

September 20, 2023

**HAND DELIVERED**

Mr. Steven Kahl  
Executive Secretary  
North Dakota Public Service Commission  
600 E. Boulevard, Dept. 408  
Bismarck, ND 58505-0480

**RE: Rugby Wind, LLC  
Rugby Wind Farm – Pierce County  
Case No. PU-05-47**

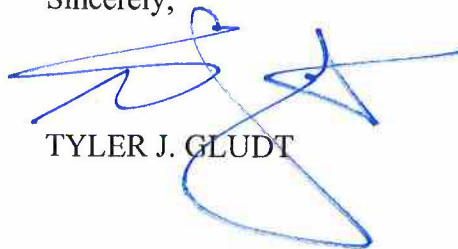
Dear Mr. Kahl:

Enclosed herewith for filing with the North Dakota Public Service Commission (“Commission”) in the above-referenced case, please find an original and seven (7) copies of the following documents:

1. Certification of Jeffrey Reinkemeyer (“Certification”);
2. Exhibit A (Environmental & Regulatory Compliance Review) to Certification;
  - a. Appendix A (Sound Level Analysis) to Exhibit A of Certification;
  - b. Appendix B (Shadow Flicker Report) to Exhibit A of Certification;
  - c. Appendix C (FAA OE/AAA Determinations) to Exhibit A of Certification;
  - d. Appendix D (Microwave Path Analysis) to Exhibit A of Certification;
  - e. Appendix E (USFWS IPaC Information) to Exhibit A of Certification;
  - f. REDACTED Appendix F (Setback & Exclusion Areas) to Exhibit A of Certification;
  - g. Appendix G (Agency Correspondence) to Exhibit A of Certification; and
3. Application to Amend Order and Certificate.

Also enclosed is a Compact Disc containing this letter and the above-referenced documents in PDF format. A cashier’s check in the amount of \$10,000.00 is also enclosed herewith in payment of the application fee. An unredacted, non-public version of the above-referenced Appendix F and associated GIS data (shapefiles) will be provided under separate cover with an Application for Protection of Information.

Sincerely,



TYLER J. GLUDT

TJG/cj  
Enclosures  
80256541 v1

cc: Rugby Wind, LLC (via e-mail w/enclosures)

**STATE OF NORTH DAKOTA**  
**PUBLIC SERVICE COMMISSION**

**Rugby Wind, LLC**  
**Rugby Wind Farm – Pierce County**  
**Siting Exclusion Certification**

**CASE NO. PU-05-47**

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**CERTIFICATION OF JEFFREY REINKEMEYER**

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The undersigned, Jeffrey Reinkemeyer, states and alleges as follows:

1. I am Jeffrey Reinkemeyer, Mid Continent Development Senior Director for Avangrid Renewables, LLC, the sole owner of Rugby Wind, LLC (“Rugby Wind”) which owns and operates the Rugby Wind Farm (“Facility”) located in Pierce County, North Dakota. The Facility is the subject of the October 3, 2005 Findings of Fact, Conclusions of Law and Order (“Order”) of the North Dakota Public Service Commission (“Commission”) and Certificate of Site Compatibility No. 5 and First Reissued Certificate of Site Compatibility No. 5 issued in Case No. PU-05-47 for the Facility (collectively, the “Certificate”). I am familiar with the planned Facility modification (“Project”) that is the subject of this Certification and have the authority to bind Rugby Wind with respect to the certifications made herein.

2. The Facility is an existing electric energy conversion facility pursuant to North Dakota Century Code (“N.D.C.C.”) § 49-22-03(5)(a) and currently has a nameplate capacity of 149.1 megawatts (“MW”).

3. As set forth in the Certificate, the Facility footprint is comprised of approximately 46,080 acres in Pierce County, North Dakota more particularly described as follows (the “Footprint”):

Township 157 North, Range 71 West  
Sections 5, 6, 7 and 8

Township 157 North, Range 72 West  
Sections 1-12

Township 157 North, Range 73 West  
Sections 1 and 12

Township 158 North, Range 71 West  
Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31 and 32

Township 158 North, Range 72 West  
Sections 1-36

Township 155 North, Range 73 West  
Sections 1, 12, 13, 24, 25 and 36

4. Rugby Wind is proposing to repower the Facility for the purpose of improving wind turbine efficiency, energy output and prolonging the useful life of the wind farm. The Project will retrofit all 71 existing Suzlon 2.1 MW turbines by replacing the existing turbine rotors (nose, cone, hub, and blades), replacing the nacelle and its interior elements (gearbox, oil cooler, drive shaft, pitch drive), refurbishing turbine generators from 2.1 MW per turbine up to 2.2 MW per turbine, reinforcing turbine foundations with upgraded collars, replacing pad-mounted transformers and pads, and installing new 34.5-kilovolt (“kV”) collector line system (aboveground and underground), as needed. There will be no changes to the existing turbine locations, turbine towers, meteorological tower, collection substation, or the associated 230 kV transmission line under Case No. PU-05-305. Additional details concerning the Project are included in the project summary attached hereto as Exhibit A.

5. All activities associated with the Project will occur entirely within the Footprint designated for the Facility utilizing access and other rights granted to Rugby Wind in existing easement and lease agreements. No additional landowner easements are required in connection with the Project.

6. Rugby Wind will minimize temporary disturbance by making use of previously disturbed construction areas such as turbine pads, electrical collection line easements, and permanent access roads. The turbine pads and permanent access roads will be widened to facilitate equipment removal and installation. Temporary crane paths may also be required. A temporary laydown yard will be established to support equipment parking, staging areas, and construction trailers. All proposed work will be completed within the Facility's Footprint.

7. The current capacity of each turbine is 2.1 MW. The new turbine equipment to be installed will have a capacity of up to 2.2 MW. Rugby Wind anticipates that the nameplate capacity would increase from 149.1 MW up to 156.2 MW. The Facility currently has an Interconnection Agreement ("IA") with Otter Tail Power Company which allows for generation up to 149 MW net at the point of interconnection. Rugby Wind will not require an IA amendment process to retrofit equipment as the Facility will continue to cap the output to 149 MW. In the future, Rugby Wind may submit a surplus interconnection request with Midcontinent Independent System Operator ("MISO") to increase its net output at the Facility to accommodate the nameplate capacity pursuant to processes and standards established in the MISO Tariff.

8. The current length of each rotor diameter is 88 meters (289 feet). The existing turbines will be replaced with a rotor diameter that is up to 120 meters (394 feet) in length. Due to the increase in rotor diameter, the overall turbine tip height will also increase from 124 meters (407 feet) up to 139 meters (456 feet).

9. The replacement of the turbines and rotor blades will not increase or decrease the existing 79-meter (259-foot) rotor hub height of each tower.

10. Rugby Wind has re-evaluated the Project for environmental and regulatory compliance and is provided as Exhibit A. As set forth in Exhibit A:

- a) Rugby Wind completed an analysis of the Commission's current exclusion area and avoidance area criteria. The Project does not affect any known exclusion or avoidance areas and complies with the siting requirements from the original Pierce County Conditional Use Permit and North Dakota Administrative Code 69-06-08-01.
- b) A Class I cultural resources inventory, a Class III cultural resources survey, and consultation with the North Dakota State Historic Preservation Office ("SHPO") was conducted for the original Certificate of Site Compatibility. Rugby Wind has contracted SWCA Environmental Consultants to complete a Class I cultural resources literature review for the Project to ascertain if any newly discovered resources or changes to the project could potentially impact cultural resources. Rugby Wind continues to progress in determining its construction limits and anticipates that development for the repower activities will take place in the previously surveyed areas; however, should construction limits impact areas outside of previously surveyed areas, additional cultural resources survey and consultation with SHPO be completed prior to any ground disturbance. Rugby Wind has initiated consultation with SHPO and anticipates completing Class III cultural resource surveys in the fall of 2023 for new survey areas, as needed.
- c) Rugby Wind has conducted a sound level analysis in connection with the Project. The results of the sound analysis are provided as an attachment to Exhibit A. Based on the sound analysis, the Project will not result in sound levels exceeding the 50 dBA noise standard adopted by the Pierce County Board of County Commissioners. The predicted sound level of 45 dBA is exceeded within 100 feet

of ten occupied residences. Rugby Wind anticipates obtaining waivers or operating turbines at a lower electrical and sound output mode in order to reduce the sound level to less than 45 dBA within 100 feet of occupied residences. Thus, the Facility will be in compliance with the noise standards adopted by the Commission.

- d) Rugby Wind has also conducted shadow flicker assessment in connection with the Project. The results of the shadow flicker assessment are provided as an attachment to Exhibit A. With the exception of one occupied residence, shadow flicker levels from the Project will not exceed 30 hours per year at occupied residences. The results of the flicker analysis are considered to be conservative because the sensitive receptors are assumed in direct view of incoming flicker from the wind turbines and does not account for varying atmospheric conditions, vegetation, or obstacles which may block the sun. Rugby Wind will either obtain a waiver from the residence owner or will utilize shadow flicker mitigating techniques to reduce shadow flicker levels to 30 hours per year at the residence.
- e) Rugby Wind will apply for and obtain all necessary state and local permits required in connection with the Project.
- f) Rugby Wind will notify surrounding landowners prior to commencement of the Project.

In accordance with N.D.C.C. § 49-22-03(3)(a)(4), Rugby Wind certifies as follows:

- 11. The activities associated with the Project will not affect any known exclusion or avoidance areas. *See* N.D.C.C. § 49-22-03(3)(a)(4)(a).
- 12. The activities are for the construction to improve the existing electric energy conversion facility known as the Rugby Wind Farm . *See* N.D.C.C. § 49-22-03(3)(a)(4)(b).

13. Rugby Wind will comply with all applicable conditions and protections in siting laws and rules and Commission orders previously issued for any part of the Facility. *See* N.D.C.C. § 49-22-03(3)(a)(4)(c).

Dated: September 19, 2023

DocuSigned by:  
**JEFFREY REINKEMEYER**  
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Jeffrey Reinkemeyer

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## TECHNICAL MEMORANDUM

**To:** North Dakota Public Service Commission  
**From:** Avangrid Renewables, LLC  
**Date:** September 20, 2023  
**Re:** **Rugby Wind Farm Repower Project Environmental and Regulatory Compliance Review**

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# 1. Introduction

## 1.1. Project Background

Rugby Wind, LLC (Rugby Wind), a subsidiary of Avangrid Renewables, LLC, operates the Rugby Wind Farm (Facility), located in Pierce County, North Dakota (Figure 1). The Facility is an electric energy conversion facility that began commercial operations in 2009 with a nameplate capacity of 149 megawatts (MW).

Pierce County granted a Conditional Use Permit (CUP, 2005-001 – Rugby Wind Farm) to Rugby Wind on July 12, 2005 and was updated on September 3, 2008, prior to construction. Rugby Wind received a Certificate of Site Compatibility (Certificate) from North Dakota Public Service Commission (ND PSC or Commission) on October 3, 2005, in Case No. PU-05-47. The Certificate was reissued on August 27, 2008, and the final layout was approved by the Commission on May 22, 2009. The existing Facility consists of 71 Suzlon S88 wind turbine generators with a capacity of 2.1 MW each, access roads, buried and overhead electrical collection lines, an electrical substation, an operations and maintenance building, and meteorological tower. As required by regulation, an aircraft detection lighting system was installed and became operational on March 18, 2022. Additionally, a 9.5-mile-long, 230-kilovolt (kV) transmission line runs from the Rugby Wind Farm Substation to the existing Rugby Substation.

As set forth in the Certificate, the Facility footprint is comprised of approximately 46,080 acres in Pierce County, North Dakota (Footprint) and includes the following:

Township 157 North, Range 71 West

Sections 5, 6, 7 and 8

Township 157 North, Range 72 West

Sections 1-12

Township 157 North, Range 73 West

Sections 1 and 12

Township 158 North, Range 71 West

Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31 and 32

Township 158 North, Range 72 West

Sections 1-36

Township 155 North, Range 73 West

Sections 1, 12, 13, 24, 25 and 36

This memorandum was compiled to support Rugby Wind's certification of compliance with North Dakota Century Code (N.D.C.C.) § 49-22-03(3)(a) as it relates to the proposed repowering activities at the Facility (Project). Rugby Wind analyzed the Project with respect to environmental and regulatory resources, with supporting documentation from SWCA Environmental Consultants (SWCA) and Jacobs Engineering Group, Inc. The following sections and referenced figures and appendices summarize the results of the analysis.

## 1.2. Project Repowering Description

Rugby Wind is proposing to retrofit Facility components for the purpose of improving the wind turbines generating efficiency, energy output and prolonging the useful life of the Facility. The repowering activities will include construction and temporary ground disturbance for the following activities:

- Replacing turbine nacelles and interior elements (e.g., gearbox, oil cooler, drive shaft, and pitch drive). The replaced nacelles will be mounted on existing turbine towers.
- Replacing rotors (i.e., nose cone, hub, and blades), therefore increasing the turbine rotor diameter from 88 meters (m) up to 120 m.
- Refurbishing the generators from 2.1 MW up to 2.2 MW per turbine.
- Reinforcing turbine foundations with upgraded collars (as needed) and removing and replacing the existing pad-mounted transformers and pads within the existing turbine gravel pad.
- Installation of new 34.5-kilovolt (kV) collector line system (aboveground and buried) within existing easements, as needed.

There will be no changes to the Facility footprint, existing leases, turbine locations, turbine towers, meteorological tower, collector substation, or associated 230kV transmission line. Figure 1 illustrates the existing Facility as-built layout. Table 1 summarizes the proposed turbine changes.

**Table 1: Rugby Wind Farm Existing and Proposed Turbine Dimensions**

Design Parameter	Existing	Proposed	Change
Hub Height	79 m	79 m	--
Rotor Diameter	88 m	120 m	32 m
Total Tip Height	124 m	139 m	15 m
Nameplate Capacity	149.1 MW	156.2 MW	7.1 MW

m – meters; MW – megawatt

The current capacity of each turbine is 2.1 MW. The new turbine equipment to be installed will have a capacity of up to 2.2 MW. The nameplate capacity would increase from 149.1 MW to 156.2 MW. The Facility currently has an Interconnection Agreement (IA) with Otter Tail Power which allows for generation up to 149 MW net at the point of interconnection. Rugby Wind will not require an IA amendment process to retrofit equipment as the Facility will continue to cap the output to 149 MW. Rugby Wind would maintain settings in the Facility’s Supervisory Control and Data Acquisition (SCADA) and windfarm management system to ensure the Facility does not exceed the net 149 MW limit at the point of interconnection. In the future, Rugby Wind may submit a surplus interconnection request with MISO to increase its net output at the Facility to accommodate the nameplate capacity pursuant to processes and standards established in the MISO Tariff.

Rugby Wind and equipment manufacturers have conducted evaluations of the existing wind turbines to determine suitability to continue to operate, within design parameters after the retrofit. Rugby Wind has also hired Barr Engineering to evaluate foundations and Westwood Professional Services to evaluate the electrical system. Based on preliminary results, turbine foundations may require further analysis. Additional investigations will be conducted to determine if any foundations will require structural upgrades, such as a foundation collar, prior to Project construction. While the reinforcement design is still under engineering review, it is anticipated that reinforcement would involve excavation below grade of all or a portion of the fill covering existing rebar and concrete foundation, with placement of additional rebar and concrete to increase the structural capacity of the foundation. Excavated materials would be either spread on-site or disposed of at an appropriate off-site location; the excavated area would remain at-grade with the existing landscape.

The electrical system study determined that the collector system will require limited upgrades. This includes installing new 34.5 kV collector lines, where required, adjacent to the existing lines and within existing easements. Rugby Wind will decommission the original and new collector line systems once the Facility retires in accordance with landowner leases. Results of these preliminary engineering studies support the proposed retrofit and requested certification of compliance.

Rugby Wind will minimize temporary disturbance by utilizing previously disturbed construction areas such as turbine pads, electrical collector line easements, and permanent access roads. Turbine pads and permanent access roads will be widened to facilitate equipment removal and installation. Temporary crane paths may also be required. It is estimated that construction

work areas at each turbine pad location would encompass an approximately 300-foot buffer that will be utilized to temporarily stage turbine blades, nose cone, and nacelle. Grading will not be required for the entire base area; however, this area will contain an engineered crane pad upon which the main crane will be placed. Proposed work will be completed within the Facility's Footprint.

In addition to the work areas at each turbine pad location, up to one, 10-acre temporary laydown area will be required for staging construction equipment and materials as well as to house construction trailers and provide parking for construction vehicles and construction employees' personal vehicles. This area will be located on leased land within the Facility Footprint and sited to avoid and minimize impacts to sensitive resources such as undisturbed habitat and water resources. Construction may occur at multiple turbine locations simultaneously to minimize Facility downtime. Rugby Wind estimates start of construction ground preparation work and equipment delivery as early as Q2 2025 with commercial operation by Q4 2025.

The turbine components that will be replaced, the rotor (nose cone, hub, and blades) and nacelle (gearbox, oil cooler, drive shaft, pitch drive), will be removed from the tower using a hydraulic crane and placed in the turbine's adjoining construction work area. The new nacelle will then be lifted to the top of the existing tower and bolted in place. The rotor (nose cone, hub, and blades) will be assembled on the ground and then the whole rotor assembly will be hoisted and attached to the turbine assembly.

Removed turbine components (e.g., nacelle and its interior elements and rotor assembly) will be handled, processed, treated, stored, reused, disposed of, or recycled in accordance with pertinent federal, state, and local regulations. At this time, crane types for construction are unknown, but if track cranes are moved between turbine locations across agricultural fields, Rugby Wind will coordinate with landowners. Prior to construction, the presence of wetlands near crane paths will be evaluated and impacts to wetlands will be avoided to the extent possible or the requisite permits obtained if wetland impacts cannot be avoided completely. At the end of the repower construction activities, any graded areas will be de-compacted, recontoured (if necessary), and any disturbed soils will be restored to pre-disturbance conditions.

## 2. Environmental Analysis

### 2.1. Socioeconomics

The Project is anticipated to provide positive short-term and long-term impacts to the local economy by extending the life of the Facility. Impacts to social and economic resources from construction activities will be short-term and expected to increase local spending at commercial businesses, such as restaurants, grocery stores, hotels and gas stations. The Project will also have long-term impacts related continuing landowner payments, taxes, and employment of full-time personnel as facility managers, site managers and turbine technicians. As a result, the repower Project will revitalize the Facility to continue contributing to the local economy for an additional 20+ years.

## 2.2. Land Use

The Project will not change the layout of the Facility and all construction activities associated with the Project will occur entirely within the Footprint designated for the Project, utilizing access and other rights granted to Rugby Wind in existing easement and lease agreements. No additional landowner easements are required in connection with the Project. Rugby Wind will utilize previously disturbed construction areas such as turbine pads, electrical collection line easements, and permanent access roads. Temporarily impacted areas will be restored in compliance with applicable provisions of the Commission's Findings of Fact, Conclusions of Law and Order, dated October 3, 2005 (Case No. PU-05-47).

## 2.3. Public Services

Truck access to the Facility is served by US Highway 2 into Rugby, which is a four-lane divided highway connecting to I-29 in Grand Forks and US Highway 83 in Minot (another four-lane divided highway to I-94 in Bismarck). From Rugby, Highway 3 to Highway 17 will serve as the primary truck access into the Facility. Specific truck routes will be dictated by the location required for delivery. Existing access roads will be used to the extent practicable. In locations where crane paths or additional turning radii are necessary for equipment delivery and installation, these temporary upgrades will be designed and constructed to the appropriate standard necessary to accommodate their intended function (e.g., traffic volume and weight of vehicles) and minimize erosion. Following construction, temporary access roads will be decompacted, recontoured, and revegetated.

Given the increased road use during construction, Rugby Wind will coordinate with local road authorities to establish road use agreements that will be in place prior to construction to ensure the safe and efficient use of roads and to minimize and mitigate the overall impact. Additional permits will be issued by the State, County and/or township for over-sized truck movements.

## 2.4. Sound, Shadow Flicker, and Human Health and Safety

A sound level analysis was completed in support of the Project. The results of the sound analysis are provided as Appendix A. Based on the sound analysis, the Project will not result in sound levels exceeding the 50 dBA noise standard adopted by the Pierce County Board of County Commissioners. The predicted sound level of 45 dBA may be exceeded within 100 feet of ten occupied residences. Rugby Wind anticipates obtaining waivers or operating turbines at a lower electrical and sound output mode in order to reduce the sound level to less than 45 dBA within 100 feet of occupied residences. Thus, the Facility will be in compliance with the noise standards adopted by the Commission.

Shadow flicker impacts are not regulated in applicable state or federal law, and there is no local zoning ordinance or permitting threshold regarding shadow flicker impact to receptors from a wind energy project in Pierce County, North Dakota. Following the National Association of Regulatory Utility Commissioners' recommendations, previous North Dakota Public Service Commission wind farm approvals, and standardized energy siting guidance, a threshold of 30 hours of shadow flicker per year was used as a threshold for determining potential impacts at

occupied residences. Rugby Wind has conducted shadow flicker assessments in connection with the Project. Results of the shadow flicker assessment are provided in Appendix B. With the exception of one occupied residence, shadow flicker levels will not exceed 30 hours per year at occupied residences. The results of the flicker analysis are considered to be conservative because the sensitive receptors are assumed in direct view of incoming flicker from the wind turbines and does not account for varying atmospheric conditions, vegetation, or obstacles which may block the sun. Rugby Wind will either obtain a waiver from the residence owner or will utilize shadow flicker mitigating techniques to reduce shadow flicker levels to 30 hours per year at the residence.

Rugby Wind has obtained Determinations of No Hazard's (DNH's) from the Federal Aviation Administration (FAA) for each turbine. A summary table has been included as Appendix C. Rugby Wind can provide copies of all DNH's to the Commission prior to start of repowering activities upon request.

Capitol Airspace Group completed a microwave path analysis for the Project. The results of the microwave path analysis are provided in Appendix D. The results of this analysis indicate that microwave path Fresnel zones do not overlie the Project. As a result, repowering wind turbines at any of the existing locations should not create a line-of-sight obstruction for any applied or licensed microwave links.

Rugby Wind will continue to comply with all safety-related and other conditions of the Commission's Order as it relates to security and hazardous materials and waste.

## 2.5. Cultural and Architectural Resources

A Class I cultural resources inventory, a Class III cultural resources survey, and consultation with the North Dakota State Historic Preservation Office (SHPO) was conducted for the original Certificate. Rugby Wind contracted SWCA to complete a Class I cultural resources literature review for the Project to ascertain if any newly discovered resources or changes to the project could potentially impact cultural resources. Rugby Wind continues to progress in determining its construction limits and anticipates that development for the repower activities will take place in the previously surveyed areas; however, should construction limits impact areas outside of previously surveyed areas, additional cultural resources survey and consultation with the North Dakota SHPO be completed prior to any ground disturbance. Rugby Wind has initiated consultation with the North Dakota SHPO and anticipates completing Class III cultural resource surveys in the fall of 2023 for new survey areas, as needed.

Currently, no impacts are anticipated to known cultural or architectural resources in the Footprint. Rugby Wind is committed to minimize impacts to archaeological and architectural sites possibly eligible for listing in the National Register of Historic Places (NRHP) and will assess impacts and the need for mitigation for any additional NRHP-eligible or potentially eligible resources identified throughout the review process in coordination with the North Dakota SHPO. Rugby Wind will also develop an unanticipated discovery plan to be in place should previously unknown archaeological resources or human remains be inadvertently encountered during the construction period.

## 2.6. Recreational Resources

The Project will not impact recreational resources. The Project continues to maintain a setback of at least 0.25-mile from nearby waterfowl production areas (WPAs).

## 2.7. Land-Based Economics

The Project's repowering activities will be located on land currently associated with the Footprint and will utilize access and other rights granted to Rugby Wind in existing easement and lease agreements. As a result of construction, crop production or grazing may be temporarily impacted for areas within the proposed construction workspaces. Rugby Wind will compensate landowners for any temporary impacts to cropland in accordance with the terms of lease agreements, as applicable. Once the retrofits are completed, land surrounding the turbines can continue to be farmed or grazed. The Project will not result in any long-term land impacts to agricultural use or production.

## 2.8. Soils

Construction activities and the movement of construction equipment within the construction workspace, may result in temporary impacts to soil resources including soil erosion and soil compaction. It is anticipated that the construction activities associated with the Project will exceed one acre of ground disturbance. Rugby Wind will seek North Dakota Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit coverage from the North Dakota Department of Environmental Quality, including the development of a Stormwater Pollution Prevention Plan (SWPPP) that will describe methods to control erosion and runoff and specify best management practices (BMPs) to control erosion and sedimentation. The SWPPP will be implemented from the initiation of construction and used through site restoration efforts. Once construction has been completed, Rugby Wind will decompact soils and backfill graded and excavated areas with the stored native material and return surface conditions to preconstruction conditions. Rugby Wind will comply with the site restoration and reseeded conditions in the Commission's Order and all other applicable permitting requirements.

## 2.9. Geological and Groundwater Resources

The Project is not expected to disturb any geologic or groundwater resources.

## 2.10. Waterbodies, Wetlands, and Floodplains

The Project is located within the U.S. Fish and Wildlife (USFWS) J. Clark Salyer Wetland Management District (WMD). In June 2023, Rugby Wind confirmed with the USFWS WMD that no new grassland or wetland easements have been added to the Footprint. Rugby Wind will avoid all grassland conservation easements and plan to avoid the protected basins associated on the wetland easements.

SWCA completed an updated wetland delineation for the Project in Q2 of 2023 in accordance with the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region,

Version 2.0. A second mobilization will be completed prior to construction to ensure the entirety of the construction works areas have been surveyed.

Wetlands and waterbodies will be avoided to the extent possible during construction of the Project. If wetland or waterbody impacts cannot be avoided, Rugby Wind will submit a permit application to the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. Wetlands and waterbodies will be flagged prior to construction to identify the limits of wetland boundaries in the vicinity of Project activities. BMPs will be designed and utilized to control sedimentation and erosion during construction as well. Temporary impacts to wetlands and waterbodies will be restored to pre-construction conditions, as needed.

Review of FEMA floodplain maps indicates that the Facility and its surroundings have not completed a study to determine flood hazard for the area. Due to the limited construction work areas and general avoidance of wetlands and waterbodies, floodplain impacts are not anticipated.

## 2.11. Vegetation

The Project does not anticipate removing trees or shrubs; however, Rugby Wind will comply with the site restoration and reseeded conditions in the Commission's Order and all other applicable permitting requirements.

## 2.12. Wildlife

Rugby Wind conducted a preconstruction wildlife baseline studies in 2005 and 2006 including fixed-point avian use surveys (avian point count surveys), line transect breeding bird surveys (breeding bird surveys), bat acoustic surveys and sharp-tailed grouse lek surveys. The findings from the original review concluded that pre-construction surveys of the proposed Facility and related construction activities, will avoid or not significantly impact wildlife resources in the Footprint. From March 2010 through March 2011, post-construction monitoring studies of bird and bat fatalities were conducted at the Facility.

Avangrid Renewables has implemented a Corporate Wildlife Plan (CWP). The CWP supports processes and practices intended to avoid and minimize impacts to all wildlife (with emphasis on birds and bats) and their habitats. To implement the CWP, Avangrid Renewables developed a Wildlife Monitoring and Reporting System (WMRS) for internally reporting bird and bat fatalities discovered during operations. WMRS consists of voluntary operational monitoring for birds and bats to assess trends of a given wind plant. Avangrid Renewables uses the resulting information to implement adaptive management actions, as necessary, to minimize or avoid risk to birds or bats and identify mitigation measures.

In addition to implementation of the WMRS, Rugby Wind implements a voluntary strategy of feathering/pause-to-cut-in for turbines at wind speeds up to three meters/second (m/s), from one-half hour before sunset to three-quarters of an hour after sunrise, between May 15<sup>th</sup> and October 15<sup>th</sup>, when temperatures are over 50° Fahrenheit. No threatened and endangered species fatalities have been detected at the Facility to date.

To evaluate current conditions, SWCA conducted a biological resources assessment using a combination of existing information obtained from publicly available sources including reports,

published literature, online agency databases, geographic information system data, and a site visit. A review of the 2015 *North Dakota State Wildlife Action Plan (SWAP)* and USFWS Information for Planning and Conservation (IPaC) online mapping tool identifies three federally listed species and one candidate species as having the potential to occur in the Facility area (Appendix E): Dakota skipper (*Hesperia dacotae*; federally threatened and a state SCP Level II species), piping plover (*Charadrius melodus*; federally threatened and a state SCP Level II species), red knot (*Calidris canutus*; federally threatened and a state SCP Level III species), Monarch butterfly (*Danaus plexippus*; candidate and a state SCP Level I species). No Designated Critical Habitat is present in or near the Footprint.

Based on the biological resources assessment review and proposed activities, the Project does not expect measurable impacts on wildlife or protected species in the region. The repower construction activity is associated with existing Facility components and previously disturbed work areas. The Project will not add new permanent structures or convert other current land uses. Tree or shrub removal is not anticipated at this time and impacts to vegetation are expected to be temporary and limited to the construction season. Operational impacts are expected to be similar to current operations and other operating wind projects in the region. Rugby Wind will engage USFWS and North Dakota Game and Fish Department in discussions regarding the Project. In addition, Rugby Wind will develop a Bird and Bat Conservation Strategy for the Facility, which will outline BMPs that are to be undertaken for the life of the Facility to minimize risks to birds, bats, and other wildlife from operation of the wind energy facility.

## 3. Compliance with Applicable Standards

### 3.1. Public Service Commission Exclusion Areas

Based on previous equipment upgrade dockets held before the Commission, Rugby Wind completed an analysis of the Commission's current exclusion area and avoidance area criteria per North Dakota Administrative Code (N.D.A.C) §§ 69-06-08-01(1) - (4). Accordingly, the Project complies with all exclusion and avoidance requirements from the original Pierce County Conditional Use Permit and North Dakota Administrative Code 69-06-08-01.

Exclusion areas described in Table 2 below and are mapped for the Project in Appendix F. Avoidance areas are described in Table 3.

**Table 2: Summary of Exclusion Areas**

NDAC § 69-06-08-01	Exclusion Area Description	Rugby Wind Comments
NDAC § 69-06-08-01(1)(a)	Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; historic districts; monuments; wilderness areas; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.	A USFWS WPA is located within the vicinity of the Facility. A minimum 0.25-mile setback was applied during the original Certification and continues to be maintained. All USFWS grassland easements have been avoided by the Project.
NDAC § 69-06-08-01(1)(b)	Designated or registered state: parks; forests; forest management lands; historic sites; monuments; historical markers; archaeological sites; grasslands; wild, scenic, or recreational rivers; game refuges; game management areas; management areas; and nature preserves.	Not applicable.
NDAC § 69-06-08-01(1)(c)	County parks and recreational areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.	Not applicable.
NDAC § 69-06-08-01(1)(d)	Areas critical to the life stages of threatened or endangered animal or plant species.	Not applicable.
NDAC § 69-06-08-01(1)(e)	Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged.	Not applicable.
NDAC § 69-06-08-01(1)(f)	Areas within one thousand two hundred feet of the geographic center of an intercontinental ballistic missile (ICBM) launch or launch control facility.	Not applicable.
NDAC § 69-06-08-01(1)(g)	Areas within thirty feet [9.14 meters] on either side of a direct line between an intercontinental ballistic missile (ICBM) launch facility and a missile alert or launch	Not applicable.

NDAC § 69-06-08-01	Exclusion Area Description	Rugby Wind Comments
	control facilities to avoid microwave interference. This restriction only applies to aboveground structures, not to surface features, such as roads, or belowground infrastructure.	
NDAC § 69-06-08-01(2)(a)(1)	One and one-tenth times the height of the turbine from the nearest edge of an interstate or state roadway right of way;	No turbines will be located within this exclusion area.
NDAC § 69-06-08-01(2)(a)(2)	One and one-tenth times the height of the turbine plus seventy-five feet from the centerline of any county or maintained township roadway;	No turbines will be located within this exclusion area.
NDAC § 69-06-08-01(2)(a)(3)	One and one-tenth times the height of the turbine from the nearest edge of railroad right of way;	No turbines will be located within this exclusion area.
NDAC § 69-06-08-01(2)(a)(4)	One and one-tenth times the height of the turbine from the nearest edge of a one hundred fifteen kilovolt or higher transmission line right of way;	No turbines will be located within this exclusion area.
NDAC § 69-06-08-01(2)(a)(5)	One and one-tenth times the height of the turbine from the property line of a nonparticipating landowner and three times the height of the turbine from an inhabited rural residence of a nonparticipating landowner, unless a variance is granted. A variance may be granted if an authorized representative or agent of the permittee, the nonparticipating landowner, and affected parties with associated wind rights file a written agreement expressing all parties' support for a variance to reduce the setback requirement in this subsection. A nonparticipating landowner is a landowner that has not signed a wind option or an easement agreement with the permittee of the wind energy conversion facility as	No turbines will be located within this exclusion area.

NDAC § 69-06-08-01	Exclusion Area Description	Rugby Wind Comments
	defined in North Dakota Century Code chapter 17-04.	

**Table 3: Summary of Avoidance Areas**

NDAC § 69-06-08-01	Description	Comments
NDAC § 69-06-08-01(3)(a)	Historical resources which are not designated as exclusion areas.	No impacts to historical resources are anticipated. Coordination with SHPO is ongoing to confirm historical resources on site. An Unanticipated Discoveries Plan will be prepared for the Project.
NDAC § 69-06-08-01(3)(b)	Areas within the city limits of a city or the boundaries of a military installation.	Not applicable.
NDAC § 69-06-08-01(3)(c)	Areas within known floodplains as defined by the geographical boundaries of the hundred-year flood.	Not applicable.
NDAC § 69-06-08-01(3)(d)	Areas that are geologically unstable.	Not applicable.
NDAC § 69-06-08-01(3)(e)	Woodlands and wetlands.	Woodlands and wetlands will be avoided to the extent possible during construction. If resource impacts cannot be avoided, Rugby Wind will work with the USFWS WMD and USACE to minimize impacts and restore areas, as needed. Rugby Wind will comply with the site restoration and reseeded conditions in the Commission's Order and all other applicable permitting requirements.

NDAC § 69-06-08-01	Description	Comments
NDAC § 69-06-08-01(3)(f)	Areas of recreational significance which are not designated as exclusion areas.	Not applicable.
NDAC § 69-06-08-01(4)	A wind energy conversion facility site must not include a geographic area where, due to operation of the facility, the sound levels within one hundred feet of an inhabited residence or a community building will exceed forty-five dBA. The sound level avoidance area criteria may be waived in writing by the owner of the occupied residence or the community building.	The Project will not result in sound levels exceeding the 50 dBA noise standard adopted by the Pierce County Board of County Commissioners. The predicted sound level of 45 dBA is exceeded within 100 feet of ten occupied residences. Rugby Wind anticipates obtaining waivers or operating turbines at a lower electrical and sound output mode in order to reduce the sound level to less than 45 dBA within 100 feet of occupied residences.

### 3.2. Setbacks

In addition to compliance with the exclusion and avoidance areas described in section 3.1, the Project continues to comply with the setbacks from the original Pierce County Conditional Use Permit and ND PSC Certificate. Table 4 and Appendix F show the Project's compliance with current and original permit setbacks.

**Table 4: Setback Compliance for Rugby Wind Farm**

Description	Calculated Setback Distance <sup>1</sup>	Status/Comments
<b>2005 Setback Compliance under PU-05-47 and Pierce County Conditional Use Permit</b>		
Setbacks of less than 200 feet are allowed if properties on both sides of the property line are leased by Rugby Wind, LLC.	61 m/200 ft	All repowered turbines are in compliance with this requirement.
No wind turbine would be placed within 1,000 feet of any occupied residence.	305 m/1,000 ft	All repowered turbines are in compliance with this requirement.

Description	Calculated Setback Distance <sup>1</sup>	Status/Comments
No wind turbine would be placed within 400 feet (or height of the turbine, whichever is greater) from any transmission line.	139 m/456 ft	All repowered turbines are in compliance with this requirement.
No wind turbine would be placed within 400 feet (or height of the turbine, whichever is greater) from any developed road.	139 m/456 ft	All repowered turbines are in compliance with this requirement.
No wind turbine would be placed within 400 feet (or height of the turbine, whichever is greater) from any adjacent non-participating property.	139 m/456 ft	All repowered turbines are in compliance with this requirement.
No wind turbine would be placed within 500 feet of any large (lacustrine) wetland complex (greater than 50 acres).	152 m/500 ft	All repowered turbines are in compliance with this requirement.
No wind turbine would be placed within 0.25 miles of any USFWS WPA.	0.25-mile	All repowered turbines are in compliance with this requirement.
No turbines would be placed on the one parcel of land (located in Section 24, Township 158 N, Range 72 W) within the project area covered by an irrigation permit.	Avoidance	All repowered turbines are in compliance with this requirement.
<b>2023 Setback Compliance under NDAC § 69-06-08-01(2)(a)</b>		
1.1x the turbine height from the nearest edge of an interstate or state roadway right-of-way (ROW).	152.9 m/502 ft	All repowered turbines are in compliance with this requirement.
1.1x the turbine height plus 75 feet from the centerline of any county or maintained township roadway.	176 m/577 ft	All repowered turbines are in compliance with this requirement.

Description	Calculated Setback Distance <sup>1</sup>	Status/Comments
1.1x the turbine height from the nearest edge of railroad ROW.	152.9 m/502 ft	All repowered turbines are in compliance with this requirement.
1.1x the turbine height from the nearest edge of a 115 kV or higher transmission line ROW.	152.9 m/502 ft	All repowered turbines are in compliance with this requirement.
1.1x the turbine height from the property line of a nonparticipating landowner.	152.9 m/502 ft	All repowered turbines are in compliance with this requirement.
3x the height of the turbine from an inhabited rural residence of a nonparticipating landowner	417 m/1,318 ft	All repowered turbines are in compliance with this requirement.

1. Assumes a total tip height of 139 meters (456 feet).  
 m – meters; ft – feet

## 4. Conclusion

The Project complies with the requirements of N.D.C.C. § 49-22-03(3)(a), including the Commission’s current exclusion area and avoidance area criteria. In addition, the Project will continue to comply with all applicable siting laws, rules, and Commission orders, including the conditions specified in the Commission’s Order and Pierce County Conditional Use Permit. Table 5 summarizes the resources that will be impacted as a result of the Project and the appropriate mitigation.

Rugby Wind has engaged with agencies throughout the development process. Appendix G below provides a copy of agency correspondence as of the date of this Certification submittal.

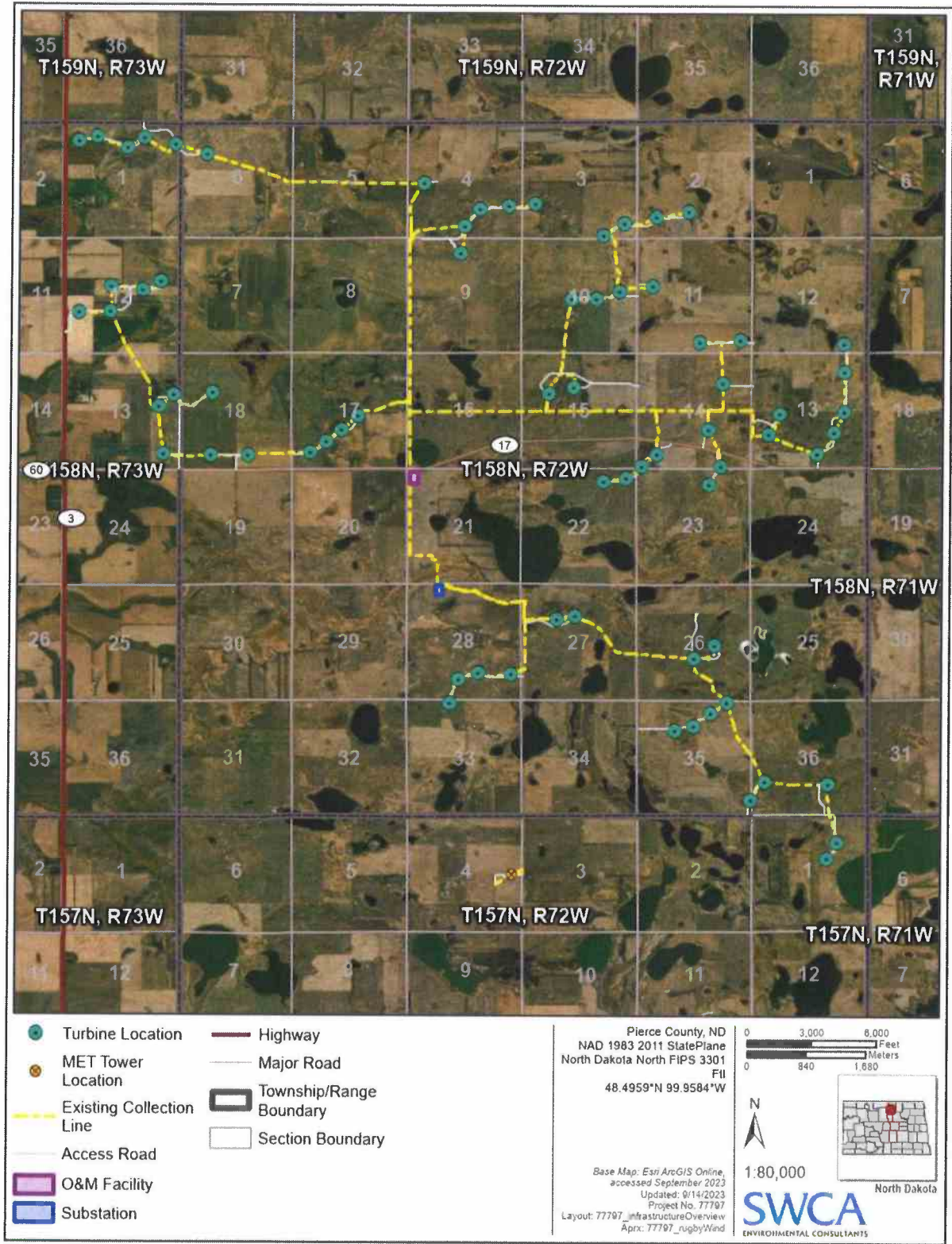
**Table 5: Summary of Environmental Resource Analysis**

Resource	Potential Project Effect	Mitigation and Avoidance Measures
Socioeconomics	The Project is anticipated to provide positive short-term and long-term impacts to the local economy.	None proposed at this time.
Land Use	The Project will not change the layout of the Facility and construction activities will utilize previously disturbed areas.	Temporarily impacted areas will be restored in compliance with applicable provisions in the

Resource	Potential Project Effect	Mitigation and Avoidance Measures
		Commission's original Certificate.
Public Services	The Project will result in a temporary increase in traffic due to construction.	Rugby Wind will coordinate with local road authorities to establish road use agreements that will be in place prior to construction as well as obtain applicable permits for over-sized truck movements, as needed.
Sound	The Project will not result in sound levels exceeding the 50 dBA noise standard adopted by the Pierce County Board of County Commissioners. The predicted sound level of 45 dBA may be exceeded within 100 feet of ten occupied residences.	Rugby Wind anticipates obtaining waivers or operating turbines at a lower electrical and sound output mode in order to reduce the sound level to less than 45 dBA within 100 feet of occupied residences.
Human Health and Safety	<p>The Project has obtained updated DNHs for all 71 turbines at the site. No impacts to microwave beam paths are expected.</p> <p>All but one occupied residence will not exceed 30 hours of shadow flicker per year.</p>	<p>In the event that Rugby Wind receives complaints, impacts will be re-evaluated, and mitigation measures will be taken if necessary.</p> <p>Rugby Wind will either obtain a waiver from the residence owner or will utilize shadow flicker mitigating techniques to reduce shadow flicker levels to 30 hours per year.</p>
Cultural and Architectural Resources	The Project will be utilizing previously disturbed work areas. As with its original construction, the Project does not anticipate impacting cultural or architectural resources.	Rugby Wind is committed to minimize impacts to archaeological and architectural sites possibly eligible for listing in the NRHP. Additional surveys will be conducted in coordination with the North Dakota SHPO, as needed. Rugby Wind will also

Resource	Potential Project Effect	Mitigation and Avoidance Measures
		develop an unanticipated discovery plan.
Recreational Resources	The Project will not impact recreational resources.	The Project will maintain the setback from USFWS WPAs.
Land-Based Economics	The Project will utilize existing Facilities and previously disturbed work areas. Crop production or grazing may be temporarily impacted for areas within the proposed construction areas. No long-term impacts are anticipated.	Rugby Wind will compensate landowners for temporary impacts to cropland in accordance with the terms of lease agreements. Once the retrofits are completed, land surrounding the Facility can continue to be farmed or grazed.
Soils	Project construction may result in temporary impacts to soil resources including soil erosion and soil compaction.	Rugby Wind will implement BMPs and the SWPPP throughout construction. Rugby Wind comply with the site restoration and reseeded conditions in the Commission's Order and all other applicable permitting requirements.
Geological and Groundwater Resources	The Project is not expected to disturb any geologic or groundwater resources.	None proposed at this time.
Waterbodies, Wetlands, and Floodplains	Temporary impacts to wetlands may result due to construction activities. There will be no impacts to floodplains.	If wetland or waterbody impacts cannot be avoided, Rugby Wind will submit for applicable permits. BMPs will be installed, and wetlands and waterbodies will be flagged prior to construction. Temporary impacts will be restored as required by applicable permits.
Vegetation	The Project will utilize previously disturbed work areas and does not anticipate removing trees or shrubs at this time.	Rugby Wind will comply with the site restoration and reseeded conditions in the Commission's Order and all

Resource	Potential Project Effect	Mitigation and Avoidance Measures
		other applicable permitting requirements.
Wildlife	The Project will utilize previously disturbed work areas and does not anticipate having long term impacts on wildlife or threatened and endangered species. Operational impacts are expected to be similar to current operations and other operating wind projects in the region.	Rugby Wind will continue its voluntary curtailment strategy at the site and develop a Bird and Bat Conservation Strategy to minimize risks to birds, bats, and other wildlife from operation of the wind energy facility.



**Figure 1. Rugby Wind Farm existing facilities.**

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**Subject** Sound Level Analysis for the Rugby Repower Wind Project  
**Attention** Manuela Elizondo/Avangrid Renewables, LLC  
**From** Mark Bastasch, P.E. (OR), INCE Bd. Cert./Jacobs Engineering Group, Inc.  
**Date** September 18, 2023

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Rugby Wind, LLC (Rugby Wind), a subsidiary of Avangrid Renewables, LLC, operates the Rugby Wind Farm in Pierce County, North Dakota (Facility). The Facility began commercial operations in 2009 and has a nameplate capacity of 149.1 megawatts (MW). Facility components include 71 Suzlon wind generating turbines with a capacity of 2.1 MW each, access roads, buried and overhead electrical collection lines, an electrical substation, an operations and maintenance building, a meteorological tower, and an aircraft detection lighting system. Additionally, a 9.5-mile-long, 230-kilovolt transmission line runs from the Rugby Wind Farm Substation to the existing Rugby Substation.

Rugby Wind is proposing to retrofit the Facility for the purpose of improving wind turbine efficiency, increasing energy output, and prolonging the useful life of the wind farm. The retrofitting process is known as "repowering." The repower scope includes replacing the turbine nacelles and its interior elements, replacing the rotor (hub and blades) and increasing the rotor diameter up to 120 meters, refurbishing generators from 2.1 MW to 2.2 MW, and reinforcing turbine foundations and associated collector lines, as needed. Rugby Wind proposes no changes to turbine locations, hub height, point of interconnection output capacity, or other existing components such as the generation-tie line and collector substation, at this time. Temporary ground disturbance is primarily limited to existing facilities such as turbine pads, electrical collection line easements, access roads, and a laydown yard.

### **1. Summary of Proposed Repower and Sound Level Analysis Results**

Rugby Wind proposes to repower up to all 71, 2.1-MW, Suzlon S88 turbines with 2.1-MW to 2.2-MW turbines. The nameplate capacity would increase from 149.1 MW to 156.2 MW. This technical memorandum provides a sound level analysis for the repowered Facility. Two turbine types were considered in the analysis: 1) Vestas V120 with Serrated Trailing Edge (STE) blades or 2) General Electric 116 (GE116) with Low Noise Trailing Edge (LNTE) blades. Figures 1 and 2 (attached) show the Facility's predicted sound pressure level based on the analysis of both turbine types described herein, as well as the residences identified by Rugby Wind. Predicted sound levels do not exceed 50 dBA at the nearest residences for either turbine type. The predicted sound level of 45 dBA is exceeded within 100 feet of seven participating and three nonparticipating occupied residences for the Vestas V120 STE turbine type. The predicted sound level of 45 dBA is exceeded within 100 feet of three participating and two nonparticipating occupied residences for the GE116 LNTE turbine type. Rugby Wind anticipates obtaining waivers or operating turbines at a lower electrical and sound output mode in order to reduce the sound level to less than 45 dBA within 100 feet of occupied residences. Thus, the Facility will be in compliance with the noise standards adopted by the Pierce County Board of County Commissioners and the North Dakota Public Service Commission (ND PSC), respectively.

## 2. Regulatory Requirements

Pierce County granted a conditional use permit (CUP, 2005-001 – Rugby Wind Farm) to Rugby Wind on July 12, 2005, and an updated CUP on September 3, 2008, prior to construction. Pierce County's Zoning Ordinance Article 2 Section 10(3) states that "*Noise shall be limited to a maximum level of 50 dBA at the nearest property line.*" The Facility's CUP granted an exception allowing the 50 dBA threshold to be assessed at the residence rather than the property line. The County confirmed no additional zoning permits are required for these repowering efforts.

Rugby received a Certificate of Site Compatibility (Certificate) from ND PSC on October 3, 2005, in Case No. PU-05-47. The Certificate was reissued on August 27, 2008, and the final layout was approved by ND PSC on May 22, 2009. Rugby Wind began operations in December 2009. In 2019, ND PSC established a new sound criterion of 45 dBA within 100 feet of an inhabited residence or a community building unless the owner has signed a waiver [ND PSC Chapter 69-06-08-01(4) Energy Conversion Facility Siting Criteria (PU-19-290)]. Rugby Wind anticipates complying with this requirement by obtaining the necessary waivers or operating turbines at a lower electrical and sound output mode.

## 3. Acoustical Modeling Method and Results

Standard acoustical engineering methods were used in the analysis to document the predicted sound level at existing nonparticipating residences as well as participating residences. The sound power levels representing the standard performance of the wind turbines are assigned based on International Electrotechnical Commission (IEC) Standard 61400-11 (2012) data supplied by the manufacturers to Rugby Wind. The stated maximum turbine sound power level for the Vestas V120 STE is 107.6 decibels on an A-weighted scale (dBA). The sound power level of the GE116 LNTE is 105.5 dBA. The substation transformer specifications are expected to require a National Electrical Manufacturers Association sound rating of 74 dBA, resulting in a sound power level of 94 dBA. Using these sound power levels as a basis, the model calculates the sound pressure level that would occur after losses from distance, air absorption, ground effects, and screening are considered.

It is useful to understand the difference between a sound pressure level (or noise level) and a sound power level. A sound power level (commonly abbreviated as PWL or  $L_w$ ) is analogous to the wattage of a light bulb; it is a measure of the acoustical energy emitted by the source and is, therefore, independent of distance. A sound pressure level (commonly abbreviated as SPL or  $L_p$ ) is analogous to the brightness or intensity of light experienced at a specific distance from a source and is measured directly with a sound level meter. Sound pressure levels always should be specified with a location or distance from the noise source.

Sound power level data are used in acoustic models to predict sound pressure levels. This is because sound power levels consider the size of the acoustical source and account for the total acoustical energy emitted by the source. For example, the sound pressure level 15 feet from a small radio and a large orchestra may be the same, but the sound power level of the orchestra will be much larger because it emits sound over a larger area. Similarly, 2-horsepower (hp) and 2,000-hp pumps can both achieve 85 dBA at 3 feet (a common specification), but the 2,000-hp pump will have significantly larger sound power level. Consequently, the sound from the 2,000-hp pump will travel farther. A sound power level can be determined from a sound pressure level if the distance from and dimensions of the source are known, and this is accounted for in the IEC 61400-11 standard for wind turbines. Sound power levels always will be greater than sound pressure levels and sound power levels should never be compared to sound pressure levels. The sound power level of commercially available modern wind turbines typically will vary between 100 and 110 dBA depending on make, model, and windspeed. This will result in a sound pressure level of about 55 to 65 dBA at 130 feet from the turbine. These levels are well below the sound pressure level where hearing protection is considered (85 dBA).

The commercial software used to prepare the acoustical model is CadnaA by DataKustik GmbH, Version 2023 (DataKustik 2023). The sound propagation factors used in the acoustical model have been adopted from International Organization for Standardization 9613-2 (ISO 9613-2), *Acoustics—Sound Attenuation During Propagation Outdoors Part 2: General Method of Calculation* (1996). The ISO 9613-2 parameters used in this assessment are a receptor height of 4 meters and mixed ground ( $G = 0.5$ , where  $G$  may vary between 0 for hard and 1 for acoustically absorptive ground) with all turbines operating at their stated sound power level plus 2 dBA. These modeling parameters are consistent with those established in the 2022 ACP/ANSI standard on modeling of wind turbines (ANSI 2022).

The turbines were evaluated with the sound emitted at hub height (79 meters). Atmospheric absorption for conditions of 10 degrees Celsius and 70 percent relative humidity (conditions that favor propagation) was computed in accordance with ISO 9613-1, *Acoustics—Sound Attenuation During Propagation Outdoors, Part 1: Calculation of the Absorption of Sound by the Atmosphere* (ISO 1993). Coordinates of the sound sources and occupied residences (“receiver locations”) included in this assessment have been provided by Rugby Wind. Sound sources and modeled sound power levels for each scenario are included in Table 1. Receiver locations and resulting sound pressure levels by scenario are presented in Tables 2 and 3, respectively.

**Table 1. Modeled Sound Sources**

Source ID	Sound Power Level (dBA)		Height (m)	Coordinates	
	Vestas STE	GE LNTE		X (m)	Y (m)
A2	109.6	107.5	79	423645	5377150
A3	109.6	107.5	79	423910	5377216
A4	109.6	107.5	79	424329	5377057
A5	109.6	107.5	79	424563	5377190
A6	109.6	107.5	79	424994	5377084
A7	109.6	107.5	79	425433	5376948
A8	109.6	107.5	79	428471	5376484
B1	109.6	107.5	79	429034	5375884
B2	109.6	107.5	79	429252	5376109
B3	109.6	107.5	79	429657	5376158
B4	109.6	107.5	79	430024	5376181
B5	109.6	107.5	79	428972	5375500
C1	109.6	107.5	79	430982	5375718
C2	109.6	107.5	79	431276	5375873
C3	109.6	107.5	79	431719	5375959
C4	109.6	107.5	79	432176	5376028
D1	109.6	107.5	79	430523	5374844
D2	109.6	107.5	79	430868	5374838
D3	109.6	107.5	79	431193	5374935
D4	109.6	107.5	79	431651	5374996
E1	109.6	107.5	79	423615	5374761
E2	109.6	107.5	79	424058	5374768
E3	109.6	107.5	79	424073	5375125
E4	109.6	107.5	79	424515	5375069

## Sound Level Analysis for the Rugby Repower Wind Project

**Table 1. Modeled Sound Sources**

Source ID	Sound Power Level (dBA)		Height (m)	Coordinates	
	Vestas STE	GE LNTE		X (m)	Y (m)
E5	109.6	107.5	79	424767	5375181
F1	109.6	107.5	79	424713	5373432
F2	109.6	107.5	79	424924	5373593
F3	109.6	107.5	79	425466	5373611
G1	109.6	107.5	79	424768	5372777
G2	109.6	107.5	79	425429	5372749
G3	109.6	107.5	79	425948	5372738
G4	109.6	107.5	79	426825	5372766
G5	109.6	107.5	79	427051	5372908
G6	109.6	107.5	79	427269	5373064
G7	109.6	107.5	79	427500	5373255
H1	109.6	107.5	79	430182	5373530
H2	109.6	107.5	79	430534	5373608
J1	109.6	107.5	79	431677	5372648
J2	109.6	107.5	79	431461	5372487
J3	109.6	107.5	79	431248	5372322
J4	109.6	107.5	79	430933	5372293
K1	109.6	107.5	79	432407	5372990
K2	109.6	107.5	79	432573	5372467
K3	109.6	107.5	79	432405	5372219
L1	109.6	107.5	79	432619	5373627
L2	109.6	107.5	79	432303	5374200
L3	109.6	107.5	79	432879	5374220
M1	109.6	107.5	79	433259	5372899
M2	109.6	107.5	79	433420	5373184
M3	109.6	107.5	79	433938	5372625
M4	109.6	107.5	79	434180	5372914
M5	109.6	107.5	79	434328	5373194
M6	109.6	107.5	79	434338	5373764
M7	109.6	107.5	79	434340	5374150
N1	109.6	107.5	79	430250	5370380
N2	109.6	107.5	79	430508	5370416
P1	109.6	107.5	79	432162	5369802
P2	109.6	107.5	79	432452	5369979
Q1	109.6	107.5	79	428730	5369235
Q2	109.6	107.5	79	428859	5369569
Q3	109.6	107.5	79	429136	5369642

## Sound Level Analysis for the Rugby Repower Wind Project

**Table 1. Modeled Sound Sources**

Source ID	Sound Power Level (dBA)		Height (m)	Coordinates	
	Vestas STE	GE LNTE		X (m)	Y (m)
Q4	109.6	107.5	79	429595	5369621
R1	109.6	107.5	79	431880	5368792
R2	109.6	107.5	79	432142	5368856
R3	109.6	107.5	79	432383	5369032
R4	109.6	107.5	79	432614	5369180
S1	109.6	107.5	79	432931	5367819
S2	109.6	107.5	79	433135	5368068
S3	109.6	107.5	79	434029	5368017
S4	109.6	107.5	79	434142	5367203
S5	109.6	107.5	79	433994	5366981
Transformer	94	94	4	428582	5370839

Notes:

dBA = decibel (A-weighted scale)

ID = identifier

m = meter(s)

**Table 2. Modeled Receiver Locations and Sound Pressure Levels for Vestas V120 STE**

Receiver Status	Receiver ID	Coordinates		Sound Pressure Level (dBA)	Distance to 45 dBA Contour (ft)
		X (m)	Y (m)		
Participating	REC10	427444	5372591	49	Within 100 ft of 45 dBA
Nonparticipating	REC13	429213	5370074	49	Within 100 ft of 45 dBA
Participating	REC18	432920	5367309	47	Within 100 ft of 45 dBA
Nonparticipating	REC04	425106	5377692	47	Within 100 ft of 45 dBA
Participating	REC19	433357	5367173	46	Within 100 ft of 45 dBA
Participating	REC34	423800	5375837	46	Within 100 ft of 45 dBA
Participating	REC14	431323	5368466	45	Within 100 ft of 45 dBA
Participating	REC33	423661	5376293	45	Within 100 ft of 45 dBA
Participating	REC09	426559	5372047	45	Within 100 ft of 45 dBA
Nonparticipating	REC39	423186	5375339	45	Within 100 ft of 45 dBA
Participating	REC07	425672	5375293	44	630
Nonparticipating	REC15	432989	5371214	44	>1,000
Participating	REC08	433360	5375223	43	>1,000
Participating	REC35	423578	5373574	43	>1,000
Participating	REC44	426194	5376303	42	>1,000
Nonparticipating	REC12	426634	5371313	40	>1,000
Nonparticipating	REC06	428370	5377614	40	>1,000

Sound Level Analysis for the Rugby Repower Wind Project

**Table 2. Modeled Receiver Locations and Sound Pressure Levels for Vestas V120 STE**

Receiver Status	Receiver ID	Coordinates		Sound Pressure Level (dBA)	Distance to 45 dBA Contour (ft)
		X (m)	Y (m)		
Nonparticipating	REC59	422487	5375868	39	>1,000
Participating	REC23	435372	5374993	39	>1,000
Participating	REC11	425699	5370908	38	>1,000
Participating	REC20	433138	5365907	38	>1,000
Nonparticipating	REC38	423222	5372146	38	>1,000
Nonparticipating	REC58	422113	5375952	38	>1,000
Nonparticipating	REC30	434641	5365645	37	>1,000
Nonparticipating	REC16	431215	5366507	37	>1,000
Nonparticipating	REC57	421887	5374243	37	>1,000
Nonparticipating	REC25	436397	5372533	36	>1,000
Nonparticipating	REC55	422545	5372689	36	>1,000
Participating	REC60	429848	5366794	35	>1,000
Nonparticipating	REC36	423463	5371000	35	>1,000
Participating	REC27	436154	5368809	35	>1,000
Nonparticipating	REC56	421745	5373378	35	>1,000
Nonparticipating	REC05	427876	5379003	35	>1,000
Participating	REC17	426580	5368203	34	>1,000
Nonparticipating	REC37	424736	5369835	34	>1,000
Nonparticipating	REC63	437098	5372305	34	>1,000
Nonparticipating	REC03	425070	5379856	34	>1,000
Nonparticipating	REC47	422614	5371019	33	>1,000
Nonparticipating	REC28	436117	5365894	33	>1,000
Nonparticipating	REC02	425012	5380574	32	>1,000
Nonparticipating	REC01	423459	5380440	31	>1,000
Nonparticipating	REC48	421813	5370887	31	>1,000
Nonparticipating	REC52	437832	5375630	31	>1,000
Nonparticipating	REC50	432868	5363892	30	>1,000
Nonparticipating	REC22	428923	5364470	29	>1,000
Nonparticipating	REC62	434301	5363345	29	>1,000
Nonparticipating	REC49	421929	5369060	29	>1,000
Nonparticipating	REC61	429637	5363884	29	>1,000
Nonparticipating	REC31	436215	5363795	28	>1,000
Nonparticipating	REC51	437078	5364423	28	>1,000
Nonparticipating	REC29	437713	5365035	28	>1,000
Nonparticipating	REC41	424801	5366011	28	>1,000
Nonparticipating	REC32	433061	5362491	27	>1,000
Nonparticipating	REC40	422998	5367053	27	>1,000

## Sound Level Analysis for the Rugby Repower Wind Project

**Table 2. Modeled Receiver Locations and Sound Pressure Levels for Vestas V120 STE**

Receiver Status	Receiver ID	Coordinates		Sound Pressure Level (dBA)	Distance to 45 dBA Contour (ft)
		X (m)	Y (m)		
Nonparticipating	REC21	427132	5363714	26	>1,000
Nonparticipating	REC42	423349	5365751	26	>1,000
Nonparticipating	REC43	423335	5364105	24	>1,000
Nonparticipating	REC46	422508	5364580	24	>1,000

**Table 3. Modeled Receiver Locations and Sound Pressure Levels for GE116 LNTE**

Receiver Status	Receiver ID	Coordinates		Sound Pressure Level (dBA)	Distance to 45 dBA Contour (ft)
		X (m)	Y (m)		
Participating	REC10	427444	5372591	48	Within 100 ft of 45 dBA
Nonparticipating	REC13	429213	5370074	47	Within 100 ft of 45 dBA
Participating	REC18	432920	5367309	45	Within 100 ft of 45 dBA
Nonparticipating	REC04	425106	5377692	45	Within 100 ft of 45 dBA
Participating	REC19	433357	5367173	45	Within 100 ft of 45 dBA
Participating	REC34	423800	5375837	44	430
Participating	REC14	431323	5368466	44	320
Participating	REC33	423661	5376293	44	700
Participating	REC09	426559	5372047	44	550
Nonparticipating	REC39	423186	5375339	43	530
Nonparticipating	REC15	432989	5371214	42	>1,000
Participating	REC07	425672	5375293	42	>1,000
Participating	REC08	433360	5375223	42	>1,000
Participating	REC35	423578	5373574	42	>1,000
Participating	REC44	426194	5376303	41	>1,000
Nonparticipating	REC12	426634	5371313	39	>1,000
Nonparticipating	REC06	428370	5377614	39	>1,000
Nonparticipating	REC59	422487	5375868	38	>1,000
Participating	REC23	435372	5374993	38	>1,000
Participating	REC11	425699	5370908	37	>1,000
Participating	REC20	433138	5365907	37	>1,000
Nonparticipating	REC38	423222	5372146	37	>1,000
Nonparticipating	REC58	422113	5375952	37	>1,000
Nonparticipating	REC30	434641	5365645	36	>1,000
Nonparticipating	REC16	431215	5366507	36	>1,000
Nonparticipating	REC57	421887	5374243	36	>1,000
Nonparticipating	REC25	436397	5372533	36	>1,000
Nonparticipating	REC55	422545	5372689	36	>1,000

**Table 3. Modeled Receiver Locations and Sound Pressure Levels for GE116 LNTE**

Receiver Status	Receiver ID	Coordinates		Sound Pressure Level (dBA)	Distance to 45 dBA Contour (ft)
		X (m)	Y (m)		
Participating	REC60	429848	5366794	35	>1,000
Nonparticipating	REC36	423463	5371000	34	>1,000
Participating	REC27	436154	5368809	34	>1,000
Nonparticipating	REC56	421745	5373378	34	>1,000
Nonparticipating	REC05	427876	5379003	34	>1,000
Participating	REC17	426580	5368203	34	>1,000
Nonparticipating	REC37	424736	5369835	34	>1,000
Nonparticipating	REC63	437098	5372305	33	>1,000
Nonparticipating	REC03	425070	5379856	33	>1,000
Nonparticipating	REC47	422614	5371019	33	>1,000
Nonparticipating	REC28	436117	5365894	32	>1,000
Nonparticipating	REC02	425012	5380574	31	>1,000
Nonparticipating	REC48	421813	5370887	31	>1,000
Nonparticipating	REC01	423459	5380440	31	>1,000
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Nonparticipating	REC22	428923	5364470	29	>1,000
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Nonparticipating	REC40	422998	5367053	28	>1,000
Nonparticipating	REC32	433061	5362491	28	>1,000
Nonparticipating	REC21	427132	5363714	27	>1,000
Nonparticipating	REC42	423349	5365751	27	>1,000
Nonparticipating	REC43	423335	5364105	25	>1,000
Nonparticipating	REC46	422508	5364580	25	>1,000

#### 4. Conclusions

As indicated in Tables 2 and 3, the highest predicted level is 49 dBA for the Vestas V120 STE turbine type and 48 dBA for the GE116 LNTE turbine type at the nearest occupied residences. The predicted sound level of 45 dBA is exceeded within 100 feet of seven participating and three nonparticipating occupied residences for the Vestas V120 STE turbine type. The predicted sound level of 45 dBA is exceeded within 100 feet of three participating and two nonparticipating occupied residences for the GE116 LNTE turbine type. Rugby Wind anticipates obtaining waivers or operating turbines at a lower electrical and sound output mode in order to reduce the sound level to less than 45 dBA within 100 feet of occupied residences. Thus, the Facility will be in compliance with the noise standards adopted by the Pierce County Board of County Commissioners and the ND PSC, respectively.

#### 5. References

American National Standards Institute (ANSI). 2022. ANSI/ACP 111-1-2022. *Wind Turbine Sound Modeling*.

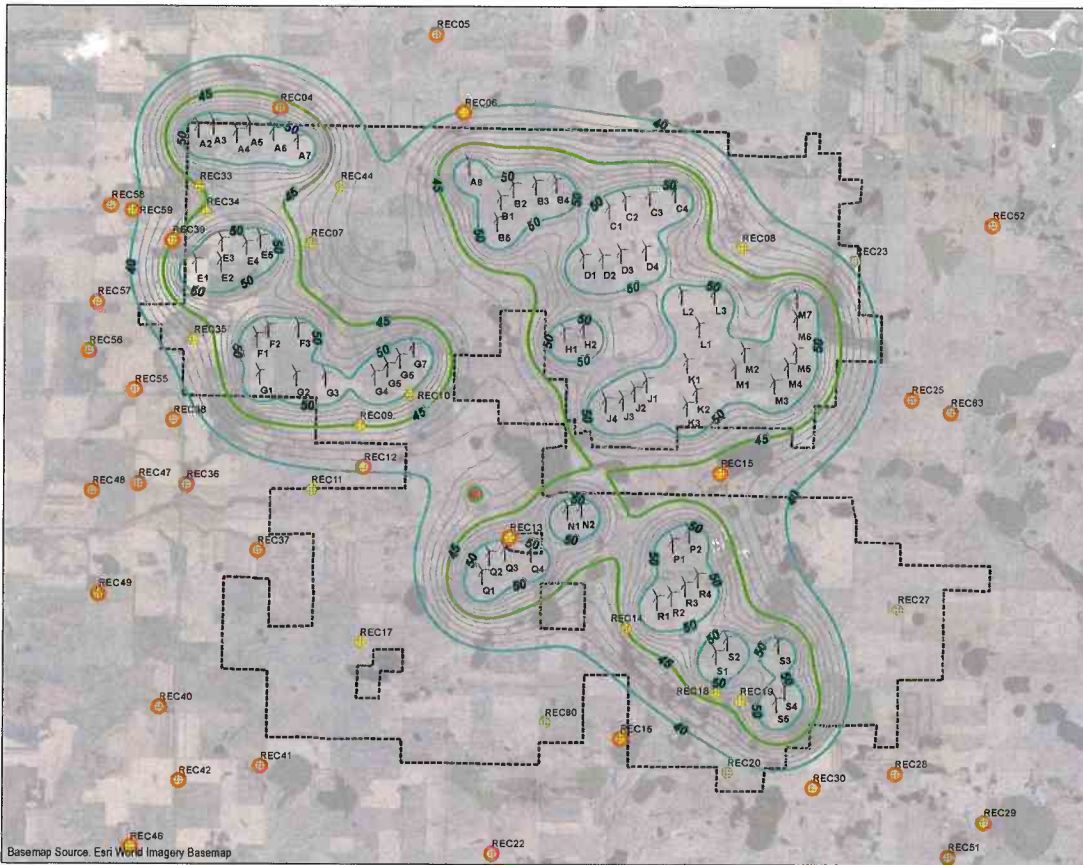
DataKustik GmbH, Munich, Germany (DataKustik). 2023. *CadnaA. State of the Art Noise Prediction Software. Version 2023*. [CadnaA – State-of-the-art Noise Prediction Software - Datakustik GmbH](#).

International Electrotechnical Commission (IEC). 2012. IEC 61400-11. *Wind turbines – Part 11: Acoustic noise measurement techniques*.

International Organization for Standardization (ISO) 1993. ISO 9613-1, *Acoustics—Sound Attenuation During Propagation Outdoors. Part 1: Calculation of the Absorption of Sound by the Atmosphere*. Geneva, Switzerland.

International Organization for Standardization (ISO). 1996. ISO 9613-2, *Acoustics—Sound Attenuation During Propagation Outdoors. Part 2: General Method of Calculation*. Geneva, Switzerland.

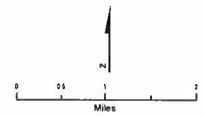
## **Figures**



**LEGEND**

- Rugby Wind Turbines
- Transformer
- Residence
- Nonparticipating Residence
- Predicted Sound Pressure Level (dBA)**
- 5 dBA Contour Interval
- 1 dBA Contour Interval
- 100-foot buffer from 45 dBA Sound Pressure Level
- Facility Site Boundary

Note:  
STE = Serrated Trailing Edge



Basemap Source: Esri World Imagery Basemap  
W:\03\PROJ\PROJ\B\KOROLA\EST\B\K\POWER\GEMAP\FILES\BASEMAP\WIND.MXD G:\EE\11/03/11 11:22 PM

Figure 1  
 Predicted Sound Pressure Level (dBA)  
 Vestas V120 Repower STE Blades  
 Rugby Repower Wind Project





Shadow Flicker Report for the  
Rugby Wind Repower Project  
Pierce County, North Dakota

AUGUST 2023

PREPARED FOR

**Rugby Wind LLC**

A Subsidiary of Avangrid Renewables, LLC

2701 NW Vaugh Street, Suite 300

Portland, Oregon 97210

PREPARED BY

**SWCA Environmental Consultants**

**SHADOW FLICKER REPORT FOR THE  
RUGBY WIND REPOWER PROJECT  
PIERCE COUNTY, NORTH DAKOTA**

Prepared for

**Rugby Wind LLC**

A Subsidiary of Avangrid Renewables LLC  
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SWCA Project No. 77797

August 2023

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## **1 INTRODUCTION**

Rugby Wind, LLC (Rugby Wind), a wholly owned subsidiary of Avangrid Renewables, LLC (Avangrid) is proposing to retrofit and operate the Rugby Wind Repower Project (the Project) located in Peirce County, North Dakota. Rugby Wind is proposing to replace nacelle and rotor equipment, reinforce existing foundations, and upgrade associated collector lines for the purpose of improving wind turbine efficiency, and energy output and prolonging the useful life of the wind farm. Wind turbine locations and access roads are anticipated to remain the same.

## **2 BACKGROUND**

The motion associated with the blades on an operating wind turbine can cast a moving shadow on locations within a certain distance of a wind turbine. This moving shadow is called “shadow flicker.” The extent of shadow flicker depends on the time of year and day (which determines the sun’s azimuth and altitude angles) and the wind turbine’s physical characteristics (overall height, rotor diameter, blade width, and orientation of the rotor blades due to wind direction). Shadow flicker is a temporary event that does not occur when the sun is obscured by clouds or fog, at night, or when the source wind turbine(s) are not operating.

Shadow flicker intensity is defined as the difference in brightness at a given location in the presence and absence of a shadow. Shadow flicker intensity diminishes when the distance between receptor and wind turbine increases. Shadow flicker intensity for receptor-to-wind turbine distances beyond 10 rotor diameters, or 7,874 feet (approximately 1.5 miles), is very low and generally considered imperceptible (see areas in blue on Figure 1). In general, shadow flicker could become more noticeable at receptors closer to wind turbines. The longest number of shadow flicker hours, along with the greatest shadow flicker intensity, would also occur at those receptors nearest the wind turbines.

Shadow flicker impacts are not regulated in applicable state or federal law, and there is no local zoning ordinance or permitting threshold regarding shadow flicker impact to receptors from a wind energy project in Pierce County, North Dakota. Following the National Association of Regulatory Utility Commissioners’ recommendations, previous North Dakota Public Service Commission wind farm approvals (Furey 2017), and standardized energy siting guidance, a threshold of 30 hours of shadow flicker per year will be used as a threshold for determining potential impacts at occupied residences.

## **3 ANALYSIS**

The shadow flicker assessment utilizes the EMD International windPRO Shadow module (Shadow module), which is used to model the potential occurrence of shadow flicker under realistic, predetermined, meteorological conditions (actual expected shadow) for the chosen turbine scenario. The Shadow module calculates the total amount of time (hours and minutes per year) shadow flicker could occur at relevant sensitive receptors (residences, schools, or public roadways). The Shadow module also calculates sun angle and position, wind turbine specifications, average daily sunshine hours, and uses US NED 1/3 arc-second for the topography for the receptors, wind turbines, and zones of visual influence. Shadow flicker is only calculated when more than 20% of the sun is covered by the blade and the sun is a minimum of 3 degrees above the horizon.

The Project proposes to repower the existing 71 wind turbines by replacing turbine components consisting of the nacelles and blades. Various wind turbine models are being evaluated to support the repower Project. To allow flexibility in turbine model selection, all 71 wind turbine locations were

conservatively assumed to be the larger, Vestas V120-2.2 wind turbine model for this shadow flicker assessment. The proposed Vestas V120-2.2 will have a hub height of 79 meters (m) and a rotor radius of 120 m long.

Thirty-one potential sensitive receptor locations were identified and evaluated in this report, up to 4.8 miles from the furthest turbine along the Project edge (Figure 1). The analysis considered the average percent of possible sunshine (Table 1) from Bismarck, North Dakota, approximately 115 miles southwest of the Project (EMD International 2023) and operational time (Table 2) determined from wind direction and frequency from the met tower at the site (Windographer 2023).

**Table 1. Average Daily Sunshine Hours**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hours	4.92	5.13	7.45	8.03	10.2	11.21	11.69	10.35	8.68	5.59	4.02	3.69

**Table 2. Operational Time**

Wind Direction	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	SUM
Wind Frequency (hours)	357	328	337	374	394	471	652	676	545	417	379	432	628	987	922	546	8,434

Note: N = north; S = south; E = east; W = west.

## 4 RESULTS

There are 16 sensitive receptors that through the analysis displayed the potential for shadow flicker from the Vestas V120-2.2 wind turbine scenario, employing a hub height of 79 m and a rotor radius of 120 m (Figure 1). Table 3 presents the predicted shadow flicker for receptors with impacts above 30 hours per year. The predicted shadow flicker impact for all 31 receptors is presented in Appendix A.

**Table 3. Sensitive Receptor with Expected Shadow Flicker 30 Hours and Above**

Participating/Non-participating	Receptor ID	Expected Shadow Flicker (hours:minutes per year)
Non-participating	Receptor 4	44:08

Overall, one sensitive receptor (Receptor 4) was identified with having expected shadow flicker impacts above the industry standard threshold of 30 hours per year. Receptor 4 is a non-participating occupied residence located approximately 0.27 mile northeast of Turbine Q3 (see Figure 1). The flicker analysis accounts for turbine and receptor topography, operational hours, and sun path over a year. Additionally, the analysis is considered to be conservative because the sensitive receptors are in direct view of incoming flicker from the wind turbines and it does not account for varying atmospheric conditions, vegetation, or obstacles which may block the sun.

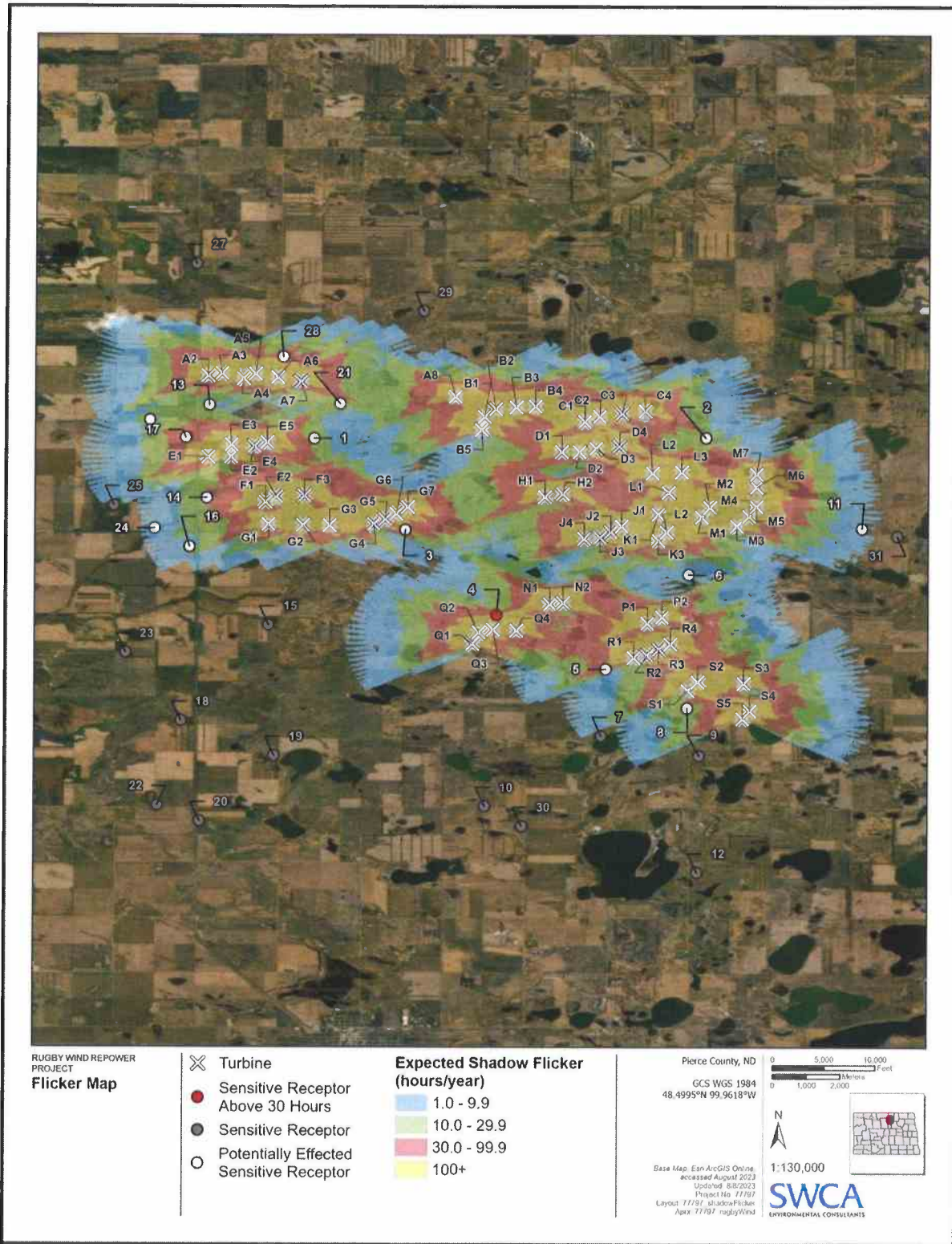


Figure 1. Shadow Flicker Analysis Area.

## **5 LITERATURE CITED**

EMD International. 2023. WindoPro. Available at: <https://www.emd-international.com/windpro/>. Accessed August 2023.

Furey, Casey A. 2017. "Wind Facility Siting in North Dakota," North Dakota Law Review: Volume 92 Number 3. Available at: <chrome-extension://efaidnbmnnnibpcajpcgclefindmkaj/https://commons.und.edu/cgi/viewcontent.cgi?article=1098&context=ndlr>. Accessed August 2023

Windographer. 2023. Rugby\_ERA5LT.tab. Provided by CLIENT, SWCA Environmental Consultants, Pierce County, North Dakota.

## **APPENDIX A**

### **Expected Flicker Output Table**

**Assumptions for shadow calculations**

Maximum distance for influence

Calculate only when more than 20 % of sun is covered by the blade

Minimum sun height over horizon for influence 3 °

Day step for calculation 1 days

Time step for calculation 1 minutes

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Project Wizard Elevation Data Grid (US NED 1/3 arc-second)

Obstacles used in calculation

Receptor grid resolution: 1.0 m

**Average Daily Sunshine Hours**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.2	11.21	11.69	10.35	8.68	5.69	4.02	3.69

**Operational Time**

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W
357	328	337	374	394	471	642	676	545	417	397	432	628

WNW	NW	NNW	SUM
987	922	546	8,434

Idle start wind speed: Cut in wind speed from power curve

### Sensitive Receptors

Receptor ID Minimum Turbine Height Expected Shadow Flicker(hours:minutes per year)

1	8:09
2	5:46
3	19:49
4	44:08
5	22:38
6	3:02
7	0:00
8	8:26
9	0:00
10	0:00
11	1:02
12	0:00
13	6:36
14	10:01
15	0:00
16	2:21
17	20:16
18	0:00
19	0:00
20	0:00
21	9:06
22	0:00
23	0:00
24	1:10
25	0:00
26	4:53
27	0:00
28	19:34
29	0:00
30	0:00
31	0:00

FAA OE/AAA Determinations  
Rugby Wind Repower

STUDY (ASN)	PRIOR ASN	STATUS	DETERMINATION	COMPLETION DATE	STRUCTURE NAME	AGL HEIGHT PROPOSED
2023-WTE-783-OE	2006-AGL-4320-OE	Determined	No Hazard	4/12/2023	A2	499
2023-WTE-784-OE	2008-AGL-3658-OE	Determined	No Hazard	4/12/2023	A3	499
2023-WTE-785-OE	2008-AGL-3639-OE	Determined	No Hazard	4/12/2023	A4	499
2023-WTE-786-OE	2006-AGL-4323-OE	Determined	No Hazard	4/12/2023	A5	499
2023-WTE-787-OE	2008-WTE-3090-OE	Determined	No Hazard	4/12/2023	A6	499
2023-WTE-788-OE	2006-AGL-4325-OE	Determined	No Hazard	4/12/2023	A7	499
2023-WTE-789-OE	2008-AGL-3649-OE	Determined	No Hazard	4/12/2023	A8	499
2023-WTE-790-OE	2006-AGL-4343-OE	Determined	No Hazard	4/12/2023	B1	499
2023-WTE-791-OE	2008-WTE-3085-OE	Determined	No Hazard	4/12/2023	B2	499
2023-WTE-792-OE	2008-WTE-3086-OE	Determined	No Hazard	4/12/2023	B3	499
2023-WTE-793-OE	2006-AGL-4346-OE	Determined	No Hazard	4/12/2023	B4	499
2023-WTE-794-OE	2006-AGL-4342-OE	Determined	No Hazard	4/12/2023	B5	499
2023-WTE-795-OE	2006-AGL-4347-OE	Determined	No Hazard	4/12/2023	C1	499
2023-WTE-796-OE	2008-WTE-3087-OE	Determined	No Hazard	4/12/2023	C2	499
2023-WTE-797-OE	2008-WTE-3088-OE	Determined	No Hazard	4/12/2023	C3	499
2023-WTE-798-OE	2008-WTE-3089-OE	Determined	No Hazard	4/12/2023	C4	499
2023-WTE-799-OE	2008-AGL-3640-OE	Determined	No Hazard	4/12/2023	D1	499
2023-WTE-800-OE	2008-WTE-3094-OE	Determined	No Hazard	4/12/2023	D2	499
2023-WTE-801-OE	2008-WTE-3095-OE	Determined	No Hazard	4/12/2023	D3	499
2023-WTE-802-OE	2006-AGL-4352-OE	Determined	No Hazard	4/12/2023	D4	499
2023-WTE-803-OE	2006-AGL-4326-OE	Determined	No Hazard	4/12/2023	E1	499
2023-WTE-804-OE	2008-AGL-3641-OE	Determined	No Hazard	4/12/2023	E2	499
2023-WTE-805-OE	2008-AGL-3656-OE	Determined	No Hazard	4/12/2023	E3	499
2023-WTE-806-OE	2008-AGL-3642-OE	Determined	No Hazard	4/12/2023	E4	499
2023-WTE-807-OE	2008-AGL-3657-OE	Determined	No Hazard	4/12/2023	E5	499
2023-WTE-808-OE	2008-AGL-3643-OE	Determined	No Hazard	4/12/2023	F1	499
2023-WTE-809-OE	2006-AGL-4330-OE	Determined	No Hazard	4/12/2023	F2	499
2023-WTE-810-OE	2008-AGL-3644-OE	Determined	No Hazard	4/12/2023	F3	499
2023-WTE-811-OE	2006-AGL-4332-OE	Determined	No Hazard	4/12/2023	G1	499
2023-WTE-812-OE	2008-AGL-3645-OE	Determined	No Hazard	4/12/2023	G2	499
2023-WTE-813-OE	2008-AGL-3646-OE	Determined	No Hazard	4/12/2023	G3	499
2023-WTE-814-OE	2010-WTE-12213-OE	Determined	No Hazard	4/12/2023	G4	499
2023-WTE-815-OE	2006-AGL-4338-OE	Determined	No Hazard	4/12/2023	G5	499
2023-WTE-816-OE	2008-AGL-3648-OE	Determined	No Hazard	4/12/2023	G6	499
2023-WTE-817-OE	2009-WTE-1418-OE	Determined	No Hazard	4/12/2023	G7	499
2023-WTE-818-OE	2006-AGL-4354-OE	Determined	No Hazard	4/12/2023	H1	499
2023-WTE-819-OE	2008-AGL-3654-OE	Determined	No Hazard	4/12/2023	H2	499
2023-WTE-820-OE	2006-AGL-4364-OE	Determined	No Hazard	4/12/2023	J1	499
2023-WTE-821-OE	2006-AGL-4363-OE	Determined	No Hazard	4/12/2023	J2	499
2023-WTE-822-OE	2006-AGL-4362-OE	Determined	No Hazard	4/12/2023	J3	499
2023-WTE-823-OE	2008-AGL-3665-OE	Determined	No Hazard	4/12/2023	J4	499
2023-WTE-824-OE	2006-AGL-4365-OE	Determined	No Hazard	4/12/2023	K1	499
2023-WTE-825-OE	2008-AGL-3655-OE	Determined	No Hazard	4/12/2023	K2	499
2023-WTE-826-OE	2008-AGL-3666-OE	Determined	No Hazard	4/12/2023	K3	499
2023-WTE-827-OE	2009-WTE-7953-OE	Determined	No Hazard	4/12/2023	L1	499
2023-WTE-828-OE	2008-AGL-3661-OE	Determined	No Hazard	4/12/2023	L2	499
2023-WTE-829-OE	2008-AGL-3653-OE	Determined	No Hazard	4/12/2023	L3	499
2023-WTE-830-OE	2006-AGL-4361-OE	Determined	No Hazard	4/12/2023	M1	499
2023-WTE-831-OE	2006-AGL-4360-OE	Determined	No Hazard	4/12/2023	M2	499
2023-WTE-832-OE	2006-AGL-4359-OE	Determined	No Hazard	4/12/2023	M3	499
2023-WTE-833-OE	2006-AGL-4358-OE	Determined	No Hazard	4/12/2023	M4	499
2023-WTE-834-OE	2006-AGL-4357-OE	Determined	No Hazard	4/12/2023	M5	499
2023-WTE-835-OE	2008-AGL-3664-OE	Determined	No Hazard	4/12/2023	M6	499
2023-WTE-836-OE	2008-AGL-3663-OE	Determined	No Hazard	4/12/2023	M7	499
2023-WTE-837-OE	2008-AGL-3671-OE	Determined	No Hazard	4/12/2023	N1	499
2023-WTE-838-OE	2008-AGL-3672-OE	Determined	No Hazard	4/12/2023	N2	499
2023-WTE-839-OE	2008-AGL-3673-OE	Determined	No Hazard	4/12/2023	P1	499

FAA OE/AAA Determinations  
Rugby Wind Repower

2023-WTE-840-OE	2008-AGL-3674-OE	Determined	No Hazard	4/12/2023	P2	499
2023-WTE-841-OE	2008-WTE-3091-OE	Determined	No Hazard	4/12/2023	Q1	499
2023-WTE-843-OE	2008-WTE-3092-OE	Determined	No Hazard	4/12/2023	Q3	499
2023-WTE-842-OE	2008-AGL-3669-OE	Determined	No Hazard	4/12/2023	Q2	499
2023-WTE-844-OE	2009-WTE-3419-OE	Determined	No Hazard	4/12/2023	Q4	499
2023-WTE-845-OE	2008-WTE-3093-OE	Determined	No Hazard	4/12/2023	R1	499
2023-WTE-846-OE	2008-AGL-3677-OE	Determined	No Hazard	4/12/2023	R2	499
2023-WTE-847-OE	2008-AGL-3678-OE	Determined	No Hazard	4/12/2023	R3	499
2023-WTE-848-OE	2008-AGL-3679-OE	Determined	No Hazard	4/12/2023	R4	499
2023-WTE-849-OE	2008-AGL-3681-OE	Determined	No Hazard	4/12/2023	S1	499
2023-WTE-850-OE	2008-AGL-3682-OE	Determined	No Hazard	4/12/2023	S2	499
2023-WTE-851-OE	2008-AGL-3683-OE	Determined	No Hazard	4/12/2023	S3	499
2023-WTE-852-OE	2008-AGL-3684-OE	Determined	No Hazard	4/12/2023	S4	499
2023-WTE-853-OE	2008-AGL-3675-OE	Determined	No Hazard	4/12/2023	S5	499

# Rugby Wind Repower Project

Rugby Wind LLC

*Pierce County, North Dakota*

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Microwave Path Analysis

July 07, 2023



Capitol Airspace Group

capitolairspace.com

(703) 256 - 2485

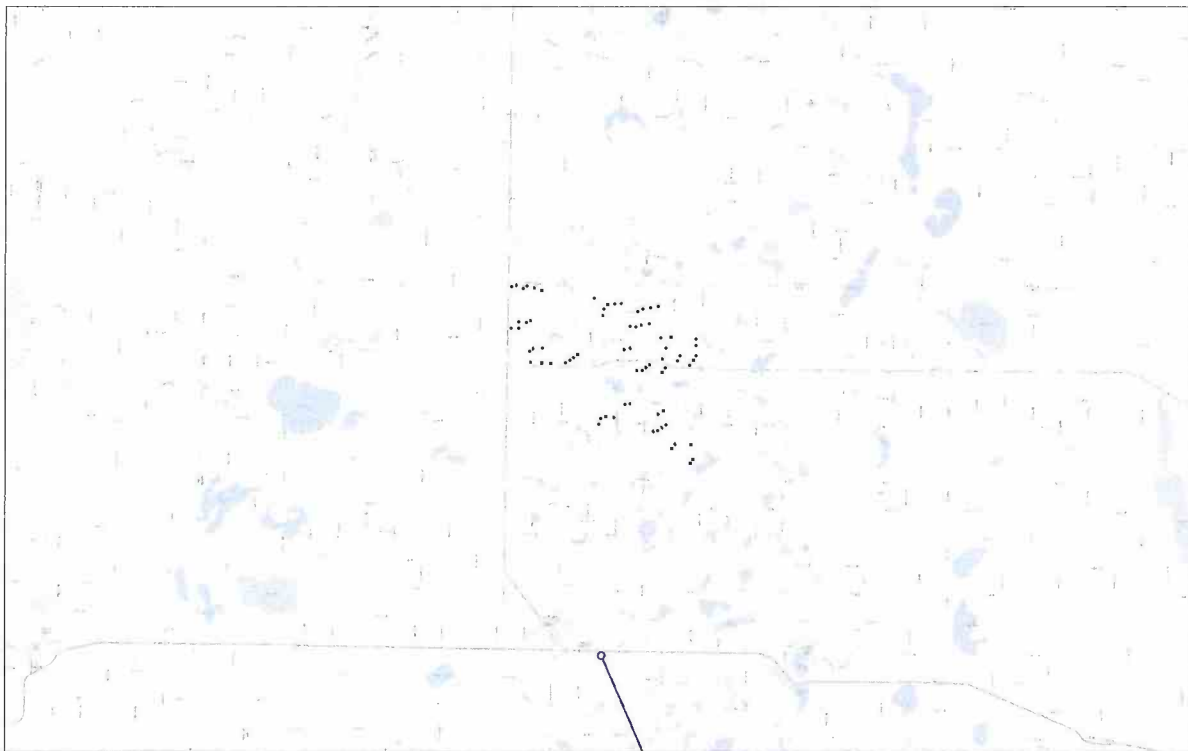


## Introduction

Capitol Airspace conducted a microwave path analysis for the Rugby Wind Repower project in Pierce County, North Dakota. The purpose for this analysis was to identify licensed and applied coordinated non-federal microwave paths that could limit repowering existing wind turbines. At the time of this analysis, 71 wind turbine locations had been identified (black points, [Figure 1](#)). This analysis assessed each location, including its rotor-swept volume, to determine if it could obstruct Fresnel zones associated with microwave paths in proximity to the Rugby Wind Repower project.

Point-to-point microwave transmission is a critical component of the national communications infrastructure. Microwave paths enable broadband data transmission that supports telephone, cellular, and personal communication service (PCS) networks, wireless internet providers, audio and video transmission from television studios to transmitter sites, as well as many other industry and utility applications. To ensure signal reliability, these paths are sited to avoid any line-of-sight obstructions.

Proposed structures that intersect a microwave link's Fresnel zone can create a line-of-sight obstruction that degrades link performance. Depending on the proposed structure type, the percentage of the Fresnel zone obstructed, and the microwave system configuration, this impact could degrade signal reliability and require revisions to the microwave system. However, due to the narrow width of most Fresnel zones, micrositing wind turbines outside of these zones is often a feasible mitigation option.



**Figure 1: Licensed microwave links (blue) in proximity to the Rugby Wind Repower project**



## Methodology

Capitol Airspace studied the proposed project based upon location information provided by Rugby Wind LLC. Using this information, Capitol Airspace used a Geographic Information System (GIS) to determine proximity to both licensed and applied coordinated non-federal microwave paths contained in the Federal Communication Commission (FCC) Universal Licensing System (ULS) database.

This analysis considers impact on microwave paths resulting from the physical blockage of the first Fresnel zone (*Figure 2*). The first Fresnel zone is a three-dimensional volume whose radius at a given point is calculated using the path frequency and distance from the transmitting and receiving antennas. The Fresnel zone radius is largest at the path midpoint (where  $d_1 = d_2$ ) and is inversely related to the path frequency. Higher frequencies result in smaller Fresnel zone radii while lower frequencies result in larger Fresnel zone radii.

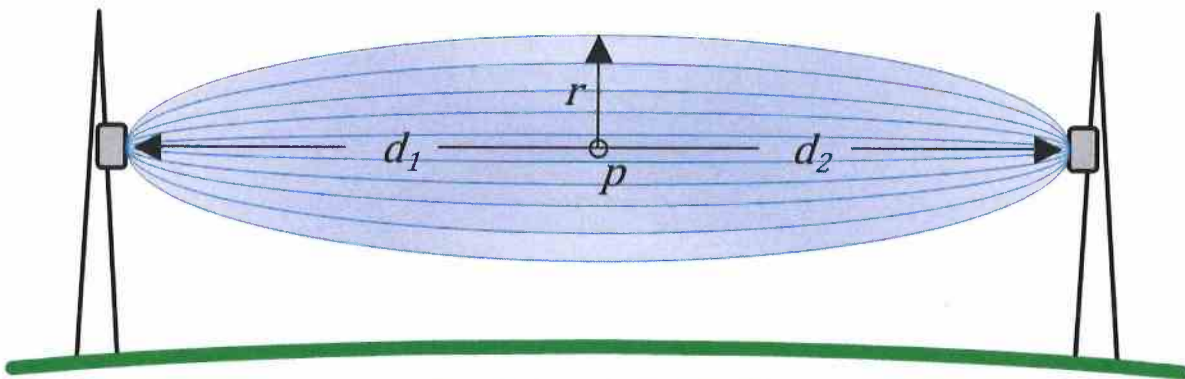


Figure 2: Fresnel zone example

In many cases, ULS database microwave transmitter and receiver antenna locations are inaccurate (e.g. *Figure 3*). Available satellite and aerial imagery were used to improve the coordinates for locations associated with microwave paths in proximity to the defined study area.

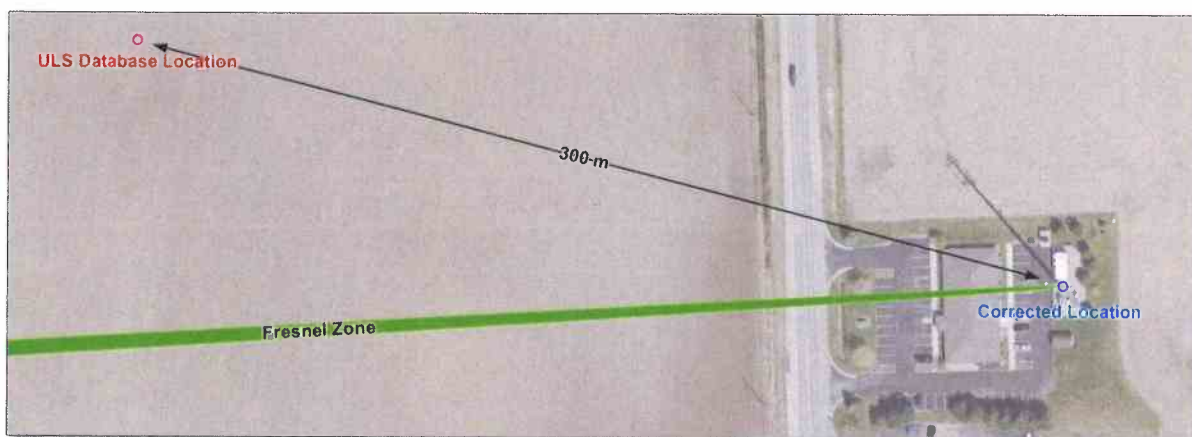


Figure 3: Example of using aerial imagery to correct erroneous ULS database antenna location



## Findings

No microwave links overlie the Rugby Wind Repower project (*Table 1*).

*Table 1: Microwave paths with Fresnel zones overlying the Rugby Wind Repower project*

Licensee	Call Sign	Path	Status	Transmitter	Receiver	Frequency (MHz) <sup>1</sup>
-	-	-	-	-	-	-

## Conclusion

The results of this analysis indicate that microwave path Fresnel zones do not overlie the Rugby Wind Repower project. As a result, repowering wind turbines at any of the proposed locations should not create a line-of-sight obstruction for any applied or licensed non-federal microwave links.

If you have any questions regarding the findings of this study, please contact *Dan Underwood* or *Sophia Bullard* at (703) 256-2485.

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<sup>1</sup> Microwave paths may be licensed to operate using more than one frequency. For the purposes of calculating Fresnel zone radii, the lowest frequency was used to create the largest Fresnel zone.

# IPaC resource list

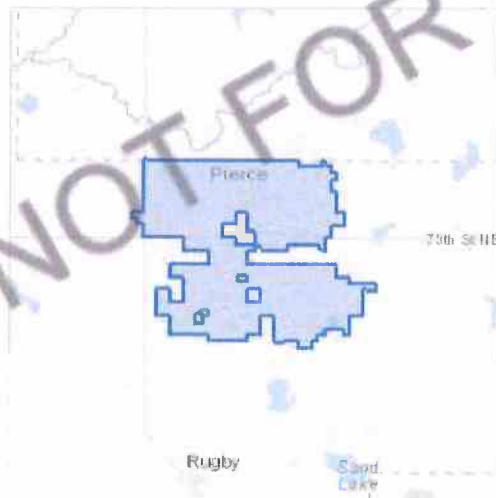
**KNOWN DKEY ISSUE:** We are experiencing time outs when multiple projects are attempting to run Determination Keys (DKeys) simultaneously, especially the Northern Long-eared Bat DKey and Northeast Endangered Species DKey. We working on a solution to address this issue as soon as possible. If you encounter a time out when running a DKey, please wait and try your project again, optimally when there is low system use (early mornings/evenings). We appreciate your patience while we address this issue.

surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

## Location

Pierce and Rolette counties, North Dakota



## Local office

North Dakota Ecological Services Field Office

(701) 250-4481

(701) 355-8513

3425 Miriam Avenue

<https://ipac.ecosphere.fws.gov/location/ABBNO27XUVH5NNV5DDU6LDBY6E/resources>

3125 William Avenue  
Bismarck, ND 58501-7926

NOT FOR CONSULTATION

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species<sup>1</sup> and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries<sup>2</sup>).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

- 2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

## Birds

NAME	STATUS
<b>Piping Plover</b> <i>Charadrius melodus</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a>	Threatened
<b>Red Knot</b> <i>Calidris canutus rufa</i> Wherever found There is <b>proposed</b> critical habitat for this species. <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened

## Insects

NAME	STATUS
<b>Dakota Skipper</b> <i>Hesperia dactotae</i> Wherever found There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/1028">https://ecos.fws.gov/ecp/species/1028</a>	Threatened
<b>Monarch Butterfly</b> <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

# Bald & Golden Eagles

There are no documented cases of eagles being present at this location. However, if you believe eagles may be using your site, please reach out to the local Fish and Wildlife Service office.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds  
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds  
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

## What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply). To see a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

## What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

## What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the [Eagle Act](#) should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

## Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON

**Black Tern** *Chlidonias niger*

Breeds May 15 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3093>

**Bobolink** *Dolichonyx oryzivorus*

Breeds May 20 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

**Franklin's Gull** *Leucophaeus pipixcan*

Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

**Lesser Yellowlegs** *Tringa flavipes*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9679>

**Marbled Godwit** *Limosa fedoa*

Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9481>

**Western Grebe** *aechmophorus occidentalis*

Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/6743>

## Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

### Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey

effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

#### Breeding Season ( )

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

#### Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

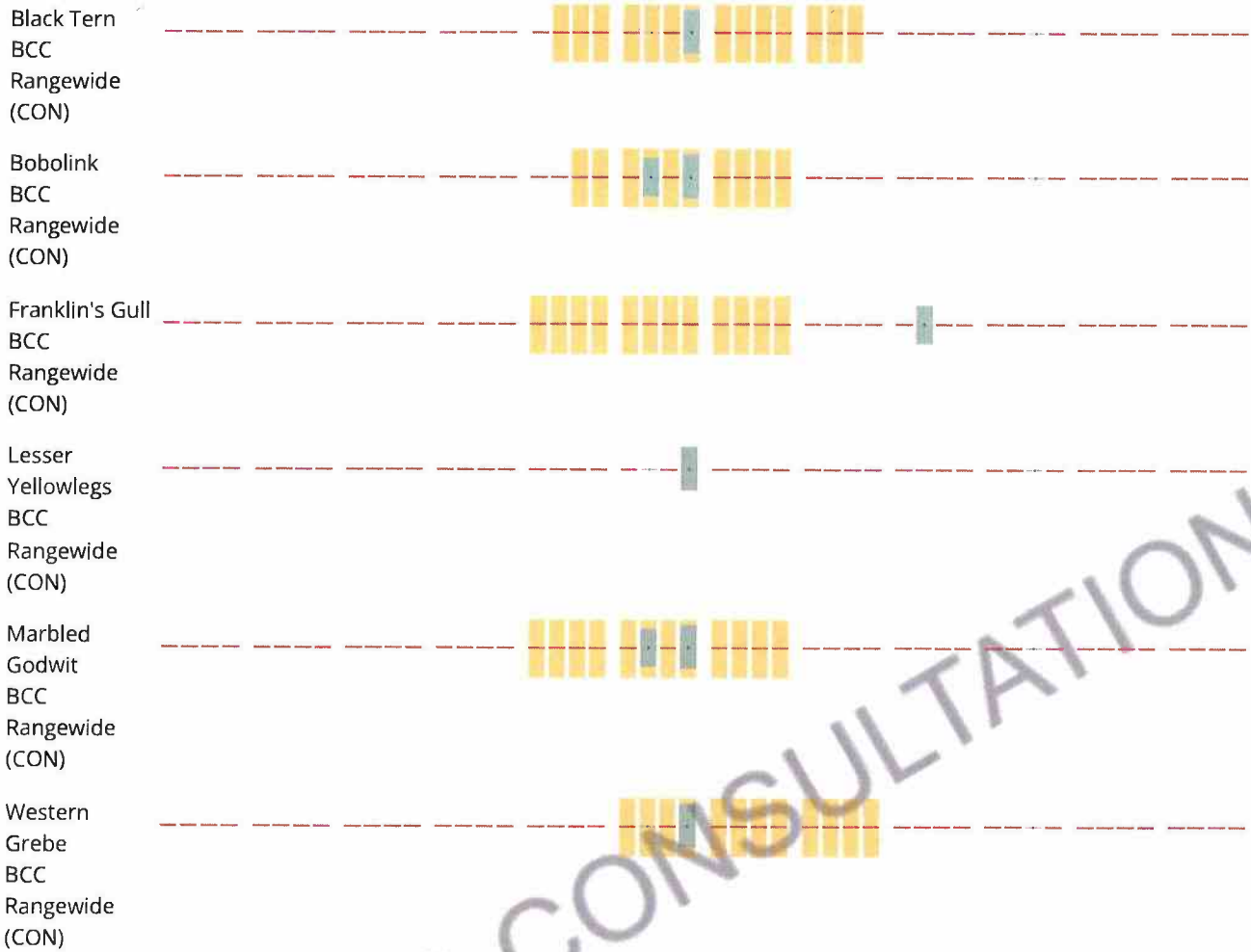
#### No Data (—)

A week is marked as having no data if there were no survey events for that week.

#### Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid

cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

### **What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

### **How do I know if a bird is breeding, wintering or migrating in my area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

### **What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

### **Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

### What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

### Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

## Facilities

### National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
PIERCE COUNTY WATERFOWL PRODUCTION AREA	587.02 acres

## Fish hatcheries

There are no fish hatcheries at this location.

## Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

### Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

#### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

#### **Data exclusions**

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

#### **Data precautions**

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

**REDACTED**



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**SWCA**  
 ENVIRONMENTAL CONSULTANTS

Sound Science. Creative Solutions.®

September 1, 2023

Lorna Meidinger, Lead Historic Preservationist  
 State Historical Society of North Dakota  
 612 East Boulevard Avenue  
 Bismarck, North Dakota 58505

**Re: Rugby Wind Repower Project in Pierce County, North Dakota**

Dear Ms. Meidinger:

Rugby Wind LLC (Rugby Wind), a wholly owned subsidiary of Avangrid Renewables, LLC, is proposing to repower the Rugby Wind Farm (project). The Rugby Wind Farm began commercial operations in 2009 and is located in Pierce County, North Dakota (Figure 1, Table 1). The existing Rugby Wind Farm has a nameplate capacity of 149 megawatts (MW) and consists of 71 wind generating turbines with a capacity of 2.1 MW each, access roads, buried and overhead electrical collection lines, an electrical substation, an operations and maintenance building, a meteorological tower, and an aircraft detection lighting system (Figure 2). Additionally, a 9.5-mile-long, 230-kilovolt (kV) transmission line runs from the Rugby Wind Farm Substation to the existing Rugby Substation.

**Table 1. Rugby Wind Farm Township, Range, and Section**

County	Township	Range	Section
Pierce	158N	73W	1, 12-14, 25, 36
Pierce	158N	72W	1-36
Pierce	158N	71W	6, 7, 18, 28-32
Pierce	157N	72W	1-6, 12
Pierce	158N	73W	1, 12-14, 25, 36

**BACKGROUND**

Rugby Wind received a Certificate of Site Compatibility (Certificate) from the North Dakota Public Service Commission (ND PSC or Commission) on October 3, 2005, in Case Number PU-05-47. The Certificate was reissued on August 27, 2008, and the final layout was approved by the Commission on May 22, 2009. A Class I cultural resources inventory (CRI), a Class III cultural resources survey, and consultation with the North Dakota State Historic Preservation Office (SHPO) was conducted during that process to comply with ND PSC and SHPO requirements. Archaeological investigations were conducted in compliance with the North Dakota Century Code and the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation.

The North Dakota SHPO was originally contacted in December 2004 to request a review of potential project-related impacts on known or suspected cultural resources. In response to the SHPO's comments, a

Class I CRI was completed in June 2005 to identify previously conducted cultural resources investigations and the location of known archaeological sites. Three resource areas were identified in the Class I CRI as areas to avoid.

In fall 2005, the project contracted HDR Engineering, Inc. (HDR) to complete a Class III cultural resources investigation for the project (Palmer et al 2005<sup>1</sup>; Palmer and Madson 2006<sup>2</sup>). Investigators considered the impact to high probability cultural areas from access roads, electrical cabling, transmission line placement, and turbine construction. High probability areas were identified during previous surveys by analyzing known site locations and landform types (Palmer and Madson 2006). In 2008, HDR completed additional surveys to accommodate revisions due to meteorological, engineering, environmental, and cultural recommendations. The final 2008 Supplemental Class III CRI Report was submitted to the North Dakota SHPO in March 2009 under North Dakota SHPO Review and Compliance Number 05-0240.

The North Dakota SHPO concurred with HDR's report recommendations and also concurred with a "No Historic Properties Affected" determination and a "No Significant Sites Affected" determination. The project avoided impacts to all archaeological sites possibly eligible for listing on the National Register of Historic Places (NRHP) during the original construction in 2009.

## **REPOWERING SCOPE OF WORK**

Rugby Wind is proposing to retrofit the facility for the purpose of improving wind turbine efficiency, energy output, and prolonging the useful life of the wind farm. This process is known as repowering. The repower scope includes

- replacing the rotors (nose cone, hub, and blades) and increasing the rotor diameter of all existing turbines from 88 meters (m) up to 120 m;
- replacing the nacelle and its interior elements (such as the gearbox, oil cooler, drive shaft, and pitch drive);
- refurbishing generators from 2.1 MW to 2.2 MW;
- reinforcing foundations, as needed; and
- upgrading collector lines, as needed.

There will be no changes to the wind farm boundary, existing turbine locations, turbine towers, meteorological tower, transmission line, or the collection substation. Table 2 provides a summary of the proposed wind turbine modifications compared to the existing wind turbines.

---

<sup>1</sup> Palmer, Erika, Julie Kloss, and Michael Madson. 2005. *Class III Cultural Resource Inventory for the Rugby Wind Farm Transmission Line Project, Pierce County, North Dakota*. HDR Engineering, Inc., Minneapolis, Minnesota.

<sup>2</sup> Palmer, Erika, and Michael Madson. 2006. *Class III Cultural Resource Inventory for the Rugby Wind Farm Project, Pierce County, North Dakota*. HDR Engineering, Inc., Minneapolis, Minnesota.

**Table 2. Rugby Wind Farm Existing and Proposed Turbine Dimensions**

Design Parameter	Existing	Proposed	Change
Hub height	79 m	79 m	-
Rotor diameter	88 m	120 m	32 m
Total tip height	124 m	139 m	15 m
Nameplate capacity	149.1 MW	156.2 MW	7.1 MW

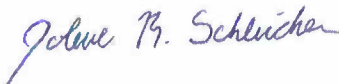
Rugby Wind is still in the process of confirming construction limits but expects temporary ground disturbance to be limited to previously disturbed facilities and construction corridors such as turbine pads, electrical collection line easements, and access roads. A temporary laydown yard will also be required to support equipment parking, staging areas, and construction trailers. Construction and equipment delivery may begin as soon as the second quarter of 2024 once all relevant permits and approvals have been obtained.

Rugby Wind has contracted SWCA Environmental Consultants to complete a Class I cultural resources literature review for the repower to ascertain if any newly discovered resources or changes to the project could potentially impact cultural resources. Rugby Wind anticipates that all development for the repower activities will take place in the previously surveyed areas; however, should construction limits impact areas outside of previously surveyed areas, we recommend that additional cultural resources survey and consultation with the North Dakota SHPO be completed prior to any ground disturbance. Rugby Wind anticipates completing Class III cultural resource surveys in the fall of 2023 for new survey areas.

Currently, no impacts are anticipated to known cultural resources in the site. Rugby Wind is committed to minimize impacts to archaeological sites possibly eligible for listing in the NRHP and will avoid these and any additional NRHP-eligible or potentially eligible resources identified throughout the review process. Rugby Wind will also develop an unanticipated discovery plan to be in place should previously unknown archaeological resources or human remains be inadvertently encountered during the construction period.

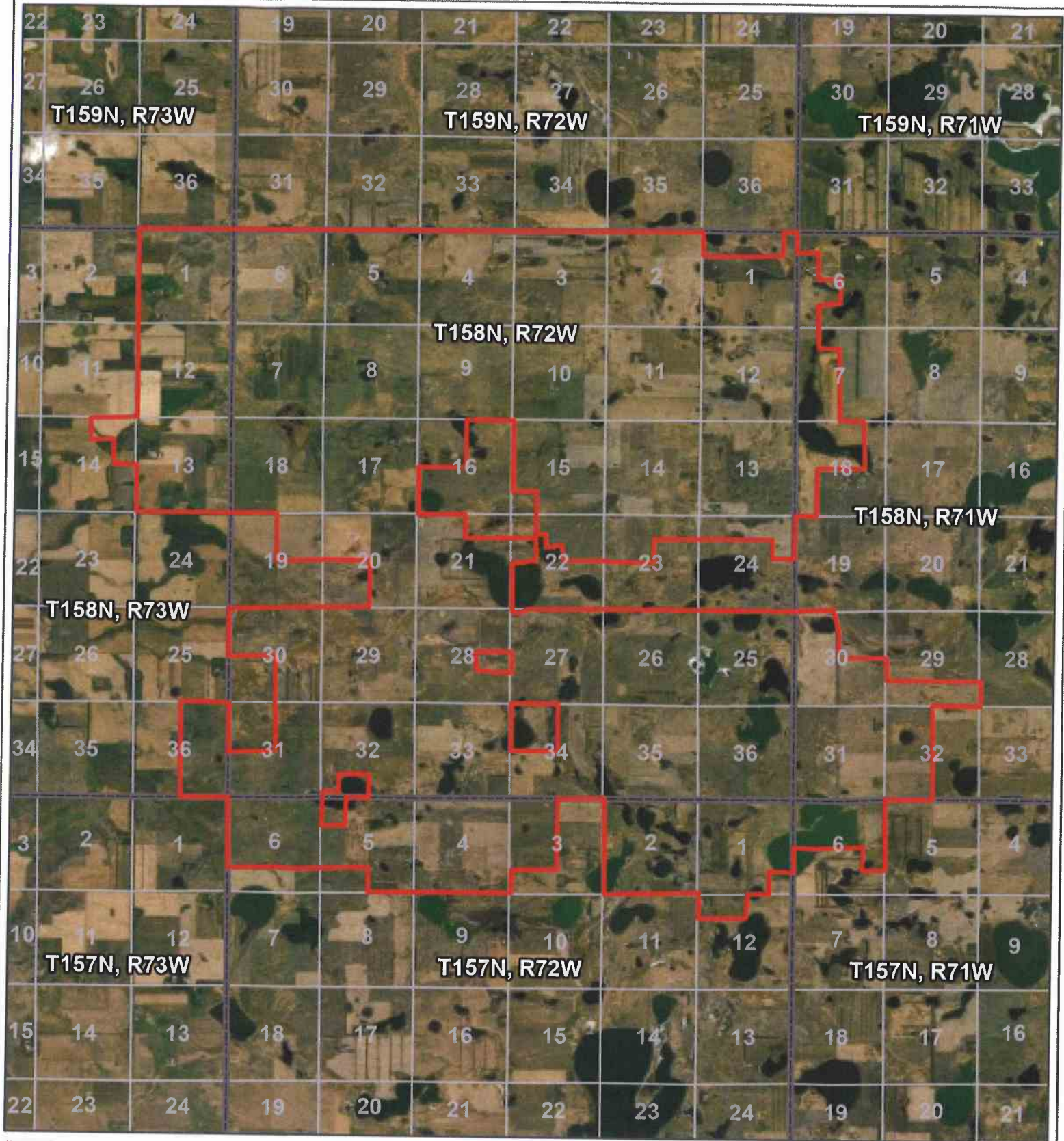
As Rugby Wind continues to progress in determining its construction limits, we would appreciate any comments your agency may have regarding the repowering project. Please contact me by email at [jschleicher@swca.com](mailto:jschleicher@swca.com) or by phone at 701-409-9398 to discuss the project further or schedule a project meeting.




Sincerely,



Jolene Schleicher  
Cultural Resources Team Lead

Enclosure: Project Maps  
cc: Manuela Elizondo, Avangrid Renewables



-  Project Area
-  Township/Range Boundary
-  Section Boundary

Pierce County, ND  
 NAD 1983 2011 StatePlane  
 North Dakota North FIPS 3301  
 FII  
 48.4926°N 99.9447°W

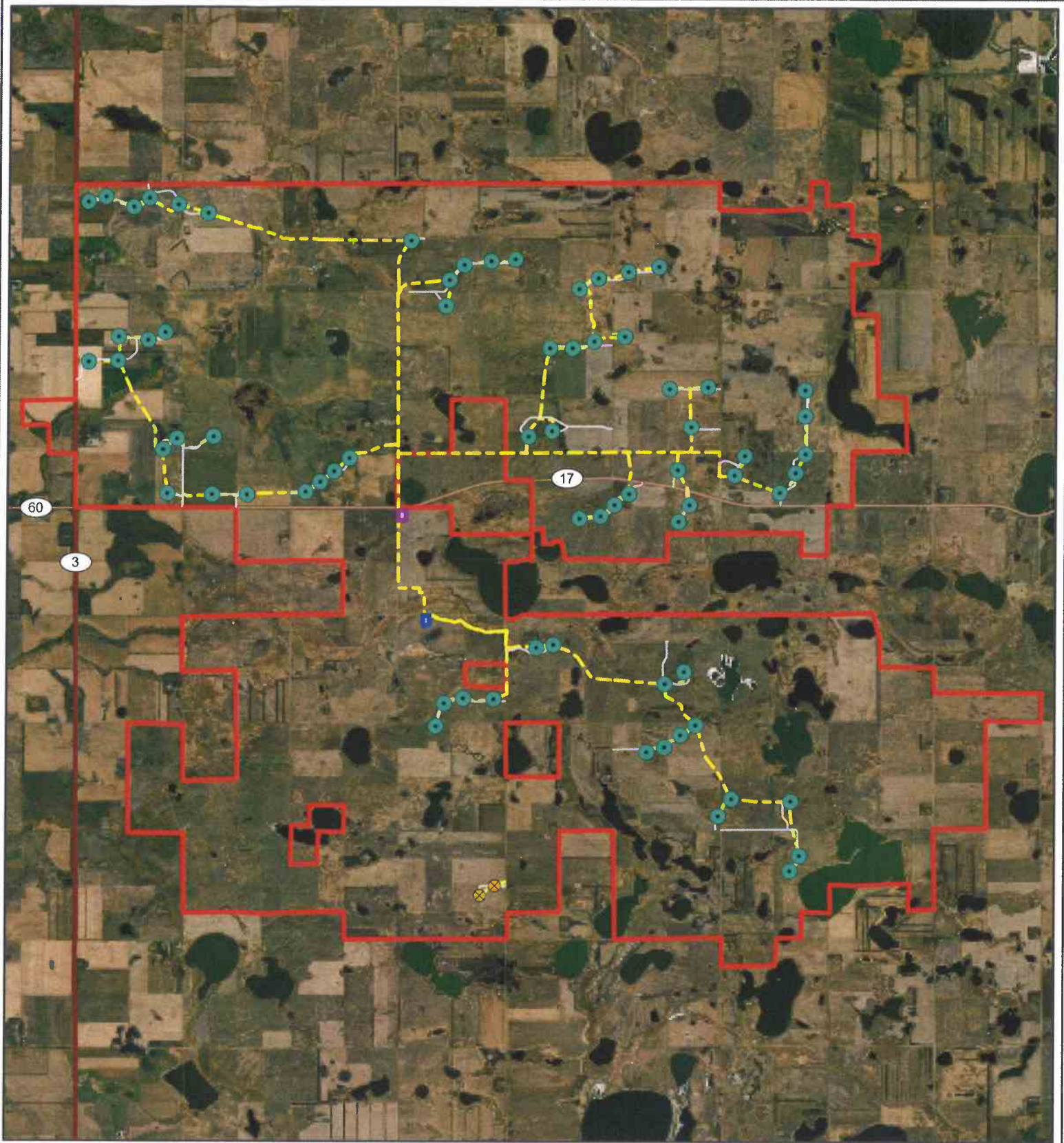





Base Map: Esri ArcGIS Online,  
 accessed August 2023  
 Updated: 8/30/2023  
 Project No. 77797  
 Layout: 77797\_projectLocation  
 Aprx: 77797\_rugbyWind

1:110,000

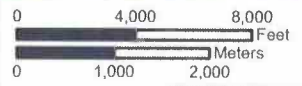


North Dakota

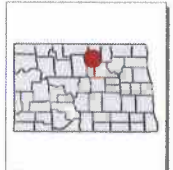


-  Turbine Location
-  MET Tower Location
-  Existing Collection Line
-  Access Road
-  O&M Facility
-  Substation
-  Highway
-  Major Road
-  Project Area

Pierce County, ND  
 NAD 1983 2011 StatePlane  
 North Dakota North FIPS 3301  
 Ftl  
 48.4926°N 99.9447°W



1:97,000



North Dakota

Base Map: Esri ArcGIS Online,  
 accessed August 2023  
 Updated: 8/30/2023  
 Project No. 77797  
 Layout: 77797\_infrastructureOverview  
 Aprx: 77797\_rugbyWind

**SWCA**  
 ENVIRONMENTAL CONSULTANTS

## ELIZONDO, MANUELA

---

**From:** Madsen, Kelly B <kelly\_madsen@fws.gov>  
**Sent:** Wednesday, June 28, 2023 4:39 PM  
**To:** ELIZONDO, MANUELA  
**Cc:** SCHWITZER, LUKE; Takala, John  
**Subject:** Re: [EXTERNAL] J. Clark Salyer Wetland Management District - Rugby Wind Farm Repower  
**Attachments:** Updated Easement Maps.zip

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Manuela,

Thank you for contacting our office to check with us before making updates to your wind farm.

Here are a few thoughts and explanations regarding our easements.

- The Exhibit-A map package that was sent to you back in 2008 appears to be missing some of the maps associated with the scope of the project. The easement maps missing are easements signed before 1976. Those contracts never had an exhibit-A map with them but recently we have made new colored supplemental maps that depict the wetland basins protected for those older easements. Its possible the person from this office back then recognized this and addressed that at that given time. Either way, I have added those new maps so you will have a good idea where the wetland basins lay in comparison to the areas you plan to work.
- The maps you have already remain unchanged. Unfortunately, they will still remain in black and white but the wetlands are delineated on the map so if you have a person that's good with GIS you could georeference them onto a color map or make a shapefile of them if you so desired.
- I briefly scanned through the project area and couldn't find any areas of real concern, however if you are updating/extending the site pads or roads you'll have to make sure that isn't going to affect any of the protected wetlands on the map that may be in close proximity. Try and keep equipment and materials out of those small seasonal/temporary type wetlands (Those usually labeled <0.1 Acres on the map). It's hard to say what the weather will be like around that time frame but many of the wetlands might be dry which will make them harder to identify.
- We haven't acquired any new easements in the project area since well before 2008, so if you're not expanding past your current areas, you will have all current documents necessary.
- At any time if you would like me to come out and stake out a wetland or offer some on the ground advice, I'd be happy to meet up.

Any other questions or concerns feel free to reach out to us.

Thanks.

---

**From:** ELIZONDO, MANUELA <manuela.elizondo@avangrid.com>  
**Sent:** Tuesday, June 27, 2023 10:56 AM  
**To:** Madsen, Kelly B <kelly\_madsen@fws.gov>  
**Cc:** SCHWITZER, LUKE <luke.schwitzer@avangrid.com>  
**Subject:** [EXTERNAL] J. Clark Salyer Wetland Management District - Rugby Wind Farm Repower

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Hi Kelly,

Thank you for returning my call today. As discussed, my name is Manuela Elizondo and I work as a permitting manager for Avangrid Renewables. We are reviewing the potential to repower the Rugby Wind Farm located near Rugby in Pierce County, ND. The facility began commercial operation in December 2009 and consists of 71 Suzlon wind turbines, each capable of generating 2.1 MW of electricity. We are proposing to conduct facility upgrades for the purposes of increasing the wind energy facility efficiency, energy output and prolonging the useful life of the site. The proposed repower upgrades consist of the following activities:

- Replacing the rotor (nose cone, hub, and blades) and increasing the tip height of turbines from 407ft up to 456ft;
- Replacing the nacelle and its interior elements (such as the gearbox, oil cooler, drive shaft, and pitch drive),
- Reinforcing foundations,
- Upgrading collector lines, and
- Potential to decommission up to 3 turbines.

There would be no changes to turbine locations, existing tower hub height, or other existing components such as the generation tie line or collector substation. I have attached the original wetland easement USFWS data from 2008 as well as a shapefile that includes existing turbine locations, substation, electrical lines, access roads and the overall site boundary. Construction may begin as early as Q3 of 2024 with commercial operation as early as 2025. We are still in the process of determining all of our construction work areas and would appreciate any updates you may have regrading wetland and grassland easements in the project's site boundary. We look forward to working with J. Clark Salyer Wetland Management District. Please feel free to contact me with any questions.

Thank you,



**Manuela Elizondo**

Sr. Permitting Manager / Permitting & Environmental Affairs

Cell 612.760.8506

[manuela.elizondo@avangrid.com](mailto:manuela.elizondo@avangrid.com)

Remote Office Minneapolis, MN

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## ELIZONDO, MANUELA

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**From:** Pierce County Emergency Management <pierceem@nd.gov>  
**Sent:** Tuesday, March 14, 2023 8:46 AM  
**To:** ELIZONDO, MANUELA  
**Subject:** RE: Rugby Wind Farm- Pierce County, ND

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Good Morning,

I spoke with my States Attorney regarding the work and we do not feel that a permit will be required for the described work.

**From:** ELIZONDO, MANUELA <manuela.elizondo@avangrid.com>  
**Sent:** Monday, March 6, 2023 9:54 AM  
**To:** Pierce County Emergency Management <pierceem@nd.gov>  
**Cc:** SCHWITZER, LUKE <luke.schwitzer@avangrid.com>; REINKEMEYER,JEFFREY <jeffrey.reinkemeyer@avangrid.com>  
**Subject:** RE: Rugby Wind Farm- Pierce County, ND

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**\*\*\*\*\* CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\***

Kelsey-

Thank you for your time this morning. As discussed, we are currently assessing the potential to repower the Rugby Wind Farm located in Pierce County, ND. At this time, the repower would include replacing the turbine nacelles (generator/gearbox), replacing blades to a maximum tip height of 476 feet, and replacing collector lines. There would be no changes to turbine locations, existing tower hub height, nameplate capacity, or other existing components such as the generation tie line or collector substation.

Please let me know if you have any other questions as you discuss with the State's Attorney.

Best,

**Manuela Elizondo**  
Sr. Permitting & Environmental Manager  
Cell 612.760.8506  
[manuela.elizondo@avangrid.com](mailto:manuela.elizondo@avangrid.com)  
*She/her/Ms.*

---

**From:** ELIZONDO, MANUELA  
**Sent:** Wednesday, February 22, 2023 3:24 PM  
**To:** [pierceem@nd.gov](mailto:pierceem@nd.gov)  
**Cc:** SCHWITZER, LUKE <[luke.schwitzer@avangrid.com](mailto:luke.schwitzer@avangrid.com)>; Reinkemeyer, Jeff <[jeffrey.reinkemeyer@avangrid.com](mailto:jeffrey.reinkemeyer@avangrid.com)>  
**Subject:** Rugby Wind Farm- Pierce County, ND

Good afternoon,

My name is Manuela Elizondo and I work as a permitting manager for Avangrid Renewables. We are reviewing the potential to repower the Rugby Wind Farm located near Rugby in Pierce County, ND. The facility began commercial operation in December 2009. Pierce County granted a Conditional Use Permit (2005-001) on July 12, 2005 and was updated on September 3, 2008 prior

to construction. Rugby received a Certificate of Site Compatibility from North Dakota Public Service Commission under Case No. PU-05-47. Rugby's Aircraft Detection Lighting System (ADLS) light mitigation system was required per N.D.C.C. Chapter 69-06-01. As a result, the facility was granted a Pierce County Conditional Use Permit (#2021-13) on September 7, 2021.

The repower would include replacing the turbine nacelles (generator/gearbox) and blades. There would be no changes to turbine locations, existing tower hub height, nameplate capacity, or other existing components such as the generation tie line, underground collector system, or collector substation. As we are still in the early phases of review, we would like to setup a conference call with your office to discuss permitting needs for the County.

Please propose a few times that would work with your schedule and we would be happy to send a meeting invitation.

Thank you,

Manuela Elizondo



**Manuela Elizondo**  
Sr. Permitting and Environmental Manager

Cell 612.760.8506  
[manuela.elizondo@avangrid.com](mailto:manuela.elizondo@avangrid.com)  
she/her/Ms.



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STATE OF NORTH DAKOTA

PUBLIC SERVICE COMMISSION

Rugby Wind, LLC  
Rugby Wind Farm – Pierce County  
Siting Application

CASE NO. PU-05-47

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APPLICATION OF RUGBY WIND, LLC TO AMEND ORDER AND CERTIFICATE

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**I. Introduction.**

Pursuant to N.D.C.C. § 49-22-08(5), Rugby Wind, LLC (“Rugby Wind”) submits this application to the North Dakota Public Service Commission (“Commission”) requesting an amendment of the Commission’s Findings of Fact, Conclusions of Law and Order, dated October 3, 2005 (Docket No. 87) (“Order”), along with Certificate of Site Compatibility No. 5 (Docket No. 86) and First Reissued Certificate of Site Compatibility No. 5 (Docket No. 112) (collectively, the “Certificate”) issued to Rugby Wind for the Rugby Wind Farm located in Pierce County, North Dakota (“Facility”). Specifically, Rugby Wind requests that the Commission amend the Order and Certificate to remove the 1.5 to 3.0 megawatt (“MW”) per turbine limitation and the overall 150 MW limitation.

**II. Procedural History.**

A brief overview of relevant procedural history is provided below:

- On October 3, 2005, the Commission issued its Order granting Certificate of Site Compatibility No. 5 to PPM Energy, Inc. (“PPM”) for the Facility. *See* Docket Nos. 86 and 87.
- On December 3, 2008, the Commission issued First Reissued Certificate of Site Compatibility No. 5 to Ruby Wind, LLC. *See* Docket No. 112.
- The Facility was constructed between 2008 and 2009 with commercial operations commencing in December 2009.

- Concurrently with the filing of this Application, Rugby Wind filed the Certification of Jeffrey Reinkemeyer, with accompanying documentation, pursuant to N.D.C.C. § 49-22-03(3)(a)(4) regarding planned equipment upgrades at the Facility (“Project”).

### **III. Planned Upgrade Project.**

The Project will retrofit all 71 existing Suzlon 2.1 MW turbines by replacing the existing turbine rotors (nose, cone, hub, and blades), replacing the nacelle and its interior elements (gearbox, oil cooler, drive shaft, pitch drive), refurbishing turbine generators from 2.1 MW per turbine up to 2.2 MW per turbine, reinforcing turbine foundations with upgraded collars, as needed, replacing pad-mounted transformers and pads, and installing new 34.5-kilovolt (“kV”) collector line system (aboveground and underground), as needed. There will be no changes to the existing turbine locations, turbine towers, meteorological tower, collection substation, or the associated 230 kV transmission line under Case No. PU-05-305. As a result of the retrofit and increase to 2.2 MW per turbine, the Facility’s total nameplate generating capacity would increase from 149.1 MW up to 156.2; however, the Facility’s output would remain 149 MW in accordance with the Facility’s Interconnection Agreement with Otter Tail Power Company.

### **IV. Amendment Request – Removal of Capacity Limitation.**

As set forth in order paragraph no. 3 of the Commission’s Order, Rugby Wind is authorized to “site and construct up to 150 MW of wind turbines ranging in size from 1.5 to 3.0 MW.” Certificate of Site Compatibility No. 5 and First Reissued Certificate of Site Compatibility No. 5 are silent with respect to per turbine and overall MW limitations for the Facility, but said certificates were issued “subject to the conditions and limitations in [the Order].” See Docket No. 112.

As noted above, when repowered, the Facility’s nameplate capacity will increase to 156.2 MW, even though the megawatts delivered to the grid will be limited to 149 MW. Based on review

of prior repower dockets, Ruby Wind understands that the Commission has previously concluded that order and certificate amendments are required where a megawatt limitation is specified.<sup>1</sup> Therefore, Ruby Wind requests that the Commission amend the Order and Certificate to remove the per turbine megawatt limitation and the overall nameplate megawatt limitation.

**V. Conclusion.**

For the reasons set forth above, Ruby Wind respectfully requests that the Commission amend the Order and Certificate to remove the per turbine megawatt limitation and overall nameplate capacity limitation set forth in the Order.

Dated this 20th day of September, 2023.

FREDRIKSON & BYRON, P.A.

By: 

LAWRENCE BENDER, ND Bar #03908  
TYLER J. GLUDT, ND Bar #06587  
1133 College Drive, Suite 1000  
Bismarck, ND 58501  
(701) 221-8700  
lbender@fredlaw.com  
tgludt@fredlaw.com

*Attorneys for Ruby Wind, LLC*

80210647 v1

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<sup>1</sup> See Order, dated December 3, 2019, Ashtabula Wind Energy Center Repower (Case No. PU-19-284); Order, September 5, 2018, Langdon Wind Energy Center Upgrade Project (Case No. PU-18-186); and Order, dated October 27, 2022, Border Winds Energy Project Repower (Case No. PU-22-173).