because of their central location and small population. By 1965, 800 missile silos had been built in the U.S. In the Dakotas, Ellsworth Air Force Base (South Dakota), Minot Air Force Base (North Dakota), and Grand Forks Air Force Base (North Dakota) each had a Ballistic Missile Wing in charge of the Minuteman facilities.

The Minuteman II missile was already being developed during the early stages of Minuteman I. The new missile was to improve on guidance systems, payload capacity, and anti-missile defenses (Slattery *et al*. 2003: 31). The first Minuteman II was deployed at Grand Forks Air Force Base in 1965. Ellsworth and Minot converted to Minuteman II shortly after starting in 1966. Not long after, development of Minuteman III was underway. These missiles were lighter, larger, and could carry three warheads. By 1977 550 Minuteman III missiles were in the ground. There, the Minuteman IIs and IIIs stayed activated until after the end of the Cold War. In 1991 the former USSR and U.S. signed the Strategic Arms Reduction Treaty (START) and the U.S. began deactivating their excess Minuteman II missiles, destroying related facilities, and upgrading all others to Minuteman III. Grand Forks Air Force Base, which had been updated to Minuteman III missiles, deactivated their systems and sent the missiles to the newly upgraded Malmstrom Air Force Base. Ellsworth deactivated their Minuteman IIs and demolished all but the Delta-01 and Delta-09 sites, which were later preserved and turned into Minuteman Missile National Historic Site. Minot Air Force Base continues to keep their Minuteman III missiles activated.

In 1954 the Defense Department chose Grand Forks for the site of a new Air Defense Command fighter-interceptor base. Grand Forks residents donated money toward the purchase of the 5,400 acres, and on February 5, 1956, construction began on the 12,350 foot runway. By 1956, the base was being built-up to support Strategic Air Command (SAC) bombers and tankers as well as fighter-interceptors. In 1957, the Grand Forks Air Defense Sector of the North American Air Defense Command, and in 1960, the Air Force, stationed the first flying units at the base (Grand Forks Air Force Base 2003, 2007). In 1964, the base became a host for SAC (Lloyd 1999: 683). On November 1, 1964 the 321st Strategic Missile Wing (SMW) was organized and construction of

Minuteman II missile complex began. Two years later in December of 1966 the 321st SMW became operational with its Minuteman II complex. On March 8, 1973 the 321st SMW upgraded its facilities to use Minuteman III missiles.

On June 1, 1992 the Air Force inactivated SAC and reassigned Grand Forks to the Air Combat Command. The Clinton Administration approved the recommendation to remove 150 Minuteman III missiles from the missile complex on October 1, 1995. The 321st was inactivated in 1998 after 34 years of service. In accordance with the START treaty, the first missile silo was imploded on October 6, 1999, and the last on August 24, 2001.

Of all of the launch facilities (LF) and missile alert facilities (MAF) of the 321st SMW, only one of each still exist; the November-33 LF and the Oscar-Zero MAF (both completed in 1965). The others were either filled in or imploded. The November-33 LF is located approximately 2 miles east of Cooperstown (North Dakota State Historical Society 2009). The LF originally housed Minuteman II missiles, but was upgraded in the early 1970s to house the Minuteman III. After 1995 the missile was removed, and the silo was filled with concrete. Currently, the above ground concrete blast door, the access hatch, the original eight-foot fence, and the electronic surveillance system are still in place. The Oscar-Zero MAF is located approximately 4 miles north of Cooperstown. This facility consists of the above ground Launch Control Support Building, the underground Launch Control Center (Figure 12), and the underground Launch Control Equipment Building. This MAF was preserved by the U.S. Air Force to become a state historic site. All three areas are open to pubic interpretation via guided tours. In 2008, Oscar-Zero MAF was listed in the National Register.



Figure 12. inside of the Oscar-Zero Launch Control Center
Photo from the collection of the State Historical Society of North Dakota, http://www.history.nd.gov/historicsites/minutemanmissile/oscarzeroimages.html.

The large-scale contextual themes have been examined above. The local, county level histories of the areas that the project crosses are provided below.

4.6 Project Area County Histories

The project APE goes through 11 North Dakota counties. The following summarizes their establishment and economic development as it relates to the built environment within the project area. It also examines some of the townships in the project area for which information was readily available. In many cases, the level of information uncovered during the background research proved to be minimal.

Local government in the northern Dakota Territory began in the 1870s shortly after the territory was established. Many of North Dakota's current counties were created from larger territorial counties, though some still have their original boundaries. Like other western states, a public land survey (PLS) was done which divided land into 36-section townships (6 miles by 6 miles). In many of these townships, sections 16 and 36 were set aside for school land. In North Dakota these townships were known as school townships. If a township had enough people, a civil township, with its own governing body, could be created by public approval. Often, civil township boundaries followed PLS boundaries, but occasionally they did not, leading to some civil townships being larger than the PLS six by six section square.

North Dakota's economic base remained agricultural for decades. Early twentieth century agricultural products in these counties all focused on wheat production as their mainstay, following in descending magnitude by barley and oats production. Flax production took place only in Grand Forks, Sheridan, and Wells counties. All of the counties had cattle production, and dairy farming was also popular.

Burleigh

Burleigh County was established in 1873 by an act of the territorial legislature, and on July 16, the county commissioners appointed officers of the register of deeds, judge, county attorney, sheriff, and coroner (Lounsberry 1919: 532). The county was named after Dr. Walter Burleigh, who was a physician, Indian agent for the Dakota Territory, trader, and a delegate to the 39th and 40th U.S. Congresses. He came to the territory by train and initially helped the Northern Pacific establish tracks east of Bismarck; however, his assistance proved to be useless and the tracks were eventually moved (Glatt 1999). Bismarck remains the county seat (1873-present) as well as the state capital (North Dakota Association of Counties 2011). Burleigh's economy was agriculture-based, but also relied on the railroads and mining. Historically, most of the crops were grains, with wheat being the largest and oats forming a third of the county grain output. Burleigh county farmers also raised cattle (Gilbreath 1910: 52). The county was one of the major transportation hubs in the state, with the Northern Pacific and the Soo Line railroads as well as the Missouri River. This portion of the state has lignite below the ground surface and one of the largest historic mines was in the northern part of the county (Gilbreath 1910: 51).

Eddy

Eddy County was part of the larger Pembina County until 1873 when it became part of Foster County (NDGenWeb "Eddy County History" 2006). On April 27, 1885, the towns of New Rockford (Eddy) and Carrington (Foster) received an equal amount of votes for county seat (Gilbreath 1906: 71). From this election, Eddy and Foster split equally, each with eighteen townships. New Rockford became the county seat for Eddy. Agriculture formed the county's economic base, with transportation available from the Northern Pacific and Great Northern railroads. During the early twentieth century, farm production was led by wheat, followed by barley and potatoes (Gilbreath 1910: 77). Rosefield Township was organized in 1906 within the county, and so-named because a large section of land in the township had wild roses in bloom on the day of the election.

Foster

Like Eddy County, Foster was part of Pembina County until 1873. In 1883, the county broke off of Pembina and contained 42 townships, with Carrington as the seat. Before 1885, some of those townships were transferred to Griggs and Nelson Counties until Foster retained only 36 (NDGenWeb "Foster County History" 2006). The county was named for James S. Foster, the Commissioner of Immigration for the Dakota Territory (Lounsberry 1919: 497, NDGenWeb 2006). Foster's early economy was based on agriculture. During the early twentieth century, this county produced much more wheat, oats, and barley than the other counties in the project area. Agriculturists at this time also raised cattle and dairy products (Gilbreath 1910: 84-85). Three of the largest railroads in the state had main lines (Great Northern, Soo Line, and Northern Pacific) and branch lines that served Foster County, shipping agricultural products out and moving manufactured goods in for area consumers.

Grand Forks

Grand Forks County was created in 1873 by an act of the territorial legislature, but the government was not organized until 1875. The county was named after the then village of Grand Forks, which was named for the junction of the Red Lake River with the Red River of the North (North Dakota Association of Counties 2011; NDGenWeb 2010). The county seat is Grand Forks. The Grand Forks economy was heavily centered on agriculture, supported by the railroads. During the early twentieth century this county was one of the largest producers of agricultural products in the state. They included wheat, oats, barley, and flax. The state wheat mill was located in the City of Grand Forks and helped promote the growing of wheat in the region. Livestock raising was also plentiful, including cattle and horses, along with dairy production (Gilbreath 1910: 90). The three large North Dakota railroads (Great Northern, Soo Line, and Northern Pacific) served the county. Information is available on two townships that the project area crosses. The Pleasant View and Avon Townships were organized in 1882. The first schools opened in Grand Forks in 1873 and the University of North Dakota Grand Forks began operating in 1884.

Andrew A. Onsager (associated with *HDR 14830/42627)* was one of the earliest settlers in Avon Township. Born in Norway in 1849, he immigrated to the United States in 1868 and came to North Dakota in 1881, where he lived with his family until his death in 1935. His son, Albert, became president of the Avon and Pleasant View Telephone Company, founded in 1909.

In 1954 the Department of Defense selected Grand Forks as the site for an Air Defense Command Base which brought some prominence to the area (NDGenWeb 2010).

Griggs

Griggs County, named for Grand Forks founder Captain Alexander Griggs, was established in 1881 and included former parts of Foster and Traill Counties, as well as townships that would later go to Steele County. The original county seat was Hope, but in 1882 the vote for county seat went to Cooperstown. Hope then went to Steel County. The fight for county seat was brutal and included "charges of armed robbery, assault, attempted kidnapping, ballot box stuffing, injunctions, court trials and numerous legal and, perhaps, illegal maneuverings" (Helland et al. 1979: 7). The people of Hope were not happy with the change and several made a failed attempt to steal the county records at gunpoint. Agriculture formed the basis of Griggs County's early twentieth century economy. Wheat was the largest crop, followed in significance by oats and barley. The county also had large cattle herds and produced dairy products (Gilbreath 1910: 95).

McLean

McLean County was established in 1883 by an act of the territorial legislature. It was named after John A. McLean, the mayor of Bismarck. The county seat is Washburn (1883-present). The early economy was based on agriculture and mining. Wheat, oats, and flax were the main crops grown in the county. In 1909, McLean produced over a million bushels of just these crops. At the end of the same year, the county had forty-seven grain elevators in the 11 railroad towns. The dairy industry was also a large agricultural component (Gilbreath 1910: 133-34). McLean is also situated on a lignite field. During the early part of the twentieth century the county was one of the largest producers of lignite. In the later half of the twentieth century, several coal burning power plants were built and continue to use approximately 15 million tons of lignite annually (McLean County 2005).

Nelson

Nelson County was established in 1883 with Lakota chosen as county seat. The county was named after N. E. Nelson, a member of the legislature and the first recorded homesteader in North Dakota (Lounsberry 1919: 498). Parts of the county came from Grand Forks after Grand Forks reorganized. Nelson County's early economy was based on agriculture, and it produced many of the crops seen in the study area—wheat, oats, and barley. Livestock and dairy production emulated the other counties in the study area, with dairy cows, cattle, and horses (Gilbreath 1910: 153).

Ora Township was organized in 1884, and was named after Ora Prindle, the first Euro-American girl who settled in the area. It is a civil township, rather than a school township. Settlers lured by beneficial homesteading laws came to the area as early as 1878 from Norway, Sweden, Russia, and Scotland. Sod and dugout houses were common until settlers could muster the means to build wood frame houses. The first church was built in 1892 and the railroad arrived in Aneta in 1896. Rural electrification came in the late 1940s, greatly simplifying rural life.

Oliver

Oliver County was established in 1885 by an act of the territorial legislature. The county was named after Harry S. Oliver, an early territorial legislator (Center, North Dakota 2011). Originally the land had been part of Mercer county, and the two were divided in 1885 (NDGenWeb 2011). At that time Raymond, near Sangor, was named the county seat. In 1902 the county seat was moved to Center, where it remains. Oliver began as an agricultural county. Again, the early twentieth century crops focused on wheat, oats, and barley (Gilbreath 1910: 158). There were also several dairy farms and cattle ranches at this time. In the early twentieth century residents began mining lignite. By 1910 the county had 31 operating mines (Center, North Dakota 2011). The mining industry boomed in the 1960s and the county is still known as "Coal Country."

Sheridan

Sheridan County was established in 1908; however, its boundaries were drawn during territorial days. Because of a small population, Sheridan County was part of McLean County for judicial purposes until a general election popular vote in 1908 separated the two. The county is named after General Philip Henry Sheridan, known for his service during the Civil War and Indian Wars on the Great Plains. McClusky was appointed a temporary county seat in 1908, and became the official seat in 1910 (Sheridan County 2011). Sheridan relied on agriculture for its economy. Like the other counties in the study area, it produced wheat and oats, but it differed in that farmers also grew flax. Cattle ranching and dairy farming also took place (Gilbreath 1910: 198). Prophets Township was named after Prophet's Mountain, a butte in the center of the township. The butte received its name after a Gros Ventres medicine man prophesied that all the land but this butte and one other would flood. The prophecy proved to be true, giving the name to the butte and later the township (Wills 1989: 32). As with many North Dakota counties, township sections 16 and 36 were designated for school land. The Prophets Township still had these sections open for school development in 1914.

Steele

Steele County was established in 1883 out of parts of Griggs and Traill Counties. The county was named after Edward H. Steele, the secretary-treasurer of the Red River Land Company. The county seat was originally Hope (1883-1885), followed by Sherbrooke (1885-1919), and finally Finley (1919-present). Steele was supported by agriculture and the main crops were wheat and barley during the early twentieth century.

Wells

Wells County was originally part of the territorial county of Buffalo (created in 1870). In 1873 a portion of Buffalo was used to create Gingras County. In 1881 the county was renamed Wells, in honor of E. P. Wells, a territorial legislator (NDGenWeb "Wells County History" 2006). In 1883 and 1885 the boundaries shifted to reflect the creation of square townships (Lounsberry 1919: 538). Sykeston served as county seat from 1884-1894. The town was named after Richard Sykes, owner of a wheat bonanza farm in the area (Lund 2006 from Wells County 2011; Gilbreath 1910: 234). In 1894, Fessenden won the popular vote and the town became the county seat. The economy centered on agriculture, with the railroad supporting this enterprise. Wheat, as in most other counties in the state, was the largest crop, and again, farmers produced oats and barley. Like Grand Forks and Sheridan counties, farmers in this locale also grew flax.

As in other counties in the study area, dairy farming was popular during the early twentieth century. The county also had 10,756 head of horses at this time, most likely to help with grain production and transportation. The three major railroads in the state had main lines (Great Northern, Soo Line) and branch lines (Northern Pacific) running through the county. Fairville Township was first organized as the Fairview School Township in 1888. It was reorganized as Fairville Civil Township after the committee discovered that there was already a Fairview in the state. The school district's name was changed to Fairville as well. The Georgetown Township was organized as a school township in 1888, and then re-organized as a civil township in 1916. It was named Germantown to honor the original German settlers in the area. The earliest settlers commonly lived in sod houses until wood frame homes could be built and similarly, early schools were sometimes also constructed of sod.

4.7 Individual Site Histories of Recorded Sites

The following section presents the individual histories for the nine recorded sites within the project area.

Site HDR *11932/41403*

The following narrative for this Eddy County farm is based on background research conducted at the Eddy County Courthouse, historic maps, and Federal Census records. The subject property has been occupied by a series of three landowners, Hale (1880s); Steinback/Steinbach (1890-1967); and Schaefer (1967-present).

An 1880s General Land Office (GLO) map shows a road and a building owned by J. O. Hale in the northwest quarter and also in the southwest quarter of the subject property Section 28. William Steinback received a patent deed for the subject property in 1890, and the 1910 Rosefield Township map shows him as the property owner. William and his wife Mary were early North Dakota settlers who owned a number of parcels in Rosefield Township. The spelling of their last name alternated from "Steinback" in early documents over to "Steinbach" in later records. The 1920 U.S. Federal Census indicates

that William Steinback was born in Germany in 1864. His wife, Mary, was born in Germany in 1867. They both immigrated to the U.S. in 1882. William and Mary had five children: William J., Lawrence V., May, Emil, and Josephine Steinback. A 1920 George A. Ogle & Co. Eddy County map shows William "Steinbach" as owning the north half of this section and adjacent sections with one building on the property. In 1954 the property passed to William's son, Lawrence Steinbach, via an indenture deed. His estate passed the property to James Schaefer in 1967, which appears to be the end of the Steinback tenure at this site.

James Schaefer was born in North Dakota in 1928. His tenure at the subject property was brief, from 1967 until his death in 1971. The property eventually passed to Darlene A Schaefer Skaar (one half), and Gregory J. Schaefer, Douglas J. Schaefer, Bradley J. Schaefer, Monty J. Schaefer, Joan M. Schaefer and Susan K. Schaefer (one half to all) in 1974. In 1986 the property was passed from Monty J., Gregory J., Douglas J., Bradley J., Joan M., and Susan K. Schaefer to Darlene A. Schaefer. In 1997 the property passed from Darlene and Elder Daugherty to Monty Schaefer. Monty and Tori Schaefer of Carrington, North Dakota, are the owners of record as of this writing.

Site HDR *14762*

This site consists of an early twentieth century schoolhouse located in the Pleasant View Township within Grand Forks County. The 1927 Brock & Company Fairfield Township map depicts the school on land held by Anna Johnston. The 1920 Federal Census indicates that Anna was seven years old and the daughter of James and Alice Johnston, and she was one of seven children. The land was obviously owned by James and Alice. James Johnston was born in Iowa in 1874, and is listed in the census as a farmer. His wife Alice was also born in Iowa in 1883 and had no listed profession. Historic USGS maps provide some data on the subject property. The 1934 Emerado quadrangle map depicts the schoolhouse as "School No. 2."

Deed information indicates that the property transferred to Lloyd F. Leake in 1951, and the school building is listed as being school number 82. Beyond this point, there is no further information on the property ownership from Grand Forks County deeds. A 2006 obituary for Lloyd Leake located on Ancestery.com indicates that he grew up in Emerado on the family farm, attended Grand Forks Central High School, and pursued training in Industrial Arts at the Wahpeton State School of Science. He taught school at Belcourt, North Dakota, and Whapeton and then became a full-time farmer with his wife for nearly 65 years in Emerado. He served on a variety of boards in the local area, and passed away in 2006. The 1978 USGS Emerado SE quadrangle labels the building as a "Town hall," which suggests that it had been converted to this use by Fairfield Township by this point. The abandonment of the building must have come after this.

Background research conducted at the University of North Dakota Grand Forks Elwyn B. Robinson Department of Special Collections and North Dakota State Historical Society in Bismarck did not uncover any additional relevant information on the schoolhouse.

Site HDR 14789/42562

The following history of this Grand Forks County farm complex is based on background research conducted at the Grand Forks County Courthouse, historic maps, and the 1910 and 1920 Federal Census records. The property is characterized initially by a number of property owners with a brief tenure. The buildings and improvements that form this site are associated with the Swenson family, who has occupied the subject property since 1901.

A road is depicted in this section on an 1873 GLO map. Charles Anderson secured a warranty deed to the northwest quarter of Section 26 in 1886. Federal Census records show that Anderson was born in Denmark in 1858 and immigrated to the U.S. in 1874. The property progressed through a number of owners in a relatively short period from 1886 to 1901, with the property changing hands through a succession of short-term owners. After Charles Anderson acquired the property in 1886, it passed from H. Edward Anderson to Emil J. Anderson in 1889, and then on to James Cooper in 1892. A little over a month later the property passed to Benjamin Warren, whose parents had both emigrated from Scotland. Next it passed to Eugene, Daniel, and James McCarthy in 1899, then to Ole Swenson in 1901. Ole was born in 1840 in Norway and had immigrated to the U.S. in 1862. He was married to Bergit, who was quite a bit younger than Ole. She was born in Norway in 1872 and had immigrated to the U.S. in 1888. The property passed to Albert O. Swenson in 1910, who farmed the property for a number of years. Next, the property went to Roy Swenson in 1945, and then to Lena Swenson in 1970. Over the course of the next 30 years, Lena appears to have sold portions of the property to Lester and Judith Wheeler. There was an agreement in 1980 that all of the property except the 4.64 acres containing the homestead (a well and structures) was to be sold while Lena retained the homestead. In 2003 Lena's property passed to Jerrald Swenson and Dawn Hetler, and they remain as the owners of record as of this writing.

Site HDR 14830/42627

The following narrative of this Grand Forks County farm complex is based on background research conducted at the Grand Forks County Courthouse, historic maps, and Federal Census records. An unpaginated and undated document located at the University of North Dakota Grand Forks Special Collections, "Some History of Avon Township," provides brief biographical information.

The property was initially owned by the Swain family, among the original founders of the Avon Township, from 1881 to 1905. The Onsager family purchased the property in 1906 and occupied it until 1960. The property has been owned by Margaret Anderson since 1965.

Morris Swain purchased the property in 1881. The document "Some history of Avon Township" provides some information on this family. Morris Swain and Samuel Swain were both minor-level Avon Township officials during its 1882 creation. Morris served as pound master and Samuel as overseer of highways. Samuel also served on the first township school board in 1882.

In 1895 the property passed to Samuel P. Swain. Over the next few years, the property changed hands back and forth between Samuel and Frank Swain. In 1896 the property passed from S. P. and Lovina Swain to Frank Swain. In 1899 the property passed from Frank Swain to S. P. Swain. In 1906 the property passed to A. A. Onsager who had emigrated from Norway in 1868. The 1910 Federal Census showed A. A. was married to Guri. The census listed four children and two hired men as part of their successful household. In 1916 the property passed to A.A. and Guri's son, Albert Onsager. Albert enjoyed a lengthy tenure on the property. "Some history of Avon Township" indicates that Albert was a school teacher at the Avon Township School Number 40 (established in 1882), and the second "South School number 2" created in 1900. Upon his death, the property passed to Adaline M. Lieberg and Margaret K. Anderson in 1961. In 1963 Clara Onsager, the daughter of Norwegian immigrants, passed part of the property to herself, Margaret Anderson, and Mr. and Mrs. Adaline and Odd Lieberg. There was another transfer from Clara Onsager in 1965 to Margaret K. Anderson. Later that year, title was transferred from Adeline M. and Odd Lieberg to Margaret K. Anderson, who is still the owner on record as of this writing.

Site HDR 26389/41731

This Nelson County farm complex site history is based on deed research and Federal Census records. The 1900 U.S. Federal Census, Ora Township, Nelson County, North Dakota (Roll T623_1230 Page 9B Enumeration District 102) indicates that Lars O. Solberg was born in Norway in June of 1858. He immigrated in 1880. In 1889 he married Gunnild [sic], who immigrated in 1888. At the time of the census, they had five children: Gusta, Ole, Paul, Oscar, and Anna. They also had Knut Knutson, a farm laborer, living on the property. Lars is listed as a farmer.

Lars received a land patent from the General Land Office on April 1, 1899 under the Timber Culture Act for the northeast quarter of T149N, R57W, Section 12. The 1910 U.S. Federal Census, Ora Township, Nelson County, North Dakota (Roll: T624_1145 Page 8B Enumeration District 126) lists the Solberg family has having a new child, Louis. The 1920 U.S. Federal Census, Ora Township, Nelson County, North Dakota (Roll: T625_1337 Page 9B Enumeration District 74) lists Lars as a farmer and Ole, Paul, Oscar and Louis are listed as farm laborers. Other Solbergs are listed as living in the same area. If and how they are related is unknown. Lars passed away in 1944.

On February 3, 1945 a final decree was made by the Estate of Lars Solberg and the deed for the property was given to Louis and Gusta Solberg. On March 31, 1955 another final

decree was made this time giving the deed to Gusta, Ole, and Oscar Solberg, and Anne Sundquist. A quitclaim was made on June 29, 1955 with Gusta, Ole, and Oscar Solberg, and Anne Sundquist as grantors and Gusta Solberg as the sole grantee. On November 29, 1983 Lavane Solberg (Estate of Gusta Solberg) signed the deed over to Lavane and Myron Solberg, both nephews of Gusta. The property went to First State Bank of Sharon on April 14, 1991 and later went to Phyllis M. Peterson under a warranty subject to a life estate.

Site HDR *26400/42860*

The following narrative for this Nelson County property is based on background research conducted in the Nelson County Courthouse for deeds and Federal Census records. *Aneta: A Century of Memories, 1898-1998* (Kueber 1998) also provided biographical information and information on this farm site.

U.S. Federal Census records indicate John P. Sundquist was born May 10, 1862, in Storvik, Sweden (Roll T623 1230 Page 5A Enumeration District 102). In Sweden he worked as a railroad laborer until age 15 and then trained to become a machinist (Kueber 1998: 286). He immigrated to the U.S. in 1882 and worked in a New York foundry, moved west to Chicago, and then to Minnesota where he found employment with a planing mill and North Pacific Railroad shop. He met Caroline Teinen, a Norwegian immigrant in 1884 in Fargo, North Dakota (Kueber 1998: 286).

John, Caroline, and their two daughters moved to Ora Township in 1886 in a covered wagon. They settled on the subject property and constructed a sod house and converted the prairie land into farmland. The family built a wood frame house at a later point. At the time of the Ora Township 1890 census they had eight children: Hanna, Egge, Oscar, Arthur, Arnald, Ida, Hjalmer, and Emma. John is listed as a farmer. The couple also had Edward Lamouren, born in New York to French parents, living with them as a farm laborer. Deed research indicates that Sundquist filed for ownership of the subject property on November 27, 1897. He received the patent on May 16, 1898.

Sundquist constructed the large Victorian-style residence on the subject property in 1908, using a design provided by his half-brother Charlie, for a cost of $7,000. They used fieldstone for the foundation, and installed both electrical wiring and running water in the house, using a gasoline engine in the basement for power. John was able to construct this impressive residence due to the high profits he gained through growing flax. Disaster struck their property in 1916, when a tornado hit their farm, demolishing a large barn and other structures. His family salvaged the lumber from the buildings and constructed three new buildings, including an ice house and granary (Kueber 1998: 286-287).



John P. & Caroline Sundquist family

Figure 13. John P. and Caroline Sundquist Family
From *Aneta: A Century of Memories, 1898-1998* (Kueber 1998: 287). John established the property and constructed the residence and other extant buildings at the subject property.



Hjalmer & Anne Sundquist

Figure 14. Hjalmer and Anne Sundquist
From *Aneta: A Century of Memories, 1898-1998* (Kueber 1998: 286). Hjalmer resided at the subject property with his wife Anne following the death of his father John.

Site HDR *26404/42854*

This narrative on the Nelson County farmstead is based on background research conducted at the Nelson County Courthouse and Federal Census records. *Aneta: A Century of Memories, 1898-1998* (Kueber 1998) also provided biographical information and information on this farm site.

Tom and Martha Fjeld were early Ora Township settlers. The 1900 U.S. Federal Census Ora Township, Nelson County, North Dakota (Roll T623 1230 Page 6A Enumeration District 102) indicates that Tom T. Fjeld was born in Norway in 1864. He immigrated to the U.S. in 1883, and in 1887 married Martha (the same year that she immigrated). Tom received a land patent from the General Land Office on May 28, 1893, for the subject property. The 1900 census lists Tom as a farmer, and he worked the subject property until he died in 1916. The Queen Anne style residence was constructed in 1911, and he presumably built the grain mill at the same time (Kueber 1998: 111). Tom and Martha

had five children, Sofie, Oscar, Theodore, Edward, and Thomas, all born in North Dakota. After his death, Tom's son Theodore took over the farming responsibilities; he retired in 1966 and died in 1972. Theodore's wife, Caroline, continued to return each summer to farm, and owned the entire property until December 27, 1999, when the northeast quarter of the northwest quarter went to Byron and Cheryl Cox. They sold the property in 2006 to Roger S. and Mary E. Nestegard, and the Nestegard family owns the property as of this writing.



Figure 15. Tom and Martha Fjeld Family
From *Aneta: A Century of Memories, 1898-1998* (Kueber 1998: 111).

Site HDR 30541

This site consists of the Sheridan County Prophets Township one-room schoolhouse. The 1892 General Land Office plat map does not depict any features at this site. Deed research conducted at the Sheridan County Courthouse indicates that the land was originally owned by Addison Dimmick. Dimmick received a patent from the Department of the Interior on October 26, 1911. He failed to satisfy a mortgage and the property went into foreclosure. A Sheriff's Deed was made and Ernst Siegele (Sheriff) gave the property to the county (Sheridan) on November 30, 1923. On January 3, 1940 the State of North Dakota made a tax deed sale conveying the property to John Beck. A warranty for joint tenancy was made between Anna Beck (wife), Andrew (son) and Marie Beck, and Albert (son) and Marie Beck. They gave the property to Francis O. (son) and Marian Beck on October 3, 1945. In John's final deed, the property transferred to Francis on February 27, 1946. On June 17, 1949 Francis and Marian give the property to John Beck. John held on to the deed for the entire southwest quarter of the southwest quarter until January 8, 2010, when he sold the property to Gregory and Michelle Parker. The piece of land that the schoolhouse sits on appears to have been owned in part by Sheridan County. On November 22, 1966, Sheridan County was the grantor on a quit claim deed with McClusky Public School District #19. A second quit claim deed was done on March 12, 1975, again with Sheridan as the grantor and McClusky as the grantee.

The 1920 U.S. Federal Census, Prophets, Sheridan, North Dakota (Roll T625_1340 Page 1B Enumeration District 218) lists Gotlieb J. Kresman as a boarder staying with John Blanchard. Kresman is listed as a teacher working at a public school. According to the

1914 Prophets Township map, John Blanchard owned the southeast quarter of section 12, approximately a mile north of the school. This suggests that Mr. Kresman was a teacher at the rural one-room schoolhouse on Addison Dimmick's property in section 13. Kresman was German-Russian, which was the predominant ethnicity in Sheridan County at that time, according to Warren Henke and Everett Albers in *The Legacy of North Dakota's County Schools* (1998).

This research suggests that the schoolhouse was established between 1893 and 1913, with the schoolhouse being present on the 1914 Prophets Township map. The schoolhouse appears on the 1945 Pelican Lake USGS quadrangle as "Prophets Sch[ool] No. l.," which suggests it still operated at this time. An abandonment date within the 1960-1970s range would parallel statewide trends for the closure of this type of school.

Site HDR *39655/41367*

The following narrative for this Wells County farmstead is based on background research conducted at the Wells County Courthouse and in Federal Census records. The property went through a series of short tenure ownerships from 1884 to 1907. The Seibold family took over the land in 1908 and has held it since that time.

An 1884 GLO map shows the name James Sweeney and a building in the southeast quarter of Section 28. John Jaeger, the son of a Russian immigrant and one of eleven children, homesteaded the subject property in 1897. One month later John and Louise Jaeger sold the property to German immigrant Adolph Roth. In 1905 Peter Zink, who was also German, acquired the property through a sheriff's deed. In 1908 Peter and Theresia Zink sold the property to Wilhelm Seibold. The 1860-1918 county land ownership maps show that Wilhelm owned this property and the adjacent property in the northwest quarter of Section 27. Wilhelm had a fairly long tenure on this property, and he and Marie Seibold passed the property to Albert L. W. Seibold in 1945. Albert and Alvina Seibold, who had married in 1957, placed the property in joint tenancy in 1967 and in 1969. Alvina Seibold inherited the property outright in 1999 upon Albert's death. Alvina immediately passed the property to her and Albert's son and daughter, Lewis A. and Pamela A. Seibold. Alvina passed away in 2006, and the property still remains in the Seibold family.

5.0 Survey Results

A total of 267 locations with buildings and structures throughout the APE were visually inspected for their potential to be historically significant. Of these, the majority were clearly not of historic age (50 years of age or older). Of those that were of historic age, most had lost integrity, having undergone extensive unsympathetic alterations (major additions to the original structure, synthetic siding, replacement windows and doors in altered openings, etc.), which eliminated them from consideration as historic property. A second common trend was the loss of contributing buildings such as residences or barns—sites often just had a vacant house or a barn and the remainder of the buildings had been demolished. The third pattern involved the introduction of large, modern vintage, prefabricated, metal storage buildings into the historic period complex.

The survey fieldwork identified nine sites as eligible for listing on the National Register of Historic Places within the Project APE as defined in Section 3.0 of this report.

This chapter discusses the results of the survey of buildings and structures within the project APE. It is organized in three major sections: Section 5.1 details listed National Register properties near the project. Section 5.2 presents a summary of the survey results by property type functional categories. Section 5.3 presents the property types in more detail, with illustrations.

5.1 Listed Historic Properties within the Project APE

The four listed historic properties within 2 miles of the Project centerline are:

- Zion Lutheran Church, Wrought Iron Cross Site, McLean County (32ML293)
- Sylvanus Marriage Octagonal Barn, Eddy County (32ED32)
- Romness Bridge, Griggs County (32GG93)
- Linwell House, Grand Forks, Grand Forks County

5.2 Architectural Property Types within the Project APE

Table 3 presents the survey area property types, which include agricultural, defense, institutional, residential, and transportation structures.

Table 3: Survey Area Recorded Property Types

Agricultural	Defense	Institutional	Residential	Transportation
Cattle feed/dairy barns	Former Minuteman III silos	Schoolhouses	Farm owner or foreman residences	Vehicular bridges
Poultry houses			Farm-hand bunk houses	
Grain mills			Pump houses	
Metal grain bins			Garages	
Quonset storage buildings				
Gable roof outbuildings				

5.3 Survey Area Property Types

The survey area is characterized by agricultural buildings, defense, institutional buildings, residences that are typically associated with an agricultural complex, and transportation-related vehicular bridges.

5.3.1 Agricultural Properties

Agricultural properties in the survey area involved six functional building types: barns, poultry houses, grain mills, grain storage bins, Quonset storage buildings, and side-gabled wood storage outbuildings.

Barns

Gambrel and Gothic arch roofed barns are the most common barn style in the project area. They typically have concrete or fieldstone foundations, horizontal wood siding, hay hoods for Jackson forks and travelers to store hay, and terne-coated ventilation cupolas (Terne is an alloy of lead and tin.). The wall openings include fixed- and hopper-sash wood windows, and double-swinging and sliding-track wooden doors. The National Register-listed Sylvanus Marriage Octagonal Barn, located in the project area within Eddy County, is an exception to the standard rectangular floor plan.

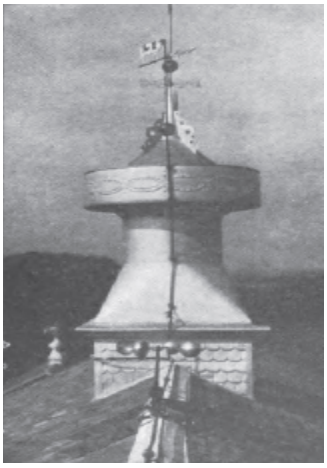


Figure 16: Ventilation Cupola Design
This ventilation cupola design appeared in the 1922 publication *Farm Buildings* (Foster and Carter 1922: 102) and is similar to those on barns in the survey area.



Cattle feed barn at site HDR 11932/41403 in Rosefield Township, Eddy County



Gothic arch roof barn HDR 14830/42627 Avon Township, Grand Forks County



Marriage Sylvanus octagonal barn 32ED32 Eddy County

Poultry Houses

Noble and Cleek's *The Old Barn Book* notes, "It isn't too much of an overstatement to say that virtually every farmstead in North America, at one time or another, had one or more structures to shelter chickens" (Noble and Cleek 1997: 135). One historic source on farm building design notes that the sawtooth or semi-monitor roof poultry house proved popular in the Mid-West (Noble and Cleek 1997: 136-137; Foster and Carter 1922: 142). Two sawtooth/semi-monitor roof poultry houses were recorded in the study area. Both have concrete foundations, horizontal wood siding, low massing, fixed and awning sash wood windows, and roofs clad with composition shingles. These buildings with sawtooth roofs also may be hog houses; however, inability to enter the buildings made this determination impossible. The lack of adjacent hog manure bins suggests they are poultry houses.



HDR 14830/42627 Avon Township, Grand Forks County



HDR 26389/41731 Ora Township, Nelson County

Grain Storage and Mill Buildings

Grain storage and mill buildings are a common sight in the study area. They have concrete pier or fieldstone pier foundations, horizontal wood siding, fixed wood windows, and gabled roofs with a cross-gabled elevator tower. Some of these buildings may be simply grain storage buildings and not mills (it was not possible to inspect the building interiors).

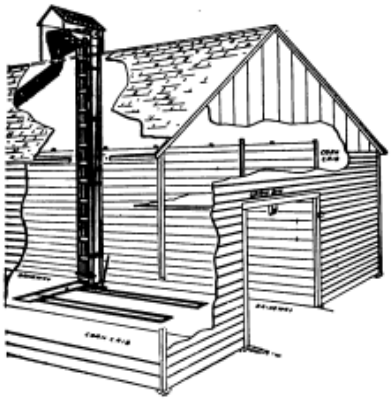


Figure 17. Inside Cup Elevator Illustration
From Foster and Carter's *Farm Buildings* (Foster and Carter 1922: 153).



HDR 26404/42854 Ora Township, Nelson County



Site lead 40038 Germantown Township, Wells County



Site lead 39661 Fairville Township, Wells County

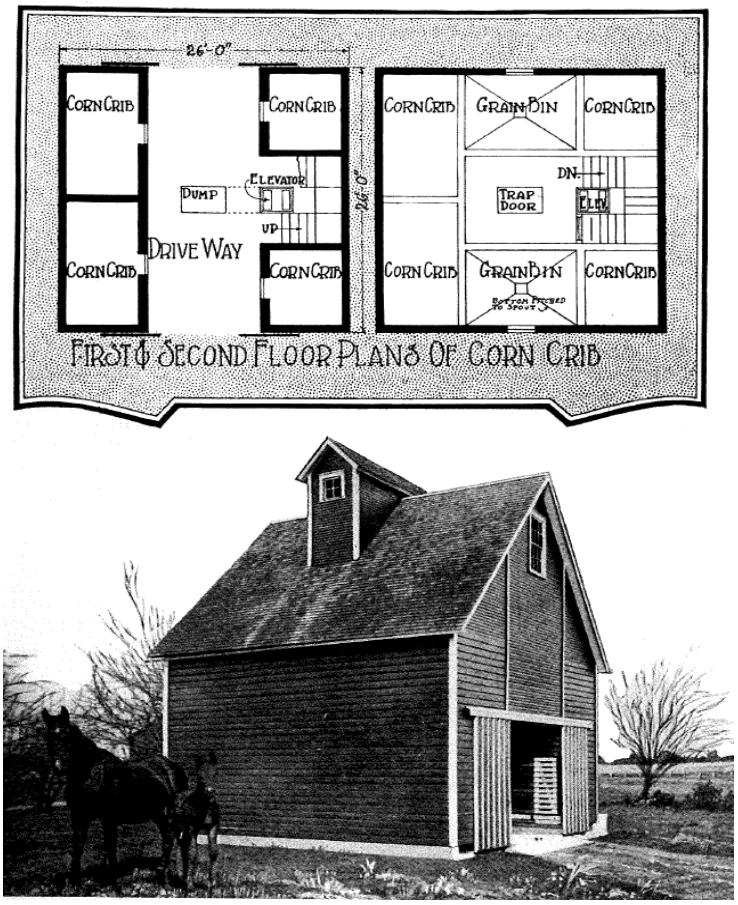


Figure 18. Corn Crib Design
This design is similar to the study area buildings and appeared in the December 1922 issue of *Farm Mechanics*.

The wood grain mills and grain storage buildings ultimately were replaced by prefabricated metal grain storage bins.

Grain Storage Bins

Round metal grain storage bins are perhaps one of the most common buildings in the North Dakota rural landscape. They are typically located in an agricultural building cluster around barns, or are grouped at the edges of agricultural fields. They have a circular concrete base foundation, metal hatch doors, a steel exterior access ladder, and a round dome roof. These prefabricated buildings were constructed by a variety of companies, such as the Butler Manufacturing Company. Butler first produced these buildings in 1907, and their manufacture became common in the late 1930s (Butler Manufacturing Company history web page, accessed July 19, 2011 http://www.butlermfg.com/about/history.asp).



Butler grain bin HDR 26389/41731 Ora Township, Nelson County



Modern vintage GSI company bin HDR 11932/41403 Rosefield Township, Eddy County

Quonset Storage Buildings

Quonset-style buildings are another very common property type in the study area. There are two types of this building. One is a Quonset-inspired round-roofed barn or storage building that has wood cladding in the building ends and asphalt shingle roof cladding. The second type is a standing metal-seam-style building. These buildings have concrete foundations, no fenestration, and sliding-track wooden or metal doors in the building ends.



Wood style Quonset building site lead 39998 Wells County



Wood style Quonset building site lead 17606/41874 Sheridan County



Modern metal Quonset building HDR 11932/41403 Rosefield Township, Eddy County

Side-Gabled Wood Outbuildings

The survey area has hundreds of side-gabled wood outbuildings that date from the early twentieth century. These utilitarian buildings have wooden post and pier foundations, horizontal wood cladding, wooden sliding-track doors, and side-gabled roofs. The similarity of this property type at the farms in the project area suggests that these were mail-order kit buildings.



Site lead 41398 Fairville Township, Wells County



HDR 14789-42562 Pleasant View Township, Grand Forks County

5.3.2 Defense Properties

Four former Minuteman missile launch facilities associated with Grand Forks Air Force Base are located in the eastern portion of the project area. They were deactivated after the end of the Cold War. The surface manifestation now consists only of a chain link and barbed wire security perimeter fence. The underground silos and launch control facilities have lost integrity due to the dismantling that took place in the late twentieth century.

5.3.3 Institutional Properties

Two one-room schoolhouses are within the project area. The Prophets Township School in Sheridan County and the Avon Township School in Grand Forks County share similar massing and construction materials. They have concrete/fieldstone foundations, horizontal wood siding, fixed wooden windows, and gable roofs.



HDR 30541 Prophets Township School Sheridan County



HDR 14762 Fairfield Township Grand Forks County

5.3.4 Residential Properties

Residential buildings within the project corridor are the most diverse property type. The styles range from late nineteenth century Victorian-inspired buildings to twenty-first century manufactured houses. The styles are based on the North Dakota Cultural Resources Survey architectural style guide (2009) and are presented in Table 4 below.

Table 4: Study Area Residential Property Types

Style	Example	Use
Victorian Era Queen Anne (ca. 1880-1915)	 HDR 26404/42854 Nelson County	Farm owner residence
Gabled Front (ca. 1880-1920);	 HDR 11932/41403 Eddy County	Farm foreman or owner residence
American Foursquare (ca. 1890-1930)	 Site lead 41874 Griggs County	Farm owner residence

Style	Example	Use
Craftsman (ca. 1910-1935)	 HDR 14830/42627 Grand Forks County	Farm owner residences
Plain Residential (ca. 1920-1950)	 HDR 11932/41403 Eddy County	Farmhand bunkhouses
Ranch/Split Level (ca. 1945	 Site lead 15480 Grand Forks County	Farm owner/foreman or single family residence tract house
Prefabricated/Modular	 Site lead 17586 Griggs County	Farm owner/foreman or single family residence tract house

One noticeable residential architectural design trend that the survey effort documented occurs in the Aneta area of Nelson County. It involves a unique façade gable-end decorative oval-shaped cutout. The frequency suggests that Aneta and Ora Township residents used either the same architect or a pattern book. The proximity to the Great Northern Railway line in Aneta may also have played a role in supplying mail order kit homes for these early 1900s residences shown below.



Site 32NEX71



Site 32NEX72



HDR 26404/42854

Residential Outbuildings

The rural nature of the project area requires many property owners to drill wells for domestic water use. This has resulted in a pump house property type at many of the project area residential compounds. They typically have wood post and pier, or no foundation, exhibit horizontal wooden siding, and fixed wooden windows. The roof configurations are typically gabled.



HDR 26389-41731 Nelson County



HDR 26404-42854 Nelson County

Garages are common twentieth century feature at project area farms. The early- to mid-twentieth century garages are singular buildings. The more recent garages are incorporated with the residence, which is a pattern associated with the post-World War II ranch style house.



HDR 26389-41731 Nelson County



HDR 26389/41731 Eddy County

5.3.5 Transportation Properties

Two vehicular bridges are located in the project area in Grand Forks County and have been recorded. Both are wooden bridges, and a consultant has recommended that both bridges be considered National Register-ineligible.



32GF3219 Grand Forks County



32GF3229 Grand Forks County

6.0 Regulatory Framework for NRHP Eligibility Evaluation

National Park Service (NPS) regulations and guidance documents (including NRHP Bulletins) outline the process for evaluating sites for NRHP eligibility. According to the NPS, the categories of sites that may be eligible for the NRHP are buildings, structures, sites, objects, or historic districts. Sites are evaluated for NRHP eligibility using the NRHP evaluation criteria, as listed in 36 CFR 60.4. To be listed in or eligible for the NRHP, a property should be 50 years or older, possess historic significance based on its related historic context, and retain historic integrity expressive of that significance. The property must meet at least one of the four following criteria:

- Criterion A: The resource is associated with events that have made a significant contribution to the broad pattern of history.
- Criterion B: The resource is associated with the lives of people significant in the past.
- Criterion C: The resource embodies distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic value; or represents a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D: The resource has yielded, or may be likely to yield, information important in prehistory or history.

For a property to be eligible for the NRHP, it must be significant in terms of its historic context and one or more of the NRHP evaluation criteria (criteria A–D) and possess historic integrity that conveys or expresses its historic significance. Historic integrity refers to the authenticity of a resource's historic identity as evidenced by the survival of physical characteristics it possessed in the past and its capacity to convey information about the basis for which the property is significant. Integrity occurs as authenticity of location, design, setting, materials, workmanship, feeling, and association. In addition to being significant under one or more NRHP criteria, a property must possess integrity in a majority of these areas. Location refers to the place where an event occurred or a property was originally built. Design considers elements such as plan, form, and style of a property. Setting is the physical environment of the property. Materials refer to the physical elements used to construct the property. Workmanship refers to the craftsmanship of the creators of a property. Feeling is the ability of the property to convey its historic time and place. Association refers to the link between the property and a historically significant event or person.

Sites or structures that may not be considered individually significant may be considered eligible for listing in the NRHP as part of a historic district. According to National Register Bulletin 15, *How to Apply the National Register Criteria for Evaluation*, a historic district possesses a significant concentration, linkage, or continuity of sites,

buildings, structures, or objects that are historically or aesthetically united by plan or physical development.[1] The district represents a significant and distinguishable entity whose components may otherwise lack individual distinction.

A property meeting one or more special requirements or criteria considerations may be eligible for the NRHP even if not usually considered for listing in the NRHP. National Register Bulletin 15 explains:

> Certain kinds of properties are not usually considered for listing in the National Register: religious properties, moved properties, birthplaces or graves, cemeteries, reconstructed properties, commemorative properties, and properties achieving significance within the past fifty years. These properties can be eligible for listing, however, if they meet special requirements, called criteria considerations, in addition to meeting the regular requirements (that is, being eligible under one or more of the four criteria A–D and possessing integrity). The criteria considerations need to be applied only to *individual* properties. Components of eligible districts do not have to meet the special requirements unless they make up the majority of the district or are the focal point of the district.

National Register Bulletin 15 guidance outlines six criteria considerations that allow exceptions or elaborations on the reasons for which a property may be considered for NRHP eligibility:

> Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past fifty years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:
>
> a. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
>
> b. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

[1] U.S. Department of the Interior, National Park Service, How to Apply the National Register Criteria for Evaluation, NRHP Bulletin 15 (Washington D.C., 1997).

c. A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his or her productive life; or

d. A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, from association with historic events; or

e. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

f. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or,

g. A property achieving significance within the past 50 years if it is of exceptional importance.[2]

[2] U.S. Department of the Interior, National Park Service, How to Apply the National Register Criteria for Evaluation.

7.0 Sites Recommended as Eligible for National Register Listing

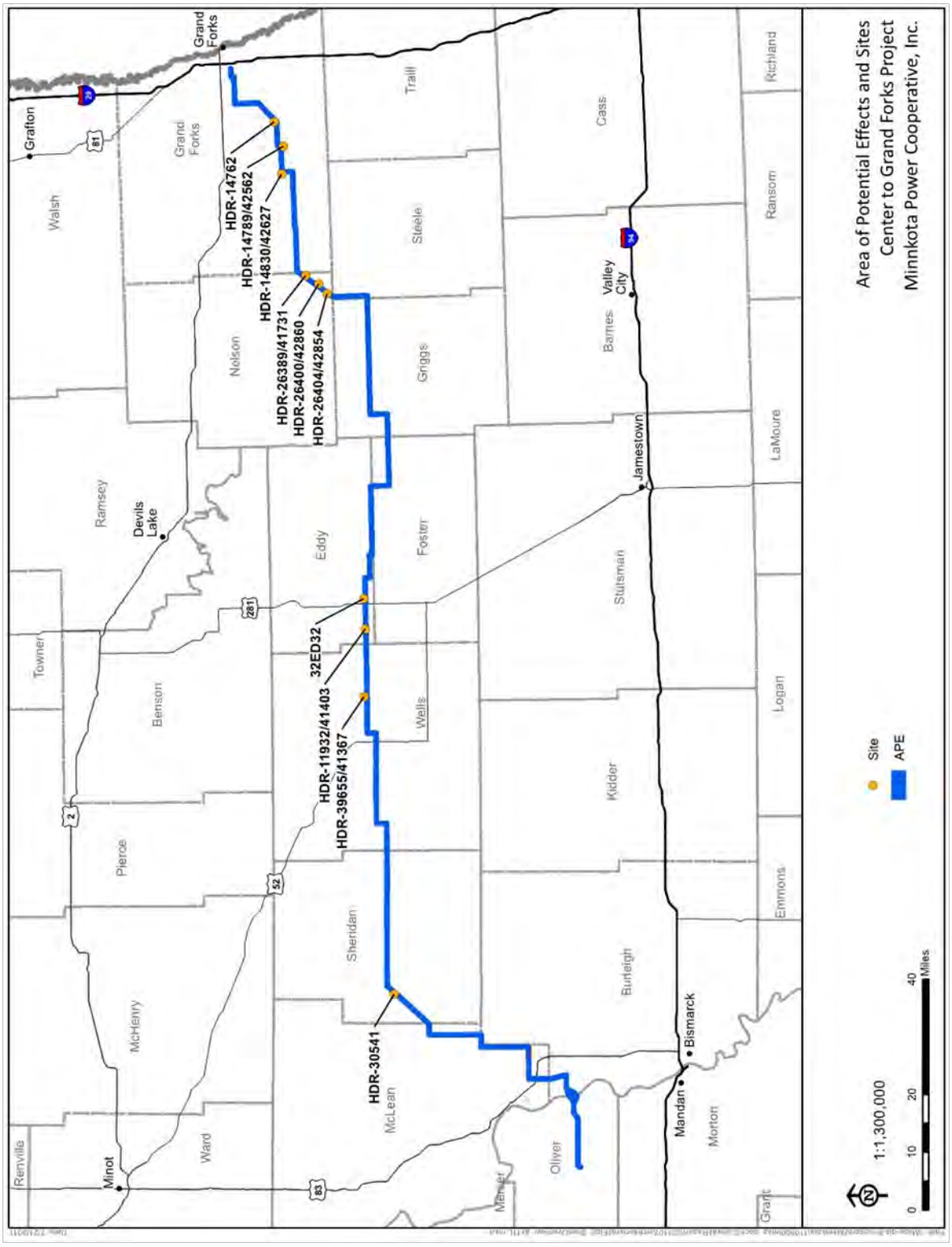
This section provides recommendations regarding National Register of Historic Places determinations of eligibility. The nine sites recommended as eligible for listing on the National Register within the Project APE as defined in Section 3.0 of this report are summarized below in Table 5. The National Register determinations of eligibility for each site follow.

Table 5: Study Area Sites Recommended as Eligible for Listing in the National Register of Historic Places

Site number	Description	National Register Criterion
HDR 11932/41403 Eddy County, Rosefield Township	Large complex with Victorian style residence, Craftsman garage, feed barns, granary, Quonset buildings. South portions of site are non-contributing due to construction of new Quonset buildings.	C for portions of site with agricultural buildings, farmhand housing, barns, and granary that are representative of an early twentieth century farm.
HDR 14762 Grand Forks County, Fairfield Township	Former one-room schoolhouse and Township meeting hall	C as part of a thematic one-room schoolhouse nomination. Does not appear to be eligible on an individual basis.
HDR 14789/42562 Grand Forks County, Pleasant View Township	Craftsman style residence, gambrel roof barn, farmhand bunkhouse, garage, side-gabled wood outbuilding	C as a intact early twentieth century farming complex.
HDR 14830/42627 Grand Forks County, Avon Township	Craftsman residence, gambrel roof barn, poultry house, granary, small Quonset style storage building.	C as a intact early twentieth century farming complex.
HDR 26389/41731 Nelson County, Ora Township	Victorian style residence, granary, farmhand bunkhouse, privy, garage, poultry house, vintage Quonset style buildings, pump house, metal grain bins	C as a intact early twentieth century farming complex.
HDR 26400/42860 Nelson County, Ora Township	Large Victorian residence, granary, possible potato shed, garage, monitor roof building, grain bins.	Tentative recommendation due to property owner not granting access to complex (building integrity levels not fully understood). Criterion A association with development of Ora Township and Aneta; Criterion B association with Ora Township Sundquist pioneer family; Criterion C for intact example of early twentieth century farming complex, Victorian style residence with few visible

Site number	Description	National Register Criterion
		alterations .
HDR 26404/42854 Nelson County, Ora Township	Grain mill, Victorian Queen Anne residence, hipped roof pump house, garage, two outbuildings	C as a intact early twentieth century farming complex.
HDR 30541 Sheridan County, Prophets Township	Vacant one-room Prophets Township schoolhouse	C as part of a thematic one-room schoolhouse nomination. Does not appear to be eligible on an individual basis.
HDR 39655/41367 Wells County, Germantown Township	Craftsman residence, Quonset style building, barn, three side-gabled outbuildings, metal grain bins, collapsing outbuilding, windmill	Tentative recommendation due to property owner not granting access to complex (building integrity levels not fully understood). Criterion C as an intact early twentieth century rural farm complex.

Figure 19. Area of Potential Effects and Sites



Site HDR 11932/41403

This farm complex is bound on the north and east by a tree shelter-belt. Wetlands which form the Rosefield Slough are located to the northwest and west of the complex, with the drainage flowing to the east-southeast. A long north-south trending dirt road provides access to the farm from 13th Street NE. The farm is located in the middle of Section 28, and has undeveloped farmland surrounding it. There are four building complexes: 1) the northwest residential portion, 2) an older agricultural building concentration on the north-central area, 3) a southwest agricultural complex with 1960-1970 vintage buildings, and 4) the southeast agricultural complex with 2000-vintage buildings and structures. A separate contributing feature on the historic period site consists of an isolated recent-vintage water control feature that dams the Rosefield Slough, which is located on the southwest portion of the farm. There is a mature tree shelter-belt that trends north-northwest to the north and central building clusters. There is also a three-part mature shelter-belt that runs along the east boundary of the buildings with an "[" configuration—the long portion runs a mile north-south past the building clusters.

The significance of this building complex is in terms of the broad patterns of North Dakota history under Criterion A of the National Register of Historic Places at the local level. The site is associated with the settlement and establishment of Rosefield Township through the development of wheat, dairy, and cattle farming.

The site is associated with the Steinbach family, who occupied it from 1890 to 1967, and the Schaefer family, that resided on the subject property from 1967 to the present. Archival research does not indicate that these families played in important role in local, state, or national history, and thus the site does not appear to be eligible under National Register Criterion B.

It is recommended that portions of the site be considered as potentially eligible to the National Register under Criterion C at the local level of significance. The buildings exhibit construction techniques and distinctive design elements and materials associated with early twentieth century North Dakota wheat, dairy, and cattle farming. The buildings present a concentration, linkage, and continuity of significant resources, e.g. a granary, Victorian-style residence, early twentieth century pump houses, feed and dairy barns, and farmhand dwellings. The Craftsman style garage is a manifestation of the architectural styles that moved from the Victorian influence to the later Arts and Crafts movement. The twentieth century use of prefabricated buildings is also manifested by the presence of a Quonset-style wooden storage building, a series of side-gabled storage buildings, metal grain bins, and large metal Quonset storage buildings.

Site HDR 14762

The significance of this Fairfield Township school building located in Grand Forks County is in that it illustrates the early one-room county schoolhouse trend during the early 1900s in North Dakota, associated with the immigration boom. The building is

potentially eligible under Criterion A at the local level for its association with early twentieth century rural public schools in North Dakota. This building should only be considered as potentially eligible as part of a thematic one-room schoolhouse National Register nomination, and would not be eligible on an individual basis.

Archival background research did not uncover any linkages with individuals important in local, state, or national history, and therefore this historic period site is not eligible under Criterion B.

It is recommend that the building be considered as eligible for listing in the National Register under Criterion C in a thematic education, multiple property nomination as an example of a wooden one-room schoolhouse dating to the early 1900s. While abandoned, the building still retains a high degree of integrity and has not been altered since its establishment. These schoolhouses reflected the permanence sought by new residents and were used in part to draw in more new settlers.

The schoolhouse retains its integrity of location, design, setting, materials, workmanship, feeling, and association. The abandoned condition of the building has influenced its physical integrity due to environmental factors with the loss of window glass and degradation of the original building fabric. The exterior maintains its original appearance and the interior design and materials are consistent with the original construction and include a slate chalkboard.

Site HDR 14789/42562

This Grand Forks County farm complex is bound on the north by a tree shelter-belt, and by agricultural fields to the east and south; 27th Street NE forms the west boundary. The building cluster with nine elements is oriented on both a north-south and east-west axis, with the residence and garage on the east-west alignment; and the agricultural buildings following a north-south tangent.

This complex appears to be an intact historic period farmstead without major impacts to its integrity. The significance under Criterion A is lacking as it did not make a significant contribution to the broad patterns of history.

Archival background research did not uncover any important linkages with the Swenson family who has occupied the site since 1901, and local, state, or national history. Therefore, this historic period site is not eligible under Criterion B.

The complex appears to have potential for the National Register of Historic Places at the local level under Criterion C, as the buildings form an intact example of an early twentieth century farm. This historic period site still maintains its integrity of location, design, materials, workmanship, and association. The site still functions as an agricultural operation with minimal impacts to the integrity of setting and feeling.

Site HDR 14830/42627

This Grand Forks County farm complex is bound on the north by a tree shelter-belt and agricultural land, by agricultural fields to the east, by 8th Avenue NE to the south, and agricultural fields to the west.

The building cluster consists of a horizontal wood-clad Craftsman style residence with a gable offset roof, located on the west side of the building complex. The remaining buildings are constructed on a north-south alignment, with the agricultural buildings located to the north and east. A seasonal creek bisects the site in a northwest and south line to the east border of the buildings.

The significance of this building complex in terms of the broad patterns of North Dakota history under National Register Criterion A does not exist. There are other agricultural properties that played a larger role in North Dakota history such as the Ralph Hall Farm in Carrington, North Dakota.

Archival background research did not uncover any linkages with individuals important in local, state, or national history, and therefore the site is not eligible under National Register Criterion B. The Swain family, who occupied the site from 1881 to 1905, was involved with the 1882 creation of Avon Township, but only in a minor way. They did not play a significant role in local, state, or national history. The barn may be associated with the Swain occupation; however, the construction techniques and architectural styling of the Craftsman residence and other agricultural buildings suggests they are linked to the subsequent Onsager family who resided at the site from 1906-1960. Albert Onsager was a school teacher at the two Avon Township schools; however, this role was not a significant one. Research did not indicate that Margaret Anderson, who has resided at the site since 1960, played a significant role in local, state, or national history.

The buildings appear to be potentially eligible to the National Register under Criterion C. The buildings exhibit unmodified construction techniques and distinctive design elements and materials associated with early twentieth century grain farms. The buildings present a concentration, linkage, and continuity of significant resources, e.g. a gambrel roof barn, semi-monitor roof poultry house, Craftsman style residence, and grain mill.

The site has cohesion in that the buildings have intact, similar early twentieth century building materials and styling. The buildings retain their integrity of location, design, materials, workmanship, feeling, and association. While the Craftsman residence (Feature 1) has a 1970s vintage garage (Feature 2), the garage is low massing, and the physical integrity levels of the surrounding buildings is extremely high, to the point that the addition is mitigated. The buildings also retain their integrity of setting and feeling—they appear as an intact early twentieth century farming operation associated with grain production. This is enhanced by the mature historic period shelterbelt that encloses the

building cluster and shields it from any modern visual intrusions and thus helps retain the site's integrity of setting and feeling.

Site HDR 26389/41731

This Nelson County farm complex is bound on the north and west by a tree shelterbelt. Wetlands are located northwest and southwest of the complex, with a northeast-trending creek that flows into the confluence of Goose and Beaver Creeks. A long north-south trending dirt road provides access to the farm from 4th Avenue NE. The farm is located in the middle of Section 12, and has undeveloped farmland surrounding it. The site has the residential portion located on the northwest area of the building cluster and has an east orientation. The majority of the agricultural buildings are located on the south portion of the site . An exception to this is the poultry house and hatchery, which are located northeast of the residence. The dirt access road passes immediately to the east of the granary building and provides access for hauling grain to the mill and flour out for shipment.

The significance of this building complex in terms of the broad patterns of North Dakota history under National Register Criterion A is not present at the local, state, or national levels. While the site is associated with the settlement and establishment of Ora Township and nearby Aneta, the John Sundquist site (HDR Site 26400-42860) appears to have a stronger association with Criterion A.

Under National Register Criterion B, the site is associated with the Solberg family of Norwegian immigrants. They were involved with the late nineteenth and early twentieth century settlement of Ora Township. Henry Solberg was one of the original founders of Ora Township in 1884, and the site is associated with Henry and his son Ole (Kueber 1998: 318). The site has been in the Solberg family since 1889. While this association with local history appears to be strong, the John Sundquist site (cited above) appears to have played a stronger role in local history in comparison, and thus, the Solberg site does not appear to be eligible under National Register Criterion B.

The building complex appears to be potentially eligible to the National Register under Criterion C at the local level of significance. The buildings exhibit construction techniques and distinctive design elements and materials associated with early twentieth century North Dakota wheat farms. The buildings present a concentration, linkage, and continuity of significant resources, e.g. a granary, Victorian-style residence, early twentieth century garage, pump houses, poultry house, round barn, and farmhand dwelling. The privy is an extant example of early twentieth century plumbing prior to the adoption of leach fields and indoor plumbing.

The site has cohesion in that the buildings have intact, similar early twentieth century building materials and styling. While the buildings would not be National Register eligible on an individual basis, they appear to be eligible as a complex. The buildings

retain their integrity of location, design, materials, and workmanship. They also retain their integrity of setting and feeling as an intact early twentieth century farming operation associated with grain production. This is enhanced by the mature historic-period shelterbelt to the north and west, in addition to the buildings being located in the center of Section 12 on a long dirt access road. This has shielded the farmstead from any modern visual intrusions and thus helps strengthen the integrity of setting and feeling.

Site HDR 26400/42860

This site located in Nelson County could not be inspected due to the property owner refusing access. This farm complex is bound on the north and west by a tree shelterbelt. County Road 7 forms the west boundary. Agricultural fields are found to the south and east, and a seasonal lake is located to the east and covers nearly a one-third of the section. The building cluster is oriented on a north-south axis. The site has an oval-shaped dirt road circulation system, with the residence located on the northwest portion, shade trees located in the center of the oval, and agricultural buildings situated on the east side of the oval. Two separate lines of round metal grain storage bins are located northeast of the residence.

The nine features at this site cannot be adequately evaluated due to site access restrictions. This information will be completed at a future date when the project condemnation proceedings take place and access is granted to the site recorder. The site appears to have some of the highest physical integrity values of all the farm complexes observed in the project corridor. It appears to be potentially eligible under Criterion B for the association with the Sundquist family, who were pioneers that have resided at the site since 1886. It also appears to be eligible under Criterion C as the Victorian style residence is impressive, and appears to maintain a high degree of integrity of design, materials, and workmanship. The site maintains its integrity of feeling, location, and association as it still functions as an agricultural operation with minimal impacts to the setting.

Site HDR 26404/42854

This Nelson County farm complex is bound on the north by a tree shelterbelt and 19th Street NE, and by agricultural fields to the east and south. A wetland area is located to the west. A south/southeast trending dirt driveway accesses the residence. A second north-south trending dirt road is located on the east side of the site and may have been used to haul grain to the granary, and flour out for shipment. A second L-shaped mature tree shelter is located to the east of the building complex.

The significance of this building complex is in terms of the broad patterns of North Dakota history under Criterion A at the local level. The site is associated with the establishment of Aneta in the late 1890s and early 1900s, and development of wheat farming. The arrival of the railroad in 1896 at Aneta helped the development of wheat farming by providing a method to ship the grain, and resulted in the construction of both

grain elevators as well as encouraging the building of new residences in the community (Kueber 1998: 321).

The site is associated with Thomas T. Fjeld, who was part of Norwegian immigrant family involved with the early twentieth century settlement of Aneta. The Fjeld family helped establish one of the first Aneta churches, and have remained active in the local community since the early 1900s (Kueber 1998: 111). They were wheat farmers who took advantage of the railroad and early twentieth century wheat boom. While the Fjeld family had many members who resided in Aneta, background research indicates their importance in local history meeting Criterion B.

The building complex appears to be potentially eligible to the National Register under Criterion C at the local level of significance. The residence, pump house, and grain mill buildings exhibit unmodified construction techniques and distinctive design elements and materials associated with early twentieth century North Dakota wheat farms. The buildings present a concentration, linkage, and continuity of significant resources, e.g. a grain mill, Queen Anne Victorian style residence, and early twentieth-century garage and pump house. The Queen Anne style residence retains hallmark design elements of this style, such as asymmetry, and massing oriented to the south facade. It also exhibits a wrap-around porch, projecting bays, dormers, and a complex cross-gabled roofline with eave returns and recessed cut outs.

The site has cohesion in that the buildings have intact, similar early twentieth century building materials and styling. The buildings retain their integrity of location, design, materials, and workmanship. They also retain their integrity of setting and appear as an intact early twentieth century farming operation associated with grain production. This is enhanced by the mature historic period shelterbelt that encloses the building cluster and shields it from any modern visual intrusions and thus helps retain the integrity of feeling. These trees are a manifestation of the 1873 Timber Culture Act.

Site HDR 30541

The site consists of the Prophets Township one-room schoolhouse in Sheridan County that is located in a treeless area on a gradual east-west trending slope adjacent to plowed agricultural fields. There is no historic vegetation associated with the building.

The significance of this school building is in that it illustrates the early one-room county schoolhouse trend during the early 1900s in North Dakota associated with the immigration boom. The building is potentially eligible under National Register Criterion A at the local level for its association with early twentieth century rural public schools in North Dakota. It is recommended that this site should only be considered as part of a thematic multiple property National Register nomination of one-room schoolhouses, or for North Dakota educational properties, and not on an individual basis.

Archival background research did not uncover any linkages with individuals important in local, state, or national history and therefore the site is not eligible under National Register Criterion B.

It is recommend that the building be considered as eligible to the National Register under Criterion C as a good example of a wooden one-room schoolhouse dating to the early 1900s. This would be as part of a thematic, multiple-property nomination; the building is not eligible under this criterion on an individual basis. While abandoned, the building still retains a high degree of integrity and has not been altered since its establishment in the 1910s. These schoolhouses reflected the permanence sought by new residents and were used in part to draw in new settlers.

The schoolhouse retains its integrity of location, design, setting, materials, workmanship, feeling, and association. The exterior maintains its original appearance and the interior design and materials are consistent with the original construction, and include a slate chalkboard.

Site HDR 39655/41367

The site could not be accessed to inspect it as the property owner did not grant access to this site. This farm complex is bound on the north by a tree shelterbelt and 14th Street NE, by 5th Avenue NE to the east, and agricultural fields to the south and west.

The building cluster includes a horizontal, wood-clad Craftsman style residence with a gable offset roof, located on the north side of the building complex. The remaining buildings are constructed on a north-south alignment, with the agricultural buildings located to the south and west. There are eight round metal grain bins located on the west portion of the site.

The eight features (or more) at this site cannot be adequately evaluated due to site access restrictions. This information will be completed at a future date when the Center to Grand Forks Wind Farm Transmission Line condemnation proceedings takes place and access is granted to the site recorder.

The preliminary research indicates that this site is not associated with important themes in local, North Dakota, or national history, and is not eligible under National Register Criterion A.

Under National Register Criterion B, the site is associated with the Seibold family from 1908 to the present. While this association with local history appears to be strong, archival background research does not indicate that the Seibold family played a strong role in local, state, or national history. Thus, this site does not appear to be eligible under National Register Criterion B.

The site's significance cannot be assessed for eligibility under National Register Criterion C due to the lack of access to determine the physical integrity levels of the buildings and complex. The site appears to be a relatively intact rural farm with buildings from 1910 to 1920.

8.0 Sites Recommended as Not Eligible for Listing

The 260 sites recommended for a finding of not eligible for listing on the National Register within the Project APE as defined in Section 3.0 are presented in Appendix A.

9.0 Recommendations

This section provides recommendations regarding determination of eligibility and determination of effect. These recommendations are not binding upon RUS or ND SHPO.

9.1 Recommended Determinations of Eligibility

As discussed in Section 5.0, nine sites are recommended as eligible for listing on the National Register; this includes an additional National Register-listed property for the purposes of this project. No recommendation is made to formally list these sites because discussions on this topic have not been held with the respective owners of these nine sites.

9.2 Recommended Determinations of Effect

For a visual intrusion to rise to the level of an adverse effect, it would have to impair the ability of a historic property to convey its sense of time and place by significantly changing the feeling and setting of the historic property. Feeling is the property's expression of the aesthetic or historic sense of a particular period of time. The sense of feeling is conveyed by physical features that convey a property's historic character. Setting is the character of the place in which the property played its historic role. The sense of setting is conveyed by how the property is situated and the relationship between the property, its surrounding features, and open space. The aspects of both feeling and setting can be negatively impacted by the introduction of modern elements into a historic location. The following guidelines apply for assessing adverse effects:

36 CFR Sec. 800.5 Assessment of adverse effects.

> An adverse effect is found when an undertaking may alter the National Register 7 elements of integrity that include location, design, setting, materials, workmanship, feeling, or association.
>
> (2) *Examples of adverse effects.* Adverse effects on historic properties include, but are not limited to:
>
> (i) Physical destruction of or damage to all or part of the property;
>
> (ii) Alteration of a property not consistent with the Secretary's standards;
>
> (iii) Removal of the property from its historic location;
>
> (iv) Change in the character of the property's use or of physical features within the property's setting;

(v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to a federally recognized tribe or Native Hawaiian organization; and

(vii) Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

The Project Environmental Assessment visual resources section describes the towers and line visual impacts and proposed visual mitigation measures:

> The proposed structures would be between 130- and 150-feet-tall. Depending on a viewer's physical location, the terrain conditions, and natural landscape features such as tree cover, the transmission structures could be visible for distances between 1.5 and 2 miles. A viewer's degree of discernable detail decreases as physical distance from an object increases. Beyond 2 miles in physical distance, the outline of structures most likely would not be seen. The transmission line wiring is unlikely to be seen clearly beyond distances of one-half to three-quarters mile. The Project proposes to use self-weathering single pole steel structures …The height of the structure may be reduced, as feasible, to minimize impacts within the areas of high scenic importance. The self-weathering structure would turn a brownish color to help blend with the landscape (Environmental Assessment, 2010:3.1).

One listed historic property and nine recommended NRHP-eligible sites are discussed. The methodology for making these determinations of effect recommendations is based on the distance between the nine sites recommended as being NRHP-eligible and the one National Register-listed property and the transmission line. Additional factors include terrain height and vegetation. The presence of many large mature tree shelterbelts, combined with a suitable distance from the transmission line, has mitigated the visual impact in most of the ten sites.

Table 6 presents information on the transmission towers and lines and their relationship to the recorded sites, and a determination of effect analysis. Full-sized aerial images of the sites and proposed transmission line corridor are presented at the end of this chapter.

Figure 20. Sites by County

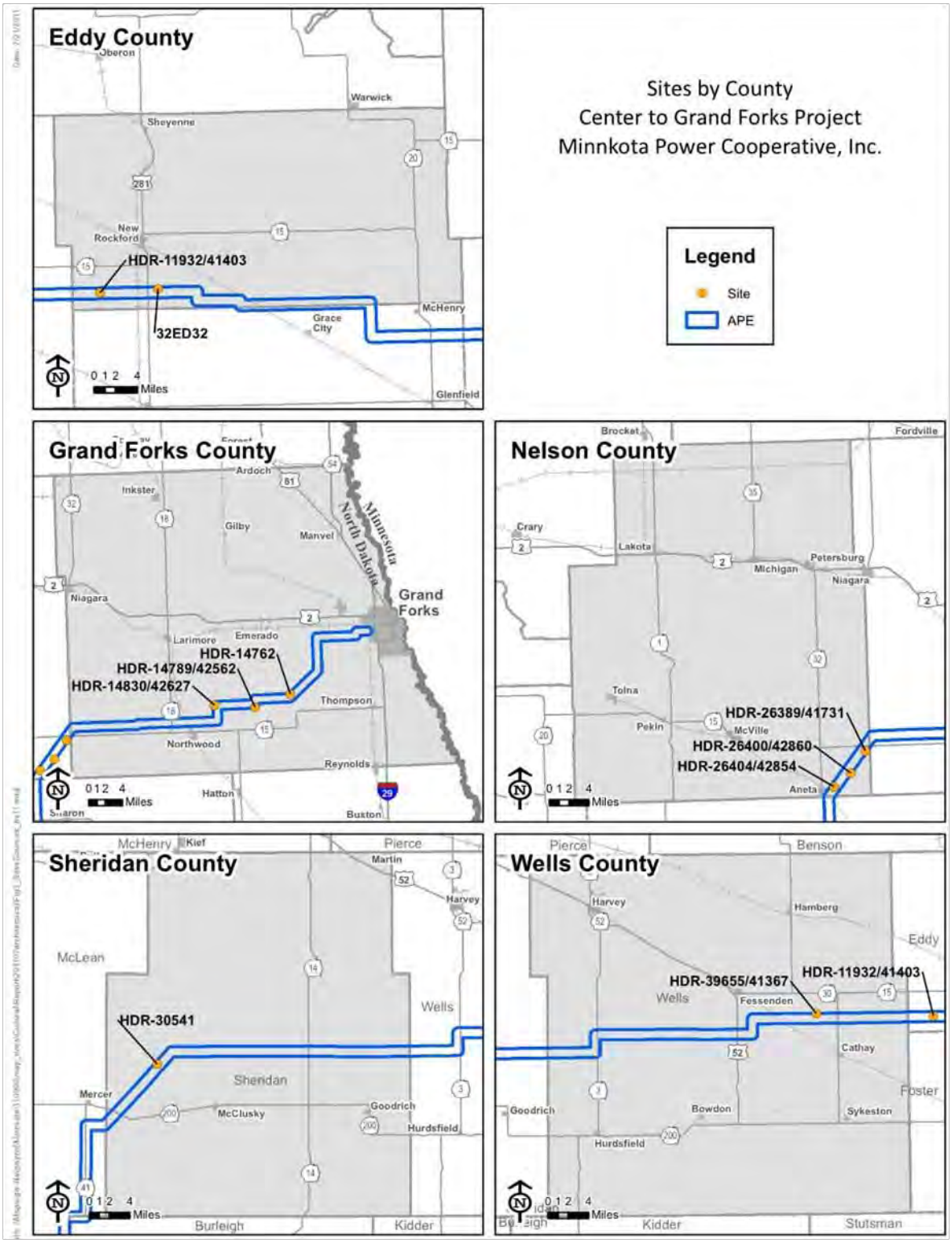
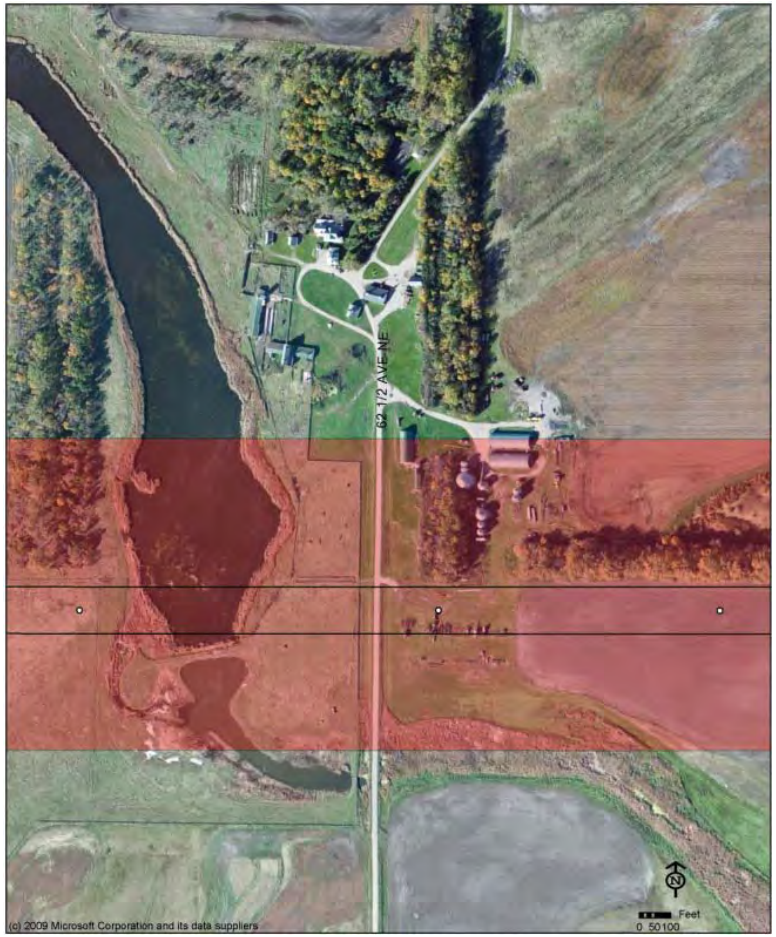


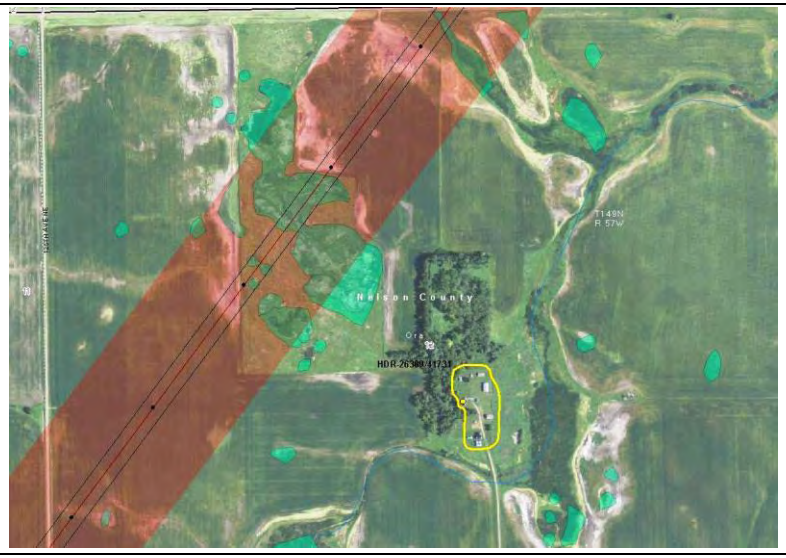
Table 6: Project Area Recommended National Register-Eligible or Listed Sites Effects Determination*

Site Number	Description	Transmission corridor and site image	Effects Analysis
HDR 11932/41403 Eddy County, Rosefield Township	Large complex with Victorian style residence, Craftsman garage, feed barns, granary, Quonset buildings.	 All images have 1000-foot corridor depicted and dots are transmission tower locations	Three proposed transmission towers will be located to the south of this site. The closest tower will be located 199 feet (0.04 miles) south of a building in the non-contributing portion of this site. The south portions of the site are non-contributing due to construction of new Quonset buildings. The easternmost tower will be located south of a large mature shelter belt. The two proposed western towers will be visible to the southeast and southwest from the contributing elements of this site. The proposed project will impact this historic period site's integrity of location, setting, and feeling, but the effects are not considered adverse. The site's integrity of design, materials, workmanship, and association will not be impacted.

*Larger format versions of all the photos in Table 6 are included at the end of this section of the document.

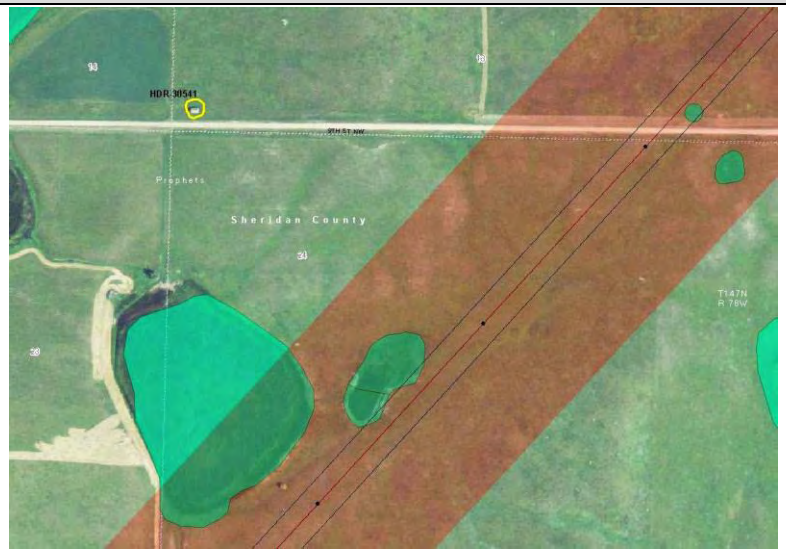
Site Number	Description	Transmission corridor and site image	Effects Analysis
HDR 14762 Grand Forks County, Fairfield Township	Former one-room school house and Township meeting hall		This school house is has no surrounding vegetation. Three proposed transmission towers and lines would be visible to the east and southeast. The closest tower would be located 1534 feet (0.29 miles) southeast of the building. Two proposed towers on the south are located at a longer distance, and a mature tree row on an east-west alignment runs between the towers and the building. This building does not appear to be NRHP eligible on an individual basis. It could be eligible as part of a multiple property nomination for North Dakota educational properties. The proposed project will impact this historic period site's location, setting, and feeling, but the effects are not considered adverse. The site's integrity of design, materials, workmanship, and association will not be impacted.

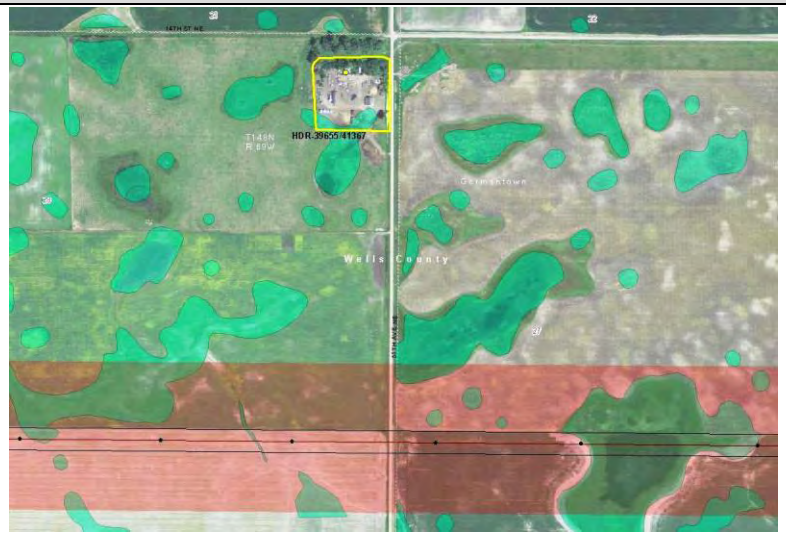
Site Number	Description	Transmission corridor and site image	Effects Analysis
HDR 14789/42562 Grand Forks County, Pleasant View Township	Craftsman-inspired style residence, gambrel roof barn, farmhand bunkhouse, garage, side-gabled wood outbuilding		The farm site has a south alignment and a mature tree shelterbelt on its north boundary. The view to the south along 27th Street NE is unobstructed. The closest proposed transmission line tower is located 2089 feet (0.40 miles) north of the site. The proposed line is on a north-south alignment, and then turns east. This configuration along with the shelterbelts helps retain the integrity of setting and feeling at this site. This property will not be adversely affected. The site's integrity of location, design, setting, materials, workmanship, feeling, and association will not be impacted.

Site Number	Description	Transmission corridor and site image	Effects Analysis
HDR 14830/42627 Grand Forks County, Avon Township	Craftsman residence, gambrel roof barn, poultry house, granary, small Quonset style storage building.		This site has a north-south orientation and a mature tree shelterbelt that encloses the building cluster. The closest proposed transmission line tower to the site is located to the east 1059 feet (0.20 miles), and then takes an east-west orientation away from the site along 8th Avenue NE. The integrity of location, setting and feeling appears to not be influenced by the proposed new structures. The site's integrity of design, materials, workmanship, and association will not be impacted. The property will not be adversely affected.
HDR 26389/41731 Nelson County, Ora Township	Victorian style residence, granary, farmhand bunkhouse, privy, garage, poultry house, vintage Quonset style buildings, pump house, metal grain bins		This site also has a north-south orientation. It is located 1513 feet (0.29 miles) southeast of the proposed transmission line, and the line route is on a northeast-southwest alignment. A large, mature tree shelterbelt (north-south axis) is located between the line and the building complex and appears to provide a sufficient buffer for the site to retain its integrity of location, setting, and feeling. This property will not be adversely affected.

Site Number	Description	Transmission corridor and site image	Effects Analysis
HDR 26400/42860 Nelson County, Ora Township	Large Victorian residence, granary, possible potato shed, garage, monitor roof building, grain bins.		The landowner did not allow access to this property. The property's orientation is to the south. The viewshed is to the south and east, which is open. A long mature north-south tree shelterbelt is located west of the site, and mature trees surround the Victorian residence and enclose the view. The transmission line is on a northeast-southwest alignment at this juncture, and the closest proposed transmission tower will be located 2347 feet (0.44 miles) west of the site. This distance combined with the trees appears to be sufficient for the site to retain its integrity of location, feeling and setting. The site's integrity of design, materials, workmanship, and association will not be impacted. This property will not be adversely affected.

Site Number	Description	Transmission corridor and site image	Effects Analysis
HDR 26404/42854 Nelson County, Ora Township	Grain mill, Victorian Queen Anne residence, hipped roof pump house, garage, two outbuildings		The property has a north-south orientation. The view from the house to the south and east towards the proposed transmission line is relatively unobstructed. One tower will be located to the east of a tree row 226 feet away from the site (0.04 miles); and its height will rise above the trees and will be visible from the residence and granary. The second tower will be located a longer distance to the southwest, and both the lines and tower will be visible from the residence, and will influence the integrity of location, setting, and feeling, and would constitute an adverse effect. The site's integrity of design, materials, workmanship, and association will not be impacted.

Site Number	Description	Transmission corridor and site image	Effects Analysis
HDR 30541 Sheridan County, Prophets Township	Vacant one-room Prophets Township schoolhouse		This school house is located in a treeless area. The proposed transmission towers and lines will be visible to the southeast and east. The closest proposed transmission line tower would be located 1440 feet (0.27 miles) away from the site. This property does not appear to be NRHP eligible on an individual basis. It would be potentially eligible as part of a NRHP multiple property nomination for North Dakota educational properties. The proposed project will impact this historic period site's integrity of location, setting, and feeling, but the effects are not considered adverse. The site's integrity of design, materials, workmanship, and association will not be impacted.

Site Number	Description	Transmission corridor and site image	Effects Analysis
HDR 39655/41367 Wells County, Germantown Township	Craftsman residence, Quonset style building, barn, three side-gabled outbuildings, metal grain bins, collapsing outbuilding, windmill		The landowner did not allow access to this property and the integrity levels of the buildings are not understood. The viewshed is to the south, east, and west. The proposed transmission line would be located to the south. The closest proposed transmission line would be located south 2097 feet (0.40 miles) from the site. There are no tree shelterbelts between the property and the transmission line. The line would be visible from the property and would impact the integrity of setting and feeling. The proposed project will impact this historic period site's integrity of location, setting, and feeling, but the effects are not considered adverse. The site's integrity of design, materials, workmanship, and association will not be impacted.

Site Number	Description	Transmission corridor and site image	Effects Analysis
32ED32 Sylvanus Marriage Octagonal Barn Eddy County	Octagonal barn constructed circa 1902, 18 additional buildings subsequently constructed on site around barn		There is a mature tree shelterbelt located between the south boundary of the property and the proposed transmission line that may hide portions of the new line from the barn southeast viewshed. This tree row has varying heights and at least two proposed towers will be visible to the southwest and will influence the integrity of location, setting, and feeling. The closest proposed transmission line tower would be located 1346 feet (0.25 miles) south of the site. The proposed project will impact this historic period site's integrity of location, setting, and feeling, but the effects are not considered adverse. The site's integrity of design, materials, workmanship, and association will not be impacted.

Site 32ED32 Sylvanus Marriage Octagonal Barn

Site 32ED32 is the Sylvanus Marriage octagonal barn, which is a National Register-listed property located in Eddy County. The entire property has integrity issues. The 32ED32 site record surveyor stated that the property would not be considered National Register eligible in its current state, with only the octagonal barn (Feature 3) being significant out of nineteen features. The property fronts 68th Avenue NE and has a north-south orientation.



Barn view to south with shelterbelt in distance.



West portion of site view to south.



Ranch residence to northwest of barn view to south.

There is a mature tree shelterbelt located between the south boundary of the property and the transmission line location that may hide the new line and towers from the view of the barn. This tree row has varying heights and is not consistent. Based on the tower placement, this could potentially result in a negative visual impact to this historic property. However, HDR's recommendation is that the octagonal barn is the only feature that should be considered for protection. The historic viewshed from 1902 has been lost long ago. The site does not retain its integrity of setting, feeling, and association through the construction of numerous new buildings since 1902. This includes a Ranch-style residence within 50 yards of the barn which does not exhibit period appropriate sympathetic use of materials, design, or workmanship.

Should the project be considered as a potential visual effectt, it could be reduced through mitigation, so that only minor impacts to the historic value of the octagonal barn would occur. Mitigation options would have to be developed by RUS in consultation with ND SHPO, and could involve Historic American Building Survey (HABS) documentation of the barn

All of the sites that have been recommended as NRHP eligible are at the local level of significance. The NRHP-listed site 32ED32 appears to also be listed at the local level of significance. This suggests that any strategy be appropriate to the relative importance of the historic period sites. For example, the school houses do not appear to be individually eligible to the NRHP, and would only be contributing elements to a statewide NRHP multiple property nomination of one-room schools for their architectural values and association with early North Dakota settlement. Avoidance measures also should take

into account the views of the property owner, community, and other interested members of the public and would require public participation. A visual intrusion into a historic period site's viewshed that substantially hinders or prevents one from experiencing the property within its significant setting is, by definition, an adverse visual effect. The principal factor is if the appreciation/understanding of the historic properties will be hindered by the introduction of a visual intrusion, in this case, the unhindered view of agricultural fields and associated buildings (setting, feeling, association). Due to the relatively flat terrain and open space that characterizes the Project's setting, any potential adverse effect can not be completely mitigated. Mitigation measures can however, lower the intensity of the visual effects from the Project.

The following are recommendations on how visual effects can be avoided through two ways to achieve a Finding of No Adverse Effect. Redesigning the proposed intrusion to lessen its appearance on the landscape is one method. This could involve increasing the distance between the transmission towers and/or lowering the transmission tower height around the identified sites that have potential as historic properties.

The second approach could involve planting trees or shelterbelts to provide a visual barrier between a transmission line, towers, and the historic period site. Screening trees of the same species as the existing historic period trees would be planted in similar fashion as the surrounding shelter belts. However, this could be interpreted as an additional visual effect but would be a mitigation approach in keeping with the historic landscape tradition. It likely would require the permission of the land owner to plant the trees. If approved as a visual screening method, the trees would need to be monitored and maintained over time to prevent die off and be replaced if they fell due to wind storms or snow loading. These options could minimize the adverse effects to the historic location, setting, and feeling of the sites recommended as being NRHP eligible and the one listed property.

The above discussion presents a preliminary determination of effects analysis as the NRHP eligibility of the nine sites has not been reviewed by SHPO. Should the NRHP eligibility for these sites be agreed upon by SHPO, the adverse effects could be mitigated by employing the visual screening techniques identified by the Project Environmental Assessment. Table 7 below summarizes the effects analysis, and full-sized aerial images of each site follows.

Table 7: Effects Analysis Summary

Site Number	Effects Analysis
HDR 11932/41403 Eddy County, Rosefield Township	The proposed project will impact this historic period site, but the effects are not considered adverse.
HDR 14762 Grand Forks County, Fairfield Township	The proposed project will impact this historic period site, but the effects are not considered adverse
HDR 14789/42562 Grand Forks County, Pleasant View Township	This property will not be adversely affected.
HDR 14830/42627 Grand Forks County, Avon Township	The property will not be adversely affected.
HDR 26389/41731 Nelson County, Ora Township	This property will not be adversely affected.
HDR 26400/42860 Nelson County, Ora Township	This property will not be adversely affected.
HDR 26404/42854 Nelson County, Ora Township	This property will be adversely affected.
HDR 30541 Sheridan County, Prophets Township	The proposed project will impact this historic period site, but the effects are not considered adverse
HDR 39655/41367 Wells County, Germantown Township	The proposed project will impact this historic period site, but the effects are not considered adverse
32ED32 Sylvanus Marriage Octagonal Barn Eddy County	The proposed project will impact this historic period site, but the effects are not considered adverse

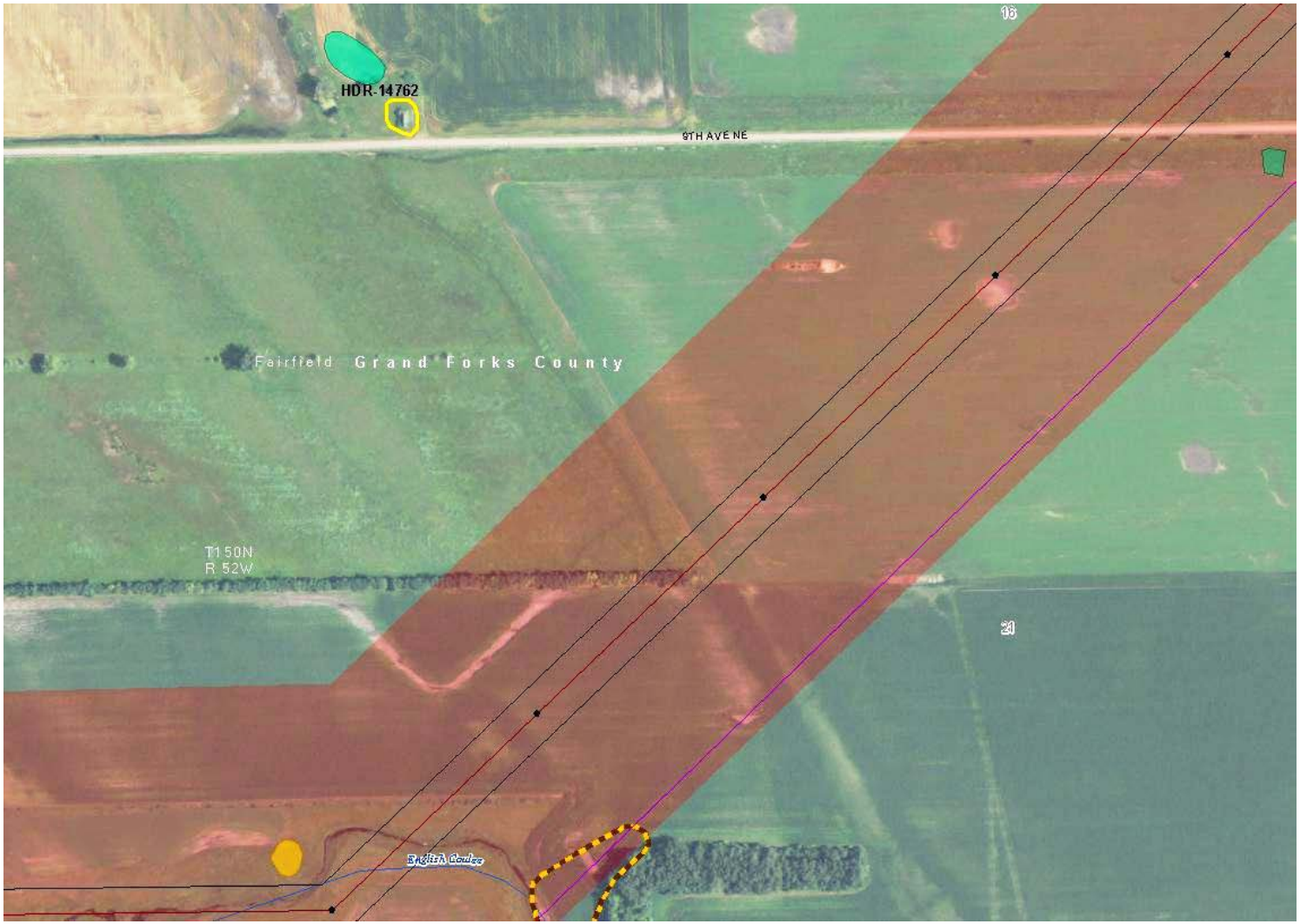
Large Format Versions of Photos from Table 6



32ED32



HDR 11932/41403


HDR-14762
9TH AVE NE
Fairfield
Grand Forks County
T150N
R 52W
16
21

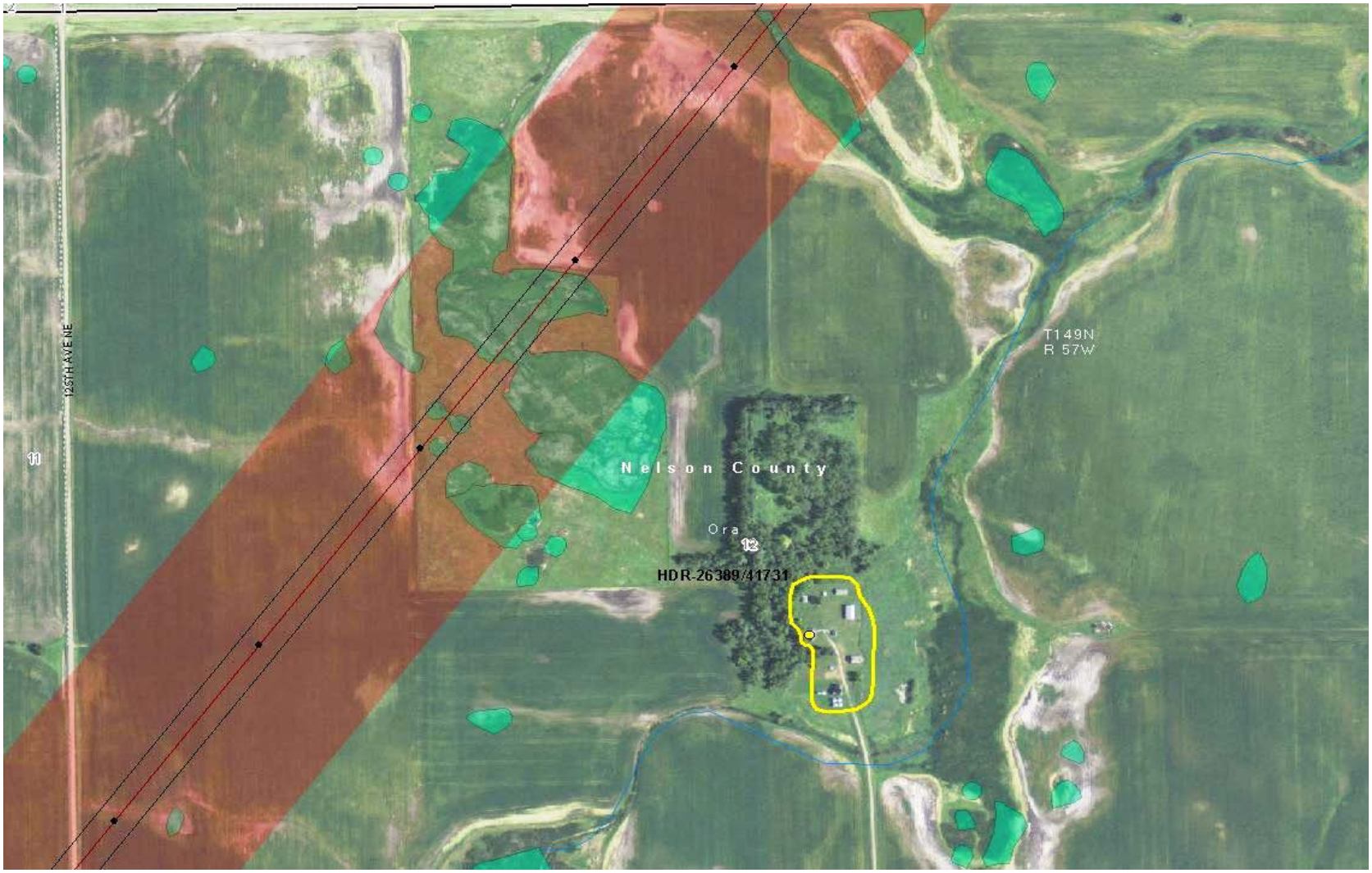
HDR 14762



HDR 14789/42562



HDR 14830/42627



HDR 26389/41731



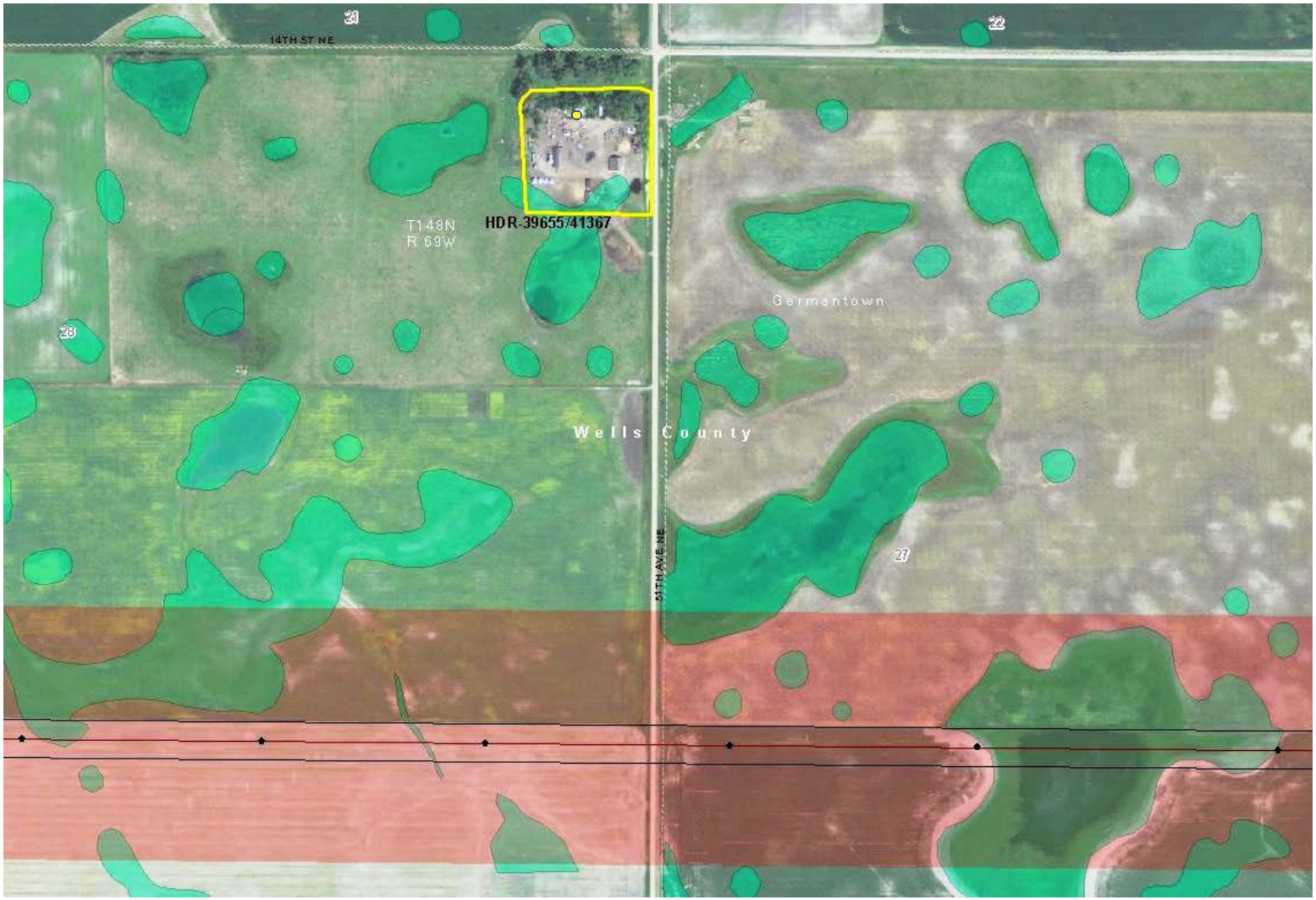
HDR 26400/42860



HDR 26404/42854


14
13
HDR-30541
9TH ST NW
Prophets
Sheridan County
24
T147N
R 78W
23

HDR 30541



HDR 39655/41367

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Appendix A

The following tables present information on the April 18 to 22, and May 17-20 2011 survey effort. Table A-1 lists site leads and NDCRS sites. Table A-2 lists sites located though GIS research and additional sites located during the field effort that were determined to be NRHP-ineligible.

Table A-1. North Dakota Cultural Resources Survey Sites and Site Leads

Site	Site Name	Image	GIS X	GIS Y
32ED222	Rocky Run-no changes since site record was updated.		489627	5272236
32ED32	Marriage, Slylvanus Octagonal Barn-no changes since site was recorded.		492881	5273347
32EDX2	Brantford Townsite	Outside of APE. Adjacent buildings are ruins.	505957	5271652
32GG81	Agricultural complex	Property owner did not grant access to property.	564477	5271332
32OL435	Price School	Site no longer extant, update site record prepared	351926	5217555

Table A-1. North Dakota Cultural Resources Survey Sites and Site Leads				
Site	**Site Name**	**Image**	**GIS X**	**GIS Y**
32OL436	Price Town site-no changes since site record was prepared.		352561	5216514
32SH348	Land owner did not grant access to property. Also refer to 30882		405682	5268248

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
5063	Farm Unit		Manufactured modern residence, prefabricated metal outbuilding	369084	5242495	5063
5290	Farm Unit	1980s vintage residence	Also refer to 42966	357635	5220969	
5299	Farm Unit	Manufactured house and 1930s wood garage.	Also refer to 40643	354499	5218147	
5302	Farm Unit		1950s vintage residence and outbuilding, mobile home. Also refer to 40638	353365	5219740	
5309	Vacant Farm Unit	Mobile home, metal grain bin, wood and two wood agricultural outbuildings		356872	5219130	
5319	Dwelling other than Farm	Property owner did not grant access to property.		353492	5217375	
5321	Vacant Farm Unit	Manufactured home, barn, and two metal storage buildings		359311	5219100	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
5326	Seasonal or Summer Dwelling	Metal storage building		353564	5217833	
11095			Gambrel roof barn with concrete block lower walls, cross-gabled 1920s house recently renovated with all doors and windows replaced. Also refer to 41449			
11801			Also refer to 41485			
11883	Farm Unit	Property owner did not grant access to property.	Also refer to 41493	520819	5271506	
11884	Farm Unit		Also refer to 41492	520175	5271178	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
11889	Farm Unit		Also refer to 41477	514984	5271247	
11890	Farm Unit	Property owner did not grant access to property.	Also refer to 41478	515290	5271254	
11904	Cemetery, East & West			507209	5271294	
11912	Farm Unit		Also refer to 41441	497726	5273549	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
11913	Farm Unit		Also refer to 41439	497392	5272200	
11921	Farm Unit		Also refer to 41426	490859	5272309	
11934	Vacant Farm Unit	Flooded, no access		480648	5273568	
11935	Vacant Farm Unit	Flooded, no access		481156	5272939	
12030	Vacant Farm Unit		Residence has been burned down, granary, barn, stone building, privy. Also refer to 41448	501007	5272022	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
12393	Farm Unit		Also refer to 41464	507189	5270332	
12394	Farm Unit	Hipped roof wood residence with windows changed out to metal versions, asbestos tile clad side gabled bunk house, five round metal grain bins, front gabled wood garage, metal seed bin.	Also refer to 41465	508910	5270096	
12396	Farm Unit		Also refer to 13095, 41462	505383	5270319	
12400	Vacant Farm Unit		Refer to 41476, 43479	513147	5270288	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
12416	Vacant Farm Unit		No standing buildings	524358	5269208	
12418	Farm Unit	Road flooded, no access.	Also refer to 43120	527902	5266224	
12422	Farm Unit		Also refer to 13198	532897	5266241	
12425	Farm Unit		Also refer to 43123	529471	5265344	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
12426	Farm Unit		Also refer to 43122	528606	5265405	
12427	Farm Unit		Also refer to 43121	527889	5264970	
13078	Vacant Farm Unit	Road flooded, no access.		524357	5266959	
13095	Vacant Dwelling other than Farm		Also refer to 12396, 41462	505773	5270346	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
13198	Dwelling other than Farm		Also refer to 12422	532836	5266297	
17566	Metal grain bin					
17573	Farm Unit			573597	5271320	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
17574	Farm Unit		Also refer to 41519	572377	5271251	
17586	Dwelling other than Farm			571415	5270892	
17599	Vacant Farm Unit			560932	5270909	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
17600	Vacant Farm Unit		Abandoned and heavily modified Craftsman residence, Butler building, Quonset building.	558015	5270773	
17606	Farm Unit		Refer to 41874	552102	5270759	
17607	Vacant Farm Unit		Barn partially demolished	552877	5270720	
17609	Farm Unit		Also refer to 41880	556693	5271328	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
17611	Binford cemetery		1902 oldest headstone			
17613	Farm Unit-South Word Farm and Ranch		Also refer to 41865.	548706	5270423	
17614	Farm Unit		Also refer to 41873.	551491	5271006	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
17642	Vacant Farm Unit			540900	5266385	
17645	Vacant Farm Unit			543529	5267445	
17646	Farm Unit		Also refer to 41863	545964	5270006	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
17649	Farm Unit		Also refer to 41504	544730	5267543	
17653	Farm Unit		Also refer to 41855	543899	5265651	
17688	Vacant Farm Unit	Abandoned cross-gabled residence viewed with binoculars, could not access due to flooded road.		563690	5270041	
17698	Dwelling	Property not accessible due to Sheyenne River flooding. Viewed with binoculars, cross-gabled residence 1890-1900, corrugated metal gabled building, hipped roof wood building, metal grain bins.		567522	5270074	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
17711	Vacant Farm Unit			572356	5270409	
17713	Farm Unit		Also refer to 41517.	572656	5270498	
17714	Vacant Farm Unit	No standing buildings on site.		573196	5269960	
17715	Farm Unit			574636	5270398	
18531	Vacant Farm Unit	Poor road conditions, viewed with binoculars-modern front-gabled metal storage building		539804	5265782	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
18612	Vacant Farm Unit	No access, road flooded and washed out		542571	5265470	
18636						
21172	Buffalo ranch		Also refer to 43117			
22897	Vacant Farm Unit		Abandoned residence and outbuilding	370828	5256402	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
22898	Vacant Farm Unit			370932	5254565	
22909	Farm Unit		Vinyl clad residence, Butler building, Quonset building, wood barn in poor condition Also refer to 40895	371220	5249190	
22911	Farm Unit-cattle	Pole barn, round metal grain bins	Also refer to 40891, 40892	370810	5247031	
23145	Farm Unit		1970s vintage house, 1950s vintage wood garage, wood outbuildings Also refer to 40879	367705	5242190	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
23146	Farm Unit			367706	5241995	
23148	Dwelling-for sale		Modern residence and garage Also refer to 40877	367705	5241522	
23154	Farm Unit		Altered historic period barn, Quonset building, two metal outbuildings, modern wood residence Also refer to 40872	366228	5238012	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
23159	Dwelling		Gable roof wood outbuilding, side gabled outbuilding, manufactured 1990s residence	367486	5231519	
23167	Farm Unit		Manufactured house, 1920s vintage wood barn, large prefabricated metal storage building Also refer to 23168, 43220, 43221	361035	5229166	
23168	Farm Unit		Also refer to 23167, 43220, 43221	361276	5229282	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
23171	Vacant Farm Unit		Front-gabled residence missing doors and windows, 1930s vintage metal building, Butler building, wood clad agricultural outbuilding, metal grain bins	360984	5230034	
23172	Vacant Farm Unit		Nothing present	362786	5230534	
23173	Vacant Farm Unit		Large prefabricated metal building, seven round metal grain bins, three plywood outbuildings in poor condition	365795	5229573	
23187	Vacant Farm Unit	Two mobile homes, wood clad front gable roof 1940s vintage residence		358313	5227299	
23188	Farm Unit	1990-2000 vinyl sided house, metal agricultural outbuilding	Also refer to 43223	358166	5227610	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
23592	Vacant Farm Unit	Flooded, no access		357994	5226527	
26413	Aneta Cemetery, East & West	Road flooded, no access		577462	5281682	
26414	Silent Hill, Aneta, ND Cemetery		Road flooded, unable to observe close up			
26641	Farm Unit			578950	5284360	
26642	Sacred Heart Catholic Cemetery			577387	5280417	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
27082	Vacant Farm Unit	No buildings on site		336138	5217266	
27084	Farm Unit	Not accessible.	Also refer to 42962	340123	5215870	
27085	Vacant Farm Unit			341463	5216461	
27087	Other Structure-ag ops	Prefabricated metal storage building, modern residence		343361	5216823	
27089	Vacant Farm Unit		Abandoned residence	343273	5215960	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
27090	Yucca Catholic Cemetery			343231	5216467	
27091			Abandoned farmstead, three wood-clad buildings, two collapsed buildings, residence windows and doors changed out			
27095	Farm Unit		Residence, garage, and outbuilding Also refer to 40624	350800	5217997	
27232	Dwelling other than Farm	Vinyl sided 1990-2000s residence		352791	5216610	
27233	Dwelling other than Farm	Wood-sided 2000s vintage residence		352892	5216403	
27337	Dwelling other than Farm	2000s vintage residence		352710	5216715	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
27350	Farm Unit	Modern farm buildings and altered residence and gable roof barn	Also refer to 40590	335199	5216700	
30473	Farm Unit	Modern residence, Butler building, round metal grain bins	Also refer to 41079	389279	5269194	
30480	Vacant Farm Unit		Butler storage building, monitor roof wood barn, three round metal grain bins	400685	5268971	
30518	Vacant Farm Unit		No trespassing, no access	403409	5268722	
30527	Vacant Farm Unit	Unable to access due to adverse road conditions		394069	5268431	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
30528	Vacant Farm Unit		Abandoned Craftsman style residence, 1910s wood outbuilding, 1920s vintage wood residence	394764	5268925	
30531	Vacant Farm Unit		Mobile home, 1920s wood garage, two Butler storage buildings, 1920s vintage wood residence, collapsed 1980s vintage shack	391942	5267977	
30533	Farm Unit	Modern residence, Quonset building, metal silo, Butler storage building	Also refer to 43082	391215	5269023	
30544	Farm Unit		Heavily altered American Foursquare residence, 1930s vintage wood garage Also refer to 40912	379026	5262306	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
30574	Farm Unit		Mobile home, 1920s wood gable roof garage, gambrel roof wood barn, 1940s asbestos tile clad residence with changed out windows and modern garage addition on west elevation	415684	5268074	
30575	Farm Unit		Also refer to 43095	415548	5267805	
30577	Vacant Farm Unit		Abandoned Front gabled residence, gable roof barn with two metal additions, wood agricultural outbuildings	414702	5267761	
30589	Vacant Farm Unit-abandoned farmstead	Property owner did not grant access to property.		374867	5258410	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
30590	Farm Unit		Abandoned 1950s vintage residence, wood gambrel roof barn, abandoned wood outbuildings	374828	5257531	
30806	Cemetery		1910-1911 graves	387040	5269372	
30882	Vacant Farm Unit	Adverse road conditions prevented access to this property-also refer to 32SH348		405676	5268253	
31051	Farm Unit	Adverse road conditions prevented access to this property-also refer to 41722		577705	5278954	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
31229	Vacant Farm Unit			576906	5270914	
31230	Vacant Farm Unit	No standing buildings at site		576831	5272875	
38644	Farm Unit	Property owner did not grant access to property.	Also refer to 43103	429506	5268448	
38651	Vacant Farm Unit		Abandoned mobile home, abandoned Front Gabled residence, collapsing wood barn	433909	5271450	
38682	Vacant Farm Unit		Abandoned residence, wood gable roof barn	430395	5268005	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
38706	Farm Unit		1970s vintage house, large modern metal outbuildings Also refer to 41357	454136	5269988	
38742	Farm Unit	Road closed due to flooding	Also refer to 41132	446194	5270029	
38744	Farm Unit	Road closed due to flooding	Also refer to 43112	442695	5270293	
38745	Farm Unit		Manufactured house, modern Quonset building, 1930s vintage wood outbuilding Also refer to 43111	439833	5270621	
38747	Farm Unit			430469	5269753	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
38751	Vacant Farm Unit		Collapsing residence and wood outbuilding	425035	5268019	
39177	Norwegian Lutheran Cemetery			471949	5272965	
39656	Farmstead		New residence and garage constructed in 2008 Also refer to 41372	467872	5273675	
39661	Farmstead-two barns burned down by property owner between field sessions.		Also refer to 39662/41387	47337	5272168	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
39662	Farmstead		Also refer to 39661/41387	47337	5272168	
39657	Other Structure-grain bins and garage		No farm residence, Quonset building, wood gambrel roof barn, grain bins, hipped roof 1920s garage.	468943	5273486	
39662	Farm Unit		Also refer to 41387	472709	5272247	
39663	Other Structure-grain bins		Quonset style barn, farm residence gone, large metal storage building, hipped roof garage	474438	5273268	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
39664	Vacant Farm Unit vacant Gedrose Centennial Farm		Farm house gone, front gabled wood garage, large metal storage buildings	474919	5273625	
39666	Other Structure-grain bins		Farm residence demolished	478320	5273558	
39667	Farm Unit			478797	5272258	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
39674	Vacant Farm Unit		Front gabled barn, collapsed buildings, very large standing metal seam	454757	5272601	
39998	Farm Unit		Silo, house, and barn 1900-1920, very large 2000s prefabricated metal storage building Also refer to 43110	438258	5271531	
40024	Farm Unit		Shingle clad historic period residence with large modern addition on west elevation. Monitor roof barn with side wings, silos Also refer to 41356.	454226	5271166	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
40038	Farm unit		Over 60% of the buildings at this site were new metal structures.	468012	5273613	
40140	Vacant Farm Unit		Abandoned 1920s vintage residence with all windows changed out, gambrel roof wood barn, wood outbuildings.	452791	5270610	
40351	Vacant Farm Unit		Road closed due to flooding	457651	5273310	
40494	Kesmoe Lake Nesting Island USFWS	No standing buildings		380517	5264569	
40499	Other Structure	Metal Quonset building		352307	5217260	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
40531	Other Structure		Agricultural equipment junk yard	367626	5237132	
40533	Other Structure	Butler building and round metal grain bin		367614	5240300	
40537	Other Structure		Metal storage buildings	370341	5244947	
40538	Other Structure		Abandoned residence	370608	5244673	
40543	Other Structure	Road closed due to flooding		376882	5260453	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
40544	Other Structure	Road closed due to flooding, grain bins seen from distance		377510	5260606	
40583	Other Structure			430357	5270318	
40584	Other Structure		Nothing standing	433610	5270799	
40589	Other Structure	No buildings on site.		334332	5216983	
40590	Dwelling		Also refer to 27350	335162	5216711	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
40624	Dwelling	See photo 27095		350762	5217966	
40638	Vacant Dwelling other than Farm	See photo 5302		353376	5219704	
40639	Vacant Dwelling other than Farm	House is on moving blocks		353799	5219060	
40640	Dwelling	1990-2000 vintage house		353685	5218986	
40641	Dwelling	1990-2000 vintage house		353756	5218871	
40642	Vacant Dwelling other than Farm	1990-2000 vintage house and trailers		353609	5218732	
40643	Dwelling	See photo 5299		354469	5218195	
40872	Dwelling	See photo 23154		366168	5237977	
40872						
40877	Dwelling	See photo 23148		367698	5241455	
40879	Dwelling	See photo 23145		367749	5242195	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
40880	Dwelling			367756	5242002	
40881	Dwelling	See photo 5063		369079	5242538	
40891	Dwelling	Pole barn, round metal grain bins	Also refer to 22911/40892	370772	5246901	
40892	Dwelling	Pole barn, round metal grain bins	Also refer to 22911/40891	370821	5246938	
40895	Dwelling	See photo 22909		371249	5249237	
40910	Dwelling	See photo 30590		374757	5257501	
40912	Dwelling	See photo 30544		379002	5262334	
41079	Dwelling	Modern residence, Butler building, round metal grain bins	Also refer to 30473	389287	5269109	
41095	Dwelling	See photo 38747	Also refer to 41096	430406	5269829	
41096	Dwelling	See photo 38747	Also refer to 41095	430372	5269832	
41132	Dwelling	Road closed due to flooding	Also refer to 38742	446219	5270122	

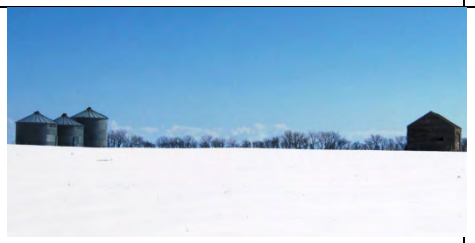
Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
41356	Dwelling		Also refer to 40024.	454276	5271205	
41357	Dwelling	See photo 38706		454089	5269922	
41372	Dwelling	See photo 39656		467948	5273700	
41387	Dwelling		Also refer to 39661/39662	472721	5272148	
41388	Other Structure		Abandoned wood side gabled outbuilding, three metal grain bins	472080	5273332	
41397	Dwelling	See photo 39667		478785	5272145	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
41398	Vacant Dwelling other than Farm			478499	5273561	
41403	Dwelling			483979	5273197	
41419	Other Structure		Log kit building	486815	5272522	
41426	Dwelling	See photo 11921		490953	5272304	
41428	Dwelling	Burlington & Northern Park		490827	5269120	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
41434						
41439	Dwelling	See photo 11913		497457	5272161	
41441	Dwelling	See photo 11912		497716	5273604	
41448	Also see photo 12030		Gambrel roof wood barn, stone building, wood privy, wood granary, burned residence, round metal grain bins, collapsed buildings.	501004	5272088	
41449	Dwelling	See photo 11095		502305	5272084	
41462	Dwelling		Also refer to 12396/13095	505521	5270365	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
41464	Dwelling		Also refer to 12393	507190	5270403	
41465	Dwelling		Also refer to 12394	508862	5270124	
41476	Vacant Dwelling other than Farm		Also refer to 12400/43479	513089	5270329	
41477	Dwelling	See photo 11889		515081	5271395	
41478	Dwelling		Also refer to 11890	515182	5271231	
41485	Dwelling	See photo 11801		517362	5270529	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
41492	Dwelling	See photo 11884		520096	5271181	
41493	Dwelling	Property owner did not grant access to property.	Also refer to 11883	520836	5271453	
41504	Dwelling	See photo 17646		544717	5267499	
41517	Dwelling	See photo 17713		572713	5270440	
41519	Dwelling	See photo 17574		572420	5271236	
41522	Other Structure			576378	5274104	
41716	Dwelling	See photo 17573		573562	5271263	
41722	Dwelling	Adverse road conditions prevented access to this property-	Also refer to 31051	577756	5278954	
41757	Price Cemetery, North & South	Property owner did not grant access to property.		352536	5216257	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
41780	Other Structure			554614	5270642	
41853	Vacant Dwelling other than Farm			544097	5269898	
41855	Dwelling	See photo 17653		543981	5265645	
41865	Dwelling	See photo 17613		548743	5270299	
41873	Dwelling	See photo 17614		551502	5270845	
41874	Dwelling		Also refer to 17606	552113	5270846	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
41880	Dwelling	See photo 17609		556783	5271369	
41887			Granary close to collapsing, located outside project APE			
41888	Other Structure-Metal outbuilding			561740	5270369	
42812	Dwelling	See photo 17715		574549	5270361	
42836	Other Structure			577284	5272394	
42962	Dwelling	Flooded road, unable to access.	Also refer to 27084	340217	5215861	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
42966	Dwelling		Refer to 5290	357669	5221000	
43082	Dwelling	See photo 30533		391297	5269029	
43095	Dwelling	See photo 30575		415576	5267893	
43096	Dwelling	See photo 30574		415815	5268053	
43103	Dwelling	Property owner did not grant access to property.	Also refer to 38644	429451	5268472	
43110	Dwelling		Cross gabled residence with all windows and doors changed out to metal. Very large metal storage buildings. Also refer to 39998.	438300	5271464	
43111	Dwelling	See photo 38745		439779	5270712	
43112	Dwelling	Road closed due to flooding, also refer to 38744		442762	5270314	
43117	Dwelling	See photo 21172		488144	5273607	
43120	Dwelling	Road flooded	Also refer to 12418	527953	5266157	
43121	Dwelling	See photo 12427		527945	5264965	
43122	Dwelling	See photo 12426	I	528630	5265485	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
43123	Dwelling	See photo 12425		529529	5265359	
43220	Dwelling		Also refer to 23167, 23168, 43221	360990	5229144	
43221	Dwelling	See photo 23167, 23168 and 43220		361238	5229353	
43223	Dwelling		Refer to 23188	358123	5227656	
43369	Dwelling		Also refer to 18558.	570493	5270915	
43466	Dwelling	Modern manufactured home		340813	5216716	
43474	Dwelling other than Farm	2000s vintage house and garage		358260	5227942	

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
43479	Dwelling		Also refer to 12400/41476	513272	5270371	
43494	Dwelling other than Farm	Property owner did not grant access to property.		353581	5216843	
43495	Dwelling other than Farm	Wood duck hunting blind	v	353296	5217540	
43499	Dwelling	See photo 17607		552920	5270751	
43501	Farm Unit			576707	5275985	
43511	Dwelling		Very large modern standing metal seam building, gambrel roof wood barn, wood Front-gabled residence, hipped roof wood garage, and Quonset building.	461528	5273409	

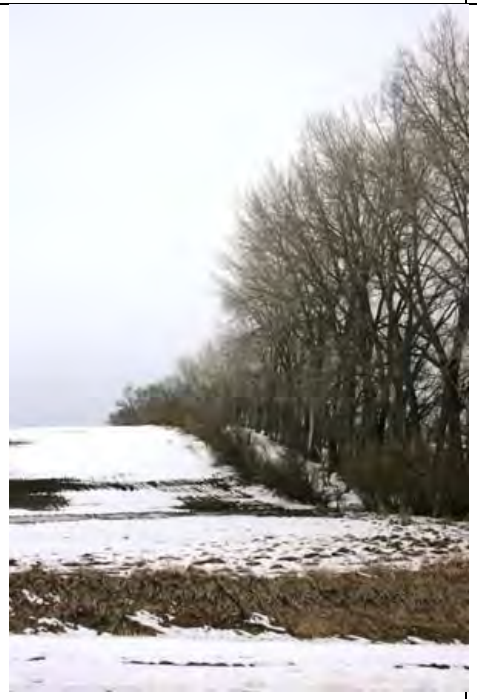
Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
New site CGF-A-1	1950-1960s vintage wood clad gable roof outbuilding, round metal grain bin		Map 3 Burleigh County, 54th St. NW/279th Ave NE Section 18, SW ¼			
New site CGF-A-2	Shelter belts-These cultural landscape features appear at numerous locations in the project APE. While information is available on the general Great Plains Shelterbelt Project, determining if these features are associated with the CCC/WPA is difficult. Some integrity issues in the linear features would be anticipated due to die off, subsequent farming, and maintenance		Map 14, Sheridan County, Sections 4, 9, 10			

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
New site CGF-A-3	Prefabricated silo and round metal grain bin		Map 19 Wells County, SE ¼ of Section 5			
New site CGF-A-4	Eight round Butler metal grain bins and two Butler buildings		Map 28, Eddy County			
New site CGF-A-5	Decommissioned Minuteman III site with metal chain link perimeter fence and metal ventilation unit		Grand Forks AFB association Griggs County			

Table A-2. NRHP-ineligible North Dakota Site Leads/New Sites Located During Field Work						
ID	**Feature**	**Image**	**Comment**	**GIS X**	**GIS Y**	**ID**
New site CGF-A-6	Decommissioned Minuteman III site [Oscar-44 (O-44)] Barbed wire perimeter fence only		Grand Forks AFB association Steele County			
New site CGF-A-7	Front-gabled horizontal wood sided residence, six round metal grain bins, and collapsing wood barn		Nelson County			
CGF-A-8						

CGF-A-9	Decommissioned Minuteman III missile site. Barbed wire perimeter fence only		T 149N R 57W SW ¼, NE ¼, NE ¼, Section 14 Nelson County			
CGF-A-10	Decommissioned Minuteman III missile site. Barbed wire perimeter fence only		T 149N R 56W NE ¼, SE ¼, SW ¼, Section 33			
32GF120	Site record updated to reflect the demolition of octagonal granary and two other buildings.					
32GF3219	Bridge-no changes since site recorded.					

32GF3229	Bridge-no changes since site recorded.					
5298	Farm Unit			Farm Unit	353602	5216826
5299	Farm Unit	Property owner did not grant access to property.		Farm Unit	354499	5218147
5300	Farm Unit			Farm Unit	353673	5219029

5301	Farm Unit			Farm Unit	353371	5219380
11891	Farm Unit			Farm Unit	517348	5270591
11898	Farm Unit			Farm Unit	504142	5270612
11905	Farm Unit		Several new metal storage buildings on site	Farm Unit	502250	5272106

12172	Farm Unit			Farm Unit	488339	5273505
14441	Dwelling other than Farm		0905 field Also refer to 17179	Dwelling	631654	5300799
14451	Farm Unit		Several new metal buildings on site Also refer to 17220	Farm Unit	639486	5308055
14454	Farm Unit		Also refer to 42523	Farm Unit	634877	5307375

14456	Farm Unit		Also refer to 43478	Farm Unit	632886	5307063
14457	Farm Unit		Also refer to 43477	Farm Unit	632705	5306211
14482	Dwelling other than Farm		0905 field	Dwelling	631854	5300786
14496	Dwelling other than Farm			Dwelling	631898	5307087

14497	Dwelling other than Farm		0905 field	Dwelling	639414	5307390
14498	Dwelling other than Farm		0905 field	Dwelling	639301	5307471
14526	Vacant Farm Unit		0905 field	Other Structure	634600	5306585
14527	Vacant Farm Unit		Storage; 0905 field Also refer to 43510	Other Structure	631902	5302469

14729	Farm Unit		Also refer to 42536	Farm Unit	631614	5300589
14732	Farm Unit		0905 field	Farm Unit	627052	5296355
14733	Farm Unit			Farm Unit	626877	5296478
14734	Farm Unit		Also refer to 42545	Farm Unit	625210	5295816

14737	Farm Unit			Farm Unit	622414	5295782
14738	Farm Unit		Also refer to 42547	Farm Unit	623364	5295784
14761	Dwelling other than Farm		0905 field	Dwelling	622415	5295632
14763	Farm Unit		Also refer to 42544	Farm Unit	627145	5295805

14779	Farm Unit			Farm Unit		
14785	Farm Unit		Also refer to 43384	Farm Unit	619229	5295299
14786	Farm Unit		Also refer to 42550	Farm Unit	622249	5294797
14790	Farm Unit		Also refer to 42608	Farm Unit	616200	5293594

14792	Farm Unit		Also refer to 42609	Farm Unit	614876	5293375
14801	Vacant Farm Unit		0905 field	Other Structure	613895	5293578
14802	Vacant Farm Unit			Other Structure	618679	5293400
14803	Vacant Farm Unit			Other Structure	620681	5295317

14840	Farm Unit		Also refer to 42951	Farm Unit	607505	5291037
14843	Farm Unit		Also refer to 42625	Farm Unit	612331	5290950
14844	Vacant Farm Unit		0905 field Also refer to 43497/43500	Other Structure	605010	5290541
14845	Cemetery, East & West			Cemetery	604697	5291179

14877	Farm Unit		Also refer to 42918	Farm Unit	597316	5290460
14878	Farm Unit		Also refer to 42925	Farm Unit	599410	5291178
14881	Dwelling other than Farm		0905 field	Dwelling	600026	5291367
14903	Farm Unit		Also refer to 42896	Farm Unit	588700	5290594

14904	Farm Unit		Also refer to 41734	Farm Unit	590342	5291049
14914	Farm Unit		Also refer to 42890	Farm Unit	585835	5289912
14984	Vacant Farm Unit			Other Structure	594816	5289726
14988	Farm Unit		Also refer to 41744	Farm Unit	604108	5289966

14989	Farm Unit		Also refer to 41743	Farm Unit	603790	5290299
14990	Farm Unit		Also refer to 41745	Farm Unit	606229	5290003
14991	Farm Unit		Also refer to 41746	Farm Unit	607484	5290353
15186	Dwelling other than Farm		Also refer to 17354/42530			

15442	Dwelling other than Farm					
15444	Dwelling other than Farm		0905 field	Dwelling	638088	5306308
15445	Dwelling other than Farm		0905 field	Dwelling	638075	5306221
15446	Dwelling other than Farm		0905 field	Dwelling	638083	5306140

15447	Dwelling other than Farm		0905 field	Dwelling	638091	5306031
15448						
15456	Dwelling other than Farm			Dwelling	638244	5305962
15457	Dwelling other than Farm			Dwelling	638390	5306016

15458	Dwelling other than Farm			Dwelling	638243	5306064
15459	Dwelling other than Farm			Dwelling	638341	5306148
15460	Dwelling other than Farm			Dwelling	638234	5306154
15461	Dwelling other than Farm			Dwelling	638235	5306217

15462	Dwelling other than Farm			Dwelling	638320	5306224
15463	Dwelling other than Farm			Dwelling	638288	5306287
15464	Dwelling other than Farm			Dwelling	638249	5306308
15465/16440	Dwelling other than Farm			Dwelling	638174	5306308

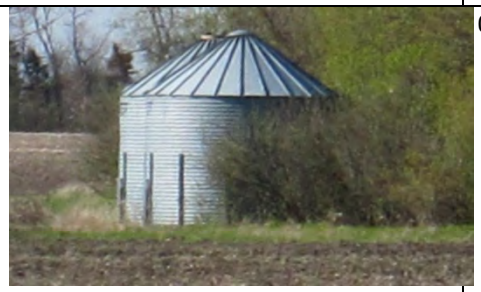
15480	Dwelling other than Farm					
15487					637939	5307553
15489	Dwelling other than Farm		0905 field	Dwelling	638163	530732 4
15490	Dwelling other than Farm		0905 field	Dwelling	638053	530732 6

15491	Dwelling other than Farm		0905 field	Dwelling	637954	5307355
15492	Dwelling other than Farm		0905 field	Dwelling	637861	5307327
15493	Dwelling other than Farm			Dwelling	637880	5307417
15494	Dwelling other than Farm			Dwelling	637950	5307425

15495	Dwelling other than Farm			Dwelling	638047	5307450
15496	Dwelling other than Farm			Dwelling	638135	5307460
15497	Dwelling other than Farm			Dwelling	638138	5307518
15498	Dwelling other than Farm		0905 field	Dwelling	638055	5307516

15499	Dwelling other than Farm			Dwelling	638150	5307658
16440	Dwelling other than Farm		0905 field	Dwelling	638070	5306412
16442	Dwelling other than Farm		0905 field	Dwelling	638065	5307783
16978	Vacant Farm Unit		0905 field	Other Structure	585689	5290272

16989	Farm Unit			Farm Unit	601296	5291414
17001	Dwelling other than Farm		Also refer to 147801	Dwelling	620520	5295678
17009	Dwelling other than Farm			Dwelling	631702	5299863
17027	Dwelling other than Farm			Dwelling	631826	5299622

17028	Dwelling other than Farm			Dwelling	631818	5299773
17155	Vacant Farm Unit		0905 field	Other Structure	586392	5289798
17179	Dwelling other than Farm	See photo 14441	0905 field	Dwelling	631758	5300814
17216	Dwelling other than Farm		0905 field Also refer to 42534	Dwelling	639996	5307425

17219	Dwelling other than Farm		0905 field	Dwelling	639520	5307355
17220	Dwelling other than Farm	See photo 14451	0905 field	Dwelling	639563	5307995
17239	Dwelling other than Farm		0905 field	Dwelling	622278	5295618
17241	Farm Unit		Also refer to 43385	Farm Unit	620692	5294199
17354	Farm Unit	See photo 15186	Also refer to 42530	Farm Unit	637769	5307434

17593	Vacant Farm Unit			Other Structure	564559	5271281
18612	Vacant Farm Unit		0905 field	Other Structure	542571	5265470
23592	Vacant Farm Unit			Other Structure	357994	5226527
26384	Farm Unit		Also refer to 41532	Farm Unit	583569	5288642

26388	Farm Unit		Also refer to 41531	Farm Unit	581906	5288353
26392	Vacant Farm Unit		0905 field	Other Structure	581969	5286155
26393	Vacant Farm Unit			Other Structure	580680	5286266
26394	Vacant Farm Unit			Other Structure	579919	5285385

26413	Aneta Cemetery	Road cut by flooding		Cemetery	577462	5281682
26642	Aneta Cemetery, North & South	Road cut by flooding		Cemetery	577387	5280417
27090	Cemetery, North & South	Yucca Catholic Cemetery	0905 field	Cemetery	343231	5216467
27095	Farm Unit			Farm Unit	350800	5217997
27230	Dwelling other than Farm			Dwelling	352549	5216473
27231	Dwelling other than Farm			Dwelling	352586	5216556

30527	Vacant Farm Unit			Other Structure	394069	5268431
30882	Vacant Farm Unit			Other Structure	405676	5268253
39177	Norwegian Lutheran Cemetery			Cemetery	471949	5272965
39657	Other Structure	grain bins and garage	0905 field	Other Structure	468943	5273486
39663	Other Structure	grain bins	0905 field	Other Structure	474438	5273268

39664	Vacant Farm Unit	vacant Gedrose Centennial Farm	0905 field	Other Structure	474919	5273625
39666	Other Structure	grain bins	0905 field	Other Structure	478320	5273558
40140	Vacant Farm Unit	Lots of farm debris	0905 field	Other Structure	452791	5270610
40351	Vacant Farm Unit			Other Structure	457651	5273310
40494	Other Structure	Kesmoe Lake Nesting Island USFWS and DU	0905 field	Other Structure	380517	5264569
40537	Other Structure	steel building	0905 field	Other Structure	370341	5244947
40538	Other Structure	vacant house	0905 field	Other Structure	370608	5244673

40544	Other Structure	grain bins	0905 field	Other Structure	377510	5260606
40583	Other Structure	barn	0905 field	Other Structure	430357	5270318
40584	Other Structure	old farm junk	0905 field	Other Structure	433610	5270799
40586	Other Structure	home debris	0905 field	Other Structure	446460	5270790
40638	Vacant Dwelling other than Farm	residence questionable	0905 field	Other Structure	353376	5219704
40642	Vacant Dwelling other than Farm	Groups of trailers unsure if occupied	0905 field	Other Structure	353609	5218732
41128	Dwelling		0905 field	Dwelling	444813	5270742

41388	Other Structure	grain bins	0905 field	Other Structure	472080	5273332
41429	Other Structure	grain bins	0905 field	Other Structure	490946	5268996
41522	Other Structure	Rural water pump	0905 field	Other Structure	576378	5274104
41531	Dwelling	See photo 26388	0905 field	Dwelling	581937	5288424
41532	Dwelling	See photo 26384	0905 field	Dwelling	583662	5288577
41734	Dwelling	See photo 14904	0905 field	Dwelling	590251	5291069
41740	Dwelling		0905 field	Dwelling	596813	5289762
41743	Dwelling	See photo 14989	0905 field	Dwelling	603771	5290352
41744	Dwelling	See photo 14988	0905 field	Dwelling	604072	5290007

41745	Dwelling	See photo 14990	0905 field	Dwelling	606144	5290027
41746	Dwelling	See photo 14991	0905 field	Dwelling	607510	5290401
41757	Price Cemetery		Gated road, no access	Cemetery	352536	5216257
41780	Other Structure		0905 field	Other Structure	554614	5270642
41853	Vacant Dwelling other than Farm		0905 field	Other Structure	544097	5269898
41984						

42517	Dwelling		aerial	Dwelling	638332	5306099
42523	Dwelling	See photo 14454	0905 field	Dwelling	634858	5307314
42530	Dwelling	See photo 15186	0905 field Also refer to 17354	Dwelling	637764	5307348
42534	Dwelling	See picture 17216	0905 field	Dwelling	640036	5307376
42536	Dwelling	See photo 14729	0905 field	Dwelling	631656	5300621
42537	Dwelling		0905 field	Dwelling	631959	5300831
42544	Dwelling	See photo 14763	0905 field	Dwelling	627111	5295841

42545	Dwelling	See photo 14734	0905 field	Dwelling	625246	5295795
42546	Other Structure		0905 field; ag storage	Other Structure	625257	5295684
42547	Dwelling	See photo 14738	0905 field	Dwelling	623313	5295767
42548	Dwelling		0905 field	Dwelling	622162	5295726
42550	Dwelling	See photo 14786	0905 field	Dwelling	622302	5294833
42551	Other Structure		0905 field old ag buildings	Other Structure	625622	5294903

42608	Dwelling	See photo 14790	0905 field	Dwelling	616150	5293536
42609	Dwelling	See photo 14792	0905 field	Dwelling	614948	5293434
42625	Dwelling	See photo 14843	0905 field	Dwelling	612350	5290890
42890	Dwelling	See photo 14914	0905 field	Dwelling	585800	5289996
42896	Dwelling	See photo 14903	0905 field	Dwelling	588635	5290648
42918	Dwelling	See photo 14877	0905 field	Dwelling	597316	5290387
42925	Dwelling	See photo 14878	0905 field	Dwelling	599465	5291228
42951	Dwelling	See photo 14840	0905 field	Dwelling	607499	5290967
43103	Dwelling		aerial	Dwelling	429451	5268472
43384	Dwelling	See photo 14785	0907 aerial	Dwelling	619242	5295251

43385		See photo 17241				
43477	Dwelling other than Farm	See photo 14457	1001 09aerial	Dwelling	632790	5306257
43478	Dwelling other than Farm	See photo 14456	1001 09aerial	Dwelling	632883	5307139
43490	Dwelling		1002 high res aerial	Dwelling	637944	5307546
43497	Vacant farm unit	See photo 14844	1009 field Also refer to 4350	Other Structure	605061	5290533
43498	Dwelling		1010 field	Dwelling	394753	5268904
43500	Dwelling other than Farm	See photo 14844	1011 stanley Also refer to 43497	Dwelling	605058	5290536

43510	Dwelling	See photo 14527	public comment	Dwelling	631860	5302424
147801		See photo 17001				

Appendix F
Sheyenne River Hydrology Study

Kadrmas Lee & Jackson
Engineers Surveyors Planners

Technical Memorandum

Project Name:	Minnkota Power – Center to Grand Forks Transmissior Line
Client:	Stanley Consultants – Duane Phillips
Project Number:	50609146
Subject:	Sheyenne River Crossing – 100 yr Flood Elevation Determination
By:	Wade Frank, PE
Date:	January 25, 2011

Introduction

Minnkota Power's proposed Center to Grand Forks transmission line crosses the Sheyenne River near Cooperstown, ND. Stanley Consultants requested that Kadrmas Lee & Jackson (KL&J) perform a hydraulic analysis to determine the water surface elevation corresponding to the 100-year flood event at this location. The elevation data will be used to determine the top of foundation elevation for the transmission line structures.

Location

The crossing is located ten miles north and one mile east of Cooperstown, ND between Section 6 of Township 147 N and Section 31 of Township 148 N.

Design Hydrology

The Sheyenne River channel in this reach is narrow and meandering. The stream banks are covered with short grasses and dense trees and are relatively short with gradual slopes. The floodplain is a relatively undisturbed rolling prairie. The stream gradient was calculated at 1.0 ft/mi (0.000193 ft/ft) from the stream survey.

The USGS's (United States Geological Survey) *Water Resources Investigations Report 92-4020* was used to determine the flood frequency discharge values. The drainage area is in North Dakota's Hydrologic Region C.

Peak flow values were obtained from the Sheyenne River USGS gaging station #05057000 at Cooperstown, North Dakota. The gaging station has a contributing drainage area of 1,270 square miles (sq mi).

In addition to the gaging station information, a hydraulic report for a bridge on ND Highway 45 was used to determine the drainage area at the proposed crossing site. The bridge report states that the drainage area at the bridge

location, which is approximately 4 miles downstream of the transmission line crossing, is 96 sq mi less than at the gaging station. Using USGS topographic maps, it was then determined that the drainage area at the transmission line crossing is 21 sq mi less than the drainage area at the bridge. Therefore, the drainage area at the proposed crossing was found to be 117 sq mi less than the drainage area at the gaging station, which resulted in an area of 1,153 square miles.

Transfer equations from USGS Report 92-4020 were used in calculating the 100-year flow at this site. The 100-year flow was found to be 8,273 cfs (cubic feet per second). ***See Appendix A for detailed calculations.***

Hydraulic Analysis

The US Army Corps of Engineer's computer program HEC-RAS Version 4.1.0 was used to model the potential hydraulic conditions of the open channel for the 100-year flow event.

The 100-year stage was determined by a trial and error procedure using the Mannings equation and a typical river section located at the proposed crossing. Site surveys along with aerial mapping data was used in developing the typical section. The typical section was then propagated 1000 feet upstream and downstream and adjusted to match the local stream gradient.

After analysis, the approximate elevation for the 100-year frequency was found to be 1315.2. ***See Appendix A for output data.***

Recommendations

We recommend that the top of the transmission line structure foundations be set above elevation 1315.2. It may also be prudent to provide freeboard above the 100-year elevation to reduce the potential for ice to impact the structures during large flood events.

Appendices

Appendix A Hydrologic Data & HEC-RAS Output

Appendix A

Hydrologic Data and HEC-RAS Results

Kadrmas Lee & Jackson
Engineers Surveyors Planners

PROJECT Griggs Hydraulics
SHEET NO. 1 OF 1
CALCULATED BY SMM DATE 1/17/11
CHECKED BY QPJ DATE 1/19/10

Flow Calculations

Contributing Area At Cooperstown Gage = 1270 sq mi (Report 92-4020)

Contributing Area At Hwy 45 = 1270 - 96 = 1174 sq mi

Contributing Area At Site = 1174 - 21 = 1153 sq mi

Check Drainage Area Ratio:

CA_u / CA_g = 1153/1270 = 0.91 ok ✓ (Between 0.75 & 1.50)

100 yr flow:

100yr flow At Cooperstown Gage = 8750 cfs (Report 92-4020)

100yr flow At Site:

$$Q_{100} = 8750 \text{ cfs } (1153/1270)^{0.58}$$

$$\boxed{Q_{100} = 8273 \text{ cfs}}$$

Station 05056950,
n = 15 years,
Q_{TS} = 98 ft^3/s,
CA = 0.08 mi^2, and
S = 300 ft/mi.

The gaging station is located in region A, and the 100-year regression equation from table 4 is

$$Q_{100} = 110\ CA^{0.640}\ S^{0.234};\ \text{thus,}$$

$$Q_{TR} = Q_{100} = 110\ (0.08)^{0.640}\ (300)^{0.234} = 83.$$

The equivalent years of record, en, for this station for the 100-year equation is 3.8 years. Using equation 1,

$$Q_{TW} = \frac{15(98) + 3.8(83)}{15 + 3.8} = 95\ ft^3/s.$$

Example for Determining Peak-Flow Frequency Data for an Ungaged Site Near a Gaging Station on the Same Stream

The following is an example of how to use the drainage-area ratio method (eq. 2) to determine peak flow for an ungaged site near a gaging station on the same stream. To estimate the 100-year peak flow for an ungaged site on Burnt Creek, locate the site in figure 1. The site is located downstream of a gaging station on the same stream (station 06342450, Burnt Creek near Bismarck, N.Dak.). Contributing drainage area (CA_u) for the ungaged site is 114 mi^2, and the contributing drainage area (CA_g) for the gaging station (table 2, map number 139) is 108 mi^2. Both the ungaged site and the gaging station are located in region B. Determine if the drainage-area ratio (CA_u/CA_g) is between 0.75 and 1.50:

$$CA_u/CA_g = 114/108 = 1.06,$$

which meets the drainage-area ratio requirement. Thus, the following relation is used:

$$Q_{100(u)} = Q_{100(g)}\ (CA_u/CA_g)^{0.58},$$

where

$Q_{100(g)}$ = 7,790 ft^3/s, the weighted peak flow for the gaging station (table 2);
CA_u = 114 mi^2; and
CA_g = 108 mi^2.

Therefore,

$$Q_{100(u)} = 7{,}790\ (114/108)^{0.58} = 8{,}040\ ft^3/s.$$

Table 3.--Drainage area and peak flow for selected recurrence intervals for gaging stations not used in the generalized skew coefficient and regression analyses--Continued

Map number	Station number	Station name	Period of record used (water year)	Drainage area (square miles)	Peak flow (cubic feet per second) for selected recurrence intervals (years)						
					2	5	10	25	50	100	500
8a	05056400	Big Coulee near Churchs Ferry, N.Dak.	1950-89 E,R	1,620 (1,460)	97	394	752	1,410	2,040	2,780	4,930
9a	05057000	Sheyenne River near Cooperstown, N.Dak.	1945-90 E,U	6,470 (1,270)	1,100	2,470	3,670	5,490	7,040	8,750	13,300
10a	05058000	Sheyenne River below Baldhill Dam, N.Dak.	1950-90 C,R	7,470 (1,910)	1,050	2,350	3,330	4,600	5,520	6,400	8.280
11a	05058500	Sheyenne River at Valley City, N.Dak.	1919, 1938-49 U 1950-75, 1981-90 R	7,810 (2,110)	1,170 1,200	2,350 2,230	3,280 2,940	4,580 3,830	5,620 4,460	6,710 5,070	9,380 6,360
12a	05058700	Sheyenne River at Lisbon, N.Dak.	1957-90 E,R	8,190 (2,490)	1,300	2,610	3,680	5,220	6,480	7,830	11,300
13a	05059000	Sheyenne River near Kindred, N.Dak.	1950-90 C,R	8,800 (3,020)	1,200	2,300	3,170	4,420	5,430	6,510	9,270
14a	05059500	Sheyenne River at West Fargo, N.Dak.	1903-06, 1919, 1930-49 U 1950-90 C,R	8,870 (3,090)	1,040 1,210	1,820 2,240	2,390 2,990	3,130 3,950	3,690 4,660	4,260 5,370	5,600 6,940
15a	05060000	Maple River near Mapleton, N.Dak.	1944-76 E,U	1,450 (1,380)	1,140	2,980	4,740	7,560	10,100	12,900	20,700
16a	05064500	Red River of the North at Halstad, Minn.	1942-90 C,R	21,800 (18,000)	10,800	20,100	27,200	36,900	44,500	52,400	71,500

Project S-323(14)
CFS/ 8-6-63

Bridge No. 45-1
Sheyenne River

045-011.152

STREAM FLOW DATA:

Sheyenne River Drainage Area At the USGS Stream Gage Located East of Cooperstown:

Total Drainage Area = 6,750 square miles
Non-contributing = 5,490 square miles

Contributing Area = 1,260 square miles at the gage QR&

Then, the drainage area at the crossing will be:

Contributing area between gage and the crossing as estimated from county maps = 96 square miles approximately

Contributing area at the crossing = 1,260 - 96 = 1,164 square miles

Hydrologic Area A-2

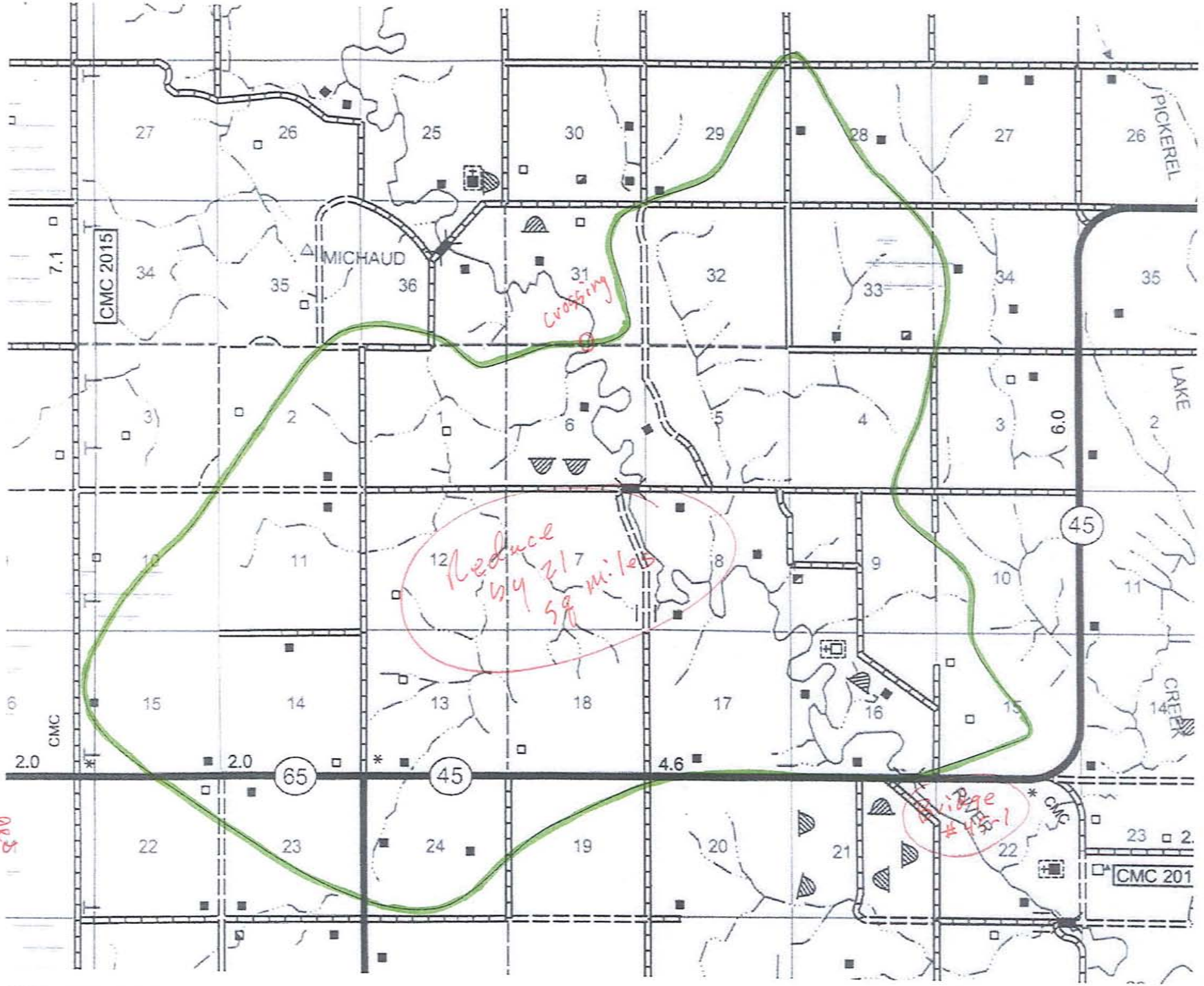
Design Frequency 25 years

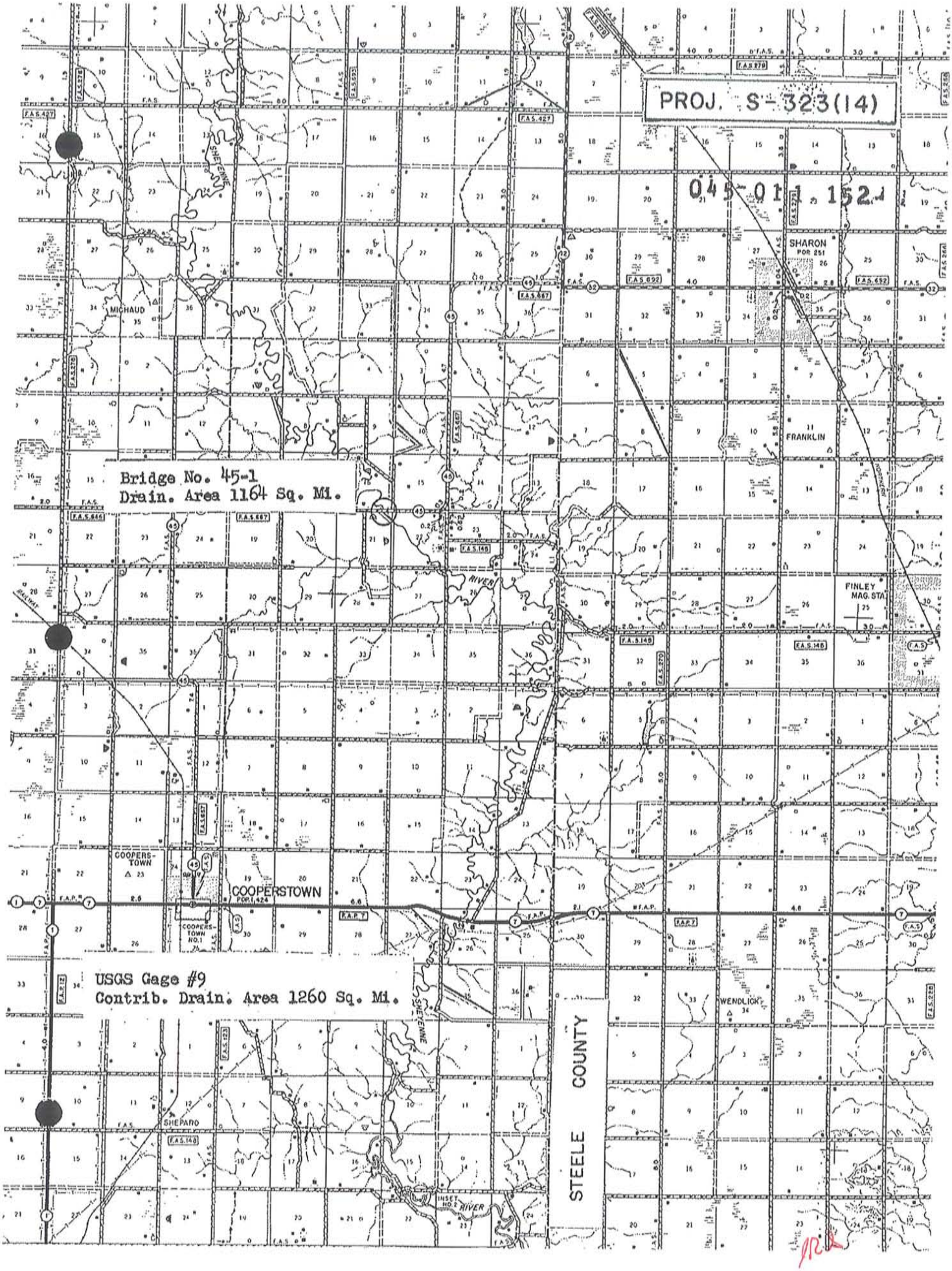
USGS Chart Value For Q_{25}=3950 cfs

From USGS Topographic maps, the average gradient for the Sheyenne River in this vicinity is:

$S = 10'/33,400' = 0.000299$ ft./ft.

Then, $s^{\frac{1}{2}} = 0.0173$

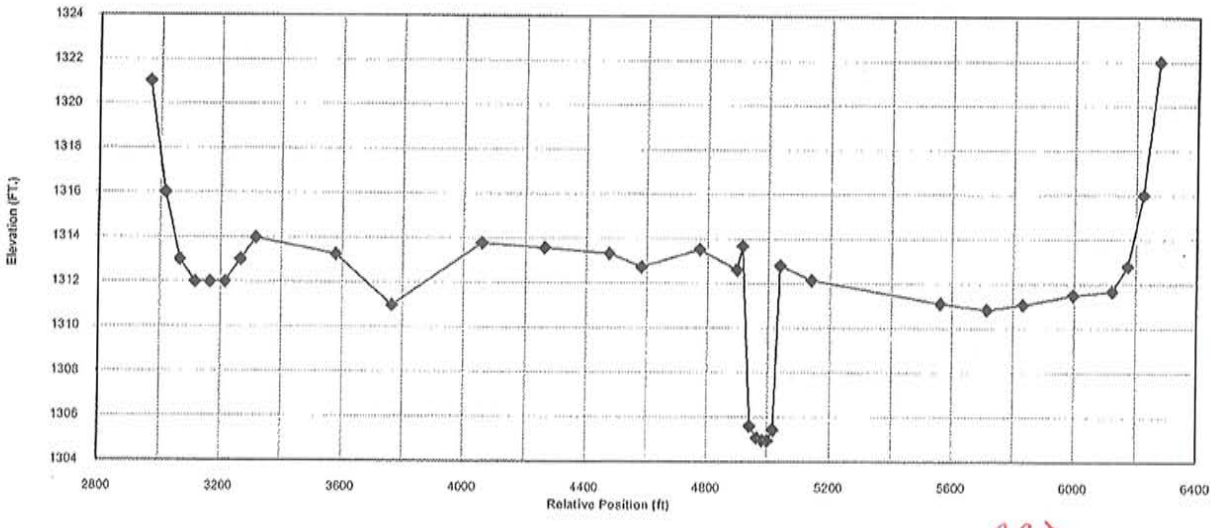

PICKEREL
LAKE
CREEK
MICHAUD
CMC 2015
CMC 201
CMC
Crossing
Reduce by 21 sq miles
Bridge #4981
45
65
45
2.0
2.0
4.6
6.0
7.1


PROJ. S-323(14)
045-011-152
Bridge No. 45-1
Drain. Area 1164 Sq. Mi.
USGS Gage #9
Contrib. Drain. Area 1260 Sq. Mi.
SHARON
POP. 251
FRANKLIN
MICHAUD
FINLEY
MAG. STA.
COOPERS-
TOWN
COOPERSTOWN
POP. 424
COOPERS-
TOWN NO. 1
WENDLICK
SHEPARD
INSET
NO. 2
RIVER
STEELE COUNTY
SHEYENNE
RIVER
F.A.S. 427
F.A.S. 692
F.A.S. 667
F.A.S. 148
F.A.S. 279
F.A.P. 7

Typical Cross Section

Point #	Northing	Easting	Distance	Cummulative Distance	Relative Position	Elevation
GIS			0.00	0.00	2966.31	1321.00
GIS			50.00	50.00	3016.31	1316.00
GIS			50.00	100.00	3066.31	1313.00
GIS			50.00	150.00	3116.31	1312.00
GIS			50.00	200.00	3166.31	1312.00
GIS			50.00	250.00	3216.31	1312.00
GIS			50.00	300.00	3266.31	1313.00
6670	709442.9	2561805.9	50.00	350.00	3316.31	1313.97
6620	709413.9	2561545.8	261.79	611.79	3578.10	1313.26
6633	709337.8	2561375.0	186.95	798.75	3765.06	1310.97
6596	709365.3	2561082.2	294.05	1092.79	4059.10	1313.78
6591	709281.5	2560895.0	205.13	1297.93	4264.24	1313.57
6585	709273.1	2560683.1	212.03	1509.95	4476.26	1313.32
6582	709266.7	2560577.0	106.36	1616.31	4582.62	1312.72
6579	709255.1	2560386.0	191.31	1807.62	4773.93	1313.52
11674	709333.5	2560290.9	123.30	1930.92	4897.23	1312.62
11673	709338.5	2560274.0	17.64	1948.56	4914.87	1313.69
6577	709359.2	2560256.0	27.38	1975.93	4942.25	1305.60
6576	709352.9	2560233.5	23.42	1999.35	4965.66	1305.07
6575	709354.7	2560214.9	18.72	2018.07	4984.38	1304.95
6574	709356.0	2560199.3	15.62	2033.69	5000.00	1304.94
6573	709357.3	2560181.1	18.21	2051.90	5018.21	1305.43
6572	709356.8	2560161.2	19.95	2071.85	5038.17	1312.82
6564	709401.2	2560069.3	102.02	2173.87	5140.18	1312.16
6549	709433.0	2559649.4	421.15	2595.02	5561.34	1311.11
6543	709544.3	2559544.8	152.70	2747.73	5714.04	1310.84
6530	709538.7	2559426.0	118.95	2866.68	5832.99	1311.07
6526	709638.8	2559296.8	163.43	3030.11	5996.43	1311.50
6509	709637.4	2559168.6	128.26	3158.38	6124.69	1311.67
GIS			50.00	3208.38	6174.69	1312.80
GIS			50.00	3258.38	6224.69	1316.00
GIS			50.00	3308.38	6274.69	1322.00

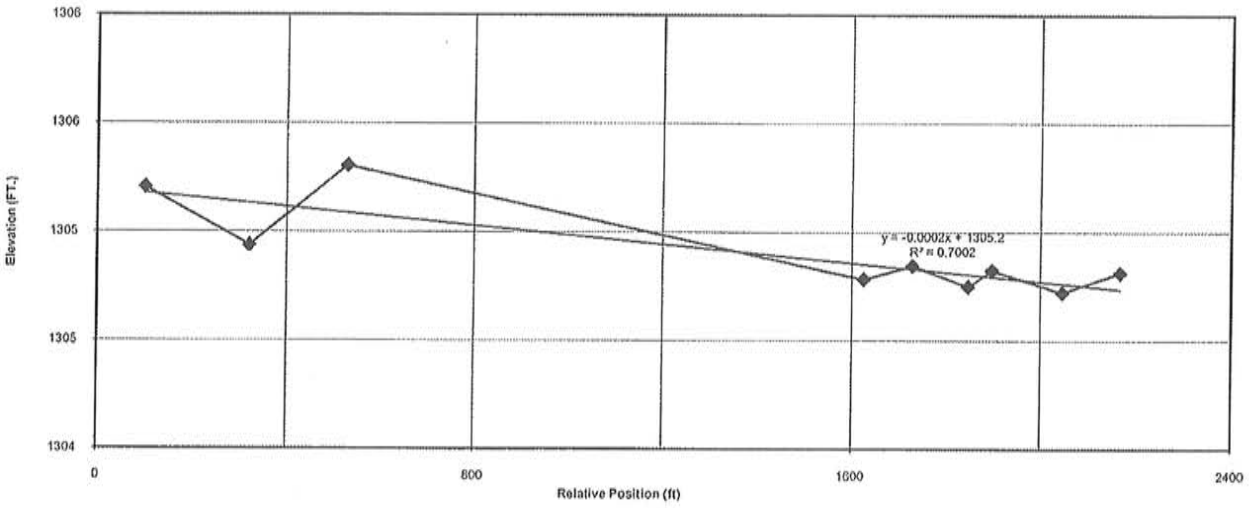
CL Transmission



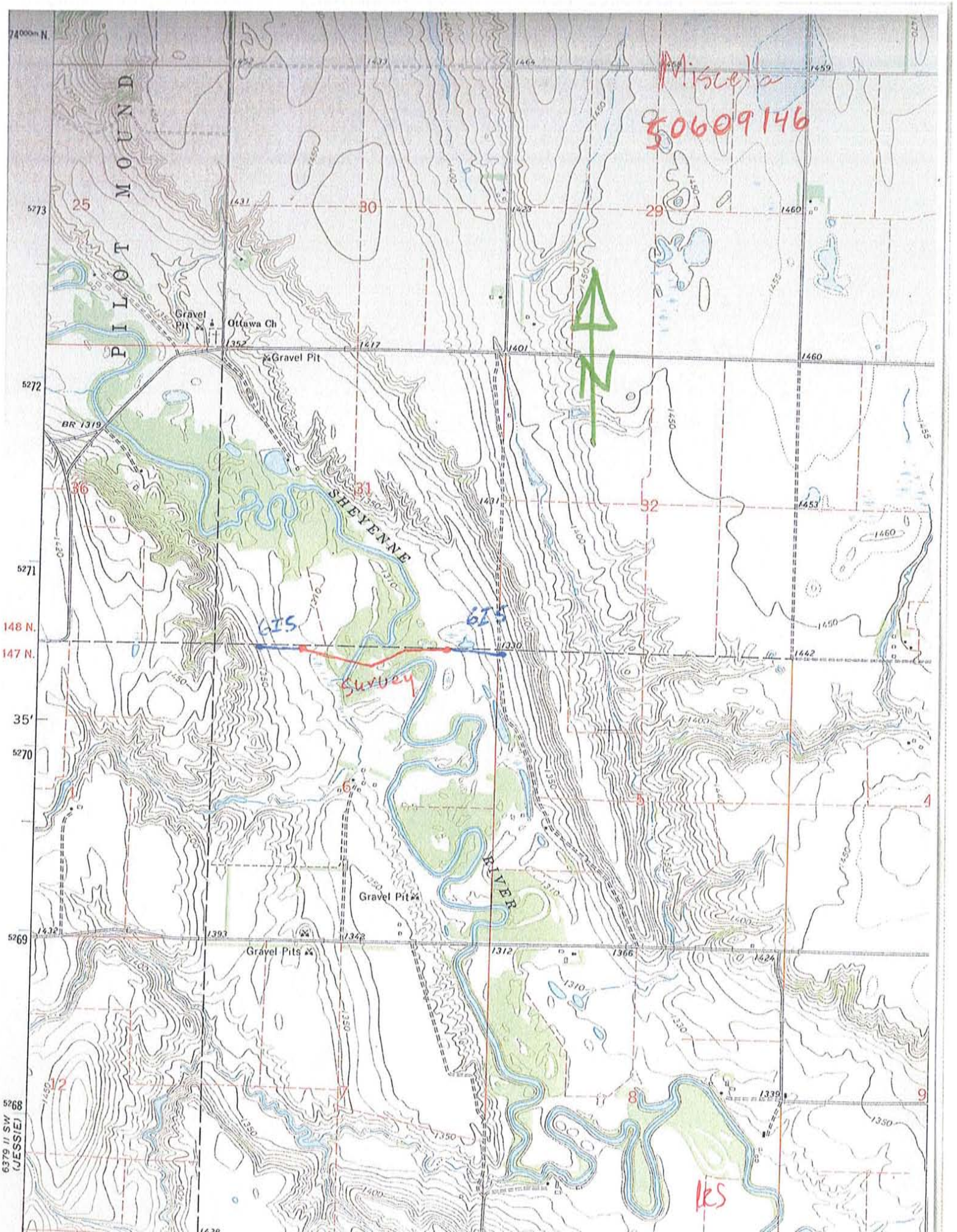
1/18/2011

Channel Profile

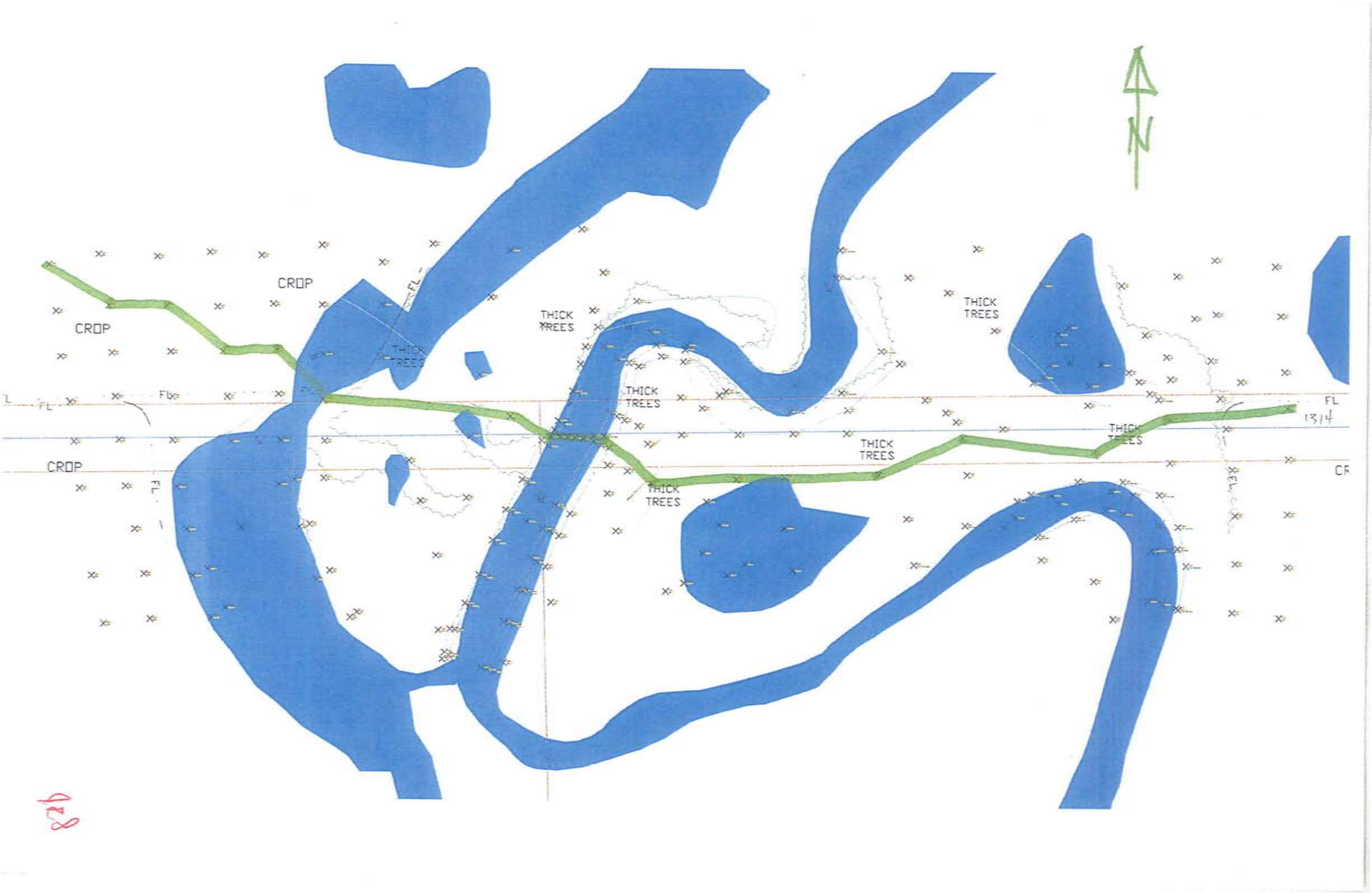
Point #	Northing	Easting	Distance	Cummulative Distance	Relative Position	Elevation
11705	709561.67	2560277.84	0	0	1+00.00	1305.21
6574	709355.96	2560199.29	220.20	220.20	3+20.20	1304.94
11704	709166.73	2560106.98	210.54	430.74	5+30.74	1305.30
6661	709189.41	2561201.39	1094.64	1525.38	16+25.38	1304.78
6659	709222.38	2561298.28	102.35	1627.73	17+27.73	1304.85
6656	709251.99	2561413.57	119.04	1746.77	18+46.77	1304.75
6655	709243.26	2561463.10	50.29	1797.06	18+97.06	1304.82
6651	709120.07	2561546.63	148.83	1945.89	20+45.89	1304.72
6648	709001.10	2561528.49	120.34	2066.24	21+66.24	1304.81

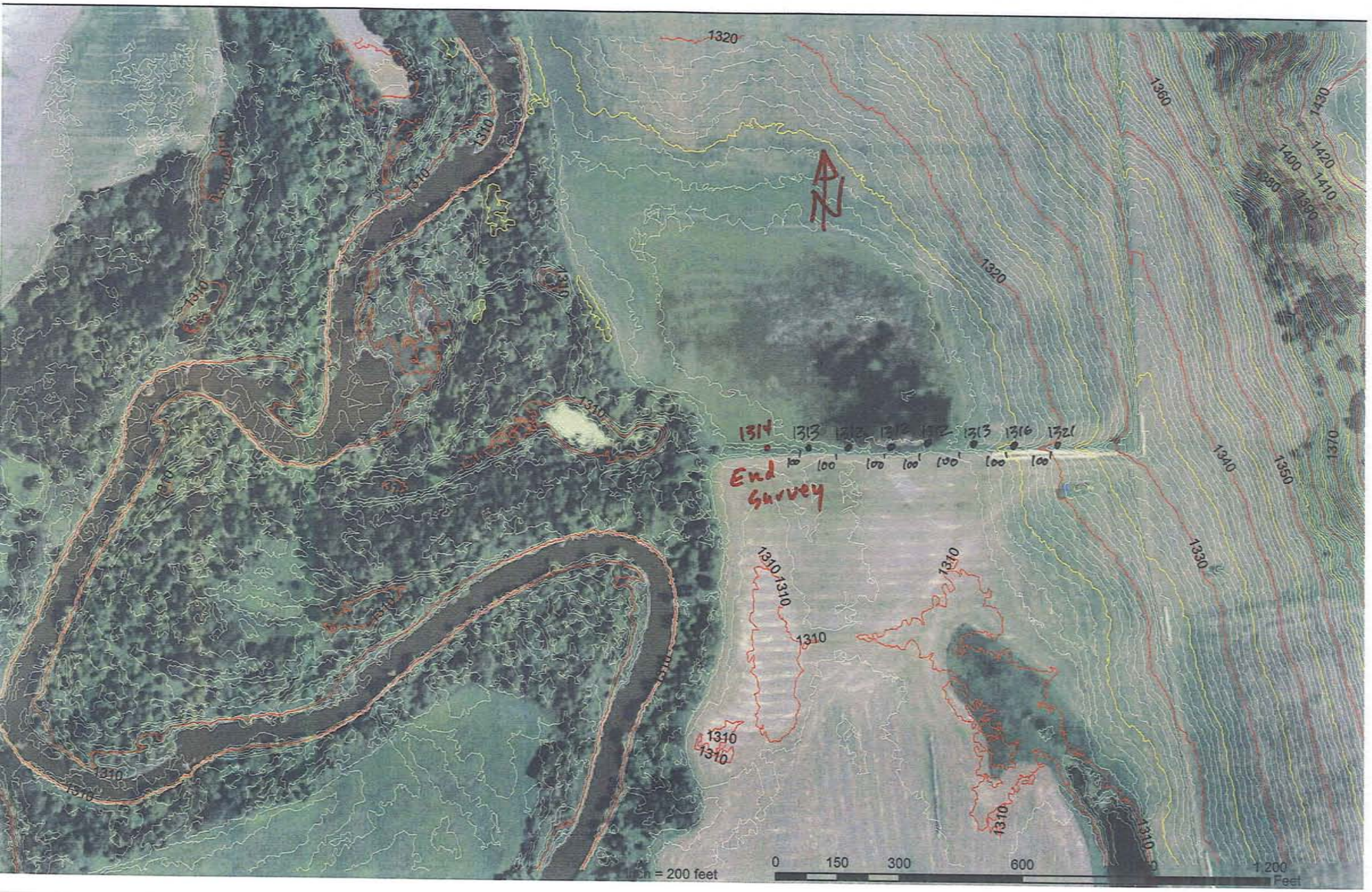


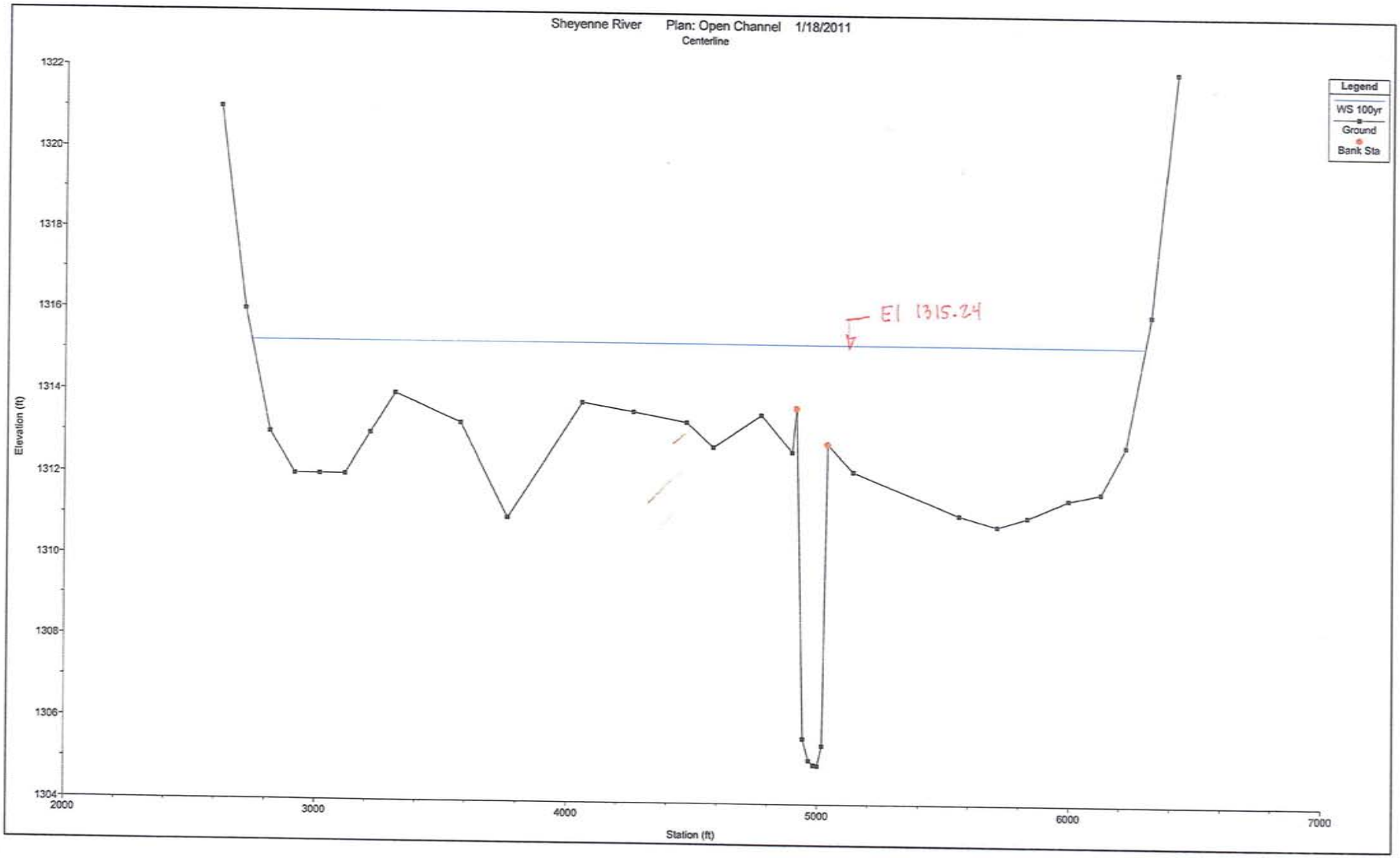
jeb 1/17/2011


Miscl'a
50609146
PILOT MOUND
Gravel Pit
Ottawa Ch
Gravel Pit
BR 1319
SHEYENNE
GIS
GIS
Survey
148 N.
147 N.
RIVER
Gravel Pit
Gravel Pits
6379 II SW (JESSIE)
LKS

1 inch = 200 feet
1310
1320
1330
1340
1350
1360
1370
1380
1390
1400
1410
1420
4Z


N
CROP
CROP
CROP
THICK TREES
THICK TREES
THICK TREES
THICK TREES
THICK TREES
THICK TREES
FL
FL
FL
FL
FL
13/4


1320
1360
1430
1420
1410
1400
1390
1380
1370
1350
1340
1330
1320
1310
1314
1313
1316
1321
100'
End Survey
0
150
300
600
1 200
Feet
= 200 feet


Sheyenne River Plan: Open Channel 1/18/2011
Centerline
Legend
WS 100yr
Ground
Bank Sta
EI 1315.24
Elevation (ft)
Station (ft)
1322
1320
1318
1316
1314
1312
1310
1308
1306
1304
2000
3000
4000
5000
6000
7000

Q28 1/24/10

Appendix G
Public and Agency Coordination

Public and Agency Coordination

The public and agency coordination efforts that began over two years ago assisted Minnkota with identifying the best possible Project Route for a transmission line within the Project Corridor described in this application.

Keeping the public and agencies informed about the Project's status has been a key component of the route selection process. Throughout the process Minnkota pursued a public outreach effort that provided comment opportunities for landowners, federal and state agencies, and local government units. In general, this section discusses Minnkota's outreach efforts during the time period from submittal of the Corridor Certificate Application to submittal of this Route Permit Application.

Minnkota engaged interested stakeholders in the route development process through a variety of tools including direct communication with landowners, a Project-specific web site (www.minnkotacgf.com), and a Project-specific information phone line (800-473-5679). To continue the coordination, Minnkota mailed quarterly newsletters to interested stakeholders who requested to be on the mailing list. This list included members of the public, agencies, and non-government organizations. Minnkota will continue to notify the public of Project milestones through Project completion.

The RUS continues to consult with the USFWS through the Section 7 consultation process and SHPO through the Section 106 consultation process. In addition, as requested by the Commission in the Certificate of Corridor Compatibility Order, Minnkota coordinated with Grand Forks Prairie Partners and Audubon Dakota through a letter, email, and field walk.

Table 1 lists the public and agency coordination effort during the time period from submittal of the Corridor Certificate Application to submittal of this Route Permit Application.

Table 1. Public and Agency Coordination

Public	Meeting/Publication Date
Newsletter #1	3/14/2011
Newsletter #2	5/30/2011
Newsletter #3	9/26/2011
State and Federal Agency	
NDGF Wilbur Boldt WMA easement	Began contacting the NDGFD in June 2011 and received notice that the easement was approved by Governor Dalrymple on 11/22/2011
NDGF GIS data update	March 2011
NDPR Land and Water Conservation Fund (LWCF) grant project update	9/23/11
NDPR GIS data update	11/4/2011
ND State Engineer – Sovereign Lands Permit	11/16/2011
USBOR	Began conversations with the USBOR in June 2011 and received notice on 10/28/2011 that the USBOR would waive their requirements to eliminate all structures from their property and grant a permit upon completion of application and submittal of fees

Public	Meeting/Publication Date
USFWS – Discussions with RUS regarding the Section 7 consultation and draft BA	Ongoing
USFWS GIS data update	4/29/2011
USFWS easement crossing permitting	Meeting - 5/6/2011 Discussions - Ongoing
USFWS field review of easements	9/12-9/16, 2011
NRCS – Seed mix recommendation discussion	5/16/2011
NRCS - Form AD-1006	5/23/2011
SHPO – Discussions with RUS regarding the Section 106 consultation, PA, cultural resources sites, and architectural properties	Ongoing
SHPO review letter on PA (included in Appendix C)	6/7/2011
SHPO concurrence letter on the Historic Building Inventory (included in Appendix E)	9/8/2011
Native American Tribes and Communities	
PA review	5/31/2011
Section 7 consultation meeting	6/22/2011
Non-Government Organization	
Audubon Dakota	Letter – 9/26/2011 Email – 10/27/11
Grand Forks Prairie Partners	Letter – 9/26/2011 Email – 10/26/2011 Field Review – 11/3/2011

County and Township Conditional Use Permit Status

Starting in fall 2010, Minnkota met with county commissioners from the 11 counties and self-permitting townships. Table 2 lists the status of the county and township conditional use permits.

Table 2. Conditional Use Permit Status

County/Township	Conditional Use Permit Approval
Oliver Co.	Yes
Painted Woods Twp – Burleigh Co.	Yes
Wilson Twp – Burleigh Co.	Yes
McLean Co.	Yes
Sheridan Co.	Yes
Wells Co.	Yes
Eddy Co.[1]	Yes
Foster Co.	Yes
Griggs Co.	Yes
Addie Twp – Griggs Co.	Yes
Sharon Twp – Steele Co.	Yes
Franklin Twp – Steele Co.	Yes
Nelson Co.	Yes
Grand Forks Co.	Yes
Fairfield Twp – Grand Forks Co.	(See Note 2)
Logan Twp – Grand Forks Co.	(See Note 2)
Lorretta Twp – Grand Forks Co.	(See Note 2)

Notes:

[1] Eddy Co. does not have formal process, but has issued letter from County Commissioners authorizing approval.

[2] Townships with planning & zoning authority in Grand Forks Co. requested delay in local permitting process until Grand Forks Co. approval was authorized.

Comment Summary

Minnkota collected public comments from the web site, letters, and hot line to identify concerns about the Project or routing suggestions. Tables 3a and 3b provide a summary of the form and topic of the comments received to date.

Table 3a. Comment Summary

Media	07/01/2011 to 11/14/2011	Pre-07/01/2011	Total To Date
Email		22	22
Hotline	1	93	94
In person		3	3
Letter	1	49	50
Meeting Comment Form		33	33
Phone		28	28
Public Meeting		1	1
Website	11	87	98
Total	13	316	329

Table 3b. Comment Summary

Topic	07/01/2011 to 11/14/2011	Pre-07/01/2011	Agency	Public
Access		1		1
Agricultural Impacts		13	3	10
Cost		2		2
Cultural Resources		12	10	2
EMF		2		2
Employment	2	26	1	27
Endangered Species		5	3	2
Environmental Impacts	2	21	7	16
General		43	5	38
Mail List	6	92	3	95
Management Areas		11	8	3
Permitting		3	2	1
Project Need		2		2
Property Values		2		2
Recreation		3	3	
Routing	4	126	11	119
ROW		49	3	46
Safety		4		4
Visual/Aesthetics		1		1
Surface Water		3	2	1

Topic	07/01/2011 to 11/14/2011	Pre-07/01/2011	Agency	Public
Wetlands		3	3	
Wind Development		2		2