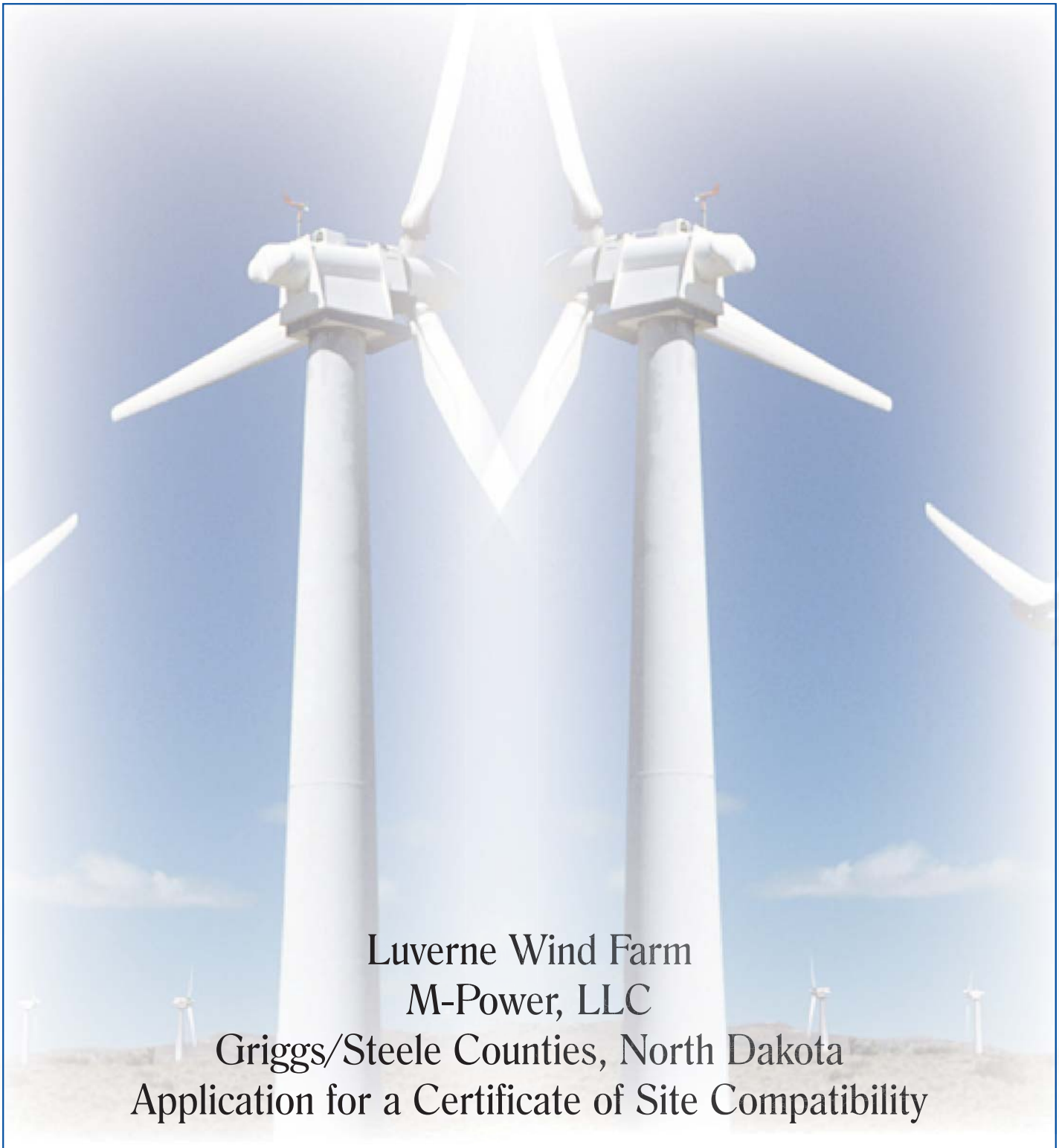

Luverne Wind Farm
M-Power, LLC
Griggs/Steele Counties, North Dakota
Application for a Certificate of Site Compatibility

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EARTHWORKS
ARCHAEOLOGY & ENVIRONMENTAL INVESTIGATIVE SERVICES

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1.0 Introduction

M-Power, LLC is submitting this application for a Certificate of Site Compatibility (Certificate) from the North Dakota PSC (Public Service Commission) to construct the proposed Luverne Wind Farm (the Project). The Project is located in Griggs and Steele Counties in North Dakota. The facility, located within a 20,480 acre study area, is planned to be approximately 157 MW (megawatts) in size and will consist of a total of 75 to 84 wind turbines, depending on turbine type. The wind farm will consist of two separate phases. Phase I will include construction of turbines to generate 107.5 MW of power in the southern portion of the study area. Phase II will include construction of turbines to generate 49.5 MW of power in the northern portion of the study area. ***Please refer to Figure 1, Project Location Map, in Appendix A.***

M-Power is a limited liability company based in Finley, North Dakota. The company was initially formed by two organizations: Griggs-Steele Empowerment Zone[1] and Griggs/Steele Wind Development Group, LLC. ***Please refer to Figure 2, Organization Structure, in Appendix A.***

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

The North Dakota Energy Conservation and Transmission Facility Siting Acts requires a Certificate application to meet criteria established in NDCC (North Dakota Century Code) 49-22. According to NDCC 49-22-02, energy conversion facilities are to be sited with consideration given to environmental preservation and an efficient use of resources.

M-Power has disclosed information to the best of their abilities as required by the North Dakota Energy Conversion and Transmission Facility Siting Act. Exclusion and avoidance areas, along with policy criteria, were considered during selection of the site and are discussed further in this application. These regulations will continue to be considered through design of the Project. Information regarding Project design, wind resources, and technical information has been included in this document to allow a thorough understanding of the Project and aid in the review. The table below provides a summary of information included in this application and the section of the document in which each is addressed. ***Please refer to Table 1, Certificate Completion Checklist.***

Table 1
Certificate Completion Checklist

State Authority	Description	Section
Chapter 49-22	PSC Guidelines: Energy Conversion and Transmission Facility Siting	1.1
Section A	Description	1.2, 1.3, 2.2, 1.5, 6.0-6.6
1.	Type: Describe the type of energy conversion facility proposed and provide a diagram of the major process system or a flow diagram.	1.0, 1.3, 2.2, 4.0, 6.0-6.6
2.	Product: Describe in general terms and technical terms the products to be	1.3, 2.2, 6.1, 6.3

[1] The Empowerment Zone was established under the USDA (United States Department of Agriculture) Rural Development program to afford communities real opportunities for growth and revitalization.

Table 1 Certificate Completion Checklist		
State Authority	Description	Section
	produced at the proposed facility.	
3.	Size and Design: Provide the following description of the production capacity and design.	1.3.2, 4.1, 4.2, 5.1, 6.0
a.	Gross design capacity;	1.3.2
b.	Net design capacity;	1.3.2
c.	Estimated thermal efficiency of the energy conversion process and the assumptions upon which the estimate is based;	N/A
d.	The number of acres that the proposed facility will occupy; and	1.0, 5.1, 7.3
e.	One (1) copy of all design data reports separate from the application.	
4.	Time Schedule: Provide the anticipated time schedule for the accomplishment of the following:	1.4
a.	Certificate of Site Compatibility;	1.4
b.	Land acquisition complete;	1.4
c.	Construction start date;	1.4
d.	Construction complete;	1.4
e.	Test operations;	1.4
f.	Commercial production date;	1.4
g.	100 % capacity factor;	1.4
h.	Any expansion or additions.	1.4
Section B	Studies[2]	
	Provide a copy of any evaluative studies or assessments of the environmental impact of the proposed facility submitted to any federal, regional, state, or local authority.	N/A
Section C	Need for Facility	2.0
1.	An analysis of the need for the proposed facility based on present projected demand for the product or products to be produced by the proposed facility, including the most recent system studies supporting the analysis of the need.	2.1
2.	A description of any feasible alternative methods of serving the need.	2.2
3.	A statement justifying any deviations from the Ten-Year Plan which the proposed facility may present.	2.3
Section D	Location	1.3.1

[2] No field studies have been completed to date. An avian study is currently in progress. A field wetland delineation will be completed as soon as seasonal conditions become favorable. It is anticipated that SHPO will require a Class III Cultural Resources Inventory. Once completed, these studies will be submitted to the proper federal agencies and forwarded to the PSC as a supplement to this document.

Table 1 Certificate Completion Checklist		
State Authority	Description	Section
1.	Select a study area, which includes the proposed facility site, of sufficient size to enable the Commission to evaluate the factors addressed in Section 49-22-09, NDCC.	1.3.1, 7.0-7.16
2.	Discuss the utility's policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives.	Appendix E
3.	Identify and map the criteria that lead to the proposed facility location within the study area.	1.2, 3.0
4.	Discuss in detail the relative value of each criteria and how the proposed facility location was selected giving consideration to all criteria.	3.0
5.	The criteria to be evaluated shall include at a minimum all of the following which are within the study area:	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 mitigation measures that will be taken to minimize adverse impacts which result from the locations, construction, and operation of the proposed facility.	7.2.1, 7.3.1, 7.4.1, 7.5.1, 7.6.1, 7.7.1, 7.8.1, 7.9.1, 7.10.1, 7.11.1, 7.12.1, 7.13.1, 7.14.1, 7.15.1, 7.16.1, Table 11
7.	List the qualifications of the people in various disciplines that contributed to the facility site location study.	11.0
8.	Maps	Appendix A
a.	Map the criteria within the study area showing the proposed facility location. 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.	Appendix A
b.	Furnish one Mylar map, separate from the application, of the same scale as the criteria maps and showing the same basic features as the criteria maps, including the study area, but not the proposed facility location.	N/A
NDCC 49-22-09	Factors to be considered in evaluating applications and the	7.0

Table 1 Certificate Completion Checklist		
State Authority	Description	Section
	designation of sites, corridors, and routes.	
1.	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.	7.0-7.16
2.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	7.0-7.16
3.	The potential for beneficial uses of waste energy from a proposed energy conversion facility.	7.4
4.	Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designed.	7.0-7.16
5.	Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects.	1.2, 2.2
6.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designed.	7.18
7.	The direct and indirect economic impacts of the proposed facility.	7.9
8.	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.	10.87.3, 7.4
9.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	7.7
10.	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.	7.14, 7.15, 7.16
11.	Problems raised by federal agencies, other state agencies, and local entities.	9.0, Appendix D

1.2 Flexibility in Siting

M-Power employed a deductive approach[3] in arriving at the preferred study area for its wind development plans. Under this approach, decisions were progressively narrowed from the general to the specific. At each step, more focus was provided and more detailed research was done. The deductive selection method minimized the expenditure of efforts on unacceptable alternatives and maximized the application of resources on viable sites.

Wind farms commonly experience constraints that limit the flexibility of siting. The American Wind Energy Association reports that North Dakota ranks highest among the contiguous states for its wind energy potential. However, wind energy development

[3] The deductive approach uses a top-down method to reach a conclusion. A wide arrange of parameters is progressively analyzed and narrowed down until a conclusion is reached.

within the state can be constrained by exclusion areas. Exclusion areas may consist of historical resources, wildlife protection areas, prime farmland, etc. and are discussed further in Section 3.1 of this document. Siting is dependent on finding a location that contains wind resources capable of sustaining a wind farm while minimizing impacts to the natural and human environment.

The proposed Project utilizes a community-based ownership model. The leadership and initial financial resources for the research and development of the Project were provided by local entities, with the expectation that this investment will provide an economic benefit to the two-county region. Therefore, the proposed project was constrained by the political boundaries of Griggs and Steele Counties.

Currently, and for the foreseeable future, North Dakota needs to export much of its wind power. This is also true of its coal-fired generation. The energy consumption by North Dakota's relatively low demand is much less than the state's energy production. While North Dakota coal-fired utilities have integrated wind generation into their production, the demand for wind generation is primarily driven by other states that mandate renewable energy in the suppliers' portfolios.

It is anticipated that energy from the Luverne Wind Farm will be utilized by regional utilities. They will use the energy within their service territories which includes parts of North Dakota, Minnesota, and South Dakota. Getting the production of energy to places where there is demand necessitates connection to the transmission system.

In 2002, the Griggs/Steele Wind Development Group, the predecessor to and one of the founders of M-Power, led efforts to identify areas within the two counties that had adequate and developable wind resources. Gross wind resource maps and engineering input were used to determine meteorological tower locations. Three 131-foot meteorological towers were erected for experimental purposes at points determined to be representative of the wind resource in a particular topographic area. Data gathered over seven years revealed four areas that meet the economical wind resource threshold. ***Please refer to Figure 3, Wind Studies, in Appendix A.***

Areas 1 and 2, as identified in Figure 3, are too far from potential transmission interconnection points. Area 3 was constrained by potential interference that a wind farm may have on a FAA (Federal Aviation Administration) Radar Facility, located west/northwest of Finley, North Dakota. With a temporary rejection from the FAA on this location, M-Power submitted a second proposal to FAA for an area farther to the south—Area 4. This proposal was found to be acceptable by the FAA and ultimately proved to be closest to the transmission solution serving the market planned for the first projects. Area 4 constitutes the study area used in this application.

Considering the measured wind resources, limited transmission solutions, county boundaries, economic factors, potential FAA concerns, environmental considerations, and topography, the area along the "Pembina Ridge" north of Luverne was selected as the study area for further analysis in this document.

Before any specific landowner property was identified, M-Power modeled arrays of typical turbine designs, taking into account surface and topographic features, to determine the optimum production in the general area. These preliminary studies

demonstrated that there was about 200 MW of developable wind resource in the study area.

M-Power then identified 32 full and contiguous sections of land that fully contained the turbine array and were determined to have the most potential for wind production. This study area consisting of 32 sections includes a buffer around its perimeter in which no turbines will be sited for the first phase of the development.

The next step was to secure the land within the study area through wind option agreements with each private landowner in the 32-section study area. The goal has been to secure voluntary options from all private landowners within the study area. M-Power paid a small nominal fee for each quarter-section for the option. In addition, each landowner who executed the option received 25 units of ownership in M-Power per quarter-section. If the Project is approved, all landowners signing the options will receive an additional award of 25 units of ownership in M-Power per quarter-section, for a total of 50 units. This ownership offer is in addition to any easement payments made for turbine sites, access roads, or other facilities associated with the wind farm. As a result of this activity, all but 14 landowners signed options. Affected landowners within the study area are considered to be M-Power owners.

Additional information regarding the existing conditions within the study area was evaluated. The following resources were reviewed and mapped when possible:

- Published literature;
- Local zoning ordinances;
- Avoidance and exclusion criteria specified in the North Dakota Administrative Code;
- Evidence of farmland uses and field patterns;
- Input from landowners, local, state, and federal agencies;
- Preliminary office review of wetlands;
- Special use easements;
- Previously mapped aesthetic and cultural considerations; and
- Other resources.

A preliminary constraint map, consisting of the aforementioned mapped data, was used to verify the economic and environmental viability of the study area. The secured land and topographic features were used as a basis for refining the utilization of the area within the study area. With specific turbine designs, M-Power's consulting engineers conducted a preliminary micro-siting exercise to verify the full potential of the study area. This test demonstrated that, when all major siting constraints are considered, the study area is preferred among those others considered.

M-Power seeks a Certificate of Site Compatibility for the study area, not the specific turbine locations. Under the conditions that may be stipulated in the Certificate of Site Compatibility, M-Power plans to proceed with its definitive micro-siting tasks within the study area. Within the permitted study area, M-Power will locate the turbines and other

associated facilities subject to required setbacks from environmentally sensitive areas, in compliance with local, state, and federal requirements.

Upon receipt of a Certificate of Site Compatibility, M-Power will complete additional studies required by the PSC. This may include the following: refinement of the office wetland analysis based on a field delineation, biological assessments, cultural resource surveys, geotechnical evaluations, avian surveys, access road locations, recommendations of other easement holders in the study area, or other specific micro-siting constraints.

M-Power also intends to consult with its landowners/partners in selecting the best possible site for turbines and/or access roads and other associated facilities. After these additional studies have been completed and input from interested parties has been incorporated, a final recommended site plan will be submitted to the Commission prior to construction. A pre-construction meeting with the Commission staff will also be held to ensure compliance with the requirements of the Certificate of Site Compatibility.

M-Power's letter of intent was filed in an effort to accelerate the project schedule as a result of the scheduled termination of the PTCs (Production Tax Credits). It has been decided that PTC's will not be applied for: however, buyers wish to begin construction as originally planned which requires the proposed schedule be maintained. This schedule has forced the overlap of some activities that ordinarily will be completed sequentially. For example, wetlands cannot be delineated until seasonal conditions are appropriate; however, preliminary wind resource evaluation must be completed as soon as possible. Therefore, M-Power plans to complete field studies when environmental conditions permit the work to be done.

1.3 Project Summary

M-Power selected the proposed site to construct a 157 MW wind farm based on extensive studies of wind resources, evaluation of environmental considerations, access to transmission, profitability, and landowner willingness.

1.3.1 Proposed Site

The study area is comprised of a total of 32 sections of agricultural land in eastern Griggs and western Steele Counties in North Dakota. It is situated between the communities of Cooperstown, Finley, and Luverne. The study area is characterized by rolling hills and includes some of the highest elevations in southern Griggs and Steele Counties. ***Please refer to Table 2, Site Location.***

Table 2
Site Location

Township Name	Township	Range	Sections
Riverside	145N	57W	14, 15, 22, 23, and 26-36
Sverdrup	144N	58W	1, 12, 13, 24, and 25
Willow Lake	144N	57W	4-9, 16-20, and 30

1.3.2 Projected Output

The proposed facility will be capable of producing a maximum total of approximately 157 MW of power. Given a rotor hub height of 260 feet AGL (Above Ground Level), the projected net yearly energy output is estimated to be 540,000 to 580,000 MW hours. A more accurate prediction of output will depend upon final wind turbine selection and the resulting final analysis of the design and layout of the facility.

1.4 Project Schedule

Provided all pre-construction permits and approvals, such as financial closing, equipment deliveries, etc, have been obtained, construction of the Project is anticipated to begin in August 2008.

Phase I will include construction of turbines to generate 107.5 MW of power in the southern portion of the study area. Phase II will include construction of turbines to generate 49.5 MW of power in the northern portion of the study area.

It is anticipated that approximately 107.5 MW in the southern portion of the project will be built for a PPA (Power Purchase Agreement) for a regional utility and approximately 49.5 MW in the northern portion will be constructed and owned by a separate regional utility. Assuming the current Project schedule is reached, the Commercial Operation date for phase I will be approximately June 30, 2009 with construction beginning in the fall of 2008. It is anticipated that phase II will also be completed by June 30, 2009 with the project being construction ready in July 2008.

The proposed project schedule is as follows:

- **Certificate of Site Compatibility**: M-Power anticipates the Certificate will be approved by the PSC in July 1, 2008.
- **Land Acquisition**: M-Power anticipates that sufficient easements will be acquired from landowners by May 2008.
- **Permits:** M-Power will complete all necessary environmental studies and acquire all necessary permits prior to construction. This will be completed in the spring/early summer 2008 to enable M-Power to move forward with construction after July 1, 2008.
- **Private Transmission Routing**: The 12- to 13-mile private transmission line routing required to deliver energy to the planned 55-mile transmission line is being permitted by HDR Engineering. Permitting is anticipated to be completed in June 2008.
- **Equipment and Construction:** The long lead items will come from two companies, under their existing supply chain agreements. Construction will be managed by an EPC (Engineering, Procurement and Construction) contractor, with construction likely beginning August 2008. Civil and electrical construction will take up to ten months to complete, depending on weather considerations.
- **Turbine Erection and Commercial Testing:** The EPC contractor will be responsible for erection of the towers and placement of the nacelles and blades.

Initial testing and calibration of the turbines will be conducted by the turbine manufacturer, whose efforts will be initiated by April/May 2009.

- **Commercial Operations**: Energizing of the wind turbines is anticipated to begin in April 2009. M-Power anticipates full commercial operation of both phase I and phase II projects to occur prior to June 30, 2009.

1.5 Project Ownership

M-Power's goal is to promote local ownership and participation in the project. Community members and landowners have the opportunity to invest in the Project. To date there are 59 local investors. Each landowner signing wind farm land options and/or easements is awarded ownership units in M-Power, bringing the total ownership to 111 individuals.

The Luverne Wind Farm will consist of two parts which are contiguous and will be developed concurrently. The larger part is a 107.5 MW Project that will be owned by M-Power One. The generation from this portion will be sold to a regional utility under a PPA. It is anticipated that the smaller part consisting of a 49.5 MW Project, will be sold to a different regional utility who will build, own, and operate it at the time it is ready for construction. It is anticipated that all rights, including landowner easements, permits, Certificates of Site Compatibility, etc., for the 49.5 MW will also be transferred to a utility buyer.

Until a final PPA or CR (Construction Ready) Project has been secured, the initial local investors (investors in M-Power) will own 100% of any project in the development stage. After the total costs of a specific project have been determined, and after a PPA is secured, a major equity partner will be brought into the Project company (M-Power One) to further capitalize the Project.

Prior to construction, the 107.5 MW PPA portion of the Project will be transferred to M-Power's Project Company: M-Power One, LLC. It is anticipated that a major equity partner will own the majority of M-Power One. This partner will also construct and operate the 107.5 MW portion of the wind farm.

After the first 10 years of operation and PTCs have expired, and after the major equity investor has received its internal rate of return, under the conditions negotiated as part of the investment contract, the major equity partner will transfer a majority ownership back to the local investors while retaining a minority share. At that point the return on investment to the local investors will be dependent upon the revenue stream and profitability of the wind farm, or the value of the company, if it is sold.

2.0 Need for Facility

2.1 Need Analysis

The United States government and approximately 25 states have adopted policies in recent years to proceed with initiatives to reduce the country's dependence on foreign oil and to reduce greenhouse gases produced via energy production and consumption. One way to reduce this dependency has been to develop alternative sources of energy, including wind energy. As stated by the DOE (United States Department of Energy),

"Wind energy diversifies the nation's energy supply, takes advantage of a domestic resource, and helps the nation meet its commitments to curb emissions of greenhouse gases, which threaten the stability of global climates."

The state of North Dakota has been identified as a leader in wind energy potential[4]. In a report commissioned by the North Dakota Division of Community Services, North Dakota has stated a desire to become a leader in "non-polluting wind generated energy" (PanAero Corporation, 1999). The Project will aid North Dakota's development of alternative energy supplies, specifically in the wind energy sector.

2.2 Alternatives

It is anticipated that full construction of the proposed Luverne Wind Farm will take place under two separate phases. Phase I will include construction of turbines to generate 107.5 MW of power in the southern portion of the study area. Phase II will include construction of turbines to generate 49.5 MW of power in the northern portion of the study area. In order to provide the flexibility to select the most appropriate technology at the time of project construction, two alternatives have been developed for Phase I. These alternatives have been developed with consideration given to optimizing wind and land resources, cost efficiency, and minimizing environmental impacts. ***Please refer to Figure 4, Project Alternatives, in Appendix A.***

Alternative A will include the construction of 42 Clipper C96 2.5 MW turbines in the southern portion of the study area. Construction in the northern part of the study area will include 33 GE 1.5 MW turbines.

Alternative B will include the construction of 51 Suzlon S88 2.1 MW turbines in the southern portion of the study area. Construction in the northern part of the study area will include 33 GE 1.5 MW turbines.

Both alternatives will include the construction of wind turbines and associated step up transformers, underground electrical collection systems, underground communication lines, access roads, crane pads, and shared common facilities as outlined below.

2.3 Ten Year Plan

M-Power is a wind resource Development Company. As such, its primary purpose is to identify, evaluate, and secure the rights to develop wind resources to the point that a quantifiable project, with identified buyers, and a feasible electrical transmission solution have been permitted and authorized for construction. At that point, the Development Company establishes a Project Company (e.g. M-Power One). The Project Company has at least three business options:

- Pursue a long-term PPA with the intended buyer;
- Sell the Project as a CR Project, in which case the rights to that Project (or portion of a Project) are sold to the buyer; or
- Build the Project, commission the turbines, and sell the completed Project to the buyer. This option is referred to as a BT (Build-Transfer) Project.

[4] Pacific Northwest Laboratory. *An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States, 1991.*

For this Application, M-Power One is currently negotiating a PPA for part of the Luverne Wind Farm and a CR Project that will be contiguous and in the same study area.

An additional 50MW is under consideration for development, contiguous to the Luverne footprint, within the near term. The business model for the 50MW addition to the initial concurrent projects described above has not yet been determined.

The Luverne Wind Farm output will be delivered to the transmission grid by way of a planned 230 KV transmission line from Pillsbury to West Fargo. In order to access this interconnection solution, M-Power plans to build a "generation outlet" 230 KV transmission line of approximately 13 miles from a collector station located on the east side of the Luverne Wind Farm to the proposed Pillsbury substation.

M-Power is designing and securing the necessary permits and rights-of-way for a 230 kV transmission line that will provide a generation outlet to the regional transmission grid. This is a 13-mile line that has the capacity to carry the generation from near the mid-point of the Luverne footprint to a planned substation just west of Pillsbury, North Dakota. A 230 KV transmission line will also be constructed extending from Pillsbury, approximately 60 miles to the Maple River Substation near Fargo, North Dakota.

It is a broadly known fact that the "Pembina Ridge," which generally runs north-south through the west edge of Steele County and the east edge of Griggs County, holds high potential for wind generation. M-Power's wind monitoring data has indicated that there are several additional areas within Griggs and Steele Counties that have relatively high developable wind resources. Each area has its own constraints however; the most significant of which is a transmission outlet. Pending transmission solutions, and of course, market opportunity, M-Power plans to pursue the development of up to 500MW of wind generation within the two counties.

M-Power plans to pursue all viable business options during the next ten years. The expansion location, timing, and type of project priorities will be, in large part, dictated by the location of developable wind resources, market demands, transmission solutions, and M-Power's management decisions.

Currently, M-Power has an application pending (not subject to this siting application) before the Midwest Independent Transmission Systems Operator (MISO) for input of 280MW of wind generation at the Buffalo Substation, just northeast of Buffalo, North Dakota. Provided that study proves economically feasible and electrically viable, it is highly probable that M-Power will pursue additional project developments in Griggs and Steele Counties within the next two to five years.

The generation outlet(s) for delivery to the Buffalo Substation have not yet been determined. The design and location of these outlets are greatly dependent upon the results of the MISO study, still in progress.

M-Power has spent a good deal of time and money to structure its business model with local ownership. Although M-Power is a locally owned and locally governed entity, its development interests may extend beyond the two counties in which the wind resource research has been conducted. Other Projects with potential for development may be

pursued if landowners in other areas express an interest in the business model, during the ten year period.

3.0 Site Selection Criteria

The proposed Project is located along the border of Griggs and Steele Counties in the southern part of the counties, approximately 30 miles north of Interstate 94. The area was selected based upon a strong wind regime, active interested landowners, and proximity to the planned transmission infrastructure between Pillsbury, ND and Fargo, ND.

The preliminary micro-siting for turbines has been conducted based upon the identified, positive wind regime, while accounting for the necessary setbacks and avoiding environmentally sensitive areas.

3.1 Exclusion Areas[5]

Per Section 69-06-08-01-1 of the North Dakota Administrative Code, certain geographical areas shall be excluded from energy facility siting consideration. In addition, a buffer zone shall be implemented around these areas to protect their integrity. ***Please refer to Figure 5, Exclusion Areas, in Appendix A, and Table 3, Summary of Exclusion Areas.***

3.2 Avoidance Areas[6]

Per Section 69-06-08-01-2 of the North Dakota Administrative Code, certain geographical areas shall not be approved for use as energy conservation facilities 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 the following: the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative sites. In addition, a buffer zone shall be implemented around these areas to protect their integrity. ***Please refer to Figure 6, Avoidance Areas, in Appendix A, and Table 4, Summary of Avoidance Areas.***

Table 3
Summary of Exclusion Areas

Exclusion Area	Present within Project Site	Proposed Buffer	Section Addressed
Designated or registered national areas; parks; memorial parks; historic sites and landmarks;	Present	Lake Ashtabula is located in the study area. It is anticipated that	7.7, 7.8

[5] As defined in North Dakota Administrative Code 69-06-01-01, exclusion criteria are defined as "criteria that remove areas from consideration for energy conversion facility sites and transmission facility routes." Exclusion areas are composed of these limiting criteria.

[6] As defined in North Dakota Administrative Code 69-06-01-01, avoidance criteria are defined as "criteria that remove areas from consideration for energy conversion facility sites and transmission facility routes unless it is shown that under the circumstances there are no reasonable alternatives." Avoidance areas are composed of these limiting criteria.

Table 3 Summary of Exclusion Areas			
Exclusion Area	Present within Project Site	Proposed Buffer	Section Addressed
natural landmarks; historic districts; monuments; wilderness areas; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.		construction in and on the shoreline of Lake Ashtabula will be avoided. In addition, cultural resources may be present[7].	
Designated or registered state areas; parks; forests; forest management lands; historic sites; monuments; historical markers; archaeological sites; grasslands; wild, scenic, or recreational rivers; game refuges; game management areas; management areas; and nature preserves.	Present	Coordination with the United States Army Corps of Engineers shall be initiated to determine the appropriate buffer around the agency's Wildlife Management Areas. It is anticipated construction in these areas will be avoided.	7.7, 7.8
County parks and recreation areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.	Present	Woodlands are located in draws. These areas of low elevation are not suitable to turbine placement. No buffer is proposed.	7.4, 7.9
Prime farmland and unique farmland, as defined by the land inventory and monitoring division of the soil conservation service, United States Department of Agriculture in 7 CFR[8] part 657; provided, however, that if the Commission finds that the prime farmland and unique farmland that will be removed from use for the life of the facility is of such small acreage as to be of negligible impact on agricultural productions, such exclusion shall not apply.	Present	The acreage of farmland that will be converted will be negligible in terms of total farmland within the study area. No buffer is proposed.	7.9, 7.10
Irrigated land.	None	N/A	7.9
Areas critical to threatened or endangered animal or plant species.	None	N/A	7.16
Areas where animal or plant species that are unique or rare to this state will be irreversibly damaged.	None	N/A	7.15, 7.16

[7] The presence of cultural resources within the study area will be confirmed during a Class III Cultural Resources Inventory. Survey results will be submitted to SHPO. Coordination shall take place with SHPO to determine buffer areas, if needed.

[8] Code of Federal Regulations

Table 4 Summary of Avoidance Areas			
Avoidance Area	Present within Project Site	Proposed Buffer	Section Addressed
Historical resources which are not designated as exclusion areas.	None[9]	N/A	7.7
Areas within the city limits of a city or the boundaries of a military installation.	Present[10]	None	7.5
Areas within known floodplains as defined by the geographical boundaries of the 100-year flood.	None	N/A	7.12
Areas that are geologically unstable.	None	N/A	7.11
Woodlands and wetlands.	Present	Buffers around wetland areas are to be coordinated with the USACE and USFWS following the field wetland delineation.	7.9, 7.13
Areas of recreational significance which are not designated as exclusion areas.	None	N/A	7.8

3.3 Selection Criteria

Site selection criteria included those criteria described under Chapter 69-06-08. Exclusion and avoidance areas, along with selection criteria described in the above section, were evaluated and taken into account when determining the Luverne Wind Farm study area and preliminary individual siting of the wind turbines. Discussion of impacts on exclusion and avoidance areas along with selection criteria are described in Section 7.0, Environmental Analysis.

3.4 Policy Criteria

Luverne Wind Farm will accommodate numerous policies and practices described under the policy criteria section. Those considered include:

- Energy conservation through location, process, and design;
- Training and utilization of available labor in North Dakota for the general and specialized skills required;
- Use of a primary energy source or raw material located within the state;
- Non-relocation of residents;
- Economies of construction and operation;
- Use of citizen coordinating committees;

[9] The presence of cultural resources within the study area will be confirmed during a Class III Cultural Resources Inventory. Survey results will be submitted to SHPO. Coordination shall take place with SHPO to determine buffer areas, if needed

[10] One former military missile site is located within the study area. The site has been decommissioned and is no longer used for military procedures.

- Commitment of a portion of the energy produced for use in the state;
- Labor relations;
- Coordination of facilities; and
- Monitoring of impacts.

3.5 Design and Construction Limitations

Design and construction limitations encountered while finding a location for the proposed wind farm included a suitable study area and willing landowners. The study area had to be large enough to provide the Project with economies of Class IV wind resources. Landowners within the study area also had to be willing to allow construction of wind turbines on their property.

There are several limitations specific to this particular study area, including numerous wetlands, residential properties, communication towers, cemeteries, and zoning ordinances. USFWS (United States Fish and Wildlife Service) Wetland Easements which protect specific wetland basins also exist within the study area. Wind turbines are not planned to be constructed in these areas, and setbacks or buffers will be incorporated around these areas to lessen the impact. In the case that identified areas can't be avoided, coordination will take place with the respected agencies or individuals to avoid, minimize, and/or mitigate impacts. Further discussion of the above resources and associated impacts are discussed in Section 7.0 Environmental Analysis.

3.6 Economic Considerations

The economics of a wind farm are driven by the value of the wind regime. The Luverne Wind Farm has annual average wind speeds ranging from 18.5 to 19.7 mph (miles per hour), resulting in net capacity factors ranging from 39 to 45%. In terms of the value of the wind regime, these net capacity factors put wind development at this location in the top 10% nationally.

M-Power and the Luverne Wind Farm also have a unique economic value to the area. M-Power is predominately locally owned, with the majority of the capital invested to date originating from the Griggs-Steele Empowerment Zone, the Griggs/Steele Wind Development Group, and local landowners and investors. As a result, there will be significant economic returns generated for the local investors and landowners.

The offtakers for this Project are regional utilities, who will market much of this renewable energy resource for the benefit of local and regional area residents.

4.0 General Description of the Proposed Facility

The Luverne Wind Farm will consist of two individual co-developed phases. Phase I will be developed in the southern portion of the study area. This will consist of a 107.5 MW Facility owned by M-Power One with output delivered under a 20- or 25-year agreement to a regional utility... Phase II will be developed in the northern portion of the study area. This will consist of a 49.5 MW facility proposed to be constructed and owned by a separate regional utility company.

4.1 Wind Power Technology

Wind turbines convert the kinetic energy of the wind into the rotational energy of a rotor and drivetrain. This energy is in turn converted into electrical power by industrial generators integrated within the wind turbine housing. In the technologies considered for this facility, this will be accomplished through a gear train which will amplify the speed of the rotor to achieve the higher speed required of the generator. An automated 'pitch' system will control the speed of the rotor by turning the face of each rotor blade into or out of the wind. Such a system will typically operate in a wind speed range of 7 to 56 mph beyond which the system will activate a brake to arrest rotation. Constant power output will be further accomplished through the use of power electronics which convert generator output to achieve required output voltage and frequency control. An integrated wind speed and direction monitoring system works with a 'yaw' motion control system to keep the face of the turbine presented into the wind.

Voltage from the turbine generator will be increased through the use of industrial step up transformers, which commonly increase the voltage to 34.5 kV (kilovolt) for injection into a collection system. The collection system will consist of electrical cable, often organized into discrete circuits of interconnected wind turbines. These circuits will be connected to a substation which will further increase the voltage to levels required for the targeted transmission system. The substation will also provide protective isolation switching and energy measurement functions.

Monitoring and control of each wind turbine will be accomplished through the use of software typically provided by the wind turbine supplier. Information will be carried on communication lines connected to each turbine and transmitted from the wind energy facility by telephone carrier. This will allow remote monitoring and control by turbine suppliers, O&M (Operation and Maintenance) providers, and wind farm owners.

Models and characteristics of the turbines being evaluated for this Project are given in the following table. ***Please refer to Table 5, Turbine Specifications.***

Table 5 Turbine Specifications			
Specifications	Turbine Type		
	GE 1.5	Suzlon S88	Clipper C96
Power Output	1.5 MW	2.1 MW	2.5 MW
Hub Height	262 feet	262 feet	262 feet
Rotor Diameter	253 feet	288 feet	304 feet
Cut-In Wind Speed	6.7 mph	8.9 mph	8.9 mph
Cut-Out Wind Speed	45 mph	45 mph	45 mph
Rated Wind Speed	26.4 mph	31.1 mph	31.5 mph
Rotor RPM[11] Range	10.1 to 20.4	15	15
Cold Temp Limit	To -25° Celsius	Information not available	To -30° Celsius
Generator (all 60Hz)	3 phase DFIG	Asynchronous Slip Ring	Synchronous Permanent Magnet (4x)

4.1.1 Wind Energy Center Layout

The following sections discuss the proposed layout in terms of orientation and spacing and proposed infrastructure.

Orientation and Spacing

- Turbines will be oriented to maximize energy capture from the dominant wind directions and to make most effective use of the available topography, while avoiding sensitive surface features, cultural resources, and/or geotechnical constraints.
- Turbine spacing will be dependent on turbine type and will be determined by the use of a wind farm layout design software system. This program seeks to optimize wind energy capture within the site while observing required setbacks and turbine spacing to minimize array losses.

Associated Infrastructure

- Each turbine will sit atop a concrete foundation whose size and design will be finalized once geotechnical analyses have been completed.
- Each turbine will also have an associated crane pad occupying an area of approximately 125x25 feet. The crane pad will provide a working surface for the crane during turbine erection and subsequent maintenance.
- Construction and service access to each turbine location will be facilitated by a compacted gravel road. These will be designed in consultation with the

[11] Revolutions Per Minute

landowner and constructed by the Project Company so as to minimize total land consumption, cost, and impact to land use.

- An electrical collection system consisting of buried conductors will interconnect all turbines to the wind farm substation. This system will operate at 34.5 kV, and will be buried in the service road shoulder to minimize cost and land consumption, while facilitating access.
- The total disturbed surface area of the project will be known once a final design is approved, but it is estimated to be less than 2% of the total area within the project study area.

4.2 Associated Facilities

The combined wind energy facility will share several key resources, as outlined below:

Maintenance Building

A facility will be constructed within the study area boundary to provide a year-round workspace and equipment storage, and to facilitate some basic maintenance activities. The maintenance building will be constructed near a year-round maintained public road***.***

Substation

System lines from each individual project will be connected to a common substation facility. Two options were considered for the location of the substation. The two options included being located in the SW ¼ of Section 26 or in Section 35. In talking to the respectful landowner of Section 26, he has requested the substation not be constructed on his property. Coordination with the adjacent landowner on Section 35 has taken place in which he has granted permission for the substation to be located on his property.

The substation will be designed to provide voltage step up from the collection system 34.5 kV to the 230 kV transmission voltage. This facility will also provide a point of energy metering and various collection system and facility isolation and protective functions. The facility will be fenced to provide site security and safety. ***Refer to Figure 7, Substation and Transmission Line Location Map and Figure 8, Substation Design, in Appendix A.***

Transmission Feeder Line

Energy from the combined wind projects will be collected at the Project substation. and transmitted to the proposed Pillsbury Substation, to be located just west of Pillsbury, North Dakota. The proposed Pillsbury Substation will be owned and operated by a regional utility company. The feeder line will be a 12 to13-mile 230 kV line designed to handle more than 200 MW of power transmission. This line is currently being permitted, designed and constructed as a parallel project to the Luverne Wind Farm, under a separate application to the North Dakota PSC. ***Refer to Figure 7, Substation and Transmission Line Location Map, in Appendix A.***

4.3 Land Rights

The study area encompasses 32 township sections and approximately 60 landowners. Land rights for the wind farm will be secured through easements, which provide both direct use of the land and associated wind rights. At present, approximately 93% of the targeted land and 86% of the landowners within the study area boundaries are under option agreements that set the parameters for long-term easements. Land rights for the substation will be secured through direct purchase, an effort which is currently in progress.

5.0 Proposed Site

5.1 Identification of Project Site

In addition to wind resource considerations, the location of the Luverne Wind Farm was selected based on its close proximity to the newly planned transmission infrastructure, substation, and landowners' interest in participating in the Project.

Land use patterns and environmentally sensitive features were factored into the site selection criteria. The site boundary encompasses an area of approximately 20,480 acres. The land occupied by the wind farm and transmission right of way comprises less than 2% of this area, assuming up to 157 MW capacity as measured with turbines, access roads and electrical infrastructure.

5.2 Wind Resource Areas – General

The DOE and the North Dakota Division of Community Services have conducted wind resource assessment studies in North Dakota. The May 2004 DOE wind map for the state of North Dakota indicates that the wind resources within the Project study area are Class 4 winds or greater. Class 4 winds have an average annual wind speed of 13 mph.

5.3 Wind Characteristics in Project Site

The wind data acquisition program was the result of a collaborative effort between the Griggs/Steele Wind Development Group, LLC and the North Dakota Department of Commerce, Division of Community Services. M-Power utilized wind data from three area meteorological towers, one on the Project site and two used in correlation within the counties. The latter two towers have been collecting data since 1998. Measured wind data collected from the Luverne meteorological tower, located within the Project study area, is available from December 21, 1999 to December 31, 2007 and provides a representation of the general wind regime in the study area.

The Luverne meteorological tower is located approximately 5.7 miles northeast of Luverne. The elevation of the tower is approximately 1,509 feet MSL. The wind speed variation within the Project study area was predicted by means of the Wind Atlas Analysis & Application Program wind flow model. This uses several models to describe the wind flow over different terrains and provide vertical and horizontal extrapolation of wind climate statistics. A fourth metrological tower 197 feet in height has been installed inside Section 12 of Broadview Township located within the study area.

The wind resource map utilizes the estimated wind speed variations at 262 feet AGL. In general, the 262 feet mean wind speed variations range from 18.5 to 19.7 mph. A wind atlas based on the Luverne wind data was used as a regional wind climate input. This wind atlas was based on the measured wind data corrected for local site effects to produce a 157 MW wind farm layout as established within the Project study area. The net capacity factor was estimated using a 10% reduction from the estimated gross, which included array losses, to account for additional energy losses. The proposed wind farm estimated net capacity factor is approximately 39 to 44%.

6.0 Engineering and Operational Design Analysis

This section provides an overall summary of the Project, including Project layout and associated facilities, turbine components, electrical systems, construction, schedule, operations, and site decommission. A summary of this information is also included in ***Appendix B, Design Data Report***. Feasible turbine options for the Luverne Wind Farm are available from a variety of manufacturers. Turbine type may affect the number and configuration of the turbine array.

6.1 Project Layout and Associated Facilities

The Project will consist of an array of wind turbines, transformers, and roads. The turbines will be interconnected by communication and electric power collection cables within the study area. In addition, the wind farm facilities will include feeder lines and a Project substation, and 12-13 miles of 230 kV transmission line that will deliver the electricity to the Pillsbury substation.

Turbine pad sites will be graded. Drainage systems, access roads, and O&M facilities will be installed as appropriate to facilitate Project construction, operation, and maintenance.

Design of the electrical system and interconnection details will be finalized based on discussions with buyers. The feeder system will deliver the power to the Project substation, which will transform the energy to 230 kV. Once transformed, the energy will be transmitted via an overhead transmission line to the Pillsbury substation.

The 107.5 MW portion of the Project will include the use of SCADA (Supervisory Control and Data Acquisition), a computer-controlled communications system, to provide automatic, independent operation and remote supervision, allowing for simultaneous control of many wind turbines. The Project Company, M-Power One, will be responsible for the 107.5 MW Project operation and maintenance until the time it is determined the Project should be decommissioned. M-Power One's major equity partner is an experienced wind farm owner/operator, and will be responsible for construction and operation of the 107.5 MW portion of the Project.

6.2 Description of Wind Turbines

M-Power seeks the flexibility to select the most appropriate technology at the time for the Project to ensure optimization of wind and land resources and cost efficiency. M-Power plans to update the site layout, consistent with the parameters laid out in the Certificate, when equipment is selected and if information regarding the wind resource identifies

opportunities to further optimize the site. A comparison of all turbine types under consideration for the Project is presented below.

6.2.1 Turbine Types

Three turbine types have been selected as proxy turbines for the Project: GE, Suzlon S88, and Clipper C96. ***Please refer to Table 6, Comparison of Turbine Types.***

Table 6 Comparison of Turbine Types			
	Proxy Turbines		
	GE	Suzlon S88	Clipper C96
Rated Capacity	1.5 MW	2.1 MW	2.5 MW
Begin Operation Wind Speed	6.7 mph	8.9 mph	8.9 mph
Capacity Reached Wind Speed	26.4 mph	31.1 mph	31.5 mph
Maximum Operation Wind Speed	45 mph	45 mph	45 mph
Withstandable Wind Speed	Over 100 mph	Over 95 mph	Over 95 mph

All of the turbine types will be controlled and monitored by SCADA communication technology, allowing for the simultaneous control of many wind turbines.

6.2.2 Rotor

A rotor consists of three blades mounted to a central rotor hub. The hub attaches to the nacelle, which houses the gearbox, generator, brake, cooling system and other electrical and mechanical systems. ***Please refer to Table 7, Rotor Comparison.***

Table 7 Rotor Comparison			
	Proxy Turbines		
	GE	Suzlon S88	Clipper C96
Rated Capacity	1.5 MW	2.1 MW	2.5 MW
Rotor Diameter	253ft	288 ft	304 ft
Swept Area	41,991 to 56,802 ft^2	65,417 ft^2	73,065 ft^2
Rotor Speed	10.1 to 20.4 rpm	15 rpm	15.5 rpm

6.2.3 Tower

The towers, on which the nacelle is mounted, will be constructed of conical tubular steel, with a hub height of 262 feet. All tower welds will be made according to specifications established by the American National Standards Institute. Surfaces of the tower components will be sandblasted and coated to protect against corrosion. A secured door at the base of the tower will provide internal access to the turbine.

6.2.4 Lightning Protection

Lightening and grounding protection for all wind farm equipments is designed and constructed to be compliant to all applicable National Electrical Code and National Electric Safety Code requirements. Grounding and shielding components are integrated into the foundation and structural elements of all equipment and conductor lines. In particular, each wind turbine will include conductive elements in the blades and a complete grounding and shielding network within the turbine, tower and foundation.

6.3 Description of Electrical System

A step-up transformer will be installed at the base of each turbine to raise the voltage to 34.5 kV—the power collection line voltage. The electrical lines will be buried in trenches adjacent to the Project access roads or across terrain as is applicable. A feeder system will deliver the power from the wind farm to the new Project substation. A new 230 kV transmission line will exit the Project substation and deliver power to the Pillsbury Substation, from where it will ultimately interconnect into the transmission system at the Maple River Substation near Fargo.

An interconnection study for the Project is underway with MAPP (Midcontinent Area Power Pool). The electrical system design and interconnection details will be determined as a result of the MAPP study. The Pillsbury Substation will be a new site connected via a 55-mile line to the Maple River Substation. The Pillsbury Substation will consist of a three breaker ring bus.

All utility protection and metering equipment will meet M-Power, and National Electric Safety Code standards for parallel operations. Detailed interconnection information will be supplied to the Commission in M-Power's application for a Corridor Certificate and Route Permit.

6.4 M-Power Energy Center Construction

As previously discussed, the Project consists of 107.5 MW in the southern portion of the study area and 49.5 MW in the northern portion of the study area. A variety of activities must be completed to carry the Project through construction. Below is a preliminary list of activities necessary to develop the Project. Pre-construction, construction, and post-construction activities for the Project include:

- Geotechnical analysis;
- Finalize turbine locations (micro-siting) and access road locations;
- Order all necessary turbine components (towers, nacelles, blades, foundations, and transformers);
- Construct access roads and feeder lines;
- Design and construct the Project substation;
- Install tower foundations and underground cables;
- Place towers and set turbines;

- Test facility; and
- Begin commercial production.

Permanent access road locations will be dependent on turbine placement. These roads will provide access both during and after construction. The roads will be approximately 16 feet wide and have a Class 5 gravel surface. Class 5 gravel is considered adequate to support the size and weight of maintenance vehicles. All access roads will meet state and local requirements.

During the construction phase, construction equipment and worker vehicles will travel to and from the site. M-Power estimates that there will be approximately 25 trips generated per day during peak construction periods. Peak construction periods are anticipated to be when the majority of the foundation and tower assembly are taking place. Upon completion of construction, heavy equipment will be removed from the site.

6.4.1 Construction Management

An EPC contractor, utilizing the services of local contractors, will be primarily responsible for the construction management of the Project. The EPC contractor will undertake the following activities:

- Obtain building, electrical, grading, road, and utility permits;
- Perform civil, structural, and electrical engineering;
- Schedule construction activities;
- Facilitate surveying and geotechnical analysis;
- Forecast Project labor needs; and
- Manage Project budget.

The EPC contractor will also facilitate subcontractor coordination and oversee installation of communication lines, power collection lines, and the substation. The EPC contractor will supervise road, foundation, and turbine construction and coordinate construction materials.

The EPC contractor will designate a construction manager to oversee specific construction tasks, including: site and access road development; foundation excavation and pouring; electrical and communications installation; tower erection; and system testing.

During construction, coordination will be ongoing between the Project development and construction teams. In this case, M-Power has designated a “Landowner Liaison”, who will be accountable to M-Power to assure that landowner concerns and M-Power’s landowner policies are addressed. The construction manger will provide ongoing correspondence with the Landowner Liaison, local officials, citizens groups, and landowners. Before the Project becomes fully operational, O&M staff will be integrated into Project construction. The O&M staff will work cooperatively with the construction manager to ensure a smooth transition from construction through commissioning and operating the facility.

6.4.2 Foundation Design

The freestanding turbine towers will be connected by anchor bolts to an underground concrete foundation. The foundation will be designed to anchor the turbine in all weather conditions Design parameters of the foundations will be dependent upon geotechnical surveys, tower load specifications, and cost considerations. Foundations for similar sized turbines are typically octagonal or circular in shape, 40 to 60 feet in diameter, and 7 to 10 feet thick.

6.4.3 Civil Works

Project completion will require civil works and physical improvements, including:

- Improve existing Project site access roads;
- Construct access roads adjacent to wind turbines for construction activities and maintenance;
- Clear and grade turbine foundations, Project substation, O&M building, transformers, and other installations;
- Trench underground cable to connect individual turbines;
- Install an on-site feeder system to connect turbines and deliver generated power to the electricity collection location; and
- Install site fencing and security.

It is anticipated that improvements to existing access roads will consist of re-grading to allow access in all weather conditions. Paving is not anticipated. Access roads will be sited in coordination with local landowners and completed in accordance with local building requirements. New roadways will be approximately 16 feet wide and will be covered with Class 5 gravel. Culverts or other drainage methods will be installed as needed. Land surface disturbed by construction activities will be reseeded in kind with the surrounding vegetation.

6.4.4 Commissioning

Upon completion of the construction phase, the Project will undergo detailed inspection and testing procedures to be commissioned. Inspection and testing will occur for each individual component of the wind turbines, as well as associated systems.

6.5 Project Operation and Maintenance

Each wind turbine in the 107.5 MW portion of the Project will communicate directly with the SCADA system for performance monitoring, energy reporting and troubleshooting. Typically, each wind turbine will operate autonomously—making its own control decisions. Similar communication and control systems will be used by the owner of the 49.5 MW portion of the Project.

M-Power One will enter into contractual agreements with the most appropriate supplier to provide on-site service and maintenance for the Project.

6.5.1 Project Control Management and Service

M-Power One and the O&M contractor will control, monitor, operate, and maintain the 107.5 MW portion of the Project by means of a SCADA computer software program. In addition to regularly scheduled on-site visits, the wind farm will be monitored via computer.

The SCADA system provides data on turbine generation and production, availability, meteorology, and communications. SCADA also relays alarms and communication errors. In addition SCADA collects performance data and parameters for each turbine, changes machine status, and collects data to assist with problem diagnostics and troubleshooting.

6.5.2 Maintenance Schedule

M-Power One will remotely monitor the Project on a daily basis using SCADA. The O&M contractor will provide routine on-site inspections to ensure the Project is operating as planned. The following schedule is anticipated to be used for servicing activities:

- **First Service Inspection –** The first service inspection will take place one to three months after the turbines have been commissioned. Focus will be placed on bolt tightening, greasing, and oil filtering.
- **Semi-Annual Service Inspection –** Semi-annual service inspections will commence six months after the first inspection. This inspection will consist of lubrication and safety testing.
- **Annual Service Inspection –** The annual service inspection will include the same items as the semi-annual service inspection plus bolt tightening and a full component check.
- **Two-Year Service Inspection –** The two-year service inspection will include items checked during the annual inspection, as well as terminal connector tightening.
- **Five-Year Service Inspection –** The five-year service inspection will include items checked during the annual inspection, as well as braking system inspection, oil and grease testing, balance check, and terminal connector tightening.

6.5.3 General Maintenance Duties

O&M field duties will require performance of all schedule and unscheduled maintenance. This will include periodic operational checks and preventative maintenance on turbines and all associated facilities/components.

6.5.4 Operations and Maintenance Facility

M-Power One will enter into a contractual agreement with the O&M contractor for services. The service and maintenance activities will be performed by qualified technicians who report to an operations manager. The operations manager will be

responsible for all management, administration, service and maintenance activities for the 107.5 MW portion of the Project.

The O&M facility will be located adjacent to the Project substation located in Section 35. Typical buildings used for this purpose are 6,250 square feet in size and house all the necessary equipment to operate and maintain the Project.

6.6 Decommissioning and Restoration

Under contractual obligation with affected landowners, owners of the wind farm will remove all wind farm facilities and foundations when the wind easement expires. Wind farm owners will comply with all applicable rules adopted by the commission as it relates to decommissioning. Owners of the wind farm also reserve the right to explore alternatives regarding Project decommissioning. Retrofitting the turbines and power system with upgrades based on new technology may allow the wind farm to produce efficiently and successfully for many more years. Based on estimated costs of decommissioning and the salvage value of decommissioned equipment, it is anticipated that the salvage value of the wind farm will exceed the cost of decommissioning.

7.0 Environmental Analysis

This section describes the existing conditions within the Project study area. The existing conditions, or affected environment, are the baseline conditions that may be affected by the proposed Project.

This section also discusses the direct environmental impacts of each Project alternative. Indirect impacts are identified in the resource discussions where applicable. Mitigation measures, such as BMPs (Best Management Practices) which will avoid, minimize, or mitigate impacts, are discussed where appropriate.

7.1 Description of Environmental Setting

The study area is located in a rural portion of Griggs and Steele Counties in North Dakota. The study area is located approximately 4 miles south of ND (North Dakota) Highway 200 and approximately 4 miles west of ND Highway 32. Cities and small towns near the study area include Cooperstown (population 1,053), Finley (population 515), Hope (population 303), Hannaford (population 181), and Luverne (population 44).

7.2 Demographics

The Project is located in a rural area in east-central North Dakota. The study area is located within portions of Sverdrup Township in Griggs County and Riverside and Willow Lake Townships in Steele County. Major employment industries within these counties include agriculture, education, health and social services, and retail trade. ***Please refer to Table 8, Demographic Trends.***

Table 8 Demographic Trends[12]				
County/Township	Population in 2000	% of County Population	Per Capita Income	% of Individuals Below Poverty Level
Griggs County	2,754	--	$16,131	10.1%
Sverdrup Township	90	3.3%	$14,289	N/A
Steele County	2,258	--	$17,601	7.1%
Riverside Township	41	1.8%	$20,384	N/A
Willow Lake Township	55	2.4%	$19,082	N/A
Statewide	642,200	--	$17,769	11.9%

7.2.1 Demographic Impacts/Mitigation

Alternative A and Alternative B—The Project will result in increased income to owners, which could raise the per capita income in Griggs and Steele Counties. It is not anticipated that the Project will alter long term population trends within Griggs or Steele Counties. No mitigation is required.

7.3 Land Use

The study area is located in a rural setting predominantly comprised of agricultural land. Conflicts with the existing development plans of state, local, or private entities within the study area are not anticipated. ***Please refer to Figure 9, Land Use, in Appendix A, and Table 9, Land Use.***

Table 9 Land Use		
Land Classification	Acreage	% of Study Area
Cropland	18,238	89.1%
Wetlands	1887	9.2%
Forested Upland	124	0.6%
Grasslands	115	0.6%
Perennial Water	97	0.5%
Developed	19	0.1%
Barren (mines)	<1	< 0.1%
TOTAL	20,480	100%

7.3.1 Land Use Impacts/Mitigation

Alternative A and Alternative B—Construction of the Project will result in the conversion of less than 2% of the total land within the study area, the majority of which will be agricultural land, for use as a renewable, alternative energy source. At this time, mitigation is not anticipated.

[12] Source: *US Bureau of the Census, Census 2000.*

7.4 Public Services

Local Services

The study area is located in a rural part of North Dakota mainly used for agricultural production. Several towns are located within 10 miles of the study area. These towns provide sewer, water, and utility services, as well as many recreational opportunities such as a golf course, theater, parks, fishing, hunting, and camping. Medical services located in Cooperstown include a 10-bed facility with emergency services. Local medical services also include dental, chiropractic, massage therapy, veterinary, and nursing home/assisted living facilities. Several of the communities have school systems providing Kindergarten-12th grade.

Electrical Service

Electrical service in the study area is provided by Nodak Electric. a distribution cooperative that gets its power from a regional utility company. No large transmission lines are currently located within the study area.

Roads

Major roadways near the study area include ND Highway 200 to the north, ND Highway 32 to the east, and ND Highway 26 to the south. County Road 25, a paved two-lane roadway, runs through the study area in a north/south direction. Other roadways in the study area include well maintained gravel roadways to very low or minimum maintenance roadways and dirt trails. ***Please refer to Figure 10, Existing Roadway Network, in Appendix A.***

Traffic

Traffic counts have been conducted for the three major highways located to the north, south, and east of the study area. Average annual daily traffic volumes included 725 vehicles on ND Highway 200, 800 vehicles on ND Highway 32, and 210 vehicles on ND Highway 26. No other traffic counts were conducted for roadways within the study area. It is anticipated that traffic on most of these additional roadways is below 100 vehicles per day. Most of the traffic loads on the roadways in the study area can be contributed to local agricultural traffic and rural residences.

Water Supply

Rural water is supplied to residents within the study area by Dakota Rural Water District. It is common for rural residences in the area to utilize private wells for alternative uses, such as agriculture. A narrow glacial aquifer, approximately one-mile wide, runs in a northwest/southeast direction through the study area.

Telephone, Fiber Optic, and Microwave Communications

Telephone, fiber optic, and microwave communications exist within the study area. Coordination with utility companies is ongoing to determine locations of these facilities and potential impacts.

Kadrmas, Lee & Jackson, Inc. (KL&J) performed a search for FCC (Federal Communications Commission) licensed and FCC applications for microwave frequencies within a 10-mile radius of the center point of the study area. The FCC

search indicated there were no licensed common carrier fixed point-to-point services in the study area as of March 24, 2008. The FCC search found nine licensed private operational fixed point-to-point microwave services and multiple address systems in the area. Coordination with the nine private services is ongoing to determine if the Project will result in interference with the facilities. A detailed report on microwave findings can be found in ***Appendix C, Microwave Communications.***

Other Utilities

In addition to water and electrical services, Universal Ensco, Inc. is providing construction management for the Keystone Pipeline, a 30" crude oil pipeline planned to begin construction in 2008. The Keystone Pipeline route passes through the Project study area. ***Please refer to Figure 11, Keystone Pipeline, in Appendix A.*** Keystone Pipeline has acquired a 50-foot permanent easement and 60 to 110-foot temporary construction easements thought the study area. No wind farm facilities can be located within the 50-foot permanent easement. Any wind farm construction related activities within Keystone's permanent or temporary easements must have Keystone's prior written approval. Any roads, overhead or buried power cables, etc., crossing the Keystone Pipeline easement must have Keystone's prior written approval and be subject to any required conditions.

7.4.1 Public Service Impacts/Mitigation

Local Services

Alternative A and Alternative B—Impacts to local services in and around the study area are not anticipated; no mitigation is required.

Electrical Service

Alternative A and Alternative B—The proposed wind farm will have a positive impact on the electrical services in the region. Both utilities, which plan to use the electrical generation from the Project, serve consumers in Eastern North Dakota and Western Minnesota. Due to Minnesota's renewable energy requirements and the greater demand for power in Minnesota, it is reasonable to assume that much of the generation from this wind farm will be consumed outside of North Dakota. However, to the extent that wind generation from this Project and other wind farms in North Dakota reduce the demand for coal-fired generation in North Dakota, negative environmental impacts may be incrementally reduced. Since wind energy does not create waste energy, there will be no use of waste energy associated with this Project.

Roads

Alternative A and Alternative B—Both alternatives will require the construction of access roads to individual tower locations. Existing and new roads within the study area will be used for construction and maintenance of the wind towers. Constructed roadways may connect several tower locations in a string. To the extent possible, roadways will be constructed in locations which minimize impacts to the environment. Per request from the NDDOT (North Dakota Department of Transportation), tower setback from the roadway shall be coordinated with the NDDOT Valley City (for Griggs County) and Grand Forks (for Steele County) District Offices. M-Power shall receive prior approval for roadway load limits and haul routes during construction from the appropriate NDDOT District Offices. If any work is to be completed within State highway right-of-ways,

appropriate permits and risk management documents are to be obtained from the NDDOT. Mitigation is not anticipated.

Traffic

Alternative A and Alternative B—It is anticipated that traffic volumes will increase both during and after construction of the wind farm. Additional traffic can be expected from workers and large trucks delivering equipment or tower parts during construction and from maintenance vehicles following construction. Traffic related to maintenance of the wind farm facilities is anticipated to be minor. However, the increase in traffic is not expected to be at a volume that will alter travel patterns in the area. Permits for transportation of large equipment will be required from the NDDOT and will be the responsibility of the contractor. Mitigation will not be required.

Water Supply

Alternative A and Alternative B—The location of water distribution systems will be taken into consideration during routing of the electrical collection lines. The water supply for residents within the study area is not anticipated to be impacted by the Project. Mitigation is not required.

Telephone, Fiber Optic and Microwave Communications

Alternative A and Alternative B—Routing of telephone and fiber optic lines will be taken into consideration during routing of the electrical collection lines. Impacts to telephone, fiber optic, and microwave communications are not anticipated; therefore, mitigation is not required.

Other Utilities

Alternative A and Alternative B—Construction of the wind farm and associated facilities will be avoided within the Keystone Pipeline's permanent right-of-way. Permission from the Keystone Pipeline will be obtained for any construction activities within the Pipeline's temporary right-of-way. Mitigation may involve temporary or permanent increased support for crossing the pipeline.

7.5 Human Health and Safety

Air Traffic

The Cooperstown Municipal Airport is located approximately 7.5 miles northwest of the study area. The runway is situated in a northwest/southeast direction. The Cooperstown Municipal Airport is a general aviation facility with no scheduled flights. Other general aviation airports in the vicinity of the study area include the Barnes County Municipal Airport and the Page Regional Airport, both located more than 20 miles away from the study area. One private runway owned by Vernon Johnson exists within the study area. The runway is located on the eastern edge of Section 35 in the study area. The local township board has indicated that the private runway is no longer in use.

Electromagnetic Fields

An EMF (Electromagnetic field) is a field created by the presence of voltage and electric current flows. The strength of the field is directly proportional to the amount of voltage and current flow. EMF are strongest at their origin and decrease in intensity as you move away. EMF will be created by construction of the wind farm.

Hazardous Materials/Hazardous Waste

A search of the North Dakota Department of Health's hazardous waste site files indicated that there are no identified hazardous waste sites, underground storage tanks, or one time use permits within the study area. Various fuels and lubricants are used in machinery during construction activities. These may require small-quantity, above ground, on-site storage during the period of construction. In addition, several petroleum-based fluids are typically used in wind turbines, including gear lubricants and hydraulic fluid.

Security

The study area is located directly north of Luverne. Farms and residences are located in or around the study area, and no towns are located within the boundaries of the study area. One former military missile site is located within the study area. The site has been decommissioned and is no longer used for military procedures.

7.5.1 Human Health and Safety Impacts/Mitigation

Air Traffic

Alternative A and Alternative B—. The Finley Radar Station is located northwest of Finley, ND. This station transmits radar used for air traffic control. FAA Form 7460-1, Notice for Proposed Construction or Alteration, will be submitted prior to construction of the proposed wind farm to ensure any aircraft impact is minimized or avoided.

The FAA publishes ACs (Advisory Circulars) that define standards for marking and lighting structures to promote aviation safety. AC 70/7460-1K Obstruction Marking and Lighting, Chapter 13, Marking and Lighting Wind Turbine Farms, provides guidelines to mark and light wind farms. Marking and lighting is intended to assist pilots in identifying and avoiding these obstacles. Any temporary or permanent structure that exceeds an overall height of 200 feet AGL or exceeds any obstruction standard contained in 14 CFR Part 77, should normally be marked and/or lighted. Turbines will be marked as stated in this guidance.

Electromagnetic Fields

Alternative A and Alternative B—Residential setback distances of 1,400 feet for wind towers and 500 feet for the transmission line will be used to lessen impacts associated with EMF. Potential impacts to residences caused by EMF include interference with television, radio, and cellular communication signals. Impacts will be mitigated on a case by case basis depending on the type of interference encountered.

Hazardous Materials/Hazardous Waste

Alternative A and Alternative B—It is not anticipated that hazardous waste sites will be encountered within the study area during construction. If hazardous waste sites are encountered, construction will be suspended and the North Dakota Department of Health will be contacted immediately to determine the best method for removal or clean up.

Any hazardous materials used for construction of the wind turbines will be contained according to the NPDES (National Pollutant Discharge Elimination System) Permit. Hazardous materials used for maintenance will be stored inside a building or surrounded by a containment area to prevent contamination from spills. There will be no underground storage tanks installed at the Project site. On-site storage of turbine petroleum products in the maintenance facility is anticipated to be minimal.

Security

Alternative A and Alternative B—It is anticipated that construction of the Project will not impact the security of surrounding residents or communities. Setbacks will be utilized as a security feature for adjacent residences. Mitigation will not be required.

7.6 Noise

The Project is located in a rural setting. Noise contributors in the study area typically include farm machinery and roadway traffic. Noise levels in rural settings typically range from 35 to 45 decibels. These noise levels are comparable to that of a quiet room.

7.6.1 Noise Impacts/Mitigation

Alternative A and Alternative B—Wind turbines will produce noise while operating. Implementing setbacks between turbines and residences will reduce noise impacts to residents. At a setback of 1,400 feet, turbine-related noise will drop off to levels consistent with that of a rural setting.

7.7 Cultural and Archaeological Resources

Per North Dakota SHPO (State Historic Preservation Officer) recommendation, a Class I file search of the records managed by the State Historical Society of North Dakota was conducted on March 5, 2008. The search indicated that there are 22 sites, three site leads, and four isolated finds recorded within a one-mile radius of the study area. Of these, four sites have been evaluated and found eligible for listing on the NRHP. One of these sites, an historic bridge, has been replaced with a modern structure. The isolated finds and eight of the sites have been evaluated and found not eligible for listing on the NRHP. The remaining ten sites and three site leads have not been evaluated for listing.

Previous cultural resource investigations—surveys, evaluation, and mitigation projects—in the study area were also identified and reviewed. The examination revealed that in the last 20 years, only short and narrow corridors for pipelines have been systematically surveyed for cultural resources.

7.7.1 Cultural and Archaeological Resources Impacts/Mitigation

Alternative A and Alternative B—The Class I file search will be submitted to SHPO. Based on this, SHPO shall make a determination as to which, if any, of the sites and site leads require further research, testing, mitigation, or avoidance. In addition, the SHPO shall determine which, if any, portions of the study area require a Class III Cultural Resources Inventory.

The Bureau of Indian Affairs indicated they have no environmental objections to the proposed action as long as the Project complies with all pertinent laws and regulations. They also find that the listed action will not affect cultural resources on tribal or individual landholdings for which they are responsible. In addition, the Sisseton Wahpeton Oyate Tribal Historic Preservation Office has requested further information regarding the Project as it becomes available. The Dakota, Nakota, and Lakota people, as well as other tribes, consider this area to be part of their aboriginal homeland.

7.8 Recreational Resources

Numerous recreational opportunities exist around the study area. A golf course is located outside of the city of Cooperstown. Additionally, the upper reaches of Lake Ashtabula are located directly west of the study area, providing fishing, swimming, and camping opportunities. Most of this activity takes place near Baldhill Dam, located approximately 17 miles south of the study area.

Numerous USFWS Wetland Easements and Waterfowl Production Areas exist in and around the study area. The USACE also operates Wildlife Management Areas within the study area. North Dakota is located in the central flyway for waterfowl migration, attracting recreationalists, such as hunters and birdwatchers, to the region.

The North Country National Scenic Trail travels through this region of North Dakota. An additional segment to the North Country National Scenic Trail is planned to follow the Sheyenne River adjacent to the study area. This proposed trail will connect the ancient glacial bed of Lake Agassiz to the prairie pothole region and the Missouri River basin of North Dakota. Some portions of the trail have been constructed, with the biggest portion to date following the McClusky Canal. Gravel roads are used in many places where there is no designated trail.

7.8.1 Recreational Resource Impacts/Mitigation

Alternative A and Alternative B—Impacts to recreational resources from construction of the Project will be mainly visual in nature. Though the USACE does not permit turbine construction on land it owns round Lake Ashtabula, users of the northern reaches of Lake Ashtabula, including hunters, fishermen, campers, and birdwatchers, will likely be impacted by the sight of wind turbines. Persons choosing to carry out recreational activities within 1,400 feet from turbines may also be impacted by turbine-related noise. Impacts to recreational resources are anticipated to be minor; therefore, no mitigation is planned.

7.9 Effects on Land Based Economics

Agriculture/Farming

According to the USDA 2002 Census of Agriculture, Griggs County contains 423 farms, which primarily produce wheat and raise cattle. The market value of crops in Griggs County is $29.7 million. Steele County contains 318 farms, which also primarily produce wheat and raise cattle. The market value of crops in Steele County is $52.2 million. In addition, some parcels of land within the study area are enrolled in CRP (Conservation Reserve Program).

There are approximately 20,231 acres of farmland within the Project study area. Of this, approximately 11,653 acres are prime farmland and approximately 5,159 acres are considered to be farmland of statewide importance. There is no irrigated farmland within the study area.

Woodlands

Wooded zones within the study area consist of shelter belts and wooded ravines. There are no economically significant forestry resources located within the study area.

7.9.1 Land Based Economics Impacts/Mitigation

Agriculture/Farming

Alternative A and Alternative B— Construction of the Project will result in the conversion of less than 2% of the total land within the study area, the majority of which will be agricultural land, for use as a renewable, alternative energy source. Though the Project will result in the conversion of farmland to use as a wind farm, economic losses to producers due to this land conversion will be minor in comparison to the additional income provided by the wind farm. Long term benefits will be seen in the extent of payments to landowners who signed options and easements with M-Power, along with those who have a tower located on their property. This additional income will also reflect as an increase to the county tax base. Additional money brought into the community will most likely be seen in increased spending at local businesses and improvements to the communities and counties.

Local contractors, equipment, labor and supplies will be used to the extent possible to construct and maintain the wind farm. This will provide payroll for local employees and bring business into local communities for the food, lodging and supplies sectors. At this time, mitigation is not anticipated.

Woodlands

Alternative A and Alternative B—Impacts to woodlands are not anticipated; therefore, no mitigation is required.

7.10 Soils

A variety of soils suited to farming practices can be found within the study area. The majority of these soils are loams, silt loams, or silty clay loams consistent with the Sheyenne River Valley. ***Please refer to Table 10, Soils Summary.***

Table 10 Soils Summary						
Map Unit Symbol	Soil Type	Identified within County		Prime Farmland	Farmland of Statewide Importance	Prime Farmland Only When Drained
		Griggs	Steele			
G3A	Parnell silty clay loam, 0 to 1% slopes	X	X			
G4A	Southam silty clay loam, 0 to 1% slopes		X			
G12A	Vallers saline-Parnell complex, 0 to 1% slopes	X	X			
G43A	Colvin silt loam, 0 to 1% slopes	X				X
G54A	Lamoure silty clay loam, 0 to 1% slopes, frequently flooded		X			
G100A	Hamerly-Tonka complex, 0 to 3% slopes	X	X			X
G101A	Hamerly-Wyard loams, 0 to 3% slopes	X	X	X		
G119A	Vallers-Hamerly loams, saline, 0 to 3% slopes	X				
G128A	Ferney-Cavour loams, 0 to 3% slopes		X			
G143A	Barnes-Svea loams, 0 to 3% slopes		X	X		
G143B	Barnes-Svea loams, 3 to 6% slopes	X	X	X		
G143C	Barnes-Buse-Langhei loams, 6 to 9% slopes	X	X		X	
G143D	Barnes-Buse-Langhei loams, 9 to 15% slopes	X	X			
G144B	Barnes-Buse loams, 3 to 6% slopes	X	X		X	
G146B	Barnes-Buse-Parnell complex, 0 to 6% slopes		X		X	
G147C	Buse-Barnes-Darnen loams, 3 to 9% slopes		X		X	
G147D	Buse-Barnes-Darnen loams, 6 to 15% slopes		X			
G147F	Buse-Barnes-Darnen loams, 9 to 35% slopes		X			
G167B	Balaton-Wyard loams, 0 to 6% slopes		X	X		
G229C	Heimdal-Esmond-Sisseton loams, 6 to 9% slopes	X			X	
G229D	Heimdal-Esmond-Sisseton loams, 9 to 15% slopes	X				
G229F	Esmond-Heimdal loams, 15 to 35% slopes	X				
G304B	Binford-Coe complex, 0 to 6% slopes		X			
G304C	Coe-Binford complex, 6 to 9% slopes		X			
G304E	Coe-Binford sandy loams, 9 to 25% slopes		X			
G384B	Maddock-Hecla loamy fine sands, 0 to 6%	X	X			

Table 10 Soils Summary						
Map Unit Symbol	Soil Type	Identified within County		Prime Farmland	Farmland of Statewide Importance	Prime Farmland Only When Drained
		Griggs	Steele			
	slopes					
G431A	Bearden silt loam, 0 to 2% slopes	X		X		
G476A	Gardena silt loam, 0 to 2% slopes	X		X		
G481A	Overly silty clay loam, 0 to 2% slopes		X	X		
G547A	Lamoure silty clay loam, saline, 0 to 1% slopes, frequently flooded		X			
G564A	LaDelle silty clay loam, 0 to 2% slopes, occasionally flooded		X	X		
G575A	Velva fine sandy loam, 0 to 2% slopes		X	X		
G602B	Walsh silty clay loam, 2 to 6% slopes		X		X	
G602C	Walsh silty clay loam, 6 to 9% slopes		X		X	
G732A	Swenoda-Barnes fine sandy loams, 0 to 3% slopes	X	X	X		
G732B	Swenoda-Barnes complex, 3 to 6% slopes	X		X		
G735A	Towner loamy fine sand, 0 to 3% slopes	X				
G750D	Dickey-Esmond-Embden complex, 6 to 15% slopes	X				
G805A	Bearden-Colvin silt loams, saline, 0 to 2% slopes	X				

7.10.1 Soils Impacts/Mitigation

Alternative A and Alternative B—Impacts to soils associated with the Project are not expected to be significant. Soil impacts will be localized, and BMPs will be implemented to minimize these impacts. Surface disturbance caused by construction of the wind turbines and infrastructure improvements will result in the soil surface becoming more prone to wind and water erosion. Another soil resource issue is soil compaction, which can occur by use of heavy equipment. Silt and clay soils are especially susceptible to this. BMPs will be utilized to minimize soil impacts. BMPs may include the use of erosion and sediment control during and after construction, segregating topsoil from subsurface materials, reseeding of disturbed areas, use of construction equipment appropriately sized to the scope and scale of the Project, ensuring access road grades fit closely with the natural terrain, and maintaining proper drainage. Mitigation will not be required.

7.11 Geologic and Groundwater Resources

The study area is located in a region of North Dakota referred to as the Coteau. The Coteau region was formed by glaciers moving across the state that became stagnant. Glacial drift, consisting of rock debris, gravel, and fine grained sediments, was deposited

in this portion of the state. When ice buried in the glacial drift melted, the prairie pothole region was formed due to lack of a drainage system.

One glacial aquifer approximately one-mile wide runs in a north/south direction through the study area. The aquifer is listed as having a shallow depth. ***Please refer to Figure 12, Groundwater Resources, in Appendix A.*** The ND SWC (State Water Commission) stated that there are no sole-source aquifers in the state.

7.11.1 Geologic and Groundwater Impacts/Mitigation

Alternative A and Alternative B—Impacts to geologic and/or groundwater resources are not anticipated; therefore, no mitigation is required.

7.12 Surface Water and Floodplain Resources

Surface water within the study area primarily consists of “prairie pothole” wetlands and the northern reaches of Lake Ashtabula. Surface waters within the study area vary in size and hydrologic regimes, from small temporary wetlands to large permanent waterbodies. Several small drainages that convey water to Lake Ashtabula exist in the western portion of the study area. ND SWC identified that no floodplains exist within the study area.

7.12.1 Surface Water and Floodplain Resources Impacts/Mitigation

Alternative A and Alternative B—Impacts to surface water will be avoided and/or minimized through use of BMPs such as silt fence, straw waddles, earth berms, retention ponds, and/or rock check dams. Measures will be taken to avoid disruption of the natural flow of any water conveyances within the study area.

7.13 Wetlands

Wetlands are defined in both the 1977 Executive Order 11990, Protection of Wetlands, and in Section 404 of the Clean Water Act of 1986, as those areas that are inundated by surface or ground water with a frequency to support and under normal circumstances do or will support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

An office wetland determination was completed to provide a preliminary analysis of the Project’s potential to impact wetlands. Wetland boundaries which occur within the study area were identified by a review of NWI (National Wetlands Inventory) maps. ***Please refer to Figure 13, NWI Wetlands, in Appendix A.***

Approximately 1,887 acres of wetlands are located within the Project study area. In addition, several wetlands within the study area are protected by USFWS wetland easements. ***Please refer to Figure 14, USFWS Easements, in Appendix A.*** The study area is located in the Prairie Pothole Region, known for shallow depression type wetlands. Prairie potholes may be either seasonal or permanent wetlands that provide important habitat for a variety of wildlife species. Historically, wetlands in this region have been compromised by farming activities.

7.13.1 Wetland Impacts/Mitigation

Alternative A and Alternative B—The NDGF (North Dakota Game and Fish Department) has requested that no appurtenances be placed in wetland areas and no alterations be made to existing drainage patterns. In addition, the USFWS requests all reasonable efforts be made to avoid placing facilities in areas that will result in impacts to wetlands protected by USFWS easement. If the Project will result in impacts to USFWS easement areas, the USFWS will conduct a study to ensure all wetland basins protected by the agency are avoided.

Once seasonal conditions are appropriate, a field wetland delineation will be conducted for areas that may be disturbed. The field wetland delineation will serve to confirm or modify the boundaries of affected NWI identified wetlands. It is anticipated that wind turbines and access roads will be positioned to avoid or minimize impacts to wetlands. Final impact quantifications and mitigation measures will be determined upon completion of the field wetland delineation.

Coordination with the USACE (United States Army Corps of Engineers) will also be completed following the field wetland delineation to determine whether impacts are USACE jurisdictional. A Section 404 Permit will be required for impacts to USACE jurisdictional wetlands. Impacts to non-jurisdictional wetlands will be mitigated in accordance with 23 CFR 777, and a mitigation plan will be coordinated with the appropriate entities.

7.14 Vegetation

Primary vegetation communities in North Dakota include short grass prairie in the drier western part of the state and tall grass prairie in the eastern half of the state. In between the short and tall grass prairies is a transitional area called the mixed grass prairie, which consists of a mixture of both short and tall grasses. The study area is located on the edge of the mixed grass prairie and tall grass prairie of eastern North Dakota. Vegetation of the mixed grass prairie consisted mainly of wheatgrass (*Agrypyron cristatum* and *Pascopyrum smithii)*, bluestem (*Andropogon gerardii* and *Schizachyrium scoparium*), and needlegrass (*Achnatherum sp.*), with the tall grass prairie consisting mainly of bluestem.

Correspondence received from the USFWS recognized the high natural resource value of native prairie and recommended avoidance of these areas. Most of the land within the study area was historically tall grass prairie but has been converted to cropland due to the rich soil resources of the area. Currently, most of the study area is used for crop production. The portions of the study area that contain native vegetation are found along bluffs overlooking the Sheyenne River valley and in areas enrolled in CRP.

Trees within the study area consist of planted hardwood shelterbelts for wind protection, along with several draws containing deciduous trees located in the western part of the study area overlooking Lake Ashtabula.

7.14.1 Vegetation Impacts/Mitigation

Alternative A and Alternative B—The majority of wind towers and access roads will be constructed on cropland. It is anticipated that impacts to land enrolled in CRP will be avoided. However, there may be areas of CRP that cannot be avoided without significantly impacting another area of concern. For those instances, M-Power will work with the local Farm Service Agency to resolve conflicts. The Project will have minimal permanent impacts on vegetation. Temporary vegetation impacts will occur during construction. Following construction, disturbed areas will be revegetated in a manner consistent with the surrounding vegetation, as appropriate. These areas will continue to be available for their present use (cultivation, grazing, prairie, etc.) following construction.

7.15 Wildlife

Mammal Species

White-tailed deer flourish in the area due to the ample forage from surrounding cropland. A limited amount of upland game birds, such as pheasant, grouse, and turkey, can also be found around the study area. Numerous other mammals such as rabbits, weasels, fox, beaver, muskrats and coyotes also inhabit this part of the state. Correspondence received from the USFWS indicated that wooded draws and riparian forests provide high value wildlife habitat. The USFWS recommends avoiding construction from February 1 to July 15 in order to avoid disruption of wildlife during breeding season. USACE Wildlife Protection Areas are located on the north western boundary of the study area on the shoreline of Lake Ashtabula.

Avian Species

The study area lies in the prairie pothole region of North Dakota and the central flyway of North America. As such, this area is used as resting grounds for many birds on their spring and fall migrations, as well as nesting and breeding grounds for many waterfowl species. A USFWS Waterfowl Production Area is located directly adjacent to the study area. USACE Wildlife Protection Areas are located on the north western boundary of the study area on the shoreline of Lake Ashtabula. Other non-game bird species are known to fly through and inhabit this region, drawing birdwatchers to the area.

Correspondence received from the USFWS and NDPR (North Dakota Parks and Recreation Department) encourage avian studies to be conducted before and following construction activities. An avian study is currently underway to determine baseline conditions of bird species that are found within the study area. This study was designed in coordination with the USFWS and NDGF. The decision to conduct post-construction avian studies is pending and will be coordinated with the USFWS and NDGF. The USFWS recommends avoiding construction from February 1 to July 15 in order to avoid disruption of avian species during the breeding and nesting season.

7.15.1 Wildlife Impacts/Mitigation

Mammal Species

Alternative A and Alternative B – It is anticipated the Project will avoid impacts to the USACE Wildlife Management Areas. Ground clearing activities associated with construction of the turbines and associated facilities may impact habitat for ground dwelling mammals and other wildlife species. However, the areas of proposed surface disturbance are minimal in the context of the setting. The majority of the study area has been previously and continues to be disturbed due to farming practices. It is anticipated that wildlife which inhabit the study area will be adaptable to the changing conditions and will continue to thrive following construction.

Avian Species

Alternative A and Alternative B – It is anticipated the Project will avoid impacts to the USACE Wildlife Management Areas. The Project may result in impacts to avian species through increasing the potential for bird strikes with the turbine rotors and associated electrical lines. The avian study will be used to determine areas that contain greater potential for bird strikes. Mitigation measures for impacts to avian species may include marking overhead power lines with visual marking devices, using underground transmission lines between turbines, burying collector lines, etc. Mitigation measures will be implemented in coordination with the USFWS and NDGF. In addition, per the request of the NDGF, GPS coordinates for each turbine will be provided to the agency once final siting decisions have been made.

7.16 Rare and Unique Natural Resources

Threatened and Endangered Species

According to the USFWS List of Endangered, Threatened, and Candidate Species and Designated Critical Habitat in North Dakota, the whooping crane, listed as endangered occurs in Griggs County. No threatened or candidate species are listed for Griggs County. There are no endangered, threatened, or candidate species listed for Steele County.

The whooping crane (*Grus Americana*) migrate through west and central North Dakota during spring and fall from breeding grounds in Wood Buffalo National Park in Canada, to their winter home in the Aransas National Wildlife Refuge in Texas. Whooping cranes prefer to roost on wetlands and stockdams with good visibility. The total population of whooping cranes living and reproducing in the wild consists of approximately 266 birds. Two additional flocks of reintroduced whooping cranes migrate from Florida to Wisconsin.

The previously discussed avian study will record the presence of any whooping cranes observed for the study duration. However, it is not anticipated that any whooping cranes will be sighted as there have been no recorded sightings in Griggs or Steele Counties. Though the whooping crane does migrate through North Dakota, the study area is located approximately 23 miles east of the primary migration corridor that includes approximately 95% of all confirmed whooping crane sightings in the State. Therefore, a determination of “may effect, but not likely to adversely affect” is recommended for the whooping crane.

Rare and Sensitive Species

The NDPR maintains a list of observances of threatened, endangered, rare, and sensitive flora and fauna species in its National Heritage Inventory database. Coordination with the NDPR indicated the presence of one invertebrate species in Griggs County and one plant community in Steele County. However, none of these were observed within the Project study area.

7.16.1 Rare and Unique Natural Resources Impacts/Mitigation

Threatened and Endangered Species

Alternative A and Alternative B – Similar to other avian species, the proposed project introduces the potential for impact to whooping cranes through strikes with turbines and associated power lines. As the study area is located outside the primary whooping crane migration corridor, impacts are not anticipated. Mitigation measures recommended by the USFWS include burying all new transmission lines which will occur for collector lines in the study area. Mitigation will be implemented in coordination with the USFWS and NDGF.

In addition, M-Power may elect to coordinate an Incidental Take Permit with the USFWS with respect to whooping cranes. The Endangered Species Act defines a "take" as an action which will harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect threatened or endangered species. Harm may include habitat modification that is significant enough to kill or injure threatened and endangered species by hindering critical behaviors such as nesting. An Incidental Take Permit is required when non-Federal activities, such as the Project, will result in the take of threatened or endangered wildlife. This Permit will authorize the incidental take of whooping cranes resulting from the Project. The Permit will require an accompanying Habitat Conservation Plan to ensure minimization and mitigation measures have been implemented for the effects of the authorized incidental take.

Rare and Sensitive Species

Alternative A and Alternative B – The Project will not impact rare and sensitive species. Mitigation will not be required.

7.17 Summary of Impacts

Please refer to Table 11, Summary Comparison of Project Alternatives and Impacts.

Table 11 Summary Comparison of Project Alternatives and Impacts			
Resource	Alternative A	Alternative B	Proposed Mitigation
Demographics	The Project will result in increased income to owners and increased revenues in surrounding communities.		No mitigation required.
Land Use	Conversion of less than 2% of total land in the study area from agricultural land to alternative energy use.		No mitigation required.
Public Services	Minor temporary impacts may occur to road, traffic, and utilities during construction.		Coordination will take place with the NDDOT regarding load restrictions, haul roads, and work in State highway right-of-way. Construction in Keystone Pipeline permanent right-of-way will be avoided
Human Health and Safety	The Project may influence aircraft operations and create EMF interference with telephone, radio, and cellular communications. Small quantities of hazardous materials including gear oil and lubricant will be used during construction and maintenance.		FAA Form 7460-1 will be submitted. Towers will be marked per FAA guidance. Setbacks of 1,400 feet from residences will be implemented to reduce EMF impacts. Hazardous materials will be contained.
Noise	Turbines will produce noise while operating.		Setbacks of 1,400 feed from residences will be implemented to ensure enough space for noise levels to drop to levels consistent with that of a rural setting.
Cultural and Archaeological Resources	A Class I File Search indicated that there are 22 sites, 3 site leads, and 4 isolated finds within a one mile radius of the study area. At this time, impacts to these sites are unknown.		Coordination with ND SHPO is ongoing to determine the need for a Class III Cultural Resources Inventory.
Recreational Resources	Visual impacts to users of Lake Ashtabula, including hunters, fishermen, campers, bird watchers, etc.		No mitigation required.
Land-Based Economics	Conversion of less than 2% of total land in study area for use as renewable alternative energy resource. Economic losses to producers as a result of this will be minor in comparison to additional income provided by the Project.		No mitigation required.
Soils	Construction activities may increase erosion potential and/or result in soil compaction.		Localize surface disturbance and implement BMPs for erosion and sediment control.

Table 11 Summary Comparison of Project Alternatives and Impacts			
Resource	Alternative A	Alternative B	Proposed Mitigation
Geologic and Groundwater Impacts	No Impact		No mitigation required.
Surface Water and Floodplain Resources	Temporary impacts to surface water resources may occur during construction.		BMPs will be used to control surface water contamination.
Wetlands	A field wetland delineation will be conducted to determine wetland boundaries and impacts. Impacts to wetlands will be avoided to the extent possible.		Wetland impacts will be mitigated with the appropriate regulatory agency. USFWS easement wetlands will be avoided to every extent possible and drainages will not be altered.
Vegetation	Minimal impacts to vegetation during construction.		Reseed disturbed areas in a manner consistent with the surrounding vegetation. Continue to allow disturbed areas to be used for their present use (cultivation, grazing, etc.) following construction. Avoid impacts to land enrolled in CRP.
Wildlife	It is anticipated that wildlife within the study area will be adaptable to changing conditions and will continue to thrive following construction. The Project may result in impacts to avian species through increasing the potential for bird strikes with turbine rotors.		Avoid impacts to USACE Wildlife Management Areas. Potential impacts determined as a result of the avian survey will be mitigated in coordination with USFWS and NDGF.
Rare and Unique Resources	The Project introduces potential for impact to whooping cranes through strikes with turbine rotors. As the study area is located outside the primary whooping crane migration corridor, impacts are not anticipated.		Mitigation measures recommended by USFWS will be implemented. Potential impacts determined as a result of the avian survey will be mitigated in coordination with USFWS and NDGF. M-Power may elect to coordinate an Incidental Take Permit for the whooping crane with the USFWS.

7.18 Irreversible and Irretrievable Commitment of Natural Resources

As with any construction project, certain irreversible and irretrievable commitments of natural resources, manpower, materials, and fiscal resources are required. Fossil fuels, labor, and construction materials will be expended to complete the Project. Additionally, labor and natural resources will be used in the fabrication and preparation of construction materials, such as concrete, steel, aggregate, etc. These materials are generally not retrievable. However, they are not in short supply, and their use will not have an adverse effect on the availability of these resources. Any construction will require a one-time expenditure of funds, which are not retrievable. However, the anticipated benefits will balance the irretrievable commitment of resources caused by the construction of the build alternatives.

8.0 Public Coordination

On March 4 and 5, 2008, members of the Project team attended County Commission meetings in Griggs and Steele Counties. In addition, PSC Hearings will be held in conjunction with the approval of this application. Hearings will be held with the Griggs County Commission, and Riverside and Willow Lake Townships in Steele County to change zoning for the tower locations. These hearings will be open to the public.

9.0 Agency Coordination

To initiate early communication and coordination, a scoping package was sent to numerous federal, tribal, state, and local agencies and other interested parties on February 27, 2008. This scoping package included information on the Project and a Project location map. At the end of the 30-day comment period, 21 responses were received. These comments have referenced and incorporated where appropriate within this document. ***Please refer to Appendix D for the Scoping Mailing List, Letters, and Responses.***

In addition, KL&J presented the Project at the bi-weekly North Dakota ICM (interagency meeting) in Bismarck on March 6, 2008. The Project was introduced and discussed with the attendees. Agencies that typically attend this meeting include, but are not limited to, the following: USACE, USFWS, Natural Resources Conservation Service, Federal Highway Administration, ND SWC, NDDOT, and NDGF. The goal of attending this meeting was to initiate early agency consultation and to identify key issues of concern that should be addressed during Project development.

KL&J staff had an additional meeting with the USFWS and NDGF on March 6, 2008. The purpose of this meeting was to discuss proposed methods for conducting the avian study and to discuss the potential for impacts to whooping cranes. Incidental take permits and associated habitat conservation plans were also addressed.

9.1 Summary of Commenting Agencies

The following provides a list of agencies that provided comments during the Project scoping process: ***Please refer to Table 12, Summary of Commenting Agencies.***

Table 12 Summary of Commenting Agencies	
Federal Agencies	Bureau of Indian Affairs
	Federal Aviation Administration
	National Park Service
	United States Air Force, Grand Forks Air Force Base
	United States Army Corps of Engineers, North Dakota Regulatory Office
	United States Army Corps of Engineers, St. Paul District Office
	United States Fish and Wildlife Service
State Agencies	Job Service North Dakota
	North Dakota Department of Commerce
	North Dakota Department of Health
	North Dakota Department of Transportation
	North Dakota Game and Fish Department
	North Dakota Office of the Attorney General
	North Dakota Parks and Recreation Department
	North Dakota State Water Commission
	Senator Kent Conrad
	State Historical Society of North Dakota
Local Entities	Dakota Rural Water District
	Griggs County
	Sisseton Wahpeton Oyate Tribal Historic Preservation Officer
	Universal Ensco, Inc.

10.0 Identification of Potential Permits/Approvals

The following permits may be required or obtained prior to construction:

- PSC—Certificate of Site Compatibility
- FAA—Form 7460-1, Notice of Proposed Construction or Alteration
- USACE—Section 404 Permit
- USFWS—Incidental Take Permit and Habitat Conservation Plan
- North Dakota Department of Health—NPDES Permit
- Conditional Use Permits—County and Township Boards

- Building Permits—County and Township Boards
- ND Highway Patrol—Overweight-Overheight Permit
- ND DOT—Utility Permit-Risk Management Document

11.0 Qualifications of Contributors to Siting Study

Lloyd Anderson earned a B.S. in Mechanical Engineering, and a M.S. in Industrial Engineering and Management from North Dakota State University. He has a wide array of business, management, and technical experience. His experience includes working as a consultant and principal (owner) of Eide Helmeke PLLP and Eide Bailly LLP; teaching at the College of Engineering, North Dakota State University; and employment as an engineer at several additional firms. Some of Lloyd's other experiences include being the owner's representative for M-Power, LLC, Management/Development of Rocking Horse Farm (real estate), Anderson Consulting, and consulting for Griggs-Steele Wind Development Group and Empowerment Zone Energy Development Committee. He holds several memberships and licenses, including being a Registered Professional Engineer (retired status) in the State of North Dakota, National and State Societies of Professional Engineers, and Institute of Industrial Engineers.

Shanna Braun graduated with a B.S. in Natural Resources Management and a B.A. in Spanish from North Dakota State University. Shanna previously worked with the Americorps Program Watershed Improvement Network as a crew leader on a variety of projects dealing with shoreline restoration, water quality and public outreach. Shanna's specialties during her three yeas with KL&J include environmental planning, NEPA documentation, and wetland delineation services. Shanna specializes in environmental work on bridge, transportation, municipal, and economic development projects, as well as field wetland delineations. Shanna is able to implement public involvement programs specific to each project. She has attended numerous training classes and is a member of the Minnesota Wetland Professionals Association and National Association of Environmental Professionals.

Charlotte Brett earned a B.A. in Environmental Studies from Prescott College and is currently working on a MPA in Environmental Science at the State University of New York Syracuse. Prior to becoming employed by KL&J, she worked for the USFWS conducting vegetation and avian studies and assisting with GIS systems. Charlotte has also led several multiple week camp and trail work expeditions constructing and maintaining backcountry trails. For the past eight years, Charlotte's work at KL&J has included conducting environmental field studies, permitting, writing NEPA documents, and overall project management. She is currently the leader of the Environmental Group at KL&J. Charlotte has also attended multiple environmental training classes and is a member of the National Association of Environmental Professionals.

Warren Enyart has a B.S in Physical Science from Minot State University and a M.S.W. in Community Development from the University of Minnesota-Duluth. He has nearly 40 years of related professional experience in Science and Technical Business Development, and Administration specialties. He has been both professionally employed and worked as a consultant in each of these areas. Much of Warren's professional consulting experience is in energy-related industrial development, including: power requirement studies, wind resource development studies, facility siting, environmental

impact assessment and management, landowner public relations, project management, permitting, regulatory compliance, and site reclamation. With respect to facility siting, Warren has worked on two large power plants and two petroleum refineries and experience working on over 3,000 miles of high voltage transmission line and pipeline projects.

John Morrison earned a B.A. in Anthropology at Hartwick College and a M.A. in Anthropology at Washington State University. His post graduate work experience includes working as a lab and field technician at the University of Delaware and University of Washington. John has completed anthropology work while employed at the Bureau of Land Management, University of North Dakota, and Metcalf Archaeological Consultants. John is currently the Director of Operations at Earthworks Inc., providing company management and project oversight. He has over 18 years of experience in cultural resource management and mitigation projects. He also has experience with the Federal Energy Regulatory Commission projects, developing avoidance and treatment plans, direction data recovery projects; and inventorying and evaluation well pads, access roads, flowlines, powerlines, etc. John is a board member for the American Cultural Resource Association.

Becky Rude has a B.A. in Biology and English Literature from Concordia College and a M.A. in Environmental Law from Vermont Law School. During her time in Vermont, she interned with the National Wildlife Federation and was involved with the review of the Circ-Williston Environmental Impact Statement. She has also been employed by Prairie Restorations Inc. whose main work focused on the restoration of prairies and wetlands. Becky's specialties at KL&J include environmental law and policy, using her understanding of NEPA and related state and federal regulations, as well as her background in science and writing, to provide NEPA documentation and environmental planning services for a variety of clients. Becky has been working with KL&J for two years.

Jennifer Turnbow has a B.S. in Environmental Science from the University of Idaho. Prior to joining KL&J, she worked for the University of Idaho in the Idaho Cooperative Fish and Wildlife Research Unit assisting in the evaluation of physiological changes of migrating juvenile Chinook salmonids (*Oncorhynchus tshawytcha*) and effects on performance and survival throughout the Snake and Columbia Rivers. Also, she assisted with sampling of juvenile Chinook salmon for fish-transportation barge holds and collection of tissue and blood samples under permitting guidelines of the Endangered Species Act of 1973. For the past five years at KL&J, Jennifer's specialty has been NEPA documentation and process along with project management.

Grady Wolf graduated with a B.S. in Natural Resources Management from North Dakota State University. While attending college, he was employed by the U.S. Army Corps of Engineers during the summer months to conduct nesting surveys of the interior least tern (*Sterna antillarum*) and piping plover (*Charadrius melodus*) on the Missouri River. His post college experience includes being employed by the Emmons County Soil Conservation and Water Resource District as the Beaver Creek Watershed Coordinator. He was responsible for conservation efforts on agricultural land and water quality concerns. During his employment with KL&J, Grady has worked on field studies to identify environmental concerns, permitting, and writing environmental documents to satisfy NEPA requirements.

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13.0 Acronym List

AC	Advisory Circular
AGL	Above Ground Level
BMPs	Best Management Practices
CFR	Code of Federal Regulations
CR	Construction Ready
CRP	Conservation Reserve Program
DOE	Department of Energy
EMF	Electromagnetic Field
EPC	Engineering, Procurement and Construction
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
GPS	Global Positioning System
KL&J	Kadrmas, Lee & Jackson, Inc.
kV	Kilovolt
MAPP	Midcontinent Area Power Pool
MISO	Midwest Independent Transmission System Operator
MPH	Miles Per Hour
MSL	Mean Sea Level
MW	Megawatt
ND	North Dakota
NDCC	North Dakota Century Code
NDDOT	North Dakota Department of Transportation
NDGF	North Dakota Game and Fish Department
NDPR	North Dakota Park and Recreation Department
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
PSC	Public Service Commission
PTC	Production Tax Credits
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Officer
SWC	State Water Commission
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

APPENDIX A

FIGURES

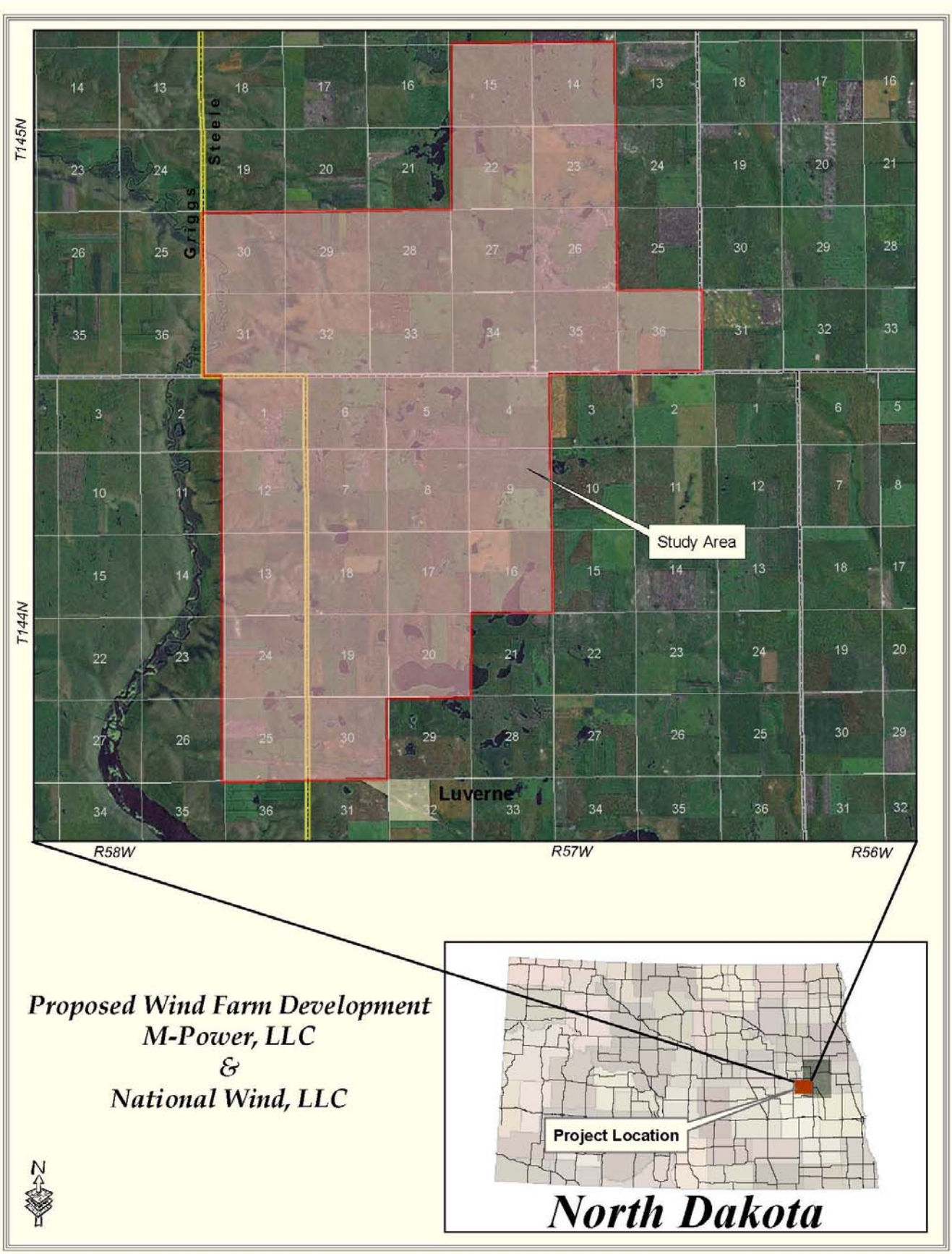


Figure 1, Project Location Map

M-Power, LLC
Organization Structure

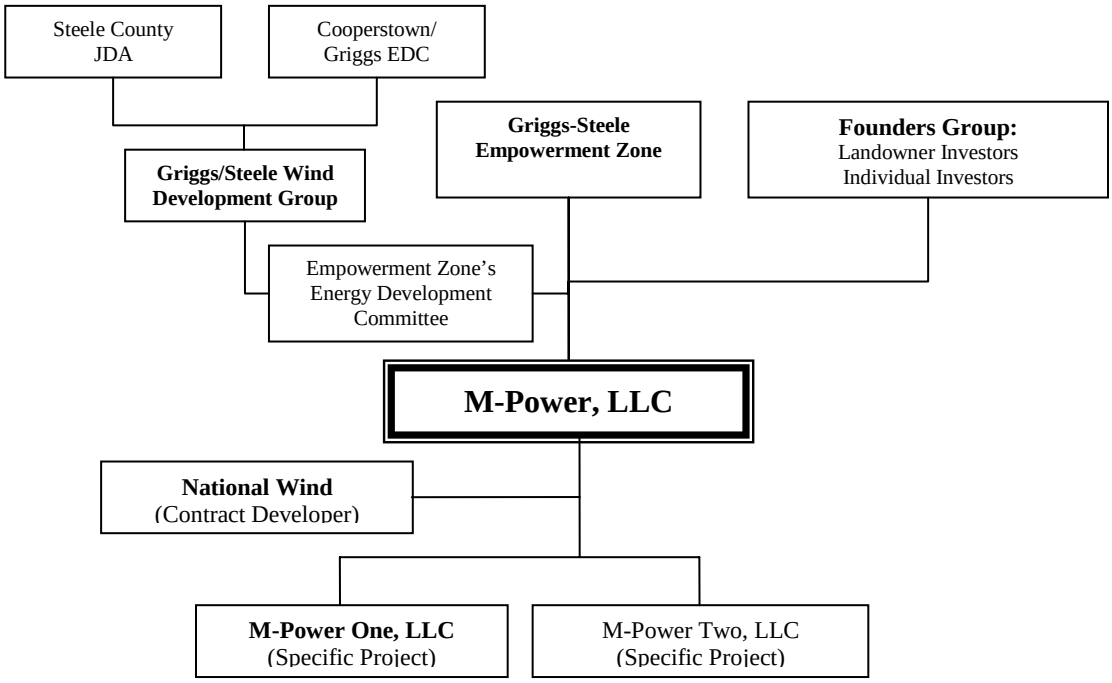


Figure 2, Organization Structure

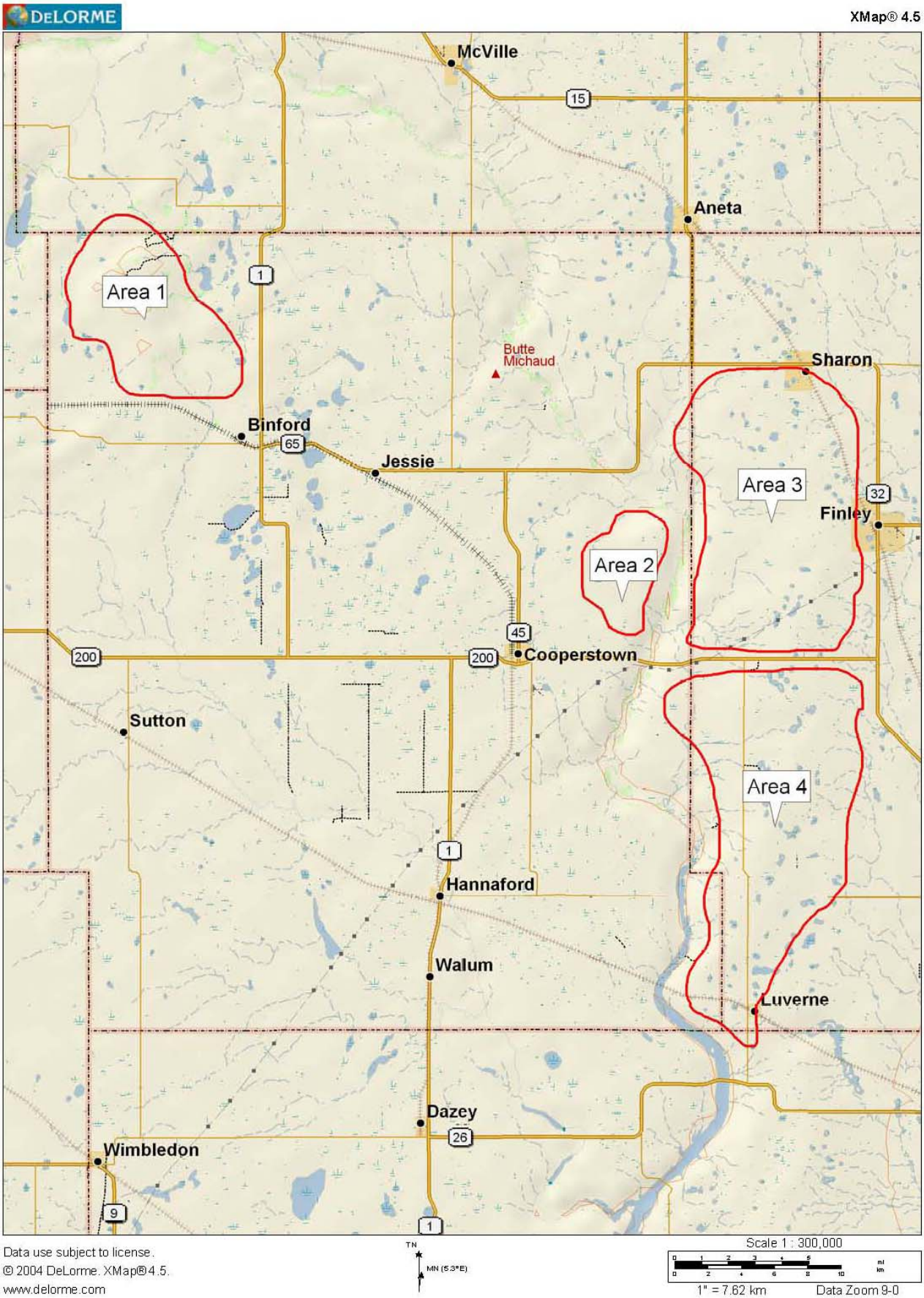


Figure 3, Wind Studies

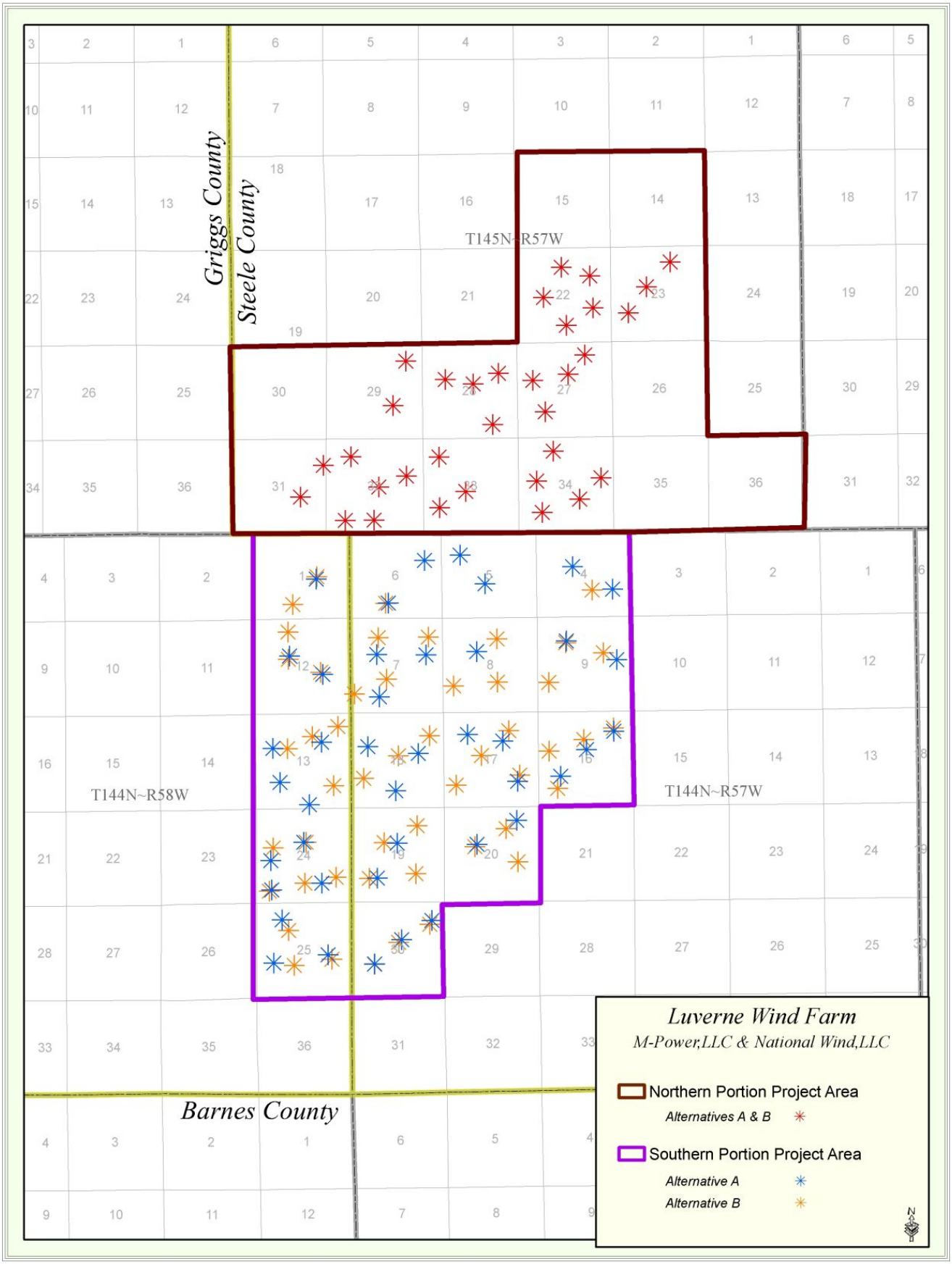


Figure 4, Project Alternatives

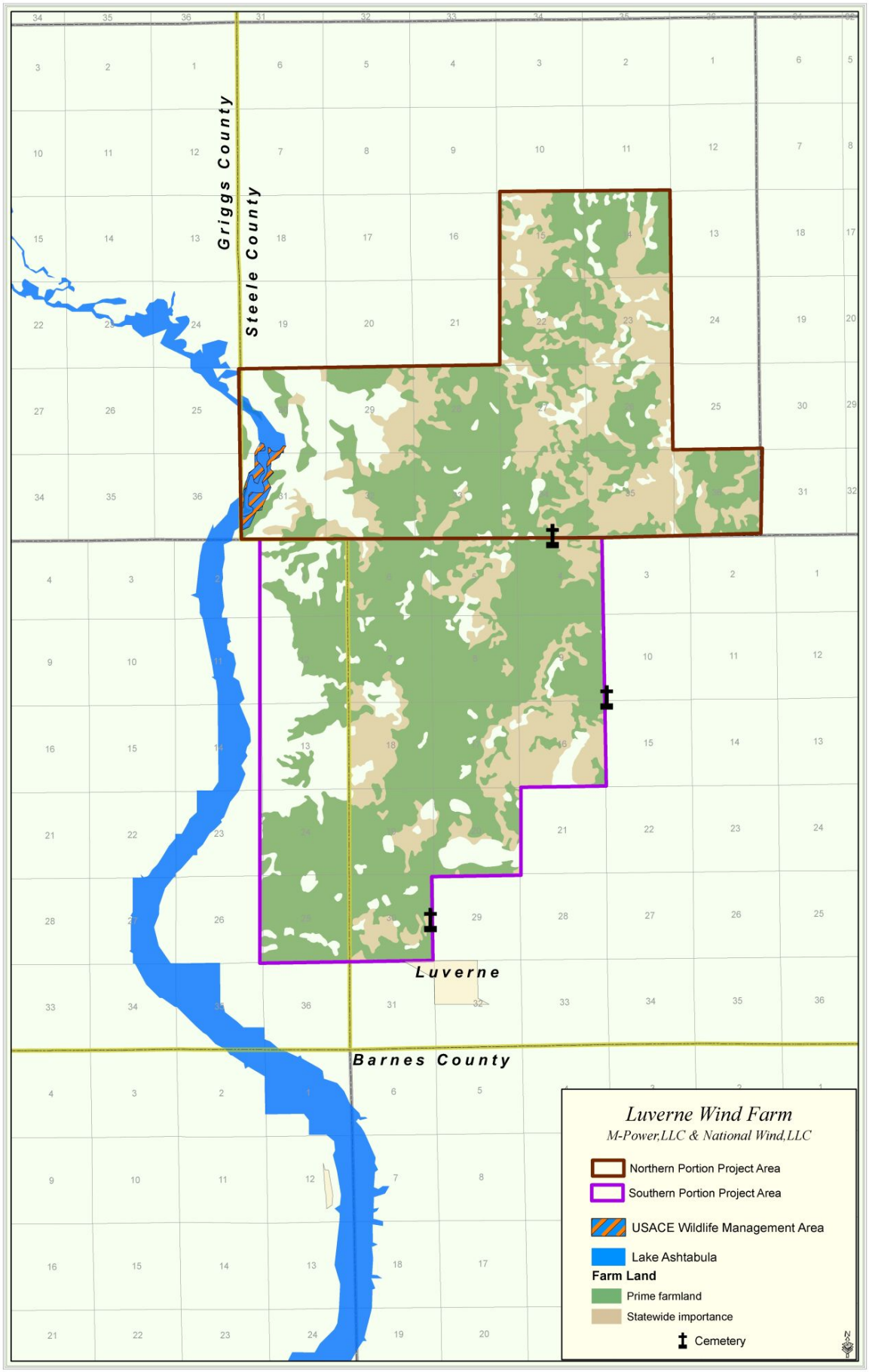


Figure 5, Exclusion Areas

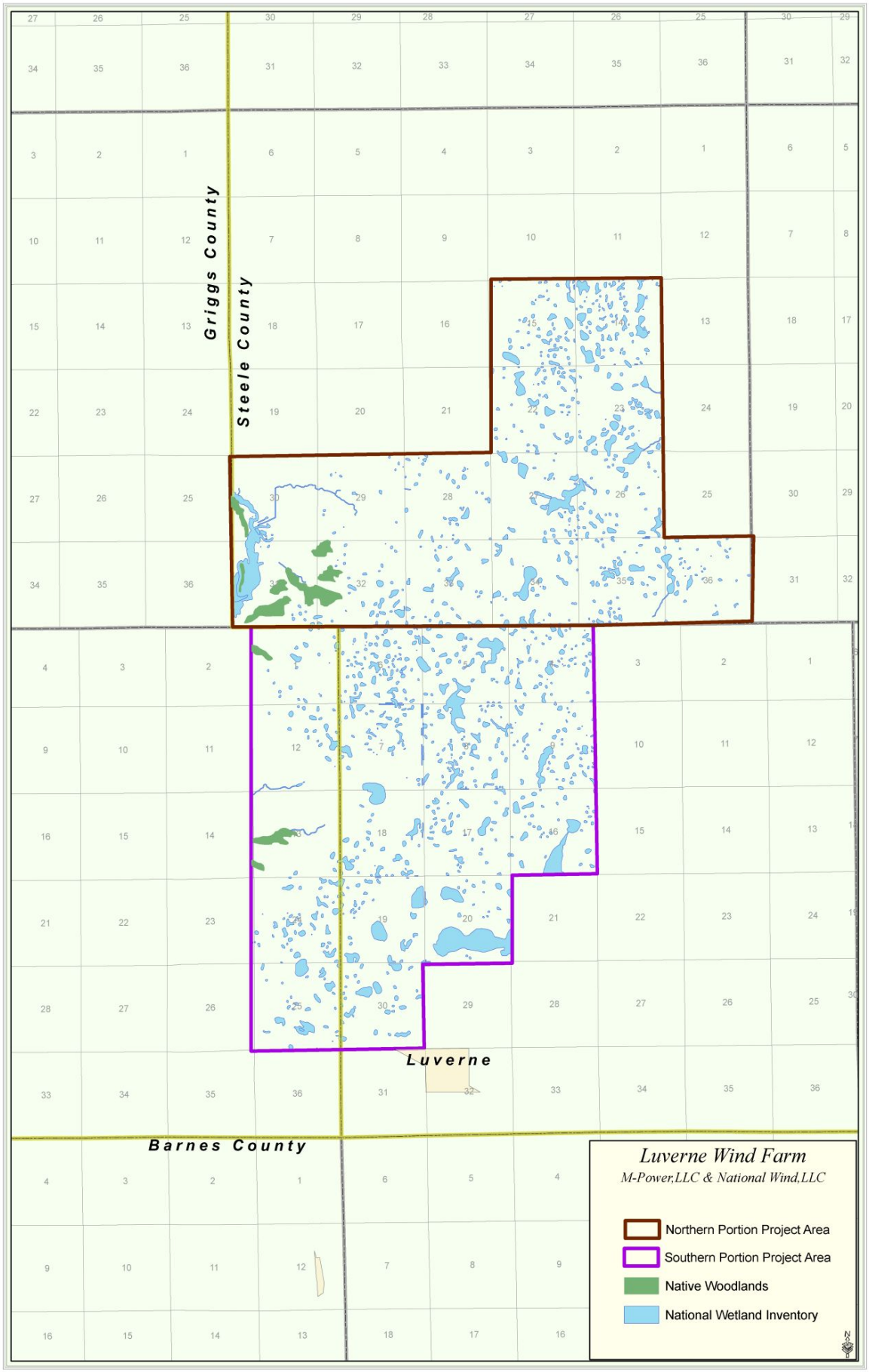


Figure 6, Avoidance Areas

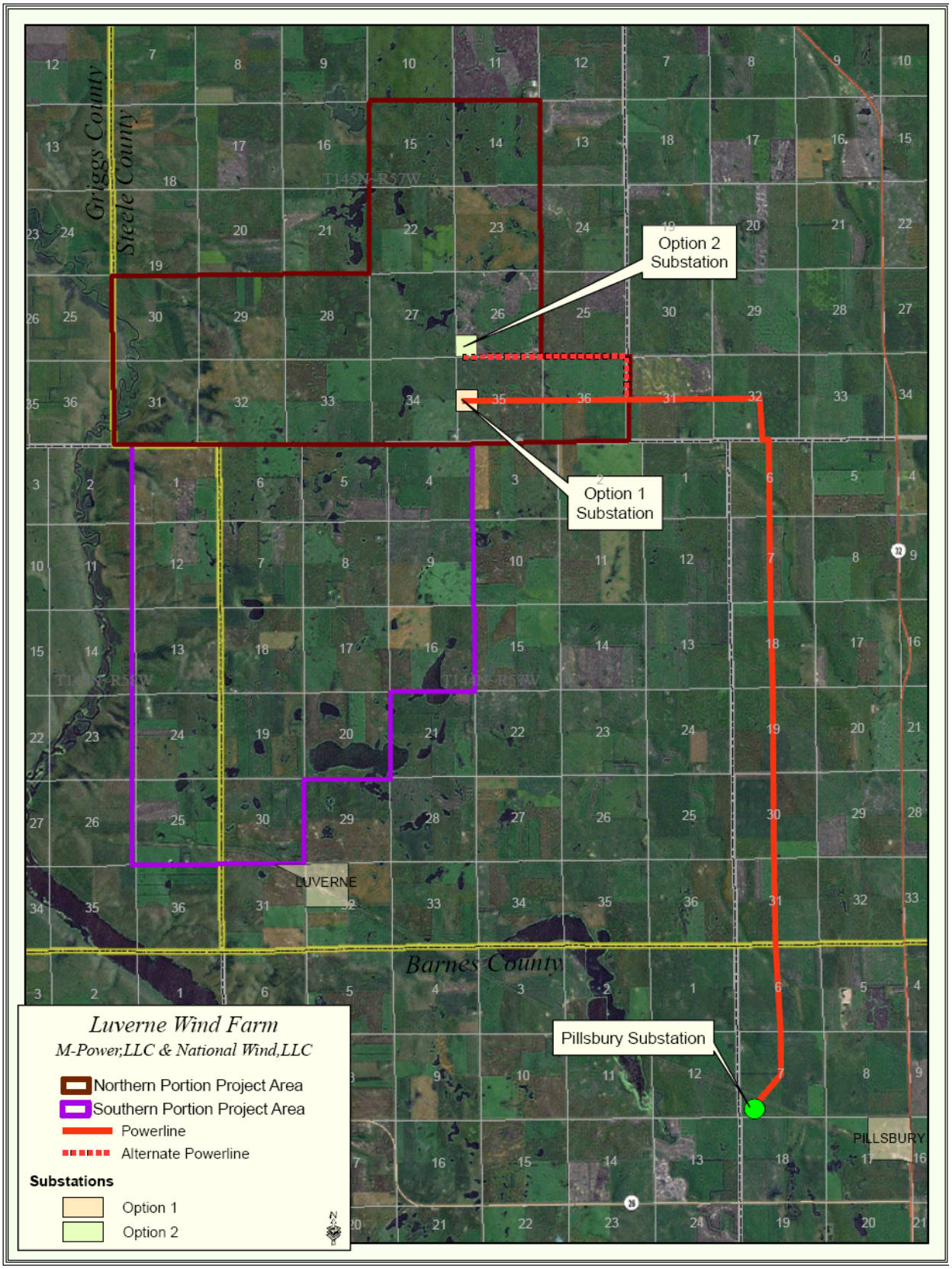


Figure 7, Transmission Line Location Map

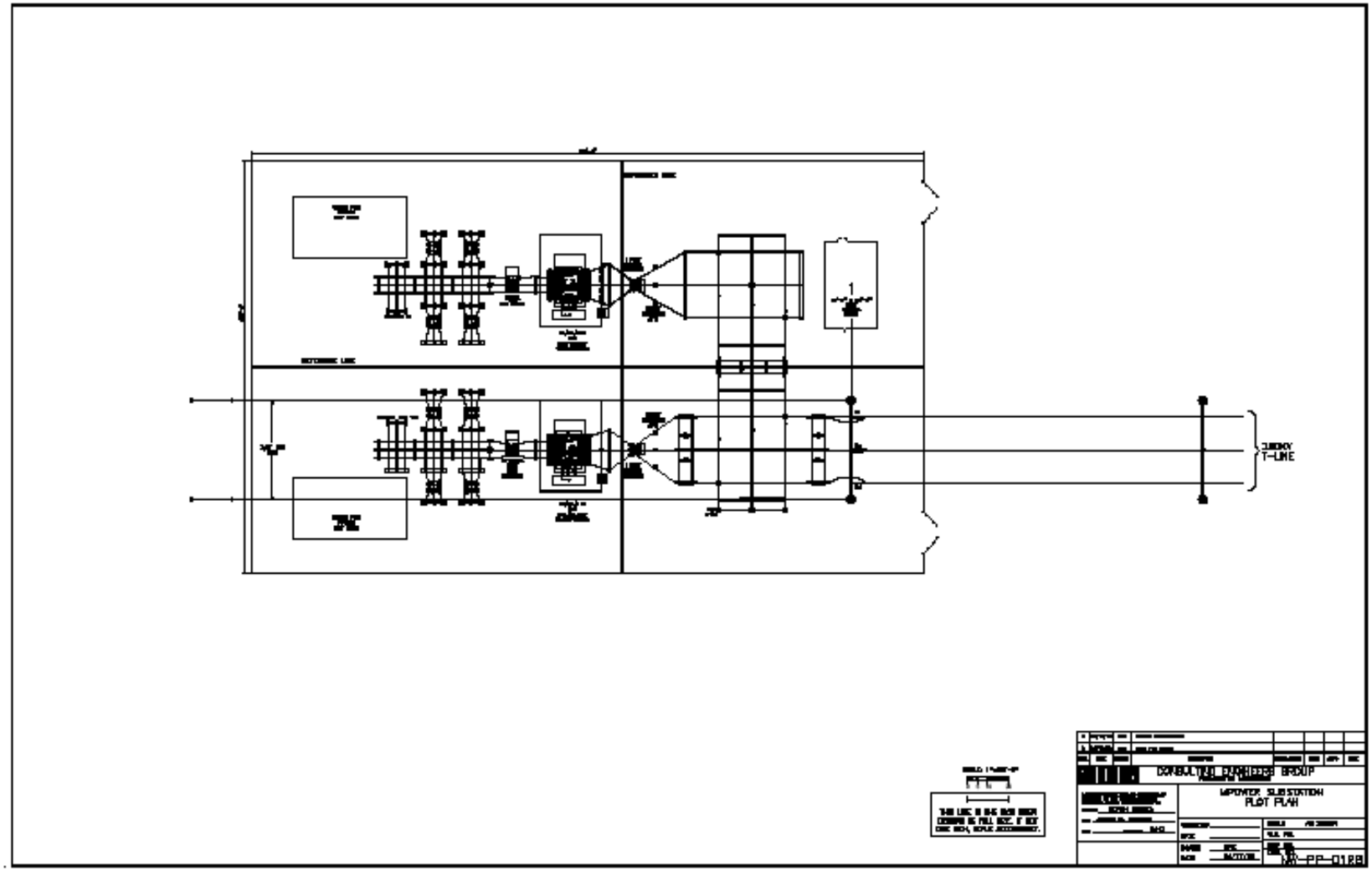


Figure 8, Groundwater Resources

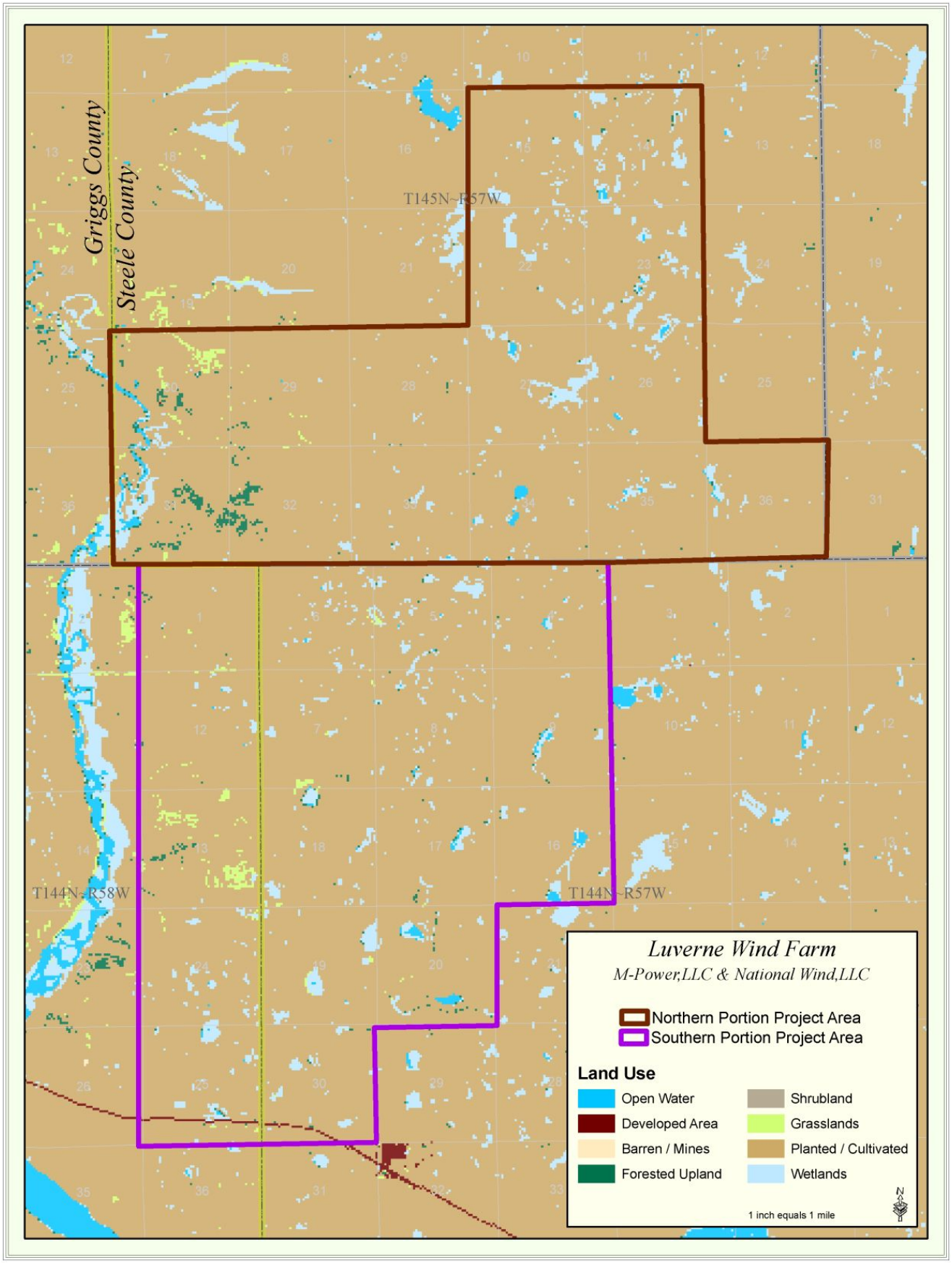


Figure 9, Land Use

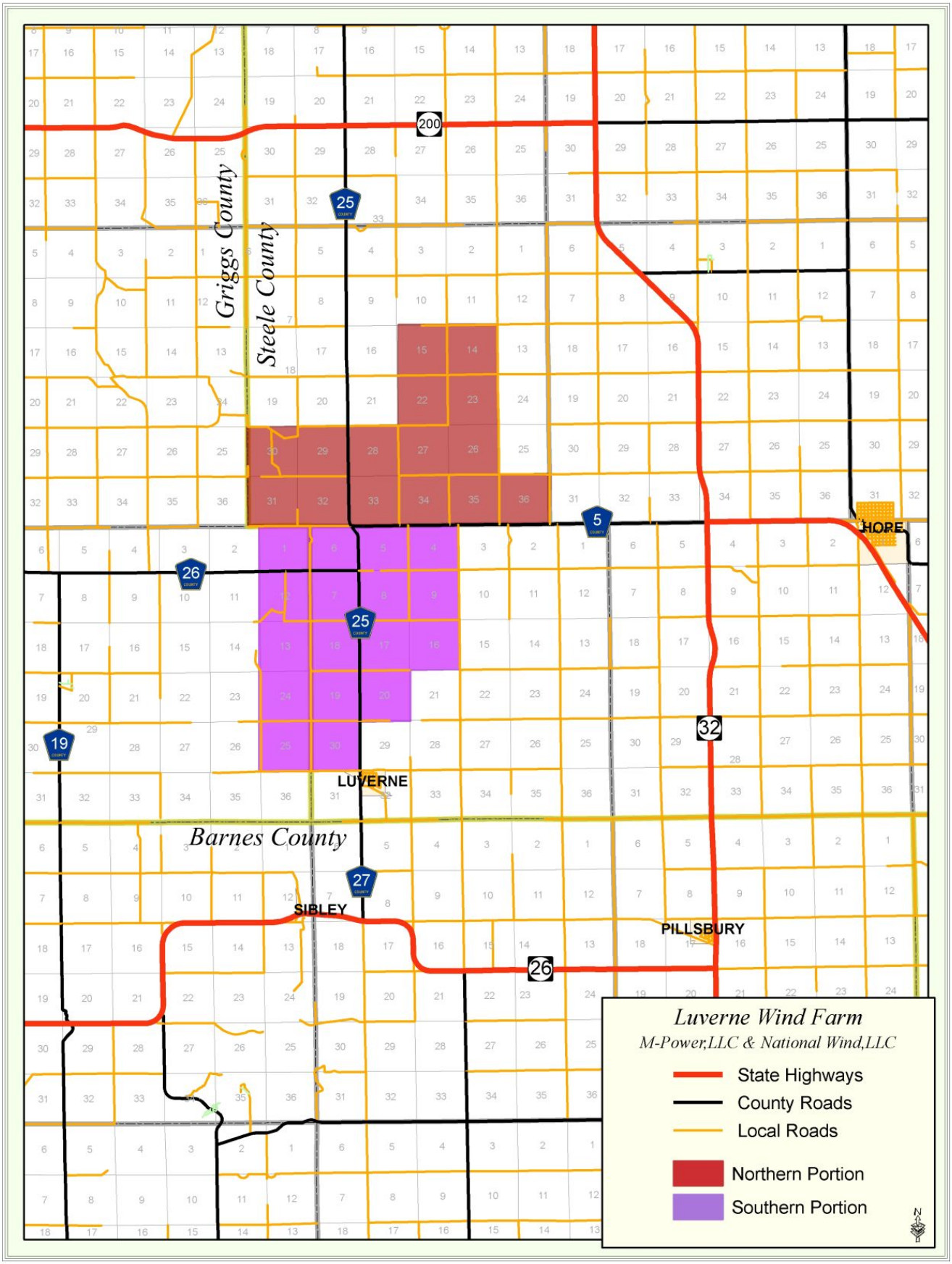


Figure 10, Existing Roadway Network

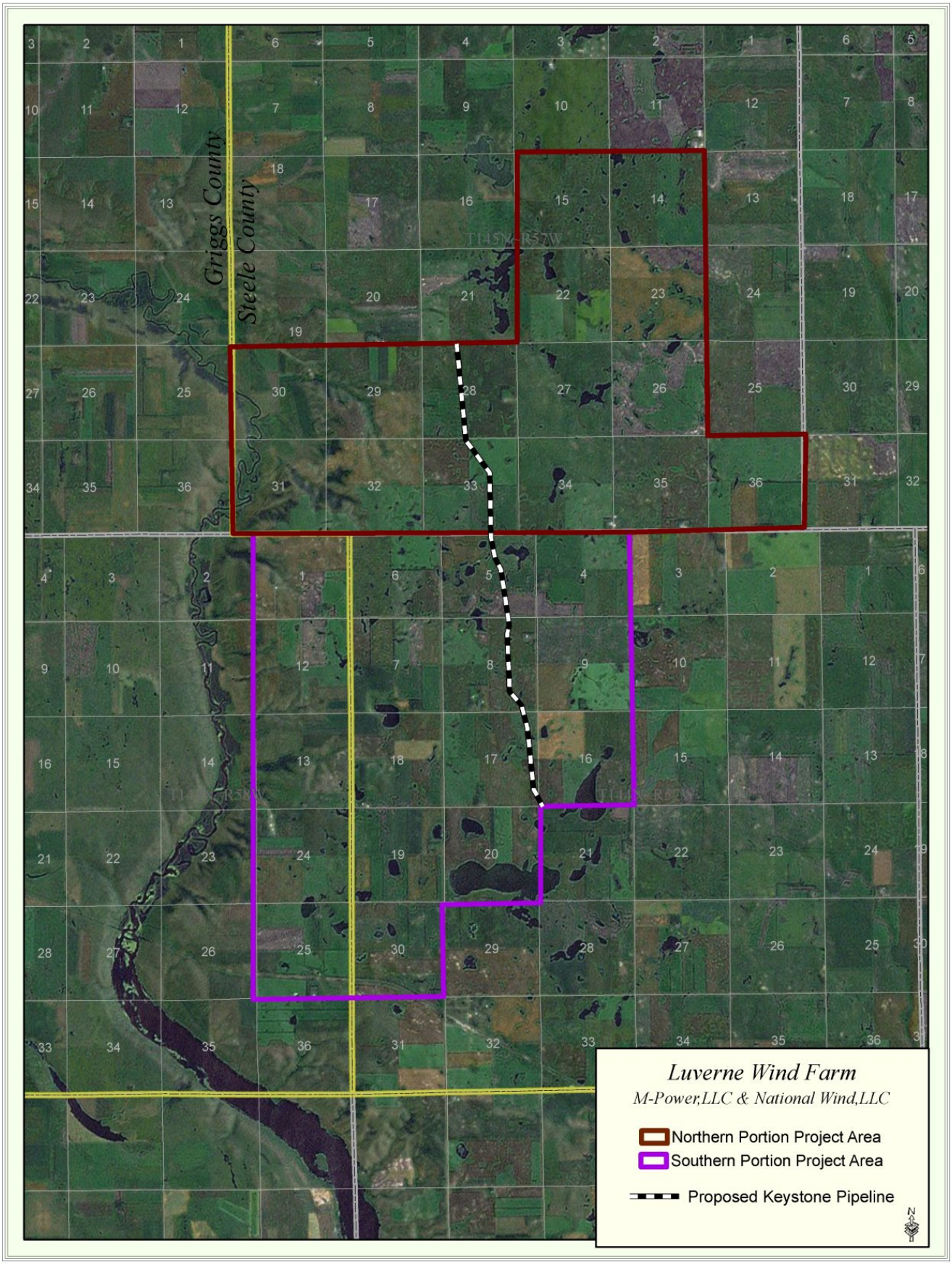


Figure 11, Keystone Pipeline

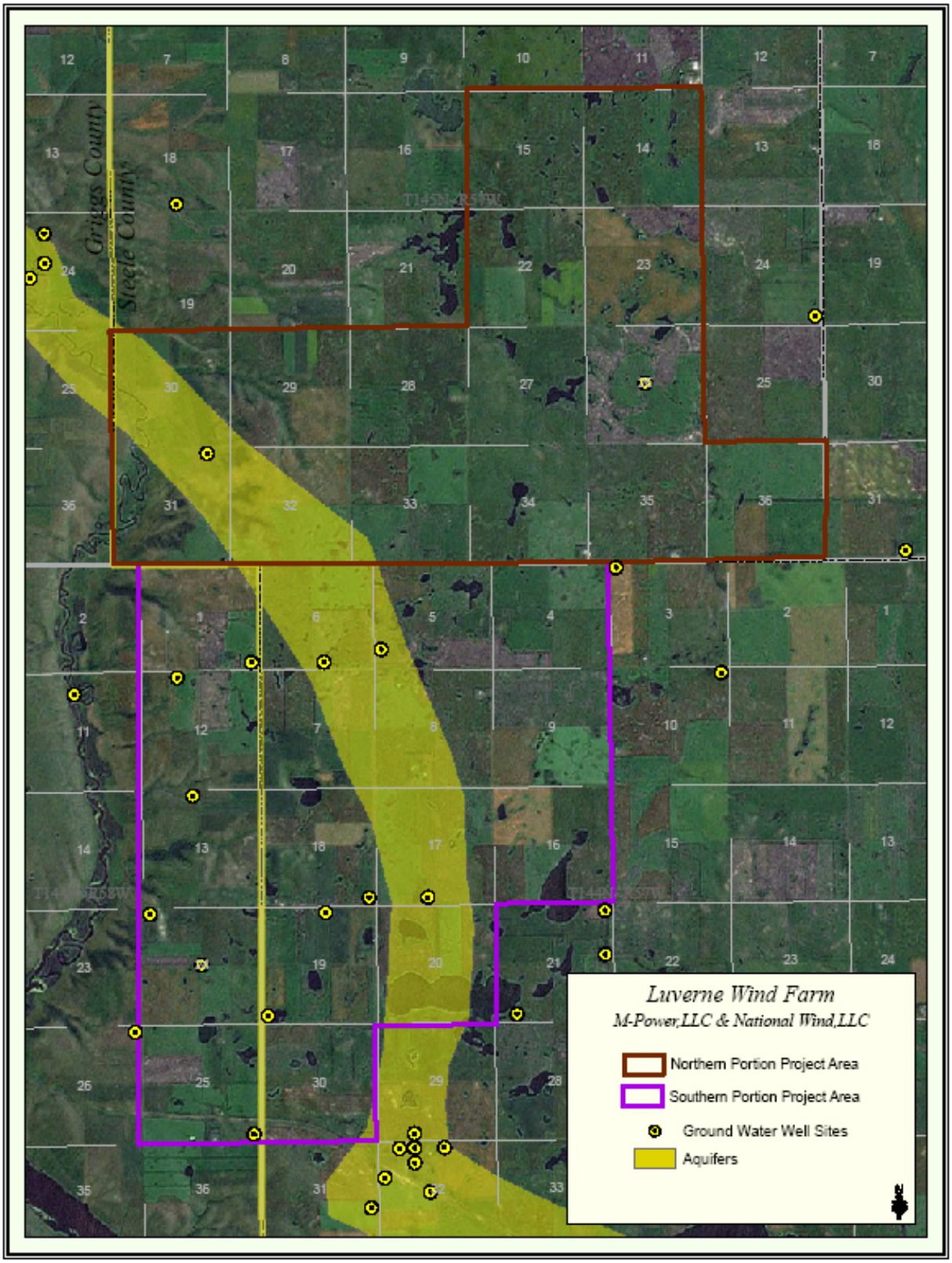


Figure 12, Groundwater Resources

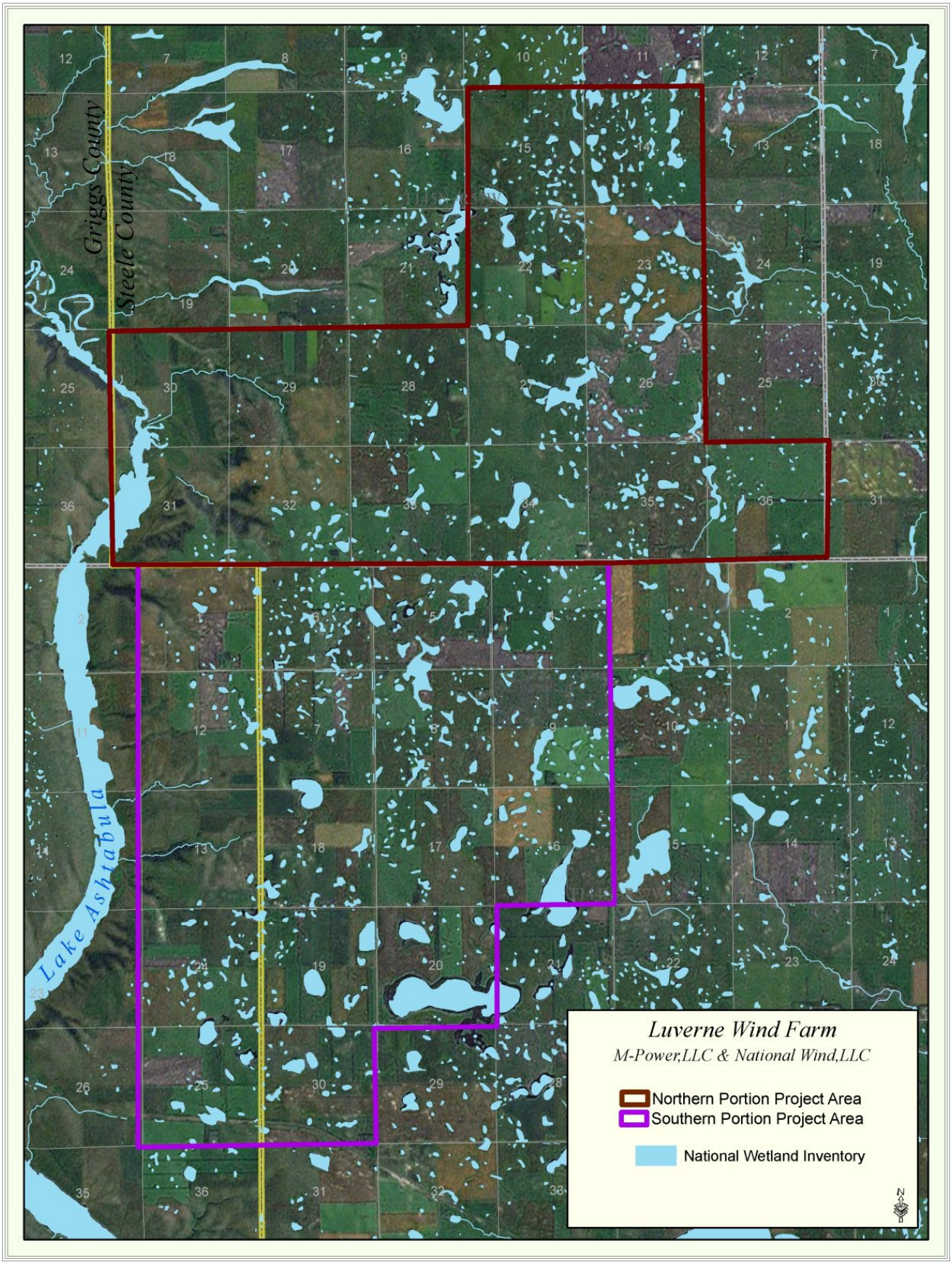


Figure 13, NWI Wetlands

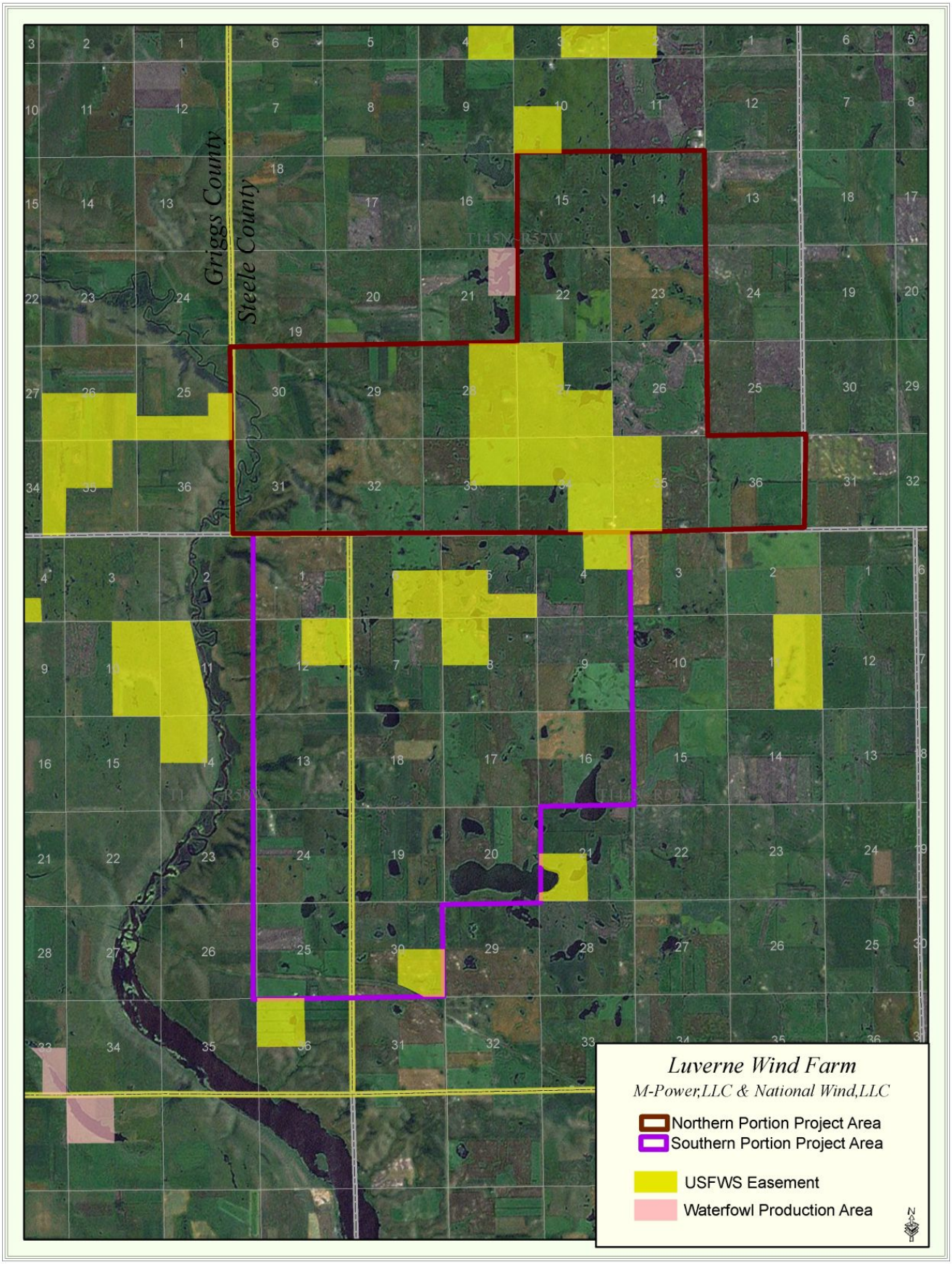


Figure 14, USFWS Easements

APPENDIX B

DESIGN DATA REPORT

LUVERNE WIND FARM GENERATION OUTLET
GRIGGS AND STEELE COUNTIES, NORTH DAKOTA

DESIGN DATA REPORT

Project

- Approximately 13-mile transmission line.
- Final layout and structure types to be completed after design is finalized.

Transmission Line

GENERAL SPECIFICATIONS

Voltage	230-kV
Average Height	60 feet (H-frame)
Capacity	300 MW
Operating Capacity	150 MW
Average Span Length	750 feet
Structure Type	H-frame
Minimum Conductor Size	795 kcmil Aluminum Conductor Steel Reinforced (ACSR)
Shield Wire	3/8 inch EHS and Optical Ground Wire
Right-of-Way	125 feet wide (typical)
Average Pole Depth	11 to 13 feet
Average Pole Diameter	18 inches
Foundation Type	Direct imbed tangent, rock back-fill – guyed angles and dead ends

Associated Facilities

GENERAL SPECIFICATIONS

Project Collector Station	
Collector Station Voltage	230-kV to 34.5 kV
Approximate Size	2 acres
Right-of-Way to be acquired (includes operation and maintenance building)	Approximately 4 acres
Equipment	Two 230kV circuit breakers, surge arrestors, ten 34.5 kV circuit breakers, capacitor bank (2), open air buswork, and control house. Two 230 kV to 34.5 kV substation transformers to match project MVA requirements (approximately 110 MVA and 55 MVA)

Project Collection System – Underground Cables	
Collection System Voltage	34.5 -kV
Approximate Total Length	Approximately 150,000 circuit feet
Right-of-Way to be acquired	Part of turbine array right of way and easements
Equipment	Padmount Transformers – 34.5 kV delta to 600 V grounded wye, 1750 kVA or as appropriate for turbine rating. Junction Cabinets – 34.5 kV above grade junctions (not fault interrupting) Primary Cable – Sizes 1/0 AWG, 4/0 AWG, 500 MCM, and 1000 MCM, 34.5 kV stranded aluminum cable, direct buried, 345 mil TRXLP insulation, jacketed concentric neutrals.

APPENDIX C

MICROWAVE COMMUNICATIONS

MICROWAVE COMMUNICATIONS

Kadrmas Lee and Jackson Inc. performed a search for FCC licensed and FCC applications for Microwave frequencies within a 10 mile radius of the center point of the proposed Wind Farm Development located at 47° 19' 8.0" N latitude and 097° 55' 44" W Longitude. The search included both FCC licensed facilities as well as any FCC applications. There were no active microwave applications within the 10 mile radius as of March 24, 2008. The FCC search indicated that there were no licensed Common Carrier Fixed Point-to-Point Services in the search area. The FCC search did find nine Licensed Private Operational Fixed Point-to Point Microwave Services, Multiple Address Systems (MAS) in the area. These MAS have a master station location registered with the FCC and are allowed to have remote stations within 35 mile radius for Multiple Two way type systems and 40 mile radius for Fixed Two way systems. Since these nine FCC licensed Private Operational Fixed Point-to Point Microwave Services only are required to register the location of the master station, the locations of multiple remote antennas cannot be determined. The coordination contact individual for these Private microwave services should be consulted to determine the locations of the remote stations or if there will be any interference caused by the Wind Farm. These types of services are regulated by the code of federal regulations Title 47 part 101 Fixed Microwave Services.

The Private Operational-Fixed Microwave

The Private Operational-Fixed Microwave Service can be used by persons eligible under Parts 80, 81 or 90 for communications related to their activities. Stations in this service are called operational-fixed to distinguish them from common carrier and public fixed stations. Only the licensee may use an operational-fixed station, and only for communications related to the licensee's commercial, industrial, or safety operations.

Private operational-fixed microwave systems serve many different purposes. They are meant to carry or relay voice, teletype, telemetering, facsimile and digital communications associated with Aviation, Marine, Public Safety, Industrial, and the Land Transportation Radio Services. For example, these systems are used to operate unattended equipment; open and close switches or valves; record data like pressure, temperature, or speed of machines; telemeter voltage and current in power lines; and perform other control or monitoring functions. Microwave systems are especially useful for controlling and monitoring various operations along installations like pipelines, railroads, and highways.

Multiple Two Way

Multiple address system authorized with multiple master and remote stations operating within 35 miles of the stated coordinates, only on subchannels with center frequencies offset from the stated center frequency of a standard 12.5 khz or 25 khz bandwidth 952/959/928 mhz channel by a maximum of 3125 hz for a 12.5 khz channel, and 9375 hz for a 25 khz channel, and only with emission 1k20d1d. Aggregate power flux density produced on any master subchannel or remote subchannel in this system at or beyond 45 miles from the center of operation must not exceed -100 decibels referenced to 1 watt per square meter.

Antenna structures for land, base and fixed stations authorized for operation at temporary unspecified locations may be erected without specific prior approval of the Commission where such antenna structures do not exceed a height of 60.96 m (200 feet) above ground level; provided that the overall height of such antennas more than 6.10 m (20 feet) above ground, including their supporting structures (whether natural

formation or man-made), do not exceed any of the slope ratios set forth in Section 17.7(b). Any antenna to be erected in excess of the foregoing limitations requires prior Commission approval. Licensees seeking such approval should file application for modification of license. In addition, notification to the Federal Aviation Administration is required whenever the antenna will exceed 60.96 m (200 feet) above the ground and whenever notification is otherwise required by Section 17.7 of the Commission's Rules. Such notification should be given by filing FAA Form 7460-1, Notice of Proposed Construction or Alteration, in duplicate, with the nearest office of the Federal Aviation Administration, which form is available from that office.

Fixed Two Way

Multiple address system authorized with master station on the Frequency Licensed at stated coordinates and remote stations on the Remote Frequency Licensed operating within a 40 mile radius of the master station.

APPENDIX D

AGENCY COORDINATION

February 27, 2008

Re: Wind Farm Development
M-Power, LLC and National Wind, LLC
Griggs County and Steele Counties, North Dakota

Dear: ,

Kadrmas, Lee & Jackson, Inc. and Earthworks on behalf of M-Power, LLC and National Wind, LLC, is preparing an application for the requirements of the North Dakota Energy Conversion and Transmission Facility Siting Act for the North Dakota Public Service Commission. The application will include the development of a 150 MW (megawatt) wind farm. The proposed wind farm is located within an 8,640 acre study area in Griggs and Steele Counties. *Please refer to the enclosed project location map.*

The proposed project would include construction of the wind farm, as well as associated access roads and utilities. This proposed project would also include the construction of a 77-mile 230 KV (kilovolt) electrical transmission line.

At this time, this proposed project does not include using any federal funding. However, if any federal funding was to be used the source of the funds would be from the US Department of Agriculture, Rural Utilities Services. Again, no federal funding is anticipated.

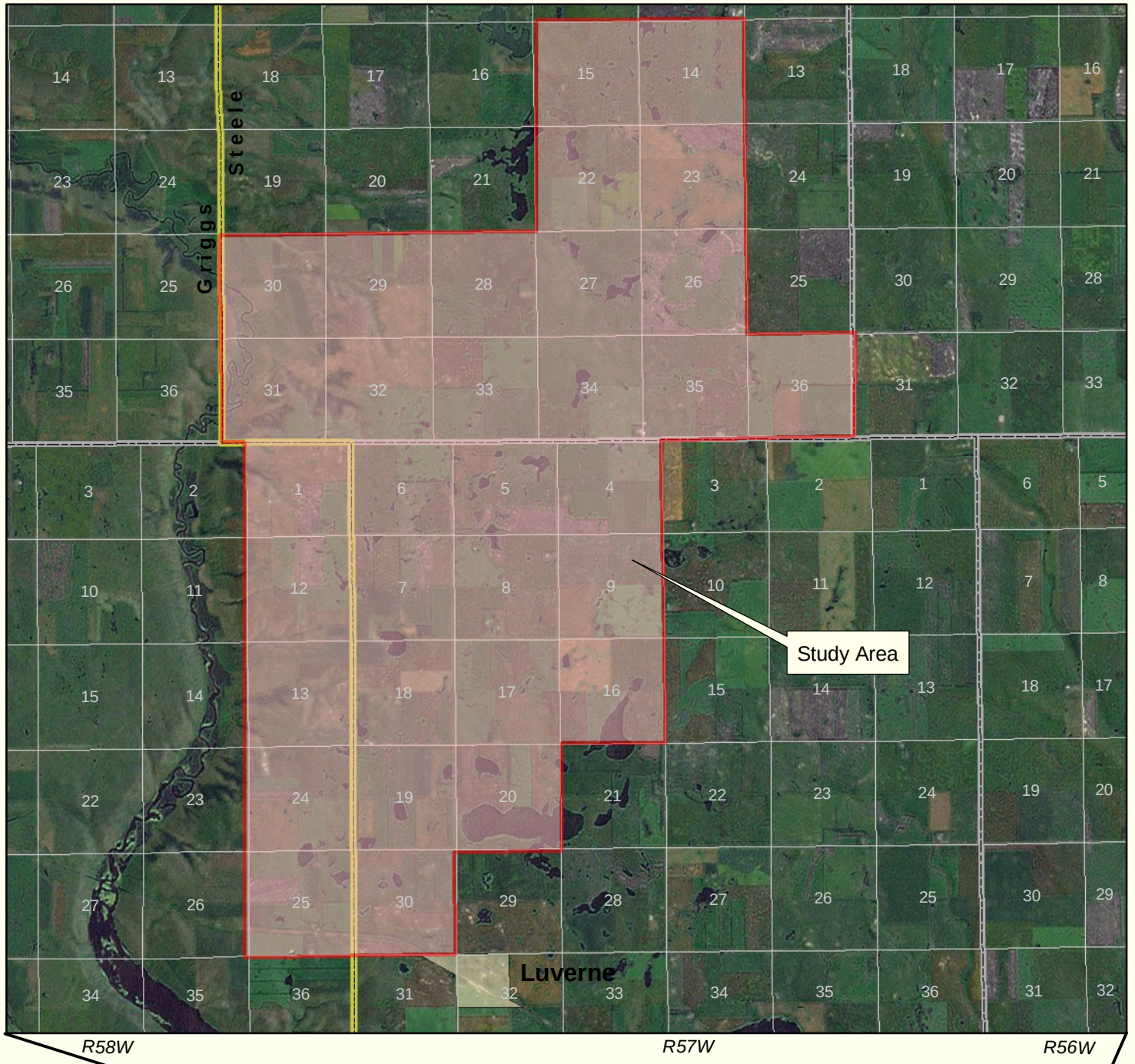
To ensure that social, economic, and environmental effects are considered in the development of this project, we are soliciting your views and comments on the proposed development of this project. We are particularly interested in any property that your department may own, or have an interest in, located within the project area. We would also appreciate being made aware of any proposed development your department may be contemplating in the area of the proposed project. Any information that might help us in our study would be appreciated.

We request that any comments or information be forwarded to our office on or before March 25, 2008. If no reply is received by this date, we will assume that you have no comment on this project.

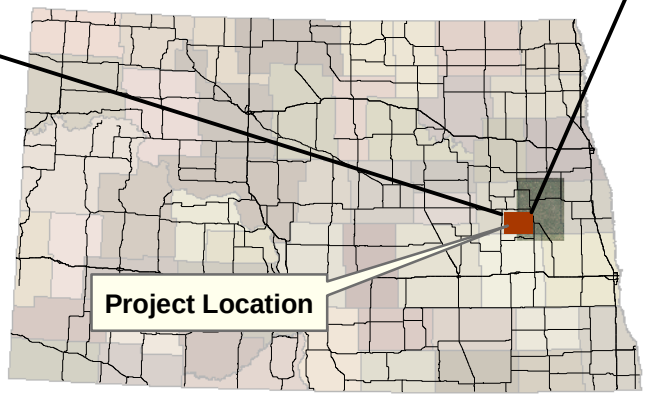
If you would like further information regarding this project, please contact me at (701) 355-8468. Thank you for your cooperation.

Sincerely,
Kadrmas, Lee & Jackson, Inc.

Enclosure (Map)



Proposed Wind Farm Development
M-Power, LLC
&
National Wind, LLC



North Dakota

SOV MASTER LIST

Save as new file for each project and edit accordingly with project specific contacts

CTitle	First	Last	Title	Department	Agency	Address	City	State	Zip
Mr.	Merl	Paaverud	State Historic Perservation Officer		State Historical Society of North Dakota	612 E. Boulevard Ave.	Bismarck	ND	58505-0830
Mr.	Francis	Ziegler	Director		North Dakota Department of Transportation	608 E. Boulevard Ave.	Bismarck	ND	58505-0700
Sir		*or Madam*	Chief Missile Engineer	91st Missile Maintenance Squadron	Cable Affairs Office	417 Bomber Blvd.	Minot AFB	ND	58705
Mr.	Mike	Black	Acting Regional Director		Bureau of Indian Affairs	115 4th Ave. SE	Aberdeen	SD	57401
Mr.	Richard	Nelson	Chief, Resource Management	Dakotas Area Office	Bureau of Reclamation	PO Box 1017	Bismarck	ND	58502-1017
Sir	*or*	*Madam*	Acting Regional Administrator	Regional Office	Department of HUD	1670 Broadway, Ste. 200	Denver	CO	80202-4813
Mr.	Steve	Obenauer	Manager	Bismarck Airports District Office	Federal Aviation Administration	2301 University Drive, Bldg 23B	Bismarck	ND	58504
Sir		*or Madam*	Director, Federal Insurance & Hazard Mitigation Division	Region 8	Federal Emergency Mngmt. Agency	Bldg 710, Box 25267	Denver	CO	80225
Sir		*or Madam*		Office of Economic Analysis	Federal Railroad Administration	400 7th St. SW	Washington	DC	20590
Ms.	Mary	Giltner	Deputy Base Civil Engineer	319 CES/CEVA	Grand Forks Air Force Base	525 Tuskagee Airmen Rd.	Grand Forks AFB	ND	58205-6434
Sir		*or Madam*	Director, Dept. of Health & Human Services	Centers for Disease Control & Prevention	National Center for Environmental Health	4770 Buford Hwy NE	Atlanta	GA	30341-3724
Mr.	Dan	Cimarosti	Manager	ND Regulatory Office	US Army Corps of Engineers	1513 S. 12th St.	Bismarck	ND	58504
Ms.	Candace	Gorton	Chief, Env., Economics, & Cultural Resource Section	Omaha District	US Army Corps of Engineers	106 S. 15th St.	Omaha	NE	68102-1618
Mr.	Michael	Knoff	Acting Chief, Project Management & Development Branch	St. Paul District	US Army Corps of Engineers	190 5th St. E.	St. Paul	MN	55101-1638
Mr.	J.R.	Flores	State Conservationist		US Department of Agriculture	PO Box 1458	Bismarck	ND	58502-1458
Mr.	John	Rogers		Economic Development Administration	US Department of Commerce	301 S. Park Ave., Rm. 196	Helena	MT	59601
Mr.	Gerald	Paulson	Director, Transmission Linest Substations	Western Area Power Admin.	US Department of Energy	PO Box 1173	Bismarck	ND	58502-1173
Ms.	Deborah	Lebow	NEPA Transportation Coordinator	Region 8, EPR-N	US Environment Protection Agency	1595 Wynkoop Street	Denver	CO	80202-1129
Mr.	Dave	Ruiter	Wetlands Coordinator	Region 8, EPR-EP	US Environment Protection Agency	1595 Wynkoop Street	Denver	CO	80202-1129
	Robin	Meigel	Finance Specialist		USDA-RUS	1400 Independence Avenue SW	Washington	DC	20250
Mr.	John	Hoeven	Governor		State of North Dakota	600 E. Boulevard Ave.	Bismarck	ND	58505-0001
Mr.	Wayne	Stenehjem	Attorney General		State of North Dakota	600 E. Boulevard Ave. Dept. 125	Bismarck	ND	58505
Senator	Kent	Conrad			US Federal Building, Room 228	220 E. Rosser Avenue	Bismarck	ND	58501
Senator	Byron L.	Dorgan			US Federal Building, Room 312	220 E. Rosser Avenue	Bismarck	ND	58501
Congressman	Earl	Pomeroy			US Federal Building, Room 312	220 E. Rosser Avenue	Bismarck	ND	58501
Mr.	Jeffrey	Towner	Field Supervisor	ND Field Office	US Fish & Wildlife Service	3425 Miriam Ave.	Bismarck	ND	58501
Mr.	Greg	Wiche	Director	Water Resources Division	US Geological Survey	821 E. Interstate Avenue	Bismarck	ND	58501
Ms.	Cheryl	Kulas	Executive Director		Indian Affairs Commission	600 E. Blvd. Ave. 1st Floor, Judicial Wing, Rm 117	Bismarck	ND	58505-0300
			Director		Job Service North Dakota	PO Box 5507	Bismarck	ND	58506-5507
Mr.	Larry	Preszler	Commissioner		ND State Land Department	PO Box 5523	Bismarck	ND	58506-5523
Mr.	Mark	Holzer	Aviation Planner		ND Aeronautics Commission	PO Box 5020	Bismarck	ND	58502-5020
Mr.	Mark	Johnson	Executive Director		ND Association of Counties	1661 Capitol Way, PO Box 877	Bismarck	ND	58502-0877
Sir		*or Madam*	Director		ND Department of Human Services	600 E. Boulevard Ave. Dept. 325	Bismarck	ND	58505-0250
Ms.	Lisa	Fair McEvers	Commissioner of Labor		ND Department of Labor	600 E. Boulevard Ave. Dept. 306	Bismarck	ND	58505-0340
Mr.	Wayne	Kutzer	Director		ND Department of Career and Technical Education	600 E. Boulevard Ave. Dept. 270	Bismarck	ND	58505-0610
Ms.	Pam	Sharp	Director		ND Office of Management and Budget	600 E. Boulevard Ave. Dept. 110	Bismarck	ND	58505-0400
Mr.	Shane	Goettle	Commissioner		Department of Commerce	600 E. Century Avenue, Suite 2	Bismarck	ND	58503
	Lynn	Helms	Director		NDIC Oil & Gas Division	600 E. Boulevard Ave. Dept. 405	Bismarck	ND	58505-0840
Mr.	L. David	Glatt	Chief	Environmental Health Section Gold Seal Center	ND Department of Health	918 E. Divide Ave., 4th floor	Bismarck	ND	58501-1947
Mr.	Tom	Berg			ND Forest Service	307 1st St. E.	Bottineau	ND	58318-1100
Mr.	Mike	McKenna	Chief	Conservation & Communication Division	ND Game & Fish Department	100 Bismarck Expressway	Bismarck	ND	58501-5095
Mr.	Ed	Murphy	State Geologist		ND Geological Survey	600 E. Blvd. Ave.	Bismarck	ND	58501-5095
Mr.	Doug	Prchal	Director		ND Parks & Recreation Dept.	1600 E. Century Ave., Suite 3	Bismarck	ND	58503-0649
Mr.	Dale	Frink	State Engineer		ND State Water Commission	900 E. Blvd. Ave.	Bismarck	ND	58505-0850
Ms.	Sara	Otte Coleman	Director	Century Center	ND Tourism Division	1600 E. Century Ave., Suite 2	Bismarck	ND	58503-2057
Mr.	Scott	Hochhalter	Soil Conservation Specialist	NDSU Extension Service	Soil Conservation Committee	2718 Gateway Ave., #104	Bismarck	ND	58503
Ms.	Lynn	Leibfried	Manager of Public Projects	Engineering Division	Burlington Northern Railroad Co.	80 44th Ave. NE	Minneapolis	MN	55421
Mr.	Jim	Krieger	Public Works Engineer		Canadian Pacific Railway	501 Marquette Ave. S.	Minneapolis	MN	55402
Mr.	Ordean	Nygren			Capital Electric Coop., Inc.	PO Box 730	Bismarck	ND	58502-0730
Mr.	Les	Alpert			Consolidated Telephone Company	PO Box 1408	Dickinson	ND	58602-1408
Mr.	Dennis	Ming	Vice President		Dakota Missouri Valley & Western Railroad	3501 E. Rosser Ave.	Bismarck	ND	58501
Mr.	Bill	Boyd	Construction Manager		Midcontinent Cable Company	719 Memorial Hwy	Bismarck	ND	58501
Mr.	Barry	Gage	Operatons Manager	Dakota Heartland Region	Montana Dakota Utilities	PO Box 777	Devils Lake	ND	58301-0777
Mr.	Garry	Speidel	District Manager	Dakota Heartland Region	Montana Dakota Utilities	PO Box 2216	Jamestown	ND	58401-6054
Mr.	George	Berg	Manager		NoDak Electric Coop., Inc.	Box 13000	Grand Forks	ND	58208-3000
Mr.	Sandy	Roth		Right of Way Department	Northern Border Pipeline Company	PO Box 542500	Omaha	NE	68154-8500
Mr.	Gary	Cox			Northwest Communications Coop.	111 Railroad Ave.	Ray	ND	58849
Mr.	Bob	Krava	Right of Way Supervisor		Otter Tail Power Company	215 S. Cascade Street	Fergus Falls	MN	56537
Mr.	David	Dunning	General Manager		Polar Communication Mutual Aid Corp.	PO Box 270	Park River	MN	58270-0270
Sir		or Madam	Engineer	Engineering Department	Qwest Communications	220 N. 5th St.	Bismarck	ND	58506-5508
Sir		or Madam	Engineer	Engineering Department	Qwest Communications	409 1st Avenue N	Fargo	ND	58102
Sir		or Madam	Engineer	Engineering Department	Qwest Communications	103 N. 5th Street	Grand Forks	ND	58203
Mr.	Ray	Christenson	Manager/CEO		Southwest Water Authority	4665 2nd St. W.	Dickinson	ND	58601
Mr.	Dan	Hillaird			Sprint	849 Earl St.	St. Paul	MN	55106
Mr.	David C.	Schelkoph	CEO		West Plains Electric Coop., Inc.	PO Box 1038	Dickinson	ND	58602-1038
Sir		*or Madam*	Manager		Xcel Energy	PO Box 2747	Fargo	ND	58108-2747
Sir		*or Madam*	Regional Environmental Coordinator	Midwest Regional Office	National Park Service	601 Riverfront Drive	Omaha	NE	68102-4226
Mr.	Dave	Pieper	Supervisor	Dakota Prairie Grasslands	US Forest Service	240 W. Century Ave.	Bismarck	ND	58503
Mr.	Jack	Isaacs	District Ranger	Grand River Ranger District	US Forest Service	PO Box 390	Lemmon	SD	57638
Mr.	Frank	Guzman	District Ranger	McKenzie Ranger District	US Forest Service	191 S. Main St.	Watford City	ND	58854
Mr.	Ron	Jablonski	District Ranger	Medora Ranger District	US Forest Service	99 23rd Avenue W Suite B	Dickinson	ND	58601
Mr.	Bryan	Scotts	District Ranger	Sheyenne Ranger District	US Forest Service	PO Box 946	Lisbon	ND	58054
Mr.	John	Thompson	District Engineer	Valley City District	ND Department of Transportation	1524 8th Avenue SW	Valley city	ND	58072-4200
Mr.	Les	Noehre	District Engineer	Grand Forks District	ND Department of Transportation	PO Box 3077	Grand Forks	ND	58208-3077
Mr.	Lonny	Bagley	Field Office Manager	North Dakota Field Office	Bureau of Land Management	29 23rd Ave W Suite A	Dickinson	ND	58601
Mr.	Bryan	Williams	Project Coordinator	Reservation Restoration Committee	Sisseton-Wahpeton Sioux Tribe	PO Box 509	Agency Village	SD	57262-0267
Mr.	Myra	Pearson	Tribal Chairman	Ft. Totten Tribal Business Office	Spirit Lake Sioux Tribe	PO Box 359	Ft. Totten	ND	58325
Mr.	Ron	His Horse Is Thunder	Tribal Chairman		Standing Rock Sioux Tribe	PO Box D	Fort Yates	ND	58538
Mr.	Marcus	Wells	Tribal Chairman		Three Affiliated Tribes	HC3 Box 2	New Town	ND	58763
Mr.	David	Brien	Tribal Chairman		Turtle Mountain Chippewa	PO Box 900	Belcourt	ND	58316-0900
Mr.	Keith	Monson	Chairman		M-Power, LLC	PO Box 335	Finley	ND	58230
Mr.	Warren	Enyart	Secretary		M-Power, LLC	PO Box 335	Finley	ND	58230
Mr.	Lloyd	Anderson	Owners Rep.		M-Power, LLC	4838 Rocking Horse Circle	Fargo	ND	58104-6049
Mr.	Patrick	Pelstring	Co-Chair		National Wind, LLC	3033 Excelsior Blvd, Suite 525	Minneapolis	MN	55416
Mr.	Jack	Levi	Co-Chair		National Wind, LLC	3033 Excelsior Blvd, Suite 525	Minneapolis	MN	55416
Mr.	Dennis	Haugen	District Supervisor	Soil Conservation District	Griggs County	PO Box 526	Cooperstown	ND	58425
Mr.	Orville	Tranby	Chairman	Water Resource Board	Griggs County	135 17th Avenue SE	Cooperstown	ND	58425
Ms.	Cindy	Anton	Auditor		Griggs County	PO Box 511	Cooperstown	ND	58425
Mr.	Kent	Anderson	Commissioner	County Commission	Griggs County	191 97th Avenue NE	Sutton	ND	58484
Mr.	Ronnie	Edland	Chair	County Commission	Griggs County	371 109th Avenue NE	Cooperstown	ND	58425
Mr.	Dennis	Halvorson	Commissioner	County Commission	Griggs County	203 11th Street SE	Cooperstown	ND	58425
Mr.	Robert	Johnson	Commissioner	County Commission	Griggs County	450 96th Avenue SE	Sutton	ND	58484
Mr.	Lyle	Pfeifer	Commissioner	County Commission	Griggs County	11451 Hwy 200	Cooperstown	ND	58425

SOV MASTER LIST

Save as new file for each project and edit accordingly with project specific contacts

CTitle	First	Last	Title	Department	Agency	Address	City	State	Zip
Mr.	Robert	Hook	Emergency Manager		Griggs County	PO Box 574	Cooperstown	ND	58425
Mr.	Wayne	Oien	Highway Superintendent		Griggs County	PO Box 427	Cooperstown	ND	58425
Mr.	Paul	Hendrickson	Sheriff		Griggs County	PO Box 574	Cooperstown	ND	58425

Luverne Wind Farm
Summary of Scoping Commenting Agencies

Federal Agencies
Bureau of Indian Affairs
Federal Aviation Administration
National Park Service
United States Air Force, Grand Forks Air Force Base
United States Army Corps of Engineers, North Dakota Regulatory Office
United States Army Corps of Engineers, St. Paul district Office
United States Fish and Wildlife Service

State Agencies
Job Service North Dakota
North Dakota Department of Commerce
North Dakota Department of Health
North Dakota Department of Transportation
North Dakota Game and Fish Department
North Dakota Office of the Attorney General
North Dakota Parks and Recreation Department
North Dakota State Water Commission
Senator Kent Conrad
State Historical Society of North Dakota

Local Entities
Dakota Rural Water District
Griggs County
Sisseton Wahpeton Oyate Tribal Historic Preservation Officer
Universal Ensco, Inc.

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Great Plains Regional Office
115 Fourth Avenue S.E.
Aberdeen, South Dakota 57401

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
DESCRM
MC-208

MAR 26 2008

Jennifer Turnbow, Environmental Planner
Kadrmas Lee and Jackson
P.O. Box 1157
Bismarck, North Dakota 58502-1157

Dear Ms. Turnbow:

We received your letter regarding the proposed Wind Farm Development in Griggs and Steele Counties, North Dakota. We have considered the potential for both environmental damage and impacts to archeological and Native American religious sites on lands held in trust by the Bureau of Indian Affairs, Great Plains Region. You should be aware, however, that tribes or tribal members may have lands in fee status near the site of interest. These lands would not necessarily be in our databases, and the tribes should be contacted directly to be sure all concerns are recognized. The action considered has the following notification date and project location:

- February 27, 2008 — Wind Farm Development, M-Power, LLC and National Wind, LLC, Griggs and Steel Counties, North Dakota

We have no environmental objections to this action, as long as the project complies with all pertinent laws and regulations. Questions regarding environmental opinions and conditions can be addressed to Marilyn Bercier, NEPA Coordinator, at (605) 226-7656.

We also find that the listed action will not affect cultural resources on tribal or individual landholdings for which we are responsible. Methodologies for the treatment of cultural resources now known or yet to be discovered – particularly human remains – must nevertheless utilize the best available science in accordance with provisions of the Native American Graves Protection and Repatriation Act, the Archaeological Resources Protection Act of 1979 (as amended), and all other pertinent legislation and implementing regulations. Archeological concerns can be addressed to Dr. Carson N. Murdy, Archeologist, at (605) 226-7656.

Sincerely,

Deputy Regional Director – Indian Services

RECEIVED
MAR 31 2008
BY:

U.S. Department
of Transportation
**Federal Aviation
Administration**

February 29, 2008

Federal Aviation Administration
Bismarck Airports District Office
2301 University Drive Bldg 23B
Bismarck, North Dakota 58504

Mr. Grady Wolf
Kadrmas, Lee, and Jackson
PO Box 1157
Bismarck, ND 58502-1157

Wind Farm Development and Proposed 77 Mile 230 kV Transmission Line
M-Power, LLC, and National Wind, LLC
Griggs County and Steel Counties, North Dakota

Dear Mr. Wolf:

The Bismarck Airports District Office is unable to evaluate the proposed 77 mile transmission line proposed for the wind farm project as the location of the transmission line was not included in the study area map.

The Bismarck Airports District Office has no objections to the proposed wind farm identified in your letter dated February 27, 2008, provided:

1. The Federal Aviation Administration (FAA) is notified of construction or alterations as required by Federal Aviation Regulations, Part 77, Objects Affecting Navigable Airspace, Paragraph 77.13. Please note that Part 77 includes temporary construction vehicles and equipment. The Notice of Proposed Construction or Alteration Form 7460-1 may be obtained and filed online at https://oeaaa.faa.gov or mailed to:

   Express Processing Center
   Federal Aviation Administration
   Southwest Regional Office
   Obstruction Evaluation Service, AJR-32
   2601 Meacham Boulevard
   Fort Worth, TX 76137-0520

2. FAA technical operations are contacted to identify any possible impacts to aircraft navigation and/or communication equipment. The MSP TSCM for the proposed area may be contacted by phone at (952) 997-9261 or in writing. The address for the Minneapolis Technical Support Center Manager (MSP TSCM) is:
   Federal Aviation Administration
   Minneapolis Technical Support Center
   Attn: MSP TSCM
   14800 Galaxie Ave, Suite 300
   Apple Valley, MN 55124

3. The design, construction, and operation of the wind farm and all associated improvements, roads, utilities, and any mitigation (including project mitigation sites not within the study area) do not create a hazardous wildlife attractant to surrounding airports. Hazardous wildlife and hazardous wildlife separation distances are defined in FAA Advisory Circular (AC) 150/5200-33A, Hazardous Wildlife Attractants on or near airports. All design, construction, and operation of the facility and all facility components (such as materials handling, landscaping, ditches, and storm water management) shall comply with FAA AC 150/5200-33A, Hazardous Wildlife Attractants on or near Airports. A copy of the advisory circular may be obtained at www.faa.gov.

Please be advised FAA Advisory Circular 150/5200-33A, Hazardous Wildlife Attractants On or Near Airports, advises a minimum separation distance between the airport and a hazardous wildlife attractant. Additionally, it is recommended that a 5-mile separation distance be considered when the attractant could cause wildlife movement into or across the approach or departure airspace.

If you or the proponents are uncertain if the proposed development will cause a wildlife hazard for your airport or other airports in the area, we recommend you or the proponent consult with the United States Department of Agriculture, APHIS, Wildlife Services or an other qualified wildlife biologists. We recommend any wildlife biologist consulting on a matter such as this, meet the qualifications identified FAA Advisory Circular 150/5200-36, "Qualifications for wildlife biologist conducting wildlife hazard assessments and training curriculums for airport personnel involved in controlling wildlife hazards on airports".

If not already included in your planning process, we request that Cooperstown Municipal Airport be given the opportunity to provide input and comments.

I appreciate that our office was given the opportunity to review this project. Please contact me if you have any questions or need further information.

If you have additional questions, please contact our office at (701) 323-7380.

Sincerely,

Patricia L. Dressler
Environmental Protection Specialist
Bismarck Airports District Office

Cc: Manager, Cooperstown Municipal Airport

Environmental Coordinator
National Park Service
Midwest Regional Office
601 Riverfront Drive
Omaha, NE 68102

049J82036859
$00.41⁰
03/27/2008
Mailed From 68102
US POSTAGE

Kadrmas Lee & Jackson
128 Soo Line Drive
P.O. Box 1157
Bismarck, North Dakota 58502-1157

Re: Wind Farm Development, Griggs and Steele Counties, North Dakota

We have received your letter of February 27 , 2008 concerning the above referenced project.

☑ We have no comment on your proposed actions.

These comments have been provided as early technical assistance and do not necessarily indicate the NPS or the Department of the Interior's response to future environmental documents prepared in association with the project.

Thank you,

Regional Environmental Coordinator

DEPARTMENT OF THE AIR FORCE
319TH CIVIL ENGINEER SQUADRON
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

MAR 18 2008

Wayne A. Koop
319 CES/CEV
525 Tuskegee Airmen Blvd.
Grand Forks AFB ND 58205-6434

Kadrmas Lee & Jackson
P.O. Box 1157
Bismarck ND 58502-1157

Dear Sir:

Your 27 Feb 08 letter concerning the proposed construction of the wind farm, as well as associated access raods and utilities, and the proposed construction of a 77-mile 230 KV (kilovolt) electrical transmission line. An environmental analysis of potential impacts associated with this project has been reviewed with our Environmental Management and Real Estate Offices. We have found that Grand Forks AFB owns no property in or adjacent to the proposed project area and have no pertinent information or comments to contribute to your environmental assessment. Thank you for bringing this matter to our attention.

Sincerely,

WAYNE A. KOOP, R.E.M.
Environmental Management Flight Chief

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
1513 SOUTH 12TH STREET
BISMARCK ND 58504-6640

REPLY TO
ATTENTION OF

March 3, 2008

North Dakota Regulatory Office [NWO-2008-00541-BIS]

Kadrmas, Lee and Jackson Inc.
P.O. Box 1157
Bismarck, North Dakota 58502-1157

To Whom It May Concern:

This is in response to your letter dated February 27, 2008 requesting Department of the Army (DA), US Army Corps of Engineers (Corps) comments on behalf of M-Power, LLC and National Wind, LLC regarding the development of a 150 MW (megawatt) wind farm. The proposed wind farm is located within an 8,640 acre study in Griggs and Steele Counties, North Dakota.

Corps regulatory offices administer Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Section 10 of the Rivers and Harbors Act regulates work in or affecting navigable waters. Section 404 of the Clean Water Act regulates the discharge of dredge or fill material (temporarily or permanently) in waters of the United States. Waters of the United States may include, but are not limited to, rivers, streams, ditches, coulees, lakes, ponds, and their adjacent wetlands. Fill material includes, but is not limited to, rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mines or other excavation activities and materials used to create any structure or infrastructure in the waters of the United States.

If your proposal would require a Section 10 and/or Section 404 permit, please complete and submit the enclosed Corps of Engineers permit application to the U. S. Army Corps of Engineers, North Dakota Regulatory Office, 1513 South 12th Street, Bismarck, North Dakota 58504. If you are unsure if a permit is required, you may submit an application, or, a letter requesting a jurisdictional determination. Include a project location map, description of work, and construction methodology when submitting either.

If we can be of further assistance or should you have any questions regarding our program, please do not hesitate to contact this office by letter or phone at (701) 255-0015 and reference project number **NWO-2008-00541-BIS.**

Sincerely,

Daniel E. Cimarosti
Regulatory Program Manager
North Dakota

Enclosure
-application

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)	OMB APPROVAL NO. 0710-0003 Expires December 31, 2004

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research and Sanctuaries Act, 33 USC 1413, Section 103. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
NWO-2008-00541-BIS			

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE *(an agent is not required)*
6. APPLICANT'S ADDRESS	7. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOS. W/AREA CODE	10. AGENT'S PHONE NOS. W/AREA CODE
a. Residence b. Business	a. Residence b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____

APPLICANT'S SIGNATURE DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE *(see instructions)*

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*	14. PROJECT STREET ADDRESS *(if applicable)*
15. LOCATION OF PROJECT _____ _____ COUNTY STATE	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

17. DIRECTIONS TO THE SITE

18. Nature of Activity *(Description of project, include all features)*

19. Project Purpose *(Describe the reason or purpose of the project, see instructions)*

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled *(see instructions)*

23. Is Any Portion of the Work Already Complete? Yes _____ No _____ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

*Would include but is not restricted to zoning, building and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Grady Wolf

From: Werner, Dana L MVP [dana.l.werner@usace.army.mil]
Sent: Friday, March 21, 2008 2:35 PM
To: grady.wolf@kljeng.com
Subject: RE: Luverne Wind Farm

Mr. Wolf -

Thank you for providing a copy of the wind farm study location. After reviewing the study area the St. Paul District Corps of Engineers does not have any objections to placing a wind farm anywhere within the study area because there are no flood control projects, except for Lake Ashtabula, in the study area. You will not be permitted to place any of the Wind Generation Towers on Corps owned land that exists around the reservoir.

You should still need to seek the environmental comments from the Omaha District Corps of Engineers Office or from the Corps regulatory field office in Bismarck. The St. Paul District does not have regulatory jurisdiction within the State of North Dakota.

If I can be of any assistance feel free to give me a call.

Dana L. Werner
Flood Damage Reduction Program Manager
St. Paul District Corps of Engineers
190 5th Street East
St. Paul, Minnesota 55101-1638

PHONE: (651) 290-5326
EMAIL: dana.l.werner@usace.army.mil

-----Original Message-----
From: Grady Wolf [mailto:grady.wolf@kljeng.com]
Sent: Thursday, March 20, 2008 3:49 PM
To: Werner, Dana L MVP
Subject: Luverne Wind Farm

Dana,

Attached is a study area map for the proposed wind farm located near Luverne ND. As we discussed on the telephone, wind towers will not be located on USACE property around Lake Ashtabula.

Thanks for your help with this project.

Grady Wolf
Environmental Scientist
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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

APR 11 2008

Ms. Jennifer Turnbow
Kadrmas, Lee & Jackson, Inc.
128 Soo Line Drive
P.O. Box 1157
Bismarck, North Dakota 58502-1157

Dear Ms. Turnbow:

This is in response to your February 27, 2008, request for environmental information in relation to a proposed wind energy development project in Griggs and Steele Counties, North Dakota. The proposed project would include construction of the wind farm, as well as associated access roads and utilities. This proposed project would also include the construction of a 77-mile 230 kilovolt (kV) electric transmission line. The proposed location for the M-Power, LLC (M-Power) and National Wind, LLC Wind Energy Project is within an 8,640 acre area in the southeast corner of Griggs County and the southwest corner of Steele County. No specific information is provided as to the number of wind turbines or other infrastructure. Therefore, our comments are general in nature. We offer the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and the National Environmental Policy Act (NEPA) (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, § 4(b), Sept. 13, 1982).

Your letter stated that if no reply is received by March 25, 2008, you will assume that we have no comments on this project. **You may not assume this.** Our office makes every effort to respond to such requests within 30 days of receipt. However, any party is responsible to ensure that their actions comply with the provisions of the laws specified above. This policy applies to requests for comments on any project; please adjust your request letters accordingly. You are certainly free to call this office to inquire as to the status of our response to any of your requests.

The U.S. Fish and Wildlife Service (Service) holds certain resources in trust and manages them for the benefit of the American people. These resources include migratory birds, inter-jurisdictional fish, federally-listed threatened and endangered species of plants and animals and their habitats, and units of the National Wildlife Refuge system. When planning an activity, project proponents should give careful consideration to potential impacts to these trust resources and compliance with the laws mentioned above. Additional information is provided below.

Migratory Birds

Adequate consideration for avian resources early in the site evaluation process can help to minimize impacts and facilitate project review. Although current wind turbine technology and proper siting can help to minimize the incidence of avian deaths due to blade, aerial line, and tower strikes, the potential for direct mortality of some migratory birds will remain. Wind power developers, in concert with the Service, can help to ensure that projects proceed with as little impact to migratory birds as possible. This can be accomplished by gathering information on avian resources as they relate to project siting and by implementing measures to minimize impacts to migratory birds from the construction and operation of the wind facility. The Service's Interim Wind Turbine Siting Guidelines are enclosed to assist in project planning (enclosure 1). We encourage M-Power to conduct a Potential Impact Index (PII) analysis to assist in the selection of a wind power site that minimizes the potential to impact migratory birds. Please inform this office whether or not you plan to use the Service's interim guidelines in selecting your site and if not, why not, and whether you intend to use a different method to assess avian resources and impacts to migratory birds.

To minimize the electrocution hazard to birds, the Service, with support from the Rural Utilities Service, recommends that new or updated overhead power lines be constructed in accordance with the current guidelines for preventing raptor electrocutions. The recommended guidelines can be found in "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996". To increase power line visibility and reduce bird fatalities resulting from collisions with power lines, the Service recommends new power lines that cross or run adjacent to rivers or large wetlands be modified according to "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994". Both publications can be obtained by writing or calling the Edison Electric Institute, P.O. Box 266, Waldorf, Maryland 20604-0266 (1-800-334-5453), or visiting their website at www.eei.org.

Threatened and Endangered Species

A list of Federally threatened and endangered species that may occur within the proposed project's area of influence is enclosed (enclosure 2). This list fulfills requirements of the Fish and Wildlife Service under Section 7 of the Endangered Species Act.

If a Federal agency authorizes, funds, or carries out a proposed action, the responsible Federal agency, or its delegated agent, is required to evaluate whether the action "may affect" listed species or critical habitat. If the Federal agency or its designated agent determines the action "is likely to adversely affect" listed species or modify critical habitat, the responsible Federal agency shall request formal section 7 consultation with this office. If the evaluation shows a "no effect" determination on listed species or critical habitat, further consultation is not necessary. If a private entity receives Federal funding for a construction project, or if any Federal permit or license is required, the Federal agency may designate the fund recipient or permittee as its agent for purposes of informal section 7 consultation. The Service does not believe that a

determination of "no effect" is appropriate for these wind resource areas because of, but not limited to, the presence of migrating whooping cranes in this area. However, due to the project location outside of the main migration corridor with only 5% of all confirmed whooping crane sightings in North Dakota, the Service believes that with conservation measures included as part of the project, a determination of "may effect, not likely to adversely affect" for the whooping crane may be appropriate. Effective conservation measures to avoid or reduce potential impacts to whooping cranes include, but are not limited to: burying all new electrical transmission lines or if new lines cannot be buried, marking all new overhead transmission lines with visual marking devices such as aviation marker balls, swinging plates, spiral vibration dampeners, or swan flight diverters.

Section 10(a)(1)(B) of the ESA allows non-Federal parties planning activities that have no Federal nexus, but which could result in the incidental taking of listed animals, to apply for an incidental take permit. (A Federal nexus exists whenever an activity is conducted, funded, or licensed or permitted by a Federal agency). The application must include a habitat conservation plan (HCP) laying out the proposed actions, determining the effects of those actions on affected federally-listed fish and wildlife species and their habitats (often including proposed or candidate species), and defining measures to minimize and mitigate adverse effects.

The Aransas Wood Buffalo Population (AWBP) of whooping cranes is the only self-sustaining migratory population of whooping cranes remaining in the wild. These birds breed in the wetlands of Wood Buffalo National Park in Alberta and the Northwest Territories of northern Canada, and overwinter on the Texas coast. Whooping cranes in the AWBP annually migrate through North Dakota during their spring and fall migrations.

Endangered whooping cranes have been documented using roosting habitat in the vicinity of these proposed wind resource areas. The proposed site is located outside the primary 180 mile-wide migration corridor that includes 95% of all confirmed whooping crane sightings in North Dakota (enclosure 3). The presence of suitable roosting and feeding habitat for whooping cranes in these wind resource areas, and confirmed whooping crane sightings, document the potential for whooping crane presence in the proposed wind resource areas. A wind energy project in these wind resource areas has the potential to affect whooping cranes during their annual spring and fall migration through North Dakota. Potential effects may be direct (e.g. collision mortality) or indirect (e.g. avoidance of the site resulting in cranes seeking alternate habitat). The interactions of whooping cranes with wind turbines and wind farms are currently not fully known, although it is expected that these large birds with relatively low maneuverability are susceptible to mortality via collisions with turbines. Currently, collisions with power lines are the greatest known source of mortality for fledged whooping cranes, and have accounted for the death or serious injury of at least 46 whooping cranes since 1956.

Fish and Wildlife Service Property Interests

The Service administers Waterfowl Production Area fee title as well as wetland and grassland easements throughout North Dakota. A review of the County plat books indicate Service property interests (wetland easements highlighted in yellow and fee title highlighted in green) are located in the planning area (enclosure 4). Contact Mr. Ed Meendering, Supervisory Wildlife Refuge Specialist, Valley City Wetland Management District, 11515 River Road, Valley City, North Dakota 58072-9619 (701-845-3466), for more specific information relative to Service property interests. Following are some suggestions and explanations of the various land interests the Service is responsible for in the proposed project area.

Wetland easements (yellow) are legal agreements with private landowners that permanently protect wetland basins from being drained, burned, leveled, or filled.

The primary responsibility in protecting these easements is to review all proposed uses to ensure that the requests are compatible with Service easement regulations and various laws and policies. Therefore, these comments and suggestions are made in an attempt to accomplish three goals: 1) avoid impacts to Service grassland and wetland easements in the project area as much as possible; 2) if unavoidable, ensure that any proposed turbine and associated infrastructure impacts (roads, buried collection lines, transmission lines, sub-stations, etc.) on any Service easement areas are kept to an absolute minimum; and 3) investigate all potential alternatives to eliminate or reduce impacts to easement areas to protect the integrity of the easement.

With these goals in mind, the Service offers the following comments:

- Wetland Easements: The Service manages a number of wetland easements in the proposed project area. Without a map showing the proposed turbine and road locations, it is not possible at this time to identify specific concerns with turbines and roads. The National Wetlands Inventory (NWI) identifies many of the area's wetlands; however, many of the small, shallow temporary wetland basins may not be recognized on NWI photography. You should make all reasonable efforts to avoid facility placement and disturbance to wetland easements. If your plans indicate a proposal to locate project facilities on Service wetland easements, the Service will review aerial photography along with field inspections to review construction stakes to make sure all wetland basins are avoided. In addition, it is important to make sure that access roads do not alter individual wetland basins and their individual watersheds.

- NEPA Review: As mentioned, if Service lands are proposed to be impacted, the Service will be required to conduct an analysis of impacts and examine alternatives, pursuant to NEPA.

High Value Habitat Avoidance

The proposed project area is located in the Drift Prairie Glaciated Plains region of North Dakota and includes areas of native mixed-grass prairie. Since the 1800s, North Dakota has lost approximately 75-90 percent of its native grasslands, primarily due to crop production. The Service recommends avoiding construction or disturbance on native prairie areas.

Native prairie has significant natural resource values including:

- Provides habitat for a number of migratory and resident grassland birds whose populations are declining.
- Provides nesting habitat for millions of waterfowl.
- Contains 200-300 plant species, which provide genetic diversity important to agriculture and medicine.
- Provides habitat for thousands of insects including the Dakota skipper, a candidate species for listing under the ESA, and other butterflies (Ex: Regal fritillary, Tawny crescent).
- Crucial for soil and water conservation.
- Provides recreational opportunities (hunting, bird watching/wildlife observation, hiking).
- Living laboratories for scientific research.

Our review of NWI maps indicate that wetland areas are located within the project area. NWI data can be accessed directly by visiting their website at (wetlands.fws.gov). Section 404 of the Clean Water Act regulates placement of fill materials in certain wetlands. A Corps of Engineers' 404 permit may be required if fill material will be placed in aquatic sites including wetlands. Contact Mr. Dan Cimarosti, Regulatory Office, Corps of Engineers, 1513 South 12th Street, Bismarck, North Dakota 58504 (701-255-0015), to determine their permit requirements. If a 404 permit is required, the Service will provide recommendations on this project to the Corps.

Other high value wildlife habitat types in North Dakota include wooded draws and riparian forests. We recommend that you avoid construction of wind towers and appurtenant facilities in the above habitat types whenever possible.

Construction activities should be conducted in a manner that will minimize impacts to the wildlife and the existing habitat in the project area. Where impacts are unavoidable, we recommend that you:

- Schedule construction 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 for nesting birds, along with information regarding the qualification of the biologist(s) performing the surveys, and any avoidance measures implemented at the project site, be throughly 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 proposed project has been completed.

- Avoid construction in native prairie, if possible, and reseed disturbed native prairie with a comparable native grass/forb seed mixture. Obtain seed stock from nurseries within 250 miles of the project area to insure the particular cultivars are well adapted to the local climate.
- Minimize grassland disturbance by using fewer, larger turbines and limiting new road construction.
- Use underground transmission lines between turbines, as well as to the primary substation.
- Locate appurtenant facilities to avoid placement of fill in wetlands along the route.
- Install and maintain appropriate erosion control measures to reduce sedimentation and water quality degradation of wetlands and streams near the project area.
- Replace unavoidable wetland losses with functionally equivalent wetlands.

Research, Monitoring, and Assessment

We encourage project proponents to conduct collision monitoring studies designed to determine the effect of several factors, such as site selection, turbine designs, the layout of wind plants, wind plant operations, habitat alteration, and changes in available perching and nesting sites, on bird deaths. The Avian Subcommittee of the National Wind Coordinating Committee (NWCC) has developed a guidance document to assist wind energy developers in designing studies that will produce credible and comparable results of avian interaction with wind power plants. The NWCC document, "Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and methods for determining or monitoring potential impacts on birds at existing and proposed wind energy sites," can be obtained by contacting the National Wind Coordination Committee, c/o RESOLVE, 1255 23rd Street, Suite 275, Washington, D.C. 20037, or by visiting their website at (www.nationalwind.org).

Given the Service requirements and recommendations above, as well as possible unforeseen issues that may arise, we encourage you to build sufficient planning time for coordination with the Service into your project timeline. Thank you for the opportunity to comment. If you require

further information as project planning proceeds, please contact Terry Ellsworth of my staff, or contact me directly, at (701) 250-4481, or at the letterhead address.

Sincerely,

Jeffrey K. Towner

Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

Enclosures (4)

cc: Supervisory Wildlife Refuge Specialist, Valley City WMD
Regulatory Office, Army Corps of Engineers, Bismarck
(Attn: D. Cimarosti)
ND Public Service Commission, Bismarck
Director, ND Game & Fish Department, Bismarck
(Attn: M. McKenna)

FEDERAL ENDANGERED SPECIES
FOUND IN GRIGGS COUNTY
NORTH DAKOTA
April 2008

ENDANGERED SPECIES

Birds

Whooping crane (Grus Americana): Migrates through west and central counties during spring and fall. Prefers to roost on wetlands and stockdams with good visibility. Young adult summered in North Dakota in 1989, 1990, and 1993. Total population 140-150 birds.

FEDERAL THREATENED, ENDANGERED, AND CANDIDATE SPECIES
AND DESIGNATED CRITICAL HABITAT FOUND IN
STEELE COUNTY, NORTH DAKOTA
April 2008

No Species listed.

GUIDELINES TO AVOID AND MINIMIZE WILDLIFE IMPACTS FROM WIND TURBINES

Wind-generated electrical energy is renewable, produces no emissions, and is a generally environmentally clean technology. Development of wind energy is strongly endorsed by the Secretary of the Interior, as expressed in the Secretary's Renewable Energy on Public Lands Initiative. However, wind energy facilities can adversely impact wildlife, especially birds, bats and insects. As more facilities with larger turbines are built, the cumulative effects of this rapidly growing industry may initiate or contribute to the decline of some wildlife populations. The potential harm to these populations from an additional source of mortality makes careful evaluation of proposed facilities essential. Due to local differences in wildlife concentration and movement patterns, habitats, area topography, facility design, and weather, each proposed development site is unique and requires detailed, individual evaluation.

The following guidance was prepared by the U.S. Fish and Wildlife Service. It is intended to assist the wind industry in avoiding or minimizing impacts to wildlife through 1) proper evaluation of potential Wind Resource Areas; 2) proper siting and design of turbines within development areas; and 3) pre- and post-construction research and monitoring to identify and/or assess impacts to wildlife.

These guidelines are voluntary. They are based on the best available science and will be updated as new information becomes available. Data on wildlife use and mortality collected at one site is not necessarily applicable to others; each site poses unique possibilities for negative effects on wildlife. In addition, the wind industry is rapidly expanding into habitats and regions that have not been well studied. The Service therefore suggests a precautionary approach to site selection and development, and will employ this approach in making recommendations and assessing impacts of wind energy developments. We encourage the wind industry to follow these guidelines, and to conduct scientific research to provide additional information on the impacts of wind energy development on wildlife. We further encourage the industry to look for opportunities to promote bird and other wildlife conservation when planning wind energy facilities (e.g., voluntary habitat acquisition or conservation easements) to compensate for habitat that is lost or degraded through development activities.

The Service is guided by the Fish and Wildlife Service Mitigation Policy (Federal Register Vol. 46, No. 15, January 1981) in evaluating modifications to or loss of habitat caused by development. This policy follows the sequence of steps recommended in the National Environmental Policy Act in seeking to avoid, minimize or compensate for negative impacts. Mitigation can involve avoiding the impact of an activity by taking no action; minimizing impacts by limiting the degree of activity; rectifying an impact by repairing, rehabilitating, or restoring an affected environment; reducing or eliminating an impact by conducting activities that preserve and maintain the resources; or compensating for an impact by replacing or providing substitute resources or environments. Any mitigation recommended by the Service for wind energy development would be for the purpose of offsetting habitat loss, degradation or fragmentation, and would be voluntary on the part of the developer. Mitigation does not apply to "take" of species under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, or Endangered Species Act.

The guidelines contain a protocol for pre-development evaluation of all potential WRAs in a geographic area (Appendix 1), and recommendations for siting, designing, constructing, and operating turbines within WRAs. Pre-development evaluations should be conducted by a team that includes Federal and/or State agency wildlife professionals with no vested interest in the sites selected. The pre-development evaluation may also identify additional studies needed prior to development. Post-construction monitoring is recommended at all sites developed. Pre- and post-development studies and monitoring may be conducted by any qualified wildlife biologist.

Definitions of terms used in this document can be found in Appendix 2.

A. Site Evaluation

The site evaluation protocol presented in Appendix 1 was developed by a team of Federal, State, university and industry biologists to rank potential wind energy development sites by impacts on wildlife. There are two steps to follow:

1. Identify and evaluate reference sites, preferably within the general geographic area of WRAs. Reference sites are areas where wind development would result in the maximum negative impact on wildlife (i.e., sites selected

to have the highest possible rank using the protocol). Reference sites are used to put risks of developing, specific sites within WRAs into perspective.

2. Evaluate potential development sites within WRAs to determine risk to wildlife, and rank sites against each other using the highest-ranking reference site as a standard. While high ranking sites are generally less desirable for wind energy development, a high rank does not preclude development of a site, nor does a low rank automatically eliminate the need to conduct pre-development assessments of impacts on wildlife.

B. Studies to Assess and Monitor Wildlife Impacts

1. While ranking potential development sites, the site evaluation team may identify pre-development studies that are needed to better assess potential impacts. Ranking may also suggest the degree and depth of study required. Developers are encouraged to conduct any studies suggested by the team, in consultation with Service and other agency wildlife biologists.

2. Post-development mortality studies should be a part of any site development plan, in order to obtain additional information on the extent of mortality, if any. As with pre-development studies, ranking may be suggestive of the degree and depth of study needed. Studies should be designed in consultation with Federal and other agency wildlife biologists.

C. Site Development Recommendations

1. Avoid siting turbines on major bird migration corridors or in areas where birds are highly concentrated, unless mortality risk is low (i.e., birds present rarely enter the rotor-swept area, such as Sage Grouse). Examples of high concentration areas for birds are wetlands, State or Federal refuges, staging areas, rookeries, and landfills. Avoid known migratory or daily movement flyways and areas with a high incidence of fog, mist, low cloud ceilings and low visibility.

2. For off-shore sites, including oceanic sites and the Great Lakes, avoid areas with consistent water bird and sea bird flight lines, colonies, foraging sites, staging and rafting areas, and areas of nutrient upwelling.

3. Configure turbines to avoid areas or features of the landscape known to attract raptors (hawks, falcons, eagles, owls). For example, Golden Eagles, hawks and falcons use cliff/rim edges extensively; setbacks from these edges may reduce mortality. Other examples include avoiding siting turbines in a dip or pass in a ridge, or in or near prairie-dog colonies.

4. Develop a habitat restoration plan for the proposed site that avoids negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. For example, avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors; reduce availability of carrion by practicing responsible animal husbandry to avoid attracting Golden Eagles and other raptors; avoid creating wetlands adjacent to turbines; and maintain contiguous habitat for area-sensitive species (e.g. Sage Grouse).

5. Configure turbines to minimize mortality; for example, orient rows of turbines parallel to known bird movements.

6. Where the height of the rotor-swept area produces a high risk for wildlife, adjust tower height where feasible to reduce the risk of strikes.

7. Avoid placing turbines near bat hibernation and breeding colonies, in migration corridors, and in flight paths between colonies and feeding areas.

8. Avoid siting turbines in habitats of any species of wildlife, fish or plant protected under the Federal Endangered Species Act.

D. Turbine Design and Operation Recommendations

1. Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities. Avoid placing external ladders and platforms on tubular towers to minimize perching and nesting. Do not use guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with recommended bird deterrent devices (*see Mitigating Bird Collisions with Power Lines. APLIC. 1994*).

2. When using three-bladed turbines, paint one of the three blades black and the other two white to increase visibility to birds.

3. If taller turbines (top of the rotor-swept area is >199 feet above ground level) requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting specified by the Federal Aviation Administration should be used. Unless otherwise requested by the FAA, only white strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. Solid red or pulsating red incandescent lights should not be used, as they appear to attract night-migrating birds at a much higher rate than white strobe lights.

4. Where feasible, place electric power lines underground to avoid electrocution of birds. Use *Mitigating Bird Collisions With Power Lines* (APLIC 1994), and *Suggested Practices for Raptor Protection on Power Lines* (APLIC, 1996) for any required above-ground lines, transformers or conductors.

5. High seasonal concentrations of birds may cause problems in some areas. If, however, power generation is critical in these areas, an average of three years monitoring data (e.g., acoustic, radar, infrared, or observational) should be collected and used to determine peak use dates for specific sites. Where feasible, turbines should be shut down during periods when birds are highly concentrated at those sites.

6. When upgrading or retrofitting turbines, follow the above guidelines as closely as possible. If studies indicate high mortality at specific older towers, retrofitting or relocating is highly recommended.

Literature Cited

Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices for Raptor Protection on Power Lines. Edison Electric Institute/Raptor Research Foundation, Washington, D.C., 128 pp.

Avian Power Line Interaction Committee (APLIC). 1994. Mitigating Bird Collisions with Power Lines: the State of the Art in 1994. Edison Electric Institute, Washington, D.C. 78 pp.

APPENDIX 1 -- PROTOCOL TO RANK POTENTIAL WIND ENERGY DEVELOPMENT SITES BY IMPACTS ON WILDLIFE

This protocol was developed by a team of Federal, State, university and industry biologists to rank potential wind development sites in Montana by their impacts on wildlife (USFWS, 2002). It has been modified to apply nationwide. The protocol focuses on a process of pre-development evaluation of potential sites and subsequent ranking against a reference site. Objectives are to: 1) assist developers in deciding whether to proceed with development; 2) provide a procedure to determine pre-construction study needs to verify use of WRAs by wildlife; and 3) provide recommendations for monitoring sites post-construction to identify, quantify, or verify actual impacts (or lack thereof).

Although this protocol focuses on impacts to wildlife, potential impacts to fish and plants should be considered as well. Surveys for rare, threatened or endangered plants should be conducted at all proposed land development sites.

Recommendations presented here are intended to provide a conceptual framework for initial steps in investigating a site. They are not intended to be all-inclusive relative to objectives, methods, and analysis nor to serve as the definitive reference or directive for any step in wind power related investigations. Further direction may be obtained in Anderson *et al.* (1999).

Potential Impact Index (PII)

The Potential Impact Index represents a "first cut" analysis of the suitability of a site proposed for development by estimating use of the site by selected wildlife species as an indicator of impact. Emphasis of the PII is on initial site evaluation and is intended to provide more objectivity than simple reconnaissance surveys.

There are two steps to follow in ranking sites by their potential impact on wildlife.

1. Identify and evaluate reference sites within the general geographic area of Wind Resource Areas (WRAs). Reference sites are areas where wind development would result in the maximum negative impact on wildlife, resulting in a high PII score. Reference sites are used to put risks of developing sites within WRAs into perspective.

2. Evaluate potential development sites within WRAs to determine risk to wildlife, and rank sites against each other using the **highest-ranking** reference site as a standard. While high ranking sites are generally less desirable for wind development, a high rank does not preclude development of a site, nor does a low rank automatically eliminate the need to conduct pre-development assessments of impacts on wildlife.

PII scores are relative, and are to be compared with those of other sites within the WRAs. The following assumptions are implicit in the PII process:

1. All WRA sites, regardless of turbine design, configuration or placement, present hazard and risk to wildlife from both an individual and population perspective.
2. Some sites present less hazard and risk to wildlife than others.
3. No adequate and defensible information exists regarding appropriateness of the proposed WRA site being evaluated, relative to impact on wildlife.
4. Evaluations will be conducted by qualified biologists without competitive interest in site selection, including those from State and Federal agencies who are familiar with local and regional wildlife.

The primary determinate of PII is evaluation of potential impacts on aerial wildlife from collision with turbines and infrastructure. The PII is derived from results of three checklists (forms are attached). These checklists should be developed and applied as follows:

A. The PHYSICAL ATTRIBUTE CHECKLIST considers topographic, meteorological, and site characteristics that may influence bird, bat and butterfly occurrence and movements.

B. The SPECIES OCCURRENCE AND STATUS CHECKLIST includes Birds of Conservation Concern at the Bird Conservation Region level (http://fws.gov/birds/education /surveys/survey reports/); all federally-listed Threatened and Endangered Species and Candidate Species (http://endangered.fws.gov/), and State Endangered, Threatened, and Candidate species; and bats and butterflies as listed by State Natural Heritage Programs.

C. The ECOLOGICAL ATTRACTIVENESS CHECKLIST evaluates the presence and influence of ecological magnets and other conditions that would draw birds, bats, or butterflies to the site or vicinity.

Cells in a checklist are checked if the condition or species is known or strongly suspected to occur. Criteria for checklist conditions marked with an asterisk (*) are explained on the following page. Conditions that are self-explanatory are not included. Conditions are not weighted. Cells are checked in the SPECIES OCCURRENCE & STATUS CHECKLIST if presence of species is unconfirmed but strongly suspected (i.e., WRA is within range and habitat of checklist species). This permits more liberal assignment of potential impact, reduces the probability of missing impacts on specific species due to lack of empirical data, and focuses future study and monitoring effort. Totals for each checklist are simple column sums. The PII is calculated from the checklist totals. A completed example from Montana is attached.

Determining Checklist Scores

A. Each checklist has boxes to be checked for a particular attribute found at each site. The maximum number of boxes that can be checked is 145. This maximum number is derived from the total number of boxes from all three checklists – Physical Attribute 36, Species Occurrence & Status 91, Ecological Attractiveness 17. These numbers were developed for Montana, and will vary from area to area due to variations in the number of physical attributes and species of concern. Keep in mind that all cells are very unlikely to be checked at a single site because all species and all ecological and physical conditions would not exist in one area.

B. After completing the three checklists for each site, add the total number of checks in a checklist for an ending sum (each box checked equals one). Each checklist has a divisor assigned (i.e. Physical Attribute checklist 0.25, Species Occurrence & Status 0.63, Ecological Attractiveness 0.12). The divisor is assigned because each checklist has a different total number of boxes, and the divisor is used in calculating the proportion each checklist represents of the total of all checklists (145). This expands the spread of index values and more dramatically displays the magnitude of differences among sites. (Example: the physical attribute checklist has 36 boxes; divide 36 by 145 =.025, the divisor.) You can change the number of boxes in any of the checklists to fit your geographic area. However, if you change the number of boxes you will have to recalculate the divisor.

Determining PII Score

A. Place the sums from each of the three checklists in the POTENTIAL IMPACT INDEX table sum boxes (Σ column) in the appropriate category.

B. Divide each checklist sum by the previously calculated divisor to adjust the sum for disproportionate numbers of conditions in each checklist, and place this adjusted sum in the Σ/p boxes for each checklist.

C. Add the adjusted checklist sums (Σ/p column) to produce the PII score.

Include any questions, statements, comments, or concerns regarding any checklist cell or category on the SITE SPECIFIC COMMENTS sheet. These comments are critical to determining pre-construction study needs. They will also help identify and refine questions and objectives to be addressed by follow-up study and monitoring. The nature of suspected Significant Ecological Events should be noted on the SITE SPECIFIC COMMENTS SHEET.

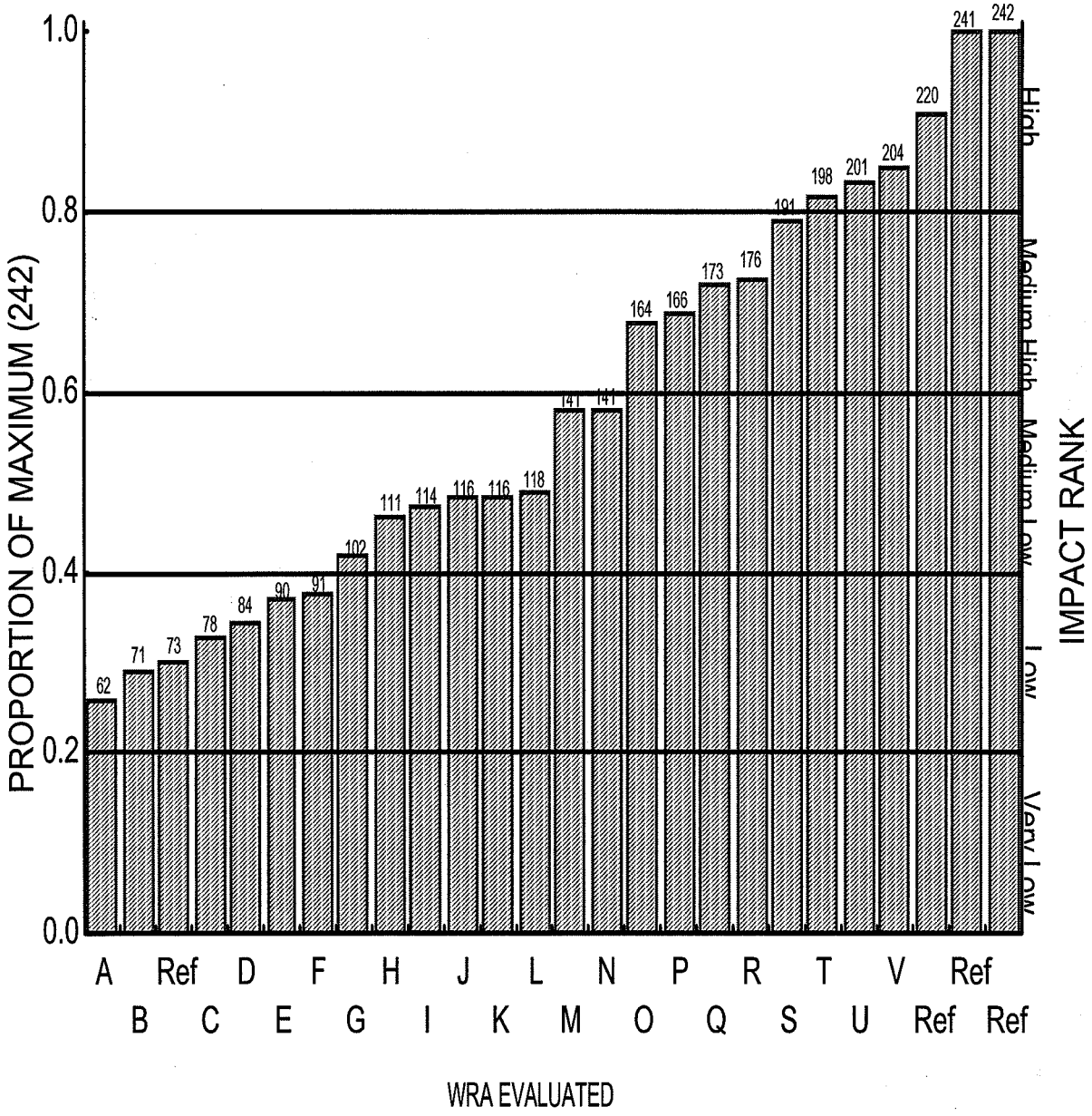

Figure 1. Impact ranks of proposed Wind Resource Areas in Montana. The number above each bar is the PII Score. Rank is a function of the proportional relationship of proposed development sites to the maximum score of four Reference Sites evaluated.

Ranking PII Scores

PII of each site evaluated is assigned a ranking based on its proportional relationship to the reference area that has the maximum PII score, as shown in Figure 1. Ranking categories (High, Low, etc.) are arbitrarily set at intervals of 20% of maximum.

Rankings are intended as a guide to developers. They are designed as indicators of relative risk to wildlife and thus the level of impact that may be expected should a site be developed. A high rank does not preclude development, nor does a low rank automatically eliminate the need to conduct pre-development assessments of impacts on wildlife. More intensive pre-construction studies may be needed for both scenarios if development of the site is pursued. Ranks may also suggest the extent of additional study needed.
In the case of federally listed threatened, endangered, or candidate species of wildlife, fish or plants, consultation under the Endangered Species Act is required, and may preclude development of a site regardless of its PII score.

Determining Pre-construction Study Needs

The goal of pre-construction studies is to estimate impacts of proposed wind power development on wildlife by addressing areas of concern identified during the PII process. Objectives, intensity, and methods of pre-construction studies are likely to be site specific, but may be independent of ranking. Regardless of ranking, studies should be designed to address 1) verification of use of WRAs by ***all*** species recorded in the "SPECIES OCCURRENCE & STATUS" CHECKLIST; 2) identification of natural conditions (*e.g.*, "Significant Ecological Events", magnitude, timing, and location of suspected bird/bat migration); or 3) questions noted in the SITE SPECIFIC COMMENTS SHEET for that site. The SITE SPECIFIC COMMENTS SHEET may also indicate conditions that need not be investigated. As a result, a site with a low rank may require radar surveillance (*e.g.*, important shorebird staging or stop-over site) while a site with a high rank may require only a single season visual survey (*e.g.*, site potentially contains autumn Whooping Crane habitat). The process should involve a feedback mechanism within an adaptive management (Walters 1986) strategy (Figure 2). Timely review of study results will determine if data are adequate, if conclusions are defensible (Anderson et al. 1999) and if additional investigational effort is required (*e.g.*, if Black-footed Ferrets are found on Mountain Plover searches). Beyond estimation of impacts prior to development, studies should be designed to detect major impacts after construction (Anderson et al. 1999).

Projects with Federal involvement also may require additional analysis under the National Environmental Policy Act or Endangered Species Act. Also, mere existence of a pre-construction study, whether in progress or completed, does not validate development of a site.

Figure 2. A suggested decision tree for assessing potential development sites. Begin by developing a PII score.

Post-construction Studies

The Service recommends that all sites be monitored for impacts on wildlife after construction is completed. Some sites may be so obviously benign that little more than simple reconnaissance study may be needed and any impact will be revealed during post-construction monitoring. Otherwise, pre-construction study should be designed to dovetail with post-construction monitoring to permit statistically valid evaluation of actual impacts. Accordingly, studies should be conducted as much as possible within a Before-After-Control-Impact (BACI) (Green 1979) study design. Such design requires investigation of at least two sites (Impact [proposed site] and Control) simultaneously, both pre-construction (Before) and post-construction (After). Because true "Control" sites are seldom available, other sites may be substituted, including Reference Areas used in developing the PII ranking. In the case of radar surveillance studies, "In" and "Out" of the proposed WRA boundaries may be acceptable (*e.g.*, Harmata *et al.* 1998). Structuring pre-construction studies within a hypothesis-testing framework will help identify appropriate metrics, focus effort, and permit comparisons with "After" conditions or other WRAs.

Where feasible, post-construction studies should also be utilized to test measures that may eliminate or reduce impacts to wildlife. See Appendix 4, Research Needed.

Metrics and Methods

Metrics are specific tools used to assess wildlife populations and their status (*e.g.*, point counts, line transects, nest success studies, radar surveys, mortality rates, and risk). They can provide important information about birds, bats, insects and other wildlife at proposed development sites. Metrics may be selected to collect seasonal, species, group, guild, or habitat specific information, based on data and comments in the SPECIES OCCURRENC &

STATUS CHECKLIST and SITE SPECIFIC COMMENTS SHEET. For example, a proposed WRA may be in a narrow north-south oriented valley of relatively monotypic habitat. These conditions suggest a heavy seasonal avian migration corridor but little avian breeding habitat. Accordingly, study emphasis should be on defining use and mortality of migratory birds during autumn or spring or both, with little effort directed at defining use and mortality of breeding birds. Conversely, a potential WRA on a flat plain in diverse habitat would indicate the exact opposite in study emphasis.

While metrics represent specific measurements, concepts and relationships, methods refer to observational or manipulative study techniques that may be used to verify the location of birds and other wildlife, estimate their numbers, and document their use and behavior (Anderson et al. 1999). Table 2 depicts some commonly used metrics and methods for wildlife studies in Montana.

Studies should also strive to generate information to avoid or mitigate impacts by siting, configuration, or operation of turbines (Johnson *et al.* 2000). Every effort should be made to choose metrics and methods that allow comparisons of pre-construction studies with "After" studies, other WRAs, and other regions.

Table 2. Examples of metrics and methods associated with evaluating use and mortality of wildlife at proposed Wind Resource Areas in Montana.

Data Need	Metric	Methods
Use Profile	Individuals/Count	Species/guild/group List Point Counts (birds) Winter Raptor Surveys Lek Counts (grouse) Migration Counts Ungulate Surveys Spotlight Surveys
	Species/Count	Point Counts (neotropical migrants) Raptor Nesting Surveys Raptor Migration Counts Acoustic Surveillance (bats) Pellet Counts Bait Stations Track Boards
	Use duration/minute/season	Radar Migration Counts Raptors/watch Area Searches
	Individuals/capture effort	Various techniques for Raptor/Passerine/Mammal/herptile capture
	Productivity	Nests/area Raptor Nesting Surveys Ungulate surveys
	Events/height category (Altitude Profile)	Radar
	Events/distance category (Spatial Profile)	Radar
	Passage Rate (events/time/unit area)	Radar
Mortality	Dead/injured individuals/unit	Transects Spot Searches

Interpreting Metrics

Just what constitutes high use (i.e., potentially high impact) may or may not be a matter of conjecture. When looking at the distribution and movements, and local, regional, or range-wide population estimates for particular species, relative proportions of species, groups or guilds of wildlife using proposed WRAs may indicate risk. If, however, baseline population data are unknown, consult with a qualified biologist who can recommend a specific metric.

It is likely that little or no evidence of mortality will be found during pre-construction study. If, however, post-construction mortality is found, and statistical evaluation is not possible, that mortality should be assessed in regard to the species status (ESA listed) or the effect of the loss of that species on a local, regional, or continental-wide populations basis.

Determining Post-construction Monitoring Needs

Post-construction monitoring is important to the Service, industry, and public because of the limited information available on impacts of wind turbines and WRAs on wildlife. Therefore, post-construction monitoring should be designed to detect major impacts. The intended time frame for post-construction monitoring is not expected to exceed 3 years, however. Major impacts may be considered as statistically significant changes in use profiles by species of concern, or limited to statistically significant increases in mortality rates of any wildlife. Monitoring effort may be intensive or cursory, depending on results of pre-construction use and mortality studies. Simple, infrequent mortality surveys on impact and control plots may be all that is needed at WRAs where recorded pre-construction use by wildlife is low. Documented high use of a proposed WRA may require monitoring methods identical to those employed in pre-construction studies. Anderson *et al.* (1999) provides specific, detailed direction in post-construction study design and monitoring. Manville (2002) developed a monitoring protocol for use by the U.S. Forest Service at three National Forests in Arizona that could be modified for use at land-based wind turbines (Appendix 5).

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POTENTIAL IMPACT INDEX CHECKLISTS

PHYSICAL ATTRIBUTE CHECKLIST

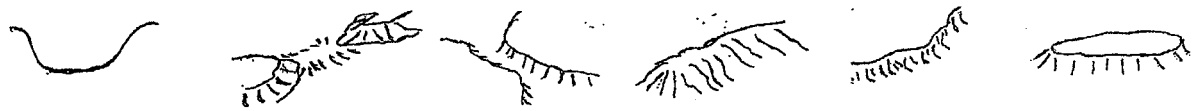
Physical Attribute				Site			
Topography (modify as necessary for marine environments)	Mountain Aspect*	Side	W				
			E				
			N				
			S				
		Top					
		Foothill	W				
			E				
			N				
			S				
	Valley*						
	Pass*						
	Gap*						
	Ridge*						
	Bluff*						
	Butte*						
Wind* Direction	S						
	N						
	E						
	W						
	Updrafts*						
Migratory* Corridor Potential	Latitudinal (N ↔ S)						
	Longitudinal (E ↔ W)						
	Wide Approaches (>30 km)*						
	Funnel Effect	Horizontal					
		Vertical					
Site Size (acres) & Configuration*	<640						
	>640 <1000						
	>1000 <1500						
	Turbine Rows not Parallel to						
Infrastructure To Build	Transmission						
	Roads						
	Buildings*						
	Maintenance						
	Daily Activity						
	Substation						
Increased Activity*							
Totals							

PHYSICAL ATTRIBUTE CRITERIA - categories, max$\sum$ = , (p =).

Topography - Terrain characteristic within the ecological influence of the proposed wind development site, generally, but not restricted to ± 8 km.

Mountain Aspect - Aspect of topography for site of proposed development. Multiple categories may be checked.

Valley Pass Gap Ridge Bluff Butte



Wind Direction - Compass direction *from* which prevailing winds approach. Multiple categories may be checked.

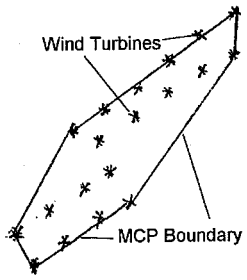
Updrafts - Do updrafts/upslope winds prevail?

Migratory Corridor Potential - Subjective estimate of area to be a potential avian/bat migratory corridor based strictly on topographical characteristics. Multiple categories may be checked.

Wide (>30 km) - Terrain characteristics of approaches to site from each migratory direction, i.e., a large plain, river corridor, long valley. The larger the area that migrant birds/bats are drawn from, the more may be at risk

Funnel Effect - Is the site in or near an area where migrant birds/bats may be funneled (concentrated) into a smaller area, either altitudinally, laterally, or both?

Site Size & Configuration – Size is estimated as if a minimum convex polygon (MCP) were drawn around peripheral turbines.



Successive boxes are checked to convey relationship of larger size = increased impact to birds/bats, *e.g.*, a 700 acre site will have 2 categories checked while a 1200 acre site will have all 3 categories checked.

Configuration of turbine rows is usually perpendicular to prevailing wind direction. Rows aligned perpendicular or oblique to route of migration intuitively presents more risk to birds than rows aligned parallel to movement.

Buildings – Building are categorized by relative size and visitation frequency, *i.e.,* structures that are visited daily are usually larger and present more impact than those that are not. If a "Daily Activity" building is required, all Building categories are checked. If a maintenance structure is required, Storage is also checked.

Increased Activity - Will any type of human activity increase? Sites in urban-suburban or otherwise developed areas (oil, gas, mines) will have less impact on wildlife than those in remote or undeveloped areas.

Avian Species of Special Concern Checklist
(Complete prior to SPECIES OCCURRENCE & STATUS CHECKLIST)

	Site											
Birds (*n* =)												
Occurrence[1]	**B**	**M/W**	**Σ**	**B**	**M/W**	**Σ**	**B**	**M/W**	**Σ**	**B**	**M/W**	**Σ**
Subtotals												
Total												

Avian Species of Special Concern Checklist (species, max $\sum$ =)

Column totals of this list are added to appropriate cells in the SPECIES OCCURRENCE & STATUS CHECKLIST. Consult Birds of Conservation Concern (USFWS, 1995, 2000). Appropriate avian field guides and species accounts should be consulted for confirmation of species distribution and habitat associations. State Natural Heritage Programs may also provide species accounts which include additional information useful in completing checklists.

In addition to species lists (rows), season of occurrence is also indicated (columns). "B" indicates breeding or summer occurrence and "M/W" indicates presence during migration or as wintering species. If occurrence within or in the vicinity ($\leq$ 7 km) of a proposed site is confirmed or suspected, an "X" is entered.

Bat Species Of Special Concern Checklist
(Complete prior to SPECIES OCCURRENCE & STATUS CHECKLIST)

	Site											
Bats (n =)												
Occurrence	**B**	**M/W**	**Σ**	**B**	**M/W**	**Σ**	**B**	**M/W**	**Σ**	**B**	**M/W**	**Σ**
Subtotals												
Total												

Bat Species Of Special Concern Checklist (species, max $\sum$ =).

Column totals of this list are added to appropriate cells in the SPECIES OCCURRENCE & STATUS CHECKLIST. Appropriate bat field guides and references (Barbour and Davis 1969, Harvey et al. 1999, Rauscher 2000) should be consulted for confirmation of species distribution and habitat associations. State Natural Heritage Programs may also provide species accounts which include additional information useful in completing checklists.

In addition to species lists (rows), season of occurrence is also indicated (columns). "B" indicates breeding or summer occurrence and "M/W" indicates presence during migration or as wintering species. If occurrence within or in the vicinity ($\leq$ 7 km) of a proposed site is confirmed or suspected, an "X" is entered.

SPECIES OCCURRENCE & STATUS CHECKLIST

Species		Site											
	Occurrence	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ
Threatened & Endangered (includes wildlife, fish, and plants)													
Candidate*													
Special Concern*	Birds (max ∑=)												
	Bats (max ∑=)												
	Subtotals												
	Total												

SPECIES OCCURRENCE & STATUS CHECKLIST (categories, max $\sum$ = , (p =).

Checklist totals for each column in "Avian Species of Special Concern List" and "Bat Species of Special Concern List are inserted in this checklist.

Threatened & Endangered Species - Species include in the Federal List of Endangered and Threatened Species (USFWS 2001a).

Candidate Species - Species being investigated for inclusion in the Federal List of Endangered and Threatened Species (USFWS 2001b).

Species of Special Concern - Species included in this checklist are those listed in Birds of Conservation Concern, and by Natural Heritage Programs that are known or suspected to be rare, endemic, disjunct, threatened or endangered.

Golden eagles may be included in this checklist because of special protective status afforded under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). Other species (e.g., sage grouse) may be included because of recent concern over population declines range wide. Bats (other than bat Species of Special Concern) should be included due to generally unknown impacts of wind farms on individual and populations.

ECOLOGICAL ATTRACTIVENESS CHECKLIST

			Site			
Ecological Attractor						
Migration Route*		Local				
	Continental*	N				
		S				
		E				
		W				
Ecological Magnets*		Lotic System				
		Lentic System				
		Wetlands				
		Native Grassland				
		Forest				
		Food Concentrated				
		Energetic Foraging				
	Vegetation/ Habitat	Unique				
		Diverse				
Significant Ecological Event*						
Site of Special Conservation Status*						
		Total				

ECOLOGICAL ATTRACTIVENESS CRITERIA - categories, max$\sum$ = , (p =).

Migration Route - Indicates predominate direction of movement of seasonal migrations. Multiple categories may be checked.

Local - Some avian populations move only altitudinally & direction may be East-West (sage grouse, owls, bald eagles).
Continental - Some migratory corridors experience mass movements in only one season/direction annually (*e.g.*, Bridger Mountains autumn eagle migration).

Ecological Magnets - Special, unique, unusual, or super ordinary habitats or conditions within the vicinity of the site that may attract wildlife. Lotic systems include small perennial or seasonal creeks to major rivers. Lentic systems include stock ponds to lakes to marine environments. Multiple categories may be checked.

Vegetation/Habitat - Unique or exceptionally diverse vegetation or habitat in the vicinity may indicate exceptional diversity and abundance of avian species or bats.

Significant Ecological Event - Special, unique, unusual, or super ordinary events that occur or are suspected to occur in the vicinity of the site, *e.g.*, up to one third of the Continental population of Trumpeter Swans visit Ennis Lake, < 4 km from a proposed Wind Resource Area; the Continental migration of shorebirds passes over (many stop) @ Benton Lake National Wildlife Refuge) and up to 2000 golden eagles pass over the Bridger Mountains in autumn. If unknown but suspected a "?" is entered. Specifics regarding the cell are then addressed in the appropriate box of the SITE SPECIFIC COMMENTS sheet to focus follow-up investigation and assist in definition of study objectives.

Site of Special Conservation Status - Any existing or proposed covenants, conservation easements, or other land development limitations intended to conserve, protect, or enhance wildlife or habitat. This criterion is weighted (2 entered if true) because of previous financial or other investment in ecological values. Specifics regarding the easement are then addressed in the appropriate box of the SITE SPECIFIC COMMENTS sheet to focus follow-up attention.

POTENTIAL IMPACT INDEX

	Site							
Checklist (p)[1]	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p
Physical ( )								
Species Occurrence & Status ( )								
Ecological ( )								
Totals								

[1]Proportion of total ( ) checklist categories.

SITE SPECIFIC COMMENTS

	Site			
Checklist				
Physical				
Species Occurrence				
Ecological				

EXAMPLE CALCULATION OF POTENTIAL IMPACT INDEX (PII)

APPENDIX 1
POTENTIAL IMPACT INDEX CHECKLISTS

PHYSICAL ATTRIBUTE CHECKLIST

Physical Attribute				Site: Snowy Mtn.Range			
Topography (modify as necessary for marine environments)	Mountain Aspect*	Side	W	X			
			E				
			N				
			S				
		Top					
		Foothill	W	X			
			E				
			N				
			S				
	Valley*			X			
	Pass*						
	Gap*						
	Ridge*			X			
	Bluff*						
	Butte*						
Wind* Direction	S						
	N			X			
	E						
	W						
	Updrafts*			X			
Migratory* Corridor Potential	Latitudinal (N □ S)						
	Longitudinal (E □ W)			X			
	Wide Approaches (>30 km)*						
	Funnel Effect	Horizontal		X			
		Vertical					
Site Size (acres) & Configuration*	<640						
	>640 <1000						
	>1000 <1500			X			
	Turbine Rows not Parallel to						
Infrastructure To Build	Transmission			X			
	Roads			X			
	Buildings*			X			
	Maintenance			X			
	Daily Activity			X			
	Substation			X			
Increased Activity*				X			
Totals				16			

Avian Species of Special Concern Checklist
(Complete prior to SPECIES OCCURRENCE & STATUS CHECKLIST)

	Site											
Birds (n =)	Snowy Mtn. R.											
Occurrence[1]	B	M/W	Σ	B	M/W	□	B	M/W	□	B	M/W	□
Nelson's Sharptailed Sparrow	X	X	2									
LeConte's Sparrow	X	X	2									
Baird's Sparrow	X	X	2									
Dickcissel	X		1									
Cassion's Kingbird	X		1									
Blackbacked Woodpecker	X		1									
Yellow-billed Cuckoo	X		1									
Peregrine Falcon	X		1									
Northern Goshawk		X	1									
Ferruginous Hawk		X	1									
Clark's Grebe	X		1									
Common Loon	X		1									
Subtotals	10	5	15									
		Total	15									

Bat Species Of Special Concern Checklist
(Complete prior to SPECIES OCCURRENCE & STATUS CHECKLIST)

	Site											
Bats (n =)	Snowy Mtn. Range											
Occurrence	B	M/W	Σ	B	M/W	□	B	M/W	□	B	M/W	□
Fringed Myotis	X		1									
Spotted Bat	X		1									
Subtotals	2		2									
Total			2									

SPECIES OCCURRENCE & STATUS CHECKLIST

Species		Site: Snow Mtn. R.											
	Occurrence	B	M/W	Σ	B	M/W	□	B	M/W	□	B	M/W	□
Threatened & Endangered	Bald Eagle		X	1									
Candidate*	Columbian Sharp-tailed Grouse	X	X	2									
Special Concern*	Birds (max Σ=)			15									
	Bats (max Σ=)			2									
	Subtotals			20									
	Total			20									

ECOLOGICAL ATTRACTIVENESS CHECKLIST

Ecological Attractor			Site: Snowy Mtn. Range			
Migration Route*	Local					
	Continental*	N	X			
		S	X			
		E				
		W				
Ecological Magnets*	Lotic System					
	Lentic System					
	Wetlands		X			
	Native Grassland		X			
	Forest		X			
	Food Concentrated					
	Energetic Foraging		X			
	Vegetation/ Habitat	Unique				
		Diverse	X			
Significant Ecological Event*						
Site of Special Conservation Status*						
Total			7			

POTENTIAL IMPACT INDEX

	Site							
Checklist (p)[1]	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p
Physical (0.25) 15÷.25=60	15	60						
Species Occurrence & Status (0.63) 20÷.63=32	20	32						
Ecological (0.12) 7÷.12=58	7	58						
Totals	42	**150**						

[1]Proportion of total ( ) checklist categories.

Appendix 2: Definitions Related to Wind Energy Development and Evaluation

AGL: height above ground level in feet *vs.* **MSL**, height above mean sea level in feet.

Dead Bird Search: an assessment of all birds killed at a turbine study site, conducted at a time (*e.g.*, first light for passerines) that minimizes scavenging by predators. Complete coverage of the search area is important to detect dead and injured birds. As dead birds or dead bird parts are discovered, they are documented according to species, location, condition, and estimated time of death. Necropsies are helpful in assessing blunt trauma, electrocution, or other causes of death.

Carcass Removal Study: a known number of bird carcasses are randomly placed at specified locations to monitor removal by scavengers or by other means. The rate of carcass removal can be calculated.

Deterrent Devices: specific equipment, devices, or techniques which are intended to be seen or heard to alert and deter birds from contacting turbine towers, rotors, guy wires, or related equipment. These include diverters installed on turbine or meteorological tower guy wires, dark (*e.g.*, black) paint on single turbine blades or portions of a blade, or noise-making devices that alert (*e.g.*, infrasound) or frighten (*e.g.*, pingers and Brecka buoys) birds.

Fish and Wildlife: any member of the animal kingdom, including any bird (including any migratory, nonmigratory, or endangered bird for which protection is afforded by treaty or other international agreement), mammal, fish, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate. Unless otherwise indicated, the Fish and Wildlife Service is particularly concerned about the impacts of wind turbines on birds, bats, and butterflies.

Flyway: a concentrated, predictable flight path of migratory bird species (*e.g.*, particularly waterbirds such as ducks, geese, large waders, and shorebirds, but also raptors, and sometimes songbirds) from their breeding ground to wintering area. Except along coast lines, the flyway concept may not generally apply to songbirds because they tend to migrate in broad fronts rather than down specific flyways. The term "corridors" has sometimes been used. These frontal movements of songbirds can change within and between seasons and years – as can, for example, movements of waterfowl – making specific designation more difficult. The concept applies both biologically and administratively. For administrative purposes, for example, there are 4 waterfowl flyways (Atlantic, Mississippi, Central, and Pacific) and 3 shorebird flyways (East, Central and Pacific). "Daily flyways" may also exist between roosting and feeding areas.

Impact Area: the area of risk to birds, bats, butterflies and other organisms from collisions and electrocutions that will likely kill or injure wildlife. The rotor swept area is the location of greatest risk, particularly the distal/outer portion of the area as blade speeds are the greatest and visibility is the poorest at this location when turbines are rapidly spinning. The turbine tower also creates a risk because, especially under lighted conditions in inclement weather, night-migrating songbirds may be vulnerable to collisions. Electrical wires and live, uninsulated wires in phase-to-phase or phase-to-ground configurations can also be deadly due to electrocutions.

Mitigation: The President's Council on Environmental Quality defined the term "mitigation" in the National Environmental Policy Act regulations to include: "(a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments." (40 CFR Part 1508.20(a-e)). The Service has adopted this definition of mitigation and considers the specific elements to represent the desirable sequence of steps in the mitigation planning process.

Observer Detection Efficiency: determining how good observers are at finding dead birds and bird parts by placing a known number of dead birds or bird parts in a variety of locations with differing vegetative structure and color, then having observers search an area throughout the day under differing sunlight conditions and differing observer alertness (*i.e.,* first, second or third search of the day). This results in an observer detection rate – a measure of the searchers' detection probability under varying vegetative conditions, time of day, and search number.

Passerines: a general term for migratory songbirds, most of which winter in tropical areas.

Precautionary Approach: a conservative, scientific approach to conserving and managing habitats and species. Absent definitive data, the approach suggests taking the best steps available to initiate appropriate conservation actions. Those actions should then be refined through the use of principles of adaptive management and sound science. The absence of complete or definitive scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species, or non-target species and their environments. Specifically, developers should apply a precautionary approach widely to conservation and management of birds, bats, butterflies, other fauna, flora and affected habitats. This will protect the resources and preserve Wind Resource Areas by taking account of the best scientific evidence available.

Reference Site: an area of high wildlife value which is used to evaluate the suitability of other areas for wind energy development. Reference sites are selected by biologists familiar with the wildlife in the geographic area and habitat types where wind energy development is contemplated, and evaluated using the Ranking Protocol in Appendix 1. The reference site having the highest score, i.e., the area where wind energy development would have the greatest negative impact on wildlife, is used as the standard against which potential wind energy development sites are ranked.

Rookery: the breeding place of a colony of gregarious birds (*e.g.,* herons) or mammals (*e.g.,* bats).

Rotor-swept Area: generally the vertical airspace within which the turbine blades (generally 3) rotate on a pivot point or drive train rotor. The Area will vary in location depending on the direction of the prevailing wind. While "slower" turbines may operate at speeds less than 30 revolutions per minute (RPMs), turbine speeds at blade tips can still exceed 220 mph in stiff

winds. Recent studies indicate that birds appear unable to recognize blade presence at rotor tips during high blade speed, referred to as the "smear effect."

Staging Area: a traditional site where migratory birds of one or more species congregate in spring and fall for varying periods of time to forage and build up fat reserves prior to launching migratory flights. The term may be used on both the breeding and wintering grounds, as well as at intermediate stopover sites used at any point along the migration route.

Turbine-related Incident: fatality or injury caused by an animal (bird, bat, butterfly, or other organism) coming into contact with any part of a wind turbine tower, rotor blade, or related electrical structure, usually the result of a turbine blade strike.

Turbine Position within a Row/String: the specific position of a turbine within a string or row of turbines. It may be designated as an end-row, mid-row, or lone row turbine (one not located within a row).

Turbine Tower Type: a turbine/tower configuration distinctly different from other configurations with respect to the availability of perches, type of turbine, tower structure, height, and manufacturer.

Wind Resource Area (WRA): the geographic area or footprint within which wind turbines are sited, placed and operated, such as the Altamont Pass WRA, or where turbine siting and placement are anticipated. The term may be used to describe an existing facility, or a general area in which development of a facility is proposed. Existing facilities are known variously as "windfarms," "wind parks, " or "energy parks." WRAs are selected based primarily on the reliability and availability of sufficient wind. These areas are designated by the *United States Wind Resource Map*, published by the National Renewable Energy Laboratory, Dept. of Energy. The *Map* delineates wind power classifications from "marginal" to "superb" based on a Weibull wind speed index.

Appendix 3: Legal Mandates

The Migratory Bird Treaty Act (16 U.S.C. 703-712) (MBTA) is the cornerstone of migratory bird conservation and protection in the U.S. The MBTA implements a series of treaties that provide for international protection of migratory birds. It is a strict liability law wherein proof of intent to violate any provision is not required. Wording is clear in that most actions that result in Ataking@ or possession (permanent or temporary) of a protected species can be a violation. Specifically, MBTA states:

"Unless and except as permitted by regulations...it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill...possess, offer for sale, sell...purchase...ship, export, import...transport or cause to be transported... any migratory bird, any part, nest, or eggs of any such bird...(The Act) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior." The word Atake@ is defined as meaning Ato pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect."

A 1972 amendment to the MBTA resulted in inclusion of bald eagles and other birds of prey in the definition of a migratory bird. The MBTA provides criminal penalties for persons who, by any means or in any manner, pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, delivery for shipment, ship, export, import, cause to be shipped, exported, or imported, delivery for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird (including bald eagles), as well as possessing bald eagles, their parts, nests, or eggs without a permit. A violation of the MBTA can result in a fine of up to $15,000, and/or imprisonment for up to 6 months, or both for an offense not involving a sale. Penalties increase greatly for offenses involving sale. The potential fines are doubled for companies or organizations.

Under authority of the Bald and Golden Eagle Protection Acts (16 U.S.C. 668-668d)(EPA) and Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531-1543), bald and golden eagles are afforded additional legal protection. Penalties for violations of these acts are up to $100,000.00 for an individual or up to $200,000.00 for a company or organization, plus up to one year in jail. While these statutes do not permit take without permit, *the Service recognizes that some birds may be killed at structures such as wind turbines even if all reasonable avoidance measures are implemented.* The U.S. Fish & Wildlife Service (FWS) Division of Law Enforcement pursues its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals and industries that pro-actively seek to eliminate impacts on migratory birds. While it is not possible under the statutes to absolve individuals or companies from liability, *the Division of Law Enforcement and Department of Justice has used enforcement and prosecutorial discretion regarding individuals or companies who have made good faith efforts to avoid the take of migratory birds.* Good faith efforts include but are not limited to, permitting State and Federal agency personnel reasonable access to wind power sites for inspection and monitoring of site impacts on wildlife.

The Endangered Species Act was passed by Congress in 1973 in recognition that many of our Nation's native plants and animals were in danger of becoming extinct. The purposes of the Act are to protect these endangered and threatened species and to provide a means to conserve their ecosystems. To this end, Federal agencies are directed to utilize their authorities to conserve listed species and make sure that their actions do not jeopardize the continued existence of listed species. The law is administered by the Interior Department's Fish and Wildlife Service and the Commerce Department's National Marine Fisheries Service (NMFS). The FWS has primary responsibility for terrestrial and freshwater organisms, while the NMFS has responsibility for marine species such as whales and salmon. These two agencies work with other agencies to plan or modify Federal projects so that they will have minimal impact on listed species and their habitat. Protection of species is also achieved through partnerships with the States, with Federal financial assistance and a system of incentives available to attract State participation. The FWS also works with non-Federal landowners, providing financial and technical assistance for management actions on their lands to benefit both listed and non-listed species.

Section 9 of the ESA makes it unlawful for a person to "take" a listed species. The Act says, "The term take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The Secretary of the Interior, through regulations, defined the term "harm" as "an act which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." However, permits for "incidental take" can be obtained from the FWS for take which would occur through an otherwise legal activity, such as construction of wind turbines, and which would not cause the species to become further imperiled.

Section 10 of the ESA allows for the development of "Habitat Conservation Plans" for endangered species on private lands. This provision is designed to relieve restrictions on private landowners who want to develop land inhabited by endangered species. Private landowners who develop and implement an approved habitat conservation plan providing for conservation of the species can receive an incidental take permit that allows their development to go forward.

The National Environmental Policy Act of 1969 (42 U.S.C. 4371 et seq.) (NEPA) requires that Federal agencies prepare environmental impact statements (EIS's) for Federal actions significantly affecting the quality of the human environment. These EIS's must describe the proposed action, conduct detailed analyses of the impacts of the proposed action and alternatives to that action, and include public involvement in the decision making process on how to proceed to accomplish the purpose of the action. The purpose of the NEPA is to allow better environmental decisions to be made. The Council on Environmental Quality, established by the NEPA, has promulgated regulations in 40 CFR 1500-1508 that include provisions for preparing EIS's and Environmental Assessments, considering categorical exclusions from NEPA documentation requirements for certain agency actions, and developing cooperating agency agreements between Federal agencies.

Appendix 4: Research Needed

Effects of inclement weather in attracting birds and bats to lighted turbines, or drawing birds and bats to within rotor-swept area of turbines, particularly for passerines during spring and fall migrations.

Localized effects of turbines on wildlife: habitat fragmentation and loss; effects of noise on both marine and terrestrial wildlife; habituation; effects of offshore turbine construction and placement on benthic biota (sea bottom dwelling invertebrate wildlife).

Effects of wind turbine string configuration on mortality: end of row turbine effect; turbines in dips or passes or draws; setbacks from rim/cliff edges.

Effectiveness of deterrents: alternating colors on blades (particularly black/white and UV gel coats on the "smear" effect); lights (e.g., Austin moon lights; color, duration and intensity of pilot warning lights; lasers); infrasound (Brecka buoys, other noisemakers such as predator and distress calls if not irritating to humans or domestic animals); visual markers on guy wires.

Utility of acoustic, infrared and radar technologies to detect bird species, abundance, location, height, and movement.

Accuracy of mortality counts: estimate of the number of carcasses (especially of passerines) lost because they have been fragmented and lost to the wind; size and shape of dead bird search areas; possibility of recording collisions acoustically or with radar or infrared monitoring.

Annual variability (temporal and spatial) in migratory pathways ; what is the utility of GIS to assess migratory pathways and stopovers, particularly for passerines, bats, and butterflies.

Effectiveness of seasonal shutdowns at preventing mortalities.

Impacts of larger turbines versus smaller models.

Appendix 5: Protocol for Monitoring the Impact of Seven Cellular Telecommunication Towers on Migratory Birds within the Coconino and Prescott National Forests, Arizona
March 12, 2002

Prepared by: Dr. Albert M. Manville, Wildlife Biologist
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[Coconino NF Tower Proposal.wpd]

STUDY NEED:

The U.S. Fish and Wildlife Service's (FWS) Division of Migratory Bird Management (MBM) Region 9 headquarters office (Arlington, VA) proposes the following protocol for the monitoring and assessment of migratory songbirds, any avian species listed under the Endangered Species Act (ESA), and any bats listed under ESA. The study is to take place over a 3 year period on 7 proposed cellular telecommunication towers on the "I-17 Wireless Project" in the Coconino and Prescott National Forests, Arizona. The FWS understands that the results of this study will be valuable in evaluating future tower systems proposed along the I-40 corridor in Coconino and Kaibab National Forests. We strongly encourage this monitoring.

The monitoring is important because virtually no studies on the impacts of communication towers have been conducted west of the Rocky Mountains. We do not believe any monitoring of the impacts of "short"[1] towers[2] has been conducted on migratory birds. The FWS-chaired (Manville) Communication Tower Working Group agreed at its June 2000 meeting that assessing the impacts of "short" towers was a nationwide priority because the question about cumulative impacts of short towers needed to be answered. A protocol for a pilot study to begin testing this potential impact was prepared by Drs. Michael Avery (Project Leader, USDA National Wildlife Research Center) and Robert Beason (Biology Department Chair, University Louisiana, Monroe) and was peer-reviewed by professional ornithologists from the Ornithological Council in 2001. The study was to be implemented on a gas pipeline right-of-way at short towers owned and operated by Enron Gas Pipeline Group. The Enron corporate bankruptcy has precluded this study.

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[1] hereafter, generally < 200 feet (61m) above ground level (AGL), unguyed, and unlit.

[2] hereafter, to include towers, monopoles and lattice structures.

The FWS commends the FS and the staff of the Coconino and Prescott National Forests (NFs) in particular for requiring the industry to fund and implement this 3-year study. We also applaud the FS for encouraging the communication tower industry to use our voluntary Service tower siting guidelines in the placement and construction of these proposed towers.

TIME LINE AND REPORTING:

The study should take place for a minimum of **3 years** – each year consisting of a **spring** and **fall** assessment that coincides with the songbird migrations and an abbreviated **summer** assessment to monitor tower impacts (including guy wires if there are any) on resident migratory birds, including any ESA-listed species that may be present during this time, as well as resident and migratory ESA-listed bats. Monitoring data from each of the spring, summer and fall seasons and an annual monitoring summary should be provided to FS and MBM/FWS. A report from the completed study, along with annual monitoring summaries, should be submitted to FS and to MBM/FWS in Arlington, VA. MBM staff can distribute these to Service staff and the 50+ members of the Communication Tower Working Group on a timely basis. Data records are to be made available for FS and FWS review at any time they may be requested.

JUSTIFICATION FOR MONITORING PROTOCOL AND STUDY DESIGN:

Studies on the mortality of birds that strike "tall"[3] communication towers conducted by Avery *et al.* (1978) and others indicate that most dead birds were found within 197 ft. (60m) of the central communication tower structure. While this and numerous other studies have focused almost exclusively on tall towers, the monitoring protocols used for these previous studies are applicable for studying "short" towers as well, with some slight modifications (see beyond).

Avery *et al.* (1978) successfully used this technique to assess songbird mortality at a 1,210-ft. (369-m) Omega tower in North Dakota. Based on daily monitoring during 3 fall and 2 spring migration seasons, 63% of the birds they found dead or injured at this tower were within 300 ft. (92 m) of the tower. The proposed study for towers in Coconino and Prescott NFs, however, is dealing with much shorter communication towers, so dead birds will likely be found at distances less than discovered by Avery *et al.* (1978). Unlike the Avery *et al.* study, tagged bird carcasses (*e.g.*, House Sparrows and European Starlings) will **not** be placed in nets to assess persistence and scavenging/predation loss, unless staff of the Coconino and Prescott NFs feel this is necessary. Placing tagged carcasses in random search plots, which are then found or not found and/or removed or not removed, helps determine biases (Erickson *et al.* 1999). However, there are inherent problems associated with using tagged bird carcasses, including the attraction of predators, cost, availability, and adequate sample size (Dr. Dale Strickland, WEST Inc., 2002 personal communications).

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[3] hereafter, towers greater than 199 feet (61m) AGL, guyed, and lit.

Avery *et al.* (1978) completely examined the inner 150-ft.-radius (46m) of a tower in North Dakota for bird carcasses. We recommend this procedure for the Coconino and Prescott studies. The ground area underneath the North Dakota tower and outside the 150-ft.-radius (46m) interior concentric circle was then divided into 3 additional strata consisting of concentric circles (Figure 1), and north-south and east-west compass lines were drawn, dividing these strata into 12 substrata beyond the inner concentric circle. Two square sampling plots – 40 ft. (12.4m) on a side – were then randomly selected within each substratum. At these sampling plots, 0.75-inch (1.9-cm) mesh nylon netting was suspended above the ground on 5-ft.-high (1.5m) steel poles, net centers were anchored to the ground, and a wooden railing around the top perimeter of each net was constructed to prevent birds from being blown out. In the Avery *et al.* (1978) study, dead bird searches were made daily at **dawn** from March 30-June 4 and August 8-November 15. Dates of daily monitoring at towers in Arizona would need to be altered to coincide with songbird migrations through the Coconino and Prescott NFs. The searches also should be conducted **daily** at **first light**.

Dealing with Biases:

Many researchers have attempted to address the need to obtain unbiased estimates of the number of birds that collide with structures, including communication towers (Harness 2001, Faanes 1987, Hartman *et al.* 1993, APLIC 1994). Biases that must be addressed include **searcher efficiency** (birds within the search areas missed by the researcher), **removal** (birds removed by scavengers or predators before the search begins), **habitat** (birds missed because the area within a designated search area is physically or otherwise not searchable), and **crippling bias** (birds that collide with towers or their guy wires but do not fall within the search area). These biases can cause counts that are lower than actual numbers of birds killed (Harness 2001).

To assess removal of tower-killed birds by scavengers and predators (*e.g.,* birds of prey, jays and magpies, foxes, cats, weasels, skunks, badgers, mink, and others), Avery *et al.* (1978) placed tagged, dead birds in some of the sampling sites. Marked birds not taken overnight by scavengers were usually picked up the following morning during the search for tower casualties.

Sampling nets were demonstrated to be highly effective in preventing losses to scavengers and predators; none of 33 of the test birds placed in nets during the study were taken during the first night, while 12 of 69 test birds placed on non-netted gravel sampling plots were taken during the study (Avery *et al.* 1978). In a study at a Tallahassee, Florida, television tower – where sampling nets were not used – scavenging was considerably higher; only 10 of 157 birds were left undisturbed after one night (Crawford 1971). Based on the sampling efficiency shown in the Avery *et al.* (1978) study, and a proposed double sampling technique discussed below, MBM/FWS does **not** recommend using tagged bird carcasses in Arizona.

Double Sampling:

Based on suggestions from Dr. Dale Strickland (WEST Inc., 2002 personal communication; after Erickson *et al.* 1999), MBM/FWS suggests applying a **double sampling regime** to the Arizona tower studies. This involves **net sampling** (after Avery *et al.* [1978], and Avery and Beason [2000] with slight modifications) – which allows for an estimate of the number of carcasses that fall beneath each tower that are relatively unbiased for searcher efficiency and carcass removal – and **ground sampling**. For the short towers to be studied, we suggest that the **entire area** the **radius** of the tower **height** be completely searched (including under the nets) each day during spring and fall migrations, and searched at least once a week during summer months. The specifics for both protocols follow.

Net sampling allows for adjustment of the **ground sampling** estimates that would correct for carcass removal and searcher efficiency bias based on the relative difference of the number of carcasses found using the 2 sampling methods at each communication tower studied. Using the nets, we assume negligible carcass scavenging. Nets also allow adjustment for these biases without the inherent problems associated with using tagged bird carcasses, as previously discussed (Strickland 2002 personal communication). The use of the 2 methods should increase the statistical power of comparison studies between each of the 7 towers being examined.

Using Transects to Determine Sampling Area and Develop Correction Factors:

It is likely that the probability of catching a bird in a net will change with distance from the tower (*i.e.*, birds may fly or be carried by the wind for a distance before dying). This factor should be included in the sampling design of this study. For example, if there is a bias because birds tend to die greater than 100 ft. (30m) from the short towers, probabilities can be determined by searching **strip transects** that radiate from the tower. This would help ① estimate the area that should be sampled by nets, ② develop a correction factor – if one is needed – for the area outside the radius of the area sampled by the nets, and ③ improve the correction factor for ground surveys (through double sampling) when total mortalities are being estimated for towers that will not be sampled with nets elsewhere (Strickland 2002 personal communication). Several strip census/transect methods are available (*e.g*, Haine, Hahn, Kelker, and others). A biometrician should be consulted for a specific recommendation for transect use and size for each site. A suggestion is presented.

Randomized Block Design:

Experiments can be "blocked" allowing each "treatment" to be randomly assigned within each block. **Blocking** can be based on a number of factors, which could potentially affect experimental variation. This can include animal abundance, vegetation, and topographical features. In studies such as this, it is common to block on habitat and time periods, a grouping called **local control** (Mead *et al.* 1993). Randomized block designs are usually statistically analyzed by analysis of variance.

In these Arizona studies, Strickland (2002 personal communication) recommends using a randomized block design where **4 treatments** are randomly assigned to the towers within a block (at least 6 blocks of 4 towers are needed; the FS has 7 towers available for study). A block of at least 4 towers would be located in very **similar habitat** relative to potential **bird use** (*e.g.*, anticipated songbird flight corridors) and other factors that may influence the likelihood of bird mortalities (*e.g.*, any history of **fog** or inclement weather, **funneling** effects, or bird **attractions**). MBM/FWS suggests that the specific statistical design of this study be worked out with Strickland, a biometrician, or others. MBM/FWS recommends the tower company or their consultant also contact Dr. Graham Smith, Chief of the Branch of Population and Habitat Assessment, MBM/FWS, Laurel, Maryland (301/497-5860; fax. 301/497-5871) for further assistance.

RECOMMENDED MONITORING PROTOCOL:

Using the study design of Avery *et al.* (1978), taking the modified design of the peer-reviewed pilot study proposed by Avery and Beason (2000), and using the suggestions presented by Strickland (2002 personal communication), MBM/FWS recommends the following:

❶ Before the monitoring actually begins, **identify** each tower according to location, type, height, elevation, topography, lighting, guys, and other distinguishing characteristics.

❷ Each day a tower is examined, note day and nighttime **weather** conditions (including temperature, wind, cloud cover, barometric pressure, rainfall, fog, obscuration, and other pertinent weather conditions) at the immediate tower site. When dead birds are located during the summertime and time of death can only be estimated, record general weather conditions back to the time the site was last monitored. Cloud cover should be designated as clear (< 10% cloud cover), partly cloudy (10-90% cover) or overcast (> 90% cover) for all searches. Make special note of inclement weather conditions, particularly during times of songbird migrations. During weekly summertime searches, attempt where possible to conduct carcass counts when weather ceilings are low and visibility is poor.

❸ In addition to the 7 "**experimental**" towers to be examined, select at least 1 unguyed, unlit tower – preferably nearby and perhaps shorter – as a "**control**" for these studies. The control(s) may not necessarily be within the NFs. If the habitat varies for each or several of the 7 experimental towers, more than one control will likely be needed. Consult a biometrician when selecting a control tower(s) and incorporating the control within the study design.

❹ Install elevated **catchment nets** at both the experimental and control towers. Nets should consist of 0.75-inch (1.9-cm) mesh knitted polyethylene, 50 x 50 ft. (15 x 15m) in size. Suspend each sampling net 5 ft. (1.5m) above ground. Attach 8-gauge monofilament nylon line around the periphery of the entire net. Be careful to avoid killing passerines, raptors or other birds that may become entangled in the catchment nets. Support the monofilament line with 6.5-ft.-long (2m) steel angle posts driven into the ground and spaced every 7-10 feet (2-3m) apart. Pull the center of each net close to the ground and secure with monofilament to a cinder block, creating a downslope gradient from the edge of the net to its center so a carcass landing in the net will tend not to be blown from the netting by a strong wind. Attaching a wooden lip around the periphery of each net (Avery *et al.* 1978) is probably unnecessary. Materials for each net installation are estimated to cost $320 (Avery and Beason 2000). The use of elevated catchment nets should make finding dead birds by tower or guy wire strikes more reliable, especially under variable habitat conditions (*e.g.*, unsuitable substrate for searching, tall grass, shrubs, roots, boulders, or trees).

❺ At each of the 7 experimental and the control(s) towers to be studied, place **3 nets** in **each** of **2 separate concentric circles** (tiers or arcs; Figure 2). The first tier to be monitored consists of a concentric circle with a radius 100 ft. (30m) from the center of the tower. Within **each 120° sector** of this circle, randomly locate **1 net**. The area sampled by these 3 nets represents approximately 24% of the total area within the 100-ft. (30-m) radius circle of the tower. Within the second stratum at a distance of 100-197 ft. (30-60m) radius from the tower, randomly place **1 additional net** within each of the 120° sectors of this circle (representing approximately 8% of the total area within this stratum). Nets are to be inspected at **first light** each day during migration seasons (those to be determined by FS in coordination with MBM/FWS Region 2 Office, Albuquerque [Bill Howe; see below]). Nets should also be inspected at least once a week at **first light** during the summertime. All bird and any bat carcasses are to be collected, dated, exact location noted, numbered, speciated, and saved for later study. For carcasses collected during the summertime, time of death should be estimated based on decomposition and carcass condition, where practical. A FWS scientific collection permit will be required. Contact Bill Howe, [FWS] Regional Nongame Migratory Bird Coordinator (505/248-6875; fax 505/248-6674) or Kamile McKeever, [FWS] Migratory Bird Permit Coordinator (505/248-7884; fax 505/248-7885) for a permit application.

❻ **Completely search** a concentric circle representing the **entire area** the radius of the height of the communication tower for dead birds and bats (Figure 3). Do this each day at **first light** during **migrations** and at least once a week at first light during the **summertime**. After each daily tower search, compare carcass data from the entire area searched to net catchment data. Extrapolate net catchment data (representing 32% of the area out to 197 feet [60m] radius from the tower) so that carcass collection represents 100% of the entire 197-ft.-radius search area and compare data sets to develop any correction factors.

❼ In consultation with a biometrician, determine the width and location of at least **1 strip census/transect** on a random compass line out from the tower's center to a distance 1.5-2 times the height of the tower (Figure 3; suggested width 50 ft. [15m]). This should be conducted at least **once per week**, preferably in early morning hours, during migrations, and several times during the summer. Doing this should better enable researchers to determine the probability of

catching a bird in a net as the distance from the tower increases. Transects should help in estimating the area that should be sampled by nets (more area further from the tower may be needed) and developing correction factors if necessary.

❽ Electrical wiring on and around the tower should be examined for any electrocutions and bird strikes. Any mortalities should be noted, carcasses collected and numbered, dated, exact locations determined, birds speciated, and carcasses saved.

❾ After the initial 3-year monitoring study, results will be reviewed by the FS, with concurrence from MBM/FWS, to determine if monitoring should be continued, modified, or discontinued. Monitoring data should be provided to FS, MBM/FWS, and any other interested parties at least twice yearly during the 3-year study and from any follow-up monitoring thereafter.

This protocol is subject to modification and design change. It may not be possible to implement all facets of this protocol based on habitat conditions, topography, and physiography. As changes are made, please notify FS and MBM/FWS staff of any suggested improvements and refinements – including any immediate suggestions or alterations.

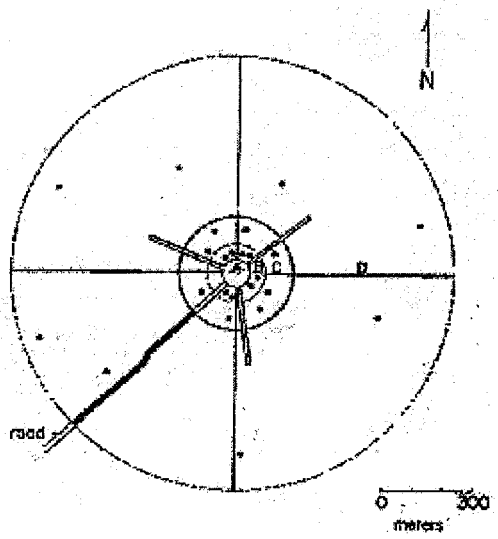

Figure 1. 1,200+-foot (369-m) North Dakota communication tower and study site showing sampling plan utilized by Avery *et al.* (1978). A= area completely sampled (150-foot [46m] radius from tower). B, C and D represent concentric circles, with randomly selected square net catchment study plots situated within each 120^0 sector of the tower footprint.

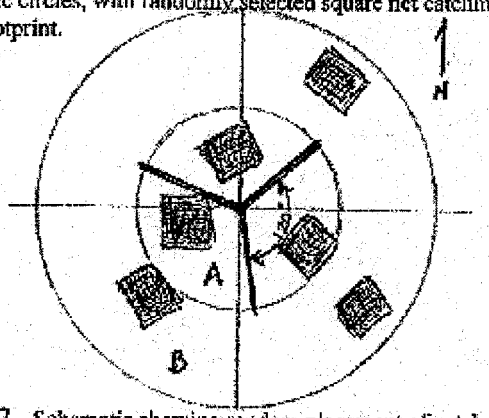

Figure 2. Schematic showing random placement of catchment nets for research towers. Radius of concentric circle A = 100 ft. (30m) from tower center, radius of concentric circle B = 100-197 ft. (30-60m). Sampling nets located in A cover 24% of total habitat of that area; B cover 8% of the total habitat of that area. Nets are each 50x50 ft. (15x15m) in size.

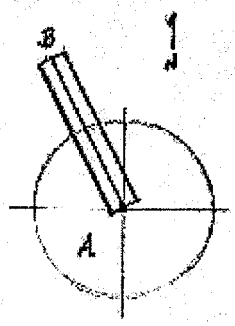

Figure 3. Schematic showing study tower, A= concentric circle whose radius equals height of tower. B= suggested transect (1.5-2 times the height of the tower, 50 ft. [15m] wide) placed on randomly selected compass line.

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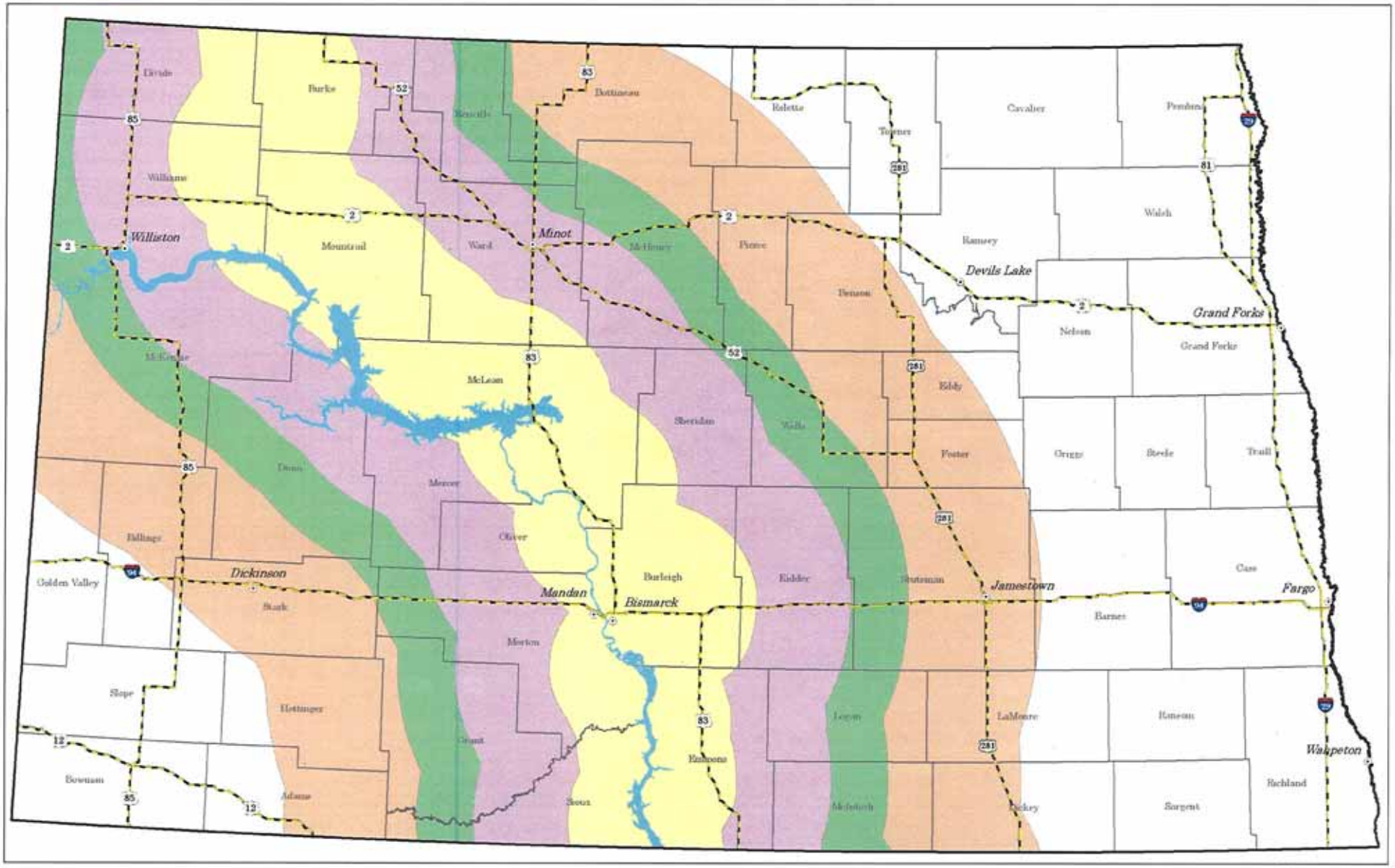
U.S. Fish & Wildlife Service

Selected Percentages Of Whooping Crane Sightings

North Dakota



PRODUCED BY ECOLOGICAL SERVICES
BISMARCK, NORTH DAKOTA
MAP DATE: 03/15/08
SIGHTINGS THROUGH SPRING 2007
FILE: TOWERS_NOLOCATIONS.MXD

0 12.5 25 50 Miles

0 12.5 25 50 Kilometers

Map Features

- Major Roads
- County Boundaries
- Missouri/Yellowstone River System

Percent Whooping Crane Sightings
- Approx 50% (40 mile corridor)
- Approx 75% (90 mile corridor)
- Approx 85% (120 mile corridor)
- Approx 95% (180 mile corridor)

NAD 83
UTM ZONE 14

MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA
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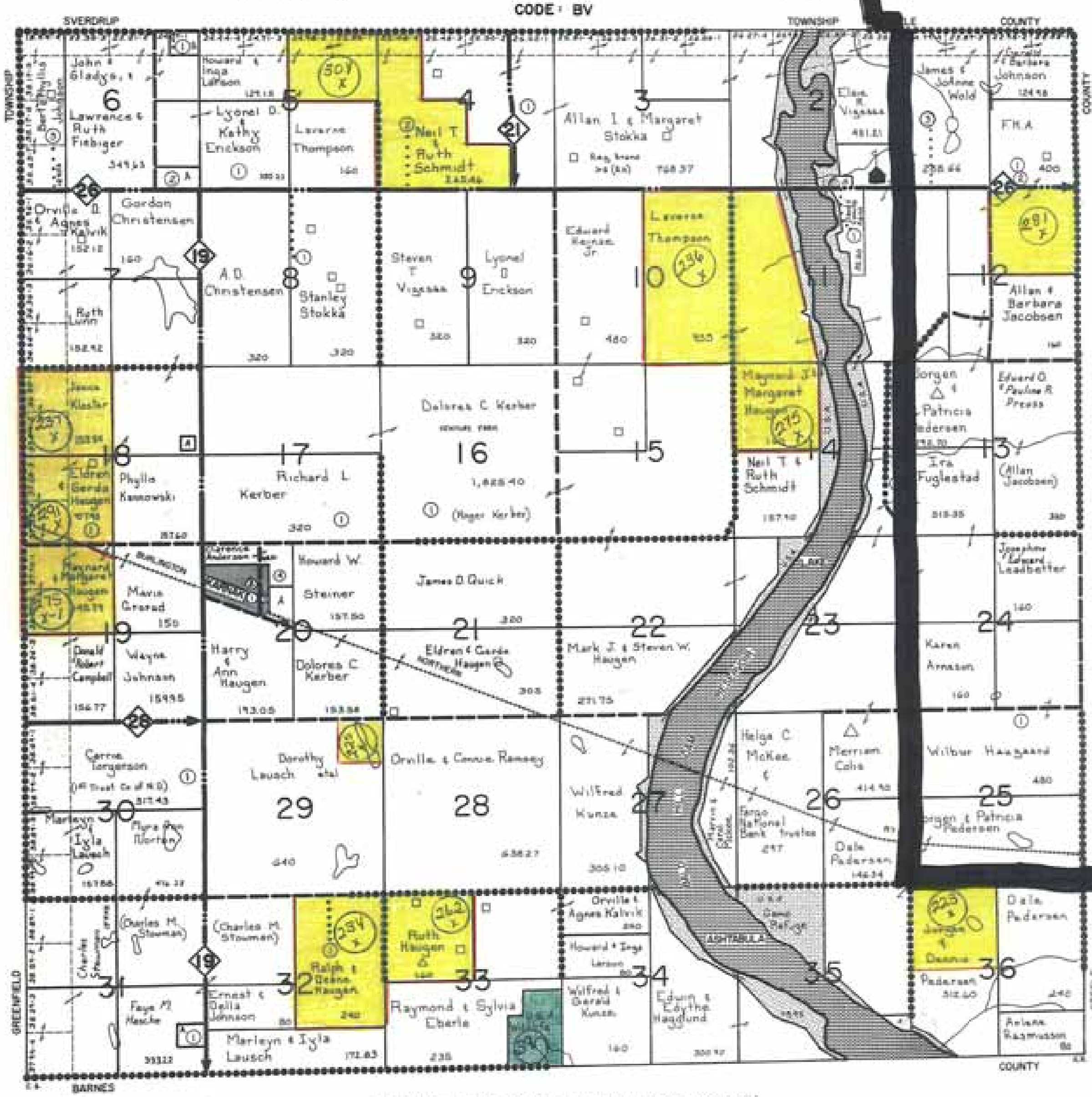
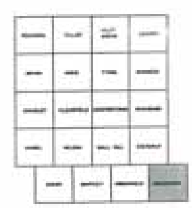
MAP OF BROADVIEW

TOWNSHIP : 144 N. RANGE : 58

CODE : BV



SEE SMALL TRACT OWNERS FOLLOWING TOWNSHIP MAPS



MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

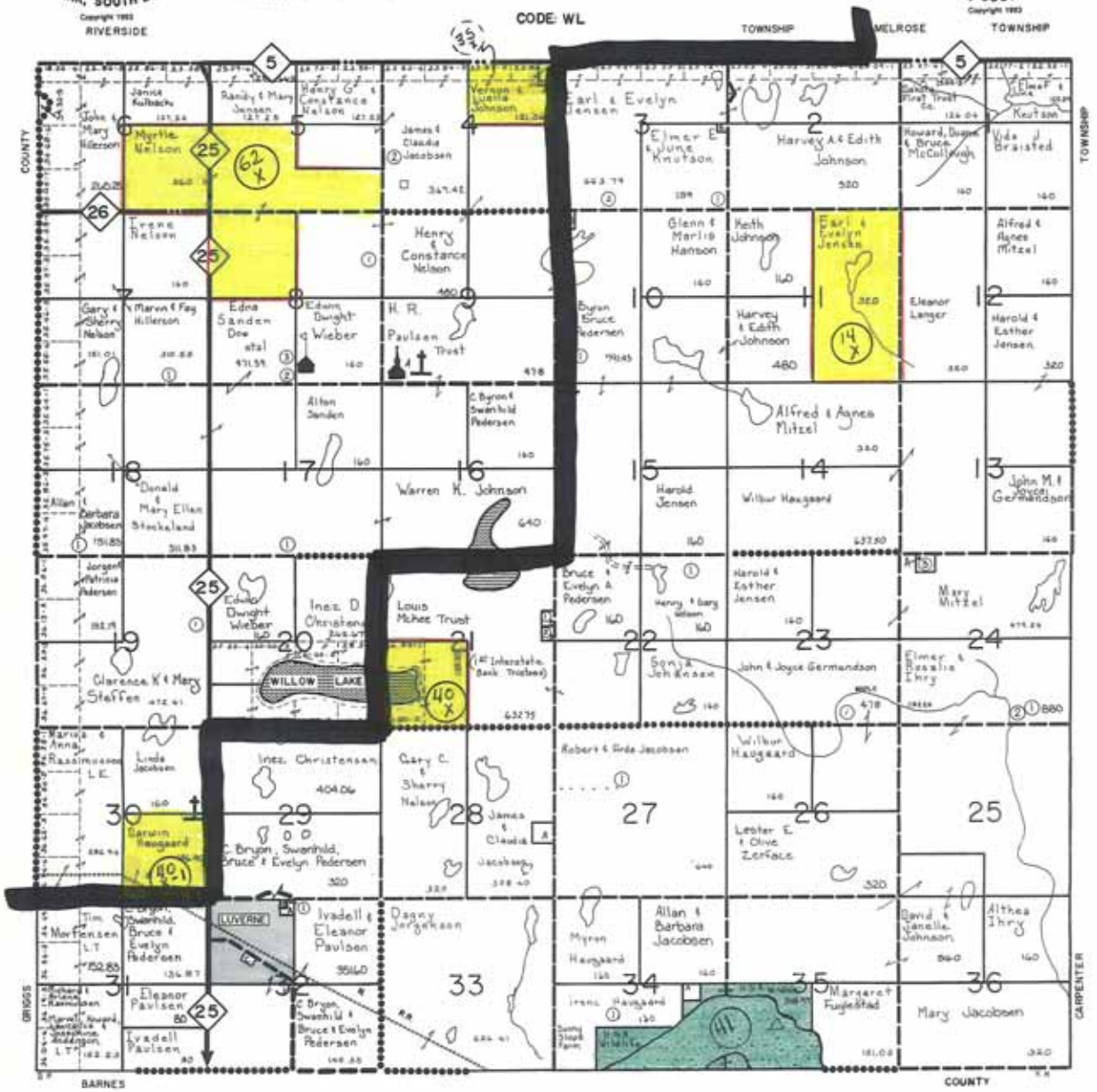
MAP OF

WILLOW LAKE

MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

TOWNSHIP 144 N. RANGE 57 W.

CODE: WL



SEE SMALL TRACT OWNERS FOLLOWING TOWNSHIP MAPS

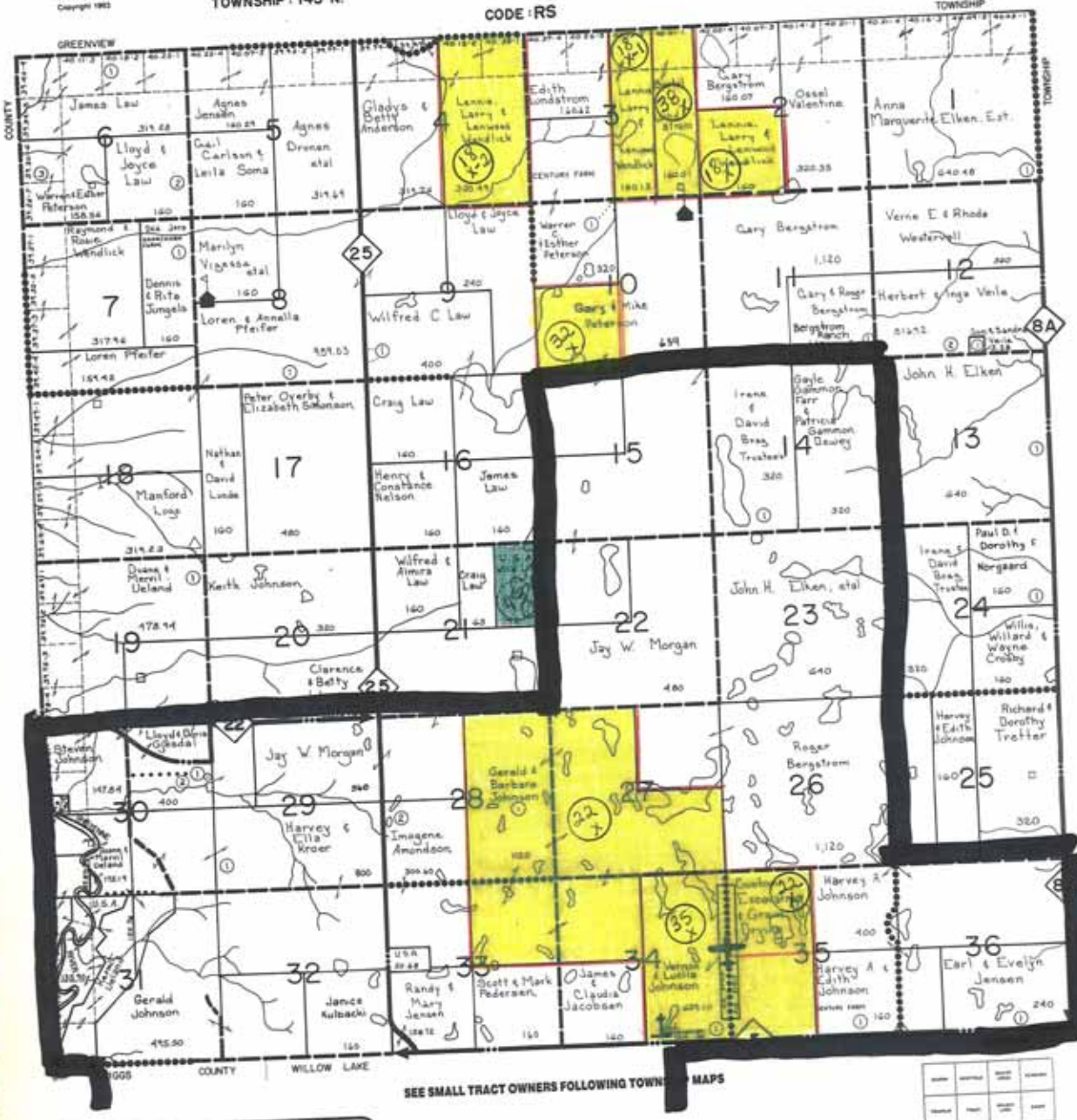
MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA Copyright 1993

MAP OF RIVERSIDE

MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA Copyright 1993

TOWNSHIP : 145 N. RANGE : 57 W.

CODE : RS



SEE SMALL TRACT OWNERS FOLLOWING TOWNSHIP MAPS

JOB SERVICE North Dakota
www.jobsnd.com

John Hoeven, Governor • Maren L. Daley, Executive Director

PO Box 5507 • Bismarck, ND 58506-5507

March 10, 2008

Kadrmas Lee & Jackson
128 Soo Line Drive
P.O. Box 1157
Bismarck, North Dakota 58502-1157

RE: Wind Farm Development
M-Power, LLC and National Wind, LLC
Griggs County and Steele Counties, North Dakota

Dear Sir or Madam:

Job Service North Dakota administers the employment service and unemployment insurance programs.

We have no comments regarding the proposed project and have no applicable permits that are required from Job Service North Dakota.

Sincerely,

Maren Daley

Maren Daley
Executive Director

North Dakota
DEPARTMENT OF COMMERCE

Community Services Economic Development & Finance Tourism Workforce Development

March 20, 2008

Jennifer Turnbow
Kadrmas, Lee & Jackson, Inc.
PO Box 1157
Bismarck, ND 58502-1157

RE: Proposed Wind Farm Development: M-Power, LLC and National Wind, LLC
Griggs County and Steel County, North Dakota

Dear Ms. Turnbow:

Your letter for comment for the above referenced project has been referred to me for response. This office is in support of this project which will further wind energy development in North Dakota.

While no permits are required from our office, we would defer to the North Dakota Game & Fish Dept., the ND Parks & Recreation Dept., the State Historical Society of North Dakota, and the North Dakota Health Dept. for their input on any environmental concerns or issues within the boundaries of the proposed project. According to your letter it appears you have already initiated this process.

As you know, the North Dakota Public Service Commission is the authority which issues permits for locating power plant and transmission lines within the state.

With regards to land use, approvals are granted by the local land use/zoning authorities.

Sincerely,

James R Boyd

James R. Boyd
Acting Energy Program Manager
Division of Community Services

jml

NORTH DAKOTA
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

March 5, 2008

Ms. Jennifer Turnbow
Environmental Planner
Kadrmas, Lee & Jackson, Inc.
P.O. Box 1157
Bismarck, ND 58502-1157

Re: Wind Farm Development
M-Power, LLC and National Wind, LLC
Griggs and Steele Counties

Dear Ms. Turnbow:

This department has reviewed the information concerning the above-referenced project submitted under date of February 27, 2008, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. With respect to construction, we have the following comments:

1. All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Any complaints that may arise are to be dealt with in an efficient and effective manner.

2. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.

3. Projects disturbing one or more acres are required to have a permit to discharge storm water runoff until the site is stabilized by the reestablishment of vegetation or other permanent cover. Further information on the storm water permit may be obtained from the Department's website or by calling the Division of Water Quality (701-328-5210). Also, cities may impose additional requirements and/or specific best management practices for construction affecting their storm drainage system. Check with the local officials to be sure any local storm water management considerations are addressed.

4. Noise from construction activities may have adverse effects on persons who live near the construction area. Noise levels can be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Noise effects can also be minimized by ensuring that construction activities are not conducted during early morning or late evening hours.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

These comments are based on the information provided about the project in the above-referenced submittal. The U.S. Army Corps of Engineers may require a water quality certification from this department for the project if the project is subject to their Section 404 permitting process. Any additional information which may be required by the U.S. Army Corps of Engineers under the process will be considered by this department in our determination regarding the issuance of such a certification.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,

L. David Glatt, P.E., Chief
Environmental Health Section

LDG:cc
Attach.

NORTH DAKOTA
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

Construction and Environmental Disturbance Requirements

These represent the minimum requirements of the North Dakota Department of Health. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect the waters of the State of North Dakota. All projects will be designed and implemented to restrict the losses or disturbances of soil, vegetative cover, and pollutants (chemical or biological) from a site.

Soils

Prevent the erosion of exposed soil surfaces and trapping sediments being transported. Examples include, but are not restricted to, sediment dams or berms, diversion dikes, hay bales as erosion checks, riprap, mesh or burlap blankets to hold soil during construction, and immediately establishing vegetative cover on disturbed areas after construction is completed. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.

Surface Waters

All construction which directly or indirectly impacts aquatic systems will be managed to minimize impacts. All attempts will be made to prevent the contamination of water at construction sites from fuel spillage, lubricants, and chemicals, by following safe storage and handling procedures. Stream bank and stream bed disturbances will be controlled to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. The use of pesticides or herbicides in or near these systems is forbidden without approval from this Department.

Fill Material

Any fill material placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds (in toxic concentrations). This includes, but is not limited to, asphalt, tires, treated lumber, and construction debris. The Department may require testing of fill materials. All temporary fills must be removed. Debris and solid wastes will be removed from the site and the impacted areas restored as nearly as possible to the original condition.

North Dakota Department of Transportation

Francis G. Ziegler, P.E.
Director

John Hoeven
Governor

April 15, 2008

Jennifer Turnbow
Kadrmas Lee & Jackson Inc.
P.O. Box 1157
Bismarck, ND 58502-1157

CONSTRUCT A WIND FARM, GRIGGS AND STEELE COUNTIES, NORTH DAKOTA

We have reviewed your February 27, 2008, letter.

We ask that you coordinate with the District regarding the setback for towers from the roadway. When this project is in process load limits may require prior approval for routes needed to be utilized and if access needs to be modified or changed that too would require contacting the District.

Additionally, if because of this project any work needs to be done on highway right-of-way, appropriate permits and risk management documents will need to be obtained from the Department of Transportation District Engineer, Les Noehre, 701-787-6500.

RONALD J. HENKE, P.E - DIRECTOR, OFFICE OF PROJECT DEVELOPMENT

57:rjh:js

c: Les Noehre, Grand Forks District Engineer

"VARIETY IN HUNTING AND FISHING"

NORTH DAKOTA GAME AND FISH DEPARTMENT

100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

March 24, 2008

Jennifer Turnbow
Kadrmas, Lee & Jackson, Inc.
P.O. Box 1157
Bismarck, ND 58502-1157

Dear Ms. Turnbow:

RE: Wind Farm Development
M-Power, LLC & National Wind, LLC
Griggs & Steele Counties, North Dakota

The North Dakota Game and Fish Department has reviewed this project for wildlife concerns. Our primary concern with wind power development is the disturbance of native prairie associated with construction of turbines, access roads, transmission lines, etc. We ask that work within native prairie be avoided to the extent possible, and that US Fish and Wildlife Service wind turbine siting guidelines be implemented as appropriate in an effort to reduce these impacts.

National Wetland Inventory maps indicate numerous wetlands within the project area. We recommend that steps be taken to protect any wetlands that cannot be avoided, above-ground appurtenances not be placed in wetland areas, and no alterations be made to existing drainage patterns.

We would appreciate being kept informed as this project progresses, and as other wind power projects are developed in North Dakota. If possible, we would also like the GPS coordinates for each turbine after the site has been established.

Sincerely,

Michael G. McKenna
Chief
Conservation & Communication Division

js

STATE OF NORTH DAKOTA
OFFICE OF ATTORNEY GENERAL
STATE CAPITOL
600 E BOULEVARD AVE DEPT 125
BISMARCK, ND 58505-0040
(701) 328-2210 FAX (701) 328-2226
www.ag.state.nd.us

Wayne Stenehjem
ATTORNEY GENERAL

March 5, 2008

Kadrmas, Lee & Jackson
PO Box 1157
Bismarck ND 58502-1157

To Whom It May Concern:

I am responding on behalf of the Attorney General to your firm's recent letter regarding an investigation of property in Steele and Griggs counties regarding proposed development of a wind farm. You ask that this office identify environmental properties, concerns, or future development by our agency relating to these tracts of land.

The Attorney General and members of his staff are prohibited by statute from giving legal advice, opinions, or assistance to private businesses or members of the public. We may only serve as legal advisors to state officials, state's attorneys, and certain city officials.

Accordingly, we cannot provide the assistance you requested. You should ask your company's legal division to conduct this kind of review. If your company does not have a legal division then to ensure compliance with state, federal and local laws and regulations you should consult an attorney in private practice licensed in North Dakota. If you need assistance finding an attorney, you can contact the State Bar Association at (701) 255-1404.

Sincerely,

Liz Brocker

Liz Brocker
Executive Assistant

John Hoeven, Governor
Douglass A. Prchal, Director

1600 East Century Avenue, Suite 3
Bismarck, ND 58503-0649
Phone 701-328-5357
Fax 701-328-5363
E-mail parkrec@nd.gov
www.parkrec.nd.gov

March 11, 2008

Jennifer Turnbow
Kadrmas, Lee and Jackson, Inc.
PO Box 1157
Bismarck, ND 58502-1157

Re: M-Power, LLC and National Wind, LLC Wind Farm Development Project
Griggs and Steele Counties, North Dakota

Dear Ms. Turnbow:

The North Dakota Parks and Recreation Department (the Department) has reviewed the above referenced project proposal to develop a 150 MW wind farm and associated access roads and utilities located in Sections 14, 15, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, and 36, T145N, R57W; and Sections 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, and 30, T144N, R57W, Steele County; and Sections 1, 12, 13, 24, and 25, T144N, R58W, Griggs County.

Our agency scope of authority and expertise covers recreation and biological resources (in particular rare plants and ecological communities). The project as defined does not affect state park lands that we manage or Land and Water Conservation Fund recreation projects that we coordinate.

The North Dakota Natural Heritage biological conservation database has been reviewed to determine if any plant or animal species of concern or other significant ecological communities are known to occur within an approximate one-mile radius of the project area. Based on this review, several occurrences have been identified adjacent to the project area including: *Pascopyrum smithii-Stipa comata prairie* (central mixed grass prairie), *Carex buxbaumii* (Buxbaum's sedge), *Schizachyrium scoparium – Bouteloua curtipendula – Stipa spartea prairie* (dry mesic tallgrass prairie), and *Fusconaia flava* (Wabash pigtoe mussel). Please see attached spreadsheet and map for more specific information on these species. Occurrences adjacent to the project area indicate that the habitat in the project area may be suited for these species or other rare, threatened, sensitive or endangered species. We defer further comments regarding animal species to the North Dakota Game and Fish Department and the United States Fish and Wildlife Service.

Because this information is not based on a comprehensive inventory, there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database. The lack of data for any project area cannot be construed to mean that no significant features are present. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Given the potential for not only habitat disturbance and disruption but threat to nesting, feeding and migratory bird and bats in the area we suggest that all efforts be made to avoid impacts to wildlife species and their habitats. In an effort to avoid or minimize impacts to wildlife and their habitats we encourage proper evaluation of all potential wind energy sites. To identify and assess adverse impacts to wildlife we suggest pre and post construction avian and bat monitoring studies be conducted.

The Department recommends that the project be accomplished with minimal impacts and that all efforts be made to ensure that critical habitats not be disturbed in the project area to help secure rare species conservation in North Dakota. Regarding any reclamation efforts, we recommend that any impacted areas be revegetated with species native to the project area.

Thank you for the opportunity to comment on this project. Please contact Kathy Duttenhefner (701-328-5370 or kgduttenhefner@nd.gov) of our staff if additional information is needed.

Sincerely,

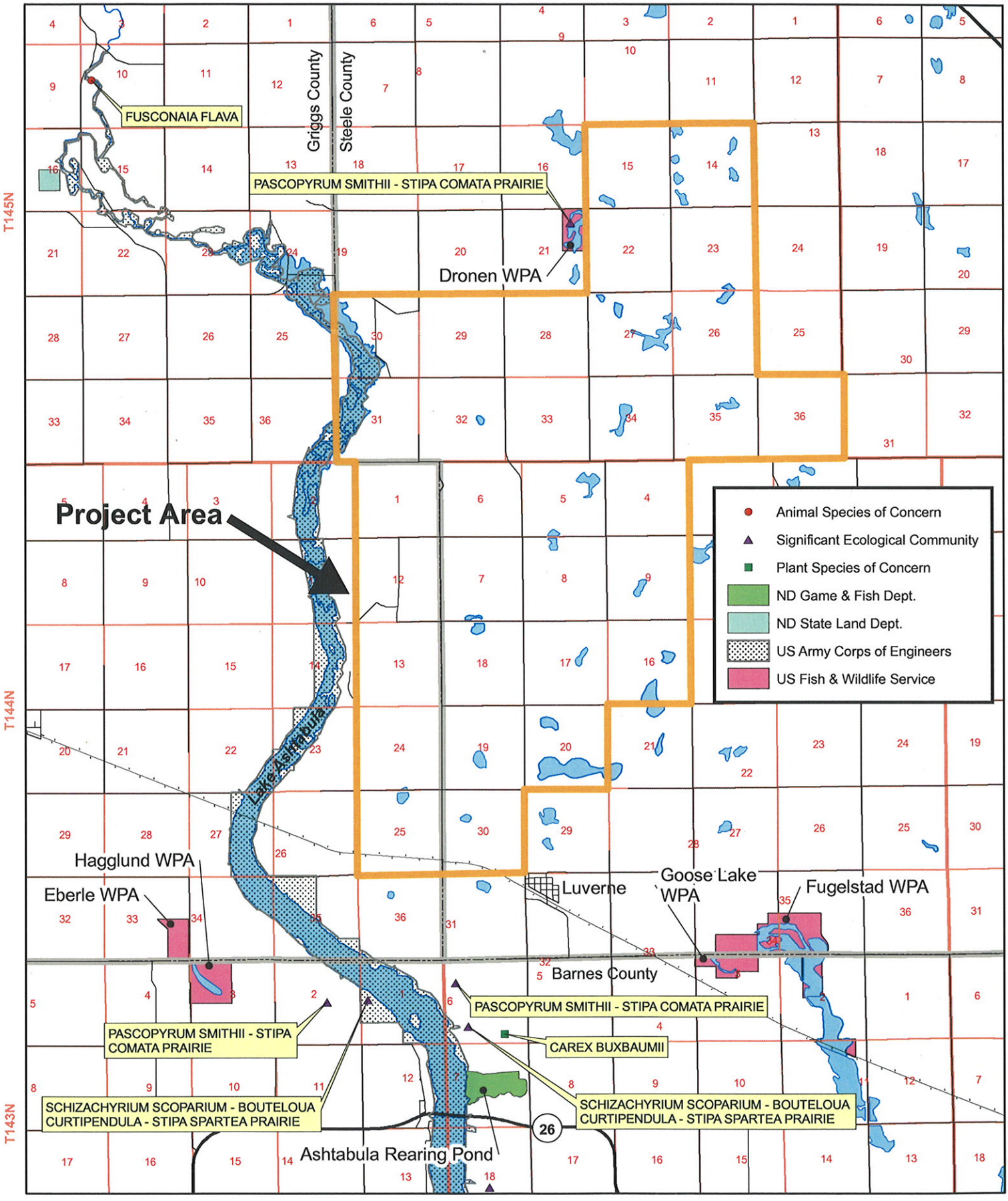
Jesse Hanson

Jesse Hanson, Coordinator
Planning and Natural Resources Division

R.USNDNHI*1943

Play in our backyard!

North Dakota Natural Heritage Inventory
Species of Concern and Significant Ecological Communities



North Dakota Parks & Recreation Department
North Dakota Natural Heritage Inventory
March 2008

North Dakota Natural Heritage Inventory
Species of Concern and Significant Ecological Communities

State Scientific Name	State Common Name	Township & Range	Section	TRS Notes	State Rank	Global Rank	Federal Status	EO Rank	Last Observation
CAREX BUXBAUMII	BUXBAUM'S SEDGE	143N057W	6		S1S2	G5			1973-07-17
PASCOPYRUM SMITHII - STIPA COMATA PRAIRIE	CENTRAL MIXED GRASS PRAIRIE	143N057W 143N058W	6 1	Sec. 7	S2			BC	1998-08-28
SCHIZACHYRIUM SCOPARIUM - BOUTELOUA CURTIPENDULA - STIPA SPARTEA PRAIRIE	DRY MESIC TALLGRASS PRAIRIE	143N057W 143N058W	6 1	Sec. 7	S1			BC	1998-08-28
PASCOPYRUM SMITHII - STIPA COMATA PRAIRIE	CENTRAL MIXED GRASS PRAIRIE	143N058W	1	2	S2			CD	1998-08-27
SCHIZACHYRIUM SCOPARIUM - BOUTELOUA CURTIPENDULA - STIPA SPARTEA PRAIRIE	DRY MESIC TALLGRASS PRAIRIE	143N058W	1	2	S1			CD	1998-08-27
PASCOPYRUM SMITHII - STIPA COMATA PRAIRIE	CENTRAL MIXED GRASS PRAIRIE	145N057W	21	NE4 E2	S2			D	1995-08-29
FUSCONAIA FLAVA	WABASH PIGTOE MUSSEL	145N058W	10	NW4NE4	S4	G5			1975

North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
701-328-2750 • TDD 701-328-2750 • FAX 701-328-3696 • INTERNET: http://swc.nd.gov

March 25, 2008

Kadrmas, Lee & Jackson
PO Box 1157
Bismarck ND 58502-1157

Dear Sir:

This is in response to your request for review of environmental impacts associated with the Wind Farm Development, M-Power, LLC and National Wind, LLC, Griggs and Steele Counties, ND.

The proposed project have been reviewed by State Water Commission staff and the following comments are provided:

- The property is not located in an identified floodplain and it is believed the project will not affect an identified floodplain.

- All waste material associated with the project must be disposed of properly and not placed in identified floodway areas.

- No sole-source aquifers have been designated in ND.

There are no other concerns associated with this project that affect State Water Commission or State Engineer regulatory responsibilities.

Thank you for the opportunity to provide review comments. If you have any questions, please call me at 328-4969.

Sincerely,

Larry Knudtson
Research Analyst

LJK:ds/1570

KENT CONRAD
NORTH DAKOTA

website: http://conrad.senate.gov

COMMITTEES:
BUDGET, CHAIRMAN
AGRICULTURE, NUTRITION, AND FORESTRY
FINANCE
INDIAN AFFAIRS

United States Senate

1-800-223-4457

530 HART SENATE OFFICE BUILDING
WASHINGTON, DC 20510-3403
(202) 224-2043

220 EAST ROSSER AVENUE, ROOM 228
BISMARCK, ND 58501-3866
(701) 258-4648

657 2ND AVENUE NORTH, ROOM 306
FARGO, ND 58102-4727
(701) 232-8030

102 NORTH 4TH STREET, SUITE 104
GRAND FORKS, ND 58203-3738
(701) 775-9601

100 1ST STREET, S.W., ROOM 105
MINOT, ND 58701-3846
(701) 852-0703

March 14, 2008

Jennifer Turnbow
Kadrmas Lee & Jackson
PO Box 1157
Bismarck, ND 58502-1157

Dear Jennifer:

Thank you for contacting me regarding wind energy in North Dakota. It was good to hear from you.

I appreciate you sharing with me information about Kadrmas Lee & Jackson's role in the development of a wind energy farm in Griggs and Steele Counties. Especially given our state's wind energy potential, I am pleased to learn about new wind energy projects in our state. Please be assured that I will continue to support renewable energy development in North Dakota.

Again, thank you for contacting me.

Sincerely,

KENT CONRAD
United States Senate

KC:wcec

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

February 28, 2008

Jennifer Turnbow
Environmental Planner
Kadrmas, Lee, and Jackson, Inc.
128 Soo Line Drive
Bismarck, ND 58501

NDSHPO REF. : 08-0444 PSC/KLJ M-Power and National Wind, LLC 150 Mega Watt (MW) Griggs and Steele County, Wind Farm & kV Transmission Line

Dear Jennifer:

We have reviewed: **08-0444: "PSC/KLJ M-Power and National Wind, LLC 150 Mega Watt (MW) Griggs and Steele County, Wind Farm & kV Transmission Line "** correspondence. There is potential for unrecorded and recorded properties in a variety of physiographic settings in the overall study area north of Luverne, as indicated on the attached map.

If the project requires permits issued by a federal and/or state agency (e.g., WAPA, RUS, COE, USFWS, BOR, PSC) then the respective agency(ies) are to be consulted regarding their recommendations on the project. As a potential federal undertaking, we encourage agency consultation as part of the Environmental Assessment process. At this point, we encourage that a Class I CRI (file and records search) be prepared and submitted for review to the appropriate agencies, as delineated from the map coverage you provided.

Thank you for the opportunity to review the project, and to further consultation on it. If you have questions please contact either Susan Quinnell at (701) 328-3576 or Paul Picha at (701) 328-3574. Please include the **NDSHPO REF.: 08-0444** in correspondence regarding the project.

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)
and
Director, State Historical Society of North Dakota

RECEIVED
FEB 29 2008

c: Susan E. Wefald, Commissioner, PSC, with map enc.

Dakota Rural Water District

204 4TH STREET WEST
PO BOX 476
FINLEY, NORTH DAKOTA 58230-0476

Phone
1-701-524-2393
1-800-656-2393
TTY-1-800-366-6888
Fax 1-701-524-2394

March 20, 2008

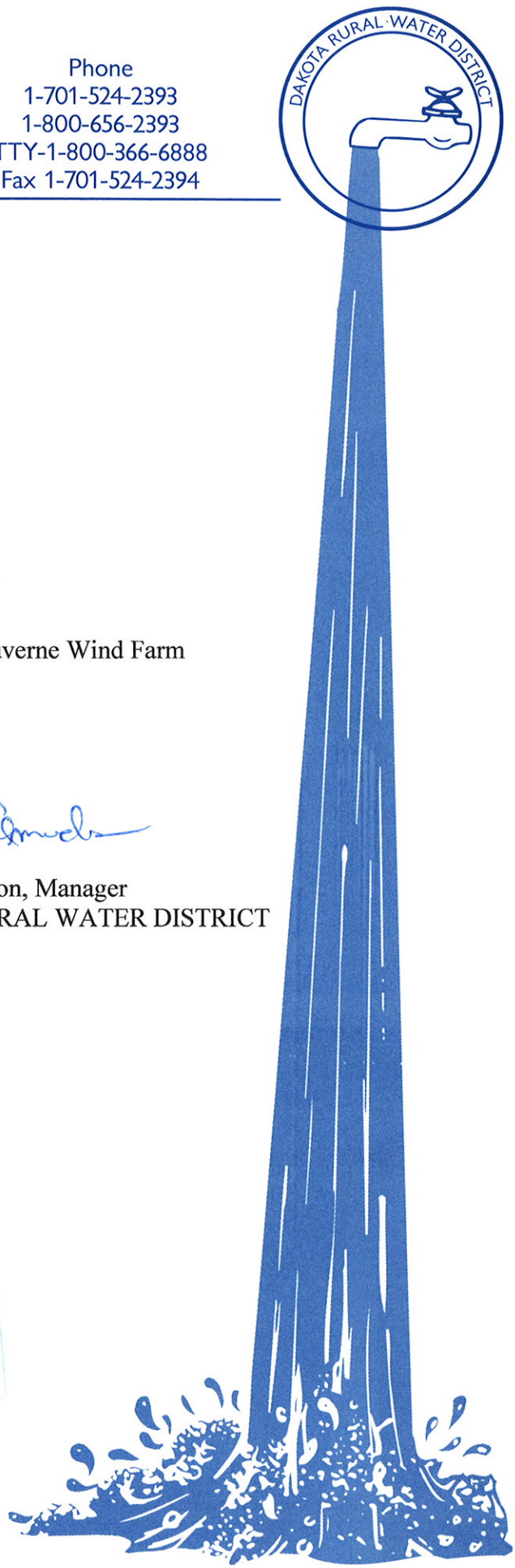
Grady Wolf
Environmental Scientist
Kadrmas, Lee & Jackson, Inc.
128 Soo Line Dr
Bismarck ND 58501

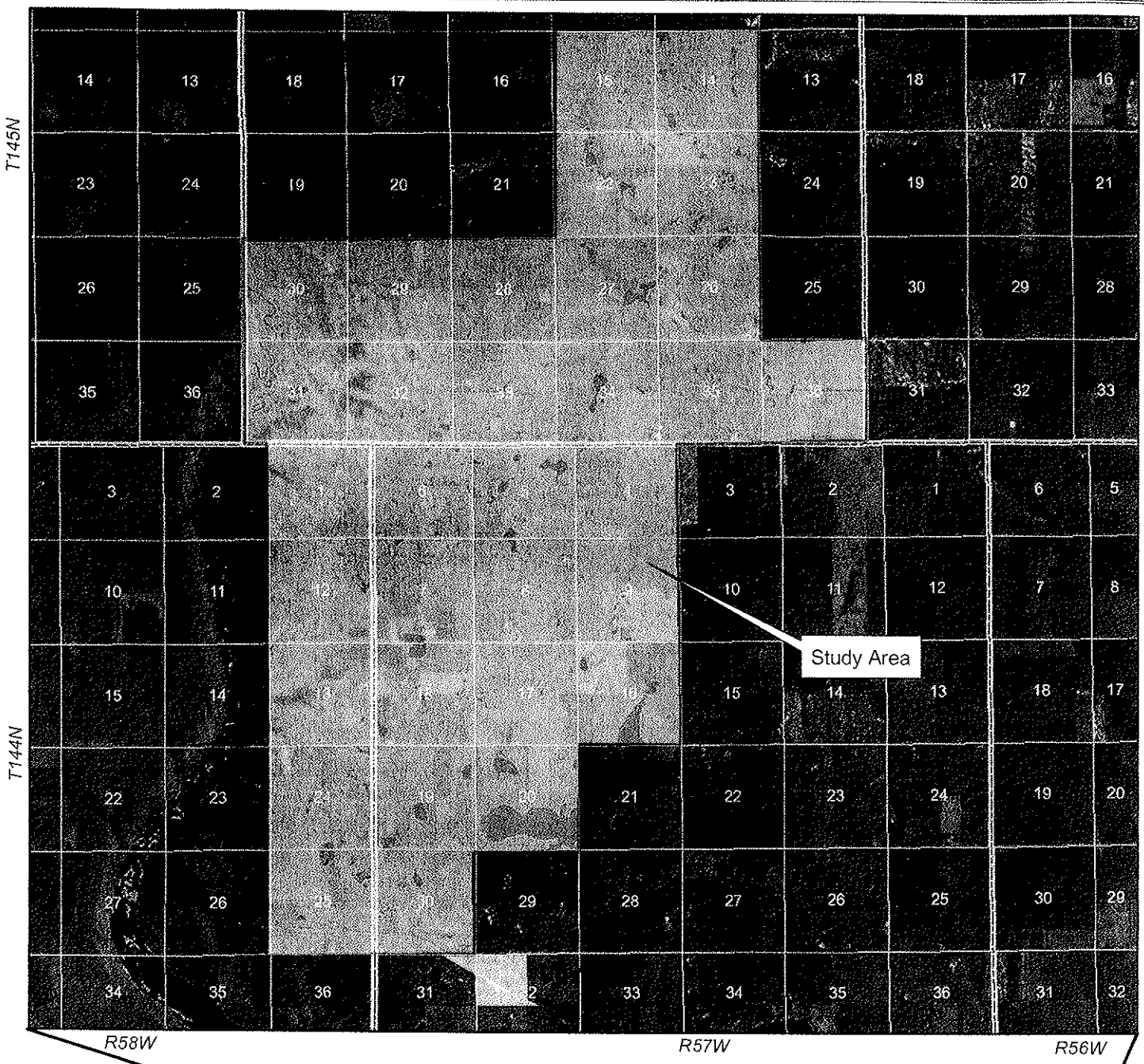
Dear Grady,

Enclosed is the information you requested for the Luverne Wind Farm regarding DRWD water lines.

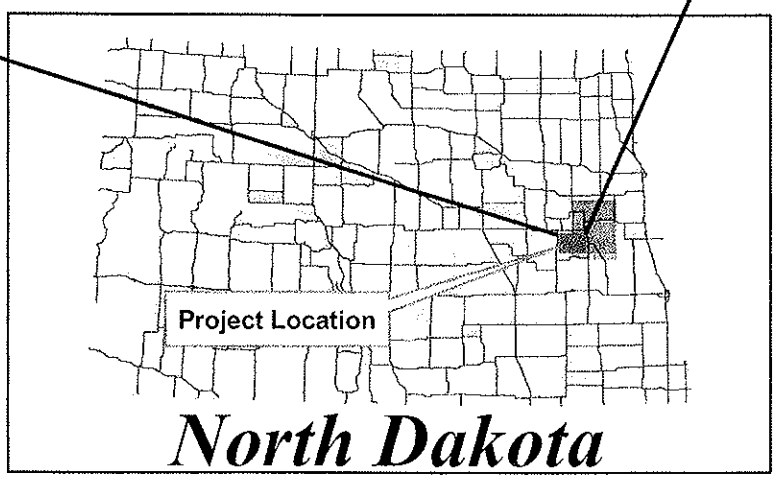
Yours Truly,

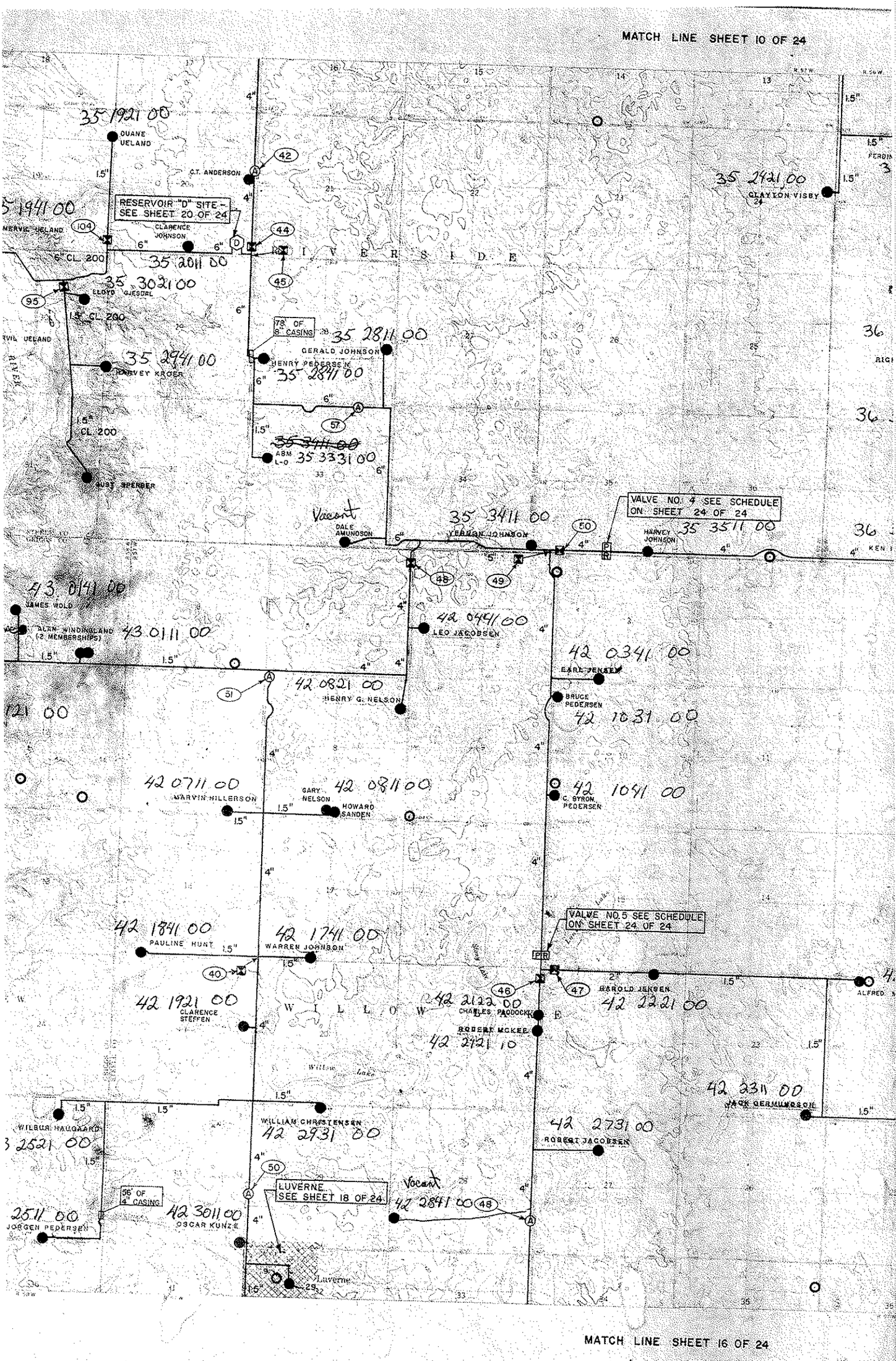
Larry Amundson, Manager
DAKOTA RURAL WATER DISTRICT





Proposed Wind Farm Development
M-Power, LLC
&
National Wind, LLC




MATCH LINE SHEET 10 OF 24
35 1921 00
DUANE UELAND
C.T. ANDERSON
RESERVOIR "D" SITE - SEE SHEET 20 OF 24
CLARENCE JOHNSON
35 2011 00
35 1941 00
35 2421 00
CLAYTON VISBY
35 3021 00
ELOYD GJESDAL
35 2941 00
HARVEY KROGER
78' OF 8" CASING
35 2811 00
GERALD JOHNSON
HENRY PEDERSEN
35 2841 00
35 3411 00
ABM L-0 35 3331 00
AUST SPERBER
Vacant
DALE AMUNDSON
35 3411 00
VERNON JOHNSON
VALVE NO. 4 SEE SCHEDULE ON SHEET 24 OF 24
HARVEY JOHNSON
35 3511 00
43 0141 00
JAMES WOLD
ALTN. WINDINGLAND (2 MEMBERSHIPS)
43 0111 00
42 0441 00
LEO JACOBSEN
42 0341 00
EARL PEDERSEN
42 0821 00
HENRY G. NELSON
BRUCE PEDERSEN
42 1031 00
42 0711 00
MARVIN HILLERSON
GARY NELSON
42 0811 00
HOWARD SANDEN
42 1041 00
C. BYRON PEDERSEN
VALVE NO. 5 SEE SCHEDULE ON SHEET 24 OF 24
42 1841 00
PAULINE HUNT
42 1741 00
WARREN JOHNSON
42 1921 00
CLARENCE STEFFEN
W I L L O W
42 2122 00
CHARLES PADDOCK
42 2221 00
HAROLD JENSEN
ROBERT MCKEE
42 2121 10
42 2311 00
JACK GERMUNDSON
WILBUR HAUGAARD
3 2521 00
WILLIAM CHRISTENSEN
42 2931 00
42 2731 00
ROBERT JACOBSEN
LUVERNE SEE SHEET 18 OF 24
Vacant
42 2841 00
56' OF 4" CASING
2511 00
JORGEN PEDERSEN
42 3011 00
OSCAR KUNZE
Luverne
MATCH LINE SHEET 16 OF 24

GRIGGS COUNTY
COOPERSTOWN, NORTH DAKOTA

County Commissioners

Kent Anderson 1st Dist.
Sutton
Ronnie Edland 2nd Dist.
Cooperstown
Dennis Halvorson 3rd Dist.
Cooperstown
Lyle Pfeifer 4th Dist.
Cooperstown
Robert Johnson 5th Dist.
Sutton
Griggs County Courier
Official Newspaper

County Officers

Cynthia M. Anton	Auditor
Connie Eslinger	Treasurer
Janice M. Steffen	Recorder & Clerk of Court
Bradley A. Cruff	State's Attorney
Charles A. Stock	Asst. State's Attorney
Paul W. Hendrickson	Sheriff
Wayne Oien	Road Supt.
Rick Cushman	Coroner
Dennis Kubischta	Veterans Service Officer
Kelly Vincent	Tax Director
Robert Hook	DES Coordinator

March 4, 2008

Kadrmas, Lee & Jackson, Inc
Attn: Jennifer Turnbow
128 Soo Line Drive
P.O. Box 1157
BISMARCK ND 58502-1157

Re: Wind Farm Development
M-Power, LLC and National Wind, LLC
Griggs County and Steele County, North Dakota

Dear Ms. Turnbow:

Pursuant to the information reviewed during the Griggs County Commission Meeting today, March 4, 2008, regarding the above-referenced project, I wish to reinforce the necessity for permits to be applied for and approved prior to any site preparation or building. I am enclosing a copy of a letter sent to Warren Enyart, Griggs Steele Empowerment Zone, on November 9, 2007.

Since this type of project would require a Conditional Use Permit followed by a building permit, I would point out that the Conditional Use Permit requires a public hearing in front of the Griggs County Planning Commission. The notification of this hearing must be published in the local newspaper at least once a week for two weeks prior to the Planning Commission Hearing. This is followed by a final hearing at the regularly scheduled Griggs County Commission meeting which is usually held during the first week of the new month. It is essential that any Petition for Conditional Use Permit be submitted to this office early in the month to allow for a speedy time line. A separate Petition must be filed for each quarter section of property that is involved with the construction of a wind turbine or power lines although more than one Petition may be heard at the same Planning Commission Hearing.

Feel free to contact me at 701-797-2413 or in writing to Griggs County Zoning Administrator, P.O. Box 541, COOPERSTOWN ND 58425-0541 if you have any questions.

Sincerely,

Connie MacKenzie

Connie M. MacKenzie
Griggs County Zoning Administrator

Cc: Lyle Pfeifer, Griggs County Planning Commission Chairman

Enclosure

GRIGGS COUNTY
COOPERSTOWN, NORTH DAKOTA

COPY

County Commissioners

Kent Anderson 1st Dist.
Sutton
Ronnie Edland 2nd Dist.
Cooperstown
Dennis Halvorson 3rd Dist.
Cooperstown
Lyle Pfeifer 4th Dist.
Cooperstown
Robert Johnson 5th Dist.
Sutton
Griggs County Courier
Official Newspaper

County Officers

Cynthia M. Anton — Auditor
Connie Eslinger — Treasurer
Janice M. Steffen — Recorder & Clerk of Court
Bradley A. Cruff — State's Attorney
Charles A. Stock — Asst. State's Attorney
Paul W. Hendrickson — Sheriff
Wayne Oien — Road Supt.
Rick Cushman — Coroner
Dennis Kubischta — Veterans Service Officer
Kelly Vincent — Tax Director
Robert Hook — DES Coordinator

November 9, 2007

M-Power LLC
Warren Enyart
Griggs Steele Empowerment Zone
P.O. Box 335
FINLEY ND 58230-0335

Re: Permits required in Griggs County

Dear Mr. Enyart:

It has been brought to my attention that meetings are scheduled over the next week regarding the proposed M-Power Wind Farm. Please note that Griggs County is zoned. Two specific sections of the Griggs County Zoning Regulations are listed below for your information:

> **"2. RULES AND DEFINITIONS, 2.1 Compliance:** "No structure, land and building shall be hereafter used and no structure or part thereof shall hereafter be located, erected, moved, reconstructed, extended, enlarged, converted or structurally altered without a building permit, and the same shall be in compliance with this ordinance.""

and

> **"8.2 Conditional use Permits, 8.2.1 Purpose:** "The development of this ordinance is based upon division of the county into districts, within which district the use of land and building bulk and locations of building and structures are mutually compatible and substantially harmonious. However, there are certain uses which, because of their unique characteristics, cannot be properly classified as permitted uses in any particular district, without consideration, in each case, of impact of those uses upon neighboring premises. Such uses, nevertheless, may be necessary or desirable to be allowed in a particular district provided that due consideration is given to location, development and operation of such uses.""

Letters will be sent out to land owners regarding their Wind Rights Option Agreement. A Conditional Use Permit must be filed for each quarter section of property that is listed in that Agreement.

Since a Conditional Use Permit requires notification in the local newspaper over a two week period regarding a hearing by the Griggs County Planning Commission followed by final approval by the Griggs County Board of Commissioners, it is essential that enough time is allowed prior to the commencement of any land preparation or construction.

This information is sent to you for your consideration prior to the meetings next week.

Feel free to contact me at 701-797-2413 or in writing to Griggs County Zoning Administrator, P.O. Box 541, COOPERSTOWN ND 58425-0541 if you have any questions.

Sincerely,

Connie MacKenzie

Connie M. MacKenzie
Griggs County Zoning Administrator

Cc: Lyle Pfeifer, Griggs County Planning Commission Chairman

Tribal Historic Preservation Office

P.O. Box 907
205 Oak St. East, Suite 207
Sisseton, SD 57262

(605) 698-4972 phone
(605) 698-7054 fax

Date March 4, 2008

To: Ms. Jennifer Turnbull
Kadramas, Lee and Jackson, Inc.

Re: Wind Farm Development
M-Power, LLC and National Wind, LLC
Griggs and Steele Counties, North Dakota

Ms. Turnbull,

Thank you for the opportunity to comment on your project. The Sisseton Wahpeton Oyate, Tribal Historic Preservation Office would appreciate further information on this project as it becomes available.

The Dakota, Nakota and Lakota people, as well as other tribes, consider this area to be part of our aboriginal homeland. All cultural and burial sites within the project APE are of importance to our people . Thank you for your cooperation.

James Whitted 106 Coordinator
SWO Tribal Historic Preservation Office

E Mail: jmswhitted@yahoo.com

UNIVERSAL ENSCO, INC.

March 26, 2008

Kadrmas, Lee & Jackson
128 Soo Line Dr
PO Box 1157
Bismarck, ND 58502-1157

Attn: Jennifer Turnbow, Project Manager

Re: Wind Farm Development
M-Power, LLC and National Wind, LLC
Griggs County and Steele Counties, North Dakota

Dear Ms. Turnbow:

This is in response to your letter of March 3, 2008, regarding the referenced proposed wind farm facility. Universal Ensco, Inc. is an independent contractor providing construction management of the Keystone Pipeline for its owner TransCanada. We are responding to your letter on behalf of Keystone Pipeline and TransCanada.

The Keystone Pipeline is a 30" crude oil pipeline to be constructed in 2008 which route passes through certain properties in six sections of the proposed wind farm foot print area in Steele County. The pipeline route is shown superimposed on the enclosed map of the wind farm area. We have previously provided an electronic file of the pipeline route through the wind farm area to Mr. Warren Enyart of the M-Power project. This file should allow them to determine the precise location of the pipeline on each individual property.

Keystone Pipeline has acquired a permanent fifty (50) foot wide easement, twenty-five feet on either side of the pipeline, from the affected landowners. In addition, Keystone has acquired an additional sixty (60) foot wide temporary construction easement and in select areas an additional one hundred ten (110) foot wide temporary construction easement.

No wind farm facilities can be located within the Keystone Pipeline permanent easement. Any wind farm construction related activities within Keystone's permanent or temporary easements must have Keystone's prior written approval and meet any Keystone required conditions. Similarly, any wind farm facilities such as roads, overhead or buried power cables, etc., crossing the Keystone Pipeline easement must have Keystone's prior written approval and be subject to any required conditions.

If any wind farm construction activities take place in the areas of the Keystone Pipeline route in 2008, they must be coordinated with Keystone to avoid conflict and/or delays of Keystone's construction contractors.

If you have any questions or require additional information, please advise.

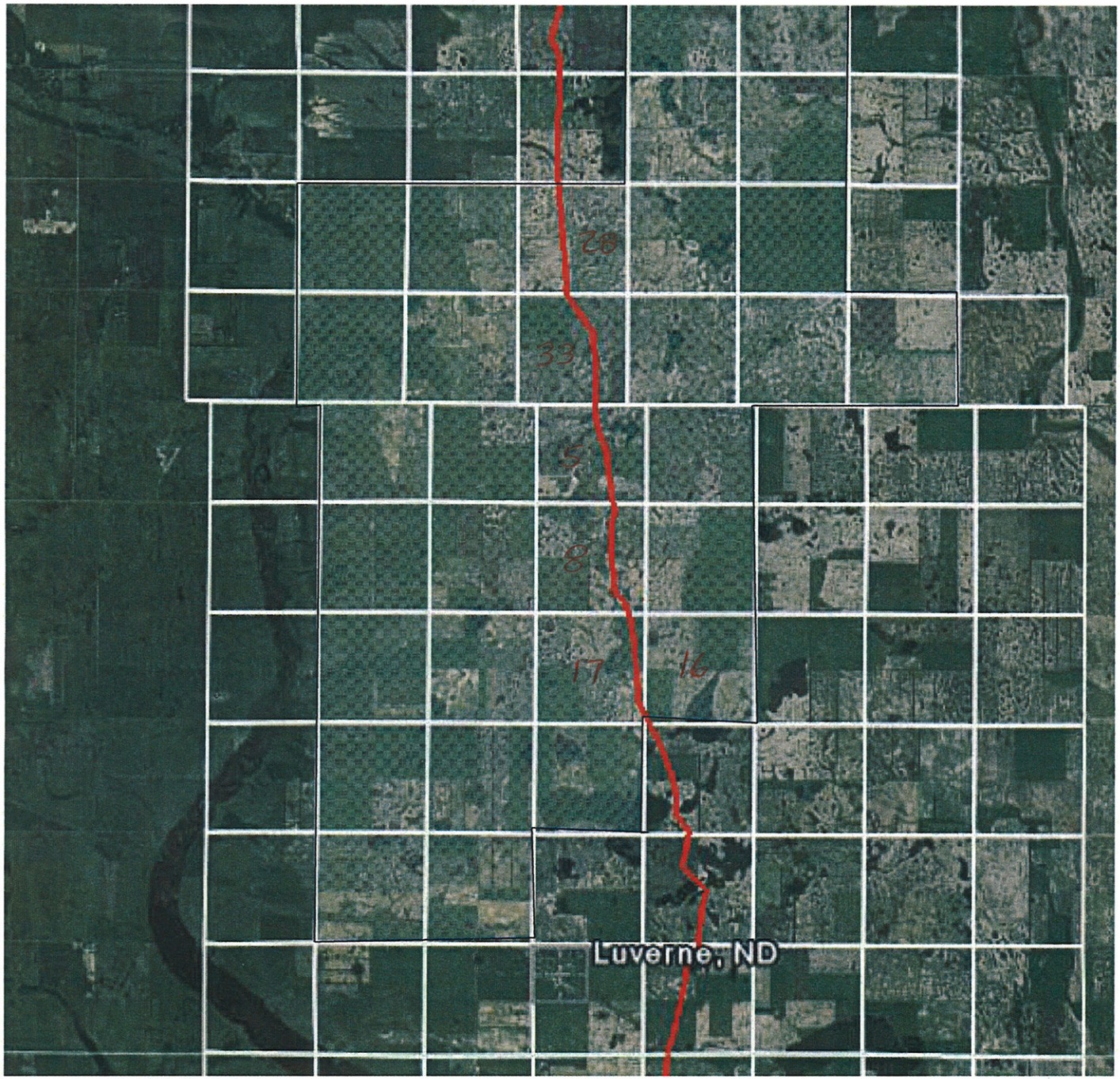
Very truly yours,

L. A. "Buster" Gray
Engineering and Construction Manager

Enclosure (Map)
cc: Files w/att

RECEIVED
MAR 31 2008
BY:

816/880-4881 Fax 816/880-6689 Watts 1-877-880-4881 7509 NW Tiffany Springs Parkway, Suite 200 Kansas City, MO 64153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Luverne, ND

APPENDIX E

M-POWER DOCUMENTS

M-Power, LLC Landowner and Local Utility Relations Policy Resolution

Whereas; M-Power, LLC is a community-based, locally-owned, wind resource development company, whose mission is to develop projects that offer landowners and local investors an opportunity to share in the economic benefits of wind generation, and

Whereas; The business model adapted by M-Power, LLC provides the opportunity for landowners to voluntarily participate in ownership of a project through their willingness to exercise wind resource options, wind turbine easements, and/or transmission line rights-of-way easements, and

Whereas; M-Power, LLC has provided additional opportunities for landowners in the footprint and other local investors to participate in its ownership, and

Whereas; Many of the owners of the wind farm projects developed by M-Power, LLC will be those within the footprint of the project, and those who provide easements for transmission line rights-of-way or turbine facilities, and other local investors, and

Whereas; M-Power, LLC desires to establish and maintain good working relationships with its owners and other landowners affected by the projects, and

Whereas; M-Power, LLC desires to establish and maintain good working relationships with other utilities serving its landowners and local investors, and

Whereas; M-Power, LLC desires to establish a model that will encourage other landowners and utilities throughout the state of North Dakota to emulate.

Now, therefore, be it resolved that M-Power, LLC shall adopt and apply the following policies in its development efforts:

1. Provide the opportunity for landowners affected by project facilities such as: turbine sites, access roads, maintenance buildings, substations, transmission lines, or other project elements, to communicate their concerns directly with project planners before final decisions are made.

2. Accommodate the desires of affected landowners whenever such decision is environmentally, technically and economically feasible.

3. Provide fair-market remuneration to the affected landowner for any damages, adverse affects, easements, or other negative impacts caused by the project that may be mutually determined by the landowner and M-Power, LLC.

4. Coordinate development plans with other utilities serving the area, and consider their recommendations in the project(s) development.

5. Provide the opportunity for other utilities serving the area to participate in the benefits of the project(s) that may be developed.

M-Power, LLC Facility Site Selection Policies Resolution

Whereas; M-Power, LLC is a community-based, locally-owned, wind resource development company, whose mission is to develop projects that offer landowners and local investors an opportunity to share in the economic benefits of wind generation, and

Whereas; The constituency of M-Power, LLC is landowner-based and as such, desire to be good stewards of the land and the environment, and

Whereas; M-Power, LLC desires to avoid, minimize, or mitigate any adverse affects that its project(s) may have on landowners, the environment, or other utilities, and

Whereas; M-Power, LLC will strictly adhere to the local, regional, state, and federal requirements relative to landowner and environmental concerns resulting from the project(s), and

Whereas; There are often trade-offs among environmental, landowner, economics, and technical considerations, and

Whereas; M-Power, LLC benefits from the broad experience of its personnel who have successfully sited power plants, wind farms, high voltage transmission lines, and related facilities to the mutual satisfaction of landowners, regulators, other utilities, and facility owners.

Now, therefore, be it resolved that M-Power, LLC shall adopt and apply the following facility site selection policies in its development efforts:

1. Identify potential conflicts among landowner, environmental, economic, technical, other utilities, and regulator interests early in the project development; avoid or resolve before final decisions are made.

2. When siting transmission lines, prefer to locate facilities “square-with-the-world” to diagonal siting, when there is evidence of cultivated fields and/or existing field patterns.

3. Prefer untilled rangeland to cultivated fields for facility siting.

4. Prefer the “quarter-line” (half-mile line) routing of transmission lines to routes adjacent to section lines.

5. Consider viable alternatives to siting early in the planning stages.

6. Coordinate development plans to other utilities serving the area, and consider their recommendations in the project(s) development.
7. Consult with landowners, regulators, and designers to select the least objectionable site.

8. Accommodate the desires of affected landowners whenever such decision is environmentally, technically and economically feasible.

9. Mitigate siting problems that cannot otherwise be avoided or resolved.