

RFP APPENDIX A.1 (WIND)
SCOPE OF WORK (PPA OR BTA)

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1.0 EXHIBIT INFORMATION

1.1 Purpose

1.1.1 Without limiting the information summarized herein, the purpose of this document is to summarize the *minimum* scope of work requirements for Contractor, which generally include:

- (1) The engineering, procurement, and construction of the balance-of-plant infrastructure for the Project, including all civil works, structural works, and electrical works;
- (2) The supply and delivery of Wind Turbines to the Project Site;
- (3) The offloading and installation of all Wind Turbines for the Project, and all tasks necessary to achieve mechanical completion of the Wind Turbines;
- (4) All tasks necessary to achieve commissioning completion of the Wind Turbines; and
- (5) The furnishing and installation of the O&M Building and the meteorological towers.

1.2 Project Description

1.2.1 PacifiCorp is soliciting proposals for cost-effective renewable resources that are located in or can be delivered to PacifiCorp's west balancing authority area ("PACW"). Any wind energy project to be owned and operated by PacifiCorp shall meet the PacifiCorp requirements set forth herein.

1.3 References

1.3.1 This exhibit shall be used in conjunction with the Work Specifications which more fully describes the *minimum* performance specifications, quality standards, and other criteria for Contractor's Work.

1.4 Definitions

1.4.1 Unless defined in this exhibit, terms that begin with an upper case shall have the meaning defined RFP Appendix A.2 (Wind) (Definitions).

1.4.2 References to "roads" and "roadways" herein shall be understood to consist of all access roads, Wind Turbine string and spur roads, substation roads, transmission line service roads, meteorological tower roads, maintenance building roads, and temporary construction roads to be constructed for the Project.

1.5 Interpretation

1.5.1 References herein to requirements to perform and/or provide work, services, equipment, or other similar items shall be understood to be the responsibility of Contractor, unless explicitly noted as being a responsibility of Owner.

1.5.2 The headings of sections and subsections herein are for convenience only and shall be ignored in construing this exhibit.

2.0 GENERAL SERVICES

2.1 General Provisions

- 2.1.1 Contractor shall perform and/or provide all work, design services, procurement services, construction services, supervision, management, labor, equipment, materials, parts, apparatus, tools, consumables, temporary structures, temporary utilities, storage, quality control and other items necessary or appropriate to complete the Work described herein, unless explicitly stated otherwise, and all such Work shall be included in the Proposal.
- 2.1.2 Contractor shall perform all Work in conformance with the Requirements. In the event of any conflict or discrepancy between this Exhibit and any Requirement, the more stringent or higher quality Requirement shall take precedence over the less stringent or lesser quality Requirement.
- 2.1.3 Contractor shall inspect the Project Site prior to initiating the Work to obtain such additional or supplementary examinations, investigations, explorations, surveys, tests, studies, and/or data concerning conditions at or contiguous to the Project Site or otherwise, which may affect cost, progress, performance, or furnishing of the Work. All such inspections shall have been contemplated and included in the Proposal, and Contractor shall not be entitled to request or be granted any scope change claims based on the results of these investigations.
- 2.1.4 Contractor shall design all aspects of the Project based on verifiable criteria that are specific to the Project and the Project Site, including elevation, precipitation, frost depth, seismic loads, and subsurface conditions. All such design criteria shall be clearly displayed on the design drawings.
- (1) Contractor shall submit with the Proposal a summary of Project Site conditions, including elevations (Wind Turbines, Project Substation, and Interconnection Line); climatic conditions (extreme ambient conditions, average ambient conditions, average annual precipitation, isokeraunic levels, lightning density, and mean relative humidity); wind loading (maximum recorded wind speed, basic wind speed, occupancy category and exposure category); seismic loading (occupancy category, site class, seismic importance factor, and spectral response acceleration); and snow loading (occupancy category, ground snow load, terrain category, exposure factor, snow importance factor, and ice loading). The source and relevant assumptions regarding all such data shall be provided in the form of RFP Appendix C-1 (Bid Summary – Power Purchase Agreement) or RFP Appendix C-2 (Bid Summary – Build Transfer Agreement), as applicable to the Agreement.
- 2.1.5 Contractor shall construct the Work, including Turbine Foundations, Access Roads, laydown yards, Collection System Circuits, the Project Substation, the Interconnection Line, the O&M Building, and all meteorological towers, at the Project Site.
- 2.1.6 Contractor shall minimize unnecessary disturbance of the existing Project Site conditions, and undeveloped areas of the Project Site shall be left in their current condition.

2.2 Construction Management

- 2.2.1 Contractor shall provide supervision, inspection, and quality control of the Work to ensure it is completed safely, competently, and efficiently. Contractor shall devote attention, skills, and expertise as is necessary to perform the Work in accordance with the Requirements.

- 2.2.2 Contractor shall provide traffic control at and within the Project Site, or as otherwise required to complete the Work, including, but not limited to, traffic control along any public or private roads.
- 2.2.3 Reserved.
- 2.2.4 Contractor shall furnish and maintain throughout construction of the Project a construction radio system for use by Owner and Owner's representative(s), including access to Contractor's primary safety channel. At least five (5) fully-functional radios shall be furnished for this purpose. This radio system shall be fully functional within 30 days of Contractor mobilization.
- 2.2.5 Contractor shall provide all necessary construction water, including, but not limited to, that which is required for temporary work, concrete preparation, dust control, rock drilling operations, and pressure washing of Wind Turbine components.
- 2.2.6 Contractor shall provide all necessary temporary/construction power, including, but not limited to, that required for the office trailers, temporary lighting, Project Substation, O&M Building, and meteorological towers. For the avoidance of doubt, Contractor shall be responsible for furnishing both the power supply and fuel source for such items.
- 2.2.7 Contractor shall provide all necessary fire management devices, per the fire management plan to be prepared by Contractor as a Contractor Deliverable, including water trailers, construction vehicle fire kits, or other similar devices, as applicable.
- 2.2.8 Contractor shall attend and actively participate in Owner-scheduled project meetings. These meetings may include, but are not limited to, (i) engineering update meetings to review progress against the Project Schedule, address issues related to the Work, and other similar items prior to construction of the Project; and (ii) Project management meetings during construction, including plan of the day, daily safety meetings, daily logistics planning, Project Schedule progress, weekly management updates, and monthly management updates.
- 2.2.9 Contractor shall support Owner with providing timely responses to reasonable requests for information from Owner or Owner's contractors, including Turbine Supplier.
- 2.2.10 Contractor shall ensure compliance with all land owner agreements for livestock management.
- 2.2.11 Contractor shall contact local authorities, pipeline companies, and utility companies to locate conflicting underground facilities *prior* to starting any excavation or trenching Work. Contractor shall be responsible for all damages resulting from contact with identified underground facilities in the vicinity of each excavation. In the event of any conflict with an underground facility, Contractor shall immediately notify Owner and shall document the nature of the conflict, relocation of the conflicting facility or structure, any damages which occurred, and final resolution. This documentation shall be provided to Owner within 48 hours of such conflict.

2.3 Project Schedule

- 2.3.1 Contractor shall prepare, implement, and manage a detailed schedule that reflects the project execution plan and anticipated sequence of site operations (the "**Project Schedule**"). The Project Schedule shall comply, at a minimum, with the Project Schedule Requirements as set forth in the Work Specifications.

- (1) Contractor shall submit with the Proposal a detailed Project Schedule. Following execution of the Agreement, this baseline schedule shall be updated and submitted to Owner for review on a weekly basis.
- 2.3.2 Contractor shall provide an individual (the “**Scheduler**”) who will be dedicated to the Project and who shall develop and maintain the Project Schedule. The Scheduler shall be an experienced specialist that is skilled in critical path method scheduling; shall be capable of producing CPM reports within 24 hours of Owner’s request; shall be present at the Project Site on a full-time basis during the construction of the Project; and shall attend and actively participate as needed in all Project meetings related to construction progress, alleged delays, or time impact.
- 2.3.3 Contractor shall cause the reports summarized in the Project Schedule Requirements, as set forth in the Work Specifications, to be submitted with each weekly Project Schedule update.

2.4 Project Documentation

- 2.4.1 Contractor shall prepare and submit all deliverables and submittals necessary for the successful completion of the Work, including, but not limited to, Job Books, As-Built Drawings, completion certificates, design documents, and all other manuals, drawings, plans, studies, calculations, safety-related documentation, reports, checklists, completion procedures, and other similar items (collectively, the “**Contractor Deliverables**”). All such materials shall be subject to review and/or approval by Owner, as applicable; shall be coordinated and discussed with all pertinent parties prior to and during the construction phase of the Project; and shall comply with, at a minimum, the Submittal Requirements set forth in the Work Specifications.
- 2.4.2 Contractor shall prepare, implement, manage, and observe the health and safety plan, the security plan, and the environmental plan (collectively, the “**HSSE Plans**”). These plans shall comply, at a minimum, with the Safety Plan Requirements and the Security Plan Requirements, respectively, each as set forth in the Work Specifications.
- 2.4.3 Contractor shall prepare, implement, and manage a detailed quality assurance plan that is specific to the Project and Project Site. This plan shall comply, at a minimum, with the Quality Plan Requirements set forth in the Work Specifications.
- 2.4.4 Contractor shall provide four (4) complete, full-size (size D), color sets *and* four (4) complete, 11-inch by 17-inch, color sets of As-Built Drawings in hard copy format, as well as one (1) complete, full-size (size D) set of As-Built Drawings in electronic format on external hard drive.
- 2.4.5 Contractor shall provide four (4) complete copies of Job Books in hard copy format and four (4) complete copies of Job Books in electronic format on external hard drive. Job Books shall comply, at a minimum, with the Job Book Requirements as set forth in the Work Specifications.
- 2.4.6 Contractor shall prepare, implement, and manage a detailed project execution plan that is specific to the Project and Project Site. The project execution plan shall be sufficient in scope and detail to convey the means and methods that will be employed by Contractor to perform all aspects of the Work. Key elements of the project execution plan shall include, but not be limited to, project management structure and key personnel; roles and responsibilities; staffing plans; communications protocol; engineering execution plans; and construction management plans, including, but not limited to, cost controls, schedule controls, mobilization, document management, materials management, details for receipt and transport of equipment, construction sequencing, movement of cranes during construction, and other similar items.

- 2.4.7 Contractor shall prepare, implement, and manage a detailed traffic management plan that is specific to the Project and Project Site. The traffic management plan shall clearly identify all haul routes from the nearest highway; proposed traffic flow within the Project Site, including public and non-public roads; plans for managing construction, delivery, public, and other traffic at the Project Site during construction; daily concrete truck delivery flow plans; and mitigation measures to reduce risk and impact to non-construction vehicles due to construction activities.
- 2.4.8 Contractor shall prepare, implement, and manage critical lift plans that are specific to the Project and Project Site. The critical lift plan shall clearly identify precautions for all critical lifts; coordination plans, including pre-lift meetings, with all participating personnel; and sample documentation/checklists for all critical lifts. Prior to performing any critical lift, Contractor shall perform a practice lift with a similar crane configuration and load configuration; practice lifts shall always be performed with the same crew and using the same lifting equipment as those used for the critical lift. Any lift exceeding ninety percent (90%) of a crane's load chart is prohibited. For purposes of this exhibit, a "critical lift" shall include, at a minimum, any lift that exceeds seventy-five percent (75%) of the rated capacity of the crane, per the respective crane's load chart; any lift that exceeds 50,000 pounds; any lift that requires the use of more than one crane; any lift requiring blind picks; any man-basket lifting operation; any load that is lifted/transported over or near energized electrical equipment, such as power lines, transformers, or switchgear; any lift in a confined space or restricted area (including an operating facility) where the load, or any part of the crane or equipment structure, could come within one (1) meter of any existing structure; or any lift where the equipment is set up near manholes, catch basins, sewers, sinkholes or other known surface or sub-surface interferences.
- 2.4.9 Contractor shall prepare a storm water pollution prevention plan (the "**SWPPP**") for the Project.
- 2.4.10 Contractor shall prepare and submit all required geotechnical documentation and submittals, as more particularly described in Section 4.0 herein.
- 2.4.11 Contractor shall prepare blasting plans and procedures for all blasting work to be performed at the Project Site. Such plans and procedures shall include, at a minimum, a description of safety buffer zones, parameters for blasting times during the day, and approved certification as required from the authority having jurisdiction. All such submittals shall be approved by Owner prior to use.
- 2.4.12 Contractor shall prepare and submit concrete and grout mix designs; concrete and grout placement procedures; and grout specification sheets as Contractor Deliverables. All such submittals shall be approved by Owner prior to use. Each mix design submitted by Contractor shall be accompanied by documentation of achieving Project-specific compressive strength requirements according to ACI procedures.
- 2.4.13 Contractor shall prepare energization plans and procedures for each Collection System Circuit, the Project Substation, and the Interconnection Line, at a minimum. Energization plans shall be submitted to Owner for approval *prior* to use. Energization plans shall include both electrical and communications infrastructure as well as backfeed plans, soaking plans, testing plans, and lock out tag out procedures, at a minimum.
- 2.4.14 Contractor shall provide a foundation inspection report for each Turbine Foundation excavation and every drilled pier constructed (if any) (each, a "**Foundation Inspection Report**"). A Foundation Inspection Report, including all accompanying documentation, shall be provided to Owner as a condition of each Turbine Foundation completion and shall include the minimum information set forth in the Work Specifications.

- 2.4.15 Contractor shall provide a bolt tensioning plan, including procedures for tightening / re-tightening, with recommendations covering the life of the Project.
- 2.4.16 Contractor shall prepare the design documents, including civil works, Turbine Foundations, Collection System Circuits, Communications System, Project Substation, Interconnection Line, O&M Building, and meteorological towers. All design documents shall meet the minimum requirements set forth in the Work Specifications.
- 2.4.17 Contractor shall prepare a set of studies and analyses for the Project (collectively, the “**Project Electrical Studies**”) to demonstrate the adequacy of the proposed system design, including any studies and analyses that may be necessary to ensure compliance with the Requirements, including the Applicable Standards or utility requirements; the Project Electrical Studies shall be submitted to Owner for review *prior* to the procurement of the applicable Equipment. The following shall be included in the Project Electrical Studies, at a minimum:
- (1) Load Flow Study: load flow study with power flow analysis for the Collection System Circuits. Final report shall include a table showing cable ampacity and percent loading per cable section corresponding to the Project one-line diagram. Cable ampacity shall not exceed 90 percent of the rated value, based on Project Site-specific thermal resistivity. All external heat sources shall be considered, including parallel circuits. Thermal design shall account for actual field soil samples and backfill requirements (native or engineered).
 - (2) Short Circuit Study: short circuit analysis of Collection System Circuits, Project Substation, and Interconnection Line, including secondary values on Wind Turbines. The short circuit analysis and study shall be utilized in Contractor’s electrical designs to support relay coordination study and equipment specification.
 - (3) Annual Energy Loss Report: electrical losses evaluation, including estimate of annual energy losses for Project design based upon fully-loaded conditions and Project Site-specific wind distribution data, respectively. Such analysis shall be sufficient to demonstrate that the Electrical Loss Limit (see [Section 6.1](#) herein) is not being exceeded, and shall be based upon Project-specific cabling and transformer specifications, Project Site-specific soil conditions, Project Site-specific wind data, and other similar considerations.
 - (4) Reactive Compensation Study: reactive power flow report, including power factor study at Point of Interconnection. The study shall identify reactive compensation required to meet the Requirements, including the requirements of interconnection for power factor and voltage regulation, and including any capacitor bank and/or reactor requirements. The study shall include varying combinations of active power (no load, partial load, full load) and voltage (min. 0.95 to 1.05 pu) at the Point of Interconnection.
 - (5) Harmonic Analysis Report: power quality analysis at the Point of Interconnection to determine the harmonic resonance and flicker conditions within the Project, and demonstration that the Project design meets the harmonics distortion requirements in the Requirements (including IEEE 519), including any necessary filtering or mitigation to be provided by Contractor.
 - (6) Concentric Induced Voltage Report: analysis to calculate the maximum induced voltage on the Collection System Circuit shield wires.

- (7) Insulation Coordination Report: study to ensure the insulation coordination requirements of IEEE C62.22-2009 have been satisfied within the Project electrical design, including proper application of surge arresters to safeguard electric power equipment within the Collection System Circuits, Substation, and Interconnection Line against hazards of abnormally-high voltage surges of various origins.
- (8) Transient Overvoltage Report: study to confirm any system modifications required to adequately limit transient overvoltage on the Collection System Circuits, including determination of the transient overvoltage levels on the Collection System Circuits after feeders have been isolated from the Substation due to a line-to-ground fault, and determination of the maximum energy required to be absorbed by each surge arrester on the Collection System Circuit feeders.
- (9) Wind Turbine Ground Grid Report: analysis of Wind Turbine grounding design to verify the adequacy of the proposed design and the safety of personnel working in or around the Wind Turbine. The study shall confirm that the grounding system maintains touch and step voltages within tolerable limits, and shall be prepared in accordance with the procedures, data, and recommendations given in IEEE 80). The study shall determine the ground potential rise with respect to remote earth, and Turbine Foundations shall be modeled as they are actually constructed (i.e., if not solidly bonded (e.g., using wire ties), they should be modeled accordingly).
- (10) Substation Grounding Report: grounding system study of ground grid conductors and interconnection (if any) with the ground grid. The study shall confirm that the grounding system maintains touch and step voltages within tolerable limits, and shall be prepared in accordance with the procedures, data, and recommendations given in IEEE 80. The study shall determine the ground potential rise with respect to remote earth.
- (11) Effectively Grounded Report: study to confirm the Project is considered effectively grounded, as defined in IEEE C62.92.1-2000.
- (12) Substation AC System Study: calculation of the capacity of the low-voltage AC systems in the Project Substation to determine size of station service.
- (13) Substation DC System Study: calculation of the capacity of the batteries and chargers within the Project Substation with the DC service required for the equipment at the substation, as determined from a load profile developed for all DC loads. The study shall determine if the minimum voltages are maintained as specified and required by equipment vendors. The DC system shall be sized to accommodate future loads for ultimate switchyard configuration.
- (14) Substation Bus Ampacity Study: calculation of bus ampacity in the Project Substation based upon continuous current rating as given on the one-line diagram and Project Site-specific conditions.
- (15) Substation Bus Structural Analysis Study: analysis of bus structural design in the Project Substation including bus, insulators, bus structures, and foundations, and based upon the most stringent combination of wind, fault current, and ice load factors, as defined in the Applicable Standards and other applicable Requirements.

- (16) Substation Bus Design Study: analysis of the performance of the buses, disconnect switches, and separately-mounted current transformers within the Project Substation to confirm that the ampacity, structural integrity, vibration, and required mechanical and electrical ratings are in accordance with the methods and recommendations of IEEE 605. Bus design, including gust factor, exposure height factor, importance factor, and corona considerations, shall be in accordance with the procedures and data given in IEEE 605.
 - (17) Substation Lighting Study: lighting illumination calculations for each Substation and Interconnection Substation, respectively, to determine the illumination levels within the new substations that will be achieved with added luminaries.
 - (18) Substation Lightning Study: direct stroke protection analysis for lightning at the Project Substation based upon Project Site-specific determinations for thunderstorm days, thunderstorm duration, isokeraunic levels, exposure, and other similar factors. The direct stroke protection system design shall include analysis using the rolling sphere method of the electrogeometric model given in IEEE 998. The direct stroke protection system design shall be in accordance with the procedures, data, and methods given in IEEE 998.
 - (19) Arc Flash Study: arc flash hazard analysis of the Equipment, including all energized equipment in the Wind Turbines, Collection System Circuits, Project Substation, Interconnection Line, and O&M Building. This analysis shall be performed in accordance with the latest version of NFPA-70E and IEEE 1584.
 - (20) Protection Coordination Study: relay and protection equipment coordination study, including detailed calculations, one-line and three-line diagrams, fuse curves, coordination curves, protected equipment data, and relay set points. This study shall include the Wind Turbine equipment (including switchgear), Collection System Circuits, Project Substation, and Interconnection Line. A narrative philosophy statement shall be submitted for comment before completing the coordination study, and the proposed settings for the Wind Turbine switchgear shall be delivered to Turbine Supplier for implementation *prior* to energization.
- 2.4.18 Contractor shall upload electronic copies of all Contractor Deliverables (including drafts and final) to Owner's web-based document management site.
- 2.4.19 Contractor shall prepare and maintain a documentation list for the Project. This list shall include, at a minimum, a listing of all Contractor Deliverables and the current status (including responsible party) and revision number of each. The naming and labeling conventions for all Contractor Deliverables shall be coordinated with and approved by Owner. The documentation list shall be updated by Contractor each time a new or revised drawing or document is issued, at a minimum.
- 2.4.20 Contractor shall prepare and maintain a complete log, including supporting documentation, of all requests for information (each, an "**RFI**") issued throughout performance of the Work. This log shall include, at a minimum, a listing of each RFI and the current status (including responsible party) and revision number of each. The naming and labeling conventions for all RFIs shall be coordinated with and approved by Owner. The documentation list shall be updated by Contractor each time a new or revised RFI is issued, at a minimum.
- 2.4.21 Contractor shall provide to Owner periodic written reports as to the actual progress of the Work in comparison to the Project Schedule. These reports shall include, but are not limited to, the plan of the day report, the weekly progress report, and the monthly progress report.

- 2.4.22 Contractor shall maintain color hard copies of all issued-for-construction drawings at the Project Site during performance of the Work, including at least one (1) complete set to be located in Owner's office trailers; such hard copies shall be updated by Contractor upon issuance of any revised issued-for-construction drawing. Contractor shall maintain separately a complete set of controlled redline drawings showing all Owner-approved changes made during construction, including reference to the applicable RFI number; such redlines shall be included in the Job Books.
- 2.4.23 Contractor (via Turbine Supplier) shall provide a Wind Turbine operations and maintenance manual, including in hard copy format and electronic format.
- 2.4.24 Contractor shall obtain (via Turbine Supplier) and utilize information for the design of the Wind Turbine Foundations, including, but not limited to, loading information, Markov matrices, and tower alignment information.
- 2.4.25 Contractor (via Turbine Supplier) shall provide an assessment of suitability of the Wind Turbines at the Project Site. This assessment shall include a representation from Turbine Supplier confirming the suitability of the Wind Turbine for the Project Site and its ability to withstand the Project Site conditions for a period of at least 20 years. Turbine Supplier's requirements for wake sector management (if any) shall be included in the suitability assessment.
- 2.4.26 Contractor (via Turbine Supplier) shall provide a current certification of compliance with IEC WT 01 / IEC 61400-1 / IEC 61400-22, either in the form of a Type Certificate or an A-Design statement of compliance, for the Wind Turbine model(s) being utilized for the Project. The Certificate shall be from Germanischer Lloyd, Det Norske Veritas, TÜV NORD Group, or an Owner-approved equal.

2.5 Signage

- 2.5.1 Contractor shall provide, install, and maintain throughout the performance of the Work all signage required by the applicable permits, the Applicable Standards, and other applicable Requirements.
- 2.5.2 Contractor shall provide and install a permanent sign on each Wind Turbine identifying the name of the Wind Turbine.
- 2.5.3 Contractor shall provide and install a permanent sign at each Wind Turbine string road listing the name(s) of all Wind Turbine(s) along that road.
- 2.5.4 Contractor shall furnish and install identification numbers and permanent, weatherproof labels on the base of all Wind Turbine towers, indicating Owner tower number and Collection System Circuit number, respectively.
- 2.5.5 Contractor shall furnish and install identification numbers and permanent, weatherproof labels on all Interconnection Line structures.
- 2.5.6 Contractor shall provide and install a permanent sign at the O&M Building location indicating Project name, Owner name, and entry requirements.
- 2.5.7 Contractor shall provide and install "no trespassing" signs at access road entry points and permanent speed limit signs at intervals of no greater than two (2) miles along all Project access roads, or less if required by the Contractor-furnished traffic management plan and/or Safety Plan.

- 2.5.8 Contractor shall, prior to the start of construction activities, measure the height of all overhead power lines or obstructions at the Project Site. Contractor shall provide, install, and maintain signage at each such crossing and incorporate any measures necessary to operate, move, and mobilize cranes and other equipment to ensure safe passage with adequate clearance.
- 2.5.9 Contractor shall provide, install, and maintain signage as needed for blind corners, steep hills, dips, trucks entering roadways, restricted areas, and other potential hazards. All such signage shall be installed prior to commencing construction activities.
- 2.5.10 Contractor shall provide, install, and maintain “buried cable” signs at all locations where an underground Collection System Circuit crosses a road or fence, respectively.
- 2.5.11 Contractor shall provide, install, and maintain signage as needed to provide reasonable information and direction to Project Site personnel and to facilitate orderly entrance and egress from the Project Site.
- 2.5.12 Contractor shall provide, install, and maintain danger signs, signals, lights, guard rails, reflectors on curves, and notices as may be necessary to adequately protect the Work and personnel of any company at the Project Site, including visitors, against injury or property damage.
- 2.5.13 Contractor shall provide, install, and maintain emergency response (E-911) address signs in accordance with local authorities.
- 2.5.14 Contractor shall provide, install, and maintain signage identifying personnel assembly locations for use during emergencies or Project Site evacuations.
- 2.5.15 Contractor shall provide, install, and maintain a contact sign at the entrance to all fenced areas.
- 2.5.16 Contractor shall provide a check-in stand at the entrance of all working areas for the location-specific safety documentation requiring sign-off of all people entering this work area. Documentation provided at such stand shall include a complete job hazard analysis.
- 2.5.17 Contractor shall uninstall, remove, and discard of all temporary signage at the completion of the Work, or as otherwise prescribed in the applicable permits.

2.6 Permits

- 2.6.1 Contractor shall obtain, pay for, and maintain all permits required for its performance of the Work.
- 2.6.2 Contractor shall maintain copies of all permits at the Project Site during construction of the Project.
- 2.6.3 Contractor shall comply with all requirements of Contractor-acquired permits, including closeout of such permits, and shall transfer to Owner such permits required for the operation and maintenance of the Project.
- 2.6.4 Contractor shall provide reasonable assistance, including engineering support, to Owner in applying for, obtaining, and maintaining the Owner-acquired permits.

2.7 Training

2.7.1 Contractor shall prepare and conduct comprehensive training of Owner and its operations and maintenance personnel in the safe operation and maintenance of the Project and its equipment. Such training shall cover, at a minimum, the Project Substation, the Collection System Circuits, the Communications System, the Interconnection Line, the O&M Building, the meteorological towers, and the Wind Turbines.

2.8 Temporary Facilities

2.8.1 Contractor shall furnish and install one (1) 24-foot by 60-foot double-wide office trailer for Owner's exclusive use. Each trailer shall be located at the laydown yard and shall be installed and ready-to-use no later than the Contractor mobilization date.

- (1) Each trailer shall include at least four (4) offices, and Contractor shall furnish each such office in Owner's trailers with two (2) desks, two (2) two-drawer file cabinets, two (2) rolling arm chairs, two (2) visitor chairs, and one (1) 2-foot by 3-foot white board.
- (2) Each trailer shall include at least one (1) conference area, and Contractor shall furnish each such conference area in Owner's trailers with six (6) 8-foot-long tables, 16 chairs, and one (1) 4-foot by 6-foot white board.
- (3) Each trailer shall include at least one (1) unisex restroom, each complete with running water, one (1) flushable toilet, and one (1) flushable urinal.
- (4) Each trailer shall include at least one (1) full-size drawing table, one (1) full-size drawing rack, and two (2) 4-foot by 6-foot bookshelves, respectively.
- (5) Each trailer shall include one (1) full-size refrigerator with freezer and one (1) full-size microwave. All appliances shall be new and unused.
- (6) Each trailer shall be furnished with central HVAC.
- (7) Each trailer shall be furnished with at least one (1) first aid kit and one (1) fully-charged fire extinguisher, respectively. Contractor shall maintain and recharge such fire extinguishers throughout the duration of the construction activities, as required.
- (8) Contractor shall provide and install phone service, broadband internet service, electric service, and running water for each Owner trailer, including connection of all communications (phone and internet) to the jobsite. Phone service shall include at least one (1) four-line phone system up to the wall jacks in each trailer. Internet service shall include high-speed internet infrastructure wiring up to the wall jacks in each trailer and high-speed wireless internet service (wifi) throughout the trailer compound, respectively. All utility services shall include use and service charges to Contractor's account, including for Owner's trailers.
- (9) Contractor shall furnish bottled water and ice in each Owner trailer and for Owner's exclusive use throughout the duration of the construction activities.

- (10) Contractor shall provide daily cleaning services within each Owner trailer throughout the duration of the Work. This shall include cleaning restrooms and trash collection, pickup, and removal, respectively.
- 2.8.2 Reserved.
- 2.8.3 Contractor shall provide separate office trailers for his own use (including for Turbine Supplier). Contractor shall be solely responsible for furnishing his trailer(s), including any utility services.
- 2.8.4 Contractor shall furnish, install, and maintain portable chemical toilets for use by site construction personnel, including Owner, Turbine Supplier, and subcontractors. This shall include cleaning (at least weekly), emptying, and disposal of such toilets through substantial completion of the Project or Contractor demobilization, whichever occurs last. Following such date, Contractor shall remove all such toilets from the Project Site.
- 2.8.5 Contractor shall design, permit, furnish, construct, and maintain, as required, any temporary fuel containment facilities required to support ongoing construction activities. This shall include removal of all such facilities following substantial completion of the Project or Contractor demobilization, whichever occurs last.
- 2.8.6 Contractor shall design, permit, furnish, construct, and maintain (including disposal), as required, any hazardous materials/waste facilities required to support ongoing construction activities. This shall include removal of all such facilities following substantial completion of the Project or Contractor demobilization, whichever occurs last. Contractor shall provide Owner with a copy of all hazardous material manifests.
- 2.8.7 As required to perform the Work, Contractor shall procure, permit, install, construct, and maintain batch plant(s) at the Project Site, including all necessary labor and materials related to the operation of the batch plant, and removal of the batch plant at the conclusion of the Work. The batch plant shall be removed from the Project Site by Contractor within 30 days of the final Turbine Foundation completion date. Power to operate the batch plant shall be the sole responsibility of Contractor.
- 2.8.8 As required to perform the Work, Contractor shall procure, permit, install, construct, and maintain fixed and/or mobile rock crusher(s) at the Project Site, including all necessary labor and materials related to the operation of the rock crusher(s), and removal of the rock crusher(s) at the conclusion of the Work. The location of any fixed rock crusher(s) shall be at the temporary facility areas, and the location of any mobile rock crusher(s) shall remain within the designated disturbance areas. Power to operate the rock crusher(s) shall be the sole responsibility of Contractor.
- 2.8.9 Contractor shall design, furnish, construct, install, and maintain one (1) temporary laydown yard.
- (1) Contractor shall incorporate into the design and construction of the laydown yard any space required by Turbine Supplier for storage or other purposes.
 - (2) Contractor shall furnish and maintain a system of temporary lighting for use in the Project Laydown Yard and other construction areas where required. All temporary lighting shall be removed at the completion of construction.
 - (3) Fencing and gates are not required for the laydown yard.

2.9 Debris

- 2.9.1 Contractor shall assume ownership of all construction-related debris and unsuitable materials, and each shall be removed from the Project Site and be properly disposed of by Contractor.
- 2.9.2 Contractor shall maintain a continuous and regular clean-up program to avoid accumulation of debris, waste, wreckage, and/or rubbish within the Project Site resulting from the Work, and shall maintain the Project Site in a neat and orderly condition throughout the performance of the Work.
- 2.9.3 Contractor shall provide all trash collection, pickup, and removal related to the Work, including within Owner's office trailers and other temporary facilities, and including disposal of cable reels. Dumpsters and trash receptacles shall be provided in sufficient quantities and with sufficient volume to support timely trash removal from the Project Site and preclude windblown trash generated during construction activities. Dumpsters and trash receptacles shall be emptied at a reasonable frequency to prevent overflowing or accumulation of trash around the dumpster or receptacle.
- 2.9.4 Contractor shall cause its subcontractors, employees, and other representatives to refrain from littering at or within the Project Site, or within other areas (including along public roadways) used in conjunction with the Work.
- 2.9.5 Contractor shall use lined washout pits, washout dumpsters, or other suitable means to contain the excess concrete and runoff from the cleaning of concrete trucks. All washout waste shall be properly disposed of off-Project Site by Contractor in accordance with the Requirements.

2.10 Project Site Closeout and Restitution

- 2.10.1 Contractor shall remove all tools, equipment, surplus materials (including unused or useless materials), waste materials, temporary work (including temporary erosion control features), temporary buildings, temporary facilities (including batch plants, rock crushers, and office trailers), and rubbish from the Project Site prior to final completion, and shall cause any facilities used by Contractor during the performance of the Work to be restored to the same or better condition that such facilities and the Project Site were in on the date the Contractor commenced work at the Project Site, ordinary wear and tear excepted.
- 2.10.2 Contractor shall perform restitution, restoration, and/or reclamation of Work areas to include, but not limited to, the following. Notwithstanding anything that follows, all Work areas at the Project Site shall be restored, at a minimum, in accordance with the requirements set forth in the applicable permits, the SWPPP, and the other Requirements, as appropriate.
 - (1) Clean all drains and ditches at completion of the construction Work, and leave the Project Site in a neat and presentable condition wherever construction operations have disturbed the conditions existing at the time of starting the Work.
 - (2) Preserve and/or restore to their pre-construction condition all land and water resources adjacent to construction areas.
 - (3) Notwithstanding the following paragraph (a), Wind Turbine Pads, laydown areas, roadway shoulders, and roadway turning radii shall be decompacted and reclaimed, including proper grading, aggregate touchup, and seeding with an approved mixture.

- (a) Crane pads shall be preserved in a suitable manner to support the use of cranes in ongoing Wind Turbine maintenance activities following construction (e.g., cranes required for gearbox removal and / or installation).
- (4) Re-dress all road surfaces within the Project Site.
- (5) Seed all cut / fill slopes utilizing an approved seed mixture.
- (6) Fill all depressions and water pockets caused by construction operations, and remove all obstructions within waterways.
- (7) Spread surplus fill on-Project Site in areas and depths approved by Owner.
- (8) Spread recovered aggregate from laydown yard within approved disturbance limits at Owner-approved locations.
- (9) Collect large rocks or boulders unearthed during excavation as part of the Work but not utilized in the construction of the Project and store at an Owner-approved location at the Project Site.

3.0 LOGISTICS SERVICES

3.1 Transportation and Delivery

- 3.1.1 Contractor shall furnish and deliver all Equipment to the Project Site.
- 3.1.2 Contractor shall perform all off-Project Site clearing necessary for the transportation of Equipment to the Project Site, including, but not limited to, tree trimming / removal and clearing of overhead obstructions.
- 3.1.3 Contractor shall upgrade and maintain public roads, bridges, and culverts as required for the transportation of Equipment to the Project Site, and including obtaining any necessary permits.
- 3.1.4 Contractor shall furnish and operate assist vehicles (i.e., prime movers) as necessary for delivery and movement of Equipment at and within the Project Site and as needed to traverse steep grades.
- 3.1.5 Contractor shall inspect all delivery trucks upon arrival to the Project Site to ensure they are free of debris, mud, and vegetation, and to ensure they are in good mechanical condition. Contractor shall also regularly inspect trucks and other equipment for oil leaks. Any vehicles that fail to pass this inspection shall be turned away, unless expressly permitted by Owner.
- 3.1.6 Contractor shall complete a test run for Wind Turbine deliveries at the Project Site by use of non-loaded trucks to demonstrate that road dimensions will be appropriate for successfully delivering components from the Project Site entrance (to be defined by Owner) to the Wind Turbine Pads in the most critical points in terms of access. Such trial run(s) shall be completed prior to commencing deliveries of Wind Turbine equipment to the Project Site, and shall be coordinated between the Turbine Supplier, Owner, and Owner's contractors.

3.2 Offloading

- 3.2.1 Contractor shall receive, visually inspect, and inventory all equipment and material deliveries to the Project Site. Contractor shall submit reports to Owner within 24 hours of delivery regarding receipt, inspection, and inventorying of all such deliveries, including any damage identified.
- 3.2.2 Contractor shall furnish all rigging, tooling, hoisting equipment, lifting devices, and other similar items necessary to offload the equipment.
- 3.2.3 Contractor shall offload all equipment at the Project Site. Contractor shall offload and stage all Wind Turbine deliveries at the Wind Turbine Pad location nearest each Wind Turbine.
- 3.2.4 Contractor shall furnish and maintain protective tarps to eliminate unwanted materials from entering Wind Turbine equipment after removal of shrink wrapping.
- 3.2.5 Contractor shall furnish and install adequate measures to prevent Wind Turbine equipment from being blown over or otherwise damaged while stored at the Project Site. This shall include tie down of blades and other similar measures.

3.3 Coordination

- 3.3.1 Contractor shall actively coordinate the sequence of Work with Owner and Owner's contractors to support the Project Schedule.

- 3.3.2 Contractor shall coordinate with all transportation contractors to mitigate congestion within the Project Site. Contractor shall provide directions to the Project laydown yard to all heavy load transportation vehicles upon arrival to the Project Site and, if required by the transportation plan, Contractor shall provide an on-Project Site vehicle escort for all such deliveries to the respective delivery location(s).
- 3.3.3 Contractor shall coordinate with local utilities, railroad, and pipeline companies to facilitate crossings and interconnections necessary to perform the Work.
- 3.3.4 Reserved.

4.0 GEOTECHNICAL SERVICES

4.1 General Provisions

4.1.1 Contractor shall conduct all geotechnical, geophysical, and other similar subsurface investigations and testing necessary for the complete engineering, procurement, and construction of the Project. For the avoidance of doubt, all such investigations shall be completed before commencing the applicable Work.

4.2 Field Investigations

4.2.1 Contractor shall drill geotechnical borings and conduct material sampling at the location of each Wind Turbine; the location of the Project Substation; along the Interconnection Line; the location of the O&M Building; and the location of each free-standing meteorological tower, respectively.

4.2.2 Contractor shall perform soil resistivity measurements at the location of each Wind Turbine; the location of the Project Substation; along the underground Collection System Circuits; and along the Interconnection Line.

4.2.3 Contractor shall perform any additional geophysical or other site investigations, including, but not limited to, deepened borings, additional borings, test pits, seismic refractions, cone penetrometer soundings, *in situ* testing, and other similar or related methods, as necessary to supplement the required geotechnical investigations summarized herein or to otherwise provide the data and recommendations required in the geotechnical engineering report.

4.2.4 If using rock anchor foundations, Contractor shall perform a rock analysis to identify the presence of fissures, rock joints, or other discontinuities that will control the overall strength of the rock mass, including, but not limited to, rock mass rating, rock classifications, depth of overburden, rock quality designation, joint spacing and orientation, stratifications, rock material strength, and water pressure in joints.

4.3 Lab Testing

4.3.1 Contractor shall perform all laboratory testing of soil and rock samples as necessary to classify the materials and to obtain physical characteristics of the subsurface materials, such as strength, compressibility, and compaction.

4.4 Submittals

4.4.1 Contractor shall submit the following for review and approval by Owner *prior* to initiating subsurface investigations:

- (1) Name and qualification statement for proposed geotechnical engineer.
- (2) Proposed scope of subsurface investigation, including number, location, and depths of borings; anticipated plan for laboratory testing; and detailed descriptions of additional site investigation techniques, including electrical resistivity or other necessary testing.

4.4.2 Contractor shall submit a complete geotechnical engineering report containing the required information summarized in the Work Specifications.

5.0 CIVIL AND STRUCTURAL SERVICES

5.1 General Provisions

- 5.1.1 Contractor shall repair all drain tiles damaged during performance of the Work, including during road installation, Collection System Circuit installation, Turbine Foundation installation, crane walks, or otherwise. Repairs shall be consistent with or better than the original tile installation.
- 5.1.2 Contractor shall furnish, install, and maintain throughout the duration of the Work all fence crossings and gates at the Project Site.

5.2 Project Site Preparation

- 5.2.1 Contractor shall provide all Project Site preparation as necessary to complete the Work, including, but not limited to, all clearing, grubbing, stripping, grading, compaction, demolition, blasting, excavation, soil stabilization, drainage, roadways, and parking areas.
- 5.2.2 Contractor shall provide and maintain throughout the duration of construction activities all necessary construction surveying and marking necessary to construct the Project and complete the Work, to include, but not limited to, the following. Contractor shall be solely responsible for locating any survey monuments at or near the Project Site, and shall replace such monuments if they are disturbed during performance of the Work.
 - (1) Grading limits.
 - (2) Limits of disturbance.
 - (3) Access roads and crane paths.
 - (4) Project Substation pads.
 - (5) Collection System Circuit routing.
 - (6) Interconnection Line routing, including centerline and structure locations.
 - (7) O&M Building, including pads and parking area.
 - (8) Wind Turbine locations.
 - (9) Laydown and storage areas.
 - (10) Culturally-, archeologically-, and/or environmentally-sensitive areas.
 - (11) Utilities, pipelines, and other buried facilities.
- 5.2.3 Contractor shall maintain all construction areas throughout the duration of the Work. Maintenance of such areas shall include washboard removal, pothole removal, snow removal, and other similar items, in a condition suitable for daily construction traffic. Maintenance by Contractor of graveled roads at the Project Site is included in these maintenance requirements.

5.2.4 Contractor shall furnish, install, and maintain temporary orange snow fencing around all archeologically-, culturally-, and environmentally-sensitive areas at the Project Site, including those identified in the applicable permits. All temporary fencing shall be removed at the completion of construction.

5.3 Rock Excavation and Removal

5.3.1 Contractor shall excavate and remove all rock as necessary to complete the Work, including any necessary blasting. Contractor shall notify Owner prior to the use of explosives at the Project Site; no blasting shall be performed without explicit written confirmation by Owner.

5.4 Roads

5.4.1 Contractor shall design, furnish, construct, and install all roads, including Wind Turbine access roads, temporary turnarounds, intersection/radius improvements, crane paths, and transitions to/from existing roads.

5.4.2 Contractor shall design, furnish, construct, and install all public road improvements in accordance with the road use agreements, including upgrading and maintaining any public roads, bridges, and culverts as specified therein.

5.4.3 Contractor shall, prior to mobilization to the Project Site, videotape and document the condition of existing public roads for the purpose of quantifying the extent of any Contractor-caused wear and tear.

5.4.4 Contractor shall repair all wear, tear, and other damage to roads during and throughout construction of the Project, including, but not limited to, that which is caused by traffic or weather. Maintenance of Project roads by Contractor shall include, but not be limited to, washboard removal, pothole removal, and snow removal.

5.4.5 Contractor shall furnish, install, and maintain roadway gates according to the landowner agreements and other applicable Requirements.

5.4.6 Contractor shall inspect and test each roadway in accordance with the Work Specifications.

5.5 Turbine Foundations and Wind Turbine Pads

5.5.1 Contractor shall design, furnish, construct, and install one (1) Wind Turbine Pad per Wind Turbine location. Contractor shall maintain the Wind Turbine Pads throughout the duration of the Work.

5.5.2 Contractor shall design, furnish, construct, and install one (1) Turbine Foundation per Wind Turbine location, including grounding.

5.5.3 Contractor shall design, furnish, construct, and install a gravel ring (i.e., “beauty ring”) at each Wind Turbine location.

5.5.4 Contractor shall inspect and test each Wind Turbine Foundation and Wind Turbine Pad in accordance with the Work Specifications.

5.6 Drainage and Erosion Control

- 5.6.1 Contractor shall furnish, construct, install, and maintain all temporary and permanent drainage or erosion and sediment control, as necessary to control the erosion of embankments, temporary and final exposed slopes, and temporary stockpiles, and including the use of Best Management Practices (as defined in the Work Specifications).
- 5.6.2 Contractor shall furnish, construct, and install any necessary controls to protect water quality.
- 5.6.3 Contractor shall continuously monitor construction operations to avoid creating conditions that could lead to excessive erosion of soil with surface runoff from Work areas.

5.7 Dust Control

- 5.7.1 Contractor shall provide construction dust control at the Project Site throughout the duration of the Work, including furnishing of all labor, equipment, and materials, including water and/or palliatives, necessary for dust control and as necessary to reduce the risk of dust becoming a nuisance.

6.0 ELECTRICAL SERVICES

6.1 General Provisions

- 6.1.1 Contractor shall relocate, drop, or cross power lines as needed and as appropriate to complete the Work, with prior approval of the appropriate authority(ies). Contractor shall be responsible for obtaining and maintaining any necessary permits and / or easements for such work.
- 6.1.2 Contractor shall furnish and install ANSI-approved arc flash labels warning of the dangers of arc flash. Such labels shall be supplied and affixed to any equipment that may require service or maintenance while energized, as specified in the Contractor-provided arc flash study.
- 6.1.3 Contractor shall design and construct the Project such that the total annual energy losses under both fully-loaded conditions and Site-specific wind distribution data (to be provided by Owner), respectively, measured between the generator leads of each Wind Turbine and the Point of Interconnection shall not exceed 2.5 percent (2.5%) (the “**Electrical Loss Limit**”). For the avoidance of doubt, this shall include all medium-voltage transformers, Wind Turbine cabling, Collection System Circuit cabling, main step-up transformer, and the Interconnection Line up to the Point of Interconnection.
- 6.1.4 Contractor shall receive explicit approval from Owner or Owner’s representative(s) of the design of all transmission lines (including the Interconnection Line) and substations (including the Project Substation) prior to construction. Owner shall have unlimited access to such designs throughout the design process, and construction of all such facilities shall be completed by one of Owner’s approved subcontractors, as more particularly detailed in Appendix C (Wind) (Approved Subcontractors).

6.2 Collection System Circuits

- 6.2.1 Contractor shall design, furnish, construct, and install the Collection System Circuits.
- (1) Contractor shall furnish all labor, equipment, and materials that are necessary for a complete, fully-functional, and safe Collection System Circuit configuration.
 - (2) Contractor shall complete all electrical connections of the Wind Turbines to the Collection System Circuits, as more particularly described in Section 7.5.3 herein.
 - (3) Contractor shall complete all fiber optic terminations, including, but not limited to, those at the Wind Turbines, O&M Building, Project Substation, and permanent meteorological towers.
- 6.2.2 Contractor shall perform directional boring at all Collection System Circuit crossings with a stream, county road, pipeline, or other buried facility.
- 6.2.3 Contractor shall test, commission, start-up, and place into successful operation each Collection System Circuit, including the electrical infrastructure, communications infrastructure, and pad-mount transformers (if any). At a minimum, testing shall include all requirements set forth in the Work Specifications.

6.3 Project Substation

6.3.1 Contractor shall design, furnish, construct, and install one (1) Project Substation.

- (1) Contractor shall furnish all labor, equipment, and materials that are necessary for a complete, fully-functional, and safe Project Substation configuration.
- (2) Contractor shall furnish all capacitor banks, reactors, and/or other reactive compensation equipment necessary for the Project.
- (3) Contractor shall furnish and install fencing around the perimeter of the Substation, including one (1) man-gate and one (1) vehicle gate, respectively.
- (4) For purposes of the Proposal, a full CCTV system is not required at the Project Substation, although Contractor shall install conduits and gang boxes (including covers for gang boxes) and leave appropriate space for future installation of a CCTV system at the Project Substation.
- (5) Contractor shall furnish main step-up transformers in the quantity shown in the Work Specifications.

6.3.2 Contractor shall test, commission, start-up, and place into successful operation the Project Substation, including the electrical infrastructure and communications infrastructure. At a minimum, testing shall include all requirements set forth in the Work Specifications.

6.4 Interconnection Line

6.4.1 Contractor shall design, furnish, construct, and install the Interconnection Line.

- (1) Contractor shall furnish all labor, equipment, and materials that are necessary for a complete, fully-functional, and safe Interconnection Line configuration.
- (2) Contractor shall furnish all Work up to the point of delineation with the interconnecting utility at the interconnection switchyard / substation.

6.4.2 Contractor shall test, commission, start-up, and place into successful operation the Interconnection Line, including the electrical infrastructure and communications infrastructure. At a minimum, testing shall include all requirements set forth in the Work Specifications.

6.5 Communications System

6.5.1 Contractor shall design, furnish, construct, and install the Communications System, including the Turbine SCADA System.

- (1) Contractor shall furnish all labor, equipment, and materials that are necessary for a complete, fully-functional, and safe Communications System configuration.
- (2) Contractor shall furnish and install all network and communication devices, including programming and configuration, necessary for the Communications System.
- (3) Contractor shall provide an open-process control (“**OPC**”) interface for communication with Owner’s OSI PI historian.

(4) Contractor shall furnish and install all fiber optic cabling between the Wind Turbines, Project Substation, and O&M Building.

6.5.2 Contractor shall test, commission, start-up, and place into successful operation the Communications System, including the electrical infrastructure and communications infrastructure, and including the Turbine SCADA System. At a minimum, testing shall include all requirements set forth in the Work Specifications.

6.6 Interconnection Substation / Switchyard

6.6.1 Contractor shall design, furnish, construct, and install the interconnection switchyard / substation, or cause such work to be performed by the interconnecting utility under the terms of the Project's interconnection agreement. All such work shall be completed in accordance with the Work Specifications or the interconnecting utility's requirements, whichever is more stringent.

7.0 WIND TURBINES

7.1 General Provisions

- 7.1.1 Contractor shall meet with Owner and Turbine Supplier prior to installation of the first Wind Turbine to participate in a one-day, in-person page turn of the Wind Turbine installation manual.
- 7.1.2 Contractor shall clean and wash all external Wind Turbine surfaces prior to erection to remove dirt generated by delivery and on-site storage.

7.2 Equipment Supply

- 7.2.1 Contractor shall furnish complete, fully-functional Wind Turbines, in a quantity sufficient to comprise the Project capacity. Wind Turbines shall be delivered to the Wind Turbine Pad location nearest each Wind Turbine.
 - (1) A climb assist system (one per Wind Turbine) shall be included in the Proposal as *optional* equipment; if a climb assist is standard equipment in the proposed Wind Turbine model, the Proposal shall indicate as much.
 - (2) A service lift system (one per Wind Turbine) shall be included in the Proposal as *optional* equipment; if a service lift is standard equipment in the proposed Wind Turbine model, the Proposal shall indicate as much.
 - (3) The Turbine Equipment shall be factory tested in accordance with the minimum requirements set forth in the Work Specifications and Owner shall have the right to witness such testing as set forth therein.
- 7.2.2 Contractor shall furnish the following Turbine Equipment, all to be delivered to the Project Site laydown yard:
 - (1) Turbine SCADA System.
 - (2) Anchor cages (one (1) per Wind Turbine), each including anchor bolts, PVC, embedment ring, nuts, washers, leveling nuts, and anchor bolt protective caps.
 - (3) Wind Turbine Foundation bolt templates for tower erection and, more particularly, for anchor bolt alignment, in a sufficient quantity to support the Wind Turbine Foundation installation schedule.
 - (4) Obstruction light brackets.
 - (5) Obstruction lights, including wiring.
 - (6) Wind Turbine earthing system
 - (7) Medium-voltage transformers.
- 7.2.3 Contractor shall furnish all containers, stands, frames, feet, racks, and any other items required to transport the Turbine Equipment (collectively, the “**Delivery Devices**”) and all specialized lifting and rigging equipment necessary for Wind Turbine offloading or installation (collectively, the “**Special Tools**”).

- 7.2.4 Contractor shall furnish and deliver to the Project Site all consumables, consumable parts, and installation spare parts necessary or appropriate to perform the Work.
- (1) Contractor shall furnish touch-up paint as necessary to repair any damage to Turbine Equipment that occurs during the transportation, offloading, erection, and/or commissioning of the Wind Turbines.
 - (2) Contractor shall furnish the first fill of all grease, oil, and other lubricants and consumables in the Turbine Equipment. All such lubricants and consumables shall be approved by Owner prior to use.
 - (3) Contractor shall furnish protective tarps to eliminate unwanted materials from entering Turbine Equipment after removal of shrink wrapping.
- 7.2.5 Contractor shall furnish all dehumidifiers, turning gears, and other similar equipment and tools that are necessary to properly store and maintain the Turbine Equipment prior to Wind Turbine erection in accordance with the storage instructions.
- 7.2.6 Contractor shall provide an arc flash hazard analysis of the Turbine Equipment and ANSI-approved warning labels warning of the dangers of arc flash to be affixed to any Turbine Equipment that may require service or maintenance while energized.
- 7.2.7 Contractor shall furnish the Spare Parts Inventory, as more particularly described in the Agreement.

7.3 Freewheeling

- 7.3.1 Contractor shall provide standstill maintenance (i.e., freewheeling) of Wind Turbines during construction, if necessary.

7.4 Technical Advisors

- 7.4.1 Contractor shall provide (via Turbine Supplier) technical advisors at the Project Site to provide advice, consultation (including answering questions), and clarification regarding the Turbine Supplier manuals, specifications, and other Wind Turbine-related technical documents. Such technical advisors shall be available during the loading, offloading, assembly, erection, installation, storage, and achievement of mechanical completion of the Turbine Equipment.

7.5 Equipment Installation

- 7.5.1 Contractor shall apply touch-up paint as necessary to repair any damage to Wind Turbine equipment, including damage that occurred prior to or during Wind Turbine erection.
- 7.5.2 Contractor shall assemble, install, construct, and erect all Wind Turbines, including all components, equipment, down-tower assembly, stairs, climb assists (if elected by Owner), service lifts (if elected by Owner), and other similar items, and including furnishing of the main crane(s) with suitable capacity for Wind Turbine erection.
- (1) Contractor shall furnish all labor, equipment (including rigging, tooling, hoisting equipment, and lifting devices), and materials that are necessary to assemble and install the Wind Turbines.

- (2) Contractor shall design, furnish, construct, and install concrete pads for the stair support columns and stair landing for each Wind Turbine.
 - (3) Contractor shall grout, install, shim, and level all tower base sections, including providing all necessary grease, shim packs, leveling feet, and other necessary items or consumables.
 - (4) Contractor shall furnish and install one (1) fire extinguisher (sized according to the Applicable Standards and other Requirements) and one (1) fire extinguisher bracket in each Wind Turbine, as required by local fire codes or other Requirements.
- 7.5.3 Contractor shall install the electrical wiring and cabling in each Wind Turbine, including all necessary pulling, dressing, lugging, taping, splicing, and terminations, to interface to the Turbine Foundation.
- (1) Contractor shall furnish all labor, equipment, and materials that are necessary for the electrical connection of the Wind Turbines to the Collection System Circuits, including all down-tower cabling.
 - (2) Contractor shall install the grounding system in each Wind Turbine, including grounding of Wind Turbine stairs.
 - (3) Contractor shall furnish and install all temporary Wind Turbine obstruction lights, including wiring and mounting brackets.
 - (4) Contractor shall furnish and install all permanent Wind Turbine obstruction lights, including wiring and mounting brackets.
 - (5) Contractor shall test the Wind Turbine tower electrical wiring and cabling. At a minimum, testing shall include all requirements set forth in the Work Specifications.
- 7.5.4 Contractor shall successfully achieve mechanical completion of each Wind Turbine, including documentation of progress on Turbine Supplier-supplied forms for each Wind Turbine, in accordance with the applicable instructions set forth in the installation manual and mechanical completion checklists.
- 7.5.5 Contractor shall provide a final broom cleaning of each Wind Turbine prior to handoff following mechanical completion.
- 7.5.6 Contractor shall collect and repackage all returnable items on loan from Turbine Supplier, including, but not limited to, shipping frames, delivery devices, brackets, lifting and rigging equipment, specialized tooling, and other returnable items. Contractor shall repackage all such items inside emptied parts containers according to instructions provided by Turbine Supplier, and shall provide inventory tracking and packing lists for such repackaged items. Contractor shall load all such repackaged items on transport trucks as made available by Turbine Supplier at the Project laydown yard according to the schedule set forth in the Agreement. Contractor shall be responsible for moving all such items from the Wind Turbine Pads to the laydown yard for transport as necessary.
- 7.5.7 Contractor shall provide qualified personnel to perform lock-out / tag-out, switching, and other similar activities during the commissioning of the Wind Turbines by Turbine Supplier.

7.6 Inspection and Commissioning

- 7.6.1 Contractor shall complete all fiber optic communications system terminations in each Wind Turbine and at the Turbine SCADA System server, respectively.
- 7.6.2 Following mechanical completion of each Wind Turbine, Contractor shall perform an inspection of each Wind Turbine. During inspection, if deficiencies or discrepancies in the requirements of the installation manual or any other Requirement are discovered, Contractor shall inform Owner of the discrepancy and such discrepancy shall be resolved prior to Wind Turbine commissioning.
- 7.6.3 Contractor shall start-up, test, commission, and successfully achieve commissioning completion of all Wind Turbines and other Turbine Equipment, including the Turbine SCADA System and service lifts (if elected by Owner), and including achievement of SCADA completion and all reliability tests being successfully run, including all testing set forth in the Work Specifications.

7.7 Coordination

- 7.7.1 Contractor shall actively coordinate the sequence of Work with Owner and Turbine Supplier to support the Project Schedule.
- 7.7.2 Contractor shall coordinate with Turbine Supplier on the handoff following mechanical completion. At a minimum, such coordination shall ensure that Turbine Supplier is aware that the respective Wind Turbine has successfully completed mechanical completion so that Turbine Supplier may commence inspection and commissioning activities. Additionally, Contractor shall share reasonable information with Turbine Supplier and turn over Wind Turbine access to Turbine Supplier as part of this coordination.
- 7.7.3 Contractor shall attend and actively participate in all Wind Turbine mechanical completion walk-downs with Turbine Supplier.
- 7.7.4 Contractor shall provide qualified support personnel to perform all lock-out-tag-out, switching, startup and testing activities in connection with Turbine Supplier's commissioning, start-up and testing of the Wind Turbines.
- 7.7.5 Contractor shall coordinate with Turbine Supplier on any termination of power or fiber optic cabling in Wind Turbines following mechanical completion.
- 7.7.6 Contractor shall coordinate with the meteorological tower consultant on the installation of the meteorological towers and the termination of cabling during installation.

8.0 METEOROLOGICAL TOWERS

8.1 Power Curve Testing

8.1.1 Contractor shall include a Wind Turbine power curve test as a separate and optional line item in the Proposal. Such test shall be designed and performed in accordance with the Work Specifications, and shall include a number of tested Turbines consistent with the number of permanent meteorological towers to be installed (see Section 8.2.1 below).

- (1) The Proposal shall include the guaranteed power curve level in the event the optional test is elected by Owner, as well as all test parameters expected to be incorporated (e.g., description of uncertainties, shear and turbulence filters, etc.).
- (2) The optional price for the initial power curve test, if elected, shall be paid by Owner. However, should subsequent tests be performed at Contractor's option or because the initial test is unsuccessful, all such costs shall be the responsibility of Contractor.

8.2 Existing Meteorological Towers

8.2.1 Contractor shall decommission any existing, temporary meteorological towers at the Project Site. All equipment from these existing towers shall be removed from the Project Site.

8.3 Permanent Meteorological Towers

8.3.1 Contractor shall design, furnish, construct, and install permanent meteorological towers according to the following schedule and based on the number of Wind Turbines installed.

No. of Wind Turbines Installed	No. of Permanent Met Towers
Less than 50	2
51 to 100	4
101 to 150	6
151 to 200	8
201 to 250	10
251 to 300	12

- (1) Contractor shall furnish all labor, equipment, and materials that are necessary for a complete, fully-functional, and safe permanent meteorological tower configuration.
 - (2) Contractor shall furnish and install fencing and gates around each permanent meteorological tower.
- 8.3.2 Contractor shall test, commission, start-up, and place into successful operation the permanent meteorological towers. At a minimum, testing shall include all requirements set forth in the Work Specifications.

8.4 Temporary Meteorological Towers

- 8.4.1 If Owner elects the optional power curve test, Contractor shall design, furnish, construct, and install temporary meteorological towers in the same quantity as the permanent meteorological towers.
- (1) Contractor shall furnish all labor, equipment, and materials that are necessary for a complete, fully-functional, and safe temporary meteorological tower configuration.
- 8.4.2 If Owner elects the optional power curve test, Contractor shall test, commission, start-up, and place into successful operation the temporary meteorological towers. At a minimum, testing shall include all requirements set forth in the Work Specifications.
- 8.4.3 If Owner elects the optional power curve test, Contractor shall decommission all temporary meteorological towers at the conclusion of Owner's site calibration test; such work shall include removal and disposal of any meteorological tower foundations. All equipment from these towers shall be stored at an Owner-designated location at the Project Site. Removal of such temporary meteorological towers must occur prior to the commencement of Turbine Foundation construction and Wind Turbine erection activities for the applicable Wind Turbine.

9.0 O&M BUILDING

9.1 General Provisions

9.1.1 Contractor shall design, furnish, construct, and install one (1) O&M Building.

- (1) Contractor shall furnish all labor, equipment, and materials that are necessary for a complete, fully-functional, and safe O&M Building configuration.
- (2) Contractor shall furnish and install a backup generator for the O&M Building.
- (3) Contractor shall furnish and construct an oil storage building.
- (4) Contractor shall furnish and construct a garbage enclosure.
- (5) Contractor shall furnish and install fencing around the perimeter of the O&M Building, including one (1) man-gate and one (1) vehicle gate, respectively.
- (6) Contractor shall provide professional cleaning service for the O&M Building at the conclusion of the Work, including, but not limited to, cleaning light fixtures, mirrors, sinks, toilets, cabinets, and lockers; washing floors; washing windows; and waxing VCT.

10.0 SERVICE AND MAINTENANCE

10.1 General

- 10.1.1 Contractor shall provide all planned and unplanned maintenance for the facility (including Turbines and all balance-of-plant infrastructure), management services, administrative services, and other similar activities throughout the term of the Agreement and until such time that Owner assumes control of the facility, as further described in RFP Appendix K (*Wind General Services Contract-Operations and Maintenance Services*).