# Application to the North Dakota Public Service Commission for a Consolidated Certificate of Corridor Compatibility and Route Permit and Waiver of Procedures and Timelines for the Antelope Hills 345 kV Transmission Line Project

**Mercer County, North Dakota**

## Case #: PU-13-846

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Note: Since most studies and agency correspondence addressed both the wind power project and the associated transmission line, these have been consolidated and are found in the Attachments A and B to the Application for Site Certificate.

# Acronyms and Abbreviations

| | |
|---|---|
| AADT | Average Annual Daily Traffic |
| Antelope | Antelope Hills Wind Project, LLC |
| APE | Area of Potential Effects |
| AVS | Antelope Valley Station |
| Basin | Basin Electric Power Cooperative |
| BMPs | Best Management Practices |
| Certificate | Certificate of Corridor Compatibility |
| CRP | Conservation Reserve Program |
| dBA | A-weighted decibel |
| DOD | Department of Defense |
| EMF | Electromagnetic Field |
| EPC | Engineering, procurement, and construction |
| ESA | Endangered Species Act |
| FAA | Federal Aviation Administration |
| kV | kilovolt |
| kWh | kilowatt-hour |
| MW | megawatt |
| MAPP | Mid-Continent Area Power Pool |
| MBTA | Migratory Bird Treaty Act |
| MCZO | Mercer County Zoning Ordinance |
| NDDOT | North Dakota Department of Transportation |
| NDAC | North Dakota Administrative Code |
| NDCC | North Dakota Century Code |
| NDGFD | North Dakota Game and Fish Department |
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | National Resource Conservation Service |
| NRHP | National Register of Historic Places |
| NWI | National Wetlands Inventory |

| | |
|---|---|
| O&M | Operations and Maintenance |
| PLOTS | Private Land Open to Sportsmen |
| Project | Antelope Hills Transmission Line Project |
| PSC or Commission | North Dakota Public Service Commission |
| RP | Route Permit |
| Roughrider | Roughrider Electric Cooperative, Inc. |
| SCADA | Supervisory Control and Data Acquisition |
| SHPO | State Historic Preservation Office |
| SWPPP | Storm Water Pollution Prevention Plan |
| USEPA | US Environmental Protection Agency |
| USDA | United States Department of Agriculture |
| USFWS | US Fish and Wildlife Service |
| WMA | Wildlife Management Area |

# 1.0 INTRODUCTION

Antelope Hills Wind Project, LLC (Antelope) is submitting this consolidated application for a Certificate of Corridor Compatibility (Certificate) and Route Permit (RP) to construct the Antelope Hills Transmission Line Project (Project). Antelope is also requesting a Waiver of Procedures and Timelines in order to allow the two applications to be combined and processed concurrently.

The Project consists of an approximately 9.5-mile-long 345 kilovolt (kV) transmission line, which would convey power from the proposed Antelope Hills Wind Energy Project to the interconnection point at the existing switchyard of Basin Electric Power Cooperative (Basin)'s Antelope Valley Station (AVS). The Project transmission line would be located entirely within Mercer County, North Dakota, (Figure 1).

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

The siting and construction and of a transmission facility in North Dakota requires issuance by the Public Service Commission (PSC) of a Certificate, pursuant to the North Dakota Energy Conversion and Transmission Facility Siting Act (North Dakota Century Code [NDCC] 49-22 and Article 69-06 of the North Dakota Administrative Code [NDAC]). A transmission facility is defined in NDCC 49-22-03-12 as "An electric transmission line and associated facilities with a design in excess of one hundred fifteen kilovolts..." The Certificate identifies a general location in which the proposed transmission facility could be built; the corridor width is defined in NDAC 69-06-05-01.2.f as a minimum of 10 percent of the length of the transmission facility, and not less than 1 mile wide.

The siting and construction of a transmission facility also requires issuance of a Route Permit (RP) by the PSC, pursuant to NDCC 49-22. The RP identifies the specific location of the right-of-way in which the transmission facility would be built. Pursuant to NDCC 49-22-08.1, an application for a RP for a transmission facility within a designated corridor shall be filed no later than 2 years after the issuance of the Certificate. This indicates that the anticipated process is to first obtain a Certificate approving a general location of the facility, then to follow that with an application for the specific right-of-way location. However, NDCC 49-22-07.2 allows the Commission to waive procedures and time schedules, such that the applications for the Certificate and the RP can be consolidated and approved in a single process.

By this application, Antelope requests that the Commission, pursuant to NDCC 49-22-¬07.2, waive the requirement that the Commission file separate applications and hold separate hearings as may be required by NDCC 49-22-08, 49-22-08.1, 49-22-13 and NDAC 69-06-01-02. Antelope respectfully requests that the Commission allow a consolidated application and hold a single consolidated hearing on this waiver request and Application and issue one order

addressing this waiver request, the request for a Certificate of Corridor Compatibility, and the request for a Route Permit, all as contained in this Application.

Antelope Hills further requests that the hearing on this application for a corridor certificate and route permit be held on the same date and in conjunction with the hearing on its application for a certificate of site compatibility for its wind energy project.

NDCC 49-22-07.2 allows procedures and time schedules to be waived if "the commission, after hearing and upon a finding that the proposed facility is of such length, design, location, or purpose that it will produce minimal adverse effects…." In determining whether the Project would result in adverse impacts on the environment, Antelope evaluated the Project using the criteria set forth in NDCC 49-22-09 and the Avoidance Areas, Exclusion Areas, and Policy and Selection Criteria set forth in NDAC 69-06-09-02. Impacts associated with the Project are summarized in Section 5.0 of this Application. Evaluation of these factors demonstrates that the proposed Project will have minimal adverse effects.

Table 1 outlines the information required to fulfill the application requirements for a Certificate and an RP, as listed in NDCC 49-22-08, and indicates where these requirements are addressed in this document.

NDAC 69-06-08-02 establishes exclusion and avoidance areas and selection and policy criteria for the siting or transmission facilities. Antelope considered these areas and policy criteria in the design of the Project, as described in Section 3.2.

**Table 1. Certificate Completion Checklist**

| State Authority | Description | Section |
|---|---|---|
| **NDCC 49-22-08** | **Application for a certificate - Notice of filing - Amendment - Designation of a site or corridor.** | |
| 1. | An application for a certificate shall be in such form as the commission may prescribe, containing the following information: | |
| a. | A description of the size and type of facility. | 1.2, 4.0 |
| b. | A summary of any studies which have been made of the environmental impact of the facility. | 5.0 |
| c. | A statement explaining the need for the facility. | 2.0 |
| d. | An identification of the location of the preferred site for any energy conversion facility. | NA |
| e. | An identification of the location of the preferred corridor for any transmission facility. | 4.0 |
| f. | A description of the merits and detriments of any location identified and a comprehensive analysis with supporting data showing the reason why the preferred location is best suited for the facility. | 2.2, 3.1, 5.0 |

| State Authority | Description | Section |
|---|---|---|
| g. | A description of mitigative measures that will be taken to minimize all foreseen adverse impacts resulting from the location, construction, and operation of the proposed facility. | 1.4, 5.1.3, 5.2.3, 5.3.3, 5.4.3, 5.5.3, 5.6.3, 5.7.3, 5.8.3, 5.9.3, 5.10.3 |
| h. | An evaluation of the proposed site or corridor with regards to the applicable considerations set out in section 49-22-09 and the criteria established pursuant to section 49-22-05.1 | 7.0 |
| i | An 8.5 x 11 inch black and white map suitable for newspaper publication depicting site area. | Figure 13 |
| **NDCC 49-22-08.1** | **Application for a permit - Notice of filing - Amendment - Designation of a route.** | |
| 1. | An application for a route permit for a transmission facility within a designated corridor shall be filed no later than two years after the issuance of the certificate and shall be in such form as the commission may prescribe, containing the following information: | |
| a. | A description of the type, size and design of the proposed facility. | 1.2, 4.0 |
| b. | A description of the location of the proposed facility. | 4.0 |
| c. | An evaluation of the proposed route with regard to the applicable considerations set out in section 49-22-09 and the criteria established pursuant to section 49-22- 05.1. | 7.0 |
| d. | A description of mitigative measures that will be taken to minimize all foreseen adverse impacts resulting from the location, construction, and operation of the proposed facility. | 1.4, 5.1.3, 5.2.3, 5.3.3, 5.4.3, 5.5.3, 5.6.3, 5.7.3, 5.8.3, 5.9.3, 5.10.3 |
| e. | A description of the right-of-way preparation and construction and reclamation procedures. | 4.5 |
| f. | A statement setting forth the manner in which: | |
| (1) | The utility will inform affected landowners of easement acquisition, and necessary easement conditions and restrictions. | 1.5 |
| (2) | The utility will compensate landowners for easements, without reference to the actual consideration to be paid. | 1.5 |
| g. | Such other information as the utility may consider relevant or the commission may require. | NA |
| **NDCC 49-22-09** | **Factors to be considered in evaluating applications and designation of sites, corridors, and routes.** | |
| | The commission shall be guided by, but is not limited to, the following considerations, where applicable, to aid the evaluation and 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. | 5.0, 7.1 |

| State Authority | Description | Section |
|---|---|---|
| 2. | The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects. | 5.0, 7.2 |
| 3. | The potential for beneficial uses of waste energy from a proposed energy conversion facility. | NA |
| 4. | Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated. | 5.0, 7.4 |
| 5. | Alternatives to the proposed site, corridor or route which are developed during the hearing process and which minimize adverse effects. | 2.0, 7.5 |
| 6. | Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated. | 7.6 |
| 7. | The direct and indirect economic impacts of the proposed facility. | 5.13, 7.7 |
| 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. | 7.8 |
| 9. | The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites. | 5.12, 5.13, 7.9 |
| 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. | 5.5, 5.6, 7.10 |
| 11. | Problems raised by federal agencies, other state agencies, and local entities. | 7.11 |

## 1.2 Project Summary

Antelope proposes to construct a 9.5-mile-long 345 kV single circuit transmission line, located entirely within Mercer County, North Dakota. The Project would convey power from the proposed Antelope Hills Wind Project (see PSC Case File No. 13-846) to the interconnection point located at the Antelope Valley Station (AVS).

The eastern approximately 3 miles of the proposed transmission line route would utilize an existing transmission corridor now occupied by a 69kV double-circuit transmission line owned by Roughrider and Coteau. This portion of the Roughrider/Coteau line would be replaced with a new 345 kV monopole structure with the Roughrider/Coteau double circuit 69 kV lines strung on the poles as an underbuild enabling the lines to share the same right-of-way. This section of the Project is referred to as the Roughrider/Coteau underbuild segment. Both the western portion and the Roughrider underbuild portion of the Project would utilize a 150 foot-wide right-of-way. At approximately 0.25 miles west of AVS the triple circuit structure supporting the proposed 345 kV with the double circuit 69 kV underbuild would no longer be required. At this point, the poles would only support the proposed 345 kV line until the line reaches the point of interconnection at AVS.

## 1.3 Project Schedule

The construction of the transmission line would be coordinated with the construction of the associated wind energy facility from which it would carry generated power. Antelope is targeting the start of construction for early 2015, provided all pre-construction permits and approvals have been obtained. The target date for operation is the end of 2015, dependent upon permitting, equipment deliveries, and other development activities. The Project schedule includes the following components:

a. Certificate and RP: Antelope hopes that the Certificate and RP will be approved by October, 2014.

b. Permits: Antelope will obtain all other permits and licenses that are required following issuance of the Certificate and RP. (See Section 6.0 for the list of anticipated permits.)

c. Equipment Procurement, Manufacture and Delivery: Antelope will order the transmission conductor cables, switchyard components and other items with long lead times as soon as practical following issuance of the Certificate and RP.

d. Construction: Construction will begin as early in 2015 as weather conditions allow.

e. Test and Operations: Testing and operation will begin in late 2015.

f. Commercial Operation: Antelope anticipates commercial operation to begin in December 2015.

## 1.4 Potential Project Impacts

The Project will create both direct and indirect impacts. Direct impacts are those caused by the Project that would occur at the same time and place as the Project. An example of direct impacts would be the potential direct mortality to birds from collision with the transmission conductors or support poles. Indirect impacts are those caused by the Project but that would occur later in time or farther removed in distance, but are still reasonably foreseeable. Examples of indirect impacts include effects to predator species resulting from the direct loss of habitat for prey species, or impacts to bird species from the energy used to avoid the transmission lines.

Impacts may also be permanent or temporary. Permanent impacts are those that will last for the life of the Project, such as habitat loss resulting from the establishment transmission support pole foundations. Temporary impacts are those that will last only for the period of construction and then would either cease or be restored. Examples include temporary increases in traffic or housing demand during construction or temporary impacts to habitat at transmission support pole sites and wire pulling and tensioning sites. Table 2 summarizes the estimated permanent and temporary impact for each potential disturbance type based on Project components.

All potential impacts presented are “worst-case” estimates, and actual impacts are anticipated to be smaller than presented.

**Table 2. Estimated Project Ground Disturbing Impacts**

| Project Component | Assumptions | Impact Multiplier (Number/ miles/acres)[2/] | Permanent Impact (acres) | Temporary Impact (acres) |
|---|---|---|---|---|
| Monopole Transmission Poles | Permanent: 6-foot radius poles/pole foundations = 113 sq. ft. per pole. = 0.0052 acres<br>Temporary: Up to 100-foot radius around poles for construction work area = 31,500 sq. ft = 0.72 acres. | 24 transmission support poles | 0.12 | 17.28 |
| H-frame or Specialty Transmission support pole foundations | Permanent: Two 6-foot radius poles/pole foundations = 226 sq. ft. per H-frame. = 0.0026 acres<br>Temporary: Up to 100-foot radius around poles for construction work area = 31,500 sq. ft = 0.72 acres. | 62 transmission support poles | 0.16 | 44.64 |
| Access roads | Permanent: none;<br>Temporary: none | 0 miles of access road improvements | 0 | 0 |
| Wire stringing, pulling and tensioning sites | Permanent: none<br>Temporary: 1 acre per pulling site | 5 pulling sites | 0 | 5 |
| Interconnection Switchyard | Permanent: none; impact would be within existing switchyard fence line;<br>Temporary: None | N/A | 0 | 0 |
| **Totals (acres)** [1/] | | | **0.28** | **67** |

1/ Total impact areas may overestimate actual impacts. These totals reflect conservative, worst-case scenarios.
2/ The number of poles is based on preliminary engineering design and is expected to change during final design.

## 1.5 Public and Agency Coordination

Antelope has been in contact with the public, landowners, and agencies throughout the planning stages of the Project. Antelope has been working with potentially impacted landowners and has

contacted some agencies in preparation for this application. Pre-application public and agency coordination efforts are described below.

Antelope has been working with the participating landowners within the Proposed Corridor since 2013. Initial easements were signed at that time to allow the preliminary route evaluation, engineering and other due diligence. Over time, additional landowners have joined and are participating in the Project. Antelope has kept in close communication with landowners through Project updates, landowner meetings, and mailings to keep them aware of the progress of the Project.

### *1.5.1 Public Outreach*

Antelope held a public informational meeting in Golden Valley, North Dakota on Monday, May 12, 2014. The all landowners within the project boundary and within a mile of the boundary were invited to the meeting. An invite to the meeting was also advertised in the local newspaper (Beulah Beacon).

### *1.5.2 Contacts with Local Government and Public Officials.*

Below is a description of agencies contacted as part of the planning process. Correspondence with agencies is presented in Appendix B to the Application for Site Certificate.

- Antelope has provided information to the Mercer County Emergency Management Services Department and the Mercer County Sheriff's Department, along with the North Dakota Aeronautics Commission.
- Antelope gave an introductory presentation to the Mercer County Commissioners at an open hearing on September 11, 2013 to provide information about the Project.
- Antelope has in held preliminary discussions with the USFWS and NDGFD about the location of the project. Both agencies were contacted in 2011 with regard to early evaluation of potential biological constraints. Both agencies were again contacted in early 2013 prior to starting intensive field surveys. Both agencies provided input into resources and sensitive biological constraints that needed to be evaluated further in the development of the project. That feedback along with other resources aided in the development of the survey protocol that has been implemented within the Proposed Corridor and the wind farm Project Area. Specifically, Antelope is in the process of completing Tier 3 surveys pursuant to the USFWS Wind Energy Guidelines.

# 2.0 NEED FOR THE FACILITY

## 2.1 Need Analysis

The need for the proposed transmission line is driven by the need for the proposed wind energy facility; this is addressed in a separate application for a Certificate of Site Compatibility.

The need for the transmission line as proposed is driven largely by engineering design requirements for the wind energy facility and the preferred point of interconnection as identified by Basin. Within the wind energy facility, the substation must be relatively centrally located in order to allow for efficient collection of generated power from the turbines. A location far to one end or the other of the Facility could result in power loss from the farthest turbines. The Wind Project substation has been located to minimize power loss in the collection system. In addition, the location of the substation is dependent on landowner cooperation; it has been sited on lands owned by a participating landowner.

The preferred point of interconnection is at the existing AVS switchyard. Although there are existing transmission lines within the Proposed Corridor to which the wind energy facility could connect, feeding power into the existing switchyard simplifies the interconnection by making improvements to an existing facility, with existing control systems. This arrangement avoids having to construct, operate and maintain a completely separate interconnection facility on land that would have to be acquired for such a purpose. Additionally, this arrangement allows the energy sent from the wind energy facility to be more easily distributed on any of the five transmission lines exiting AVS, rather than it being isolated on only one of those lines.

## 2.2 Alternatives

NDCC 49-22-08.f requires “a description of the merits and detriments of any location identified and a comprehensive analysis with supporting data showing the reason why the preferred location is best suited for the facility.” NDCC 49-22-08.1c requires a similar analysis for the proposed Route. Antelope has explored a number of alternative corridors and routes between the wind energy facility substation and the AVS switchyard.

### *2.2.1 The Proposed Corridor and Route*

The Proposed Corridor and Route are the result of negotiations with landowners as well as assessments of impacts associated with each alternative. The Proposed Corridor and Route also represent the shortest feasible pathway between the substation and the point of interconnection. The Proposed Corridor and Route are described in Section 4; alternatives considered and eliminated are described below.

### *2.2.2 North Alternative*

Antelope has explored one alternative that would take a northerly route between the substation and the point of interconnection, as shown on Figure 5. This route was considered in order to avoid Coteau's existing and future planned mining operations within the Freedom Mine. The route was evaluated as a mechanism of placing the line outside of the permitted area associated with the Freedom Mine. This alternative was eliminated primarily because it would result in a substantially longer transmission line, with potentially higher environmental costs and no discernable advantages. Neither the North Alternative nor the Proposed Route can completely avoid mapped economic coal deposits, and either would impact similar acreages across those deposits. The North Alternative would parallel a major county collector road (CMC 2917) so would be viewed for longer times and by a greater number of people than the Proposed Route, which does not parallel a major road. The North Alternative would be 2 to 4 miles north of the existing transmission lines in the area, effectively enlarging the area impacted by transmission lines over the Proposed Route, which runs very close to the existing lines. Couteau also expressed concerns with the Northern Alternative do to the potential impacts on future mining operations within the Freedom Mine. The longer northern route would have a higher permanent and temporary impact footprint due to the greater number of towers and miles of access roads. For these reasons, the North Alternative has been eliminated from consideration.

### *2.2.3 Routes into the Antelope Valley Station POI*

There have been a number of routes that were analyzed and potential alternatives to access the POI at AVS. Specifically, between AVS and approximately 3 miles to the west is heavily constrained due to the presence of a number of existing and proposal transmission lines and the current and future mining areas associated with Coteau's Freedom Mine Operations. There have been several routes into AVS that have been evaluated by Antelope, but have been rejected from further consideration. These alternatives included:

- Revising the point of interconnect from AVS to a new switching/collection station on the planned AVS-Neset line. This alternative was determined to be infeasible due to the fact that it would have invalidated the queue position and subsequent interconnection evaluations that have been completed for the Project.
- Revising the point of interconnect from AVS to a new switching/collection station on the the existing AVS-Charile Creek line. This alternative was determined to be infeasible due to the fact that it would have invalidated the queue position and subsequent interconnection evaluations that have been completed for the Project.
- Proposing to add a second circuit to the planned AVS-Neset line in the final 3 miles of the line before it enters AVS. The timing of the planned commercial operation of the AVS-Neset line does not line up with the project schedule for the Antelope Hills Wind

Project. In addition, Basin would like to retain the ability to utilize the second circuit of the line in the future.

- Routing options that parallel the existing AVS-Broadland line. Several routes were considered that would parallel the existing AVS-Broadland line the final 3 miles to AVS. These locations were determined to be infeasible due to future operations associated with the Freedom Mine.

## 2.3 Ten-Year Plan

In accordance with NDCC 49-22-04, Antelope filed its first Ten-Year Plan with the PSC and with the Auditor for Mercer County in October 2013. The second update to the Ten-Year Plan was filed in August 2014.

# 3.0 SITE SELECTION CRITERIA

NDAC 69-06-08 establishes criteria for siting energy facilities, including exclusion areas, avoidance areas, selection criteria and policy criteria. Antelope's compliance with these criteria is discussed in the following sections.

## 3.1 Introduction

The location of the proposed transmission facility is derived largely from the location of the proposed wind energy facility and the preferred point of interconnection as identified by Basin Electric. The location of the wind energy facility was chosen based on its having a reliable wind regime capable of producing sufficient power; cooperation from a sufficient number of landowners; environmental conditions that allow environmental standards to be met at an economically-supportable cost; sufficiently close transmission infrastructure with which to interconnect; and a power purchase agreement. These are described in greater detail in the application for a site certificate for the wind farm (PSC Case File No. 13-846).

The location of the transmission line is based on some of these factors, including landowner cooperation, favorable environmental conditions, and the location of existing transmission infrastructure.

### *3.1.1 Landowner Agreements*

Antelope has entered into agreements with landowners within the Proposed Corridor in order to secure rights to access their property for surveys, testing, construction, operation, and maintenance of both the transmission line and the associated wind power project. Landowner agreements, and appropriate easement agreements and waivers for the Project, have either all been secured or are in the final stages of negotiation. The following describes the current status of landowner and easement agreements:

- **Pending Surface Easements on T-Line Route.** The parcels with surface rights in the Roughrider underbuild segment are currently under an existing transmission line easement with Roughrider that Antelope would utilize by way of a joint pole use and subeasement agreement.
- **Roughrider.** Antelope is in the process of negotiating a joint pole use and subeasement agreement with Roughrider. At the time of the application filing, Roughrider has signed a Letter of Intent related to the joint pole use and subeasement agreement, which grants Antelope authority to proceed with permit applications to the PSC and County.
- **Basin.** Antelope is in the process of negotiating an easement with Basin associated with the parcels owned by Basin near AVS. Antelope and Basin are also in the process of establishing crossing agreements for the locations where the Project

transmission line would cross existing and proposed Basin transmission lines in the area.

- **Coteau.** The selection of the proposed transmission line route to the point of interconnection at AVS was selected in consultation with representatives from Coteau Properties Company in order to avoid impacts to future mining areas associated with the Freedom Mine operations. The final 3 miles of the proposed transmission line route into AVS will involve the co-location of the proposed 345 kV line with the existing double circuit 69 kV Roughrider and Coteau lines. A joint pole use and subeasement agreement is in the process of being executed with both Roughrider and Coteau.

Figures 2 and 3 show the location of properties whose owners have committed to grant transmission line easements to Antelope.

### *3.1.2 Environmental Conditions*

A transmission line project must be based on environmental conditions which allow the Project to meet environmental standards at an economically-supportable cost. Antelope has chosen a Project site with favorable environmental conditions as discussed in Section 5.

### *3.1.3 Interconnection Infrastructure*

A viable wind power project requires interconnection infrastructure sufficiently close to the Project to keep the cost of additional transmission reasonable. In the case of Antelope Hills, the preferred point of interconnection to Basin's transmission infrastructure is located at AVS, located approximately 8 miles from the proposed Project substation.

### *3.1.4 Power Purchase Agreement*

A viable wind power project must secure a purchase agreement for the power produced. Antelope and Basin Electric entered into a 25-year power purchase agreement for the full output of the Antelope Hills wind project on November 6, 2013.

## 3.2 PSC Siting Criteria

### *3.2.1 Exclusion Areas*

NDAC 69-06-08-02.1, as promulgated by NDCC 49-22-05.1, lists five categories of geographical areas that should be excluded from a transmission corridor and route; these are listed below in Table 3. Exclusion and avoidance areas may be located within a corridor, but at no given point shall such an area or areas encompass more than fifty percent of the corridor width unless there is no reasonable alternative. NDAC 69-06-08-02 further specifies that a buffer zone of a reasonable width to protect the integrity of the area shall be included. Natural

screening may be considered in determining the width of the buffer zone. Most categories of exclusion area are not present in the Proposed Corridor; where present, the Project has been designed to avoid impacting these exclusion areas. Exclusion and avoidance areas are shown for the Proposed Corridor on Figure 6.

**Table 3. Exclusion Areas**

| NDAC 69-06-08-02.1 | Exclusion Area | Present within Proposed Corridor? | Present within Proposed Route? | Description | Section Addressed |
|---|---|---|---|---|---|
| a | Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; monuments; and wilderness areas. | No | No | NA | 5.11, 5.12 |
| b | Designated or registered state: parks; historic sites; monuments; historical markers; archaeological sites; and nature preserves. | Potentially Present | Potentially Present | Of these exclusion areas, only previously documented or yet-to-be-discovered historic or archaeological sites that may be eligible for NRHP listing are potentially present. No NRHP-listed sites exist in the Proposed Corridor or Route. Previously documented eligible sites may be present with the Corridor or Route, and will be avoided during construction. If previously unknown historic or cultural sites that are eligible for NRHP listing are discovered during construction, they will be avoided as necessary. | 5.6, 5.11, 5.12 |
| c | County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions. | No | No | NA | 5.6, 5.11 |
| d | Areas critical to the life stages of threatened or endangered animal or plant species. | No | No | NA | 5.5 |

| NDAC 69-06-08-02.1 | Exclusion Area | Present within Proposed Corridor? | Present within Proposed Route? | Description | Section Addressed |
|---|---|---|---|---|---|
| e | Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged. | No | No | NA | 5.4, 5.5 |

### *3.2.2 Avoidance Areas*

NDAC 69-06-08-02.2 lists nine categories of geographical areas that should not be considered in the routing of a transmission facility unless there is no reasonable alternative; these are listed below in Table 4. NDAC 69-06-08-02 further specifies that a buffer zone of a reasonable width to protect the integrity of the area shall be included. Natural screening may be considered in determining the width of the buffer zone. As with exclusion areas, most categories of avoidance area are not present in the Proposed Corridor. Avoidance areas are mapped for the Proposed Corridor on Figure 6.

**Table 4. Avoidance Areas**

| NDAC 69-06-08-02.2 | Avoidance Areas | Present within Proposed Corridor? | Present within Proposed Route? | Description and Proposed Buffer | Section Addressed |
|---|---|---|---|---|---|
| a. | Designated or registered national: historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands. | No | No | NA | 5.6, 5.12 |
| b. | Designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands. | No | No | NA | 5.6, 5.12, Figure 12 |

| NDAC 69-06-08-02.2 | Avoidance Areas | Present within Proposed Corridor? | Present within Proposed Route? | Description and Proposed Buffer | Section Addressed |
|---|---|---|---|---|---|
| c. | Historical resources which are not specifically designated as exclusion or avoidance areas. | Yes | Potentially Present | A records search and a Class III cultural resources inventory is in the process of being completed for the Project. Sites with potential cultural significance will be avoided to the extent practicable. Sites that may be discovered during construction would also be avoided to the extent practicable. | 5.11 |
| d. | Areas which are geologically unstable. | No | No | NA | 5.1 |
| e. | Within five hundred feet [152.4 meters] of a residence, school, or place of business. | No | No | NA | Figure 6 |
| f. | Reservoirs and municipal water supplies. | No | No | NA | 5.2 |
| g. | Water sources for organized rural water districts. | No | No | NA | 5.2 |
| h. | Irrigated land. | No | No | NA | 5.2 |
| i. | Areas of recreational significance which are not designated as exclusion areas. | No | No | The Proposed Route would skirt the southern edge of a PLOTS parcel. This parcel would not be crossed.<br><br>NA | 5.12 |

### *3.2.3 Selection Criteria*

NDAC 69-06-08-02.3 establishes selection criteria based on avoidance of significant adverse effects to specific resources resulting from the location, construction, and operation of the facility in that area. Table 5 describes the potential adverse effects to these resources. All such impacts will be at an acceptable minimum, or will be managed and maintained at an acceptable minimum.

**Table 5. Selection Criteria**

| NDAC 69-06-08-02.3 | Selection Criteria | Potential Effects | Section Addressed |
|---|---|---|---|
| a. | The impact upon agriculture: | | |
| (1) | Agricultural production | Approximately 0.2 acres of land will be permanently impacted and 67 acres of land will be temporarily impacted. These impacts represent a minor portion of the land area within the 6,414-acre Proposed Corridor, most of which will continue to be is available for agricultural production. These impacts are adverse but minimal. | 5.1, 5.6 |
| (2) | Family farms and ranches | Although some farmland will be permanently converted to foundations for the transmission line support poles, lease payments to farmers will provide a compensatory source of income and no adverse impacts will result.<br>The Project will comply with local setbacks for non-participating landowners. | 5.6, |
| (3) | Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation | No agricultural irrigation is currently present within the Proposed Corridor. No adverse effects are expected. | 5.2, 5.6 |
| (4) | Surface drainage patterns and ground water flow patterns | No adverse effects are expected. A SWPPP and NDPES permit will be adhered to in order to avoid impacts to surface drainages and ground water flow patterns. | 5.2 |
| b. | The impact upon: | | |
| (1) | Sound-sensitive land uses. | The only noise sensitive land uses within the Proposed Corridor are residences. Based on the acoustic analysis presented in Section 5.10 Project-related noise levels will not violate any local, state or federal threshold levels. | 5.10 |
| (2) | The visual effect on the adjacent area. | The transmission line would be seen in the context of several other transmission lines, the AVS, Great Plains Synfuels Plant and the Antelope Hills wind farm. The proposed transmission line, therefore, would be unlikely to create a strong visual contrast that could be considered an adverse impact. | 5.12 |
| (3) | Extractive and storage resources. | The transmission line would have no additional impacts to extractive resources, in that it would utilize a route already occupied by existing transmission lines where it would cross economic coal deposits. There are no storage resources in the area to be affected. | 5.1 |

| NDAC 69-06-08-02.3 | Selection Criteria | Potential Effects | Section Addressed |
|---|---|---|---|
| (4) | Wetlands, woodlands, and wooded areas. | Impacts to wetlands and woodlands will be avoided. | 5.3, 5.4 |
| (5) | Radio and television reception, and other communication or electronic control facilities. | No impacts to electronic communications are anticipated. | 5.8 |
| (6) | Human health and safety. | No impacts to human health and safety are anticipated. | 5.8 |
| (7) | Animal health and safety. | No impacts to livestock are anticipated from construction or operation of the facility. Antelope will implement measures to avoid and minimize impacts to wildlife by siting facilities away from active raptor nests and wetlands to the extent practicable. | 5.5, 5.8 |
| (8) | Plant life. | The Project will result in approximately 0.2 acres of permanent ground disturbance, including loss of the existing plant populations. As discussed above, this impact would be minimal in the context of the entire Proposed Corridor. | 5.4 |

### *3.2.4 Policy Criteria*

In accordance with NDAC 69-06-08-02.4, the PSC may give preference to an applicant that will maximize benefits that result from the adoption of the policies and practices listed. Table 6 lists those policy criteria and its applicability to the Project.

**Table 6. Policy Criteria**

| NDAC 69-06-08-02.4 | Policy Criteria | Applicability and Applicant Response | Section Addressed |
|---|---|---|---|
| a. | Location and design. | Antelope has chosen the route and is designing the transmission facilities to minimize the impact on any potentially sensitive areas. | 2.2, 5.0 |
| b. | Training and utilization of available labor in this state for the general and specialized skills required. | Antelope's EPC contractor will use local labor to the extent practicable. | 4.5, 5.13 |
| c. | Economies of construction and operation. | Antelope will construct and operate the transmission line and the wind energy facility as a single unit, leading to economies of construction and operation. | 4.5, 5.13 |
| d. | Use of citizen coordinating committees. | Antelope will continue to work with landowners of properties for the Project. | 1.5 |
| e. | A commitment of a portion of the transmitted product for use in this state. | Energy produced will be delivered into the Basin Electric substation at the AVS switchyard, from which it will be distributed to customers of Basin Electric. Basin Electric's service area includes North Dakota, and a portion of the energy produced will be used in-state. | 2.0 |
| f. | Labor relations. | No labor relations will be affected. | 4.5, 5.13 |
| g. | The coordination of facilities. | Existing facilities and facility corridors were considered in the location of the transmission line and associated facilities. | 2.2 |
| h. | Monitoring of impacts. | Antelope and the EPC contractor will employ environmental monitors onsite as needed during construction to ensure there will be no impacts to wetlands and documented archeological sites that require avoidance, and that necessary BMPs are implemented. Post-construction monitoring will be conducted as per USFWS WEGs. | 5.5 |
| i. | Utilization of existing and proposed rights of way and corridors. | Existing facilities and facility corridors were considered in the location of the transmission line and associated facilities. | 2.2 |
| j. | Other existing or proposed transmission facilities. | The Project would not result in adverse impacts to any other existing or proposed transmission facilities. | 2.2 |

## 3.3 County Criteria

In addition to the North Dakota siting criteria discussed above, Antelope will comply with the setbacks for non-agricultural uses established by Mercer County (Figure 6), as shown in Table 7.

**Table 7. Mercer County Zoning Ordinance Setback Distances for Non-Agricultural Land Uses**

| Ordinance Section | Setback Type | Setback Distance |
|---|---|---|
| Chapter 3, Section I, District Regulations | Setbacks for structure and improvements to centerline of all county, state, and federal highways and roads | 150 feet |
| Chapter 3, Section I, District Regulations | Side lot lines | 50 feet |
| Chapter 3, Section I, District Regulations | Rear lot lines | 50 feet |

# 4.0 DESCRIPTION OF THE PROPOSED FACILITY

## 4.1 Proposed Corridor

NDAC 69-06-04-02 states that the width of a corridor must be at least 10 percent of the length of the line, not less than 1 mile and not more than 6 miles in width. The proposed corridor is approximately 1 mile wide and encompasses the proposed transmission line route. The proposed corridor is shown on all map figures for this application.

The Proposed Corridor is located in northwestern Mercer County, North Dakota, northwest of the town of Beulah, and north of the towns of Zap and Golden Valley (see Figure 1). The corridor encompasses approximately 6,414 acres. Most of the land in the Corridor is in private ownership; a 160-acre parcel of State Trust land is partially within the Corridor (Figure 2). Table 8 lists the township, range and section locations in which the Proposed Corridor is located; these are also identified on Figure 2.

**Table 8. Proposed Corridor Location**

| Township | Range | Section(s) |
|---|---|---|
| 145N | 88W | 7,8,9, 13-18, 20-24 |
| 145N | 89W | 9-16 |

The 160-acre State Trust parcel encompasses the northwest quarter of Section 16, Township 145 North, Range 88 West (Parcel number 14508816B; Figure 2).

## 4.2 Proposed Route

Antelope has identified one Proposed Route between the Project substation and the point of interconnection at the AVS switchyard. (Figures 2). The Proposed Route is approximately 9.5 miles long and would be constructed within an approximately 150-foot wide right-of-way. The Proposed Route is located entirely within the Proposed Corridor. The Proposed Route does not cross either of the State Trust parcels that are within the Corridor.

The eastern approximately 3 miles of the proposed transmission line route would utilize an existing transmission corridor now occupied by a 69kV double-circuit transmission line owned by Roughrider and Coteau. This portion of the Roughrider/Coteau line would be replaced with a new 345 kV monopole structure with the Roughrider/Coteau double circuit 69 kV lines strung on the poles as an underbuild enabling the lines to share the same right-of-way. This section of the Project is referred to as the Roughrider/Coteau underbuild segment. Both the western portion and the Roughrider underbuild portion of the Project would utilize a 150 foot-wide right-of-way. At approximately ¼ mile west of AVS the triple circuit structure supporting the proposed 345 kV with the double circuit 69 kV underbuild would no longer be required. At this point, the poles

would only support the proposed 345 kV line until the line reaches the point of interconnection at AVS. Figures 3 and 4 reflect this section of the propose route.

## 4.3 Beginning and Ending Points

The transmission line will begin at the Project substation, where power from the turbines will be aggregated and stepped up to transmission line voltage of 345 kV. The substation will be addressed as part of the Application for Site Compatibility for the Antelope Hills Wind Project. The end point of the transmission line will be the AVS switchyard (Figure 2).

## 4.4 Transmission Line Design

The Project will consist of approximately 9.5 miles of single-circuit, 3 phase, 345 kV transmission line. Each of the three phases would consist of a 795 “Drake” ACSR double-bundled conductor. In the approximately 3 mile-long Roughrider/Coteau underbuild section, the Project circuit would be placed above the two rebuilt 3-phase 69 kV circuits (345kV, Single Circuit with 69kV, Double Circuit Underbuild). Each phase of the two Roughrider circuits would consist of a single conductor.

The Project will be supported on wooden or tubular steel monopole transmission support poles. The Roughrider underbuild section would primarily utilize steel monopoles (Figure 7). Each pole would be approximately 130 feet tall, and would be direct-embedded into native soil approximately 20 to 30 feet deep. The pole locations within the Roughrider/Coteau underbuild section would be placed approximately 300 feet apart depending on site-specific considerations. The western segment would utilize either wood H-frame supports or steel monopoles (Figures 7b and 7c). The wood H-frames would be approximately 80 feet tall, and would be direct-embedded into native soil approximately 13 to 18 feet deep. The steel monopoles would be approximately 110 feet tall, and would be direct-embedded into native soil approximately 15 to 20 feet deep. The typical span length in the western segment would be approximately 700 feet between poles, depending on site-specific considerations.

Specialty tower structures (Figure 7) will be necessary at locations where the proposed transmission line would cross under other existing lines (which occurs twice along the Roughrider underbuild section); at corners or angle points in the route; at each end of the line; and for transition structures. At these locations, either 3-pole guyed wood or steel direct-embedded structures, or steel H-frames mounted on reinforced concrete foundations would be used. These structures would be approximately 90 feet in height.

Based on preliminary engineering design, the 9.5 mile transmission line would require a total of approximately 89 poles; three of these would be specialized structures within the AVS switchyard. Of the 86 poles outside of the AVS switchyard, approximately 24 would be monopoles used in the Roughrider underbuild segment, and 62 would be H-frames or specialty structures. Specific pole locations will be determined during final engineering prior to construction. Pole locations will avoid sensitive areas such as wetlands, streams, riparian areas,

and any identified native prairie remnants, and will generally be placed at the edges of farm fields to avoid disruption to agricultural practices.

The Project will be constructed to maintain minimum conductor-to-ground clearance as required by National Electrical Safety Code (NESC) rules, in both the eastern Roughrider underbuild section and the western standalone section. Specific tower heights will be determined during final engineering design, in order to maintain this minimum clearance at the lowest point of conductor sag for all normal operating conditions. Clearances may be increased to account for site-specific situations.

The transmission line design includes a shield wire, which would be strung at the top of the poles to provide lightning protection. The shield wire would also contain a fiber optic core that forms part of the communications system for the transmission line, allowing for monitoring and remote control of substation and interconnection facility components. Where the Project would cross under other transmission lines on H-frame structures, an additional short segment of shield wire would be included (so there is one atop each leg of the H-frame), and grounded at both ends.

Other hardware that is not associated with the transmission of electricity may be installed as part of the Project. This hardware may include aerial marker spheres or bird markers and other equipment to reduce bird mortality.

### *4.4.1 Interconnection Yard*

The Project would interconnect at the existing AVS 345 kV switchyard on the existing and open northeast bay. Necessary improvements within the switchyard include one 345-kV power circuit breaker, three disconnect switches and motor operators, two 345-kV take-off structures, associated relay panels, and steel and bus work. All improvements at the AVS would take place within the footprint of the switchyard. The AVS switchyard is an existing facility, and no additional land area would be required for the interconnection equipment.

### *4.4.2 Temporary Access Routes*

No temporary or permanent access roads would be built to construct or maintain the proposed transmission line. Construction of the line would take place during the summer months when the ground is dry and hard enough to support construction equipment with no improvements.

Much of the Route is adjacent to existing public roads and can be accessed with minimal off-road work. Other portions of the Route run primarily along section lines, where there are commonly existing farm roads that can be utilized. Access of this nature would generally be confined to the defined section line rights-of-way or to the defined Route easement. Antelope will coordinate with landowners prior to and during construction to assure that existing farm roads are used to the greatest extent practicable, and will obtain additional easements as

necessary for access routes that are not within the section line rights-of-way or the Route easement.

### *4.4.3 Temporary Impact Areas*

Associated temporary impact areas will include conductor pulling and tensioning sites, and temporary construction areas at each pole location,

Pulling sites and would be required at each end of the Route and at each of the five right-angle bends along the Route. Wire pulling at each end of the Route would occur within the wind energy facility substation or within the AVS switchyard, neither of which would generate additional impacts. At Route corners the pulling sites would extend approximately 500 feet from the corner pole, in line with the incoming conductors and would be about 50 feet wide, for approximately 1 acre of additional temporary disturbance outside the right-of-way at each angle. However, because construction will occur in the summer months when the ground is dry and hard enough to support construction vehicles without the need for temporary improvements, actual impacts would be minimal, consisting primarily of vegetation trampling with a very small amount of ground disturbance. The specific locations of pulling sites will be determined and adjusted as needed prior to construction to avoid any sensitive resource areas that may be present. NWI and existing stream data indicates that there are no wetlands or perennial streams located in or near any of the pulling sites. Because the corner pulling sites will be outside of the 150 foot Route easement, temporary construction easements will be obtained from affected landowners prior to beginning construction.

Some temporary impacts will also occur at each of the pole locations. As with pole access and pulling sites, the actual impacts would be minimal, consisting primarily of vegetation trampling with a very small amount of ground disturbance. However, for the purposes of impact assessment, Antelope assumes a temporary impact area approximated by a 100 foot radius circle, or approximately 0.72 acres at each pole location.

### *4.4.4 Control System*

The proposed transmission line would be operated in conjunction with the Antelope Hills Wind Project, through its Supervisory Control and Data Acquisition (SCADA) system. The SCADA system will be located at the O&M building, and which is addressed as part of the Application for Site Compatibility for the Antelope Hills Wind Project.

## 4.5 Construction

The general sequence of pre-construction, construction, and post-construction activities for the Project is as follows:

- Grant of Certificate

- Ordering of Project components with long lead times including transmission support poles and conductors, high-voltage switches, circuit breakers and transformers;
- Final biological and archaeological surveys;
- Soil borings, testing and analysis for proper foundation design and materials;
- Final siting of transmission support poles,
- Clearing of pole sites;
- Installation of steel monopole and switchyard equipment foundations;
- Pole placement;
- Installation of switchyard equipment;
- Conductor stringing;
- Acceptance testing of facility; and
- Commencement of operation.

### *4.5.1 Construction Management*

Antelope will hire an engineering, procurement, and construction (EPC) contractor which will have primary responsibility for construction management of both the wind farm and the transmission line. The EPC contractor will use the services of local contractors where possible and appropriate and will undertake the following activities:

- Securing building, electrical, grading, road, and utility permits;
- Performing detailed civil, structural and electrical engineering;
- Scheduling execution of construction activities;
- Completing surveying and geotechnical investigations;
- Forecasting Project labor requirements and budgeting;
- Coordinating and managing the work of all Project subcontractors;
- Providing direct supervision for the installation of all Project components including roads, foundations, poles, insulators and conductors, and interconnection equipment.

Construction activities under the supervision of the EPC will consist of the following general tasks:

- Site development, including roads;
- Foundation excavation;
- Concrete foundation installation;
- Electrical and communications equipment installation;
- Tower assembly and erection;
- System testing; and
- Restoration of temporary impact areas.

Throughout the construction phase, ongoing coordination will occur between Antelope and the EPC. The EPC's on-site Project construction manager will help to coordinate ongoing communication with local officials, citizens groups and landowners. Antelope, the EPC

construction manager and the O&M staff manager will work together to ensure a smooth transition from construction through wind farm and transmission line commissioning and operation.

### *4.5.2 Commissioning*

The Project will be commissioned after completion of the construction phase and detailed inspection and testing. Inspection and testing will occur for each component of the transmission facility.

## 4.6 Operation and Maintenance

Project operation and maintenance will consist of continuous remote monitoring through the SCADA system and regular on-site inspections approximately every 6 months and maintenance as needed.

## 4.7 Decommissioning and Restoration

The Project will have an anticipated life of 30 years, based primarily on the projected life of the turbines in the Wind Project. At the end of that period or at Antelope's option, Project components may be upgraded if necessary and the Project continued in use; or the Project may be decommissioned. Prior to commencement of decommissioning, Antelope will file a decommissioning plan with the North Dakota PSC which meets the requirements of NDAC 69-09-09-06.

In the event that the Project is decommissioned, all towers and overhead cables would be dismantled and removed. Foundations would be removed to a depth of 36 inches below ground. Areas disturbed by construction and decommissioning activities would be graded, topsoiled, and reseeded according to agency recommendations and landowner specifications.

# 5.0 ENVIRONMENTAL ANALYSIS

This section provides a description of the environmental conditions that exist within the Proposed Corridor, along with the potential Project impacts and mitigative measures.

## 5.1 Geology and Soils

### *5.1.1 Existing Conditions*

**Elevation and Topography**

Topography within the Corridor is flat to rolling, with the steepest topography occurring to in the eastern end of the Corridor (Figure 4). The topography within the Corridor ranges from approximately 1,950 to 2,300 feet above sea level (640 to 700 meters).

**Geology and Mineral Resources**

A mantle of glacial drift deposited during the Pleistocene period overlies Tertiary rocks in the Proposed Corridor. The drift in the upland areas consists of till composed of unsorted silt, clay, sand, and gravel. Till thicknesses rarely exceeds 100 feet. The drift in stream valleys consists of a mixture of outwash sand and gravel that is cut and overlain by younger Holocene age alluvial deposits. Rarely is the alluvium more than 50 feet thick. Much of it consists of dark-gray sandy silt and clay (Croft 1973).

The bedrock geology of the study area consists of Sentinel Butte Formation from the Tertiary System. The Sentinel Butte Formation consists of gray-brown bentonitic claystone, siltstone, sandstone, and lignite. The sandstone is thin bedded and is generally fine-grained and silty. This formation can be up to 510 feet thick (Croft 1973).

Economic coal deposits are found in the eastern end of the Proposed Corridor and would be crossed by the Proposed Route, as shown on Figures 5 and 8. These deposits meet the minimum criteria established by coal companies operating surface mines in North Dakota. These deposits have not been mined and do not represent active mining areas; however, they may represent future mining areas. A large area of economic coal deposits has been mined as close as 0.5 miles east of the Proposed Corridor; the Freedom Mine, operated by Coteau Properties, is the largest lignite mine in the United States. This mine encompasses several square miles outside the Proposed Corridor. Portions of the Proposed Corridor are also owned by Coteau Properties.

No active or abandoned subsurface mines are located within the Proposed Corridor. Four gravel pits were identified within the Corridor.

The transmission corridor is located near the southern edge of the Bakken Shale Oil Field. Records from the North Dakota Geologic Survey, Oil and Gas Division indicate that one well

has been drilled within the Proposed Corridor; this was an exploratory well that did not produce (was "dry").

Investigations of public maps and local geology did not identify any fossil collection sites in the immediate vicinity of the Proposed Corridor.

## Seismic Risk

No recorded areas of seismic activity or subsidence were identified in the Proposed Corridor. According to the North Dakota Geographic Survey, North Dakota is located in an area of very low earthquake probability. There are no known active tectonic features in south-central North Dakota and the deep basement formations underlying North Dakota are expected to be geologically stable (Bluemle 1991). This information is supported by US Geographic Survey seismic hazard maps, which show that the Proposed Corridor is located in an area with very low seismic risk (USGS 2008). Related geologic hazards, such as soil liquefaction, are therefore also unlikely.

## Soil Resources and Farmland

The U.S. Department of Agriculture (USDA) has mapped soils in the Proposed Corridor (USDA 2009). Project Area soils are primarily well-drained loams and silt loams derived from the underlying glacial deposits and, to a lesser extent, the underlying sandstones and siltstones. Hydric soils are also present within the Proposed Corridor; hydric soils are called out specifically because of their potential to be wetlands. No hydric soils are mapped within the Proposed Corridor or the proposed Route.

Areas of Prime Farmlands[1] and Farmlands of Statewide Importance are present within the Corridor (Figure 9). Approximately 14 acres of Prime Farmland and 78 acres Farmland of Statewide Importance are mapped within the Proposed Corridor.

According to the Soil Survey of Mercer County (USDA 1978), erosion by wind or water may be a hazard on most of the soils in Mercer County, particularly on cropland soils. Wind erosion hazard is most severe for soils that have a high percentage of lime, clay, or fine sand in the surface layer, such as the Vebar and Zahl soils. Water erosion is also a hazard on most of the cropland soils in the county, particularly on those soils having long, smooth slopes greater than 3 percent. Water erosion hazard is also greatest when the surface is bare. The soil survey report notes that loss of organic matter through erosion is also of concern, and indicates that

[1] Prime Farmland soils are defined in the NRCS Title 430 National Soil Survey Handbook, issued November 1996, as follows: "Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management" (USDA 1996).

proper management of soils to maintain good tilth is especially needed on soils that have a sodic subsoil and on the Lawther and Moreau soils that have a silty clay surface layer.

### *5.1.2 Potential Impacts*

The Project will result in direct, permanent impacts to soils through the establishment of transmission pole foundations. These impacts will remove soils from agricultural production for the life of the Project. The Project will result in temporary impacts around each pole site.

The Project will create up to approximately 0.2 acres of permanent impact and 67 acres of temporary impact to soils. Because of the flexibility inherent in the location of transmission line poles, the Project is expected to avoid all permanent impacts to hydric soils and to Prime Farmland. Figure 9 shows the location of the Project with these soil types.

Because of the relatively gentle relief in the Proposed Corridor, the deliberate avoidance of steep slopes, and the use of appropriate BMPs during and following construction, the potential for soil loss due to erosion will be low. Impacts to hydric soils such as compaction are expected to be minimal due to the siting of Project facilities to avoid wetlands and other areas with hydric soils.

Construction and operation of the Project would result in some loss of farmlands; however, the permanent impact area would be less than one acre, and effects on agricultural production would therefore be minimal. Direct, permanent impacts represent a small fraction of the land area within the 6,414-acre Proposed Corridor, most of which will continue to be is available for agricultural production. In addition, lease payments to farmers will provide a compensatory source of income such that no adverse impacts will result from the negligible loss of farmable area at the pole locations.

Soil erosion, compaction, and other related soil disturbance will be short-term, and will be minimized by implementing environmental protection measures including stormwater management BMPs, robust hazardous materials handling and spill response procedures, decompaction of temporary disturbance areas as needed, and implementing dust control measures to limit wind erosion and revegetation of disturbed areas. The loss of organic matter will be limited through implementation of stormwater management BMPs, and by stripping and stockpiling topsoil in disturbance areas and using stockpiled topsoil to finish restoration of temporary disturbance areas. With the proper implementation of these environmental protection measures, no unmitigated loss of highly productive soil will result from implementation of the Project.

Impacts to mineral resources would be minimal. Sand and gravel are plentiful locally, and although gravel mining would not be permitted within the 150 foot right-of-way, this would not cause a local shortage of these materials. The Project would not affect existing oil and gas wells or infrastructure.

The Corridor and Route must cross an area of economic coal deposits in order to reach the preferred point of interconnection; the Route would cross approximately 0.75 miles of economic coal deposits. This Route was determined in consultation with Coteau Properties and Basin as having the least impact on current and potential future mining operations. Direct impacts to this mineral resource are therefore not anticipated to be significant.

Geologic hazards such as seismicity, landslide, or subsidence will not be concerns for the Project. The region is considered to be seismically stable, and no areas of subsidence, liquefaction, mass movement or other geologic hazards have been identified in the Proposed Corridor. Project facilities will be microsited to avoid such areas if any are identified during final design, and appropriate engineering design, primarily for pole foundations, will be used to further reduce the impacts of geologic hazards to a non-significant level.

### *5.1.3 Mitigative Measures*

Antelope will avoid impacts to Prime Farmland and hydric soils by siting poles off of these farmlands to the extent practical. The Project will make use of existing farm roads as much as possible, and will generally place poles at the edges of farm fields to minimize disruptions to cropland and farming practices.

Antelope will implement avoidance and minimization measures during final design and construction of the Project as appropriate and include the following:

- Avoid placement of Project components in areas with unsuitable seismic, liquefaction, slope, subsidence, settling, or flooding conditions.
- Minimize the extent of the project footprint, including improved roads and construction staging areas.
- Minimize ground-disturbing activities, especially during the rainy season.
- Use existing roads and disturbed areas to the extent possible.
- Conduct construction and maintenance activities when the ground is frozen or when soils are dry and native vegetation is dormant.
- Stabilize disturbed areas that are not actively under construction using methods such as erosion matting or soil aggregation, as site conditions warrant.
- Salvage topsoil from all excavation and construction activities to reapply to disturbed areas once construction is completed.
- Dispose of excess excavation materials in approved areas to control erosion.
- Isolate excavation areas (and soil piles) from surface water bodies using silt fencing, bales, or other accepted appropriate methods to prevent sediment transport by surface runoff.
- Use earth dikes, swales, and lined ditches to divert local runoff around the work site, where conditions warrant.
- Reestablish the original grade and drainage pattern to the extent practicable.
- Reseed disturbed areas with a native seed mix and revegetate disturbed areas immediately following construction.

BMPs to prevent soil erosion will be implemented during construction of the Project as required by the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit and the accompanying Project Erosion and Sedimentation Control Plan (ESCP).

Additional site-specific measures to further reduce impacts to soils may be identified and implemented as appropriate; however, impacts to soil resources are not expected to be significant.

## 5.2 Water Resources

### *5.2.1 Existing Conditions*

**Surface Water**

Surface water in the western third of the Proposed Corridor flows southwesterly to Goodman Creek, via many unnamed tributaries. Surface water in the eastern two-thirds of the Proposed Corridor flows southeasterly to Antelope Creek via its West Branch and other unnamed tributaries. Surface water in a small area near the center of the Corridor, north of the Route, flows northward to Lake Sakakawea via unnamed tributaries to an unnamed creek that flows into Beaver Creek Bay.

Figure 10 shows the streams and wetlands present throughout the Proposed Corridor. Most streams are intermittent and in many cases function as drainage ways within tilled agricultural fields. There are no major rivers or traditional navigable waters found within the Proposed Corridor. Registered surface water rights in the vicinity are limited to one surface water right for flood control at AVS. No public water sources, reservoirs or municipal water supplies, or irrigated land are present within the Proposed Corridor.

The Project is located in an area of North Dakota for which flood hazard areas have not been mapped by Federal Emergency Management Agency (FEMA 2009). While there are many streams within the Proposed Corridor, all but a few are small; primarily intermittent streams with low likelihood of significant flooding.

**Groundwater**

Groundwater in the region supplies both public and private wells (Croft 1973). Local drinking water can be productively derived from some shallow glacial and alluvial sand and gravel aquifers associated with rivers in the area. Shallow groundwater typically follows local topography. However, nearly all potable water supplies in the region are derived from deeper aquifers, primarily the Fox Hills, Hell Creek, and Tongue River aquifers.

Review of the North Dakota State Water Commission database of driller logs indicates that 4 wells have been drilled within the Proposed Corridor. All four are observation wells. The observation wells do not provide water and there is no water data available for them.

Regionally, both ground and surface water diversion rights allow for withdrawals to serve municipal, industrial, irrigation and other purposes. Registered water rights in the vicinity include three groundwater rights for industrial purposes including power generation at AVS and use at the adjacent Great Plains Synfuels gasification plant.

### *5.2.2 Potential Impacts*

Operation of the Project will not use surface or groundwater; therefore, there will be no direct or indirect impacts either to water quantity or water quality. The Project is highly unlikely to impact 100-year floodplain areas since as discussed above the likelihood of significant flooding is very low. Project infrastructure – primarily transmission line support poles and temporary access routes – will be set back from streams a sufficient distance to avoid impacts to floodplains that may exist.

Project construction activities such as excavation and construction of foundations are unlikely to affect groundwater quality or flow patterns. If impacts were to occur, they will likely be minor and highly localized, and would not impact any water supply wells as there are none in the Corridor. Water needed for construction (e.g., for mixing concrete and for dust control) would be obtained from sources with permitted water rights; the amount required would not create a measureable impact to groundwater availability in the region.

Although it appears to be unlikely based on existing conditions, subsurface blasting may be required to excavate for pole foundations. This could potentially fracture bedrock and affect groundwater flow in the immediate vicinity of the disturbance; however, potential blasting activities would not be deep enough to impact the aquifers most used in the region. In the event that subsurface blasting is required, a blasting plan would be developed and implemented to keep the impacts localized and fracture the least amount of bedrock necessary for construction. Potential disturbances due to blasting would be localized and temporary, with groundwater likely to resume its natural course of flow down-gradient of the foundation.

Operation of the Project may involve storage of small quantities of hazardous materials to be kept and used onsite (e.g., herbicides used for noxious weed management). These materials will be managed according to the mitigation measures described in Section 5.2.3, which would prevent their release into surface or groundwater in the Proposed Corridor.

### *5.2.3 Mitigative Measures*

Antelope will implement measures to avoid or minimize impacts to water resources, as appropriate, including:

- Minimize the extent of land disturbance to the extent possible.
- Use existing roads and disturbed areas to the extent possible.
- Site transmission line support poles to avoid crossing streams and wetlands and minimize the number of drainage bottom crossings.

- Apply standard erosion control BMPs to all construction activities and disturbed areas (e.g., sediment traps, water barriers, erosion control matting) as applicable to minimize erosion and protect water quality.
- Apply erosion controls relative to possible soil erosion from vehicular traffic.
- Identify and avoid unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, high slope angles, and certain geologic landforms).
- Construct drainage ditches only where necessary; use appropriate structures at culvert outlets to prevent erosion.
- Avoid altering existing drainage systems, especially in sensitive areas such as erodible soils or steep slopes.
- Clean and maintain catch basins, drainage ditches, and culverts regularly.
- Limit herbicide and pesticide use to nonpersistent, immobile compounds and apply them using a properly licensed applicator in accordance with label requirements.
- Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials.
- Reestablish the original grade and drainage pattern to the extent practicable.
- Reseed (non-cropland) disturbed areas with a native seed mix and revegetate disturbed areas immediately following construction.

Additional site-specific measures to further reduce impacts to water resources may be identified and implemented as appropriate; however, impacts to water resources are not expected to be significant.

## 5.3 Wetlands

### *5.3.1 Existing Conditions*

A preliminary assessment of the presence of wetlands was performed for Project using available desktop data including the National Wetlands Inventory (NWI) data set (USFWS 2013a). This data was further evaluated using high-resolution aerial photography. The use of aerial photography is appropriate for the Proposed Corridor since the area contains little tree cover and the boundary of these waters is generally evident. Figure 10 shows the location of wetlands and streams within the Proposed Corridor and Route; these waters are scattered and relatively sparse.

The preliminary assessment was used as a guide to avoidance and minimization, and to determine potential impacts for the Project. NWI data is not definitive as to classifications and existence of features, and any potentially jurisdictional wetlands that would actually be impacted by the Project will be delineated prior to construction.

### *5.3.2 Potential Impacts*

Based on the current design, impacts to wetlands would be avoided completely. Specifically, the location of transmission support poles would be adjusted to avoid direct impacts to identified wetland areas. No permanent impacts would result from temporary access activities.

### *5.3.3 Mitigative Measures*

Antelope will implement the following measures to avoid or minimize impacts to wetlands as follows.

- Site transmission support poles and temporary access routes to avoid wetlands and minimize the need to cross drainage bottoms.
- A Project Storm Water Pollution Prevention Plan (SWPPP) will be obtained and complied with to ensure surface water, including wetlands, is not adversely affected by run off from construction activities.

## 5.4 Vegetation

### *5.4.1 Existing Conditions*

**Vegetation Communities**

Vegetation within the Proposed Corridor consists primarily of agriculture and grassland. Some of the grassland areas may be classified as native prairie (areas of naturally occurring grasses and forbs) (USGS 2013). Typical crops include wheat, barley, oats, sunflower, and hay. Riparian areas are likely to contain shrubs and small trees associated with streams. Wetlands and ponds basin are sparse and are less than 5 acres and support seasonal surface water.

The vegetation communities within the Proposed Corridor are identified in Figure 11. The source data is based on USGS GAP analysis land cover data.

**Native Prairie Habitats**

Remnant native prairie may be present at scattered locations throughout the Project Area. Native prairie serves as a vital ecological resource by improving water quality, providing erosion control, and supporting a diverse population of plants and animals. However, due to the native prairie's fertile soils and predominantly flat topography, large areas of native prairie have been converted to agricultural lands. Native prairie is important habitat used by some protected bird species (see Section 5.5.1).

**Noxious and Invasive Weeds**

North Dakota has listed twelve species as noxious weeds (NDCC 63-01.1). Mercer County does not list additional noxious weed species (NDDA 2013a). The North Dakota Weed Mapper

(NDDA 2013b) indicates that none of the state-listed weeds are known to be present in the Proposed Corridor.

**Rare Plant Populations**

There are no federal listed, proposed, or candidate plant species known to occur in Mercer County. North Dakota's list of Species of Conservation Priority does not include any plant species.

## *5.4.2 Potential Impacts*

The Project will result in direct, permanent impacts to vegetation communities through the establishment of transmission support poles. The Project will result in temporary impacts at the each pole site, at the construction laydown area, and at wire pulling and tensioning sites.

The Project will have approximately 0.2 acres of permanent impact and 67 acres of temporary impact, as shown in Table 2. These impacts will be distributed between cropland and grassland, and are expected to be extremely small, with no permanent impacts to wetlands, trees, shrubs or water. Antelope will work to locate transmission support poles so as to avoid impacts to sensitive habitats; however these impacts are not expected to be significant.

## *5.4.3 Mitigative Measures*

Remnant native prairie may be present at scattered locations throughout the Proposed Corridor. During final design Antelope will use aerial photography and the results of further on-site investigations to locate transmission support poles on previously disturbed land to the maximum extent practical.

Antelope will implement measures to avoid or minimize impacts to sensitive habitats and measures to control the spread of invasive species, as appropriate, including:

- Minimize the size of areas in which soil would be disturbed or vegetation would be removed.
- Reduce habitat disturbance by keeping vehicles on designated temporary access routes and minimizing foot and vehicle traffic through other areas.
- Initiate habitat restoration of disturbed soils and vegetation as soon as possible after construction activities are completed. Restore areas of disturbed soil using weed-free native grasses, forbs, and shrubs, in consultation with land managers and the Mercer County Weed Boards.
- Develop a plan for control of noxious weeds and invasive plants that could occur as a result of new surface disturbance activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations, which would include at least the following:
    - Require the use of certified weed-free mulching.

  - Establish a controlled inspection and cleaning area for trucks and construction equipment are arriving from locations with known invasive vegetation problems. Visually inspect construction equipment arriving at the construction area and remove and contain seeds that may be adhering to tires and other equipment surfaces.
  - Regularly monitor the transmission line corridor for the establishment of invasive species. Initiate weed control measures immediately upon evidence of the introduction or establishment of invasive species.
  - Do not use fill materials that originate from areas with known invasive vegetation problems.
  - Monitor the transmission line corridor regularly for the establishment of invasive species; initiate weed control measures immediately upon evidence of the introduction of invasive species.
- Regularly inspect the transmission line corridor for damage from erosion, washouts, and rutting. Initiate corrective measures immediately upon evidence of damage.
- Reclaim areas of disturbed soil using weed-free native shrubs, grasses, and forbs. Restore the vegetation cover, composition, and diversity to values commensurate with the ecological setting.

Introduction of noxious weeds will be mitigated through prompt revegetation with native species or restoration of prior land use, and through ongoing monitoring and control programs. Additional site-specific measures to further reduce impacts to plant communities may be identified and implemented as appropriate; however, impacts to plant communities are not expected to be significant.

## 5.5 Wildlife

Wildlife species of greatest concern are federally and/or state-protected species, avian species, and bats that may occur in the Proposed Corridor. Protection for wildlife species is provided under the following statutes:

- The Endangered Species Act (ESA) mandates protection of species federally listed as threatened or endangered and their associated habitats. The ESA makes it unlawful to "take" a listed species. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or attempt to engage in any such conduct." Significant modification or degradation of listed species' habitats is considered "harm" under ESA regulations. Projects that have such potential will require consultation with USFWS and may require special permitting or mitigation measures to avoid or reduce impacts to these species. Candidate species receive no statutory protection from the USFWS; however, they do receive full protection once listed.
- The Bald and Golden Eagle Protection Act prohibits the take of any bald eagle or golden eagle, alive or dead, including any part, nest, or egg. "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb". "Disturb" means to

agitate or bother an eagle to a degree that causes, or is likely to cause 1) injury to an eagle; 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. The USFWS promulgated regulations in 2009 that provide for a permitting framework for incidental take associated with otherwise lawful activities, including wind energy (50 Code of Federal Regulations § 22.26). The Final Eagle Conservation Plan Guidance – Version 2, that outlines the recommended steps for permit applicants, was released by USFWS in April 2013 (USFWS 2013b).

- Under the Migratory Bird Treaty Act (MBTA) it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture, or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any native migratory bird, part, nest, egg or product. On March 23, 2012, the USFWS released the Land- Based Wind Energy Guidelines (USFWS 2012a). These voluntary guidelines provide recommended approaches for assessing and avoiding impacts to wildlife and their habitats, including migratory birds, associated with wind energy project development. While the MBTA provides no process for authorizing incidental take of MBTA-protected birds, USFWS has indicated that compliance with these guidelines would be considered in assessing any potential liability under the MBTA.

## *5.5.1 Existing Conditions*

Antelope has completed a series of wildlife and habitat assessments that cover the area of both the proposed wind energy facility and the transmission line Corridor. The following discussion therefore applies to both proposed projects; Corridor or Route-specific data is described to the extent that it can be separated out from the larger study areas.

**Federally Listed and Candidate Species**

The USFWS provides data regarding federally threatened, and endangered, and candidate species at the county level for public use. According to the USFWS, Mercer County has five endangered wildlife species, one threatened species, one candidate species, and two species proposed for listing (see Table 9). These species are discussed in the following sections.

In a letter dated October 22, 2010, the North Dakota Game and Fish Department (NDGFD) provided comments to Antelope regarding the Project (see CIA in Appendix A to the Application for Site Certificate); whooping cranes were not specifically addressed in that letter. The primary concerns expressed included limiting impacts within native prairie to the extent possible; avoiding wetlands and alternations to surface drainage patterns; and placing electrical collection lines underground where possible, and applying appropriate Avian Protection Line Interaction Committee (APLIC) design standards for any necessary above-ground segments.

The USFWS provided comments on the Project in a letter dated December 1, 2010, in response to a request for comment made for the Critical Issues Analysis (see Appendix A to the Application for Site Certificate). The letter notes the presence of potentially suitable roosting and feeding habitat for whooping cranes in the wind farm Project Area, and recommends mapping wetlands and analyzing the potential effects to migrating whooping cranes from loss of use of habitat in the Project Area for migration stopovers.

The only specific recommendations made are that any new transmission line be placed underground to avoid collision mortality, and the installation of visual marking devices on existing transmission lines within 1 mile of potentially suitable whooping crane habitat. The USFWS letter includes a general recommendation that high value habitat types, including native prairies, woodlands, wooded draws and riparian forests, be avoided whenever possible. It also recommends minimizing impacts to wildlife and habitat by reseeding disturbed native prairie; minimizing grassland disturbance by using fewer, larger turbines and fewer access roads; using self-standing towers (no guy wires); avoiding wetland fill; replacing unavoidable wetland impacts with functionally equivalent wetlands; and utilizing appropriate erosion control measures to prevent water quality degradation.

**Table 9. Federally Listed and Candidate Species in Mercer County**

| Common Name | Latin Name | Habitat | Status |
|---|---|---|---|
| Black-footed Ferret | *Mustela nigripes* | Prairie dog complexes | Endangered |
| Gray Wolf | *Canis lupus* | Last confirmed sighting in North Dakota in 1991. | Endangered |
| Interior Least Tern | *Sternula antillarum* | Missouri River and Yellowstone sandbars; beaches; | Endangered |
| Pallid Sturgeon | *Scaphirhynchus albus* | Bottom dwelling, Missouri and Yellowstone Rivers | Endangered |
| Whooping Crane | *Grus Americana* | Palustrine wetlands and cropland ponds | Endangered |
| Piping Plover | *Charadrius melodus* | Missouri River sandbars, alkali beaches[1/] | Threatened |
| Northern Long-Eared Bat | *Myotis septentrionalis* | Caves and mines, forested areas | Proposed as Endangered |
| Rufa red knot | *Calidris canutus rufa* | Coastal areas and wetlands | Proposed as Threatened |
| Spragues pipit | *Anthus spragueii* | Native prairie | Candidate |

Source: USFWS 2010
1/ Designated Critical Habitat for piping plover is located on the following water bodies: Lake Audubon, Lake Sakakawea, and the Missouri River. All of these water bodies are located north and east of the Proposed Corridor.

### *Black-footed Ferret*

Historically, black-footed ferrets occupied much of the Great Plains region of North America, co-locating with prairie dog (*Cynomys* sp.) colonies and complexes. Black-footed ferrets depend on

prairie dog complexes for food and habitat. Prairie dogs and black footed ferrets prefer level topography in grasslands, steppe, and shrub steppe. Plowed lands, forests, wetlands, and water are avoided (USFWS 2013c). There are no records of recent black-footed ferret occurrences in North Dakota though there is potential for reintroduction (USFWS 2008b, as cited in HDR Critical Issues Analysis; see Appendix A to the Application for Site Certificate). No black-footed ferrets were observed incidentally during WEST's avian surveys (see Appendix A to the Application for Site Certificate). No prairie dog colonies have been identified within the Proposed Corridor.

### *Gray Wolf*

The gray wolf was listed as an endangered species in 1978 (USFWS 1978). In 2003, the USFWS downlisted the two northern subpopulations (western and eastern distinct population segments) to threatened (USFWS 2003). The eastern population remains listed as threatened. Once common throughout North Dakota, the last confirmed sighting in the state was 1991, although there have been more recent but unconfirmed reports of sightings in the Turtle Mountains in the north-central portion of the state. The presence of wolves in most of North Dakota would likely remain sporadic and consist of occasional dispersing animals from Minnesota and Manitoba (USFWS 2008a). No gray wolves were observed incidentally during WEST's avian surveys (see Appendix A to the Application for Site Certificate).

### *Interior Least Tern*

The interior population of the least tern was listed as endangered in 1985 (USFWS 1985a). In North Dakota, the interior least tern is primarily found on sandbars on the Missouri River between the Garrison Dam and Lake Oahe, in the reservoirs, and on the Missouri and Yellowstone Rivers upstream of Lake Sakakawea (USFWS North Dakota Ecological Field Services Office 2008). This tern nests on barren sandbars on the Missouri River and feeds on small fish in the river (USFWS 1990a). As of 2008, approximately 100 pairs were known to breed in North Dakota (USFWS 2008b). Critical habitat for the interior least tern has not been designated.

No habitat for interior least terns is found within the Proposed Corridor, and none were observed during avian use surveys (see Appendix A to the Application for Site Certificate).

### *Pallid Sturgeon*

The pallid sturgeon historically occupied the Mississippi and Missouri rivers and their major tributaries (USFWS 1990b). The reason for decline of the sturgeon has been water control and development projects on the Mississippi and Missouri rivers. The sturgeon still occupies portions of the main stem of the Missouri River.

There is no pallid sturgeon habitat in the Proposed Corridor, nor in close proximity to the Proposed Corridor in streams flowing through or from it.

### *Whooping Crane*

The whooping crane is protected by federal laws in the United States. It was listed as endangered in the United States in 1970 under the Endangered Species Preservation Act of 1966 (16 USC Section 668aa(c)) and then under the ESA in 1973. Critical habitat was designated in 1978. Under the North Dakota Comprehensive Wildlife Conservation Strategy Guide (NDGFD, 2005), the whooping crane is a Level III Species of Conservation Priority, defined as "North Dakota's species having a moderate level of conservation priority but are believed to be peripheral or non-breeding in North Dakota" (NDGFD, 2005)

One self-sustaining wild population of whooping cranes currently exists in the world. Members of this population breed primarily within the boundaries of Wood Buffalo National Park in Canada and migrate through the central United States en route to the wintering grounds at Aransas National Wildlife Refuge along the Gulf Coast of Texas. This flock is referred to as the Aransas-Wood Buffalo National Park Population. Due to intensive management, this population has increased from 15 birds in 1941 to 263 as of the start of spring migration in 2010 (WCCA 2010). The migration route is well defined and 95 percent of all observations occur within a 200-mile wide corridor during spring and fall migration (CWS and USFWS 2007). The USFWS subdivides this corridor into 5 percent increments starting at 75 percent. The Proposed Corridor is within the area encompassing 75 to 80 percent of confirmed whooping crane sightings, and is approximately 50 miles west of the migration corridor centerline.

Antelope contracted WEST to complete an analysis of potential whooping crane habitat in the area of the wind energy facility and transmission line (see Whooping Crane Habitat Review report in Appendix A to the Application for Site Certificate). The habitat review and analysis evaluated whether the wind energy facility Project Area, which encompasses all but the eastern 2 miles of the Corridor, represented high, average or low potential whooping crane habitat as compared to nearby reference locations. The potential whooping crane habitat analysis included a comparison of wetlands, wetland basins, and land cover within the proposed Project Area and four reference areas of the same dimensions located a few miles to the north, south, east and west; all four reference areas are located inside the defined whooping crane migration corridor. A recently developed potentially suitable habitat assessment (Watershed Institute 2012) was also used to quantify and compare whooping crane habitat within the study areas. This assessment first screens all wetlands within the study areas for minimum size, visual obstructions, and disturbances (roads, buildings, and gas and oil development). Those wetlands left are then quantified (as a means to quantify suitability) by their size, density of wetlands around them, distance to food, whether they are natural or manmade, and their water regime.

The mean suitability score for wetlands in the wind farm Project Area was 10.4; mean suitability scores and ranges for the other four reference areas ranged from a low of 8.6 for the southern reference area to a high of 12.2 for the eastern reference area. The overall ranking is below what was determined to be suitable potential habitat in Kansas (a mean score of 12 or more; Watershed Institute 2012). The density and nature of wetlands in the eastern end of the Corridor are similar to that of the Project Area, indicating that the suitability rating for the Corridor would

be similar to that of the remainder of the area; however, wetlands in this part of the Corridor are already affected by the presence of several existing transmission lines.

Although the Proposed Corridor is within the defined migration corridor, no whooping cranes have been documented within the Proposed Corridor (see whooping crane habitat analysis in Appendix A to the Application for Site Certificate). The closest confirmed sighting is approximately 1.5 miles south of the Corridor. No whooping cranes were observed during avian use surveys (See avian survey report in Appendix A to the Application for Site Certificate). While whooping cranes likely migrate over the Proposed Corridor and there is potential for roosting or foraging use, the Proposed Corridor does not provide unique habitat compared to adjacent areas.

### *Piping Plover*

The Great Plains population of the piping plover was listed as threatened in 1985 (USFWS 1985b). The piping plover breeding range stretches from south central Canada into the Midwest United States. The majority of piping plover breeding pairs found in the United States are concentrated in Montana, the Dakotas, and Nebraska. This population of piping plover winters in the Gulf of Mexico. The plover nests in 23 counties in North Dakota, primarily in alkali wetlands in the Missouri Coteau and on barren sandbars in the Missouri River and system reservoirs. Reasons for decline of the piping plover include habitat loss and nest depredation in the wetlands, however the main reason for decline of the species along the Missouri River is habitat loss due to water development projects (e.g. Fort Peck Dam, Garrison Dam, and Oahe Dam) and loss of wetlands due to agriculture and other developments (NDSWC 2008).

Critical habitat for the piping plover was designated on September 11, 2002 (USFWS 2002). There is no USFWS-designated critical habitat for the piping plover in the Proposed Corridor (50 CFR Part 17). The entirety of Lake Sakakawea has been designated as critical habitat; the nearest portions of the lake are approximately 3.6 miles north of the Proposed Corridor. The designated critical habitat areas are composed of shorelines, peninsulas, and islands, below the top of the maximum operating pool level and on lands owned by the Federal government; the USACE manages the lands bordering most of the lake. These reservoir habitats include sparsely vegetated shoreline beaches, peninsulas, islands composed of sand, gravel, or shale, and their interface with the water (USFWS 2002).

No piping plover habitat is present within the Project Corridor, and none were observed during avian use surveys (see Appendix A to the Application for Site Certificate).

### *Northern Long-eared Bat*

On October 2, 2013, the northern long-eared bat was proposed for federal listing as endangered under the ESA throughout its range (USFWS 2013c). The range of this species includes eastern and north central United States, including North Dakota. Habitat includes caves and mines for hibernating during the winter, called hibernacula, as well as underneath bark, in cavities or crevices of live and dead trees in the summer for roosting. This medium sized bat

(approximately 3.0 – 3.7 inches) with a wing span of 9 -10 inches is distinguishable from other bats by it its long ears (USFWS 2013d).

Threats to the northern long-eared bat include white nose syndrome, impacts to hibernacula and impacts to summer habitat. No hibernacula are known from North Dakota and no known subsurface mines, caves or other cave-like structures occur in the Proposed Corridor. In addition, based on WESTs suitable habitat analysis, there is very little summer roost habitat in the Proposed Corridor, therefore, habitat is limited for northern long-eared bats.

### *Rufa Red Knot*

On September 27, 2013 the rufa red knot was proposed for federal listing as threatened under ESA (USFWS 2013e). Rufa red knots fly very long distances during migration (over 9,000 miles) in the spring and autumn. This range predominately encompasses coastal areas from south of Tierra del Fuego to as far north as central Canadian Arctic. Rufa red knots have been documented in most states during migration, including North Dakota. This species depends on suitable habitat, food and weather conditions along its migration. Rufa red knots feed predominately on clams, mussels, snails and other invertebrates including their shells. However, stop over habitats, including wetlands, require the presence of easily-digestible food such as juvenile clams and mussels and horseshoe crab eggs UFWS 2013f. Threats to rufa red knot include vulnerability to climate change and affects to arctic tundra, coastal habitats and rising sea levels, depletion of food source and weather patterns. No rufa red knots were observed during avian use surveys (See  Appendix A to the Application for Site Certificate).

### *Sprague's Pipit*

The Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in Minnesota, Montana, North Dakota and South Dakota as well as south-central Canada (Jones 2010). The USFWS reviewed the conservation status of Sprague's pipit to determine whether the species warrants protection under the ESA. The status review found that listing Sprague's pipit as threatened or endangered is warranted, but that listing the species at this time is precluded by the need to complete other listing actions of a higher priority (Jones 2010). Currently the Sprague's pipit remains a candidate species for listing under the ESA and is also protected under the MBTA. Conversion of native prairie to agriculture and overgrazing in much of this species' range continue to cause declines on breeding and wintering grounds (Jones 2010).

No Sprague's pipits were observed during avian use surveys (See Appendix A to the Application for Site Certificate).

## State Species of Conservation Priority

The NDGFD has identified 100 species of conservation priority, or those in greatest need of conservation in the state (NDGFD 2008). These species are categorized into three levels as follows:

- Level I - Species in greatest need of conservation
- Level II - Species in need of conservation, but have had support from other wildlife programs
- Level III - Species in moderate need of conservation, but are believed to be on the edge of their range in North Dakota

Table 10 shows Level I species that have been documented in the Missouri Slope Region including Mercer County.

**Table 10. Species of Conservation Priority Level I in the Missouri Slope Region**

| Common Name | Scientific Name | Habitat Type | Habitat Details |
|---|---|---|---|
| Baird's Sparrow | *Ammodramus bairdii* | Native Prairie /Grassland | Prefer native prairie; structure may be more important than plant species composition. Nesting may take place in tame grasses (found in Crested Wheat, while avoids Smooth Brome). Areas with little to no grazing activity are required. |
| Black-tailed Prairie Dog | *Cynomys ludovicianus* | Native Prairie/ Grassland | Require short-grass prairie habitats. Avoids heavy brush and tall grass areas due to the reduced visibility these habitats impose. |
| Chestnut-collared Longspur | *Calcarius ornatus* | Native Prairie/ Grassland | Located in tracts of heavily grazed or hayed mixed-grass prairie or mixed-grass/short-grass prairie. |
| Ferruginous Hawk | *Buteo regalis* | Native Prairie | Confined to very limited areas of native prairie, usually those with hilly terrain or with low-grade topsoil that has not been altered by plowing or overgrazing. |
| Grasshopper Sparrow | *Ammodramus savannarum* | Native Prairie | Inhabit open prairie with intermittent brush, avoids heavy brush cover. |
| Lark Bunting | *Calamospiza melanocorys* | Native Prairie/ Grassland | Inhabit short-grass & mixed-grass communities as well as fallow fields, roadsides, and hayfields. |
| Long-billed Curlew | *Numerius americanus* | Native Prairie/ Grassland | Inhabit dry native grasslands. |
| Plains Spadefoot | *Spea bombifrons* | Native Prairie/ Grassland/Cropland | Found in the dry prairies, sagebrush communities, and farm fields. |
| Sprague's Pipit | *Anthus spragueii* | Native Prairie | Inhabit native medium to intermediate height prairie. In short grass prairie landscape, can often be found in areas with taller grasses. More abundant in native prairie than in exotic vegetation. Requires relatively large areas of appropriate habitat. |
| Swainson's Hawk | *Buteo swainsoni* | Native Prairie/ Grassland/Forests | Require native prairie or cropland that includes thickets of natural tree growth, brush margins of native forested tracts, or shelterbelts. |

| Common Name | Scientific Name | Habitat Type | Habitat Details |
|---|---|---|---|
| Upland Sandpiper | *Bartramia longicauda* | Native Prairie/ Grassland | Inhabit mixed-grass prairie, extensive tracts of wet meadow, grazed tall-grass prairie, tame haylands, CRP fields, and mowed or burned railroad or highway rights-of-way. |
| Western Hognose Snake | *Heterodon nasicus* | Native Prairie | Prefers sandy or gravelly habitats like sand prairies, very open portions of prairies, or sand dunes with very little cover. |
| Wilson's Phalarope | *Phalaropus tricolor* | Wetland | Inhabit swales along ephemeral streams and various types of ponds and lakes that contain expanses of shallow water that are interspersed with, or adjacent to, wet-meadow vegetation. |

Source: Hagen et al. 2005

North Dakota's list of Species of Conservation Priority includes six species that are also listed as federally threatened or endangered: the interior least crane, piping plover, pallid sturgeon, whooping crane, black-footed ferret and gray wolf. These species are discussed above.

Sixteen North Dakota Species of Conservation Priority were observed in or near the Proposed Corridor during avian surveys (See Appendix A to the Application for Site Certificate). These included five Level I species and eleven Level II species (Table 11).

**Table 11. Species of Conservation Priority Observed During Wildlife Surveys**

| Common Name | Scientific Name | Conservation Priority Level |
|---|---|---|
| Ferruginous hawk | *Buteo regalis* | 1 |
| Franklin's gull | *Larus pipixcan* | 1 |
| Grasshopper sparrow | *Ammodramus savannarum* | 1 |
| Marbled godwit | *Limosa fedoa* | 1 |
| Swainson's Hawk | *Buteo swainsoni* | 1 |
| American kestrel | *Falco sparverius* | 2 |
| Bald Eagle | *Haliaeetus leucocephalus* | 2 |
| Bobolink | *Dolichonyx oryzivorus* | 2 |
| Golden eagle | *Aquila chrysaetos* | 2 |
| Loggerhead shrike | *Lanius ludovicianus* | 2 |
| Northern Harrier | *Circus cyaneus* | 2 |
| Northern pintail | *Anas acuta* | 2 |
| Sharp-tailed grouse | *Tympanuchus phasianellus* | 2 |
| Upland sandpiper | *Bartramia longicauda* | 2 |
| Western meadowlark | *Sturnella neglecta* | 2 |
| Willet | *Catoptrophorus semipalmatus* | 2 |

## Avian Species

### *Avian Point Count Surveys*

Antelope contracted WEST to conduct fixed-point avian surveys to estimate seasonal and spatial use of the study area by birds. The surveyors also recorded incidental observations of all diurnal raptors, unusual or unique birds, sensitive species, mammals, reptiles and amphibians detected outside of the standardized survey periods. Birds observed incidentally were excluded from avian use calculations. Surveys commenced in September of 2013 and have continued through the summer of 2014. Surveys are still ongoing as of the submittal of this application and are expected to be completed in August 2014.

Seventy-eight bird species were identified during point count surveys and incidentally through June of 2014. No federally endangered, threatened or candidate species were recorded. Sixteen North Dakota Species of Conservation Priority were recorded, including both bald and golden eagles. Sixteen North Dakota Species of Conservation Priority were recorded, including both bald and golden eagles. Canada goose was the most abundant species, representing 22 percent of the total number of observations, followed by horned larks, representing 17 percent of the total number of observations. Ten species of raptors including bald and golden eagles, five hawk species (ferruginous, rough-legged, red-tailed, Swainson's hawk, and northern harrier), one owl species (great horned owl), one falcon (American kestrel) and one vulture species (turkey vulture) were observed. The most common raptor species observed was northern harrier, representing 44 percent of the total raptor observations.

### *Sharp-tailed Grouse Lek Surveys*

Antelope contracted WEST to conduct sharp-tailed grouse lek aerial surveys in April and May 2014, in order to determine the approximate location of leks and provide general information on sharp-tailed grouse use within and immediately adjacent to the combined wind farm and transmission line Project Area[2].

Surveys were conducted during peak lekking season (early April through mid-May). 18 confirmed leks (birds observed in courtship behavior at the same location during more than one survey) and 3 probable leks (birds observed in courtship behavior during only one survey) were recorded. The maximum number of sharp-tailed grouse recorded on leks ranged from 2 to 24 birds. All but one of the identified leks were located in short grass prairie habitat. Although the survey was not intended to estimate the sharp-tailed grouse population in the vicinity of the

[2]. The lek surveys that were completed did not cover the final three miles along the Roughrider/Coteau underbuild segment. This section of the Proposed Route is located within an existing transmission line corridor in an active coal mining area, and involves the rebuild of an existing line to support the new 345 kV structure with the 69 kV double-circuit underbuild. Given the significant, existing disturbance that is already present within this area, it is likely that the surrounding habitat has been significantly degraded for the purpose of supporting breeding habitat for grouse in the area.

Project, the relatively large number of birds recorded at some leks may suggest a healthy sharp-tailed grouse population in the area.

Table 12 lists identified lek sites located within 1 mile of the Proposed Corridor. None of the confirmed leks and one of the probable leks are located within the Proposed Corridor. Five additional confirmed and no probable lek sites were identified within 1 mile of the Proposed Corridor. The probable lek (Site 17) is located approximately 0.22 miles from the Proposed Route.

**Table 12. Sharp-tailed Grouse Leks within 1 Mile of the Proposed Corridor**

| Lek ID | Lek Status | Maximum number of individuals | Distance to Proposed Corridor (miles) | Distance to Project Route (miles) |
|---|---|---|---|---|
| 11 | Confirmed | 8 | 0.65 | 1.15 |
| 12 | Confirmed | 20 | 0.77 | 1.27 |
| 16 | Confirmed | 13 | 0.49 | 0.98 |
| 17 | Probable | 10 | Within | 0.22 |
| 18 | Confirmed | 8 | 0.10 | 0.60 |
| 20 | Confirmed | 2 | 0.78 | 1.28 |

### *Raptor Nest Surveys*

For the purposes of the Project, raptors are defined as kites, accipiters, buteos, harriers, eagles, falcons, and owls. Aerial surveys for raptor nests included the Study Area plus a 1-mile buffer in accordance with guidance provided in the USFWS Inventory and Monitoring Protocols (Pagel et al. 2010). In addition, surveys for eagle nests, included the Study Area plus a 10-mile buffer because the USFWS defines the area nesting population for golden eagle to be the “number of pairs of golden eagles known to have a nesting attempt during the preceding 12 months within a 10-mile radius of a golden eagle nest” (USFWS 2013b).

Aerial raptor nest surveys were conducted in April 2014; the survey report is provided in Appendix A to the Application for Site Certificate. The survey was based on the wind farm Project Area and its 1 mile and 10 mile buffer areas; the eastern 2 miles of the Corridor are outside the Project Area but entirely within the 10-mile buffer area. The eastern 2 miles outside the Project Area is an existing transmission line right-of-way. Surveyors documented 31 raptor nests representing three identified species: bald eagle, great-horned owl, and red-tailed hawk. Of these 31 nests, only 4 are located within 1 mile of the Proposed Corridor, and one bald eagle nest is located within 10 miles of the Proposed Corridor. All four of the nests within 1 mile of the Corridor are active red-tailed hawk nests.

Table 13 indicates the nest activity status, associated species and location relative to the Corridor and Route for all raptor nests documented within 1 mile of the Corridor during the

survey and for eagle nests within 10 miles of the Corridor. No potential or occupied eagle nests are located within the Corridor or the 1-mile buffer.

**Table 13. Raptor Nests Documented within 1 Mile of the Proposed Corridor**

| Nest ID[1/] | Species | Nest Status | Distance to Proposed Corridor (miles) [2/] | Distance to Proposed Route (miles)[2/] |
|---|---|---|---|---|
| 4 | Red tailed hawk | Active | Within | 0.33 |
| 9 | Red tailed hawk | Active | 0.29 | 0.79 |
| 25 | Red tailed hawk | Active | 0.50 | 1.00 |
| 26 | Red tailed hawk | Active | 0.37 | 0.87 |
| BE213 | Bald eagle | Active | 3.64 | 4.14 |

1/ Nest IDs as assigned by WEST in Raptor Nest Survey Report (Appendix A)
2/ distances are approximate.

### *Bat Study*

Of the 47 bat species in the United States, 10 occur in North Dakota and may potentially occur within the Proposed Corridor based on current known distribution ranges including the little brown bat (*Myotis lucifugus*), silver-haired bat (*Lasionycteris noctivagans*), big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), western long-eared myotis (*M. evotis*), western small-footed myotis (*M. ciliolabrum*), Keen's myotis (*M. keenii*), northern long-eared myotis (*M. septentrionalis*) and long-legged myotis (*M. volans*) (ASM 2007, NatureServe 2008, BCI 2009). None of the species that potentially occur within the Proposed Corridor are federally listed as threatened or endangered. The northern long-eared bat is a sensitive species and was proposed for listing as endangered by the USFWS in 2013 (USFWS 2013d). Three of the species that could potentially occur within the Proposed Corridor– hoary bat, silver-haired bat, and eastern red bat – are highly migratory and are found in the greatest abundance in North Dakota during late May through early September (Cryan 2003).

Antelope contracted WEST to complete a study of bat activity in the wind farm and transmission line Project Area during summer and fall 2014 (see report in Appendix A to the Application for Site Certificate). Acoustic monitoring surveys were conducted at four meteorological tower stations within the Project Area. Surveys were conducted from mid-June through mid-October to capture the fall migratory period. One of the detectors was placed at approximately 45 meters (148 feet) above ground level to record bats flying near rotor heights; the others were placed at ground level. The detectors were programmed to start recording approximately 30 minutes before sunset and turn off approximately 30 minutes after sunset each night.

The standard metric used for measuring bat activity was the number of bat passes per detector-night, and this metric was used as an index of bat activity in the Study Area. To assess potential

for bat fatalities, bat activity in the Study Area was compared to existing data at other wind energy facilities in the Midwest.

Acoustic studies for bats are ongoing; however, the Project Area is mostly agriculture and grassland and provides limited habitat for bats. Bat species that may potentially occur in the vicinity of the Project Area, include migratory tree-roosting species (eastern red, hoary, and silver-haired). These species will most likely use the Project Area during migration because trees found along riparian corridors and established windbreaks may provide suitable roosting habitat. The silver-haired bat, hoary bat, and eastern red bat have been found in the highest numbers as mortalities at wind farms throughout North America (Kunz et al. 2007). Big brown bat is considered a generalist and will use trees, caves, and fabricated structures for roosting. Given that big brown bats are widespread and common in North Dakota (USGS 2013a), and the presence of suitable artificial structures and foraging habitat within the Project Area, the species has a high likelihood of occurrence within the Project Area.

West also conducted a northern long-eared bat desktop habitat analysis to determine suitable habitat in the Project Area. Suitable habitat was defined as forests and woodlands containing potential roosts and forested linear features such as fencerows, riparian forests and other wooded corridors, as well as, human-made structures. It was determined that no suitable habitat is present within the Proposed Corridor.

## *5.5.2 Potential Impacts*

Impacts to wildlife can be short-term (one or two reproductive seasons, generally during the construction period), or long-term (affecting several generations during the life of the Project). Impacts can also be direct (an immediate effect to an individual, population, or its habitat), or indirect (an effect that may occur over time or result from other actions).

**Federally Listed and Candidate Species**

***Black-footed Ferret***

The Project is unlikely to affect black-footed ferret as there have not been any prairie dog colonies found in the Proposed Corridor and it is unlikely that black-footed ferrets are present.

***Gray Wolf***

The Project is unlikely to affect current gray wolf habitat, and there has not been a confirmed wolf sighting in North Dakota since 1991.

***Interior Least Tern***

The Project is unlikely to impact interior least tern, as there have been no documented occurrences of the species in or near the Proposed Corridor.

### *Pallid Sturgeon*

The Project will have no impact on pallid sturgeon, as there is no habitat for this fish within the Proposed Corridor, and the Project will not impact water quality in the Missouri River or its major tributaries where the pallid sturgeon is known to occur.

### *Whooping Crane*

Studies have shown that transmission line collisions cause 40 percent of known whooping crane mortality in the Rocky Mountains (Lewis 1993). Avian risk is greatest where transmission lines intersect migratory pathways, feeding, nesting, or roosting sites, Studies show that marking static lines is effective in reducing collisions (Morkill and Anderson 1991). Placement of a variety of bird diverters on static lines has been shown to effectively reduce collisions between 50 and 90 percent (APLIC 1994 and Morkill and Anderson 1991).

The Project is unlikely to impact whooping crane based on the following findings: No whooping cranes were observed during fall or spring wildlife surveys for the Project, and there are no historical records of whooping cranes occurring within the Proposed Corridor. In addition, the overall suitability rating for wetland habitat in the Study Area is below what is considered to be suitable potential habitat for whooping cranes.

### *Piping Plover*

The Project is unlikely to impact piping plover, as there have been no documented occurrences of the species in or near the Proposed Corridor.

### *Northern Long-eared Bat*

The Project is unlikely to impact Northern long-eared bat because there is very little suitable habitat within or near the Proposed Corridor.

### *Rufa red knot*

The Project is unlikely to impact Rufa red knot, as there have been no documented occurrences of the species in or near the Proposed Corridor.

### *Sprague's Pipit*

The Project may impact individual Sprague's pipits during the spring and fall migration through collision with the transmission lines. However, any impacts are expected to be minimal as the species was not detected during surveys.

### State Species of Conservation Priority

Sixteen North Dakota Species of Conservation Priority were observed during wildlife surveys, and an additional 13 Level1 species are known to occur in Mercer County (see Table 10 and 11, respectively). The impacts discussion below related to passerines, grouse, and raptors cover impacts to State Species of Conservation Priority.

## Avian Species

*Passerines*

Passerines (songbirds) were the most abundant bird type observed during surveys. Passerines (songbirds) were the most abundant bird type observed during surveys. Migrant passerines are found more often in post-construction mortality monitoring compared to other groups of birds (Arnett et al. 2007, Strickland and Morrison 2008, Strickland et al. 2011). Although nocturnal migrants comprise the majority of songbird fatalities, the proportion of migrating songbirds killed at any given wind project during migration is reported to be low (Strickland et al. 2011). Locally breeding songbirds may experience lower mortality rates than migrants because many of these species tend not to fly at turbine heights during the breeding season, except some species with aerial flight displays in the rotor swept area (Pickwell 1931, Johnson and Erickson 2011).

During the avian surveys, 41 species of songbirds were observed, totaling 2,940 observations. Horned larks had the highest number of observations (795), followed by western meadowlark (266), and red-winged blackbird (328). Although these species have been documented at other wind energy facilities with transmission lines, if fatalities occur at the Project, they are unlikely to have population-level impacts.

### *Grouse*

Prairie grouse have been identified as a group that exhibits avoidance behavior. Particular concern over avoidance issues has been raised by agencies and non-governmental groups with respect to grouse species (USFWS 2012b). To date, this research is limited to observational studies, with results varying by grouse species and source of disturbance (i.e., roads, oil and gas wells, vertical structures, and transmission lines).

Studies of grouse have documented that some species of grouse avoid transmission lines, improved roads, buildings, oil and gas wells, and communication towers (Pitman et al. 2005, Pruett et al. 2009, Johnson et al. 2012). However, other studies have found no evidence of avoidance of transmission lines or of wind facilities (Johnson et al. 2012). Although some studies have concluded that avoidance of other development is based on height, which could drive avoidance of wind turbines, Walters et al. (2014) found that, in most published studies, the effect of the height of a structure could not be conclusively isolated from the other effects of energy development.

### *Raptors*

Four active red-tailed hawk nests were identified within 1 mile of the Proposed Corridor; of these, only one is located within the Corridor and is approximately 0.22 miles from the proposed Route. One bald eagle nest is located within 10 miles of the Corridor. Six observations of bald eagles and one observation of a golden eagle flying through the area confirm the potential utilization of the area by eagles, however, the probability of mortality with Project facilities is low. Northern harrier had the highest number of observations (49), followed by red-tailed hawk (27).

Surveys are still ongoing as of the submittal of this application and are expected to be completed in August 2014.

***Bats***

Overall, there is a low likelihood of occurrence for bat species for the entire Project Area, because lands are mostly agriculture and grassland which provide limited habitat for bats. Acoustic surveys are ongoing; however, should bats occur along the Proposed Corridor, the potential for direct impacts, such as, collision and electrocution with transmission lines is minimal. Based on the available data, it is expected that bat fatalities at the Project, while likely low overall, will be highest during late summer and early fall.

## *5.5.3 Mitigative Measures*

**Federally Listed and Candidate Species**

Antelope will implement avoidance and minimization measures and BMPs for listed wildlife species that have a potential to be in the wind farm and transmission line Project Area as appropriate, as follows:

***Whooping Crane***

*Survey Requirements and Avoidance Measures:*

- Conduct preconstruction evaluations and/or surveys to identify wetlands that provide potentially suitable stopover habitat.
- Do not site turbines, transmission lines, access roads, or other project facilities within or adjacent to wetlands that provide suitable stopover habitat.

*Conservation Measures:*

- Place state-of-the-art bird flight diverters on any new or upgraded overhead collector, distribution, and transmission lines located within 1 mi (1.6 km) of suitable stopover habitat.
- Instruct workers to avoid disturbance of cranes present near project areas.

**State Species of Conservation Priority and Avian Species**

Antelope will prepare a Bird and Bat Conservation Strategy based on the USFWS Wind Energy Guidelines. The overall goal of such a plan is to reduce or eliminate avian and bat mortality. Antelope will work with the USFWS and the NDGFD to identify protective measures to include in the plan.

# 5.6 Land Use/Farmland

## *5.6.1 Existing Conditions*

The land within the Proposed Corridor is primarily in private ownership, and is largely in agricultural use including crops and livestock grazing, with two farmstead residences and a number of associated barns and outbuildings. The Proposed Corridor is not located within any city limits or any military installation. There are several industrial developments in or near the Proposed Corridor, including several Basin Electric transmission lines within the Corridor, along with AVS, the Great Plains Synfuels plant, and a microwave tower and several private mobile communications towers near the eastern end of the Corridor. Roads within the Proposed Corridor include two paved county major collector roads (2913 and 2917), gravel surfaced county roads and two-track farm roads and trails. There are no state highways within the Proposed Corridor; the nearest is ND 1806, which runs east-west 1.5 to 4.5 miles north of the Corridor.

### County Land Use Regulation

The Project is subject to land use regulation by Mercer County. The entire Corridor is zoned for Agricultural use under the Mercer County Zoning Ordinance (MCZO). Under the MCZO (March 2013), the construction of a transmission facility in the Agricultural District requires a Conditional Use Permit (MCZO Chapter 3, Section I, Conditional Uses letter A). An application for a Conditional Use Permit will be filed with Mercer County in August 2014.

### USFWS Wetland and Grassland Easements

The USFWS has been purchasing wetland easements in the Prairie Pothole Region since 1989. Easement wetlands are part of the National Wildlife Refuge System. There are no USFWS wetland easements in the Corridor or in Mercer County (NCED 2013).

### Conservation Reserve Program (CRP) Easements

The Natural Resource Conservation Service (NRCS) and Farm Services Agency administer a number of conservation-based programs for private landowners. The CRP conserves soil and water resources and provides wildlife habitat by removing enrolled tracts from agricultural production, generally for a period of 10 years. The NRCS administers a number of conservation-based programs for private landowners. These tracts cannot be hayed, tilled, seeded, or otherwise disturbed without the authorization of the NRCS. The 2002 Farm Bill amended Section 3832 of the Farm Security and Rural Investment Act to allow the use of CRP land for wind energy generation.

According to the Farm Services Agency, there are a total of 3,229.3 acres of land in Mercer County enrolled in CRP as of March, 2014); the Proposed Corridor may include some lands that are enrolled in CRP. Antelope will work with landowners within the Proposed Corridor to determine if any lands are enrolled in CRP. Should any CRP lands be identified, Antelope will

avoid those areas to the extent practicable during micrositing, either by spanning those lands or modifying the Route to bypass them. If avoidance is not practical, Antelope will work with the landowner and USDA to determine an appropriate course of action.

### USDA Loan Coordination

The USDA offers a variety of loans through its Rural Development program. Land under loans from the USDA requires special coordination with the USDA if non-agricultural project activities are proposed within those parcels. The Proposed Corridor may include some lands that have used USDA loads and are therefore subject to USDA review. Antelope will work with landowners within the Proposed Corridor to determine if any lands are under USDA jurisdiction due to loans. Should any loan coordination lands be identified, Antelope will work with the landowner and USDA to determine appropriate avoidance or mitigation measures, if necessary.

### Private Land Open to Sportsmen (PLOTS)

NDGFD runs the PLOTS program, under which private lands may be opened to public hunting use. These lands are enrolled in one of three NDGFD programs to enhance fish and wildlife populations for sustained public use, and may also be jointly enrolled in other federal programs such as the CRP described below. As of July 2014 one PLOTS parcel is located partially within the Proposed Corridor; it encompasses the west half of Section 12, Township 145 North, Range 89 West (Figure 12). The Proposed Route would cross along the southern boundary of this parcel.

### Wildlife Management Areas

Wildlife Management Areas (WMAs) are state-owned lands managed by the NDGFD for wildlife habitat. There are no WMAs in or near the Proposed Corridor. The closest is the Golden Valley WMA, located about 2.6 miles northwest of the Corridor; this WMA offers sharp-tailed grouse and deer hunting opportunities. Two other WMAs are also located in the vicinity. The Beaver Creek WMA is approximately 3.5 miles north of the Corridor at the southern end of Beaver Creek Bay, and the Hille WMA is approximately 5.25 miles to the northeast of the Corridor (Figure 12). Both of these WMAs are on the south shore of Lake Sakakawea on lands managed by the USACE, and offer hunting and fishing opportunities.

### State Trust Lands

One quarter-section of State Trust land is partially within the Corridor but would not be crossed by the Route. The State Trust parcel encompasses the northwest quarter of Section 16, Township 145 North, Range 88 West (14508816B; Figure 2).

### Federal Lands

There are no federally-owned or managed lands within the Proposed Corridor.

**Tribal Lands**

There are no tribally-owned or managed lands within the Proposed Corridor.

**Other Avoidance Areas**

NDAC 69-06-08-02.2 lists five categories of nationally-designated land uses to be avoided; these include designated or registered national: historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands. None of these occur within or near the Proposed Corridor.

NDAC 69-06-08-02.2 also lists seven categories of state-designated land uses to be avoided; these include designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands. None of these occur within or in close proximity to the Proposed Corridor.

### *5.6.2 Potential Impacts*

The development of the Project will not displace any residents or existing or planned industrial facilities. Setbacks to roads and nonparticipating lands as established by county and state regulations would be observed.

The Project would not impact any wetland easements, wetlands management districts, or wildlife management areas. If Project facilities are proposed within areas enrolled in CRP and it is not practical to move those facilities, Antelope will work with landowners and NRCS to determine whether the parcel should be removed from the program and if reimbursement is necessary. The Project would cross along the southern boundary of a parcel of PLOTS land within the Corridor. This would have a negligible permanent disturbance impact in relation to the total size of the PLOTS parcel, and would not inhibit hunting within the parcel.

### *5.6.3 Mitigative Measures*

Operation of the Project will not change the land use in the majority of the Proposed Corridor or Route. The proposed land use will not involve any ongoing industrial use of non-renewable resources or emissions into the environment. Consequently, no further mitigative measures have been proposed.

## 5.7 Transportation

### *5.7.1 Existing Conditions*

**Ground Transportation**

Most construction equipment and materials would arrive at the Proposed Corridor via truck, along Interstate Highway 94 (I-94). From I-94, the most direct route to the Proposed Corridor is via State Highway 49 (ND-49), which runs from an interchange at I-94 north into Beulah (Figure

1). From Beulah, a number of routes into the Proposed Corridor are possible, which would utilize a combination of major county collector roads and minor graveled roads. Major county collector roads that may be used include County Routes 5 and 13 within the Proposed Corridor, and County Routes 15, 16, 17, and 21 outside the Corridor (Figure 2).

It is possible that Project some materials or equipment may be delivered by rail. A Burlington Northern Santa Fe (BNSF) rail line runs near ND200 to the south of the Proposed Corridor, with a spur to AVS.

Local roads within and near the Proposed Corridor would also be used for Project construction and operation. Local county roads are spaced throughout the Proposed Corridor; these are generally section line roads. However, while section lines in North Dakota are all designated as public right-of-way, not all such right-of-way is owned or maintained by the local counties. Local county roads within the Proposed Corridor include paved, gravel, dirt and unimproved roadways. Mercer County roads within and near the Proposed Corridor are shown on Figure 2 and other figures.

Traffic volume data in the vicinity of the Project is limited. Traffic counts are available for some roads in the vicinity. Available existing traffic volumes on the area's roadways are shown in Table 14.

Additional county and township roads run through the Proposed Corridor in addition to those listed in Table 14, but no vehicle count data are available for them. In general, the NDDOT indicated that roads with vehicle counts under 100 vehicles per day, or Average Annual Daily Traffic (AADT), are rarely counted. According to NDDOT, vehicle counts on routes with no count data are likely lower than those with count data. For purposes of comparison, the functional capacity of a two-lane paved rural road is approximately 5,000 AADT. Paved four-lane highways such as I-94 have a functional capacity of approximately 80,000 vehicles per day. Based on these data, traffic volumes on the roads in and near the Proposed Corridor are low and levels of service are high.

**Table 14. Existing Daily Traffic Levels**

| Roadway Segment | Existing AADT/Commercial Truck Traffic |
|---|---|
| I-94 at ND-49 Interchange | 8635/ 2405 |
| I-94 at ND-49, eastbound off-ramp | 835/ 105 |
| I-94 at ND-49, westbound off-ramp | 275/ 60 |
| ND-49 north of I-94 | 1665/ 315 |
| ND-49 at south end of Beulah | 2640/ 675 |
| ND-49 0.25 mile south of ND-200 | 4170/ 485 |
| ND-49 0.25 mile north of ND-200 | 2900/ 260 |
| ND-200 west of ND-49 | 1585/ na |
| ND-1806 west of CR-21 | 240/ 55 |
| CR-5 north of ND-1806 | 95/ 10 |
| ND-200 northeast of Zap | 1615/ 395 |
| ND-200 north of Zap | 1295/ 350 |
| CR-13 north of ND-200 | 240/ 35 |
| Source: North Dakota DOT Transportation Information Map (NDDOT 2013). | |

## Air Transportation

There are three public airports, six private airports and one private heliport within 25 miles of the Proposed Corridor (Table 15 and Figure 1). Setbacks from public and private airports exceed North Dakota Aeronautics Commission and Federal Aviation Administration (FAA) requirements.

**Table 15. Public/Private Airports within 25 Miles of the Proposed Corridor**

| Airport Name | Type | Distance from the Proposed Corridor (miles) | Direction from the Proposed Corridor |
|---|---|---|---|
| Beulah | Public | 7.8 | South-Southeast |
| Mercer County Regional Airport | Public | 13.0 | East-Southeast |
| Garrison Dam Recreational Airpark | Public | 21.4 | Northeast |
| Brecht Strip | Private | 6.8 | South |
| Sakakawea Medical Center Heliport | Private | 11.4 | East-Southeast |
| Frei Private | Private | 10.6 | West |
| Fredericks Ranch | Private | 14.2 | Northwest |
| Indian Hill Resort | Private | 14.6 | North |
| Smith Strip | Private | 22.4 | Southwest |
| Fischer Private Airport | Private | 23.8 | Northeast |

Regulations contained in 14 CFR Part 77 include requirements for notice to FAA and definitions of obstructions to air navigation. Notice to the FAA allows the agency to evaluate the effect of

the proposed construction on air safety and navigable airspace, which begins with a determination of whether the proposed structure represents an obstruction. Thresholds for notice are defined in 14 CFR Subpart B Section 77.9, and are related to construction that would represent an obstruction or would intrude upon protected airspace or approach and takeoff clearance areas around airports. The first threshold for notice is any construction or alteration that would exceed 200 feet above ground level. The second threshold for notice is construction that would exceed the height of an imaginary surface extending upward and outward for a horizontal distance of 20,000 feet (3.8 miles) from a public use airport, a military airport, an airport operated by a federal agency or the Department of Defense, or an airport with an FAA-approved Instrument Approach Procedure (IAP).

The Project does not meet either threshold for notice to the FAA and a determination of hazard. None of the proposed transmission line infrastructure would exceed 200 feet in height above ground level, and there are no airports within 3.8 miles of the Proposed Corridor.

Obstructions are defined in 14 CFR 77, Subpart C (Sections 77.13 through 77.23), which defines obstructions based on both absolute height of the proposed object and height in relation to protected airspace, in effect establishing five distinct thresholds. The first threshold is defined in Section 77.17(a)(1) as an object that is greater than a height of 499 feet above ground level at the site of the object. The second threshold is defined in Section 77.17(a)(2) as an object with "a height that is 200 feet AGL, or above the established airport elevation, whichever is higher, within 3 nautical miles [3.45 statute miles] of the established reference point of an airport, excluding heliports, with its longest runway more than 3,200 feet in actual length." As with the notification requirement, "airport" is defined as a public use airport, a military airport, an airport operated by a federal agency or the Department of Defense, or an airport with an FAA-approved Instrument Approach Procedure (IAP). A Determination of No Hazard to Air Navigation will be issued when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard but would not have a substantial aeronautical impact to air navigation. A Determination of No Hazard may include conditional provisions, limitations to minimize potential problems, supplemental notice requirements, or requirements for marking and lighting, as appropriate.

The Project would not be considered an obstruction to air navigation under FAA regulations. No part of the Project would exceed 200 feet in height above ground level, nor would it be located within 3 nautical miles of any airport. Because notice to FAA is not required, an aeronautical study will not be completed and a Determination of No Hazard will not be issued by FAA.

The FAA's online Department of Defense (DoD) Preliminary Screening Tool indicates that the Proposed Corridor lies within the confines of two Military Training Routes (MTR): IR644 and IR649. IR-designated routes are flight corridors in which military aircraft may exceed the standard flight speed limit of 250 knots, up to 420 knots, and in which military aircraft may fly below the standard floor of 1,500 feet above ground level (AGL). The minimum flight elevation on both routes is 200 feet AGL; however, these two routes are used only for B-52 training flights, which are not permitted to fly below 1000 feet AGL. The Air Force has indicated that the

Project would therefore not pose a problem for these routes, and that the Project would not be opposed (personal communication, Denny Hough, Chief of Airspace Management, Minot Air Force Base, 4/3/2014).

## *5.7.2 Potential Impacts*

**Ground Transportation**

Construction will increase traffic on local roads to the Proposed Corridor possibly causing temporary impacts to local traffic flow while equipment is hauled to the site. There are several roads on which construction-related traffic will be concentrated. It is anticipated that construction-related vehicles will primarily use I-94 and ND-49 to Beulah, and major county collector roads into the Proposed Corridor.

While the number of vehicle trips for workers and equipment has not been modeled, construction traffic is highly unlikely to materially impact local traffic patterns or lower the existing levels of service, given the low volume of existing traffic.

Construction of the Project will require the movement of oversize/overweight loads on public roads. The EPC contractor will obtain any necessary permits for transporting equipment and materials, and will implement traffic control measures as appropriate to limit the impacts of those loads on other road users.

Operation of the Project is not expected to result in any significant traffic issues on the area highways or state roads because there will be a minimal increase in traffic (only a few vehicles per day). In the event that major maintenance is required that necessitates the use of large equipment or involves large components, the necessary trip permits will be obtained and traffic controls will be implemented as needed to limit impacts to other road users.

Impacts to existing road infrastructure will mostly be positive. Construction activities will use the existing section line roads whenever possible. Where needed, existing local roads will be improved to allow large loads of construction equipment or materials. These improvements will remain in place following the completion of construction to assist with access and maintenance of the proposed facilities. Roads damaged during construction will be returned to pre-construction condition or better.

Construction of the Project would require stringing of conductors over public roads, which may cause temporary traffic delays. Temporary guard structures would be erected on either side of the road to hold cables above the roadway such that vehicles could pass below; these would be removed following the completion of stringing. Antelope and its construction contractor will coordinate with local and state transportation authorities to ensure that appropriate traffic safety and management plans are implemented during construction, and to minimize potential temporary disruptions to travel in the area.

**Air Traffic**

The Project would not be considered an obstruction to air navigation under FAA regulations. No part of the Project would exceed 200 feet in height above ground level, nor would it be located within 3 nautical miles of any airport. Because notice to FAA is not required, an aeronautical study will not be completed and a Determination of No Hazard will not be issued by FAA.

There are no specific marking or lighting requirements for the proposed transmission line that would be triggered by FAA regulations or guidelines.

### *5.7.3 Mitigative Measures*

Antelope will observe the setbacks to roadways as established by the State in NDAC 69-06-08 during final micrositing of Project infrastructure. The observance of these setbacks would prevent damage to area roadways or disruptions to local travel in the unlikely event of a catastrophic failure of a transmission support pole. The Project would also be constructed according to NESC standards, which include conductor-to-ground clearance requirements sufficient to prevent hazards to road use.

Antelope will implement the following avoidance and mitigation measures to minimize impacts to transportation infrastructure:

- Existing roads will be used to the extent possible.
- Project personnel and contractors will be instructed and required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types, and site-specific conditions to ensure safe and efficient traffic flow.

During construction, operations and maintenance, and decommissioning phases, traffic will be restricted to designated temporary access routes and improved public roads. Use of other unimproved roads will be restricted to emergency situations.

## 5.8 Human Health and Safety

This section considers potential Project impacts to human health and safety.

### *5.8.1 Existing Conditions*

**Electromagnetic Fields**

Electric and magnetic fields, often referred to collectively as EMF, occur both naturally and as a result of the generation, transmission and use of electric power. The electrical power system in the United States is an alternating current (AC) system operating at a frequency of 60 hertz (Hz), resulting in “power frequency” or “extremely low frequency (ELF)” EMF.

No state or federal regulations or guidelines apply to EMF levels for transmission lines.

A substantial amount of research has been conducted in the U.S. and around the world over the past several decades examining whether exposures to power-frequency EMFs cause health or

environmental effects. Epidemiological studies have addressed many of the issues raised about EMFs and health. Multidisciplinary reviews express the consensus in the scientific community that the epidemiologic evidence is insufficient to demonstrate a causal relationship between extremely low-frequency (power frequency) EMF and any health effect (NIEHS 1998; NIEHS 1999; HCN 2001, 2004; NRPB 2001, 2004; IARC 2002).

**Induced Voltage, Induced Current and Nuisance Shock**

The flow of electricity in a transmission line can induce a small electric charge, or voltage, in nearby conductive objects. An induced electric charge can flow, or become electric current, when a path to ground is presented. Induced current can be observed as a continuous flow of electricity or, under some circumstances as a sudden discharge, commonly known as a "nuisance shock." The amount of current flow, or the magnitude of the nuisance shock, is determined by the level of charge that can be induced and the nature (conductivity or impedance) of the path to ground. Metallic roofs, vehicles, equipment, or wire fences are examples of metallic objects in the vicinity of the Project in which a small electric charge could be induced. Factors to consider when assessing the potential hazards and mitigation measures for induced voltage include the location and inherent characteristics of nearby objects, and the degree and nature of grounding of those objects. More conductive materials accumulate greater charge than less conductive materials while large objects, such as a tractor-trailer, will accumulate a greater charge than smaller objects such as a pick-up truck (EPRI, 2005). A linear object that is parallel to the transmission line would be more greatly affected than one that is perpendicular to the line. An object passing quickly under the transmission line would be minimally affected compared to a stationary object. A grounded or partially grounded object will accumulate charge that could be discharged as a nuisance shock, while continuous current would occur in a grounded object. The total amount of charge that can be induced in a perfectly non-grounded object is limited by the strength of the magnetic field and the nature of the object; after a time the field and the induced charge in the object will reach equilibrium (steady-state), and the induced charge would stop building.

Continuous induced current may occur if a metallic object is partially grounded or grounded some distance from the transmission line. Continuous induced current may occur in linear objects that are parallel to the transmission line, such as some fences, pipelines, or other transmission or power distribution lines.

A sudden discharge can occur if a non-grounded, inductively charged object is presented with a path to ground; this is known as a "nuisance shock" or a "static shock." The most common example of this is when a vehicle, which is insulated from grounding by its tires, is parked under a transmission line for sufficient time to build up a charge. A person touching such a charged vehicle could become a conducting path for the current and can feel a momentary shock if the available electrical charge is sufficient, generally above 1 mA (Dalziel and Mansfield, 1950).

The National Electrical Safety Code (NESC) sets the ground rules for practical safeguarding of persons during the installation, operation or maintenance of electric supply and communication

lines and associated equipment. The NESC serves as the authority on safety requirements for power systems, providing the basic standards that are considered necessary for the safety of employees and the public under the specified conditions. The phenomena of induced current and its safety and health implications is captured in NESC Rule 234G.3, which requires that

> *"[f]or voltages exceeding 98 kV ac to ground, either the clearances shall be increased or the electric fields, or the effects thereof, shall be reduced by other means, as required, to limit the steady-state current due to electrostatic effects to 5 mA, rms, if an ungrounded metal fence, building, sign, billboard, chimney, radio or television antenna, tank or other installation, or any ungrounded metal attachments thereto, were short-circuited to ground."*

The 5 milliamperes (mA) figure embedded in the NESC rule is a scientifically-derived health and safety limitation, intended to eliminate the potential for harmful electric shock. The threshold of perception for current flowing through the human body is approximately 1 mA (Dalziel and Mansfield, 1950). If the current is increased sufficiently beyond a person's perception threshold, it can become bothersome and possibly startling. Larger currents can cause the muscles of the arm and hand to involuntarily contract so that a person cannot let go of an electrified object. The value at which 99.5 percent of men, women and children can still let go of an object is approximately 9, 6, and 5 mA, respectively. To address this safety concern, the NESC Rule 234G.3 limits the steady-state current due to electrostatic effects to 5 mA; it is a performance standard aimed at limiting the potential charge that could be developed so that a potential nuisance shock would not be harmful to children.

**Telecommunication and Radar**

Electromagnetic interference from power transmission systems in the U.S. is governed by the Federal Communication Commission (FCC) Rules and Regulations (FCC 1988). A power transmission line is categorized by the FCC as an "incidental radiation device." It is defined as "a device that radiates radio frequency energy during the course of its operation although the device is not intentionally designed to generate radio frequency energy." Such a device "shall be operated so that the radio frequency energy that is emitted does not cause harmful interference. In the event that harmful interference is caused, the operator of the device shall promptly take steps to eliminate the harmful interference." In this case, "harmful interference" is defined as "any emission, radiation or induction which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with this chapter" (FCC 1988). North Dakota does not have adopted standards for either radio interference or television interference.

Modern communications systems all rely on electromagnetic radiation (EMR) to transmit information. AM and FM radio, television, shortwave radio, cellular telephones, radar, GPS devices and satellite communications, cordless telephones, Bluetooth, and wireless computer networks such as WiFi or WLAN all utilize a region of the electromagnetic spectrum known as "radio frequency," (RF) EMR, which extends from the very low-frequency end at about 30 kHz up into the high-frequency microwave range at about 300 GHz. Each type of technology uses a

specific segment of the electromagnetic frequency spectrum; older technology such as AM radio is at the low-frequency end, while newer technologies such as GPS and WiFi utilize high-frequency signals.

High voltage transmission lines typically exhibit some level of corona activity, which releases broadband radio frequency emissions that may be perceived as interference with some radio communications. The level of interference can be partially determined by how similar or different the signal frequency is compared to the noise frequency; for interference to occur, frequencies must be similar. In general, there is very little interaction between signals of differing frequency; radio signals, television signals, cellular phone signals and GPS signals can all coexist in the same space and time without interfering with each other.

Transmission lines can cause some interference with radar systems, particularly if placed within 10 miles of the radar transmitter/receiver. Interference of this nature is caused primarily by reflection of the radar signal off of lattice towers. The use of monopoles is expected to eliminate any potential radar interference.

**Hazardous Materials / Hazardous Waste**

The Proposed Corridor is located in a relatively rural area of North Dakota. Potential hazards may exist in rural areas from old gasoline facilities, landfill sites, and private activities. Hazardous wastes from large industrial or commercial activities are not likely.

The U.S. Environmental Protection Agency (USEPA) Superfund National Priorities List database was reviewed to determine the potential for major hazardous material issues within the Proposed Cprrodpr. The database also lists sites registered under other EPA programs including Conditionally Exempt Small Quantity Generators (CESQG) and Toxic Release Inventory Sites (TRIs). No National Priorities List sites are present within the Proposed Corridor (USEPA CERCLIS 2013). No CESQG, TRI, or any other EPA-listed sites occur within or near the Proposed Corridor. NDDOT maps were also consulted as they often identify known dumps in the area; there are no known dumps in the Proposed Corridor. Basin Electric's Antelope Valley Generating Station and the adjacent Beulah Great Plains Gasification Plant are both registered as hazardous waste generators and handlers, and have air emissions permits. There are no other hazardous waste handlers or toxic release inventory sites located within the Proposed Corridor or within 5 miles of the Proposed Corridor (National Atlas 2003).

## *5.8.2 Potential Impacts*

**Electromagnetic Fields and Human and Animal Health**

The general scientific consensus is that low-level power frequency EMF poses no discernable risk to human health, and has few discernable effects on animal health. The strength of electric and magnetic fields drops off sharply with increasing distance from the conductor, and would fade to background levels within less than 200 feet of the centerline. Because there are no residences or other structures within 200 feet of the Proposed Route, Project EMF levels will not

be above background levels at any residences. The only exposure will be to maintenance workers, primarily at the interconnection switchyard. Because the Project will be constructed to meet NESC standards, electromagnetic fields will be limited to acceptable industry standards; with this and the limited exposure times of workers, no adverse impacts to public or worker health and safety will be created.

**Induced Current Effects**

Nuisance shocks and induced currents can be reduced or eliminated by proper grounding of metallic objects near the transmission line, shielding them from the electric field, or positioning the transmission line farther from the objects. Grounding an object will reduce the induced potential to essentially zero and eliminate the object as a source of shocks or currents.

During final engineering and construction of the Project, Antelope will identify all wire fences, pipelines, irrigation lines, metal roofs and other objects near the Proposed Route in which a current could be induced. All such objects will be properly grounded within or as close as practicable to the right-of-way, in order to prevent induced current and nuisance shocks.

Unlike fences or buildings, mobile equipment, such as vehicles and agricultural machinery, cannot be permanently grounded. However, no large vehicles are anticipated to be parked or otherwise located near the transmission line for long enough periods to acquire induced current.

The NESC is updated every 5 years; Antelope will use the most current version available at the time final engineering of the Project is completed.

**Telecommunication and Radar Interference**

The corona-induced broadband electromagnetic radiation (EMR) from transmission lines can produce interference with some communications signals if there is an overlap in the signal and EMR frequencies. Broadband corona EMR discharge typically occurs in the frequency spectrum from below 100 kilohertz (kHz) to approximately 1,000 megahertz (MHz), which overlaps with the frequencies used for AM and FM radio and some television signals. With sufficient corona activity, some radio and television interference can be noticeable; however, the radio noise generated by a transmission line is very low in power and interference is generally only experienced in very close proximity to the transmission line. These effects are most pronounced directly underneath the line conductors, and decrease with distance from the transmission line. The level of interference with reception of a radio signal also depends on the relative locations of the radio transmitter, the radio receiver, and the transmission line. A transmission line that is directly between a radio transmitter and a listener's receiver may be more likely to interfere with that listener's reception, whereas a transmission line behind or beside the listener in relation to the transmitter would not necessarily cause interference depending on the radio receiver's antenna.

In general, complaints related to corona-generated interference are infrequent, and electric power companies are able to operate very effectively under the present FCC rule because harmful interference can generally be eliminated or effectively mitigated. Technologies that use

frequency modulation, such as FM radio stations and the audio portion of older analog broadcast TV signal, are generally not affected by noise from a transmission line. As digital signal processing has been integrated into television and radio recievers, the potential interference impact of corona-generated radio noise has been further reduced. Moreover, the advent of cable and satellite television service, and the federally-mandated conversion to digital television broadcast in June 2009 have greatly reduced the occurrence of corona-generated interference. Newer digital television receivers are equipped with systems to filter out interference.

Low-frequency corona-induced EMR does not interact with higher-frequency satellite signals, wireless computer networks, or wired communication systems. Wireless computer network systems, cell phones, GPS units, and satellite receivers operate at high frequencies in the tens to hundreds of megahertz (MHz) or even gigahertz (GHz). These systems also often use frequency modulation (FM) or digital coding of the signals so they are relatively immune to electromagnetic interference. GPS units are used in a wide range of activities, including several important agricultural activities such as monitoring pivot irrigation, tracking wheeled and tracked equipment movements during farming operation, and checking the orientation of aerial spraying aircraft. GPS units operate in the frequency range of 1.2 to 1.6 GHz. Satellite receivers operate at frequencies of 3.4 GHz to 7 GHz and studies have demonstrated that there is no effect from transmission lines unless the receiver was trying to view the satellite through a transmission tower or conductor bundle of the transmission line (Chartier et al. 1986). Repositioning the receiver by a few feet was sufficient to eliminate the obstruction and reduced signal. Mobile phones operate in the radio frequency range of about 800 MHz to 1,900 Mhz or higher. Due to the high frequencies used by these devices, modulation and processing techniques, and the typically lower-frequency corona-induced EMR, effects from interference are unlikely.

No impacts to radar systems are anticipated with the construction or operation of the Project. Antelope has used the FAA's online Department of Defense Preliminary Screening Tool (DoD Tool) to evaluate potential impacts of the Project on Air Defense and Homeland Security radar systems and to Weather Surveillance Radar. The DoD Tool indicates that there would be no impact to any type of radar system (see results in Appendix A to the Application for Site Certificate, Critical Issues Analysis). The Proposed Corridor is located over 60 miles from the nearest radar system, and would be below the level of radar in any event. The use of monopole supports eliminates the potential for reflection interference.

**Hazardous Materials / Hazardous Waste**

All hazardous materials will be handled and disposed of in accordance with state and federal regulation. The potential for spills of hazardous materials will be mitigated by the implementation of a Spill Prevention, Control and Countermeasures (SPCC) Plan during construction of the Project. An SPCC Plan would not be necessary during the operational phase of the Project, because the only significant quantities of hazardous materials would be contained within the substation transformers, switches and circuit breakers. These are considered qualified oil-filled

operational equipment, and require the establishment of an inspection and monitoring program, as well as a spill contingency plan and the commitment of resources to expeditiously control and remove any discharged oil. These measures will reduce the level of risk for human health impacts to a level of non-significance.

### *5.8.3 Mitigative Measures*

All facilities will be constructed in accordance with the National Electrical Safety Code, U.S. Department of Labor Occupational Safety and Health Standards, and other applicable State safety standards.

**Electromagnetic Fields**

Since no significant adverse impacts are anticipated, no mitigative measures are proposed at this time.

**Telecommunication Interference**

Since no significant adverse impacts are anticipated, no mitigative measures are proposed at this time. However, Antelope will address complaints on a case-by-case basis; mitigation measures may include, but are not limited to, the relocation of receiving antennas, provision of improved receivers such as satellite dishes.

**Hazardous Materials / Hazardous Waste**

Since no significant adverse impacts are anticipated, no additional mitigative measures are proposed at this time.

## 5.9 Air Resources

### *5.9.1 Existing Conditions*

USEPA and the North Dakota Department of Health (NDDoH) regulate air quality in North Dakota through implementation of the Federal Clean Air Act (CAA) (42 U.S.C. §§ 7401-7671q). The CAA requires the adoption of National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare from the effects of air pollution. The CAA defines NAAQS as levels of pollutant above which detrimental effects on human health and welfare could occur. A state or region is given the status of “attainment” if the NAAQS thresholds have not been exceeded for any criteria pollutant, or “nonattainment” for a specific pollutant if the NAAQS thresholds have been exceeded for that pollutant. Standards are provided for sulfur dioxide ($SO_2$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), ozone ($O_3$) particulate matter less than 10 microns (PM10), particulate matter less than 2.5 microns (PM2.5), and lead (Pb), which are known as the criteria pollutants.

The entire state of North Dakota is in attainment of all state and federal air quality standards, and no exceedences have been reported for at least the past 10 years[3]. Relatively high concentrations of total suspended particulates (dust) may occur in springtime from farming operations and strong winds; however these have not and are not likely to exceed NAAQS.

### *5.9.2 Potential Impacts*

Direct impacts to air quality would include temporary increases in vehicle emissions and dust during construction. All such impacts would be limited to the period of construction, and are not expected to cause an exceedence of any NAAQS or federal guidance related to greenhouse gas (GHG) emissions.

The only emissions related to operation of the Project would be extremely minor exhaust emissions from maintenance vehicles. These emissions would not cause any detectable impacts to regional air quality.

### *5.9.3 Mitigative Measures*

Antelope will implement measures applicable to reducing air quality impacts, including the following:

- General mitigation measures applicable to multiple phases of project development include the following:
  - Post and enforce lower speed limits on dirt and gravel roads to minimize airborne fugitive dust.
  - Minimize potential environmental impacts from the use of dust palliatives by taking the necessary measures to keep the chemicals out of sensitive terrestrial habitats and streams. The application of dust palliatives must comply with Federal, State, and local laws and regulations.
  - Ensure that all pieces of heavy equipment meet emission standards specified in the State Code of Regulations, and conduct routine preventive maintenance, including tune-ups to manufacturer specification to ensure efficient combustion and minimum emissions. If possible, equipment with more stringent emission controls should be utilized.
  - Limit idling of diesel equipment to no more than 10 minutes unless necessary for proper operation.

Mitigation measures applicable during construction activities include the following:

[3] Annual reports of the North Dakota Department of Health Air Quality Monitoring program were reviewed for the years 2000 to 2011; these and additional annual reports are available online at: http://www.ndhealth.gov/AQ/AmbientMonitoring.htm

- Stage construction activities to limit the area of disturbed soils exposed at any particular time.
- Water unpaved roads, disturbed areas (e.g., areas impacted by scraping, excavation, backfilling, grading, and compacting), and loose materials generated during project activities as necessary to minimize fugitive dust generation.
- Install wind fences around disturbed areas if windborne dust is likely to impact sensitive areas beyond the site boundaries (e.g., nearby residences).
- Spray stockpiles of soils with water, cover with tarpaulins, and/or treat with appropriate dust suppressants, especially when high wind or storm conditions are likely. Vegetative plantings may also be used to limit dust generation for stockpiles that will be inactive for relatively long periods.
- Train workers to comply with speed limits, use good engineering practices, minimize the drop height of excavated materials, and minimize disturbed areas.
- Cover vehicles transporting loose materials when traveling on public roads, and keep loads sufficiently wet and below the freeboard of the truck in order to minimize wind dispersal.
- Inspect and clean tires of construction-related vehicles, as necessary, so they are free of dirt prior to entering paved public roadways.
- Clean (e.g., through street vacuum sweeping) visible trackout or runoff dirt from the construction site off public roadways.

No additional mitigation measures are considered necessary during normal operations of the Project, but some dust control measures discussed above may be applicable to minimize fugitive dust emissions from bare surfaces and unpaved roads.

Decommissioning activities generally mirror construction activities; thus, the same mitigation measures should be applied during decommissioning as would be applied during construction.

## 5.10 Noise

### *5.10.1 Existing Conditions*

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

Mercer County would generally be characterized as a rural agricultural land use area, and existing ambient sound levels are expected to be relatively low, although sound levels may be

sporadically elevated in localized areas due to roadway noise or periods of human activity. Background sound levels will vary both spatially and temporally depending on proximity to area sound sources, roadways and natural sounds. Principal contributors to the existing acoustic environment likely include motor vehicle traffic, farming equipment, farming activities such as plowing and irrigation, all-terrain vehicles, local roadways, rail movements, periodic aircraft flyovers, and natural sounds such as birds, insects, and leaf or vegetation rustle during elevated wind conditions in areas with established trees or crops. Diurnal effects result in sound levels that are typically quieter during the night than during the daytime, except during periods when evening and nighttime insect noise dominates in warmer seasons.

In areas with elevated background sound levels, sound may be obscured through a mechanism referred to as acoustic masking. Seasonal effects such as cricket chirping, certain farming activities, as well as wind-generated ambient noise as airflow interacts with foliage and cropland, contribute to this masking effect. The latter is most prevalent in rural and suburban areas with established tree stands. Wintertime defoliate conditions typically have lower background sound levels due to lower wind masking effects and reduced outdoor activities in colder climates. During colder seasons, people typically exhibit lower sensitivities to outdoor sound levels, particularly in this geographical region of the United States, as windows and doors are typically closed, and limited time is spent outdoors as compared to more temperate climates.

Some land uses are considered more sensitive to intrusive noise than others due to the type of activities typically involved at the receptor location. Sensitive noise receptors normally include residences, schools, libraries, religious institutions, hospitals and nursing homes, daycare centers, and some types of businesses; North Dakota also specifies community buildings as noise sensitive receptors. Noise sensitive receptors within 1 mile of the Proposed Corridor are identified on Figure 6. These are limited to scattered farmsteads; there are no schools, libraries, religious buildings, hospitals, nursing homes, day care centers or other types of noise sensitive receptors in the vicinity. There are 4 noise sensitive receptors identified within the Proposed Corridor; none are within the Proposed Route. Four additional noise sensitive receptors are located within 0.5 miles of the Proposed Corridor, for a total of 8 noise sensitive receptors within 1 mile of the Route centerline.

NDAC 69-06-08-02.3.b(1) requires an assessment of the effect of the Project on sound-sensitive receptors; however, the Energy Facility Siting Criteria do not include noise standards that are applicable to transmission lines. Mercer County also does not have noise standards or ordinances that are applicable to transmission lines.

The US EPA, through the Noise Control Act of 1971 and a subsequent report in 1974, does provide specific dBA noise levels that are recommended to be adhered to in order to be protective of public health. The recommended US EPA (1978) noise guideline is an $L_{dn}$ of 55 dBA ($L_{dn}$(24-hours), applicable to outdoor locations at noise sensitive receptors where extended periods of time are spent, (e.g., yards). This noise level corresponds to a maximum instantaneous equivalent sound level ($L_{eq}$) of 48.6 dBA.

The National Safety Council (NSC) recommends no more than 85 dBA for 8 hours of exposure as the safe limit for farm operations. Industrial standards of the Occupational Safety and Health Administration (OSHA) regulations would apply to those involved in the construction, operation, and maintenance of the facilities. OSHA permissible noise exposures are shown in Table 16.

**Table 16. OSHA Permissible Noise Standards**

| Duration (number of hours per day) | Sound Level (dBA) |
|---|---|
| 8.0 | 90 |
| 6.0 | 92 |
| 4.0 | 95 |
| 3.0 | 97 |
| 2.0 | 100 |
| 1.5 | 102 |
| 1.0 | 105 |
| 0.75 | 110 |
| 0.5 | 115 |

## *5.10.2 Potential Impacts*

Noise can be generated by corona activity on a transmission line. Corona produces audible sound composed of two major components. The first is a broadband component that is characterized as a crackling, frying, or hissing noise. The second component is a 120 Hz pure tone that is superimposed over the broadband noise. Corona activity and resulting noise is greater in wet weather than in dry conditions.

Project construction may cause short-term but unavoidable noise impacts due types of construction and equipment. Construction activity would also generate traffic that would have potential noise effects, such as trucks travelling to and from the site on public roads. Sound generated by construction activities is generally exempt from state and local noise regulation. Once the Project has been built, no significant noise impacts are anticipated from regular maintenance.

A screening level acoustic assessment was conducted to determine the level of Project noise at noise sensitive receptors within and near the Proposed Corridor and Route (see acoustic evaluation in Appendix A to the Application for Site Certificate). The acoustic modeling results were compared to the North Dakota standard of 50 dBA. Noise was modeled at the closest receptor, which is located approximately 750 feet from the proposed line. In addition, a modeling uncertainty factor of 3 dBA was added to the BPA CAFE sound power levels as an added level of conservatism. Using the H-Frame structure the received sound level is predicted to be 32 dBA $L_{50}$ and with the monopole structure the received sound level is predicted to be 37 dBA $L_{50.}$ Since these values are well under the 50 dBA standard, no exceedences are predicted.

**Potential Noise Impacts to Wildlife**

Although it is likely that construction of the Project will result in short-term disturbance of wildlife, it will be difficult to assess whether the disturbance comes from the noise of construction activities or the activities themselves (e.g., construction vehicles moving along roads). All such activities will be short-term and limited to the period of construction. Available research regarding the noise impacts of transmission lines suggests that animals in the area would either habituate to consistent low-level corona noise or would alter their behaviors to adapt to the new acoustic environment (e.g., Rabin et al. 2003, Brumm and Slabbekoorn 2005, Wood and Yezerinac 2006).

## *5.10.3 Mitigative Measures*

Antelope will implement BMPs and mitigation measures applicable to noise, as follows:

BMPs and mitigation measures applicable throughout multiple phases of Project development include the following:

- Take advantage of topography and the distance to nearby sensitive receptors when positioning potential sources of noise.
- Select equipment and engineering designs with the lowest noise levels available and no prominent discrete tones, when possible.
- Maintain all equipment in good working order in accordance with manufacturer specifications. Suitable mufflers and/or air-inlet silencers should be installed on all internal combustion engines and certain compressor components.
- All vehicles traveling within and around the construction area should operate in accordance with posted speed limits.
- Establish a process for documenting, investigating, evaluating, and resolving project-related noise complaints.

BMPs and mitigation measures applicable during construction include the following:

- Limit noisy construction activities to the least noise-sensitive times of day (daytime only, between 7 a.m. and 7 p.m.) and weekdays.
- Schedule noisy activities to occur at the same time whenever feasible, since additional sources of noise generally do not greatly increase noise levels at the site boundary. Less-frequent but noisy activities would generally be less annoying than lower-level noises occurring more frequently.
- Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors.
- In the unlikely event that blasting or pile driving would be needed during the construction period, notify nearby residents in advance.

The same BMPs and mitigation measures applicable to construction activities are applicable to decommissioning activities.

## 5.11 Cultural, Historical, and Architectural Resources

Cultural resources include archeological sites, historic standing structures, objects, districts, traditional cultural properties and other properties that illustrate important aspects of prehistory or history or have important and long-standing cultural associations with established communities or social groups. Significant archeological and architectural properties are usually defined by eligibility criteria for listing in the National Register of Historic Places (NRHP), and in consultation with the State Historic Preservation Office (SHPO).

### *5.11.1 Existing Conditions*

There are no designated or registered historic sites, monuments, historical markers or archaeological sites within the Proposed Corridor or Route.

The online NRHP database was searched for registered properties in Mercer County located within the Proposed Corridor and a surrounding 1 mile buffer. No NRHP registered archaeological or historic resources are located within or near the Proposed Corridor.

A search of the State Historical Society of North Dakota's web site and manuscript files was conducted for the Area of Potential Effect (APE), defined as the area in and within 1 mile of the proposed Route; this encompasses the entire Corridor plus approximately 0.5 miles to either side of the Corridor. The file search revealed 78 previously recorded sites, site leads and isolated finds in the land sections adjacent to the proposed Route (see cultural resources summary report in Appendix A to the Application for Site Certificate). Of these, 32 have not been evaluated for potential NRHP listing, 39 have been evaluated and found to be ineligible for listing, and 7 have been found to be eligible for listing. Most of the sites consist of or include a stone circle, chipped stone, charcoal and ceramics, bone or faunal remains, or other rock features such as cairns, indicating Native American use of the area. A small number are historic-era sites, often dumps, with masonry, metals, glass and wood; a few contain old farm machinery, and a few others are remnants of abandoned homesteads. One gravesite is identified.

The scarcity of listed archaeological and/or historic facility resources does not mean the Proposed Corridor or Route is clear of significant resources. It is possible there are both recorded and unrecorded resources in the Corridor that may be significant, but which have been neither evaluated nor had their status determined. In order to assess whether there are previously undocumented cultural resources that may be affected, a Class III archeological pedestrian survey is being conducted to assess areas of disturbance associated with the Project. An architectural inventory of structures and buildings around the Corridor will also be conducted, though no existing structures will be directly impacted by the Project.

## *5.11.2 Potential Impacts*

A significant impact to cultural resources would occur if a site or archaeological, tribal, or historical value that is listed, or is eligible for listing, in the NRHP could not be avoided or mitigated during siting or construction.

Possible concerns that should be considered for this project include:

- Unrecorded cultural resources located within the study area
- Any ground disturbing activity within the study area that has potential to impact known or unknown cultural resources
- Visual impacts to recorded or unrecorded cultural resource properties

No significant impacts to cultural resources are anticipated from the Project. As the layout of the Project is finalized, the location of Project facilities will be adjusted as needed to avoid impacts to cultural resource. Transmission tower foundations can be shifted forward or back along the Proposed Route to avoid sites, while access activities can be shifted side-to-side within the Route if needed. All resources identified in the Class III survey will be avoided until such time as SHPO makes a determination of eligibility for NRHP listing.

If historic or prehistoric materials are discovered during monitoring of earth-disturbance construction activities, construction would be halted and the SHPO would be notified in order to initiate procedures outlined in NDCC 55-1-11. These procedures would include evaluating the find for eligibility and determining appropriate treatment with the SHPO and the North Dakota Intertribal Reinterment Committee (NDIRC).

An impact to significant architectural resources would occur if a site that is listed, or is eligible for listing, in the NRHP would be affected by the Project. Effects can be either direct, which involves physical harm to a listed or eligible resource, or indirect, which involves a change in the setting, feeling or associations related to a listed or eligible resource. Since no NRHP listed or eligible architectural resources are known to exist in the Proposed Corridor, impacts are not expected.

## *5.11.3 Mitigative Measures*

Antelope will implement avoidance and mitigation measures and BMPs applicable to historic and cultural resources, as follows:

- Impacts to cultural, historic and archaeological resources determined to be eligible for NRHP listing will be avoided through modifications to the Project layout.
- A Class III archaeological pedestrian survey will be conducted prior to beginning construction on the Project, and the results provided to the SHPO. All cultural and archaeological resources identified in the Class III survey will be avoided until such time as the SHPO makes a determination of eligibility for NRHP listing.

- Cultural resources discovered during construction will immediately be brought to the attention of the SHPO. Work would be immediately halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation plans are being developed.
- If human remains are found on a development site, work will cease immediately in the vicinity of the find. The appropriate law enforcement officials and the SHPO will be contacted. No material will be removed from the find location. If it is determined that the remains belong to an archaeological site, the SHPO will be consulted to determine how the remains should be addressed.

## 5.12 Recreational Resources

### *5.12.1 Existing Conditions*

There are no designated recreation areas, public or private parks and no designated trails within the Proposed Corridor or Route. There are no designated or registered national parks, memorial parks, historic sites or landmarks, natural landmarks, monuments or wilderness areas within or near the Proposed Corridor.

Nearby recreation resources include Lake Sakakawea and associated public use areas and parks. Lake Sakakawea is located 3.5 to 6 miles north of the Proposed Corridor (Figure 12). The lake and adjacent lands are maintained by the USACE for recreation (camping, picnicking, boating, fishing), fish and wildlife enhancement, flood control, hydropower production, navigation, and irrigation. USACE has multiple public use areas (PUAs) along the lake. The nearest public use areas are Twin Buttes and Red Butte Bay, located about 3 miles and 4.8 miles north of the Proposed Corridor, respectively, and Beulah Bay, located about 7 miles northeast of the Proposed Corridor.

The NDFGD runs the PLOTS program, under which private lands enrolled in the program may be opened to the public for hunting. As of July 2014 one PLOTS parcel is located within the Proposed Corridor, encompassing the west half of Section 12, Township 145N Range 89W (Figure 12). The Proposed Route would cross the southern end of this parcel.

Wildlife Management Areas also serve as recreation resources. The closest is the Golden Valley WMA, located about 2.6 miles northwest of the Corridor; this WMA provides sharp-tailed grouse and deer hunting opportunities. Two other WMAs are also located in the vicinity. The Beaver Creek WMA is approximately 3.5 miles north of the Corridor at the southern end of Beaver Creek Bay, and the Hille WMA is approximately 5.25 miles to the northeast of the Corridor (Figure 12). Both of these WMAs are adjacent to Lake Sakakawea on lands managed by the USACE, and offer hunting and fishing opportunities.

There are no state parks near the Proposed Corridor; the nearest state park (Lake Sakakawea State Park) is approximately 20 miles to the east. There are no state recreation areas near the Proposed Corridor; the nearest, Indian Hills State Recreation Area and Resort, is approximately

12 miles to the north, on the north shore of Lake Sakakawea. There are no state nature preserves or natural areas within 40 miles of the Proposed Corridor. There are no designated multi-use or snowmobile trails in Mercer County (State of North Dakota 2010).

### *5.12.2 Potential Impacts*

The only direct impacts to recreation resources from the Project would be the construction of the transmission line across the southern end of the PLOTS parcel. Approximately 4 support poles would be placed within the parcel but no other permanent ground disturbance would occur. The permanent impacts would be negligible in terms of the overall size of the parcel, and the Project would not limit the ability to hunt in the PLOTS parcel.

The Project would have no direct impacts to other existing recreation areas in the vicinity. Potential impacts would be limited to indirect, visual effects. Based on terrain, much of the Project would be visible for users at the Golden Valley WMA, at a nearest viewing distance of approximately 2.6 miles; Views of the Project from Twin Buttes and Red Butte Bay PUA and the Beaver Creek and Hille WMAs are likely to be partially or entirely screened by terrain, and would be at much greater viewing distances where the Project would not be prominent. The Project may be visible from a portion of the Indian Hills State Recreation Area and Resort, but at a distance of approximately 12 miles it would be difficult to pick out. Where visible, the Project would be seen in the context of several other existing transmission lines, AVS, the Great Plains Synfuels Plant, and the proposed Antelope Hills wind farm. The proposed transmission line, therefore, would be unlikely to create a strong visual contrast that could be considered an adverse impact to nearby recreation areas.

### *5.12.3 Mitigative Measures*

The Project would not result in significant adverse impacts to any recreation area; therefore, no mitigative measures are proposed.

## 5.13 Socioeconomics

### *5.13.1 Existing Conditions*

The Project is located in Mercer County, North Dakota, a primarily rural agricultural area located approximately 65 miles northwest of Bismarck, ND and 45 miles northeast of Dickinson, ND.

There are several small cities near the Proposed Corridor. The city of Beulah. located about 8 miles southeast of the Proposed Corridor, is the largest city in the area (2010 population 3,142). The city of Hazen (2010 population 2,420) is located about 6 miles east of Beulah. The cities of Zap (2010 population 244) and Golden Valley (population 182) are both located approximately 6 miles to the south. The cities of Dodge (2010 population 99) and Halliday (2010 population 209) are located to the southwest in Dunn County. A small number of scattered farmsteads are

located within the Proposed Corridor, and there is no indication of any new residential construction.

Mercer County contains 1,043 square miles of land, with a density of just over 8 persons per square mile; the population density of the census block group in which the Proposed Corridor is located (Mercer County Tract 9618, Block Group 1) is approximately 1.6 persons per square mile. Approximately 95 percent of the population is composed of white persons who are not of Hispanic or Latino origin. The median age of Mercer County residents is 46.3 years. Approximately 17 percent of the county population is 65 years or older and 6 percent of the population is under 5 years of age (US Census Bureau 2010). The 2010 census reported a total of 4,450 housing units in Mercer County, of which approximately 18.5 percent were vacant; of the vacant housing units, nearly 60 percent are classified as being for seasonal, recreational or occasional use.

According to the 2010 Census, mining, quarrying and oil and gas extraction industry employs the largest share of the county's workforce, followed by utilities; specific employment numbers (and thus percentages) are not made available due to the small number of businesses in each category. Health care and social services and retail trade represent the next two largest employment industries, each representing approximately 10.5 percent of the county workforce. Per capita income in 2010 was $31,331; median household income was $63,244. Approximately 7.2 percent of the population lived below the poverty level, compared to 14.3 percent nationwide.

Agriculture plays a significant role in the County's land use and economy. In 2007, there were 455 farms in Mercer County, comprising approximately 76 percent (509,522 acres) of the total county land area. According to the 2007 Census of Agriculture (USDA 2007), the total market value of agricultural products produced in Mercer County was over $40 million, 62 percent of which was from crops and 38 percent from livestock sales.

Tax revenues in Mercer County fund a number of vital community services, including fire protection and law enforcement, emergency management, health and welfare services, and public schools. Tax revenues also fund agricultural extension services, weed management programs, and a roads maintenance department, along with other typical county government services.

## *5.13.2 Potential Impacts*

**Economic Impacts**

The Project, in this case the wind power project and the transmission line considered together, would have positive economic impacts for the local population, including lease and royalty payments for participating landowners, employment, and property and sales tax revenue. Landowner compensation will be established by individual lease agreements, but is anticipated to total over $200,000 annually. Annual property tax payments to local entities are estimated at $800,000. In general, agricultural lands within the transmission line right-of-way can still be

farmed. In addition, in an environment of uncertain and often declining agricultural prices and yields, the supplemental income provided to farmers from right-of-way leases will provide stability to farm incomes and thus will help assure the continued viability of farming in the Proposed Corridor.

Construction of the entire Project would be coordinated with and constructed by the same workers as the Antelope Hills Wind Project. Similarly, it would be operated in conjunction with the wind farm and the wind energy facility and transmission line together would create 8 to 12 full-time permanent jobs and from 250-300 peak construction jobs. To the extent that local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in Mercer County will contribute to the total personal income of the region. Additional personal income will be generated for residents in the county as well as the state by circulation and recirculation of dollars paid out by Antelope as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies and other products and services will benefit businesses in the county.

**Other Potential Impacts**

It is likely that sufficient skilled labor is available in Mercer County and the surrounding vicinity to serve the basic infrastructure and site development needs of the Project. Specialized labor from outside the local area will be required for certain components transmission line construction.

No effects on permanent housing are anticipated. During construction, out-of-town laborers will likely use lodging facilities in Beulah, Hazen, or the other small cities in the area; some workers may commute from as far away as Bismarck or Dickinson. Operation and maintenance of the wind energy facility and transmission line will employ from 8-12 maintenance staff; these are expected to largely be existing residents of the area

Local businesses such as motels, restaurants, bars, gas stations, and grocery stores would likely experience some increase in revenue resulting from new employment of the non-resident portion of Project construction crews. In particular, the consumption of goods, services, and temporary lodging in and near Beulah, Hazen and other cities in the region could be expected to minimally increase due to the presence of these non-native workers. Other local area businesses that may benefit through increased sales would likely include ready-mix concrete and gravel suppliers, hardware and general merchandise stores, welding and machine shops, packaging and postal services, and heavy equipment repair and maintenance services.

This relatively small increase in demand for local goods and services would be minimal due to the small size of the non-local workforce and the short-term nature of the construction phase of the Project. For the same reasons, the effects to infrastructure such as schools, hospitals, housing, and utilities would also be minimal.

### *5.13.3 Mitigative Measures*

Socioeconomic impacts associated with the Project will be primarily positive, with an influx of wages and expenditures made at local businesses during the Project construction and an increase in the county's tax base due to taxation of transmission infrastructure. In addition, the lease payments paid to landowners will offset potential financial losses associated with removing land from agricultural production.

# 6.0 POTENTIAL PERMITS AND APPROVALS

The federal and state permits or approvals that have been identified as potentially required for the construction and operation of the Project are shown in Table 17. Permits dependent on the final site layout will be applied for after receiving PSC approval and prior to construction.

**Table 17. Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility**

| Regulatory Authority | Legal Authority | Permit/Approval | Description | Trigger | Application Time | Website |
|---|---|---|---|---|---|---|
| **Federal** | | | | | | |
| USACE | Clean Water Act (33 USC 1251 et seq) Section 404 (33 USC 1344) | CWA Section 404 Permit; individual, general or nationwide permit | Regulates discharge of dredged or fill materials into waters of the United States | Activities that may impact federal waters, including wetlands | 45 days | |
| USFWS Region 6 | ESA Section 7 16 USC 1536(a)(2) | Consultation pursuant to ESA Section 7. | Federal activities and non-Federal activities that receive Federal funding or require a Federal permit typically obtain incidental take authority through the consultation process under Section 7 of the ESA. | Federal action and the presence of listed species in or near the project area. | Prior to ground disturbing activities. Depending on project size and potential impacts to listed species – 1 to 6 months. | http://www.fws.gov/endangered/hcp/hcpbook.htm<br><br>http://www.fws.gov/mountain-prairie/endspp/ |
| USEPA | Clean Water Act Section 311, 40 CFR 112 | Spill Prevention Control and Countermeasures (SPCC) Plan. | Would be required if any facility associated with the project (O&M or substation) has a tank holding more than 1,320 gallons. | Oil storage of more than 1,320 gallons of oil. | A copy of the plan will need to be maintained on file with the owner/operator and reviewed by the certifying engineer every 5 years. | |
| **State** | | | | | | |

| Regulatory Authority | Legal Authority | Permit/Approval | Description | Trigger | Application Time | Website |
|---|---|---|---|---|---|---|
| North Dakota Department of Health | Clean Water Act 33 USC 1342 NDAC 33-16-01 | NPDES General Permit (Construction). | For stormwater discharges from construction activities. | Grading of more than 1 acre. | Permit to be filed prior to construction with a Stormwater Pollution Prevention Plan (SWPPP). | http://www.ndhealth.gov/WQ/Storm/Construction/C onstructionHome.htm |
| | NDAC 33-16-01 | Septic Tank and Drainfield Permit. | Required for installation of septic system at O&M facility. | Installation of a septic system. | Prior to construction. | |
| North Dakota Public Service Commission | NDCC 49-22 and NDAC 69-06 | Certificate of Corridor Compatibility and Route Permit | Required for Transmission Lines over 115 kV | Construction of Transmission Line | Prior to Construction | http://www.psc.state.nd.us/ jurisdiction/electricity-laws.html |
| North Dakota Public Service Commission | NDCC 49-22 and NDAC 69-06 | Certificate of Site Compatibility | Required for facilities with greater than 0.5 MW nameplate capacity. | Generation of power described in previous column. | 180 days prior to construction (minimum). | http://www.psc.state.nd.us/ jurisdiction/electricity-laws.html` |
| North Dakota Highway Patrol | | Overheight/ Overweight Permit. | Required to transport oversize loads on state maintained roads. | Project construction requires oversize/ overweight truck loads. | Prior to construction. | http://www.nd.gov/ndhp/permits/permits.html |
| North Dakota Department of Game and Fish | | Wildlife conservation recommendations. | Consultation will be required as part of by North Dakota PSC review of the Certificate of Site Compatibility. | Certificate of Site Compatibility Review by ND PSC. | | |

| Regulatory Authority | Legal Authority | Permit/Approval | Description | Trigger | Application Time | Website |
|---|---|---|---|---|---|---|
| North Dakota State Water Commission | NDAC 889-03-01-10 | Temporary Water Permit. | Required for temporary use of surface or groundwater. | Construction water used onsite. | Prior to construction; permit is valid for up to one year | http://www.swc.state.nd.us/4dlink9/4dcgi/GetSubCategoryRecord/Permits/Water%20Permits |
| Mercer County | MCZO Chapter 3, Section I, Conditional Uses O | Conditional Use Permit. | All proposed wind energy facilities in an agricultural zone must apply for a conditional use permit with County Planning Commission. | Wind energy facility in agricultural zone. | Prior to construction. Process takes about 3 months. | |
| Mercer County | MCZO Chapter 4.I | Road Crossing/ Encroachment Permit. | Required for installation of service connections or extensions of existing underground utilities including crossing of county highways or for placing temporary obstructions on the right-of-way. | Working in or utility crossing of county road right-of-way. | Prior to construction. | |
| | County Regulations | Building Permit. | Required if O&M building is constructed. | O&M Building. | Prior to construction. | |
| | MCZO Chapter 4.I | Permit to Construct a Sewage Disposal System. | Required for sanitation at O&M building. | Restroom, shower or kitchen in O&M building. | Prior to construction. | |

# 7.0 FACTORS CONSIDERED BY PSC

The North Dakota Energy Conversion and Transmission Facility Siting Act lists 11 factors to guide the Commission in the evaluation and designation of the site of the facility (NDCC 49-22-09).

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

The preceding sections discuss the research and investigations relating to the effects of the proposed facility on public health and welfare, natural resources, and the environment. These effects and the proposed mitigative measures to minimize these effects are summarized in Section 5.0.

## 7.2 Technologies to Minimize Adverse Environmental Effects

Antelope will utilize the most current technologies that minimize impacts to the environment. These will include the use of bundled conductors to minimize corona noise and EMF effects. The Project would be designed and constructed according to APLIC standards to limit potential impacts to raptors.

## 7.3 Potential for Beneficial Uses of Waste Energy

This factor is not applicable to this Project since a transmission line does not produce waste energy.

## 7.4 Unavoidable Adverse Environmental Effects

Unavoidable adverse environmental effects are described for each resource area in Section 5. Unavoidable permanent ground disturbance will include the permanent loss of approximately 0.2 acres of habitat through the construction of transmission support towers. Unavoidable permanent effects will also include noise effects. Unavoidable temporary effects will include ground disturbance, noise and air emissions related to construction. Temporary ground disturbing impacts will total approximately 67 acres.

## 7.5 Alternatives to the Proposed Corridor or Route

During its siting process Antelope investigated a number of potential Routes between the proposed wind energy facility and the preferred point of interconnection at the existing AVS switchyard. The Proposed Corridor and Route were selected based on the following initial factors which will both meet the requirements for a viable transmission project and minimize environmental impacts:

- The Proposed Corridor has sufficient number of landowners who are willing to participate in the Project through lease agreements.

- Environmental conditions in the Proposed Corridor will allow the Project to meet applicable environmental standards at an economically-supportable cost.
- By collocating the transmission line with the existing Roughrider line, the cumulative permanent footprint of these lines is minimized. In addition, this routing minimizes the potential impact to economic coal resources by utilizing an existing transmission corridor rather than adding a new one.

Antelope believes that the Proposed Corridor and Route represent the alternative which is both the most economically viable and has the least environmental impacts.

## 7.6 Irreversible and Irretrievable Commitment of Natural Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action. There are few commitments of resources associated with this Project that are irreversible and irretrievable, but these include those resources primarily related to construction. Construction of the Project will necessitate a one-time expenditure of funds, which is not retrievable.

Labor and natural resources will be used in the fabrication and preparation of construction materials. Many of these materials are not retrievable. Construction resources that will be used include aggregate, concrete, steel, and hydrocarbon fuel. During construction, vehicles will travel to and from the site utilizing hydrocarbon fuels. These resources are not in short supply, and their use will not have an adverse effect on the availability of these resources. In addition, the anticipated economic benefits of the Project will balance the irretrievable commitment of resources resulting from the construction of the Project.

## 7.7 Direct and Indirect Economic Impacts

Direct and indirect economic impacts would be primarily positive, as discussed in Section 5.14. Antelope's annual payments to local landowners are anticipated to be in the range of $200,000. This will be new revenue which will help to diversify and strengthen the local farming economy. Antelope's annual property tax payments to local entities are anticipated to total around $800,000; this new revenue will support important local government functions. The majority of both revenue sources will be spent in the local and state economies, thus supporting local employment. The wind energy facility and transmission line together will support 8 -12 permanent jobs for maintenance and operation of the facility.

A one-time economic benefit will be realized during construction of the wind energy facility and transmission line, which will support a maximum of 250-300 direct construction jobs. Continuing to establish the central region of North Dakota as an important producer of alternative energy

sources may spur the development of wind-related businesses in the area, in turn contributing to economic growth in the region.

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

No conflicts are anticipated with existing state and local government and private entities' development plans. The Proposed Route has been determined in consultation with Basin Electric in particular in order to avoid adverse impacts to the existing transmission lines in the area as well as to Basin's proposed AVS-Neset 345 kV transmission line. Coteau Properties has also been involved in the design of the Proposed Route, in order to assure that impacts to their ability to extract economic coal resources would be minimized. There are no other known development plans for land in the Proposed Corridor.

## 7.9 Effect of Route on Cultural Resources

Antelope is committed to minimizing impacts to cultural resources and will avoid known resources and any additional resources identified throughout the life of the Project. If avoidance is not possible, Antelope will work with the North Dakota SHPO to mitigate potential impacts.

## 7.10 Effect of Route on Biological Resources

Antelope will implement measures to avoid and minimize effects to biological resources at the proposed site. The impact of the Project on wildlife is expected to be minimal. There is potential for avian and bat collisions with the conductor wires; mitigative measures will be employed to minimize those potential impacts. Detailed discussion of potential impacts and proposed mitigative measures on biological resources is provided in Section 5.4 (Vegetation) and Section 5.5 (Wildlife).

## 7.11 Concerns Raised by Federal, State or Local Agencies

The only concerns raised to date by federal, state or local agencies have been those related to wetland and wildlife protection, in letters from the NDGFD and the USFWS; these letters are summarized in Section 5.5.1 and the complete letters are found in Appendix B to the Application for Site Certificate. Antelope intends to avoid all wetland impacts through micrositing of turbine locations, and other facilities during final engineering design, and will implement BMPs to protect water quality. As requested by USFWS, high value habitat types including native prairie, wooded draws and riparian areas will be avoided to the extent practicable. Areas temporarily disturbed by construction activities will be restored and reseeded with native vegetation types. Section 5.5 provides additional discussion related to wildlife protection and measures to be implemented to minimize impacts to wildlife and habitat.

# 8.0 QUALIFICATIONS OF CONTRIBUTORS

| Name<br>Project Role | Education and Professional Experience |
|---|---|
| Tracey Dubuque<br>Principal in Charge, Senior Peer Review | Ms Dubuque is a senior project manager and professional civil engineer. She serves as the Director of Onshore Wind Energy Development for Tetra Tech. Ms. Dubuque has experience preparing environmental documentation for energy facilities throughout the United States, including applications under North Dakota energy siting regulations.<br><br>Ms. Dubuque has a BS in Civil Engineering. |
| Dale Bennett<br>Project Manager, Lead Author | Mr. Bennett is a senior project manager with over 20 years of experience managing large and small planning, land use and regulatory projects. For the last 4 years his practice has focused on renewable energy development including wind and transmission projects.<br><br>Mr. Bennett has a BA in biology and a JD. |
| Thomas Kruger<br>Land Use Planner, Contributing Author | Mr. Kruger is a land use planner and regulatory specialist with over 12 years of experience. He regularly performs detailed regulatory research, authors environmental and permitting documents, and performs peer review of complex data sets.<br><br>Mr. Kruger has a BA in Biology and a Master's degree in Urban and Regional Planning. |
| Jennifer D'Avanzo<br>Senior Biologist, Contributing Author | Ms D'Avanzo is a biologist with over 11 years of experience, including coordination of field surveys, environmental monitoring and authoring reports and sections of environmental documents. She has worked a senior biologist on large-scale power transmission and pipeline projects throughout the western United States.<br><br>Ms D'Avanzo has a BS in Forest Biology and a Master's Degree in Landscape Architecture. |
| Laura Nagy<br>Biology Peer Review | Ms. Nagy is Tetra Tech's Natural Resources Discipline Lead, and is that role is responsible for training and quality control standards, and works to ensure that appropriate resources company-wide are available to meet our clients' needs.<br><br>Ms. Nagy has a BA in Biology, Master's Degree in Zoology and PhD in Evolution and Ecology |

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# Figures

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# Appendix A

## Studies and Assessments

## See Attachment A to the Application for Site Certificate

# Appendix B

# Agency Correspondence

## See Appendix B to the Application for Site Certificate