

Agricola Wind Project

Permit Application No. 23-00064

1100-2.6 Exhibit 5

Design Drawings

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EXHIBIT 5 DESIGN DRAWINGS

(a) Design Drawings

The Civil and Electrical Design Drawings (Appendices 5-A and 5-B) were prepared by Westwood Surveying & Engineering; the Substation Design Drawings (Appendix 5-C) were prepared by RAE LLC, WBE. These drawings are labeled “not for construction” and were prepared at direction of professional engineers, licensed and registered in New York State whose names are clearly printed on the drawings. More information is provided in Exhibit 5(f).

(b) Setback Requirements for Wind Turbines Towers

The Facility layout (Figure 2-2) has been designed to meet or exceed the setback requirements outlined in Section 1100-2.6(b). The manufacturers for the turbine models under consideration for the Facility (Vestas and Nordex) do not have minimum setback recommendations. Setback distances prescribed by Section 1100-2.6(b) based on the tallest turbine model under consideration for the Facility are detailed in Table 5-1. These setbacks are shown in the design drawings (Appendix 5-A).

Table 5-1 Required Setback Distances for Wind Turbine Towers

Structure		Required Standard	Setback Distance ¹
Type	Classification Method		
Substation	Digitization from Aerial Imagery	1.5 x the maximum blade tip height	300 meters (984 feet)
Above-ground Bulk Electric System (100 kV or higher)	Boundary Survey	1.5 x the maximum blade tip height	300 meters (984 feet)
Gas Wells (unless waived by landowner and gas well operator)	Magnetometer Survey (see Appendix 3-B)	1.1 x the maximum blade tip height	220 meters (722 feet)
Public Roads	Boundary Survey	1.1 x the maximum blade tip height	220 meters (722 feet)
Non-participating Property Lines	Boundary Survey	1.1 x the maximum blade tip height	220 meters (722 feet)
Non-participating, Non-residential Structures	Receptor Survey (see Appendix 5-D)	1.5 x the maximum blade tip height	300 meters (984 feet)
Non-participating Residences	Receptor Survey (see Appendix 5-D)	2 x the maximum blade tip height	400 meters (1,312 feet)

¹ Calculated based on the height of the tallest turbine model listed below in Table 5-3.

A receptor dataset was developed by Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) and then provided to the Applicant for the purposes of studying the potential impacts of noise and shadow flicker from the Facility (see Exhibits 7 and 8,

respectively). Specifically, this sensitive receptor survey identified and classified structures or places that may meet the sensitive receptor definition outlined in 16 NYCRR Section 1100-2.8(h)(1) that are located within a 2-mile radius of any proposed wind turbine or substation (the Receptor Study Area). The Receptor Survey Memorandum (Appendix 5-D) provides further information on the methods applied in identifying potential receptors.

In addition to the setbacks listed above, the Applicant reviewed setback standards established by the Towns in which wind turbines are proposed. The Towns of Scipio and Venice each have adopted setback requirements that differ from the setback requirements contained in the Article VIII regulations. Below is a table of setbacks by Town compared to the setbacks required under Article VIII.

Table 5-2. Local Law Setback Requirements

Structure Type	Article VIII	Scipio	Venice
Substation	1.5x Total Height	N/A	N/A
Above-Ground Distribution	N/A	N/A	1.1x Total Height
Above-Ground Transmission	1.5x Total Height	N/A	1.5x Total Height
Public Roads	1.1x Total Height	1.5x Total Height	1.1x Total Height
Non-Participating Property Lines	1.1x Total Height	1.5x Total Height	1.1x Total Height
Non-Participating, Non-Residential Structures	1.5x Total Height	N/A	N/A
Non-Participating Residences	2.0x Total Height	N/A	2.0x Total Height
Non-Participating Commercial Structures ²	N/A	N/A	1.5x Total Height
Non-Participating Occupied Buildings ³	N/A	2.5x Total Height	N/A
Participating Residences	N/A	1.1x Total Height	N/A

¹As defined in local law No. 2 of 2024 of the Town of Venice, inclusive of any Commercial Structure located on real property not under lease to or other use agreement with a wind generating company, Applicant, or an Applicant affiliated company, including its successors and assigns.

²As defined in local law No. 2 of 2022 of the Town of Scipio, inclusive of any residence, school, hospital, church, public library or other buildings used for public gathering that is occupied or in use when the permit application is submitted.

As discussed in Exhibit 24, the Applicant has designed the Facility to meet most of the setbacks required by the Towns of Scipio and Venice. However, the Applicant is seeking waivers of the 1.5 times setback requirement from non-participating property lines and public roads and the 2.5 times setback requirement from non-participating residences established in the Town of Scipio.

(c) Power, Hub, Height, Rotor Diameter, Total Height of Turbines

Due to market factors such as availability and cost, a specific turbine model has not yet been confirmed for the Facility. Turbine models that have been determined to be suitable for the Facility include those identified in Table 5-2; see also Appendix 5-E. The total height for these turbine models ranges from 599 to 656 feet. The Applicant may select a turbine model not presented in this Application provided that the total height, rotor diameter, and sound power level output of the selected turbine are not greater than those analyzed in this Application.

Table 5-3. Approximate Turbine Dimensions by Model

Turbine Model	Rated Power	Hub Height	Rotor Diameter	Total Height
Nordex N149	4.X MW	108 meters (354 feet)	149 meters (489 feet)	182.5 meters (599 feet)
Vestas V150	4.5 MW	120 meters (394 feet)	150 meters (492 feet)	195 meters (640 feet)
Vestas V162	6.8 MW	119 meters (390 feet)	162 meters (531 feet)	200 meters (656 feet)

(d) Setback Requirements for Solar Facility Components

The proposed Facility is not a solar energy generating facility; therefore, the requirements of Section 1100-2.6(d) are not applicable.

(e) Maximum Height of Solar Facility Components

The proposed Facility is not a solar energy generating facility; therefore, the requirements of Section 1100-2.6(e) are not applicable.

(f) Site Plans and Drawings

(1) General Site Plans

The Design Drawings and other supporting materials are organized by engineering discipline (civil, electrical, and high voltage [i.e., substation] at a common engineering scale of at least 1:200. Generally, the drawing sets for each of these disciplines are further organized by defined engineering area, or by Facility component. The Civil Design Drawings (Appendix 5-A), Electrical Design Drawings (Appendix 5-B), and Substation Design Drawings (Appendix 5-C) include a layout for all Facility components as well as the information outlined below:

- Access roads, turn-around areas, and temporary road improvements (Appendix 5-A, C400 Series and C500 Series);²
- Wind turbine locations, and associated temporary crane pads (Appendix 5-A, C400 Series);
- Electric collection line corridors (including an indication of the permanent right-of-way [ROW]), locations of proposed splice vaults/junction boxes, and trenchless collection line installations (Appendix 5-A and Appendix 5-B);
- Collector substation, point of interconnection (POI) switchyard, and operations and maintenance (O&M) facility (Appendix 5-A, C600 Series, Appendix 5-C);
- Existing electric transmission lines and interconnection location, including associated ROW (Appendix 5-A, C600 Series, and Appendix 5-C);

² Access roads were designed to comply with the NYS Fire Code, typical industry standards, and the recommendations contained in the preliminary geotechnical report (Appendix 10-B). The primary cross section is to be utilized in most areas (e.g., access roads, laydown yards, intersection improvements, etc.). The existing access road cross section is applicable where proposed access roads follow existing farm roads. The aggregate ring section is applicable to the permanent gravel ring around the turbine, which has specific electrical hazard safety needs.

- Approximate limits of disturbance for all Facility components (turbines, access roads, buildings, electric lines, collector substation, etc.) (Appendix 5-A);
- Approximate clearing limits for all Facility components (turbines, access roads, buildings, electric lines, collector substation, etc.) (Appendix 5-A, T300 Series);
- Proposed wind turbine setbacks based on the tallest wind turbine model under consideration from occupied structures, property lines and easements, existing overhead electric lines, and roads (Figure 24-1);³
- Permanent meteorological (MET) towers (Appendix 5-A, Sheets T326, T350, C414, C417, EC326, and EC350).
- Lighting plans for the O&M facility and interconnection facilities (Appendix 05-C, AGCL-731 series).

(2) Typical Design Detail Drawings and Plans

The Civil Design Drawings (Appendix 5-A), Electrical Design Drawings (Appendix 5-B), and Substation Design Drawings (Appendix 5-C) and other supporting drawings contain typical design details for all Facility components drawn to scale using computer graphics or computer-aided design software. Table 5-3 includes more information regarding what is included for each component.

Table 5-4. Typical Detail Drawings

Facility Component	Drawing Set(s)
Wind turbine elevations	Appendix 5-F
POI Switchyard station and interconnection facilities	Appendix 5-C
Collection substation	Appendix 5-C
Permanent point of access	Appendix 5-A
Underground infrastructure	Appendix 5-A, Appendix 5-B
Overhead electric collection lines	Appendix 5-B
Overhead electric transmission lines	Appendix 5-A, Appendix 5-B

(3) Site Suitability Reports for Turbine Models

A temporary 60-meter-tall (196.9-foot-tall) MET tower was installed in the Town of Venice in August 2021 and a temporary 80-meter (262.5-foot tall) MET tower was installed in the Town of Scipio in August 2023 to generate the site-specific data necessary for modeling purposes and validation of the wind resource. Wind resource analyses were performed to optimize the turbine layout for maximum energy production within the context of the existing, site-specific constraints and support the estimated capacity factor for the Facility.

³ Wind turbine and meteorological tower setbacks are not shown on the drawings as the scale of the drawings is not appropriate to the scope of the setbacks, i.e., sufficient context is not provided at a 1:100 scale to correctly interpret 1,312-foot setbacks.

The manufacturers of the wind turbines under consideration for the Facility provided site suitability reports showing that the turbine models are compatible with existing conditions (Appendix 5-E). Based on the site suitability reports, the wind turbines proposed for the Facility are rated to withstand wind speeds above those likely to occur in the Facility Site.

(4) Engineering Codes, Standards, Guidelines, and Practices

The list of codes and standards that have been, and will continue to be considered during the design, construction, operation, and maintenance of this Facility is extensive. The following is provided as a representative list of organizations which issue applicable codes and standards. This list will be updated with specific codes, standards, and guidelines following Certification, during final design.

- The Aluminum Association (AA)
- American Association of State Highway and Transportation Officials (AASHTO)
- American Concrete Institute (ACI)
- American Institute of Steel Construction (AISC)
- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)
- American Society for Testing and Materials (ASTM)
- American Welding Society (AWS)
- Concrete Reinforcing Steel Institute (CRSI)
- Edison Electric Institute Publications (EEI-AEIC)
- Federal Energy Regulatory Commission (FERC)
- Insulated Cable Engineers Association (ICEA)
- International Electro-technical Commission (IEC)
- Institute of Electrical and Electronics Engineers (IEEE)
- Mine Safety and Health Administration (MSHA)
- National Bureau of Standards (NBS)
- National Electrical Manufacturers Association (NEMA)
- National Electric Code (NEC)
- National Electric Safety Code (NESC)
- National Electrical Testing Association (NETA)
- National Fire Protection Association (NFPA)
- National Institute of Standards and Technology (NIST)
- National Ready Mixed Concrete Association (NRMCA)
- Occupational Safety and Health Administration (OSHA)
- Portland Cement Association (PCA)
- Rural Electrification Administration (REA)
- Society of Automotive Engineers (SAE)
- Society for Protective Coatings (SSPC)
- Uniform Building Code (UBC)
- Underwriter's Laboratories, Inc. (UL).

The short sections of proposed transmission and collection lines will be designed in accordance with the following specific standards:

- ANSI C2-2012 - National Electrical Safety Code (NEC)
- ANSI 05.1.2008 - Wood Poles – Specifications & Dimensions
- ASCE 48-2011 - Design of Steel Transmission Pole Structures
- ASCE MOP 74-2010 - Guidelines for Electrical Transmission Line Structural Loading
- ASCE MOP 91-1997 - Design of Guyed Electrical Transmission Structures
- IEEE 81-2012 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System
- IEEE 516-2009 - IEEE Guide for Maintenance Methods on Energized Power Lines
- IEEE 524-2003 - Guide to the Installation of Overhead Transmission Line Conductors
- IEEE 563-1978 - Guide on Conductor Self-Damping Measurements
- IEEE 644-1994 - Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines IEEE 656-1992 - Standard for the Measurement of Audible Noise from Overhead Transmission Lines
- IEEE 691-2001 - Guide for Transmission Structure Foundation Design and Testing
- IEEE 738-2006 - Standard for Calculating the Current-Temperature of Bare Overhead Conductors
- IEEE 977-1991 - Guide to Installation of Foundations for Transmission Line Structures
- IEEE 1243-1997 - Guide for Improving the Lightning Performance of Transmission Lines
- IEEE 1313.2-1999 - Guide for the Application of Insulation Coordination
- IEEE Std 1542-2007 - Guide for Installation, Maintenance, and Operation of Irrigation Equipment Located Near or Under Power Lines.

(5) Manufacturer Design, Safety and Testing Information or Equipment

Technical and safety brochures to the extent available from the manufacturers are included in Appendix 5-G for turbines to be installed during construction, in accordance with Section 1100-2.6(f)(5). Details regarding specific equipment to be installed at the Project collection substation and POI switchyard are not available at this time as they will be procured later in the Project timeline and, as with the POI switchyard, in coordination with the New York State Electric and Gas Company.