GENERAL INFORMATION ABOUT THE PROPOSED FACILITY

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B.1 GENERAL INFORMATION ABOUT THE PROPOSED FACILITY

OAR 345-021-0010(1)(b) Information about the proposed facility, construction schedule and temporary disturbances of the site, including:

OAR 345-021-0010(1)(b)(A) A description of the proposed energy facility, including as applicable:

Response: EC&R Development, LLC (Applicant) proposes to construct the Brush Canyon Wind Power Facility (Facility) in Wasco and Sherman counties, Oregon. The proposed Facility is located largely northeast of the City of Antelope and east of U.S. Route 97 (US 97) on approximately 76,072 acres of private land (see Exhibit C, Figure C-1, for a map of the Facility site vicinity). The Applicant proposes to construct up to 223 turbines. An approximately 32-mile, 230-kilovolt (kV) overhead transmission line will interconnect the Facility to the rebuilt Bonneville Power Administration (BPA) Buckley substation, located approximately 10 miles southwest of the incorporated city of Grass Valley. The transmission line corridor spans 75 feet on either side of centerline, resulting in a total corridor of approximately 590 acres within the overall 76,072-acre site boundary. Exhibit C, Figure C-2, is a map of the Facility layout and Figures C-3a through C-3d are maps of the Facility components.

Facility components are proposed on private land for which the Applicant has negotiated or is in the final stages of negotiating long-term wind energy leases or easements with the landowners. Easements also will be negotiated with adjacent landowners and wind energy developers for road and collector line access, as needed.

Facility construction is anticipated to begin in early 2015. The completion of construction, commissioning of the Facility, and start of commercial operations are targeted for the end of 2015. Given that construction could conceivably be delayed by weather or other unforeseen circumstances such as market changes and BPA’s substation construction as described in this Exhibit, the Applicant would like the flexibility to build the Facility in one or more phases, and proposes to commence construction of the first phase within 5 years after the effective date of the site certificate, with a deadline for construction completion of 6 years from issuance of the site certificate.

(i) The nominal electric generating capacity and the average electrical generating capacity, as defined in ORS 469.300.

Response: The proposed Facility is expected to provide a nominal generating capacity of up to 535 megawatts (MW) and up to 178 average megawatts (aMW) of energy.

B.2 MAJOR COMPONENTS, STRUCTURES, AND SYSTEMS

(ii) Major components, structures and systems, including a description of the size, type and configuration of equipment used to generate electricity and useful thermal energy.

Response: Major components, structures, and systems associated with the proposed Facility are the turbines, including the nacelle, blades, rotor, and tower; turbine foundations; and the generator step-up (GSU) transformer and transformer foundations. Sections B.2.1, B.2.2, and B.2.3 describe the turbines, foundations, and GSU transformer, respectively. Sections B.2.4 through B.2.7 describe additional structures and systems.

B.2.1 Turbines

B.2.1.1 Size, Quantity, and Type

The Applicant proposes to construct up to 223 turbines with a combined generating capacity of up to 535 MW. The actual nameplate capacity will depend on the turbine model selected and the number of
turbines constructed. Because turbine make and model have not been selected and the facilities have not been microsited (see B.2.1.3 Micrositing Flexibility), the Applicant requests the ability to select from turbines ranging in size from 1.6 to 2.4 MW, with blade tip heights ranging from 410 to 492 feet. These turbine sizes represent the range of technologies currently available on the market that may be feasible at the site.

B.2.1.2 Configuration

Environmental studies and detailed engineering and constructability evaluations are still underway. As a result, the Applicant has not yet selected a final turbine size and type. For resources protected by a Council standard, the Applicant analyzes the proposed 223-turbine layout regardless of turbine size and type selected (each turbine will disturb the same amount of land). For example, the analysis methodology for visual resources captures the worst-case impacts from the tallest (492-foot-high) turbine option, and the analysis methodology for noise impacts and compliance captures the worst-case impacts from the 223-turbine layout based on the maximum anticipated turbine sound power level. Estimated land disturbance calculations from Facility construction and operation are detailed in Exhibits C and P.

B.2.1.3 Micrositing Flexibility

The Applicant proposes a micrositing corridor permitting approach for turbines, as well as for collector lines, roads, and other related or supporting facilities, including the transmission line. This approach allows flexibility in the final orientation of Facility components, and minimizes or avoids impacts to wildlife, habitat, and other resources. Micrositing also provides flexibility in reaching final easement agreements with landowners and selecting turbine vendors and sizes to both maximize the use of the wind resource and minimize ground disturbance. The Applicant can optimize the final layout while assessing possible impacts using a worst-case scenario, thus demonstrating to the regulatory agencies that the Facility will meet applicable regulatory standards for all potential turbine options considered. Before construction, the Applicant will determine the exact type, number, and location of the turbines and all related or supporting facilities based on the turbine model selected and other siting criteria.

B.2.1.4 Components and Specifications

A typical wind turbine and tower, as shown in Figure B-1, consists of a tubular steel tower mounted on a reinforced concrete foundation, and the nacelle, which houses equipment such as the gearbox and supports a rotor with three blades. The total height of the turbine tower and blades (tip-height) is expected to be between 410 and 492 feet. Turbines will interconnect with an onsite power collection system that will be connected to two proposed new onsite Facility collector substations. The turbines will be grouped in linear strings, and some will include aviation safety warning lights as required by the Federal Aviation Administration (FAA). The number of turbines with lighting and the lighting plan will be determined in consultation with the FAA.

Nacelle

The nacelle houses several of the turbine components, including the turbine’s main shaft, gearbox, brakes, bearings, cooling system, hydraulic systems, yaw gears, and generator. In some models, the GSU transformer is located in the nacelle. The GSU transformer will increase the turbine output voltage from a maximum of 690 volts to the collection system voltage of 34.5 kV. The nacelle and the associated components (without the blades and rotor) weigh between 77 and 90 tons, depending on the model selected. The nacelle will also have an anemometer to measure wind speeds and direction, which in turn, controls the yaw mechanism to turn the nacelle and rotor to capture the wind.
**Blades and Rotor**

Three turbine blades attach to the turbine’s main shaft at the blade hub. The combined weight of the three blades and blade hub is between 41 and 82 tons. Depending on the turbines selected, the blades will be made of either carbon fiber or laminated fiberglass. For the range of turbine sizes selected, the blades are between 131 and 190 feet in length. When in motion, the blades will cover an area of between 270 and 384 feet in diameter, which in this application is referred to as the rotor swept height.

The rotor’s rotational speed ranges from 10 to 15 revolutions per minute. The turbines operate on a variable pitch principal in which the rotor blades rotate about their axis to maintain an optimum position to maximize electrical output for wind speeds while maintaining a constant rotational speed. The turbines will begin to generate electricity at wind speeds of approximately 9 miles per hour (mph) and will be shut down at speeds exceeding 56 mph.

**Towers**

The tower supporting the wind turbine is tapered from the base to the hub, with a base diameter of 14 to 20 feet and rising between 262 and 328 feet in height, as illustrated in Figure B-1. The tower is hollow and houses a ladder to access the nacelle and electrical components. A self-diagnosing controller is located inside the base within the tower. Each tower will feature a locked entry door at ground level and an internal access ladder with safety platforms for access to the nacelle. Towers will be fabricated in sections and assembled onsite. Towers will be uniformly painted an FAA-approved color suitable for daytime marking and air navigation. The tower will be designed to withstand the maximum wind speeds expected at the Facility—typically 25 meters per second (m/s) (56 mile per hour [mph]) at hub height (or as required by local building code, as described in Exhibit K).

**B.2.2 Turbine Foundations**

The towers are mounted on a reinforced concrete foundation. Depending on soil conditions, foundations may include a spread, pier, or similar footing type. Regardless of the footing type, a permanent cleared area of up to 60 feet in diameter will be maintained around each turbine. Figure B-2 presents a typical pier- and spread-type footing foundation. The actual foundation design for each turbine will be determined based on site-specific geotechnical information and structural loading requirements of the selected turbine model.

All temporary impacts associated with turbine installation will be reclaimed as described in Exhibit C of this Application for Site Certificate (ASC).

**B.2.3 Generator Step-Up Transformer and Transformer Foundations**

For most turbine types, a GSU transformer will be installed at the base of each wind turbine to increase the output voltage of the turbine to the voltage of the power collection system (typically 34.5 kV). Small concrete slab foundations will be constructed to support the GSU transformers.

Figure B-3 shows the typical GSU transformer and its foundation. In this figure, the transformer is installed at the base of the tower, rather than inside it. The transformer is a rectangle measuring approximately 7.5 feet by 8.5 feet. Support for the transformer will be provided by a concrete pad or foundation approximately 8 inches thick, which will be placed over 2 feet of weak concrete fill. The weak concrete fill will measure 7.5 feet by 13.5 feet and will be placed under the transformer pad and between the transformer and the tower pedestal. The entire support structure will be above 3 feet below grade. Approximately 1.5 cubic yards will be used in the pad and approximately 11 cubic yards will be used in the concrete fill, for a total of approximately 13 cubic yards of concrete per transformer.
B.2.4 Site Plan and General Arrangement

(iii) A site plan and general arrangement of buildings, equipment and structures.

Response: Figure B-4 shows a typical turbine layout site plan, with dimensions for the turbine tower base, foundation, underground circuitry, and access roads. Figures C-2 and C-3 in Exhibit C illustrate the preliminary 223-turbine layout.

B.2.5 Fuel and Chemical Storage Facilities

(iv) Fuel and chemical storage facilities, including structures and systems for spill containment.

Response: The Applicant does not anticipate producing, using, storing, transporting, or disposing of extremely hazardous materials (as defined by 40 Code of Federal Regulations [CFR] 335) during Facility operation and maintenance. Lubricants, oils, greases, antifreeze, cleaners, degreasers, and hydraulic fluids used in Facility operation and maintenance will be stored in the O&M building, in approved containers located above ground. Similarly, lubricants, oils, greases, antifreeze, cleaners, degreasers, or hydraulic fluids being held for delivery to a certified recycling transporter will be temporarily stored in the O&M building in approved containers that will be located above ground. Production, use, storage, transport, and disposal of any hazardous materials associated with the proposed Facility will be in strict accordance with federal, state, and local government regulations and guidelines. Exhibit G of this ASC provides a detailed description of hazardous materials handling and disposal.

B.2.6 Equipment and Systems for Fire Prevention and Control

(v) Equipment and systems for fire prevention and control.

Response: South Sherman Fire and Rescue and the Shaniko Volunteer Fire Department will provide fire protection to the Facility area. The Applicant will notify South Sherman Fire and Rescue and the Shaniko Volunteer Fire Department of construction plans, identify the location of and access to Facility structures, and assist if able in the case of fire in or around the Facility area. The site will be equipped with fire protection equipment in accordance with the Oregon Fire Code.

The wind turbines in the Facility will be provided with built-in fire prevention equipment that shuts the turbines down automatically before mechanical problems create excess heat or sparks. The use of underground power collector lines substantially reduces the risk of fire from short circuits caused by wildlife or lightning. Most of the Facility's proposed new access roads are oriented perpendicular to the prevailing winds and thus serve as effective fire breaks. A temporary staging area around each turbine site will remain cleared of vegetation throughout the construction process and a permanent cleared area of 60 feet in diameter will be maintained around each turbine. After construction has been completed, there will be no welding, cutting, grinding, or other flame- or spark-producing operations near the turbines. The Applicant will revegetate this cleared area with agricultural crops or native grasses, as appropriate. A Fire Prevention Plan will be prepared in coordination with South Sherman Fire and Rescue and the Shaniko Volunteer Fire Department before construction and operation. Details of consultation between the Applicant and local fire departments, and their ability to provide services, are presented in Exhibit U of this ASC.

All onsite employees for both construction and operations will receive annual fire prevention and response training by a professional fire safety training firm. South Sherman Fire and Rescue and the Shaniko Fire Department will be asked to participate in this training. Before each fire season and upon hire of new employees or subcontractors, an orientation concerning fire hazards, fire safety, emergency notification procedures, use of fire safety equipment, fire safety rules and regulations, and the conditions
of approval will be provided by the employer. Employees will be prohibited from smoking outside of company vehicles during dry summer months.

Each company vehicle onsite will contain a fire extinguisher, 5-gallon backup pump, shovel, emergency response procedures, and a two-way radio for immediate communications with the O&M facility. The O&M facility staff will coordinate fire response efforts. Water receptacles will be present at appropriate locations around the Facility to be determined in consultation with the local fire departments. At a minimum, 5,000 gallons of water storage receptacles will be brought to any job site where there is a substantial risk of fire. Each receptacle will be equipped with a pump and hoses. The pumps will be 5-horsepower (hp) engine-driven units with a pumping rate of approximately 60 gallons per minute. One-inch hoses will be stored with each water receptacle. Finally, the water receptacles can be towed by a number of vehicles, including service trucks and pickup trucks; such vehicles will be present in sufficient numbers during construction and operation of the Facility. Local fire departments will have maps and gate keys to the Facility site.

B.2.7 Energy Sources Not Applicable to Proposed Facility

B.2.7.1 Thermal Power Plants

(vi) For thermal power plants

(I) A discussion of source, quantity and availability of all fuels proposed to be used in the facility to generate electricity or useful thermal energy;

(II) Process flow, including power cycle and steam cycle diagrams to describe the energy flows within the system;

(III) Equipment and systems for disposal of waste heat;

(IV) The fuel chargeable to power heat rate;

Response: The above rules are not applicable to wind power generation.

B.2.7.2 Underground Gas Storage

(vii) For surface facilities related to underground gas storage, estimated daily injection and withdrawal rates, horsepower compression required to operate at design injection or withdrawal rates, operating pressure range and fuel type of compressors.

Response: The above rules are not applicable to wind power generation.

B.2.7.3 Liquefied Natural Gas

(viii) For facilities to store liquefied natural gas, the volume, maximum pressure, liquefaction and gasification capacity in thousand cubic feet per hour.

Response: The above rules are not applicable to wind power generation.

B.3 MAJOR COMPONENTS, STRUCTURES, AND SYSTEMS OF RELATED OR SUPPORTING FACILITIES

OAR 345-021-0010(1)(b)(B) A description of major components, structures and systems of each related or supporting facility.
Response: Related or supporting facilities consist of the 34.5-kV power collector lines, two Facility collector substations, a 230-kV transmission line and interconnection substation, communication and Supervisory Control and Data Access (SCADA) systems, an O&M building, meteorological towers, access roads, and additional temporary construction areas such as staging areas and two batch plants.

B.3.1 Power Collector Lines

The Facility’s power collector lines will be installed along and between the turbine strings. The collector lines are designed to collect power generated by each wind turbine and route the power to two Facility collector substations. The collector lines will operate at 34.5 kV.

B.3.1.1 Underground Lines

Most of the 34.5-kV collector lines, approximately 92 miles, will be buried underground in a trench approximately 3 feet wide and not less than 2 to 3 feet deep. Specific trench depth will be based on geotechnical conditions and local requirements, and in accordance with National Electric Safety Code, which requires a minimum burial depth of 30 inches or as required to protect the cable from site conditions. Trenches will be sited in areas paralleling existing or new roads where possible, to minimize ground disturbance. The trenches will be backfilled and fill material will be buried with the line for protection and insulation. Intermittent cable and junction splice boxes will be located on the ground surface above the underground collector lines.

B.3.1.2 Junction Boxes

Intermittent cable and junction splice boxes will be located on the ground surface above the underground cabling. The specific number of junction boxes to serve the power collection system will depend on the final turbine layout. Typically, two junction boxes are needed for every 10 turbines. For example, a maximum of 23 junction boxes will be used for the Facility based on a maximum layout of 223 turbines.

B.3.1.3 Aboveground Lines

As stated above, approximately 92 miles of collector lines will be placed underground; however, in some locations, the 34.5-kV collector lines may be constructed aboveground. The Applicant requests flexibility in siting a limited amount of overhead 34.5-kV lines, for areas where underground lines not feasible. Approximately 3.4 miles of 34.5-kV collector lines may run on overhead wooden monopole structures ranging from 40 to 50 feet in height. The poles will contain up to two circuits. Overhead pole structures will allow the collector lines to span terrain such as canyons and intermittent streams, thus reducing environmental impacts.

Final siting of the collector system will be identified once final engineering drawings are completed. This information will be presented to Sherman and Wasco counties, and to the Oregon Department of Energy, in a building permit application to be submitted to the Mid-Columbia Building Code Services before construction, in accordance with Oregon Revised Statute (ORS) Chapter 455 (see Exhibit E). Figure B-5 shows typical overhead 34.5-kV support structures.

B.3.2 Collector Substations

Two Facility collector substations are proposed. One collector substation will be located in the southern portion of the site boundary, and the second collector substation will be located in the northern portion of the site boundary (see Figure C-3 for approximate locations). Power from the turbines will be collected at 34.5-kV and transmitted by underground or overhead lines to the collector substations where the power will be converted to 230 kV. A 230-kV line will connect the southern collector substation to the
northern collector substation, and continue from the northern collector substation to BPA’s existing 500-kV line at the Buckley substation, which BPA proposes to rebuild.

The Facility collector substations will be situated in an area covering approximately 4 acres each. Both substations will contain circuit breakers, power transformers, bus and insulators, disconnect switches, relaying, battery and charger, surge arrestors, AC and DC supplies, control house, metering equipment, SCADA system provisions, grounding and associated control wiring.

The Facility collector substations will be located on private land. The Applicant requests flexibility in the siting of the Facility collector substations pending final engineering drawings. The substation sites will be cleared and graded. Each site will contain concrete foundations, steel support structures, a small control building, aboveground electrical equipment, an access road, and communications links via fiber optic cable or microwave. Each substation site perimeter will be secured by a chain-link fence with a locked gate, intrusion detection, and other security features. The fenced area will be graveled with space for a transformer, switching equipment, and utility vehicle parking. Transformers will be oil-filled and will not contain polychlorinated biphenyls (PCBs).

B.3.3 Communication and SCADA Systems

Fiber optic or copper communication lines will follow the collector lines. The communication line will run from each wind turbine to the Facility collector substations and the O&M building (see Section B.3.6 for a description of the O&M building). The communication system will allow individual wind turbines and other facilities to be monitored and controlled both onsite (in the O&M building) and from remote locations. The communication system will also follow the 230-kV overhead transmission line from the Facility collector substations to the interconnection substation.

Additionally, wind turbines will be equipped with computer control systems to monitor variables such as wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch, and yaw angles. Each turbine will be connected to a central SCADA system, which allows for remote control and monitoring of individual turbines and the wind plant as a whole from the central host computer or from a remote computer.

B.3.4 230-kV Transmission Line and Interconnection Substation

The Applicant is proposing a new 32-mile overhead, 230-kV transmission line that will connect the Facility to BPA’s 500-kV transmission line at the Buckley substation. BPA has indicated to the Applicant that Buckley substation is a Gas Insulated Substation, an obsolete piece of equipment that cannot be expanded and needs to be rebuilt. Although BPA has a long-term plan to replace Buckley with a new air-insulated, 500-kV substation at the same location, the Brush Canyon Facility would accelerate that plan because Buckley is not currently capable of accommodating the interconnection with this obsolete design. BPA has indicated that replacing Buckley will require 24 to 30 months to complete once work has begun. BPA cannot begin work on Buckley until the Applicant has received a site certificate from the Energy Facility Siting Council.

The 230-kV transmission line corridor will extend for approximately 12 miles from the southern collector substation to the northern Facility collector substation, and continue for 20 miles from the northern collector substation to BPA’s existing 500-kV line at the rebuilt Buckley substation. The transmission line corridor spans 75 feet on either side of centerline, resulting in a total corridor of approximately 590 acres within the overall site boundary acreage. The Applicant is considering the following two options for 230-kV overhead transmission line support structures:
• Steel monopole structures extending 120 feet above grade and spaced 400 to 650 feet apart
• Wooden H-frame structures extending 85 feet above grade and spaced 400 to 500 feet apart

Figure B-6 shows typical 230-kV single-circuit and H-frame support structures. Figure C-2 in Exhibit C shows the transmission line route.

B.3.5 Permanent Meteorological Towers

The Applicant will install up to 10 permanent meteorological (met) towers within the Facility site boundary for the collection of wind speed and direction. Each met tower will be approximately 262 feet (80 meters) tall and consist of a self-supporting three-faced lattice tower. The foundation will consist of three circular concrete foundations, one for each leg of the tower. Each concrete foundation will have a diameter of 2 to 3 feet. Installation of permanent met towers requires approximately 1.5 acres of temporary disturbance per tower. The permanent footprint of each met tower is approximately 37 square feet. Permanent met towers will be fitted with safety lighting and paint as required by the FAA. Figure B-7 provides general design information for a typical met tower foundation.

B.3.6 Operations and Maintenance Facility

The Applicant plans to construct one O&M building for the Facility. The O&M building will be located on up to 10 acres and will consist of a single-story, prefabricated structure totaling approximately 10,000 to 11,000 square feet. The building will house office space, workshop areas, and control facilities, as well as storage, bathroom, and kitchen facilities. Depending on the location of the proposed O&M building, water for the bathroom and kitchen will be obtained from a local well, or will be trucked in and stored in an onsite tank. Water use will be less than 5,000 gallons per day (gpd), as described in Exhibit O of this ASC. Domestic wastewater will be handled with an onsite septic system. Required water supply and wastewater disposal permits are discussed in Exhibit E. Telephone service will be provided by the local service provider and connect to the O&M building using existing overhead lines. A permanent, fenced, graveled parking and storage area for employees, visitors, equipment, and emergency response vehicles will be located adjacent to the building. The approximate location of the O&M building is identified in Figure C-3 of Exhibit C.

B.3.7 Access Roads

Access to the Facility will be provided by interstate and state highways, a combination of existing private and county roads, and new roads constructed specifically for Facility access (see Exhibit U for transportation routes). New access road construction and upgrades or improvements to existing roads will be done according to Sherman and Wasco County ordinances and through approval of the Sherman and Wasco County public works departments. The Applicant will implement improvements to existing roads and proposes to construct new gravel roads along the length of turbine strings and in areas where existing roads do not provide access to wind turbine locations. Improved roads will include a gravel, all-weather surfaced roadbed. Compliance with county ordinances regarding road construction is addressed in Exhibit K.

B.3.7.1 Existing Roads

Typical existing roads onsite are generally 8 to 16 feet in width. Proposed Applicant improvements include widening existing roads up to an additional 24 feet to provide access for construction vehicles and for crane paths along turbine string access roads during construction. During construction, some roads may need an additional shoulder for turnaround areas for larger vehicles. These areas will be reclaimed upon completion of construction. For purposes of estimating impacts, the Applicant assumes that up to 70 hammerhead turnaround areas may be needed, each with a turning radius of up to 150 feet.
B.3.7.2 New Roads

New access roads generally will be 16 to 18 feet wide. The Applicant will design the roads under the direction of a licensed engineer and Sherman and Wasco County requirements. Roads will be compacted to meet load requirements for equipment. The roads will be retained to 16 to 18 feet wide after construction for use during Facility operations.

B.3.7.3 Estimated Impacts

For the purposes of estimating impacts, the Applicant analyzes all proposed new roads and existing road improvements as new roads. Therefore, approximately 95 miles of new roads will be required for construction.

B.3.8 Staging Areas and Batch Plants

During construction, the Applicant will build one approximately 10-acre temporary staging area to store supplies and equipment. The 10-acre staging area will be located adjacent to the proposed O&M building, as shown in Exhibit C, Figure C-3. Additional temporary staging areas of approximately 1.7 acres each will be located adjacent to individual turbine sites. Two temporary batch plants of approximately 5 to 10 acres each will be located within the Facility for aggregate storage and concrete preparation for turbine pads. The temporary batch plants will be permitted by the selected contractor. Any rock for construction purposes will be obtained from local permitted quarries near the Facility site. Associated rock-crushing activities will occur at the quarry before transporting to the temporary batch plants. The use of nearby quarries will reduce heavy truck traffic. In addition, the temporary batch plants will require a Temporary Air Quality permit obtained by the selected batch plant operator/contractor. The proposed batch plant locations are shown in Figure C-3.

B.4 APPROXIMATE DIMENSIONS OF MAJOR STRUCTURES AND VISIBLE FEATURES

OAR 345-021-0010(1)(b)(C) The approximate dimensions of major facility structures and visible features.

Response: The approximate dimensions of the following major Facility structures and visible features are described in this section: turbines, collector substations, and O&M facility.

B.4.1 Turbines

The generator installed in each turbine will have a nameplate rating of 1.6 to 2.4 MW, depending on the turbine model selected. The Applicant seeks flexibility with regard to turbine selection within a range of generator sizes. Selection will occur following additional design evaluation and will depend on turbine availability. Figure B-1 shows the typical configuration for a wind turbine. A range of dimensions for the total height, tower, rotor blade, and rotor diameter is illustrated.

During construction, a larger area will be used to lay down the rotors and maneuver cranes during turbine assembly. The typical area of disturbance is a circular area with a radius equal to the blade length, as shown in Figure B-4. In some cases, construction contractors prefer a larger area measuring approximately 160,000 square feet at each of the turbine locations to reduce construction costs. The Applicant has calculated the worst-case impacts in Exhibits C and P, using a temporary staging area of approximately 160,000 square feet at each of the turbine locations.

B.4.2 Facility Collector Substations

The Facility collector substations will be located as shown in Figures C-2 and C-3. Two approximately 4-acre collector substations are planned. The substation sites will be cleared and graded, and will include concrete foundations, steel support structures, and aboveground electrical equipment. Each collector

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substation will include but not be limited to circuit breakers, power transformer(s), bus and insulators, disconnect switches, relaying, battery and charger, surge arrestors, AC and DC supplies, control house, metering equipment, SCADA system provisions, grounding and associated control wiring.

B.4.3 Operations and Maintenance Facility

The Applicant plans to construct one O&M building for the Facility. The O&M building will be located on up to 10 acres and will consist of a single-story, prefabricated structure totaling approximately 10,000 to 11,000 square feet. Water for the O&M building will be obtained from a local well, or will be trucked in and stored in an onsite tank. Water use will be less than 5,000 gpd for commercial/industrial use and an onsite septic system. Telephone and power service will be provided by the local service provider. A permanent, fenced, graveled parking and storage area for employees, visitors, equipment, and emergency response vehicles will be located adjacent to the building.

B.5 CORRIDOR SELECTION ASSESSMENT

**OAR 345-021-0010(1)(b)(D)** If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a transmission line or pipeline that, by itself, is an energy facility under the definition in ORS 469.300, a corridor selection assessment explaining how the applicant selected the corridor(s) for analysis in the application. In the assessment, the applicant shall evaluate the corridor adjustments the Department has described in the project order, if any. The applicant may select any corridor for analysis in the application and may select more than one corridor. However, if the applicant selects a new corridor, then the applicant must explain why the applicant did not present the new corridor for comment at an informational meeting under OAR 345-015-0130. In the assessment, the applicant shall discuss the reasons for selecting the corridor(s), based upon evaluation of the following factors:

(i) Least disturbance to streams, rivers and wetlands during construction;

(ii) Least percentage of the total length of the pipeline or transmission line that would be located within areas of Habitat Category 1, as described by the Oregon Department of Fish and Wildlife.

(iii) Greatest percentage of the total length of the pipeline or transmission line that would be located within or adjacent to public roads and existing pipeline or transmission line rights-of-way.

(iv) Least percentage of the total length of the pipeline or transmission line that would be located within lands that require zone changes, variances or exceptions.

(v) Least percentage of the total length of the pipeline or transmission line that would be located in a protected area as described in OAR 345-022-0040.

(vi) Least disturbance to areas where historical, cultural or archaeological resources are likely to exist.

(vii) Greatest percentage of the total length of the pipeline or transmission line that would be located to avoid seismic, geological and soils hazards.

(viii) Least percentage of the total length of the pipeline or transmission line that would be located within lands zoned for exclusive farm use.

**Response:** The proposed 230-kV transmission line is a related or supporting facility. The Applicant has proposed a transmission line corridor (also referred to as the transmission line route) that minimizes or avoids impacts to wildlife, habitat, and other sensitive resources. The proposed 230-kV transmission line route is shown in Figures C-2 and C-3.
The Applicant selected the proposed route after determining that no other route would better meet the Applicant’s own criteria for successful siting and at the same time satisfy the Council’s standards. Siting criteria that influenced the Applicant’s selection process included identifying a direct route from the proposed turbines to the interconnection point at the rebuilt Buckley substation while minimizing disturbance and avoiding sensitive resources; minimizing impacts to agricultural practices by routing along property lines; navigating difficult and varied topography; and locating the route through land for which the Applicant has negotiated or is in the process of negotiating long-term wind leases or easements. As an alternative to the proposed 230-kV overhead line, the Applicant considered various alternative design scenarios, including removing the 230-kV overhead line between the northern and southern Facility collector substations, and even removing the southern substation, to reduce the overall length of the 230-kV transmission line to 20 miles and limit the 230-kV line to one county. If such an alternative design were proposed, under ORS 469.300, the transmission line would not be considered an energy facility, and would not be reviewable under this application requirement. However, the length of overhead 34.5-kV lines within the Facility site boundary would substantially increase, creating additional disturbance to the resources identified in OAR 345-021-0010(1)(b)(D)(i-vii) and potentially creating significant additional visual impacts.

The requirements of OAR 345-021-0010(1)(b)(D) do not constitute a Council standard—they are application requirements and should be considered as informational, within the context of other applicable Council standards. In summary, the route proposed for the transmission line from the southern to northern collector substation and continuing from the northern collector substation to the rebuilt Buckley substation, best meets the Applicant’s needs and at the same time satisfies Council standards. The Applicant has determined that no alternative routes would achieve the same result.

(i) **Least disturbance to streams, rivers and wetlands during construction.**

**Response:** The proposed 230-kV transmission line will minimize disturbance to streams, rivers, and wetlands during Facility construction, as evidenced by the description provided in Exhibit J. Support poles for overhead transmission line crossings of streams and wetlands will be placed outside of wetlands and stream channels to the extent possible. Before construction, the Applicant will prepare a Joint Permit Application and obtain the necessary permits from the U.S. Army Corps of Engineers and Oregon Department of State Lands.

(ii) **Least percentage of the total length of the transmission line that would be located within areas of Habitat Category 1, as described by the Oregon Department of Fish and Wildlife.**

**Response:** The proposed 230-kV transmission line will avoid all Category 1 habitat, as evidenced by the description provided in Exhibit P.

(iii) **Greatest percentage of the total length of the transmission line that would be located within or adjacent to public roads and existing pipeline or transmission line rights-of-way.**

**Response:** The proposed 230-kV transmission line will maximize proximity to public roads and existing transmission line right-of-way. Figures C-2 and C-3 in Exhibit C show the proposed transmission line route.

(iv) **Least percentage of the total length of the transmission line that would be located within lands that require zone changes, variances or exceptions.**

**Response:** The proposed 230-kV transmission line will avoid lands that require zone changes, variances, or exceptions, as evidenced by the description provided in Exhibit K.
(v) Least percentage of the total length of the transmission line that would be located in a protected area as described in OAR 345-022-0040.

Response: The proposed 230-kV transmission line will avoid all protected areas described in OAR 345-022-0040, as evidenced by the description provided in Exhibit L.

(vi) Least disturbance to areas where historical, cultural or archaeological resources are likely to exist.

Response: The proposed 230-kV transmission line will avoid areas where historical, cultural, or archaeological resources are likely to exist, as evidenced by the description provided in Exhibit S.

(vii) Greatest percentage of the total length of the transmission line that would be located to avoid seismic, geological and soils hazards.

Response: The proposed 230-kV transmission line will avoid seismic, geological, and soils hazards, as evidenced by the description provided in Exhibit H. Transmission tower foundations will not adversely affect slope stability or long-term erosion. During final design of the transmission line and towers, geotechnical investigations will be conducted to characterize the soils and bedrock along the alignment.

(viii) Least percentage of the total length of the transmission line that would be located within lands zoned for exclusive farm use.

Response: The proposed 230-kV transmission line will be located entirely within lands zoned for exclusive farm use, as evidenced by the description provided in Exhibit K and consistent with other Oregon wind energy facility applications. No other route would avoid exclusive farm use zoning or provide a shorter or more direct route to the rebuilt Buckley substation. Moreover, as described in Exhibit K, the transmission line is the most reasonably direct route available that also minimizes agricultural impacts by routing along property lines, and avoids segmentation or bisecting of agricultural operations and practices.

B.6 TRANSMISSION LINE LENGTH, RIGHT-OF-WAY, AND POWER

OAR 345-021-0010(1)(b)(E) If the proposed energy facility is a pipeline or transmission line or has, as a related or supporting facility, a transmission line or pipeline of any size:

B.6.1 Length of Line

(i) The length of the pipeline or transmission line.

Response: Approximately 92 miles of 34.5-kV collector lines will be installed underground to connect the turbines to the Facility collector substations. In some locations, underground lines are not feasible. Approximately 3.4 miles of 34.5-kV collector lines may run on overhead pole structures.

The proposed overhead 230-kV transmission line connecting the southern collector substation to the northern collector substation will travel for approximately 12 miles onsite. The 230-kV transmission line will then extend for approximately 20 miles from the northern collector substation to BPA’s existing 500-kV line at the rebuilt Buckley substation. The proposed approximately 32-mile overhead 230-kV transmission line route is shown in Figures C-2 and C-3.

B.6.2 Right-of-Way

(ii) The proposed right-of-way width of the pipeline or transmission line, including to what extent new right-of-way will be required or existing right-of-way will be widened.
**Response**: The 34.5-kV collector cables will be buried in the soil approximately 3 feet below ground surface, except where overhead lines will be needed to cross streams, wetlands, canyons, or other rugged terrain. The collector system line and any overhead collector lines will occupy private land pursuant to leases or easements with landowners. The leases will authorize placement of the lines, restrict inconsistent or competing uses of the property, and contain a 150-foot right-of-way width. No new right-of-way will be required and no existing right-of-way will be widened for a transmission line.

The proposed 230-kV transmission line will cross US 97. Before construction, the Applicant will coordinate with the ODOT District 9 permit writer to obtain an application and permit to occupy or perform operations upon a state highway. The Applicant will provide documentation of written correspondence with ODOT staff to the Oregon Department of Energy.

(iii) **If the proposed transmission line or pipeline corridor follows or includes public right-of-way, a description of where the transmission line or pipeline would be located within the public right-of-way, to the extent known. If the applicant proposes to locate all or part of a transmission line or pipeline adjacent to but not within the public right-of-way, describe the reasons for locating the transmission line or pipeline outside the public right-of-way. The applicant must include a set of clear and objective criteria and a description of the type of evidence that would support locating the transmission line or pipeline outside the public right-of-way, based on those criteria.**

**Response**: The proposed overhead transmission line requires no public right-of-way.

**B.6.3 Transmission Line Power**

(iv) **For transmission lines, the rated voltage, load carrying capacity, and type of current and a description of transmission line structures and their dimensions.**

**Response**: The proposed transmission line will have a rated voltage of 230 kV. The line will have a load-carrying capacity adequate for the peak capacity of all of the connected turbines. The transmission line will either be supported by 85-foot-tall, H-frame wooden structures spaced approximately 400 to 500 feet apart or 120-foot-tall, monopole steel structures spaced approximately 400 to 650 feet apart.

**B.7 CONSTRUCTION SCHEDULE**

**OAR 345-021-0010(1)(b)(F) A construction schedule including the date by which the applicant proposes to begin construction and the date by which the applicant proposes to complete construction. Construction is defined in OAR 345-001-0010. The applicant shall describe in this exhibit all work on the site that the applicant intends to begin before the Council issues a site certificate. The applicant shall include an estimate of the cost of that work. For the purpose of this exhibit, “work on the site” means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor, that the applicant anticipates or has performed as of the time of submitting the application.**

**Response**: Facility construction is anticipated to begin in early 2015. The completion of construction, commissioning, and start of commercial operations are targeted for the end of 2015. Given that construction could conceivably be delayed by weather or other unforeseen circumstances such as market changes and BPA’s timing for completion of necessary substation upgrades, the Applicant would like the flexibility to build the Facility in one or more phases, and proposes to commence construction within 5 years after the effective date of the site certificate, with a deadline for construction completion of 6 years from issuance of the site certificate.
Additional engineering and geotechnical investigations may occur prior to issuance of the site certificate. No other construction work is anticipated to begin prior to issuance of the site certificate. The estimated cost of the preconstruction work is less than $250,000 [ORS 469.300(4), OAR 345-001-0010(11)].
Figures
NOTE: All dimensions are approximate.
FIGURE B-2

Typical Pier- and Spread-Type Footing Foundation
Brush Canyon Wind Power Facility
Application for Site Certificate
FIGURE B-3
Typical Generator Setup Transformer Foundation
Brush Canyon Wind Power Facility
Application for Site Certificate
FIGURE B-4
Typical Wind Turbine
Brush Canyon Wind Power Facility
Application for Site Certificate
Approximately 40' to 50'

Typical 34.5-kV single circuit

Typical 34.5-kV double circuit
FIGURE B-6

Typical Overhead 230-kV Support Structures
Brush Canyon Wind Power Facility
Application for Site Certificate
Two (2) ties within top 5" of concrete

FIGURE B-7
Typical Meteorological Tower Foundation
Brush Canyon Wind Power Facility
Application for Site Certificate