



# **EIGHT POINT WIND ENERGY CENTER**

**Case No. 16-F-0062**

**1001.11 Exhibit 11**

**Preliminary Design Drawings**

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## Exhibit 11: Preliminary Design Drawings

The Preliminary Design Drawings provided in support of this exhibit were developed under the direction of a professional engineer licensed in the State of New York. The plans were prepared using AutoCAD Civil 3D design software and are generally presented at a scale of 1 inch=100 feet, with the exception of those intended to provide an overview of the Facility Site. The drawings are labeled appropriately as “Preliminary – Not for Construction.”

The Project is also required to obtain coverage under State Pollutant Discharge Elimination System (SPDES) Stormwater General Permit for Construction Activities (GP-0-15-002). To demonstrate compliance, stormwater management and erosion prevention & sediment control (EPSC) elements are depicted with the proposed grading on the Access Road Plan and Profile drawings.

### 11(a) Site Plan

The site plans included in the Preliminary Design Drawings provided with this exhibit depict all Facility components including proposed wind turbine locations and access roads, permanent meteorological towers, substation yards, control house, Operations and Maintenance (O&M) building, laydown and staging areas, underground and above ground collector line locations, and the relative locations of sensitive natural resources. The “Overall Project Plan” depicts the proposed locations of the turbines, collector lines, substations, laydown and staging areas for the entire Project along with potential areas where road intersection improvements may be necessary. The “Natural Resources Map” shows the proposed locations of the turbines, meteorological towers, access roads, and collector lines relative to mapped streams, wetlands, soils and bedrock, and the 100-year flood zone.

Turbine component delivery and related logistic considerations are still being evaluated because the origination of supplies has not been determined; however, potential delivery routes have been identified (Appendix 25-1) and preliminary route evaluations have been conducted (Appendix 25-2). Prior to development of the Final SWPPP, the final delivery routes and coordination with the appropriate civil authorities will be undertaken. The SWPPP will include detailed delivery route road improvements that may be necessary for delivery of Project components.

The turbine site plans and typical cross-section drawings depict tower foundations using concrete spread foot type foundations as this configuration will require the greatest natural resource impacts of the options considered and is the most common wind turbine foundation type in the industry. An alternate foundation type is also under evaluation. The Patrick & Henderson Tensionless Pier (PHTP) type foundation is a proprietary, patented design that could result in decreased surface excavation impacts, and concrete volumes. Sample design drawings of the proprietary PHTP foundation are provided in Appendices 11-1 and 11-2.

Application of the foundation system to be employed is still being evaluated. Since the traditional spread footing type foundation generally results in the greatest impact, statistics cited in this Application are based on that configuration. To ensure flexibility in the facility design, it is the Applicant’s intention to have both foundation system types permitted, with the final design selection per turbine presented in the Compliance Filings.

## 11(b) Construction Operations Plan

Various plans included in the Preliminary Design Drawings provide more detailed views of construction operation elements. The Laydown Yard Plans show the overall layout of these areas including material staging areas, construction equipment and worker parking areas, and points of ingress and egress. Proposed excavation areas are shown on the Access Road Plan & Profile drawings. Spoils piles will be stockpiled nearby the excavation areas for re-use in post-construction site restoration. The Access Road Plan & Profile drawings also show the turbine foundation locations, adjacent crane pads, and assembly areas associated with each turbine. The final contractor trailers/offices and the concrete batch plant locations are not certain at this time (as that is left to the EPC contractor to decide), but they will be located entirely within one of the six laydown yards.

## 11(c) Grading and Erosion Control Plan

Soils information, site grading, stormwater management, and erosion control measures are shown for each access road and turbine location on the Access Road Plan & Profile drawings. These plans depict existing and proposed topography at 2-foot contour intervals. Existing topography was derived from a LiDAR survey contracted by the Applicant and conducted in April 2017. Soil types and boundaries were obtained from the Natural Resources Conservation Service Web Soil Survey database for Steuben County, NY. Please refer to Exhibit 21 for more detailed geotechnical information including boring reports, depths to bedrock, earthwork volume calculations, etc. Exhibit 21 also references a copy of the “Desktop Geotechnical Study” prepared by Kenney Geotechnical Services, which is also included as Appendix 21-6.

General areas of cut and fill are indicated on both the grading and profile views. Excavated material will be stockpiled (often “windrowed”) in the vicinity of the cut (i.e. along the access road, near the turbine foundations, along the access road and collection line corridor, etc.) and will be re-distributed during post-construction site restoration. Topsoil will be segregated from common fill (subsoils) and an agricultural monitor will be on-site during construction to oversee topsoil separation.

The stormwater management features shown on the Access Road Plan and Profile drawings are conceptual. Stormwater Management Practice (SMP) sizing calculations have not been performed. Final design will be submitted with the Stormwater Pollution Prevention Plan (SWPPP). The design will conform to the requirements of the Stormwater Management Design Manual (2015). The erosion & sediment control measures shown on these plans have been designed in conformance with the Standards and Specifications for Erosion and Sediment Control (2016).

## 11(d) Landscaping Plan

Clearing limits are shown on the Access Road Plan & Profile drawings. Clearing is kept to the minimum needed for turbine erection and access road and collector line construction. These plans also indicate locations where temporary cut and fill areas required for access and construction are to be returned to original grades.

It is important to note that both the clearing limits and the cut and fill areas shown in the Access Road and Plan & Profile drawings are conservative in nature, in that they portray the maximum amount of clearing and/or cut/fill that may be necessary during construction. The clearing limits and roads have been designed according to the most stringent standards for conservative estimates, but slight modifications could be made within a smaller area of disturbance to minimize impacts (i.e., adjusting work areas to minimize clearing, working with existing topography, etc.).

## 11(e) Lighting Plan

The Project is proposed to include turbines of a size that require lighting, in accordance with Article 13.6 of FAA Circular AC70/7460-1L. The aircraft obstruction lighting to be provided will be in compliance with FAA L-864, consisting of two synchronized red flashing strobes located at the top, and on each side of the tower nacelle. At the request of the U.S. Air Force, the Project will utilize infrared LED obstacle lighting which is compatible with night vision goggles. Additionally, the Applicant is evaluating the use of Aircraft Detection Lighting Systems (ADLS). ADLS minimize the effect of turbine lights by only activating when an aircraft is detected within a defined distance of the Project. The use of ADLS would need to be approved by the FAA.

No security lighting at the base of the towers is planned. Doorway/access lighting will be provided for maintenance activity during periods of darkness but will not normally be illuminated. Security lighting shall be installed at the collector substation and the O&M building. A concept lighting plan for the collector substation is included with the Exhibit 11 drawings. This drawing plan was developed to minimize fugitive light while meeting lighting standards established by the National Electric Safety Code (NESC). The collection substation will normally be unoccupied. During unoccupied periods, ingress/egress and security lighting will not be illuminated. The O&M yard lighting will be designed with similar illumination levels for open areas and parking as those in the substation. These lights too, will be controlled by a timer. Similar to the collection substation, the O&M yard will normally be unoccupied after dark. Appropriate levels of security lighting will only be provided if theft or vandalism becomes a problem.

During emergency operations, with all lighting fixtures illuminated the lighting plan strives to provide lighting levels of 0.5 to 1 foot candle in the roadways and parking areas and up to 0.2 foot candles in areas without equipment. Critical equipment is illuminated at approximately 5 foot candles. The average lighting levels within the yard during emergency operations will be 7.4 foot candles with higher intensity lighting at localized areas inside and outside the yard. To ensure nuisance light emissions do not occur, the yard lighting will be controlled by a timer, in accordance with the NESC, limiting illumination for periods up to one and one-half hour long unless the timer is manually re-set.

During non-emergency operations, ingress/egress and parking area illumination can be turned on from within the control house. Again these exterior lights will be on a timer with a maximum set time of one and one-half hours.

## 11(f) Architectural Drawings

The Preliminary Design Drawings include plans that depict the control house and O&M building. These drawings show facilities typical of what has been constructed for similar wind generator facilities. The actual buildings constructed at this facility will be similar, but may include some additional features specific to this facility and locale. These drawings include dimensioned floor plans, exterior elevations, and foundation information.

## 11(g) Design Detail Drawings of Underground and Overhead Facilities

The Preliminary Design Drawings and various appendices of this Application contain typical design details associated with the Facility, including:

- Turbine access roads
- Component laydown and assembly areas
- Typical turbine foundation details
- Typical existing road improvement details
- Underground and overhead collector system, plan/profile and details
- Wind turbine brochure data
- Typical wind turbine technical and safety manuals
- Turbine structures; overhead collection line structures; Foundation designs and details (WTGs and O&M building); Plan of collector cables;
- Elevation views of the overhead collector structures can be found in Appendix 34-1.

Existing underground utility locations, including active gas and oil production wells and associated pipelines, are currently being located and surveyed within the Facility Site and subsequently mapped. Those locations identified as of this filing have been included in the drawing set. The remainder of the underground utilities will be added to the Project drawings prior to development of the EM&CP drawing set. If necessary a supplemental permit filing will be provided. Exhibit 6 includes a more detailed discussion of utility locations and setbacks as they relate to the Project layout.

## 11(h) Interconnection Facilities

A single line drawing, depicting the electrical components of the Project collection substation is included in Appendix 5-3 of the Application. A general arrangement plan of the Project collection substation is also included in Appendix 5-3. While not part of this Project, elevation views of typical structures for the 115 kV transmission line (which will be permitted through the Article VII process) are included in Appendix 34-2. Additional details for the transmission line and Point of Interconnection will be included as part of the Article VII Application.

## 11(i) Engineering Code, Standards, and Guidelines

Below is a detailed list of engineering codes, standards, guidelines, and practices that Eight Point Wind intends to conform to during the planning, designing, construction, and operation of the Facility:

- American National Standards Institute (ANSI)
- Institute of Electrical and Electronics Engineers (IEEE)
- Insulated Cable Engineers Association (ICEA)
- American Society of Mechanical Engineers (ASME)
- National Electric Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- New York State Fire Prevention and Building Code
- New York State Energy Code
- Uniform Plumbing Code (UPC)
- United Laboratories (UL)
- American Iron and Steel Institute
- American Institute of Steel Construction
- International Building Code (IBC) 2006
- AASHTO Standard for Aggregates
- ASCE 7-05 Minimum Design Loads for Buildings and Other Structures
- Federal OSHA 1910.269 Training

The electrical designs of the substations will be in accordance with applicable industry codes and standards, as well as applicable federal, state, and local codes and standards, including:

- ANSI/IEEE 81 Part 1 – Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
- ANSI/IEEE 81 Part 2 – Guide for Measurement of Impedance and Safety Characteristics of Large, Extended or Interconnected Grounding Systems
- IEEE 100 – The Authoritative Dictionary of IEEE Standards Terms
- IEEE 487 – Recommended Practice for the Protection of Wire-Line Communication Facilities Serving Electric Power Stations
- IEEE 519 – IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems
- IEEE 693 – Recommended Practice for Seismic Design at Substations
- IEEE 15547 – Standard for Interconnecting Distributed Resources with Electric Power Systems
- NEC – National Electric Code
- NESC C2 - National Electrical Safety Code
- ANSI C84.1 – Electric Power System and Equipment – Voltage Ratings (60 Hz)
- National Fire Protection Association (NFPA) 70 - National Electrical Code
- American Society of Civil Engineers (ASCE) Manual No. 313 – Guideline for Electrical Collector Line Structural Loading
- NERC Operating Standards
- NERC/ERCOT Planning Standards
- NWPP Operating Manual
- NERC/ERCOT Reliability Criteria including:
  - Reliability Criteria for System Design
  - Power Supply Design Criteria

- American Concrete Institute (ACI)
- American Iron and Steel Institute (AISA)
- American Institute of Steel Construction (AISC)
- American Society of Mechanical Engineers (ASME)
- American Society for Testing and Materials (ASTM)
- National Electric Manufacturers Association (NEMA)
- Electronics Institute of America (EIA) RS-232-D
- Electronics Institute of America (EIA) RS-310-D
- Electronics Institute of America (EIA) RS-422-D
- Electronics Institute of America (EIA) RS-485
- Electronics Institute of America (EIA) 568
- Electronics Institute of America (EIA) 569
- International Electrotechnical Commission (IEC) 8802 or IEEE-802
- International Electrotechnical Commission (IEC) 1131
- IEEE 488.2
- ICC International Building Code (IBC)