

Preliminary Application for Site Certificate for the Muddy Creek Energy Park

Background Information Exhibit

**Submitted to the
Oregon Energy Facility Siting Council**

**Prepared for
Muddy Creek Energy Park, LLC**

Prepared by



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Acronyms and Abbreviations

| Acronym/Abbreviation | Definition |
|----------------------|---|
| AC | alternating current |
| Applicant | Muddy Creek Energy Park LLC |
| ASC | Application for Site Certificate |
| BESS | battery energy storage system |
| CFR | Code of Federal Regulations |
| DC | direct current |
| EFSC | Energy Facility Siting Council |
| EPA | U.S. Environmental Protection Agency |
| FAA | Federal Aviation Administration |
| Facility | Muddy Creek Energy Park |
| gen-tie | generation-tie |
| HV | high-voltage |
| kcmil | thousands of circular mils |
| kV | kilovolt |
| Li-ion | lithium-ion |
| MV | medium-voltage |
| MVAC | medium-voltage alternating current |
| MW | megawatt |
| NHD | National Hydrography Dataset |
| NOI | Notice of Intent |
| NPDES | National Pollutant Discharge Elimination System |
| NWI | National Wetlands Inventory |
| O&M | operations and maintenance |
| OAR | Oregon Administrative Rules |
| ODEQ | Oregon Department of Environmental Quality |
| ODOT | Oregon Department of Transportation |
| ODFW | Oregon Department of Fish and Wildlife |
| ORS | Oregon Revised Statutes |
| PCS | Power Conditioning Station |
| POI | Point of Interconnect |
| SCADA | supervisory control and data acquisition |
| SPCC | Spill Prevention, Control, and Countermeasures |

1.0 Introduction

Muddy Creek Energy Park, LLC (Applicant) seeks to develop the Muddy Creek Energy Park (Facility), consisting of a 150-megawatt (MW) solar energy generation, a 150-MW battery energy storage system (BESS) project, and related or supporting facilities on approximately 1,590 acres of private land in Linn County, Oregon. This Application for Site Certificate (ASC) demonstrates that the proposed Facility will be designed, constructed, and operated consistent with the relevant Oregon Energy Facility Siting Council (EFSC) siting criteria and standards. In addition to meeting the minimum required EFSC criteria, the Applicant proposes to design, construct, and operate the Facility using agrivoltaics. Agrivoltaics co-locates the Facility with active farm operations to retain agricultural production and minimize agricultural impacts within the Facility Site Boundary.

The Applicant proposes to continue farming activities within solar array area in the Facility Site Boundary. Agrivoltaics will be co-located in the solar array area with active farm operations to retain agricultural production and minimize agricultural impacts within the Site Boundary. Approximately 732 acres of the 873 acres within the Facility's limits of disturbance will be returned to agricultural use post-construction. The remaining 141 acres within the Facility will contain the infrastructure required for photovoltaic operation.

2.0 Facility Information – OAR 345-021-0010(3)(a)

OAR 345-021-0010(3)(a) Information about the proposed facility, construction schedule and temporary disturbances of the site, including:

(A) A description of the proposed energy facility, including as applicable:

2.1 Electric Generating Capacity – OAR 345-021-0010(3)(a)(i)

(i) For electric power generating plants, the nominal electric generating capacity and the average electrical generating capacity, as defined in ORS 469.300;

The Facility's nominal and average generating capacity would be up to 150 MW, as defined in Oregon Revised Statutes (ORS) 469.300(4)(c). The Facility will generate electricity using photovoltaic solar panels wired in series and in parallel to form arrays and connected to electrical infrastructure. The Facility will also include a BESS for stabilizing the solar resource with an up to 150 MW of storage capability.

2.2 Overview of Major Components – OAR 345-021-0010(3)(a)(ii)

(ii) Major components, structures and systems, including a description of the size, type and configuration of equipment used to generate, store, transmit, or transport electricity, useful thermal energy, or fuels;

The Facility Site Boundary is 1,590 acres of private land located approximately 8 miles south of Brownsville, Oregon in unincorporated Linn County (Figure 1). The Applicant proposes to construct and operate a solar photovoltaic power generation facility of up to 150 MW, with a related or supporting BESS also up to 150 MW, and associated interconnection facilities within the Facility Site Boundary. The Facility’s proposed point-of-interconnect to the regional electrical grid is PacifiCorp’s existing Diamond Hill Substation located between the northern and southern portions of the Facility Site Boundary and east of I-5 (Figure 2).

The Facility’s nominal and average generating capacity will be up to 150 MW, as defined in ORS 469.300(4)(c). The Facility will generate electricity using solar panels wired in series and in parallel to form arrays and connected to electrical infrastructure. The Facility will also include a BESS for stabilizing the solar resource with a storage capability of up to 150 MW. Table 1 provides estimated quantities of the Major Facility Components.

Table 1. Major Facility Components

| Component | Quantity |
|---------------------|---|
| Solar Modules | 280,240 |
| Tracker Systems | |
| • 2-String Trackers | 215 |
| • 3-String Trackers | 2,870 |
| Posts | up to 45,500 |
| Inverters/PCS | 40 |
| Fence | 83,347 linear feet/15.79 miles (array) 793 linear feet/0.15 miles (BESS) |
| Roads | 72,447 linear feet/13.75 miles |

2.2.1 Solar Modules

Solar modules use bifacial mono- or poly-crystalline cells to generate electricity by converting sunlight energy into direct current (DC) electrical energy. The electrical generation from a single module will vary by module size and the number of cells per module. The dimensions of each module will be approximately 8 feet long and 4 feet wide. The modules used in current, preliminary site design each have a nameplate rating of 660 watts and measure 93.8 inches by 51.3 inches by 1.38 inches.

Figure 2 depicts the solar layout developed for purposes of analyzing impacts, using approximately 280,240 modules in strings of 31 modules per string for 9,040 strings. The actual number of

modules will vary depending on the module technology, energy output, spacing, mounting equipment and other design criteria, which are subject to change during final design. Impact assumptions are based on this use of 280,240 modules for the 150-MW solar array, and that areas within the solar array area will be permanently impacted by construction of the Facility.

Solar modules consist of antireflective glass, a metal frame, and wire connectors. The modules will be connected in series to form long rows or strings. The module strings are connected via combiners, cables, and switchboards. The configuration of strings (the solar array) vary depending on the equipment type and topography. The actual number of modules used will vary depending on the module technology, spacing, mounting equipment, and other design criteria, which are subject to change during final design.

2.2.2 Tracker Systems

Strings of solar modules will be mounted on single-axis tracker systems that optimize electricity production by rotating the solar modules to follow the path of the sun throughout the day. The length of each tracker string may vary by topography and the number of modules that the tracker can hold. The drive unit for the single-axis tracking system can control a single string or multiple strings of modules through a series of mechanical linkages and gearboxes. As the solar modules tilt throughout the day, the height of their top edges will shift accordingly (i.e., up to 10 feet high). The tracker system and associated posts will be specifically designed to withstand wind, snow, and seismic loads anticipated at the site.

The length of each tracker row may vary by topography and the number of modules that the tracker can hold. The actual number of tracker systems and modules will depend on the final design. The depicted layout in Figure 2 assumes 78 to 90 modules per string rack depending on the string length. The drive unit for the tracking system can control a single row or multiple rows of modules through a series of mechanical linkages and gearboxes. As the solar modules tilt throughout the day, the height of their top edges will shift accordingly, up to 10 feet high. Each set of approximately racked modules will be mounted approximately 5 feet off the ground on a single-axis tracker that rotates 60 degrees to the east and west. The tracker system and associated posts will be specifically designed to withstand wind, snow, and seismic loads anticipated at the site.

2.2.3 Posts

Each tracker will be supported by multiple steel posts, which could be either round hollow posts or pile-type posts (i.e., H-pile, C-pile, S-pile). Post depth may vary depending on soil conditions but the posts are typically installed 5 to 20 feet below the surface and protrude approximately 5 feet above grade. Posts at the end of tracker strings are usually installed deeper to withstand wind uplift. The Applicant anticipates that posts will be installed without concrete. Post locations will be determined by geotechnical investigations during final design of the tracker system and solar array area within the Facility Site Boundary.

2.2.4 Cabling

The electrical power produced by the solar modules is in the form of DC voltage. Cables for the DC system will collect and aggregate the DC power from the tracker system modules (i.e., each string of modules in series) and combine multiple strings to a single combiner box. Cabling from multiple combiner boxes will connect to a single inverter, which will convert the DC to AC and connect to the buried collection system. See Section 2.2.5 for more information about project inverters. For example, the cabling system for the site plan shown on Figure 2 connects modules in series per string with a single pad-mounted combiner box per rack, for a maximum of 920 combiner boxes. A larger DC cable will run between each combiner box and to the module block inverter, hanging underneath the modules. Cabling can be mounted to the tracker system, placed in cable trays, or buried. Buried cable associated with the solar array will be located within the solar area fence line associated with the Site Boundary and included in the estimated total permanent impact associated with the solar array area (i.e., no temporary impacts are calculated for buried cable inside the solar array area).

DC cabling will range in size from #8 copper up to 750 kcmil AL¹. Conductors will be classified as photovoltaic (PV) wire in accordance with National Electric Code 690.31(C)1.

Specific quantities are subject to final design, but typical values are estimated as follows:

- 750 kcmil AL PV wire: 887,120 feet
- #8 copper PV wire: 4,374,6200 feet

Equipment Grounding Conductor (bare copper conductor):

- AWG 4/0: 55,010 feet
- 1,500 kcmil 58,715
- 1,250 kcmil 14759
- 1,000 kcmil 74,259
- 750 kcmil 41,208
- 500 kcmil 87,191 feet
- DC cabling may be abandoned in place at the time of Facility decommissioning if it is deeper than 4 feet.

2.2.5 Inverters / Power Conditioning Stations

The solar modules will be arranged into subarray blocks, with the output of each subarray block's solar modules feeding one inverter, or Power Conditioning Station (PCS). Figure 2 depicts a solar site plan with 40 PCS/inverter/transformer stations which are used to convert the DC output

¹ A method of measuring conductor size that stands for thousand circular mils. AL stands for "aluminum."

power from the solar modules to AC power suitable for injecting into the power grid. The final number of inverters will vary depending on the actual generation output of the solar array. The inverter specification will comply with the applicable requirements and standards of the National Electric Code and Institute of Electrical and Electronics Engineers standards.

The DC power electrical output of the solar modules is collected at DC combiner boxes located throughout the solar module array. The output of the solar modules is designed to stay below 1,500 volts, as required by the National Electric Code. The electrical output of the DC combiner boxes is then fed into the subarray block's PCS.

The PCS is a large, modular, self-contained piece of equipment that includes the inverter power electronics, step-up transformer, controls, and auxiliary and communications systems necessary for operation of the solar and BESS systems. A PCS unit is needed to change the DC power generated by the solar modules into AC power at an appropriate voltage level for interconnecting with the project substation as well as managing other functions like voltage stabilization, frequency control, and reactive power compensation.

PCS employ several advanced control systems, switching algorithms, and ancillary services for both the input and output stages. For the input stage, the inverters can manipulate the DC voltage to ensure that the solar modules are producing the maximum amount of power for the site conditions at that time (such as amount of sunlight on the solar panels and ambient temperature).

The conversion of DC power into AC power is accomplished by advanced microprocessor-controlled power electronics called inverters. These power electronics will rapidly switch the DC power supply on and off, vary the duration that the power supply is turned on, and alternate the polarity of the output power in a process called "pulse width modulation". Using these power electronics, the inverter shapes the power output into the positive and negative swells of a sine wave, which is waveform used by the electrical grid. This waveform is then smoothed with an output filter, and harmonics are limited to meet the requirements of the interconnecting grid.

The PCS units also contain a medium-voltage step-up transformer. This transformer takes the low voltage AC output of the inverters (typically around 660 volts) and steps up the voltage to a much higher level that is suitable for supplying the AC power over the long distances between the PCS unit and the project substation (typically around 34.5 kV). Using a voltage level this high is standard practice to reduce power losses over the vast lengths of cable between the PCS and the project substation. From the PCS transformers, the AC electricity is aggregated via underground 34.5-kV cables and routed to the collector substation.

The above discussion regarding PCS, inverters, and transformers focuses on the solar array area. It is also applicable to the BESS PCS units, inverters, and transformers. The main difference is that the DC input power for BESS PCS units will be supplied by the BESS battery output rather than solar modules. The BESS PCS units are also bi-directional, meaning that they will convert AC power into DC power and use that DC power to charge the BESS units.

2.3 Project Site Plan – OAR 345-021-0010(3)(a)(iii)

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

A site plan including Facility infrastructure is included in Figure 2.

2.4 Fuel and Chemical Storage Facilities – OAR 345-021-0010(3)(a)(iv)

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

The Facility does not require fuel or chemicals for the generation of electricity. While not considered a hazardous material, transformers contain mineral- or vegetable-based oil for cooling. The 40 step-up transformers in the solar array PCS units and the initial 24 step-up transformers for the BESS area will be dry-type, and will not use oil for cooling. The collection substation transformer will also typically use mineral oil or seed oils that are considered nontoxic. Transformer coolant does not contain polychlorinated biphenyls or compounds listed as extremely hazardous by the U.S. Environmental Protection Agency (EPA). The small quantity and nontoxic nature of the oils combined with the fact that the transformers will be included in secondary containment on concrete pads will minimize risk effects of potential spills on soils. In the unlikely event of a spill, the Applicant will follow response measures outlined in its operations Spill Prevention, Control, and Countermeasures (SPPC) Plan that will be prepared prior to construction as required under 40 Code of Federal Regulations (CFR) 112.

No lubricants, degreasers, herbicides, or other chemicals will be stored at the Facility. If needed they will be brought to the site by maintenance employees. Use of these chemicals will follow label instructions. No underground storage tanks will be installed at the Facility. No extremely hazardous materials (as defined by 40 CFR 355) are anticipated to be produced, used, stored, transported, or disposed of at this Facility during operation.

Fuels will be the only hazardous material that may be stored in substantial quantities on-site during construction. During construction, on-site aboveground fuel storage may be placed in designated areas within the temporary staging areas. Secondary containment and refueling procedures for on-site fuel storage will follow the contractor's SPPC Plan. Secondary containment will be compliant with requirements in 40 CFR §112.7(c), which requires secondary containment for all above ground, buried, and partially buried containers. It is anticipated that the majority of fuel containers will have self-contained secondary containment (e.g., double-walled containers) that provide capacity for the entire container plus precipitation, but in some cases, smaller containers (e.g., drums) will be placed in a constructed secondary containment area that is impervious, and is diked, or otherwise contained, to provide the required fuel and precipitation capacity.

Most fuel will be delivered to the temporary laydown yards by a licensed specialized tanker vehicle on an as-needed basis.

There will be no substantial quantities of lubricating oils, hydraulic fluid for construction equipment, or other hazardous materials maintained on-site during construction. Lubricating oil and hydraulic fluids for construction equipment will be either stored in small quantities on-site or

brought in on an as-needed basis for equipment maintenance by a licensed contractor using a specialized vehicle. Waste oils would be removed by the same maintenance contractor. Dielectric, mineral- or vegetable-based oils for the transformers will either be stored in small quantities on-site or arrive on an as-needed basis and be transferred into the receiving components. Potentially hazardous substances will not be permanently present within the construction areas in quantities that exceed Oregon State Fire Marshal Reportable Quantities.²

Qualified oil-filled equipment, including the substation generator step-up (GSU) transformer, will contain oil during operations. Secondary containment and refueling procedures during operations will continue to follow the SPCC Plan and will be compliant with requirements in 40 CFR §112.7(c).

While not considered a hazardous material, an electrolyte solution would be contained within the BESS, since lithium-ion (Li-ion) batteries will be used by the Facility. Li-ion battery systems are modular systems that contain multiple smaller battery cells. The cells are the primary containment for gel or liquid electrolyte materials. The module containing the cells is relatively small, about the size of a desktop computer processor, and serves as leak-proof secondary containment. Modules are placed in anchored racks within the steel containers. The risk of leakage is low, because battery cells are hermetically sealed. Electrolyte can only escape (as vapor) in the unlikely case that a battery cell ruptures, and in that event, it will be contained in the BESS steel container. Note that used Li-ion batteries can sometimes be considered hazardous waste by the EPA and will be disposed of according to the most current guidelines at end of life. See Section 2.9.1 for additional description and discussion of the BESS.

The Applicant will prepare and maintain an SPCC Plan to outline preventative measures and practices to reduce the likelihood of an accidental spill, and to expedite the response to and remediation of a spill should one occur.

2.5 Fire Prevention and Control – OAR 345-021-0010(3)(a)(v)

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

2.5.1 Solar Facility Components

This section provides a summary of wildfire risk and prevention; see Exhibit M for more detailed information on these topics.

Solar facilities do not pose a significant fire risk. A risk of fire can occur during construction of the Facility when welding and metal cutting for foundation rebar frames will take place, and when vehicles and construction equipment are used in areas of tall, dry grass. To prevent fires from occurring, the construction contractor will implement several systems and procedures. These will include requirements to conduct welding or metal cutting only in areas cleared of vegetation, and to

² “Reportable quantity” refers to the amount of hazardous substance that has to be released into the environment before the U.S. Environmental Protection Agency requires notification of the release to the National Response Center pursuant to the Comprehensive Environmental Release, Compensation, and Liability Act, also known as Superfund. These numerical designations are listed under 49 Code of Federal Regulations 172.101 Appendix A, Table 1 and Table 2.

keep emergency firefighting equipment on-site when potentially hazardous operations are taking place. Employees will keep vehicles on roads and off dry grassland when feasible during the dry months of the year. When such activities are required for emergency purposes, fire precautions will be observed. Fire extinguishers and shovels will be kept in all vehicles. On-site employees will receive training on fire prevention and response and have on-site fire extinguishers to respond to small fires. In the event of a large fire, emergency responders will be dispatched.

Fire prevention specific to solar arrays is dependent on proper installation and maintenance of electrical equipment to prevent short-circuits and consequent sparking, and reduction in fuel to reduce the chance of fire spreading. The Applicant will employ qualified employees to install and maintain electrical equipment. The solar array will have shielded electrical cabling to prevent electrical fires, as required by applicable code. All electrical equipment will meet National Electrical Code and Institute of Electrical and Electronics Engineers standards and will not pose a significant fire risk. With proper maintenance and safety checks, the electrical collection system and 230-kV generation-tie (gen-tie) transmission lines are unlikely to cause a fire. Weeds will be managed in accordance with the weed management procedures described in the project Draft Noxious Weed Control Plan (see Exhibit G). Additional fire prevention and response measures for the Facility are described in Exhibit M. These include best management practices related to worker activities, maintenance of fire suppression equipment, and coordination with the local fire district.

Facility roads will be sufficiently sized for emergency vehicle access in accordance with 2026 Oregon Fire Code requirements, including Section 503 and Appendix D - Fire Apparatus Access Roads. Roads will measure 16 feet wide with a typical cross section of 20 feet, having an internal turning radius of 28 feet and less than 10 percent grade, or a similar profile depending on siting, to provide access to emergency vehicles. The areas immediately around the operations and maintenance (O&M) structure, substation, and BESS will be graveled, with no vegetation present. See Exhibit L for additional discussion of Project fire prevention measures and coordination with local emergency responders.

Smoke/fire detectors will be placed around the site that will be tied to the supervisory control and data acquisition (SCADA) system (see Section 2.9) and will contact local firefighting services. The O&M building will have basic firefighting equipment for use on-site during maintenance activities, such as shovels, beaters, portable water for hand sprayers, fire extinguishers, and other equipment.

2.5.2 Battery Energy Storage System

The chemicals used in Li-ion batteries are generally nontoxic but do present a flammability hazard. Li-ion batteries are susceptible to overheating and typically require cooling systems dedicated to each BESS enclosure, especially at the utility scale (LAZARD 2025). The gas released by an overheating Li-ion cell is mainly hydrogen fluoride, carbon dioxide and carbon monoxide, well as other in smaller amounts. The electrolyte solution, usually consisting of ethylene or propylene, may also vaporize and vent if the cell overheats (Battery University 2022).

The Applicant will implement the following fire prevention and control methods to minimize fire and safety risks for the Li-ion batteries proposed for the BESS:

- The batteries will be self-contained and include internal fire suppression systems
- Ample working space will be provided around the BESS for maintenance and safety purposes.
- Off-site, 24-hour monitoring of the BESS will be implemented and will include shutdown capabilities.
- Transportation of Li-ion batteries is subject to 49 CFR 173.185 – Department of Transportation Pipeline and Hazardous Material Administration. This regulation contains requirements for prevention of a dangerous evolution of heat; prevention of short circuits; prevention of damage to the terminals; and prevention of batteries coming into contact with other batteries or conductive materials. Adherence to the requirements and regulations, personnel training, safe interim storage, and segregation from other potential waste streams will minimize any public hazard related to transport, use, or disposal of batteries.
- Design of the BESS will be in accordance with applicable Underwriters Laboratories (UL; specifically, 1642, 1741, 1973, 9540A), National Electric Code, and National Fire Protection Association (specifically 70, 70A, 855) standards, which require rigorous industry testing and certification related to fire safety and/or other regulatory requirements applicable to battery storage at the time of construction.
- Additionally, the Applicant will employ the following design practices, as applicable to the available technology and design at time of construction:
 - Use of HVAC systems for Li-ion phosphate systems to maintain battery temperatures within the optimal range, which reduces the risk of battery malfunction that could lead to fire;
 - Use of Li-ion phosphate battery chemistry, which is a more thermally stable Li-ion cathode chemistry;
 - Employment of an advanced and proven battery management system;
 - Qualification testing of battery systems in accordance with UL 9540A (UL Solutions 2025);
 - Employment of fire control panels with 24-hour battery backup;
 - Minimum required training for both operational personnel as well responding Fire Departments, as per NFPA.
 - Installation of fire sensors, smoke and hydrogen detectors, alarms, emergency ventilation systems, cooling systems, and aerosol fire suppression/extinguishing systems in every battery container;

- Installation of roof-mounted blast door to mitigate blast and help control smoke spread.
- Installation of doors that are equipped with a contact that will shut down the battery container if opened;
- Installation of fire extinguishing and thermal insulation sheets between each individual battery cell;
- Implementation of locks and fencing to prevent entry of unauthorized personnel;
- Installation of remote power disconnect switches; and

Clear and visible signs to identify remote power disconnect switches.

2.5.3 Fire Protection and Prevention Coordination

The Applicant will work with Harrisburg Fire and Rescue District and Linn County Fire Defense Board to address potential needs for a construction phase fire prevention and management plan. The Applicant will also develop First Aid and Emergency Response procedures for the construction and operation phases for the Facility. Development of these plans will involve consultation with the Harrisburg Fire and Rescue District and other appropriate local emergency response agencies. The Applicant will notify the fire protection district of construction plans, identify the location of and access to the Facility, and assist (if able) in the case of fire in or around the Facility.

The Facility will be equipped with fire protection equipment in accordance with the Oregon Fire Code. Fire danger during construction will be reduced through implementation of safe working practices, such as maintaining adequate firefighting equipment and water supplies on hand during operations that carry a high fire risk, conducting welding within a cleared or graveled area, and preventing parking of vehicles in areas with high, dry grass. Given the inherent fire-safety features of Facility components significant new demands on the fire protection forces that serve the area are not anticipated (see Exhibit M).

Maintenance employees will receive training in fire prevention and response. Employees will also be required to keep vehicles on roads and off dry vegetation during the dry months of the year, unless such activities are required for emergency purposes, in which case fire precautions will be observed. In the rare event of an electrical fire in the solar module blocks or collector substation, it is likely that Facility staff will monitor and contain the fire but not try to extinguish it. At the beginning of Facility operations, a copy of the site plan indicating the arrangement of the Facility structures and access points will be provided to the Harrisburg Fire and Rescue District, which is the local fire district (see Exhibit M). The Applicant will coordinate with the Oregon State Fire Marshall as needed. Exhibit M provides additional information regarding the Applicant's approach to fire prevention and control.

2.6 Thermal Power Plants – OAR 345-021-0010(3)(a)(vi)

(vi) For thermal power plants, combustion turbine power plants, or other facilities designed to generate electricity from gas, liquid, or solid fuels:

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

(II) If the facility will generate electric power from natural gas, petroleum, coal or any form of solid, liquid or gaseous fuel derived from such material, a discussion of methods the facility will use to ensure that the facility does not emit greenhouse gasses into the atmosphere, and a description of any equipment the facility will use to capture, sequester, or store greenhouse gases;

(III) A description of energy flows within the facility, including power cycle and steam cycle diagrams, as appropriate;

(IV) A description of equipment and systems for disposal of waste heat generated by the facility; and

(V) The fuel chargeable to power heat rate of the energy facility.

The Facility is not a thermal power plant, combustion turbine power plant, or other facility designed to generate electricity from any gas, liquid, or solid fuels. The Facility will generate solar power; no waste heat will be generated.

2.7 Surface Facilities Related to Underground Gas Storage – OAR 345-021-0010(3)(a)(vii)

(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;

The Facility does not involve underground gas storage. Therefore, this rule is not applicable.

2.8 Facilities for Storage of Liquefied Natural Gas – OAR 345-021-0010(3)(a)(viii)

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

The Applicant does not propose the storage of liquefied natural gas. Therefore, this rule is not applicable.

2.9 Description of Related and Supporting Facilities – OAR 345-021-0010(3)(a)(B)

(B) A description of major components, structures and systems of each related or supporting facility;

Related or supporting facilities consist of the up to 150-MW BESS, collector substation, SCADA system, gen-tie line, site access, service roads, perimeter fencing, gates, and temporary construction staging areas. The Applicant is requesting micrositing flexibility for the layout of the solar arrays and related or supporting facilities within the site boundary. As such, the following descriptions are based on the best available information at this time and may be modified at final design prior to construction.

2.9.1 Battery Energy Storage System

The Facility includes a 150 MW BESS area centralized near the Facility's collector substation (Figure 2). The BESS is capable of storing and deploying energy generated by the Facility, as well as recharging directly from the utility grid, if allowed. The BESS technology proposed for this project uses Li-ion battery chemistry. The BESS is anticipated to use a series of self-contained enclosures located on a concrete pad within a centralized fenced area. The BESS options under consideration include fire suppression systems.

The BESS will be capable of discharging up to 150 megawatts-alternating current (MWAC) continuously for a period of 4 hours, using Li-ion batteries. (see subsections below for a detailed description of the proposed BESS equipment). The batteries and associated equipment would be oversized or periodically augmented in accordance with the manufacturer's recommendations to ensure a minimum of 400 MWh (150 MWAC for 4 hours) of energy storage capability over the life of the BESS, taking into account natural degradation of the batteries over time.

2.9.1.1 Battery Types

Lithium-Ion Batteries

Li-ion batteries are the most common type of utility-scale battery energy storage system technologies currently, although other technologies are used and are being developed. Li-ion batteries are a type of rechargeable battery where lithium ions, suspended in an electrolyte, move from negative to positive electrodes to create voltage. The process is reversed when recharging. Specifically, the batteries proposed for this project use Lithium-Iron-Phosphate (LiFePO₄). Li-ion batteries experience degradation of performance over their useful lifespan, which depends on several factors including battery technology, temperature, and rate/number of charge and discharge cycles. The Li-ion battery technology under consideration for this Facility has an expected useful life of 20 years. Li-ion batteries are generally used in utility-scale applications when rapid, short-term (minute) deployments of power are needed. For example, Li-ion batteries can smooth the fluctuating generation from solar arrays, which can vary based on time of day and cloud cover, to deliver consistent and predictable power to the grid.

Li-ion battery systems are modular systems that are housed inside enclosures. Each BESS container contains multiple battery modules, and the battery modules are electrically connected to achieve the designed voltage and amperage for the BESS system. The battery modules each contain several smaller battery pouch cells. The cells are the primary containment for gel or liquid electrolyte

materials. The module containing the cells is relatively small, about the size of a desktop computer processor, and serves as leak-proof secondary containment for the cells. Several cells are contained within a module, and several modules are collected in a pack. The packs are then wired into a string and finally into the full modular unit. The quantities of cells, packs, strings, and modular units will vary based on manufacturer and on the model of BESS enclosure procured for the Facility, but the general framework is typical for utility-scale Li-ion systems. Each modular BESS enclosure proposed for this project is capable of producing 1.32 MWAC of power, with a 4-hour rating (5.11 MWh of energy). This Facility would require 96 of the proposed modular Li-ion battery system enclosures to meet the nameplate power and energy requirements at the beginning of life. Additional batteries will be used to augment the design as the batteries degrade over the lifetime of the project, with an anticipated maximum of 122 battery enclosures total at end of life.

2.9.1.2 BESS Equipment

The battery storage design will include, but not be limited to, the following elements:

- Battery storage equipment, which will be a collection of enclosures, each containing batteries, racks or containers for the batteries, inverters, isolation transformers, and switchboards;
- Balance of plant equipment, which may include medium-voltage and low-voltage electrical systems, fire suppression, HVAC systems (fire suppression systems are only required for Li-ion technology, if selected), auxiliary electrical systems, and network/SCADA systems; and
- High-voltage (HV) equipment, including a step-up transformer, HV circuit breaker, HV current transformers and voltage transformers, a packaged control building for the HV breaker and transformer equipment, HV towers, structures, and HV cabling.

The battery containers will be placed on concrete slabs. Each container holds batteries, a battery management system, a fire detection and alarm system, and integrated liquid cooling. By connecting multiple containers, the BESS can be scaled to the desired capacity.

2.9.1.3 Battery Energy Storage System Operations and Maintenance

The batteries and other materials for the battery energy storage system will be manufactured off-site and transported to the Facility by truck. As applicable, defective or decommissioned parts will be disposed of or recycled in compliance with 49 CFR 173 Subpart E, which regulates the transportation of batteries.

The O&M activities will mainly consist of minimal procedures that do not require tampering with the battery cell components. For the purposes of analysis, it is assumed that BESS technologies under consideration could require replacement of the batteries on average every 20 years.

The BESS will be stored in completely contained, leak-resistant modules. The modules will be stored on a concrete pad. BESS will be inspected according to the manufacturer's recommendations, which are assumed to be monthly inspections.

As described in Section 2.4, an SPCC Plan will be developed to manage, prevent, contain, and control potential releases, with provisions for quick and safe cleanup of hazardous materials. Fire prevention and control measures specific to the BESS are discussed in Section 2.5.2 and Exhibit M.

2.9.2 Collector Substation

The Facility will connect with the existing PacifiCorp Diamond Hill 230-kV substation. One collector substation will be used for the proposed Facility and will be located within the Facility Site Boundary (Figure 2). The collector substation will occupy up to 1 acre and will have one generator step-up transformer that will step up from 34.5 kV to 230 kV.

Prior to construction, the substation site will be cleared and graded, with a bed of crushed rock applied for a durable surface. The substation will be enclosed by a locked 6-foot-tall wire mesh perimeter fence. Additional substation equipment may include circuit-breakers and fuses, transmission line termination structures, power transformers, bus bar and insulators, disconnect switches, relaying, battery and charger, surge arresters, AC and DC supplies, control systems, metering equipment, grounding, and associated control wiring. Any additional equipment will be located within the fenced substation.

2.9.2.1 34.5-kV Collector Line

After converting the DC power generated by the solar modules to AC power, the PCS uses an integral step-up transformer to increase the voltage of the power to 34.5 kV. This voltage range is generally called medium voltage (MV). The three-phase medium voltage AC (MVAC) output power from the PCS's step-up transformer will be connected to a three-phase bus inside an enclosed compartment that is integral to the PCS. That three-phase bus has terminations where the project's 34.5-kV collector cables will be landed. Each of the 34.5-kV collector lines will consist of three such cables, with one cable corresponding to each phase of the three-phase power grid. Each cable will be an insulated, stranded metal conductor (typically aluminum) in a size range of 4/0 – 1500 kcmil wire gauge, ranging between 1.25 and 2.5 inches in diameter, and will be rated for use in power distribution systems and rated for direct burial.

The Underground MVAC electrical cables will be buried to a minimum of 3 feet, with junction splice boxes positioned intermittently along the lines for maintenance access. These cables will be installed underground in trenches³ when practicable, or in horizontal-directional drilled bores when trenching is not feasible, such as under existing roads, waterbodies or wetlands. In this maximum footprint layout for analysis, approximately 62.72 miles of 34.5-kV cables will be installed underground (see Figure 2). The amount of trenching and boring will be less than this length, because the 62.72-mile length is the total length of MVAC cables (recall that each 34.5-kV collector line has three phases), and the 34.5-kV collector lines can be co-located in trenches when following the same route.

³ As multiple lines are laid together, the total length of trenches is less than the length of underground 34.5-kV conductor cable buried.

The collector lines will be installed inside the Site Boundary (see Figure 2). For the purposes of calculating impacts, for collector line segments that are outside of the solar array area, the Applicant assumes a temporary impact corridor approximately 55 feet wide for buried collector lines. Temporary impacts from collector line construction will be restored and revegetated following construction in accordance with the Agrivoltaics Plan (see Exhibit G). Section 3 presents the temporary and permanent impacts of the collector lines where they are outside of the solar array area.

2.9.3 SCADA System

A communication system consisting of fiber optic and copper communication lines will connect the solar array, BESS, and substation to the SCADA control rooms (within the O&M structure and BESS) and to the internet service provider. These communication lines as well as the onsite sensors will either be buried or overhead within a cable management system, depending on site-specific conditions. Where buried, the communication lines are placed above the collector lines in the same trench. This communication system allows each solar string, BESS, and substation to be monitored by a SCADA system, accessed through both the SCADA control room in the substation or remotely. This system monitors these components for variables such as meteorological conditions, critical operating parameters, and power output. The solar array is controlled and monitored via the SCADA system and can be controlled remotely. SCADA software is tuned specifically to the needs of each project by the solar module manufacturer or a third-party SCADA vendor. This system will be monitored 24/7 by a remote operations center.

2.9.4 Generation-Tie Transmission Line

The Facility will require construction of an associated gen-tie transmission line that will connect the collection substation to the POI to the regional grid. The associated gen-tie transmission line is not a transmission line within the meaning of EFSC jurisdiction (see Section 2.11). The Facility will have one new collector substation located within the Site Boundary. The collector substation will collect generation output from the 34.5-kV collector lines and step it up to 230-kV for delivery to the Facility's POI at the existing PacifiCorp Diamond Hill Substation (Figure 2). The collector substation will transport power to the Diamond Hill Substation via 230-kV gen-tie transmission line, which will be located within the Facility site boundary.

Approximately a 0.65 mile overhead gen-tie transmission line is anticipated, supported either by H-frame structures with two galvanized steel or wood poles, or by galvanized steel or wood monopole structures. The structures will be approximately 200 feet above grade depending on design and terrain. The gen-tie transmission line corridor is approximately 80 feet in width to allow flexibility for final design. The 230-kV lines will generally have a maximum 500 foot-long spans between structures; however, the gen-tie transmission line will be within the Site Boundary (see Figure 2).

2.9.5 Site Access, Service Roads, Perimeter Fencing, and Gates

The Facility will use existing access roads when practicable. The primary transportation corridor to the Facility is I-5 and the Facility can be accessed from I-5 at Diamond Hill Road. Other Facility access is from Gap Road and Priceboro Road d (Figure 2). New service roads will be constructed within the Facility Site Boundary to provide access to Facility infrastructure.

Newly constructed service roads will be graded and graveled as needed to meet load requirements for equipment. Service roads are anticipated to be approximately 20 feet wide and will be constructed to facilitate access within the Facility Site Boundary for construction and maintenance purposes. Internal service roads will meet applicable standards for emergency vehicle access. Corridors between module racking will be approximately 16 feet wide and racking will range from approximately 6 to 60 feet, commonly 20 feet from perimeter fencing to allow for continued agricultural activities.

To the extent feasible, vegetation will be cleared and maintained along perimeter roads to provide a vegetation clearance area for fire safety. Use of the service roads may continue after construction, or new service roads may be removed, and the land reclaimed to pre-construction conditions. Vegetation maintenance along proposed solar array interior roads will include grazing and mowing to a height no more than approximately 24 inches (pollinator friendly and low enough to keep modules clear of vegetation).

Once constructed, the Facility will be accessible via grass corridors or new roads. Approximately 11 miles of new roads will be constructed to access Facility infrastructure. Figure 2 depicts the Facility layout. Existing roads are not anticipated to require improvements or alterations.

The locations of specific access points and gates will depend on the final configuration of the solar array and related infrastructure. Chain-link perimeter fencing, 6 feet in height, will enclose the solar array as well as other infrastructure within the Facility Site Boundary. The perimeter fencing will have lockable vehicle and pedestrian access gates.

2.9.6 Temporary Construction Staging Areas

During construction, up to 10 temporary construction yards (laydown areas) will be used to support construction, store supplies and equipment, and facilitate the delivery and assembly of materials and equipment. These temporary construction staging areas may contain temporary storage of diesel and gasoline fuels located in aboveground tanks and within designated secondary containment areas. The temporary construction staging areas will be within the Facility Site Boundary.

2.10 Approximate Dimensions of the Facility – OAR 345-021-0010(3)(a)(C)

(C) The approximate dimensions of major facility structures and visible features;

This ASC assesses the maximum anticipated impacts of Facility structures and visible features. Preliminary estimates of dimensions for major Facility structures are summarized below.

2.10.1 Solar Array

As described above, the solar modules will be aligned in strings. The dimensions of each module will be approximately 8 feet long and 4 feet wide. This will be a targeted dimension, with variations pending final technology selection and design considerations. The maximum height of the solar modules will be 10 feet when the modules are fully tilted. The solar modules consist of antireflective glass, a metal frame, and wire connectors. The modules will be connected in series to form long rows or strings. The module strings are then connected via combiners, cables, and switchboards.

Racks of modules will be grouped in blocks of various sizes in the solar array area. Wire perimeter fencing will be up to six feet in height, enclose the solar arrays, and have lockable vehicle and pedestrian access gates. The exact number and size of modules, layout, and associated equipment specifications will be determined during final design; however as noted earlier, the actual solar array equipment and layout selected will not exceed the impacts analyzed.

Figure 2 depicts the Facility's proposed solar layout for purposes of analyzing impacts, using approximately 280,240 modules in strings (Table 1), but any number of modules may be used to achieve the up to 150-MW generation capacity. The actual number of modules will vary depending on the module technology, energy output, spacing, mounting equipment, and other design criteria, which are subject to change during final design. The exact number and size of modules, layout, and associated equipment specifications will be determined during micrositing at final design within the Facility Site Boundary.

2.10.2 Battery Energy Storage System (BESS) Enclosures and Transformers

The Facility will include a BESS system utilizing lithium-iron-phosphate (LFP) type batteries, which are a type of Li-ion battery. The BESS will be in large, self-contained enclosures measuring approximately 23 feet wide, 9 feet long, and 10 feet tall. The BESS enclosures will be installed on concrete pads within an approximately 4-acre centralized area near the Facility's collector substation inside the Facility Site Boundary.

Each BESS enclosure contains the LFP batteries' SCADA, power management system, battery charging and regulation, and a fire detection and alarm system. The BESS enclosures include a liquid-cooling system to maintain an acceptable operating temperature for the batteries and to prevent overheating.

The three-phase AC power output of the BESS PCS is at 690 volts alternating current (VAC). The low voltage output from up to four BESS enclosures will be collected at a switchgear, and the collected power will be fed to an adjacent step-up transformer in its own enclosure (one transformer per switchgear, one switchgear per up to four BESS enclosures). The step-up transformer will increase the voltage level to 34.5 kV, which is then sent to the substation using underground MVAC collection cables.

2.10.3 Collector Substation

The collector substation will be used for the proposed Facility and will be located within the Facility site boundary. The collector substation will be located on an approximately 1-acre area within the Facility site boundary and will be enclosed by the locked chain-link fence surrounding the Facility.

2.10.4 Gen-tie line

The Facility's 230-kV gen-tie line will be approximately 0.65-mile long within an 80-foot-wide corridor (Figure 2). The 230-kV gen-tie line will be supported either by H-frame structures with two steel or wood poles or by a steel or wood monopole structure. The structures will rise to a height of approximately 60-80 feet above grade, depending on the terrain. The specific interconnection components will be dictated by PacifiCorp during micrositing at final design.

2.10.5 Collector Lines

The 34.5-kV collector lines will run underground for improved reliability. The approximately 63 miles of underground collector lines will be directly buried at a depth up to 4 feet; however, some portion of the lines may be above ground. If needed, overhead collector line segments will likely be placed on steel or wood monopoles approximately 60 to 80 feet high and subject to the requirements of the National Electrical Safety Code.

2.10.6 Temporary Construction Staging Areas

Temporary construction staging areas will occur within the collector substation and BESS areas, and within the Facility Site Boundary. There will be 10 laydown yards for equipment and materials storage. The total acreage for the 10 laydown yards is approximately 4.68 acres. One or more of the staging areas will include a construction trailer and portable toilets.

2.11 Pipelines and Transmission Line Corridors – OAR 345-021-0010(3)(a)(D)

(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 corridors for analysis in the application. In the assessment, the applicant must 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 must discuss the reasons for selecting the corridors, 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; and

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

The Facility is not a pipeline, nor a transmission line as defined by ORS 469.300. The Facility includes neither a pipeline nor a transmission line that, by themselves, would be considered an energy facility under ORS 469.300(11)(a)(C).

The associated gen-tie line will be approximately 0.65 miles of 230-kV overhead line to connect the Facility collector substation to the existing 230-kV PacifiCorp's existing Diamond Hill Substation. The Facility Site Boundary is entirely within the unincorporated areas of Linn County. Therefore, a corridor selection assessment is not required.

2.12 Description of Pipelines and Transmission Lines – OAR 345-021-0010(3)(a)(E)

(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:

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

The proposed 230-kV gen-tie line will extend approximately 0.65 miles from the collector substation to the existing 230-kV PacifiCorp's existing Diamond Hill Substation located between the northern and southern portions of the Facility Site Boundary, as shown on Figure 2.

(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;

The transmission line will be sited within the Facility Site Boundary. No new right-of-way will be required, and no existing right-of-way will be widened.

(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;

The proposed transmission line does not follow or include public right-of-way because no public right-of-way is available between or near the proposed collector substation. The proposed transmission line will provide the most direct connection between collector substation, regardless of whether it is located within a public right-of-way.

(iv) For pipelines, the operating pressure and delivery capacity in thousand cubic feet per day and the diameter and location, above or below ground, of each pipeline; and

The Facility does not include a pipeline; therefore, this requirement is not applicable.

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

The proposed 230-kV gen-tie line traverses private land through an easement authorized by the property owner. The proposed gen-tie line will be located directly adjacent to the existing 230-kV PacifiCorp Diamond Hill-McKenzie and the 138-kV Emerald People's Utility District Diamond Hill transmission lines. Facilities on PacifiCorp's property will be owned and constructed by PacifiCorp per the terms of the Facility's interconnection agreement.

The width of the gen-tie line corridor is 80 feet, centered on the line (Figure 2). This width is within the transmission line corridor width defined in OAR-001-0010(14).

The Facility is not a pipeline, nor a transmission line as defined by ORS 469.300. The Facility includes neither a pipeline nor a transmission line that, by themselves, would be considered an energy facility under ORS 469.300(11)(a)(C).

2.13 Project Construction Schedule – OAR 345-021-0010(3)(a)(F)

(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 must describe in this exhibit all work on the site that the applicant intends to begin before the Council issues a site certificate. The applicant must 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.

Facility construction is anticipated to commence in December 2027, pending issuance of a site certificate from EFSC. Once initiated, construction is anticipated to be completed within 18 months. The completion of commissioning and start of commercial operation is targeted for June 2029, though the Applicant will try to bring the facility online earlier if achievable. Additional engineering and geotechnical investigations may occur prior to issuance of the site certificate. As defined in ORS 469.300(6), surveying and exploration activities (such as geotechnical investigations) are excluded from the definition of construction work, and preconstruction conditions may be satisfied for the applicable Facility component, as applicable, based on final design and configuration. No other construction work is expected to begin prior to issuance of the site certificate.

3.0 Facility Location – OAR 345-021-0010(3)(b)

OAR 345-021-0010(3)(b) Information about the location of the proposed facility, including:

3.1 Proposed Locations of Facility Sites – OAR 345-021-0010(3)(b)(A)

(A) A map or maps showing the proposed locations of the energy facility site, all related or supporting facility sites and all areas that might be temporarily disturbed during construction of the facility in relation to major roads, water bodies, cities and towns, important landmarks and topographic features, using a scale of 1 inch = 2000 feet or smaller when necessary to show detail;

The Facility is located entirely on the east side of I-5 in Linn County, Oregon near the cities of Coburg, Harrisburg, and Brownsville, as shown on the following maps:

- Figure 1 is an overview map of the Facility, including the proposed Site Boundary and nearby major roads, communities, and other recognizable features.
- Figure 2 is a map showing the proposed Site Boundary and solar array layout, including the locations of related or supporting facilities in relation to nearby cities and towns, county boundaries, existing public roads, and other geographic features.
- Figure 3 shows that no other energy generation facilities are known to be permitted at the state or local level within 10 miles of the proposed Site Boundary.

3.2 Site Description – OAR 345-021-0010(3)(b)(B)

(B) A description of the location of the proposed energy facility site, the proposed site of each related or supporting facility and areas of temporary disturbance, including the total land area (in acres) within the proposed site boundary, the total area of permanent disturbance, and the total area of temporary disturbance. If a proposed pipeline or transmission line is to follow an existing road, pipeline or transmission line, the applicant must state to which side of the existing road, pipeline or transmission line the proposed facility will run, to the extent this is known; and

The site boundary includes approximately 1,590 acres of private land, encompassing the major Facility components and related or supporting facilities (see Section 2). The site boundary provides flexibility for micro-siting the Facility and related and supporting facilities. The Applicant has negotiated land access agreements, as required, with the landowners. The site boundary encompasses some or all the townships, ranges, and sections identified below (see Table 2). Table 2 lists the Tax Lot ID Number of tax lots within the proposed site boundary; see Section 4.0 for Property Owner Information.

Table 2. Facility Location by Township, Range, Section, County, and Tax Lot ID Number

| Township | Range | Section | County | Tax Lot ID Number |
|----------|-------|---------|--------|--------------------|
| 15S | 03W | 14 | Linn | 200 |
| | | 21 | Linn | 202, 400, 500, 601 |
| | | 22 | Linn | 100 |
| | | 23 | Linn | 100 |
| | | 27 | Linn | 200, 300, 400 |
| | | 28 | Linn | 101 |
| | | 33 | Linn | 100, 203 |

As noted above, the Applicant requests flexibility in siting the Facility within the Site Boundary in order to use the most efficient and effective equipment and layout possible at the time of final design. Because this analysis uses the largest anticipated footprint for the Facility, equipment and layout selected will not exceed the impacts analyzed. Resource surveys have been conducted for the entire Facility Site Boundary where components of the solar arrays will be sited. See Exhibits G, H, J, and O1 for details regarding wetland, biological, and cultural surveys. The solar arrays and supporting facilities will be adjusted during the final design to avoid or minimize adverse impacts to resources to the extent practicable. Additional design considerations include the integration of agricultural operations within the solar array area, defined as *agrivoltaics*. Agrivoltaics will be co-located in the solar array area with active farm operations to retain agricultural production and minimize agricultural impacts within the Site Boundary. Native habitat cover within the Site Boundary will be retained to the extent practicable.

Table 3 provides the estimated acres of temporary and permanent disturbance resulting from the construction of the proposed Facility. This layout represents the maximum scenario for purposes of analyzing land use impacts (described in detail in Exhibit D). Table 3 presents the impact by disturbance type. However, some disturbance types may overlap by the nature of their development. Therefore, the last row in the table provides the total Facility disturbance area with all development overlap removed. For purposes of analysis, the Applicant considered a solar array area that will occupy approximately 826.81 acres enclosed within the site boundary, using the proposed solar technology described in Section 2. The solar array area is considered permanently disturbed and includes all solar components (i.e., modules, PCS, tracking systems, posts, collector lines, and other associated equipment), the BESS, portions of the gen-tie transmission line, new access roads, temporary access roads, substation, and the temporary construction yards. All other permanent impacts are listed as separate line items and include permanent impacts from the BESS, gen-tie transmission line, the new access roads, and collector substation; however, the total eliminates any overlap of features within the solar array area. Note that the vegetation within the solar array area will be returned to active agriculture. It is anticipated that there will be residual wildlife and ecological value for the life of the Facility, and the area would resume agricultural use during operations. Any temporary disturbance impacts will only occur outside of the solar array area and include temporary impacts from the underground collector lines, transmission lines, and perimeter fencing.

Table 3. Estimated Temporary and Permanent Disturbance (in Acres)

| Facility Component or Disturbance Type | Permanent | Temporary |
|---|--------------------|-------------------|
| Solar Array Area ¹ | 826.8 acres | N/A |
| Collector Lines (underground) ² | N/A | 23.1 acres |
| Battery Energy Storage System ³ | 3.8 acres | 0.9 acres |
| Generation-tie Transmission Lines (230 kV) ⁴ | 0.004 acres | 6.4 acres |
| Permanent New Roads ⁵ | 20.1 acres | 22.1 acres |
| Temporary New Roads ⁸ | N/A | 4.7 acres |
| Collector Substation ⁶ | 0.9 acres | 0.6 acres |
| Temporary Construction Yards ⁷ | N/A | 4.7 acres |
| Perimeter Fence Line ⁹ | N/A | 14.4 acres |
| Total¹⁰ | 835.1 acres | 38.1 acres |

Note that totals may not sum correctly due to rounding.

1. The solar array areas includes all solar components (i.e., modules, inverters [fenced separately], transformers, tracking systems, posts, portions of the collector lines, and other associated equipment), as well as the following supporting facilities: portions of the new access roads and all of the temporary constructions areas. Permanent impacts for each component are listed separately; however, the total eliminates any overlap of features within the solar array area.
2. Temporary impact assumes a 5-foot buffer on collector lines to create temporary disturbance corridors of varying width. Assumes 19.21 miles of underground 34.5-kV collector line (located inside both the solar array areas and site boundary). Also includes HDD work areas.
3. The BESS will be concentrated near the substations. For purposes of the analysis in this ASC, it is assumed that BESS containers will be fenced separately and collocated with the inverters and transformers sites, occupying approximately 3.75 acres total within the site boundary. This assumes a 20 to 25-foot temporary disturbance corridor on the outer side of the BESS.
4. Overhead gen-tie transmission line disturbance amounts include the support poles. Assumes a 80-foot temporary disturbance corridor with up to 8 structures total. Assumes approximately 500-foot minimum spans between poles. Total of 0.65 miles of 230-kV line total, interconnecting the collector substations to the to the POI. Located inside the site boundary
5. New access roads are assumed to be up to 20 feet in width in general; all new roads are located inside both the solar array areas and limit of disturbance. Assumes 10.68 miles of new permanent roads, 3 to 10 feet of temporary impact on each side of roads.
6. The collector substation is fenced separately within the site boundary and include a surrounding gravel area and other associated components, occupying 0.92 acres within the site boundary. This assumes a 30-foot temporary disturbance corridor on the outer side of the collector substation.
7. Disturbance is calculated from the 10 temporary construction yards, up to 4.68 acres total, located inside the solar array areas.
8. New temporary access roads are assumed to be up to 16 feet width in general. All temporary access roads are located inside the solar array areas. Assumes 2.65 miles of temporary roads.
9. This is only the solar array areas perimeters and assumes a 8-foot temporary disturbance corridor on the outer side of the fence multiplied by the linear footage of fence for temporary workspace to install the fence. The narrow footprint of the fence is considered part of the permanently disturbed solar array areas. Assumes a total of 14.4 miles of fence around the solar array areas (6-foot wire mesh, 1-foot barbed wire, alternative being 7-foot agricultural fencing).
10. Totals eliminate any overlap of features (e.g., overlapping temporary workspace, disturbance types within both the solar array areas and site boundary, as applicable).

3.3 Locations of Nearby Energy Facilities – OAR 345-021-0010(3)(b)(C)

(C) For energy generation facilities, a map showing the approximate locations of any other energy generation facilities that are known to the applicant to be permitted at the state or local level within the study area as defined in OAR 345-001-0010 for impacts to public services.

Figure 3 shows approximate locations of existing energy infrastructure known to the Applicant within 10 miles of the Facility Site Boundary. No existing or permitted energy facilities are identified within 10 miles of the Facility Site Boundary in accordance with the study area for public services defined in OAR 345-001-0010(35)(b).

4.0 Property Owner Information – OAR 345-021-0010(3)(c)

OAR 345-021-0010(3)(c) A list of the names and mailing addresses of property owners, as described in this subsection:

(A) The list must include all owners of record, as shown on the most recent property tax assessment roll, of property located:

(i) Within 100 feet of property which is the subject of the application, where the subject property is wholly or in part within an urban growth boundary;

(ii) Within 250 feet of the property which is the subject of the application, where the subject property is outside an urban growth boundary and not within a farm or forest zone; or

(iii) Within 500 feet of the property which is the subject of the application, where the property is within a farm or forest zone.

(B) The applicant must submit an updated list of property owners as requested by the Department before the Department issues notice of any public hearing on the application for a site certificate as described in OAR 345-015-0220; and

(C) In addition to incorporating the list in the application, the applicant must submit the list to the Department in an electronic format approved by the Department.

The proposed Site Boundary is described in detail in Section 2. Attachment 1 includes the names and mailing addresses of all landowners of record within the notification area as defined by OAR 345-21-0010(1)(c)(A). The Applicant will update Attachment 1 within 60 days of the public hearing. An Excel spreadsheet of Attachment 1 has also been included with this submittal.

5.0 Applicable Statutes, Rules, and Local Government Ordinances – OAR 345-021-0010(3)(d)

OAR 345-021-0010(3)(d) Identification, by legal citation, of all state statutes and administrative rules and local government ordinances containing standards or criteria that the proposed facility

must meet for the Council to issue a site certificate, other than statutes, rules and ordinances identified in Exhibit E, and identification of the agencies administering those statutes, administrative rules and ordinances. The applicant must identify all statutes, administrative rules and ordinances that the applicant knows to be applicable to the proposed facility, whether or not identified in the project order. To the extent not addressed by other materials in the application, the applicant must include a discussion of how the proposed facility meets the requirements of the applicable statutes, administrative rules and ordinances.⁴

5.1 Applicable Rules and Ordinances

Table 4 identifies by legal citation and relevant administering agency the state statutes and administrative rules and local government ordinances referenced in other exhibits, except for those presented in Exhibit A. The identified statutes, rules, and ordinances contain standards or criteria that the proposed Facility must meet for EFSC to issue a site certificate.

Applicable state statutes, administrative rules, and local government ordinances containing land use standards are identified in Exhibit D.

⁴ “Exhibit E” as mentioned in this OAR no longer exists within the Division 21 or Division 22 regulations. In 2025, the EFSC-related OARs underwent a substantial revision, and this language (referring to the older document structures) was inadvertently retained in the OAR text. The document this refers to is now known as Exhibit A.

Table 4. Statutes, Rules, and Local Ordinances Referenced in Other Exhibits

| Administering Agency | Agency Address | Program Description Legal Citation | Relevant Location |
|--|--|--|-------------------|
| Oregon Department of Agriculture | Troy Abercrombie Program Manager Native Plant Conservation 635 Capitol Street NE Salem, OR 97301 (503) 983-4065 | Native Plant Conservation Program (Oregon Revised Statutes) ORS Chapter 564 (Wildflowers, Threatened or Endangered Plants); OAR Chapter 603, Division 73 (Plants: Wildflowers and Endangered, Threatened and Candidate Species) | Exhibit H |
| Oregon Department of Environmental Quality | Oregon Department of Environmental Quality 4026 Fairview Industrial Drive SE Salem, OR 97302 (503) 229-5257 | Hazardous Materials Management ORS Chapters 465 and 466 (Hazardous Waste and Hazardous Materials I and II); and OAR Chapter 340, Divisions 45, 47, 108, 100 through 122, 150, and 160 (Hazardous Waste Management); 40 CFR Parts 110, 122, 262, 265, 280, 302, 355, and 761 | Section 5.3.2 |
| | Oregon Department of Environmental Quality 4026 Fairview Industrial Drive SE Salem, OR 97302 (503) 229-5257 | OAR 345-022-0120 Waste Minimization; Solid Waste Management ORS Chapter 459 (Solid Waste Management) and OAR Chapter 340, Division 93 (Solid Waste General Provisions) | Exhibit N |
| | Oregon Department of Environmental Quality 4026 Fairview Industrial Drive SE Salem, OR 97302 (503) 229-5257 | Noise Regulations ORS 467.020 and ORS 467.030 (Noise Control) and OAR Chapter 340, Division 35 (Noise Control Regulations) | Exhibit O3 |
| Oregon Department of Fish and Wildlife | Springfield Field Office 3150 E Main Street Springfield, OR 97478 (541) 726-3515 | Fish and Wildlife Habitat Mitigation Policy ORS 496; OAR Chapter 635, Divisions 100 and 415 (Fish and Wildlife Habitat Mitigation Policy) | Exhibits G, H, O1 |

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| Administering Agency | Agency Address | Program Description Legal Citation | Relevant Location |
|---|--|--|-------------------|
| | Springfield Field Office 3150 E Main Street Springfield, OR 97478 (541) 726-3515 | State Threatened and Endangered Species OAR Chapter 625, Division 100 (Wildlife Diversity Plan) and OAR 635-044-0130 | Exhibit H |
| Oregon Department of Geology and Mineral Industries | Jason McLaughry Geologic Survey and Services Program Oregon Department of Geology and Mineral Industries 1995 3 rd Street, Suite 130 Baker City, OR 97232 (541) 519-3419 | Department of Geology and Mineral Industries Administrative Rules- OAR Chapter 632 | Exhibits B, C |
| Oregon Department of Land Conservation and Development | Hilary Foote Department of Land Conservation and Development 635 Capitol Street NE, Suite 150 Salem, OR 97301 (503) 373-0050 | OAR 345-022-0030(2) and (3) Land Use; Oregon Statewide Planning Goals, applicable sections of OAR Chapter 660, applicable substantive criteria of the Linn County Comprehensive Plan and land use ordinances, and any exceptions to the same may be granted by EFSC under OAR 345-022-0030(4). | Exhibit D |
| Linn County Planning Department – Land Use ¹ | Linn County Planning & Building 300 SW 4th Avenue, Room 114 PO Box 100 Albany, OR 97321 (541) 967-3816 | OAR 345-022-0030(2)(a) Land Use Linn County Zoning Ordinance | Exhibit D |

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| Administering Agency | Agency Address | Program Description Legal Citation | Relevant Location |
|---|---|--|--------------------------|
| Office of State Fire Marshal; Oregon State Police | Chad Hawkins Assistant Chief Deputy Office of State Fire Marshal, Oregon State Police 3991 Fairview Industrial Dr SE Salem, OR 97302 (503) 934-8252 | OAR 345-022-0115 Wildfire Prevention and Risk Mitigation ORS 453; OAR Chapter 837, Divisions 85 and 95; Fire and Life Safety Regulations, OAR 837, Division 40 | Exhibit L |
| Oregon Public Utility Commission | Oregon Public Utility Commission 201 High Street SE, Suite 100 Salem, OR 97301-3398 (503) 378-6600 | Public Utility Commission of Oregon Safety Standards ORS 757.045; OAR Chapter 860, Division 24 (Safety Standards) | Section 2.0 Exhibit A |
| State Historic Preservation Office | John Pouley Oregon State Historic Preservation Officer Assistant State Archaeologist 725 Summer St NE Suite C Salem, OR 97301 (503) 480-9164 | Historic, Cultural and Archaeological Resources Standard ORS 97.745 (Prohibited Acts); ORS 358.920 (Prohibited Conduct); ORS 390.010 (Outdoor Recreation); ORS 390.235 (Archaeological Sites and Historical Material); and OAR 345-022-0090 (Historic, Cultural and Archaeological Resources Standard) | Exhibit J |
| 1. As stated in Exhibit D: The Applicant intends to satisfy EFSC's land use standard, OAR 345-022-0030, by seeking an EFSC determination under ORS 469.504(1)(b). The Applicant seeks a determination by EFSC of compliance with land use standards from Linn County. | | | |

5.2 Need Standard for Nongenerating Facilities – OAR 345, Division 23

OAR 345-023-0005 – Need for Facility. This division applies to nongenerating facilities as defined in ORS 469.503(2)(e), except nongenerating facilities that are related or supporting facilities. To issue a site certificate for a facility described in sections (1) through (3), the Council must find that the applicant has demonstrated the need for the facility. The Council may adopt need standards for other nongenerating facilities. This division describes the methods the applicant shall use to demonstrate need. In accordance with ORS 469.501(1)(L), the Council has no standard requiring a showing of need or cost-effectiveness for generating facilities. The applicant shall demonstrate need:

(1) For electric transmission lines under the least-cost plan rule, OAR 345-023-0020(1), or the system reliability rule for transmission lines, OAR 345-023-0030, or by demonstrating that the transmission line is proposed to be located within a “National Interest Electric Transmission Corridor” designated by the U.S. Department of Energy under Section 216 of the Federal Power Act;

(2) For natural gas pipelines under the least-cost plan rule, OAR 345-023-0020(1), or the economically reasonable rule for natural gas pipelines, OAR 345-023-0040;

(3) For storage facilities for liquefied natural gas with storage capacity of three million gallons or greater under the least-cost plan rule, OAR 345-023-0020(1), or the economically reasonable rule for liquefied natural gas storage facilities, OAR 345-023-0040.

(4) If the proposed facility is a non-generating facility for which the applicant must demonstrate need under OAR 345-023-0005, the applicant must submit information about the need for the facility, providing evidence to support a finding by the Council as required by OAR 345-023-0005(1)-(3), including identification of the rule in Division 23 of this chapter under which the applicant chooses to demonstrate need.

Not applicable. The Facility is not a nongenerating facility.

5.3 Materials Analysis

Many sections of OAR 345 Division 22 incorporate a materials analysis. To reduce repetition, the material analysis for the proposed Facility has been included below.

5.3.1 Materials Inventory

(A) An inventory of substantial quantities of industrial materials flowing into and out of the proposed facility during construction and operation;

5.3.1.1 Construction Materials

The Applicant is requesting to permit a range of technology to preserve permitting flexibility and will stipulate the precise details of photovoltaic solar energy generation and related or supporting facilities during final design and engineering prior to construction. The analysis for this exhibit

includes the maximum number of materials anticipated within the Project site boundary to address the maximum anticipated disturbance.

For the Facility, the Applicant will use photovoltaic solar modules composed of bifacial mono- or poly-crystalline cells supported on non-specular, galvanized steel racks. Solar modules consist of a crystalline cell, antireflective glass, a metal frame, and factory-installed “quick connect” wire connectors. The modules are inert and will not introduce any hazardous materials to the Facility. Each tracker will be supported by steel posts. Each pile is assumed to have an average length of 12 feet, requiring approximately 108 pounds of steel per pile. Other onsite equipment will include overhead and buried conduits, inverters, combiners, and transformers.

Battery manufacturer options are under consideration as the technology continues to rapidly evolve. The battery options are anticipated to use a series of self-contained enclosures located on concrete pads within an approximately 4-acre area adjacent to the collector substation. The BESS options under consideration include fire suppression systems.

The Applicant proposes using a lithium-iron phosphate (LFP), which is a type of Li-ion battery technology for the battery energy storage system. Li-ion battery systems are modular systems that are housed inside large containers (enclosures). Each BESS container contains multiple battery modules, and the battery modules are electrically connected to achieve the designed voltage and amperage for the BESS system. The quantities of cells, packs, strings, and modular units will vary based on manufacturer and on the model of BESS enclosure procured for the Facility, but the general framework is typical for utility-scale Li-ion systems. Each modular BESS enclosure proposed for this project is capable of producing 1.32 MWAC of power, with a 4-hour rating (5.11 MWh of energy). This Facility would require 96 of the proposed modular Li-ion battery system enclosures to meet the nameplate power and energy requirements at the beginning of life (BIL). Additional batteries will be used to augment the design as the batteries degrade over the lifetime of the project, with an anticipated maximum of 122 battery enclosures total at end of life (EOL).

Although leaks from the modules are very unlikely, because any leak will require failure of the sealed module, any material that might leak from the module to the floor of the container will easily be contained within the container. The technology options will be manufactured, assembled, and inspected off-site. They will be shipped to the site as outdoor-rated prefabricated modules, which will be installed and electrically connected on-site.

The primary construction materials for the Facility are rock and gravel (aggregate), steel, water, concrete, and assorted electrical equipment. Table 5 provides an inventory of materials that will be used during Facility construction, based on current engineering estimates. The amount of water required for construction is discussed in Exhibit O2. Solid wastes generated and flowing out of the Facility during construction are discussed in Section 5.1 and outlined in greater detail in Exhibit N.

Table 5. Inventory of Construction Materials

| Material | Ultimate Disposition | Quantity/Units |
|---|---|--|
| Major and Supporting Facility Components | | |
| Solar Modules | Throughout each solar module string | Maximum 280,240 modules |
| Solar module steel tracker posts | Throughout each solar module string | 45,415 posts, 2,452 tons steel (108 pounds per post) |
| Solar modules per string | Throughout each solar module string | 31 modules per string (maximum 9,040 strings) |
| Inverters/Transformers (Power Conversion System) | Aboveground throughout solar array | 40 PCS units with inverters and transformer each. |
| Batteries | BESS | Li-ion battery housed in an initial 96 BESS containers at Facility beginning of life; augmented to 122 containers at Facility end of life. |
| Transformer/Inverter | BESS | Initial 24 BESS inverter step-up transformer at Facility beginning of life; augmented to 31 BESS inverter step-up transformer at Facility end of life. |
| Combiner boxes | Aboveground throughout each solar panel string | 920 boxes |
| 230-kV gen-tie transmission line | Used on-site for power transmission | 1 overhead 0.65 mi gen-tie line |
| 34.5-kV underground collector lines | Used on-site for power transmission | 62.72 miles of underground 34.5-kV collector lines |
| Optical communication wire (weight = 1.1 tons per mile) | Used for communications for system operations | 112,558 ft of 12-fiber single mode fiber optic communication cable |
| Fencing | Encloses solar array, BESS, and substation | 14.81 miles of fencing around the solar array area 0.48 miles of fencing around substation and BESS area |
| Substation | On-site graveled area | 1 substation |
| Temporary Construction Staging Areas | On-site graveled area | 10 laydown yards |
| Riprap | Used for erosion control at low water crossings | 858 yards ³ |
| Concrete | | |
| BESS | Foundation | 1,315 yards ³ (96 BESS containers) |
| Solar array (tracker posts) | Driven Piles | N/A |
| Transmission line support structures | Foundation | 320 yards ³ (1 gen-tie transmission line, 0.65 miles, 8 support poles) |
| Solar array (Inverters/Transformers) | Foundation | 1,476 yards ³ (40 Inverter/Transformers) |
| Substation Transformer | Foundation | 64 yards ³ |

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| Material | Ultimate Disposition | Quantity/Units |
|--------------------------------------|--|---|
| Culverts (Reinforced Concrete pipe) | Remains on-site for drainage and stormwater control | 18-inch RCP culverts under roadways: 50 feet |
| Aggregate (rock and gravel) | | |
| Interior array access roadways | On-site graveled area | 14,257 yards ³ (assume 6-inch aggregate base over compacted subgrade, 16-foot access roadways) |
| Temporary access roadways | On-site graveled area | 4,144 yards ³ (assume 6-inch aggregate base over compacted subgrade, 16-foot access roadways) |
| Substation and BESS access roadways | On-site graveled area | 3,056 yards ³ (assume 6-inch aggregate base over compacted subgrade, 20-foot access roadways) |
| BESS | On-site graveled area | 3,500 yards ³ (up to 96 containers, on 3.95-acre BESS area) |
| Inverter/Transformer pads | On-site graveled area | 249 yards ³ (40 inverters, assume 4 inches of aggregate) |
| Substation | On-site graveled area | 900 yards ³ (1 substation, 1 acre) |
| Temporary construction areas | On-site graveled area | 3,788 yards ³ (10 laydown yards, 4.7 acres) |
| | | |
| Herbicide | Used on transmission right-of-way, collector substation, and BESS for weed control | Less than 5 gallons, |
| Insulating Oil (PCB free) | Used in the collector substation transformer | Pending |

Rock and Gravel

Road construction will utilize rock and gravel (aggregate) for new, permanent access roads. No improvements or alterations are proposed for existing roads. Rock and gravel will also be used as ground-surfacing material for the battery energy storage system, around inverter/transformer stations in the solar array, access roads, collector substation, and the temporary construction areas. Table 5 provides the estimated tons of aggregate for each of these purposes.

The gravel placed at the temporary construction staging areas will be removed following construction by the construction contractor with each phase. The construction contractor will acquire the rock and gravel from existing or new commercial gravel pit sources in Linn County to the extent feasible.

Water and Concrete

Water will be required during construction for dust control, road compaction, concrete mixing, and drinking/sanitation.⁵ The amount of water needed for construction will depend on weather conditions during the construction phases, as well as the final design of Project components. Exhibit O-2 provides detail on water quantities, assumptions, and sources.

Concrete will be used to lay foundations for the BESS storage containers, inverter/transformer stations, and collector substation (Table 5). In some soil conditions, concrete backfill may be needed for tracker post installation.

Steel

Large quantities of steel will be needed for the solar array, as listed in Table 5. The estimate is based on the proposed solar array layout using 45,415 steel posts to support the solar module trackers. Each post is assumed to have an average length of 12 feet, requiring approximately 108 pounds of steel per post.

Steel containers will house each BESS battery module pack. The amount of steel will vary depending on the type and configuration of the battery system. However, this analysis assumes that up to 96 containers will be used, requiring approximately 225 tons of steel. The associated quantity of steel is also listed in Table 5.

Other Typical Construction Materials

Several other materials will be brought on site to construct the solar array, battery energy storage system, and other related or supporting facilities (Table 5). Electrical cable and combiner boxes will be used to connect the solar strings within the array and to the collector substation. The Facility will include 62.72 miles of underground 34.5-kV collector lines. A Generator step-up transformer will be located at the supporting substation. The solar array will be constructed from prefabricated solar modules composed of mono- or poly-crystalline cells supported by non-specular, galvanized steel racks. Additional elements associated with the battery energy storage system will include fire-suppression systems (for Li-ion batteries specifically), battery containers, racks, and the batteries themselves. The Facility will include 0.65 miles of new 230-kV transmission line (with up to 8 support structures) interconnecting the collector substation to the Facility's POI at the existing PacifiCorp Diamond Hill substation. The transmission system will be aboveground. The solar array will include up to 40 inverters and transformer stations, which will be placed together on the same slab of concrete. Chain-link fencing will be used to enclose the solar array area, substation, and potentially the battery energy storage system (to be determined prior to construction).

⁵ Note that other dust suppressants besides water may be used as necessary during extreme drought conditions (synthetic polymer emulsions, chemical suppressants, organic glues, and wood fiber materials).

5.3.1.2 Operational Materials Inventory

Materials used during Facility operations are variable and dependent upon the maintenance or repair events that occur during the life of the Facility. Major replacement or repair events are possible during the life of the Facility; however, since the cause and extent of these types of potential events are unknown, no estimates have been provided for the number of major components that would be needed. Minor maintenance may also require the replacement and removal of smaller components, which are not expected to constitute substantial amounts of industrial materials

Table 6 provides a list of materials estimated for use for a typical 5-year operation period. Operations materials are variable, and dependent upon the maintenance or repair events that occur. It is possible that no materials would be required during a typical 5-year period. However, Table 6 provides for minimal replacement of materials that are sometimes lost, damaged, or stolen. Operations materials would be delivered to the required location at the time needed.

Table 6. Materials Inventory for Operations

| Material | Ultimate Disposition | Quantity/Units |
|--|--|---|
| Batteries | Disposed of at approved facility | 96 Li-ion containers |
| Aggregate base | Used for road repair/stabilization and to replenish yard rock | 6 inches |
| Transformer oil | Within transformer boxes for cooling (No extra oil stored outside of transformers. Additional oil only required due to failure, provided on an as-needed basis.) | Substation transformer (XX gallons). (Oil quantity for each transformer type will be determined prior to Facility operations once final equipment is selected.) |
| Herbicide (Round-up and 2, 4-D weed control) | Substation, BESS and transmission line right of way | Less than 5 gallons, |

Solar Array and Collector Substation

No substantial quantities of industrial materials will be brought onto, stored, or removed from the Facility during operations. The materials that will be brought onto or removed from the site will relate to maintenance or replacement of damaged equipment (e.g., spare solar module and related components, electrical equipment). The materials replaced and removed will not constitute significant amounts. When needed, replacement solar modules will be shipped to the Facility. Table 6 includes materials and amounts that will be used during operation of the transformers for the solar array and collector substation.

Solar modules will rely on rainfall to minimize the effects of solar module dust and dirt on energy production (referred to as soiling) although this is not anticipated and will be dependent on weather conditions.

Battery Energy Storage System

The types and quantities of industrial materials used during operation of the battery energy storage system are listed in Table 5. Energy storage systems degrade over time and may require replacement during the 20-year Facility lifetime.

Batteries will be replenished at a rate depending on usage. For example, a battery that is cycled more often will degrade faster than one that is used less often. For this analysis, it is assumed that the battery will be fully discharged each day and the useful life of the battery will be 20 years requiring possible replacement after year 20.

The Li-ion battery systems are typically air cooled, and do not have a liquid component. However, some Li-ion battery systems are liquid cooled, such as the Tesla Powerpack, which uses coolant similar to automotive antifreeze. The coolant, if used, is recirculated through a closed system to cool the batteries.

Other Typical Operational Materials

Small quantities of herbicides and pesticides may be stored on site for use during Facility operations. None will be present in substantial reportable quantities; the amounts present (if any) will be no greater than household quantities.⁶

5.3.2 Hazardous Materials Handling and Management

(B) The applicant's plans to manage hazardous substances during construction and operation, including measures to prevent and contain spills; and

All potentially hazardous substances, will be used in a manner that is protective of human health, protective of the environment, and that complies with all applicable local, state, and federal environmental laws and regulations. For any necessary, potentially hazardous substance used during the Project's construction or operation, Safety Data Sheets will be made available and located at the construction area or the relevant Project component. Extremely hazardous substances in excess of threshold planning quantities, highly toxic substances, or explosive materials will not be necessary to support either the construction or the operations phases of the Project. Additionally, materials used during the construction and operations of the Project will be selected so that they minimize the potential for producing "hazardous waste," as defined by the Resource Conservation and Recovery Act (42 U.S.C. §6901 et seq. [1976]). Accidental releases of hazardous materials will be prevented or minimized through proper containment of these substances during use and transportation to the Project site as described in the SPCC Plan.

5.3.2.1 Construction Materials

Potentially hazardous materials that will be used for construction include herbicide, paint, unused solvents, and spent vehicle and equipment fluids and components (e.g., used oil, used hydraulic

⁶ "Household quantity" refers to container sizes designed for consumer use, which are sized such that each container would hold less than a reportable quantity of any constituent hazardous chemical.

fluids, spent fluids, oily rags, and spent lead-acid or nickel-cadmium batteries). Potentially hazardous substances will not be permanently present within the construction areas in quantities that exceed Oregon State Fire Marshal Reportable Quantities.⁷

Fuels will be the only hazardous material that may be stored in substantial quantities on-site during construction; the Applicant anticipates that up to 1,000 gallons of diesel fuel and 500 gallons of gasoline may be kept on-site for fueling of construction equipment, two tanks total. These will both be stored in temporary aboveground tanks in the construction yard(s), within an area that provides for secondary containment. The gasoline tank is expected to be filled once per month, and the diesel tank will be filled twice per month. Secondary containment and refueling procedures for on-site fuel storage will follow the contractor's SPCC Plan. Secondary containment will be compliant with requirements in 40 CFR §112.7(c), which requires secondary containment for all above ground, buried, and partially buried containers. It is anticipated that the majority of fuel containers will have self-contained secondary containment (e.g., double-walled containers) that provide capacity for the entire container plus precipitation. In some cases, smaller containers (e.g., drums) will be placed in a constructed secondary containment area that is impervious and is diked or otherwise contained to provide the required fuel and precipitation capacity. Fuel for construction equipment will be delivered to the site via a specialized mobile vehicle by a licensed service contractor on an as-needed basis. Following the completion of fueling activities, these vehicles will not remain on-site longer than necessary to complete their fueling tasks. Construction-based equipment will be regularly inspected to detect potential leaks or other issues that may require maintenance. Potentially hazardous substances related to the maintenance of the construction equipment will only be brought to the construction site by a maintenance technician on an as-needed basis, and any unused or waste substances will be removed during the same service call.

In the unlikely event that an accidental spill occurs, any spilled or released substances will be cleaned up, and any contaminated media impacted by the spill will be managed in accordance with all applicable regulations as described in the SPCC Plan. As specified in the contractor's SPCC Plan, larger spill kits with absorbents, absorbent pads, spill socks, and disposable bags will be maintained in proximity to construction activities. In addition, to reduce the response time to a spill, smaller spill kits containing absorbent pads will be located on key pieces of construction equipment. All employees will be instructed in the location, handling, and usage of the spill kits. Any reportable spills will be immediately called in to the Oregon Emergency Management Division's Oregon Emergency Response System, per OAR Chapter 340 Division 142.

⁷ "Reportable quantity" refers to the amount of hazardous substance that has to be released into the environment before the U.S. Environmental Protection Agency requires notification of the release to the National Response Center pursuant to the Comprehensive Environmental Release, Compensation, and Liability Act, also known as Superfund. These numerical designations are listed under 49 Code of Federal Regulations 172.101 Appendix A, Table 1 and Table 2.

5.3.2.2 Operations Materials

Use of the battery energy storage system may include hazardous substances within internal battery components; however, batteries are integrated to safely operate when used according to the recommendations of the manufacturer and their integrity is maintained (not damaged and internal seal is intact). Li-ion batteries present a flammability hazard and require cooling systems to prevent overheating. The battery energy storage system will have integrated safety systems that monitor battery performance to detect malfunctions and implement response measures (for example: notifying operators, depowering the system, or deploying fire suppression devices). Batteries will be housed in leak-proof containers to prevent inadvertent release of hazardous materials. Operations and maintenance staff will conduct inspections of the battery cells for damage. Note that used Li-ion batteries may contain hazardous waste and will be handled and disposed of per the most up-to-date guidelines at the end of their life.

For the replacement of Li-ion batteries specifically during operation, the Applicant will follow the handling guidelines of 49 Code of Federal Regulations 173.185 – Department of Transportation Pipeline and Hazardous Material Administration related to the shipment of Li-ion batteries. The regulations include requirements for prevention of a dangerous evolution of heat, prevention of short circuits, and prevention of damage to the terminals. They also require that no battery will come into contact with other batteries or conductive materials. Regardless of the batteries selected for the Facility, licensed third-party battery suppliers will be responsible for transporting batteries to and from the Facility in accordance with applicable regulations, as required through their licensure. Spent batteries will be disposed of at a facility permitted to handle them in compliance with applicable Resource Conservation and Recovery Act and Toxic Substances Control Act regulations administered by the EPA or Oregon Department of Environmental Quality. Adherence to the requirements and regulations (including personnel training, safe interim storage, and segregation from other potential waste streams) will minimize safety hazards related to transport, use, or disposal of batteries.

Small quantities of herbicides, or other chemicals will be brought to site as needed during maintenance activities. Sorbent materials will be brought to the site during maintenance activities to capture any small spills that may occur. No underground storage tanks will be installed at the Facility. No extremely hazardous materials (as defined by 40 Code of Federal Regulations 355) are anticipated to be produced, used, stored, transported, or disposed of at this Facility during operation.

Secondary containment is optional for the transformers, as these are classified as qualified oil-filled operational equipment under the EPA's Amended Spill Prevention, Control, and Countermeasure Rule issued in 2006 (EPA-550-F-06-008). Per this amended rule, instead of providing secondary containment for qualified oil-filled operational equipment, an owner or operator may prepare an oil spill contingency plan and a written commitment of personnel, equipment, and materials to quickly control and remove discharged oil; the plan must include an inspection or monitoring program for the equipment to detect a failure and/or discharge. Alternatively, the transformers may be installed on foundations that provide secondary containment, or sorbent materials may be kept on hand to

capture minor leaks. The Applicant plans to install secondary containment for the substation transformers, and the specific design will be determined prior to construction of the substation. All secondary containment will meet EPA requirements to have sufficient capacity to contain at least 10 percent of the total volume of the primary containers or 100 percent of the volume of the largest container, whichever is greater. The transformers in the substation yard will have polychlorinated biphenyl-free insulating oil inside the units, which have their own oil containment systems; at no time will oil be able to discharge from the proposed oil containment system. Due to the quantity of oil in the transformers (see Table 5), the Applicant will maintain an SPCC Plan for the substation operations.

The Applicant will have an operational SPCC Plan to detail appropriate response measures. In the unlikely event of an accidental hazardous materials release, any spill or release will be cleaned up and the contaminated soil or other materials disposed of and treated according to applicable regulations. Employees will be trained to be aware of the potential hazards of the contents of the module through the availability of Safety Data Sheets, and to handle such releases in accordance with applicable regulations. Spill kits containing items such as absorbent pads will be located on equipment and in on-site temporary storage facilities to respond to accidental spills, if any were to occur. Employees handling hazardous materials will be instructed in the proper handling and storage of these materials, as well as where spill kits are located. The Applicant will report spills or releases of hazardous materials during operation as noted above to the Oregon Emergency Response System, per reporting requirements detailed in OAR Chapter 340 Division 142.

5.3.3 Non-Hazardous Waste Management

(C) The applicant's plans to manage non-hazardous waste materials during construction and operation.

The Applicant will fully comply with all applicable waste handling and disposal regulations on all lands associated with the Facility, during both construction and operation. Solid waste will be stored in a manner that does not constitute a fire, health, or safety hazard until such time as it can be hauled off for recycling or disposal, as appropriate. Exhibit N provides details on the types and amounts of waste, and procedures and systems for the handling and disposal of waste materials.

5.3.3.1 Construction Materials

Non-hazardous waste materials generated during Project construction are described in Exhibit N and may include items such as scrap steel, wood, concrete, excavated soil, and packaging material waste. Construction will not require the use of specialized structures, systems, or equipment for waste management or disposal. Standard 30-cubic-yard roll-off dumpsters for construction waste will be kept on-site to keep construction debris until it is hauled off-site by a licensed waste hauler (see Exhibit L for waste service provider information). Excess excavated soil material will be used to restore ground contours after construction, and to provide fill on-site or be transported off-site for disposal. The only other material that has the potential to be disposed of on-site is waste concrete generated during construction. Waste concrete will consist of concrete solids contained in

the concrete chute washout water. Washdown methods will be determined by the contractor and may occur at contractor-owned batch plants or a designated concrete washout. Excess concrete will be incorporated into the foundation, rather than disposal of the material. There will be no disposal of hardened waste concrete on-site other than as described here.

Packaging waste (such as paper and cardboard) and refuse will be separated, accumulated in dumpsters, and periodically removed for recycling or disposal at the Coffin Butte Landfill (see Exhibit L). Portable toilets will be provided for on-site sewage handling during construction and will be pumped and cleaned regularly by the construction contractor.

Construction stormwater will be generated within the limit of disturbance. Such stormwater will be covered under the Project's National Pollutant Discharge Elimination System 1200-C construction permit and its associated Erosion and Sediment Control Plan (ESCP). A draft ESCP is included with Exhibit C.

5.3.3.2 Operational Materials

During Project operations, solid waste generation will be minimal. Administrative activities related to the solar array and battery storage system will be conducted remotely. Damaged equipment and other solid waste will be collected by the maintenance crews, removed, and transported off-site to facilities such as the Coffin Butte Landfill that handle the disposal or recycling of these items. Solar panel washing will rely on rainfall and will evaporate or will infiltrate into the ground near the point of use (see Exhibit N). No additional industrial wastewater streams will be generated at the solar array.

6.0 Specific Standards – OAR 345-021-0010(3)(e)

6.1 Overview of Electrical and Magnetic Fields from Overhead Transmission Lines

OAR 345-021-0010(3)(e) If the proposed facility is a facility for which the Council has adopted specific standards, information about the facility providing evidence to support findings by the Council as required by the following rules:

- (A) For wind energy facilities, OAR 345-024-0010 and 345-024-0015;*
- (B) For surface facilities related to underground gas storage reservoirs, OAR 345-024-0030, including information required by OAR 345-024-0030(3);*
- (C) For any transmission line under Council jurisdiction, OAR 345-024-0090; and*
- (D) For a fossil-fueled power plant or other facility that emits carbon dioxide, OAR 345-024-0500 to 345-024-0720.*

The proposed Facility is a solar energy generation and battery storage project, therefore, OAR 345-021-0010(3)(e)(A), (B) and (D) are not applicable. OAR 345-021-0010(3)(e)(C) is also not

applicable, although the 230-kV transmission line and 34.5-kV collector cables do amount to related or supporting facilities to the Facility. As a result, the criteria for (C) are provided below.

OAR 345-024-0090 Siting Standards for Transmission Lines

To issue a site certificate for a facility that includes any transmission line under Council jurisdiction, the Council must find that the applicant:

Although the 230-kV transmission and 34.5-kV collector lines do not constitute energy facilities under EFSC jurisdiction as defined by Oregon Revised Statute 469.300 because they do not cross more than one city or county, they do amount to related or supporting facilities to the solar energy facility that is under EFSC jurisdiction.

(1) Can design, construct and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public;

Attachment 2 provides modeling results for alternating current electric fields and demonstrates that these electric fields do not exceed 9 kilovolts/meter (kV/m) in areas accessible to the public.

(2) Can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.

(3) If the proposed energy facility is a transmission line or has, as a related or supporting facility, a transmission line of any size, the applicant must submit the following:

(a) Information about the expected electric and magnetic fields, including:

(A) The distance in feet from the proposed center line of each proposed transmission line to the edge of the right-of-way;

(B) The type of each occupied structure, including but not limited to residences, commercial establishments, industrial facilities, schools, daycare centers and hospitals, within 200 feet on each side of the proposed center line of each proposed transmission line;

(C) The approximate distance in feet from the proposed center line to each structure identified in (3);

(D) At representative locations along each proposed transmission line, a graph of the predicted electric and magnetic fields levels from the proposed center line to 200 feet on each side of the proposed center line;

(E) Any measures the applicant proposes to reduce electric or magnetic field levels;

(F) The assumptions and methods used in the electric and magnetic field analysis, including the current in amperes on each proposed transmission line;

(G) The applicant's proposed monitoring program, if any, for actual electric and magnetic field levels; and

(b) An evaluation of alternate methods and costs of reducing radio interference likely to be caused by the transmission line in the primary reception area near interstate, U.S. and state highways.

Attachment 2 provides detailed information on the electric and magnetic fields associated with the Project's transmission line. A summary of that information has been provided below.

6.2 Overview of Induced Current, Induced Voltage, and Nuisance Shock

Electric currents can be induced by electric and magnetic fields in conductive objects near transmission lines. In particular, the concern is for very long objects parallel and close to the line. The primary concern is the potential for small electric currents to be induced by electric fields in metallic objects close to transmission lines. Metallic roofs, farming equipment and large vehicles, vineyard trellises, and fences are examples of objects that can develop a small electric charge in proximity to high-voltage transmission lines. Object characteristics, degree of grounding, and electric field strength affect the amount of induced charge. An electric current can flow when an object has an induced charge and a path to ground is presented. The amount of current flow is determined by the impedance of the object to ground and the voltage induced between the object and ground. The amount of induced current that can flow is important to evaluate because of the potential for nuisance shocks.

A common induced voltage hazard occurs on wire fences that parallel overhead transmission lines. If the fence is ungrounded, it possesses the voltage of the net electric field of the overhead conductors at the location of the fence. A person touching such a fence becomes a conducting path for the current to flow to ground and will feel a momentary shock. The alternating current static voltage on the fence bleeds off quickly but can be annoying. This hazard is easily removed by bonding the fence wires along the length of the fence to grounding rods that are driven into the soil.

It will be a rare situation for the ideal conditions to occur (i.e., a large metallic object which is perfectly insulated from the ground, located in the highest calculated electric field of almost 3.4 kV/m within the right-of-way, and touched by a perfectly grounded person) where the possibility of a perceived nuisance shock could occur. The calculated electric fields at the right-of-way edges and beyond (2.3 kV/m for the 230-kV gen-tie line) will be sufficiently low enough that nuisance shocks should not occur. The calculated maximum magnetic fields (43.8 milligauss within the right-of-way of the 230-kV gen-tie line) are sufficiently low that induced current in a metallic object should not occur. Note that the proposed gen-tie line is located within the site boundary of the Facility.

6.3 National Electrical Safety Code Provisions Relevant to Induced Current

The National Electrical Safety Code (NESC) sets the standards for practical safeguarding of people during the installation, operation, or maintenance of electric supply and communication lines and associated equipment. NESC Rule 234G.3 (NESC 2023) addresses induced current and sets forth a certain standard to ensure the safety and health implications of the same are properly addressed:

For voltages exceeding 98 kV ac to ground, either the clearances shall be increased or the electric field, or the effects thereof, shall be reduced by other means, as required, to limit the steady-state

current due to electrostatic effects to 5 mA, rms, if an ungrounded metal fence, building, sign, billboard, chimney, radio or television antenna, tank or other installation, or any ungrounded metal attachments thereto, were short-circuited to ground.

The 5-mA figure embedded in the NESC rule is a scientifically derived health and safety limitation, intended to eliminate the potential for harmful electric shock. The threshold of perception for current flowing through the human body is approximately 1 mA (Dalziel and Mansfield 1950). If the current is increased sufficiently beyond a person’s perception threshold, it can become bothersome and possibly startling. Larger currents can cause the muscles of the arm and hand to involuntarily contract so that a person cannot let go of an electrified object. The value at which 99.5 percent of men, women, and children can still let go of an object is approximately 9, 6, and 5 mA, respectively. To address this safety concern, NESC Rule 234G.3 limits the steady-state current due to electrostatic effects to 5 mA; it is a performance standard aimed at limiting the potential charge that could be developed so that a potential nuisance shock would not be harmful to children.

The NESC is updated every 5 years. The Facility will be designed, constructed, and operated in accordance with the version of the NESC that is most current at the time that the final engineering of the Facility is completed.

6.4 Predicted Induced Current

Empirical evidence has yielded a known relationship between short-circuit current and electric field strength for various types and sizes of objects. Based on these known relationships, Table 7 indicates the maximum current that could be induced in several types of vehicles and agricultural-related pieces of equipment potentially present in the transmission line right-of-way.

Table 7. Induced Current Factors

| Object | I_{sc}/E (mA/kV/m) | Maximum Induced Current (mA) ¹ |
|---|----------------------|---|
| Car—L 4.6 m x W 1.78 m x H 1.37 m | 0.088 | 0.92 |
| Pickup Truck—L 5.2 m x W 2.0 m x H 1.7m | 0.10 | 1.05 |
| Large Tractor-Trailer—Total Length 15.75 m Trailer: 12.2 m x W 2.4 m x H 3.7 m | 0.64 | 6.72 |
| Combine—L 9.15 m x W 2.3 m x H 3.5 m | 0.38 | 4.0 |
| Source: Table 7.8-2, from EPRI 2005. I_{sc} = short-circuit current E = AC electric field m = meter 1. Maximum induced current calculated for strongest predicted electric field of 10.5 kV/m, associated with the proposed Facility. | | |

Induced currents from 230-kV or 34.5-kV transmission line magnetic fields are typically not a hazard because almost no voltage is involved. A current-carrying conductor will induce a current to flow in another conductor that is parallel to it. Induced currents result from the net AC magnetic field. In the common case of grounded fences, electrical loops can be created in which induced

currents can flow. The value of the induced current will depend on the magnetic field strength; the size, shape, and location of the conducting object; and the object-to-ground resistance.

It would be a rare situation for the ideal conditions to occur (a large metallic object which is perfectly insulated from the ground, located in the highest calculated electric field of almost 2.3 kV/m within the right-of-way, and touched by a perfectly grounded person) where the possibility of a perceived nuisance shock could occur. The calculated electric field (0.038 kV/m for the 230-kV monopole transmission line) at the right-of-way edges and beyond will be sufficiently low enough that nuisance shocks should not occur.

The calculated maximum magnetic field (43.8 milligauss within the right-of-way of the 230-kV monopole transmission line, is sufficiently low that induced current in a metallic object should not occur.

7.0 NEPA-Related Documents – OAR 345-021-0010(3)(f)

OAR 345-021-0010(3)(f) Documents prepared in connection with an environmental assessment or environmental impact statement for the proposed facility under the National Environmental Policy Act of 1970, if any, may contain some of the information required under the application information requirements in OAR 345, divisions 021 and 022. The applicant may copy relevant sections of such documents into the appropriate exhibits of the site certificate application. The applicant may otherwise submit full copies of those documents and include, in the appropriate exhibits of the site certificate application, cross-references to the relevant sections of those documents. The applicant may use such documents only to avoid duplication. The applicant must include additional information in the site certificate application as needed to meet the requirements of the application information requirements in OAR 345, divisions 021 and 022.

This proposed Facility is not located on federal land. Due to anticipated federally jurisdictional wetland and waters impacts resulting in more than 0.5 acres, the proposed Facility will require a Section 404 Clean Water Act individual permit from the US Army Corp of Engineers (USACE) Portland District. USACE will prepare a NEPA analysis based on the information submitted in a Joint Permit Application.

8.0 Contents of the Application – OAR 345-021-0010(3)(g)

OAR 345-021-0010(3)(g) The applicant must include a table of contents in the preliminary application identifying the location of each required exhibit.

Table 8 lists the relevant exhibits included in this ASC. These exhibits have been attached to this submittal as appropriate.

Table 8. Division 22 Exhibits

| Standard | Exhibit |
|--|--|
| OAR 345-022-0000 General Standard of Review | This Application |
| OAR 345-022-0010 Organizational Expertise | Exhibit A. Organizational Expertise |
| OAR 345-022-0020 Structural Standard | Exhibit B. Structural Standard |
| OAR 345-022-0022 Soil Protection | Exhibit C. Soil Protection |
| OAR 345-022-0030 Land Use | Exhibit D. Land Use |
| OAR 345-022-0040 Protected Areas | Exhibit E. Protected Areas |
| OAR 345-022-0050 Retirement and Financial Assurance | Exhibit F. Retirement and Financial Assurance |
| OAR 345-022-0060 Fish and Wildlife Habitat | Exhibit G. Fish and Wildlife Habitat |
| OAR 345-022-0070 Threatened and Endangered Species | Exhibit H. Threatened and Endangered Species |
| OAR 345-022-0080 Scenic Resources | Exhibit I. Scenic Resources |
| OAR 345-022-0090 Historic, Cultural and Archaeological Resources | Exhibit J. Historic, Cultural and Archaeological Resources |
| OAR 345-022-0100 Recreation | Exhibit K. Recreation |
| OAR 345-022-0110 Public Services | Exhibit L. Public Services |
| OAR 345-022-0115 Wildfire Prevention and Risk Management | Exhibit M. Wildfire Prevention and Risk Management Exhibit |
| OAR 345-022-0120 Waste Minimization | Exhibit N. Waste Minimization Exhibit |
| OAR 345-022-0130 State and Local Laws and Regulations | Exhibit O. State and Local Laws and Regulations Exhibit <ul style="list-style-type: none"> • Exhibit O-1: Wetlands and Other Jurisdictional Waters • Exhibit O-2: Water Use • Exhibit O-3: Noise and Cooling Towers |

9.0 Other Information Requested in the Project Order – OAR 345-021-0010(3)(i)

OAR 345-021-0010(3)(i) Any other information that the Department requests in the project order or in a notification regarding expedited review.

In its First Amended Project Order of June 10, 2025, ODOE did not request additional information. Information required by Oregon Administrative Rule 345 Division 21 or otherwise identified in the Project Order has been provided in the relevant exhibits.

10.0 References














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Figures

Muddy Creek Energy Park

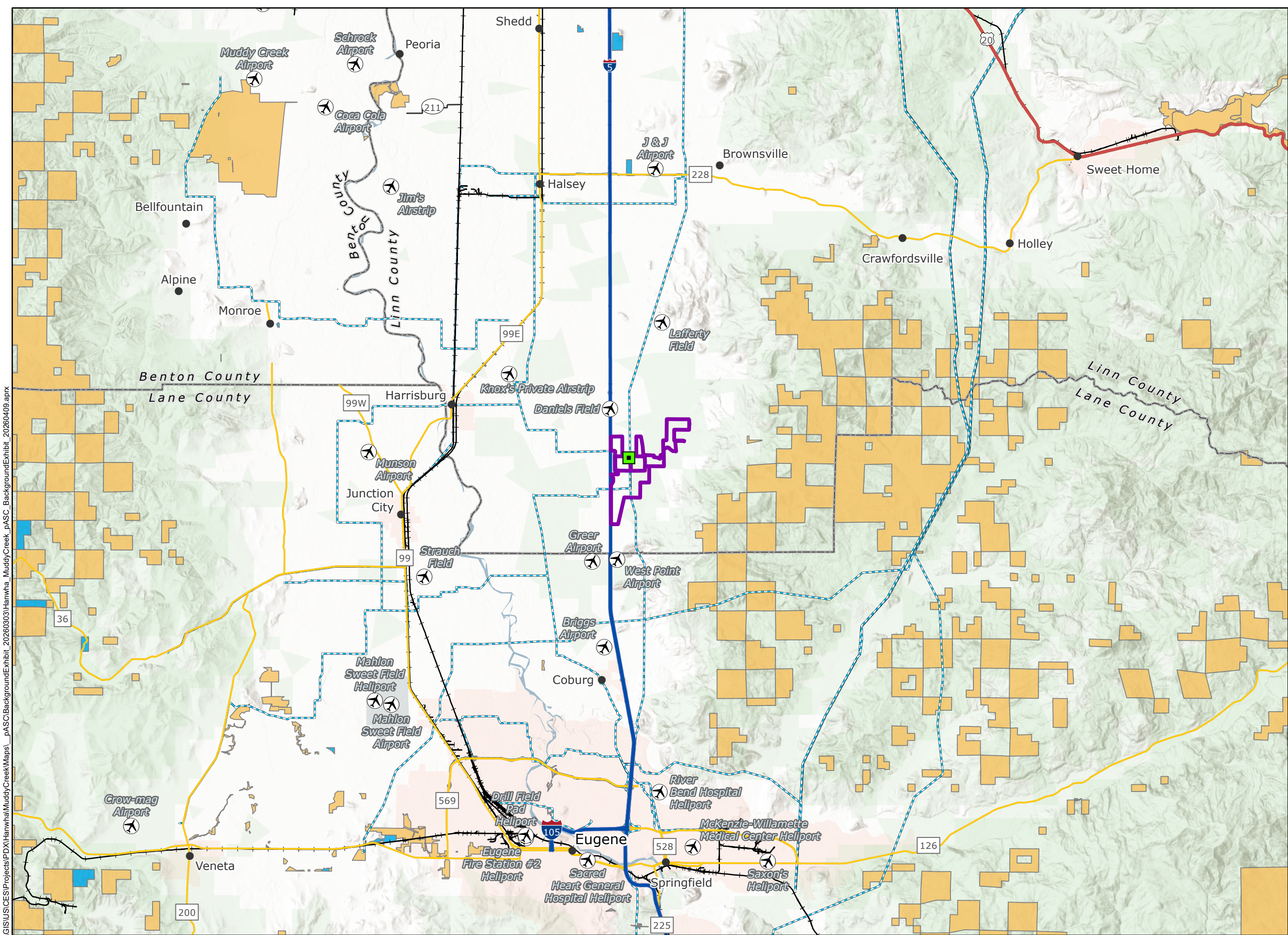
Figure 1 Vicinity Map

LINN COUNTY, OR

-  Facility Site Boundary
-  City/Town
-  County Boundary
-  Interstate Highway
-  US Highway
-  State Highway
-  County Highway
-  Railroad
-  Existing Transmission Line
-  Existing Substation
-  Airport / Airfield
-  Federal Land
-  State Land



Reference Map




















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Muddy Creek Energy Park

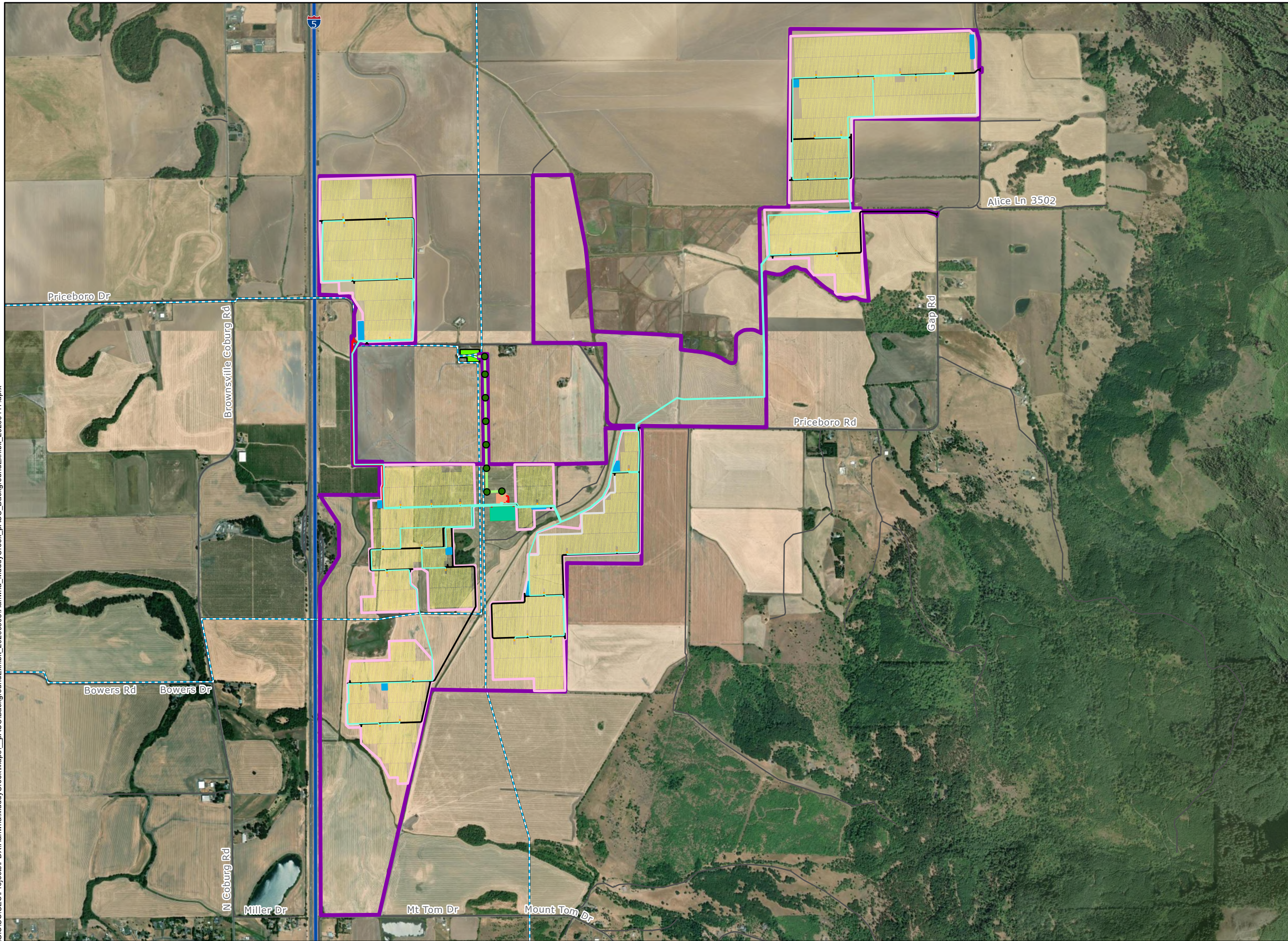
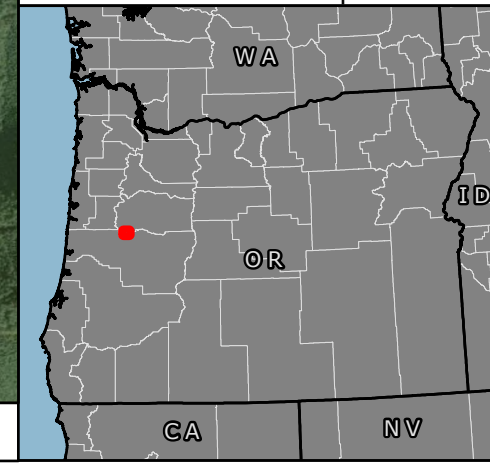
Figure 2 Facility Layout

LINN COUNTY, OR

-  Facility Site Boundary
-  Interstate Highway
-  Local Roads
-  Existing Transmission Line
-  Existing Substation
- Proposed Facility Components**
-  Fenceline
-  Solar Array
-  Inverters
-  Laydown Areas
-  BESS Area
-  Collector Substation
-  Permanent Road
-  Permanent Substation Road
-  Temporary Road
-  Underground Collector Lines
-  Overhead Transmission Line
-  Transmission Line Poles



Reference Map














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NOT FOR CONSTRUCTION

Muddy Creek Energy Park

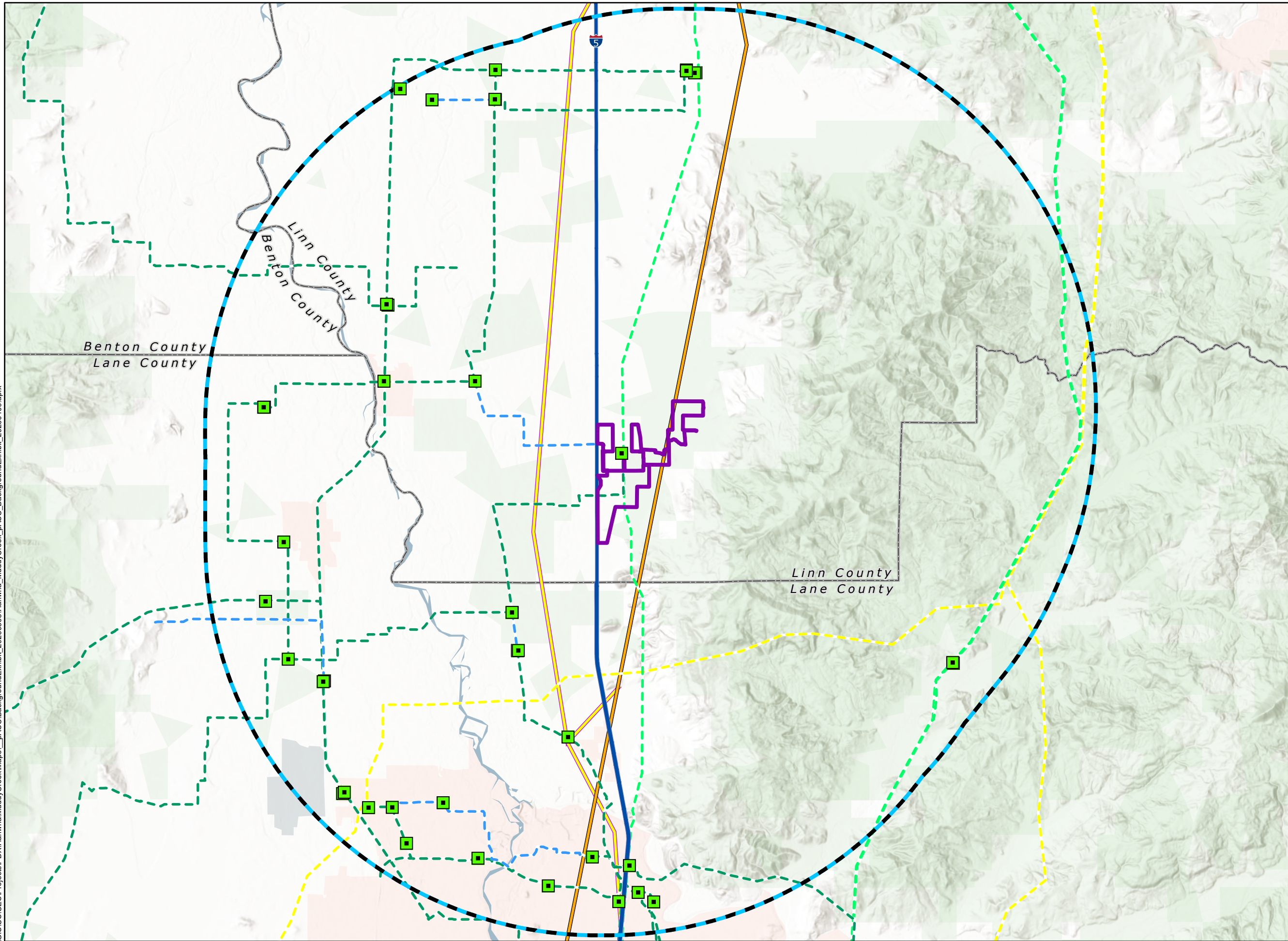
Figure 3 Energy Facilities within 10 Miles

LINN COUNTY, OR

-  Facility Site Boundary
-  Analysis Area (10-mile Buffer)
-  County Boundary
-  Interstate Highway
- Existing Energy Infrastructure
 -  Existing Substation
 -  Existing Natural Gas Pipeline
 -  Existing Petroleum Product Pipeline
- Existing Transmission Line by Voltage
 -  500 kV
 -  230 kV
 -  100-161 kV
 -  Under 100 kV



Reference Map







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Attachment 1. Property Owner List

Muddy Creek Energy Park

Figure 1 Taxlots

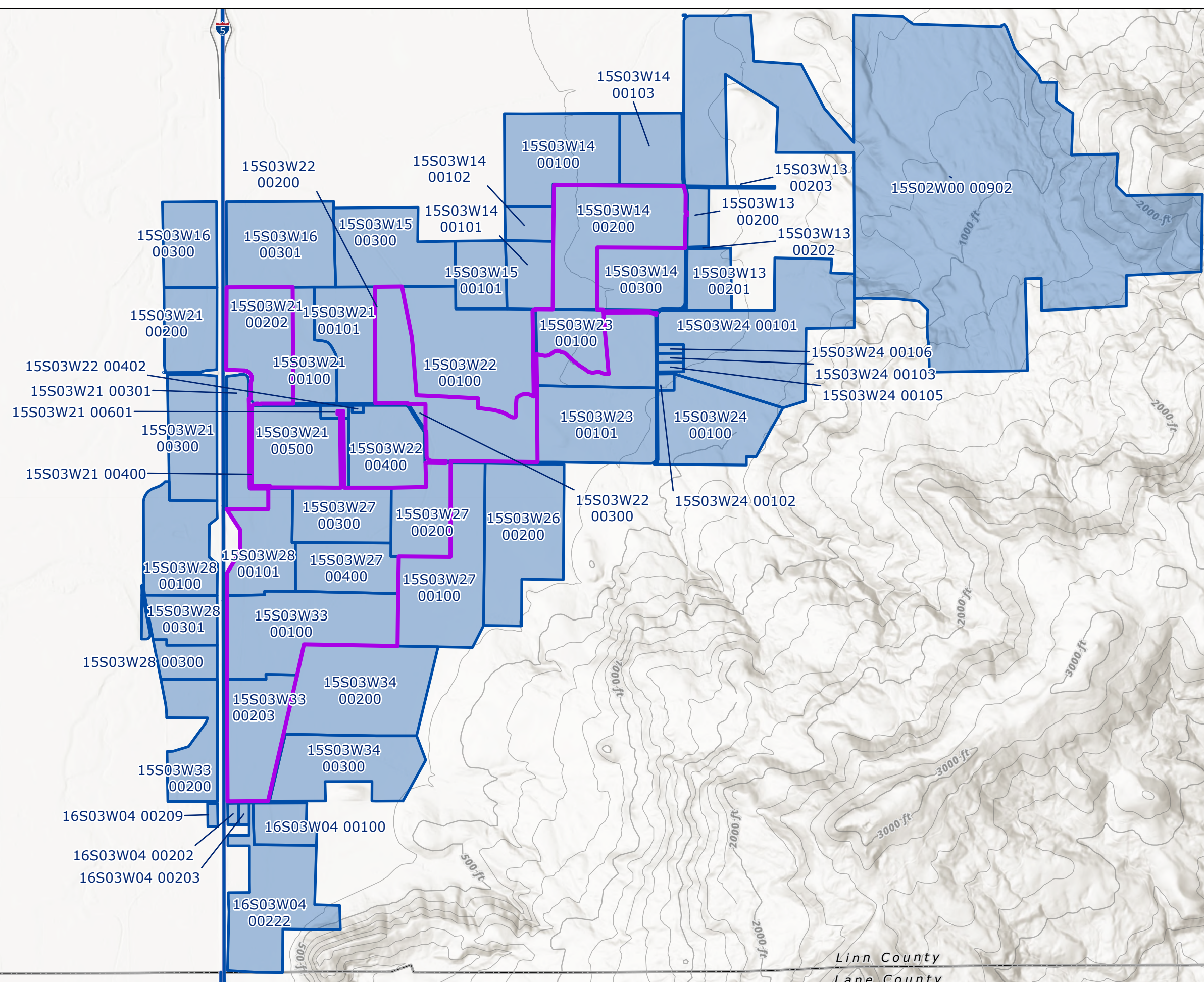
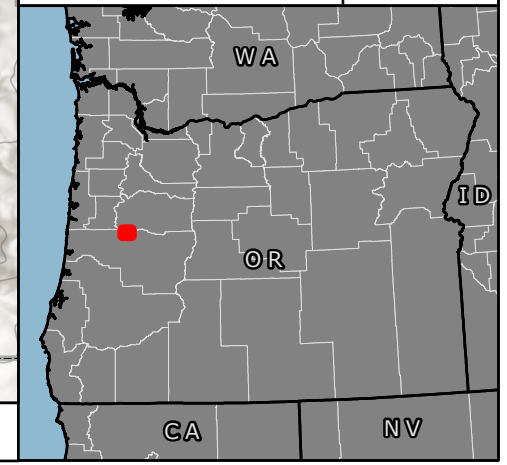
LINN COUNTY, OR

-  Facility Site Boundary
-  Linn County Taxlot Boundary*
-  County Boundary
-  Interstate Highway

* Taxlot boundary data obtained from Linn County on 5/08/2026



Reference Map



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Application for Site Certificate for the Speedway Project
 Property Owner List and Tax Lot Map - Linn County Assessor Data (Obtained May 8, 2026)

| Map Tax Lot | Owner | Mail Address | Mail City | State | Zip Code | Full Mailing Address |
|----------------|---|------------------------------|------------------|-------|----------|--|
| 15S02W00 00902 | KAMPFER RANCH LLC | 23511 GAP RD | HARRISBURG | OR | 97446 | 23511 GAP RD, HARRISBURG, OR 97446 |
| 15S03W13 00200 | LEABO EDWIN R TR | PO BOX 434 | HARRISBURG | OR | 97446 | PO BOX 434, HARRISBURG, OR 97446 |
| 15S03W13 00201 | LEABO EDWIN R TR | PO BOX 434 | HARRISBURG | OR | 97446 | PO BOX 434, HARRISBURG, OR 97446 |
| 15S03W13 00202 | LEABO EDWIN R TR | PO BOX 434 | HARRISBURG | OR | 97446 | PO BOX 434, HARRISBURG, OR 97446 |
| 15S03W13 00203 | ANDERSON FAMILY REVOCABLE LIVING TRUST | 34586 RANCH DR | BROWNSVILLE | OR | 97327 | 34586 RANCH DR, BROWNSVILLE, OR 97327 |
| 15S03W14 00100 | ESTERGARD PHILLIP E | 1649 W 13TH AVE | JUNCTION CITY | OR | 97448 | 1649 W 13TH AVE, JUNCTION CITY, OR 97448 |
| 15S03W14 00101 | ESTERGARD PROPERTIES LLC | PO BOX 268 | HARRISBURG | OR | 97446 | PO BOX 268, HARRISBURG, OR 97446 |
| 15S03W14 00102 | MARR ROBERT E & KAY D ET AL | PO BOX 268 | HARRISBURG | OR | 97446 | PO BOX 268, HARRISBURG, OR 97446 |
| 15S03W14 00103 | ESTERGARD PHILLIP E | 1649 W 13TH AVE | JUNCTION CITY | OR | 97448 | 1649 W 13TH AVE, JUNCTION CITY, OR 97448 |
| 15S03W14 00200 | MIDNIGHT SUN INC IV | 10 STATE HOUSE SQ 15TH FLR | HARTFORD | CT | 6103 | 10 STATE HOUSE SQ 15TH FLR, HARTFORD, CT 06103 |
| 15S03W14 00300 | MUDDY CREEK FARMS | PO BOX 27 | MILTON FREEWATER | OR | 97862 | PO BOX 27, MILTON FREEWATER, OR 97862 |
| 15S03W15 00101 | ESTERGARD PROPERTIES LLC | PO BOX 268 | HARRISBURG | OR | 97446 | PO BOX 268, HARRISBURG, OR 97446 |
| 15S03W15 00300 | ESTERGARD PROPERTIES LLC | PO BOX 268 | HARRISBURG | OR | 97446 | PO BOX 268, HARRISBURG, OR 97446 |
| 15S03W16 00300 | BIEGLER WADE J & STACEY L | 22703 N COBURG RD | HARRISBURG | OR | 97446 | 22703 N COBURG RD, HARRISBURG, OR 97446 |
| 15S03W16 00301 | ESTERGARD PROPERTIES LLC | PO BOX 268 | HARRISBURG | OR | 97446 | PO BOX 268, HARRISBURG, OR 97446 |
| 15S03W21 00100 | GRIMES KIMBERLY | 30309 LASSEN LN | JUNCTION CITY | OR | 97448 | 30309 LASSEN LN, JUNCTION CITY, OR 97448 |
| 15S03W21 00101 | LEGACY VALLEY FARMS LLC | 29873 NIXON DR | HALSEY | OR | 97448 | 29873 NIXON DR, HALSEY, OR 97448 |
| 15S03W21 00200 | GRIMES MARITAL TRUST | 30309 LASSEN LN | JUNCTION CITY | OR | 97448 | 30309 LASSEN LN, JUNCTION CITY, OR 97448 |
| 15S03W21 00202 | LANGDON PROPERTY LLC | 30600 DIAMOND HILL DR | HARRISBURG | OR | 97446 | 30600 DIAMOND HILL DR, HARRISBURG, OR 97446 |
| 15S03W21 00300 | BAKER FAMILY VENTURES LLC | 32257 DIAMOND HILL DR | HARRISBURG | OR | 97446 | 32257 DIAMOND HILL DR, HARRISBURG, OR 97446 |
| 15S03W21 00301 | BAKER FAMILY VENTURES LLC | 32257 DIAMOND HILL DR | HARRISBURG | OR | 97446 | 32257 DIAMOND HILL DR, HARRISBURG, OR 97446 |
| 15S03W21 00400 | DC JONES ENTERPRISES LLC | PO BOX 8346 | COBURG | OR | 97408 | PO BOX 8346, COBURG, OR 97408 |
| 15S03W21 00500 | CRABTREE REVOCABLE TRUST | 91465 N COBURG RD | EUGENE | OR | 97408 | 91465 N COBURG RD, EUGENE, OR 97408 |
| 15S03W21 00601 | PACIFIC POWER & LIGHT CO | 825 NE MULTNOMAH ST STE 1900 | PORTLAND | OR | 97232 | 825 NE MULTNOMAH ST STE 1900, PORTLAND, OR 97232 |
| 15S03W22 00100 | LANGDON & SONS INC ET AL | 30600 DIAMOND HILL DR | HARRISBURG | OR | 97446 | 30600 DIAMOND HILL DR, HARRISBURG, OR 97446 |
| 15S03W22 00200 | ESTERGARD PROPERTIES LLC | PO BOX 268 | HARRISBURG | OR | 97446 | PO BOX 268, HARRISBURG, OR 97446 |
| 15S03W22 00300 | SCHATZ TERRANCE D & NANCY | 33525 PRICEBORO DR | HARRISBURG | OR | 97446 | 33525 PRICEBORO DR, HARRISBURG, OR 97446 |
| 15S03W22 00400 | CRABTREE REVOCABLE TRUST | 91465 N COBURG RD | EUGENE | OR | 97408 | 91465 N COBURG RD, EUGENE, OR 97408 |
| 15S03W22 00402 | NULL DANIEL W & NULL CYNDIE K | 33366 PRICEBORO DR | HARRISBURG | OR | 97446 | 33366 PRICEBORO DR, HARRISBURG, OR 97446 |
| 15S03W23 00100 | GILBERT PEGGY A | 22316 GAP RD | HARRISBURG | OR | 97446 | 22316 GAP RD, HARRISBURG, OR 97446 |
| 15S03W23 00101 | ROBERT & RETA LEABO REV LIV TRUST ET AL | 33048 SE PEORIA RD | CORVALLIS | OR | 97333 | 33048 SE PEORIA RD, CORVALLIS, OR 97333 |
| 15S03W24 00100 | JELDEN MONTY A & JOYCE C TRUSTEES | 22225 GAP RD | HARRISBURG | OR | 97446 | 22225 GAP RD, HARRISBURG, OR 97446 |
| 15S03W24 00101 | JELDEN MONTY A & JOYCE C TRUSTEES | 22225 GAP RD | HARRISBURG | OR | 97446 | 22225 GAP RD, HARRISBURG, OR 97446 |
| 15S03W24 00102 | JONES MICHAEL TROY & KATHY L TRUSTEES | 22335 GAP RD | HARRISBURG | OR | 97446 | 22335 GAP RD, HARRISBURG, OR 97446 |
| 15S03W24 00103 | WHITE TRAVIS T | 1733 CRESCENT AVE | EUGENE | OR | 97408 | 1733 CRESCENT AVE, EUGENE, OR 97408 |
| 15S03W24 00105 | T WHITE LLC | 1733 CRESCENT AVE | EUGENE | OR | 97408 | 1733 CRESCENT AVE, EUGENE, OR 97408 |
| 15S03W24 00106 | ELMBLADE MARK & DARBIE | 22443 GAP RD | HARRISBURG | OR | 97446 | 22443 GAP RD, HARRISBURG, OR 97446 |
| 15S03W26 00200 | BOWERS DONALD E & LORENA J TRUSTEES | 22009 COBURG RD | HARRISBURG | OR | 97446 | 22009 COBURG RD, HARRISBURG, OR 97446 |
| 15S03W27 00100 | BOWERS DONALD E & LORENA J TRUSTEES | 22009 COBURG RD | HARRISBURG | OR | 97446 | 22009 COBURG RD, HARRISBURG, OR 97446 |
| 15S03W27 00200 | MIDNIGHT SUN INC IV | 10 STATE HOUSE SQ 15TH FLR | HARTFORD | CT | 6103 | 10 STATE HOUSE SQ 15TH FLR, HARTFORD, CT 06103 |
| 15S03W27 00300 | DC JONES ENTERPRISES LLC | PO BOX 8346 | COBURG | OR | 97408 | PO BOX 8346, COBURG, OR 97408 |
| 15S03W27 00400 | DC JONES ENTERPRISES LLC | PO BOX 8346 | COBURG | OR | 97408 | PO BOX 8346, COBURG, OR 97408 |
| 15S03W28 00100 | R2M2 INC | PO BOX 595 | HARRISBURG | OR | 97446 | PO BOX 595, HARRISBURG, OR 97446 |
| 15S03W28 00101 | MIDNIGHT SUN INC IV | 10 STATE HOUSE SQ 15TH FLR | HARTFORD | CT | 6103 | 10 STATE HOUSE SQ 15TH FLR, HARTFORD, CT 06103 |
| 15S03W28 00300 | DIANE L BOWERS TRUST | 21561 N COBURG RD | HARRISBURG | OR | 97446 | 21561 N COBURG RD, HARRISBURG, OR 97446 |
| 15S03W28 00301 | RICHARD G BOWERS TRUST | 21561 N COBURG RD | HARRISBURG | OR | 97446 | 21561 N COBURG RD, HARRISBURG, OR 97446 |
| 15S03W33 00100 | MIDNIGHT SUN INC IV | 10 STATE HOUSE SQ 15TH FLR | HARTFORD | CT | 6103 | 10 STATE HOUSE SQ 15TH FLR, HARTFORD, CT 06103 |
| 15S03W33 00200 | OLD OAKS FARMS LLC | 21944 STRODA LN | HARRISBURG | OR | 97446 | 21944 STRODA LN, HARRISBURG, OR 97446 |
| 15S03W33 00203 | MIDNIGHT SUN INC IV | 10 STATE HOUSE SQ 15TH FLR | HARTFORD | CT | 6103 | 10 STATE HOUSE SQ 15TH FLR, HARTFORD, CT 06103 |
| 15S03W34 00200 | DAVE MALPASS LAND CO | PO BOX 8220 | COBURG | OR | 97408 | PO BOX 8220, COBURG, OR 97408 |
| 15S03W34 00300 | DAVE MALPASS LAND CO | PO BOX 8220 | COBURG | OR | 97408 | PO BOX 8220, COBURG, OR 97408 |
| 16S03W04 00100 | R2M2 INC | 21320 N COBURG RD | HARRISBURG | OR | 97446 | 21320 N COBURG RD, HARRISBURG, OR 97446 |
| 16S03W04 00202 | ABATIE FRANK J & SHERRIE RAYE | 32940 MOUNT TOM DR | HARRISBURG | OR | 97446 | 32940 MOUNT TOM DR, HARRISBURG, OR 97446 |
| 16S03W04 00203 | BOLMAN BRIAN E & DEBRA M | 32992 MOUNT TOM DR | HARRISBURG | OR | 97446 | 32992 MOUNT TOM DR, HARRISBURG, OR 97446 |
| 16S03W04 00209 | SPURLOCK LIVING TRUST | 32860 MILLER DR | HARRISBURG | OR | 97446 | 32860 MILLER DR, HARRISBURG, OR 97446 |
| 16S03W04 00222 | R2M2 INC | 21320 N COBURG RD | HARRISBURG | OR | 97446 | 21320 N COBURG RD, HARRISBURG, OR 97446 |

Attachment 2. EMF Report

Electromagnetic Frequencies from Transmission Lines

Muddy Creek Energy Park

**Prepared for
Muddy Creek Energy Park, LLC**

Prepared by



May 2026

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Acronyms and Abbreviations

| Acronym/Abbreviation | Definition |
|----------------------|-------------------------------------|
| AC | alternating circuit |
| ACSR | aluminum conductor steel reinforced |
| BESS | Battery Energy Storage System |
| CAFE | Corona and Field Effect |
| dB | decibels |
| EMF | electric and magnetic field |
| EMR | electromagnetic radiation |
| FCC | Federal Communications Commission |
| GHz | gigahertz |
| Hz | hertz |
| KCMIL | kilo center mils |
| kHZ | kilohertz |
| kV | kilovolt |
| m | meter |
| mG | milligauss |
| MHz | megahertz |
| OAR | Oregon Administrative Rules |
| | |

1.0 Introduction

Muddy Creek Energy Park, LLC (Applicant) seeks to develop the Muddy Creek Energy Park (Facility), a 150-megawatt (MW) solar energy generation and 150 MW battery energy storage system (BESS) project and related or supporting facilities on approximately 1,590 acres of private land in Linn County, Oregon. This Application for Site Certificate (ASC) demonstrates that the proposed Facility will be designed, constructed, and operated consistent with the relevant Oregon Energy Facility Siting Council (EFSC) siting criteria and standards. In addition to meeting the minimum required EFSC criteria, the Applicant proposes to design, construct, and operate the Facility using agrivoltaics. Agrivoltaics co-locates the Facility with active farm operations to retain agricultural production and minimize agricultural impacts within the Facility Site Boundary.

The Specific Standards for Transmission Lines under Oregon Administrative Rule (OAR) 345-024-0090 provide the Applicant must demonstrate it:

(1) Can design, construct and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public;

(2) Can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.

1.1 Electrical and Magnetic Field Background Information

Electrical and magnetic fields (EMFs) occur both naturally and as a result of the generation, transmission, and use of electric power. The earth itself generates steady-state magnetic and electric fields. Electromagnetic fields are present around any conductors or devices that transmit or use electrical energy; as a result, exposure to EMF is common from an array of electrical appliances and equipment, building wiring, and electric distribution and transmission lines. The electrical power system in the United States is an alternating current (AC) system operating at a frequency of 60 hertz (Hz)¹, resulting in “power frequency” or “extremely low frequency (ELF)” EMF.² While electric and magnetic fields are often referred to and thought of collectively, each arises through a different mechanism and can have differing effects.

Electric fields around transmission lines are produced by the presence of an electric charge, measured as voltage, on the energized conductor. Electric field strength is directly proportional to

¹ Hertz is a measure of cycles per second. In a 60-Hz transmission system, the charge and direction of current flow on each conductor will cycle from positive to negative and back to positive 60 times per second. The direction of force in the electric and magnetic fields will also cycle in direct relation to the charge and direction of flow on the conductor.

² The electric transmission system in the U.S. operates at 60 Hz, while in Europe and other parts of the world, the systems operate at 50 Hz; both produce fields that are referred to as power frequency or ELF EMF.

the line's voltage; that is, increased voltage produces a stronger electric field. The strength of the electric field is inversely proportional to the square of distance from the conductors; the electric field strength declines as the distance from the conductor increases. The strength of the electric field is measured in units of kilovolts (kV) per meter (m) or kV/m. Electric fields are readily weakened or blocked by conductive objects such as trees or buildings. The direction of force within the electric field alternates at a frequency of 60 Hz, in direct relation to the charge on each conductor. However, the overall transmission line voltage, and therefore the overall strength and reach of the electric field, remains practically steady and is not affected by the common daily and seasonal fluctuations in usage of electricity by customers.

Magnetic fields around transmission lines are produced by the movement of electrical charge, measured in terms of amperage, through the conductors. Like the electric field, the magnetic field alternates at a frequency of 60 Hz. Magnetic field strength is expressed in units of milligauss (mG).³ The magnetic field strength is directly proportional to the amperage; that is, increased current flow resulting from increased power flow through the line produces a stronger magnetic field. As with electric fields, the magnetic field is inversely proportional to the square of the distance from the conductors, declining in strength as the distance from the conductor increases. Magnetic fields are not blocked or shielded by most materials. Unlike voltage, the amperage and the resulting magnetic field around a transmission line fluctuate daily and seasonally as the usage of electricity varies and the resulting amount of current flow varies.

Each AC three-phase circuit carries power over three conductors. One phase of the circuit is carried by each of the three conductors. The AC voltage and current in each phase conductor is out of sync with the other two phases by 120 degrees, or one-third of the 360-degree cycle. The fields from each of these conductors tend to cancel each other out because of this phase difference. However, since the conductors are separated from each other, when a person stands under a transmission line, one conductor is somewhat closer than the others and will contribute a net uncanceled field at the person's location.

1.2 EMF Standards

No federal regulations or guidelines apply directly to the EMF levels for transmission lines. The National Institute of Environmental Health Sciences (NIEHS) performed an extensive review of field-related issues in the 1990s that resulted in the decision that regulatory actions are unwarranted (NIEHS 1999).

Although there are no federal regulations on power-frequency EMF in the United States, international recommendations and guidelines exist. Table 1 lists power-frequency EMF guidelines recommended by the European Union, the International Committee on Electromagnetic Safety (ICES), and the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which is an affiliate of the World Health Organization (EU 1999, ICES 2002, ICNIRP 2010).

³ Magnetic field strength may also be measured in terms of the Tesla, an International System unit of measurement. 1 Gauss = 0.0001 Tesla, or 1 Tesla = 10,000 Gauss; 1 Gauss = 1,000 mG.

Table 1. International Guidelines for Alternating Current Power-Frequency EMF Levels

| Agency | Exposure | Electric Field (kV/m) | Magnetic Field (mG) |
|--|--------------------------------------|--------------------------|------------------------|
| European Union | General public | 4.2 | 833 |
| ICES ¹ | Occupational | 20 | 27,100 |
| | General public | 5 | 9,040 |
| | General public (within right-of-way) | 10 | NA |
| ICNIRP | Occupational | 8.3 | 10,000 |
| | General public | 4.2 | 2,000 |
| Magnetic fields are measured in gauss (G) and milligauss. 1 G = 1,000 mG NA = Not Applicable (no requirements) 1. ICES recommendations have been adopted as standards by the Institute of Electrical and Electronics Engineers (IEEE); see Standard C95.6 -2002 (R2007). | | | |

Transmission line projects in Oregon must comply with the electric field standard found in OAR 345-024-0090, which requires that the applicant design, construct, and operate the proposed transmission line so that AC electric fields do not exceed 9 kV/m at 1 meter above the ground surface in areas accessible to the public. There is no similar Oregon design standard for magnetic fields.

Six other states have adopted limits for electric field strength either at the edge or within the right-of-way of the transmission line corridor. Only Florida and New York currently limit magnetic fields levels from transmission lines. The magnetic field levels set in those two states only apply at the edge of the right-of-way and were developed to prevent magnetic fields from increasing beyond levels currently experienced by the public. Table 2 shows the AC electric field and magnetic field standards that have been adopted by states in the U.S.

Table 2. Other State Alternating Current Power-Frequency EMF Standards

| State | | Location | Electric Field (kV/m) | Magnetic Field (mG) |
|------------|------------------------|------------------------------------|--------------------------|------------------------|
| Florida | 230 to 500 kV lines | Within right-of-way | 10 | NA |
| | | Edge of right-of-way | 2 | 200 ¹ |
| | 230 kV or less | Within right-of-way | 8 | NA |
| | | Edge of right-of-way | 2 | 150 |
| Minnesota | | Within right-of-way | 8 | NA |
| Montana | | Within right-of-way: road crossing | 7 | NA |
| | | Edge of right-of-way | 1 ² | NA |
| New Jersey | | Within right-of-way | NA | NA |
| | | Edge of right-of-way | 3 | NA |

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| State | Location | Electric Field (kV/m) | Magnetic Field (mG) |
|---|-----------------------------------|-----------------------|---------------------|
| New York | Within right-of-way: open | 11.8 | NA |
| | Within right-of-way: public road | 7 | NA |
| | Within right-of-way: private road | 11 | NA |
| | Edge of right-of-way | 1.6 | 200 |
| North Dakota | Within right-of-way | 9 | NA |
| | Edge of right-of-way | NA | NA |
| Oregon | Within right-of-way | 9 | NA |
| | Edge of right-of-way | NA | NA |
| NA = Not Applicable (no requirements) 1. Magnetic field strength is limited to 250 mG for new double-circuit 500-kV lines constructed on a previously existing right-of-way. 2. Can be waived by landowner. | | | |

In the fall of 2009, the Energy Facility Siting Council (EFSC) commissioned a review of existing information to prepare for the review of several transmission lines under discussion at that time. That review was conducted by Dr. Kara Warner and presented to the Council on November 20, 2009, during a regular Council meeting. The prevailing conclusions were that there is a need to continue to monitor the science on EMF; that low-cost, prudent avoidance measures of public EMF exposure are appropriate; and that health-based limits are not appropriate given the scientific data available (EFSC 2009).

2.0 Project EMF – OAR 345-024-0090(3)(a)

(3) If the proposed energy facility is a transmission line or has, as a related or supporting facility, a transmission line of any size, the applicant must submit the following:

(a) Information about the expected electric and magnetic fields, including:

2.1 Analysis Area – OAR 345-024-0090(3)(a)(A)(B)(C)

OAR 345-024-0090(3)(a)(A) The distance in feet from the proposed center line of each proposed transmission line to the edge of the right-of-way;

OAR 345-024-0090(3)(a)(B) The type of each occupied structure, including but not limited to residences, commercial establishments, industrial facilities, schools, daycare centers and hospitals, within 200 feet on each side of the proposed center line of each proposed transmission line;

OAR 345-024-0090(3)(a)(C) The approximate distance in feet from the proposed center line to each structure identified in (3);

The distance from the proposed centerline of the overhead transmission line to the edge of the right-of-way is 40 feet on either side.

Permanently occupied buildings along the overhead transmission line route are beyond 200 feet on each side of the proposed centerline of the transmission line (Table 3).

Table 3. Identified Structures

| Location | Description | Distance from Centerline (feet) | Occupied |
|--------------------------|--------------------|---------------------------------|----------|
| 44.247896°, -123.044697° | Metal Storage Barn | ~443 | No |
| 44.248186°, -123.044669° | Occupied Residence | ~500 | Yes |

2.2 Modeling Results – OAR 345-024-0090(3)(a)(D)

OAR 345-024-0090(3)(a)(D) At representative locations along each proposed transmission line, a graph of the predicted electric and magnetic fields levels from the proposed center line to 200 feet on each side of the proposed center line;;

Table 4 shows calculated electric field values and Table 5 shows the calculated magnetic field values for the proposed 230-kV overhead transmission line.

Table 4. Calculated Electric Field Values

| Line Description | Figure | Electric Field (kV/m) | | |
|-----------------------------------|--------|-----------------------|------------------------------------|-----------------------|
| | | 200 Feet Left (East) | Peak Value | 200 Feet Right (West) |
| 230-kV overhead transmission line | 1, 3 | 0.045 | 2.254 (12 feet west of centerline) | 0.042 |

Table 5. Calculated Magnetic Field Values

| Line Description | Figure | Magnetic Field (mG) | | |
|-----------------------------------|--------|----------------------|-----------------------------------|-----------------------|
| | | 200 Feet Left (East) | Peak Value | 200 Feet Right (West) |
| 230-kV overhead transmission line | 2, 3 | 1.24 | 43.83 (4 feet west of centerline) | 1.19 |

The analysis results of the Bonneville Power Administration Corona and Fields Effect Program, Version 3 (CAFE) model (BPA n.d.) presented in Table 2 demonstrates that the proposed 230-kV overhead transmission line can be constructed and operated such that the AC electric field would not exceed 9 kV/m at 1 meter above the ground surface, as required by OAR 345-024-0090(1). Figure 1 shows the electric field graph and Figure 2 shows the magnetic field graphs for the 230-kV overhead transmission line. The analysis results for the 230-kV overhead transmission line are provided in Attachment 1. The modeling assumptions related to the Facility are intentionally

conservative, producing worst-case EMF results. EMF levels under normal operating conditions would be lower than indicated by this analysis.



Figure 1. Electric Field, 230-kV Overhead Transmission Line

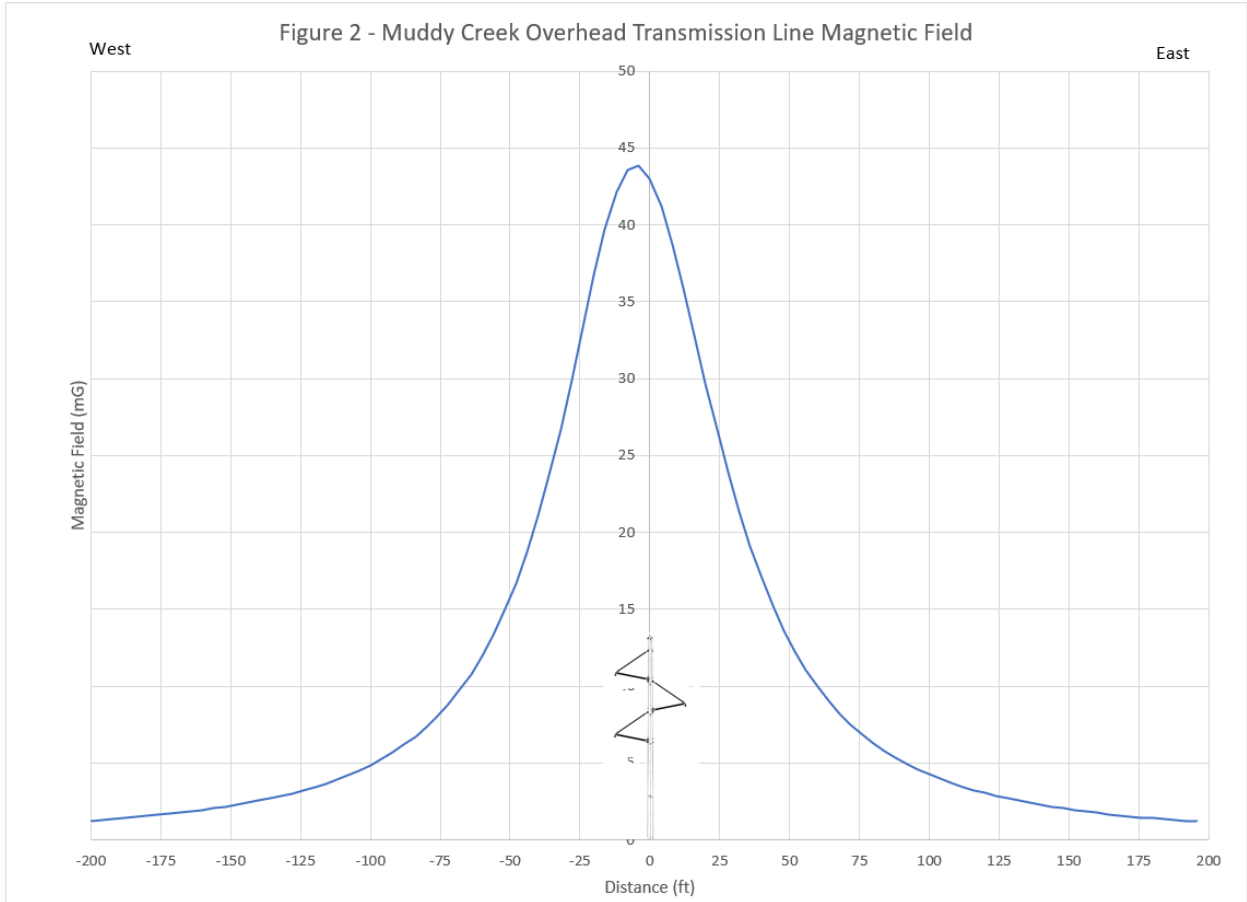


Figure 2. Magnetic Field, 230-kV Overhead Transmission Line

2.3 EMF Calculation Methods – OAR 345-024-0090(3)(a)(F)

OAR 345-024-0090(3)(a)(F) The assumptions and methods used in the electric and magnetic field analysis, including the current in amperes on each proposed transmission line; and

The following assumptions are used for the calculation of the electric and magnetic field analysis of the 230-kV overhead transmission line. The planned 230-kV overhead transmission line configuration is shown in Figure 3. Assumptions for modeling are as follows:

- Environmental parameters – 1 inch of precipitation per hour, 2.0 miles per hour wind speed (for modeling wet-weather conditions).
- Height for both electrical and magnetic field measurements – 1 meter, or 3.28 feet above ground.
- 230-kV overhead transmission line information:
 - Line amperage – 376.53 amps (calculated from 150 MW average power delivered at 230-kV)
 - Line voltage – 230-kV phase/phase or 132.9-kV phase/ground
 - Conductor type – Single 954 kilo circular mils (KCMIL) aluminum conductor steel reinforced (ACSR) “Cardinal” conductors, 0.954” in diameter as shown in Figure 3.
- Ground wire – one steel ground wire, 0.700” in diameter, as shown in Figure 3. Lowest height from ground is estimated at 62.5 feet.
 - Minimum height of conductor from ground – 25 feet.
 - Phase locations (as shown in Figure 3):
 - A phase is located on the upper arm of the transmission structure at 47.04 feet (estimated) and 9’-3.25” left of center (to the west).
 - B phase is located on the central arm of the transmission structure at 36.02 feet (estimated) and 9’-3.25” right of center (to the east).
 - C phases are located on the lower arms of the transmission structure at 25 feet (estimated) and 9’-3.25” left of center (to the west).
- Average elevation – 339 feet – Corona model recommends zero elevation for overhead transmission lines with an average elevation less than 1,000 ft.

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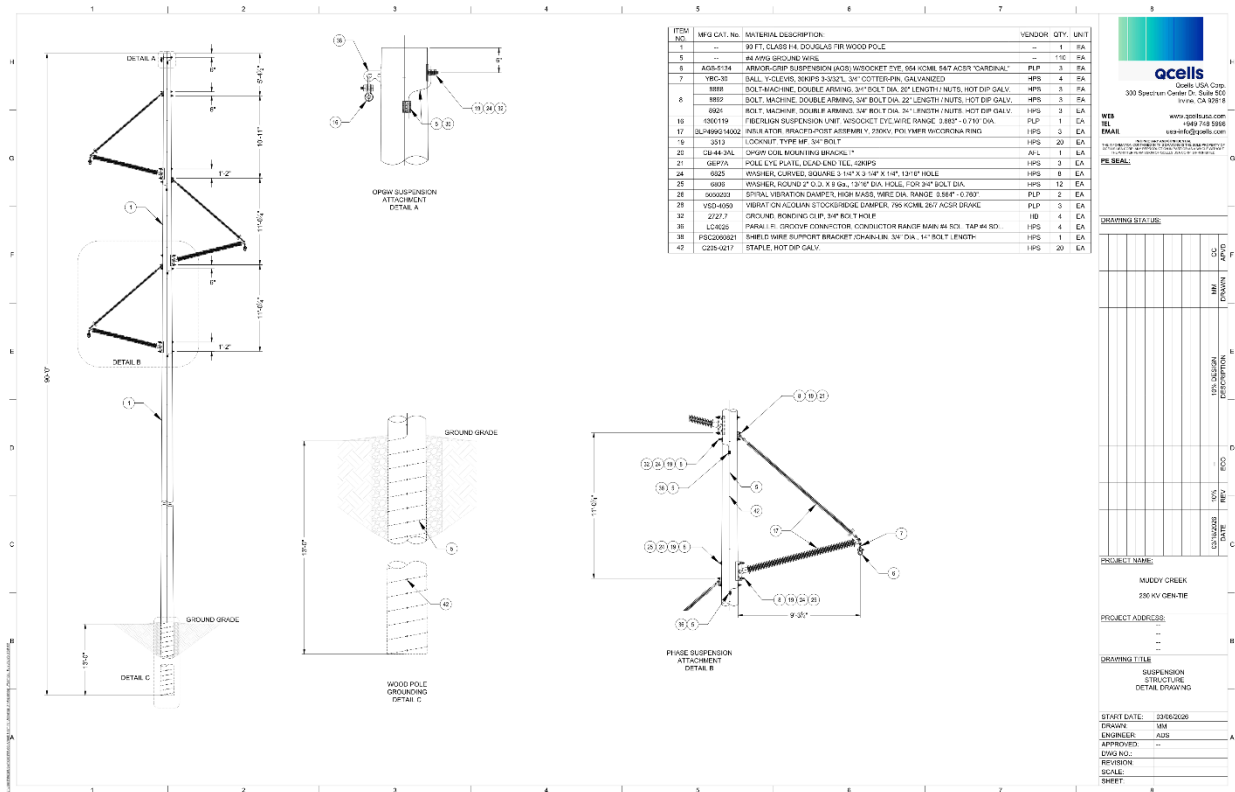


Figure 3. Typical Overhead Transmission Line

3.0 EMF Mitigation Measures – OAR 345-024-0090(3)(a)(E)

345-024-0090(3)(a)(E) Any measures the applicant proposes to reduce electric or magnetic field levels;

The Applicant will comply with Site Certificate conditions to limit EMF impacts once assigned by EFSC. These conditions may include the following, and may be modified by EFSC at the time of issuing the Site Certificate:

- Constructing all aboveground 230-kV transmission lines with a minimum clearance of 30 feet from the ground.
- Developing and implementing a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, irrigation systems, or other objects or structures of a permanent nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line (OAR 345-027-0023(4)).
- Designing and maintaining all transmission lines so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public.

4.0 EMF Monitoring Program – OAR 345-024-0090(3)(a)(G)

OAR-345-024-0090(3)(a)(G) The applicant's proposed monitoring program, if any, for actual electric and magnetic field levels.

No program for monitoring actual EMF levels before or after construction is proposed at this time.

5.0 Radio and TV Interference – OAR 345-024-0090(3)(b)

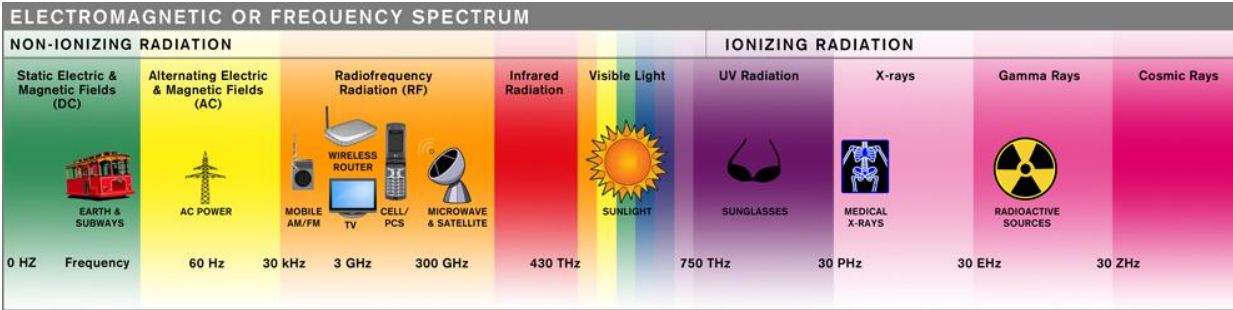
OAR-345-024-0090(3)(b) An evaluation of alternate methods and costs of reducing radio interference likely to be caused by the transmission line in the primary reception area near interstate, U.S. and state highways.

5.1 Background

5.1.1 Electromagnetic Interference

Electromagnetic interference from power transmission systems in the U.S. is governed by the Federal Communications Commission (FCC) Rules and Regulations (FCC 1988). A power transmission line is categorized by the FCC as an “incidental radiation device.” It is defined as “a device that radiates radio frequency energy during the course of its operation although the device is not intentionally designed to generate radio frequency energy.” Such a device “shall be operated so that the radio frequency energy that is emitted does not cause harmful interference. In the event that harmful interference is caused, the operator of the device shall promptly take steps to eliminate the harmful interference.” In this case, “harmful interference” is defined as “any emission, radiation or induction which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with this chapter” (FCC 1988). Oregon does not have regulatory standards for either radio or TV interference.

Modern communications systems all rely on electromagnetic radiation (EMR) to transmit information. AM and FM radio, TV, shortwave radio, cellular telephones, radar, Global Positioning System (GPS) devices and satellite communications, cordless telephones, Bluetooth, and wireless computer networks such as Wi-Fi or wireless local area network all utilize a region of the electromagnetic spectrum known as “radio frequency” EMR, which extends from a low-frequency at about 30 kilohertz (kHz) to the high-frequency microwave range at about 300 gigahertz (GHz). Each type of technology uses a specific segment of the electromagnetic frequency spectrum; older technology such as AM radio is at the low-frequency end, while newer technologies such as GPS and Wi-Fi utilize high-frequency signals. Figure 4 provides a visual representation of typical communications frequencies.



Source: EMF & Radio Frequency Solutions. Available at: <http://www.emfrf.com/index.php/emf-rf/emf-overview/electromagnetic-spectrum-or-frequency-spectrum.html>.

Figure 4. Communications Frequency Spectrum

The level of interference can be partially determined by how similar or different the signal frequency is compared to the noise frequency. In general, there is very little interaction between signals of differing frequency; radio signals, TV signals, cellular phone signals, and GPS signals can all coexist in the same space and time without interfering with each other. For interference to occur, frequencies must be similar.

EMR and resulting interference can be an indirect product of electric transmission lines. EMR arises not from the lines themselves, but from the interaction of the strong electric field at the surface of the conductors and other energized components with the surrounding air. Two types of interactions may occur that create electromagnetic interference: corona discharge and gap discharge.

5.1.1.1 *Corona Discharge*

High-voltage power transmission lines generate a strong electric field at the surface of the conductor, which can be strong enough to split the surrounding air molecules, resulting in the emission of electromagnetic energy in the form of ultraviolet and near-ultraviolet light and broadband radio frequency EMR (corona discharge also produces audible sound, which is addressed in Exhibit O3; audible sound is not discussed further in this Exhibit). The former can sometimes be seen by humans under the right conditions or with specialized equipment, while the latter can sometimes be heard as electronic “noise,” or interference with radio signal reception. Broadband corona EMR discharge typically occurs in the frequency spectrum from below 100 kHz to approximately 1,000 megahertz (MHz), which overlaps with the frequencies used for AM and FM radio and some TV signals. With sufficient corona activity, low-frequency radio and TV interference can be noticeable within a few hundred feet of the transmission line. These effects are most pronounced directly underneath the line conductors and decrease with distance from the transmission line.

Corona on a transmission line conductor depends on several factors such as operating voltage, conductor diameter, overall line geometry, weather conditions, and altitude. Conductor size, line

voltage and line geometry are taken into consideration when designing a transmission line so that the electric fields at the conductor surface are minimized. However, for a high-voltage line, any incidental irregularities on the conductor surface (for example, water droplets, dust, debris, and nicks or scratches in the conductor) act as points where the electric field may be intensified sufficiently to produce corona. Thus, the level of corona activity is elevated during foul weather when raindrops on the conductor surface act as points producing corona.

5.1.1.2 *Gap Discharge*

A gap discharge occurs when current arcs across a gap between two conductive objects. Gap discharges can produce radio noise in the lower frequencies (AM radio frequencies) and well into the microwave range (analog TV frequencies). These discharges can be produced by loose connections, a problem that more commonly occurs on low-voltage distribution lines but rarely occurs on high-voltage transmission lines (Trinh 2012). Unlike corona discharge, which may occur anywhere along a high-voltage transmission line conductor, gap discharge occurs at mechanical connectors and components that are used to hold the conductors in place. Gap discharge is controlled through proper construction and maintenance practices to ensure all mechanical connectors and components are properly assembled. Because gap discharge is an intermittent, temporary, and readily resolved problem, and results only in localized electrical interference issues, the potential for interference with TV signals or higher-frequency communications is not considered a significant problem.

5.1.2 *Radio Interference Effects*

The corona-induced broadband EMR from transmission lines can produce interference to AM signals, such as a commercial AM radio audio signal (i.e., radio noise) or the video portion of an older analog broadcast TV station (i.e., TV noise). Technologies that use frequency modulation, such as FM radio stations and the audio portion of older analog broadcast TV signals, are generally not affected by noise from a transmission line. As digital signal processing has been integrated into these communication systems, the potential interference impact of corona-generated radio noise has decreased.

The level of interference caused by radio noise from a transmission line to the reception of a radio signal depends on the location of the radio transmitter, the radio receiver, and the transmission line. A transmission line that is directly between a radio transmitter and a listener's receiver may be more likely to interfere with that listener's reception, whereas a transmission line behind or beside the listener in relation to the transmitter will not necessarily cause interference, depending on the radio receiver's antennae. The radio noise generated by a transmission line is very low in power and decreases rapidly as distance from the line increases. It is experienced only when near the transmission line.

In general, complaints related to corona-generated interference are infrequent. Moreover, the advent of cable and satellite TV service, and the federally-mandated conversion to digital TV broadcast in June 2009 have greatly reduced the occurrence of corona-generated interference.

Low-frequency corona-induced EMR does not interact with the higher-frequency satellite signals or with wired communication systems, while digital TV receivers are equipped with systems to filter out interference. Many radio stations also broadcast in digital, reducing the likelihood of corona-induced EMR interference. Electric power companies operate very effectively under the present FCC rule because harmful interference can generally be eliminated or effectively mitigated.

Radio noise is measured in units of decibels (dB) based on its field strength referenced to a signal level of 1 microvolt per meter (Institute of Electrical and Electronics Engineers [IEEE] 1986). Corona-induced radio noise during fair weather is calculated to be approximately 40 dB (dB-1 microvolt per meter [$1 \mu\text{V}/\text{m}$]) at the edge of the right-of-way. This is considered an acceptable level (IEEE 1971). When the transmission line is in proximity to roadways (for example, interstate, U.S., and state highways), such as when it passes over these roadways, radio interference may be experienced for short distances while in proximity to the line. Interference may be more noticeable near the line particularly during foul weather, when corona activity is elevated.

5.1.3 Interference with Other Electronic Communications

Wireless computer network systems, cell phones, GPS units, and satellite receivers operate at high frequencies in the tens to hundreds of MHz or even GHz. These systems also often use FM or digital coding of the signals so they are relatively immune to electromagnetic interference from transmission line corona. GPS units are used in a wide range of activities, including several important agricultural activities such as monitoring pivot irrigation, tracking wheeled and tracked equipment movements during farming operation, and checking the orientation of aerial spraying aircraft. GPS units operate in the frequency range of 1.2 to 1.6 GHz. Satellite receivers operate at frequencies of 3.4 GHz to 7 GHz and have shown no effect from transmission lines unless the receiver was trying to view the satellite through the transmission tower or conductor bundle of the transmission line (Chartier et al. 1986). Repositioning the receiver by a few feet was sufficient to eliminate the obstruction and reduced signal. Mobile phones operate in the radiofrequency range of about 800 MHz to 1,900 MHz or higher. As a result of the high frequencies used by these devices, modulation and processing techniques, and the typically lower-frequency corona-induced EMR, effects from interference are unlikely.

The voltages and currents associated with the transmission line have the potential to induce voltage and current in nearby conductors (e.g., ungrounded metal fences and ungrounded metal irrigation systems). This effect is more likely where ungrounded fences or irrigation systems are parallel and long (1 mile or more). These induced voltages could result in a “nuisance” shock to anyone who touches such a fence or irrigation system. These shocks are known as nuisance or “startle” shocks as they will not physically harm someone but may be noticed by some people and provoke a startle reaction. An example of an ungrounded metal irrigation system would be a center pivot system on rubber tires. By contrast, the Vermeer-type metal irrigation system is grounded through its metal wheels and therefore presents less of a shock hazard.

A GPS unit in farming equipment should work properly within the vicinity of a transmission line. GPS devices continually pull signals from a number of satellites, not just one, and may also utilize a

fixed base station. A signal may be blocked temporarily if the transmission structure is between the receiver and a weak signal, but it will return as the farm equipment moves past the structure. It is also common for GPS receivers to drop and pick up signals even in the absence of transmission lines and structures. If the base station signal is weak or blocked, additional or alternate locations may improve the signal and performance.

Signal interference occurs when other signals at the same frequency as the satellite signal are present. Multipath occurs when objects such as buildings, structures, or tractor parts reflect a GPS satellite signal, causing the satellite signal to arrive at the receiver later than it would have if it followed a straight line from the satellite. A study commissioned by EPRI found that signal interference is “unlikely” based on the design of GPS receivers and their ability to separate the GPS signal from background noise (Silva and Olsen 2002). Another study compared the accuracy of real-time kinematic GPS receivers at different locations to transmission lines and towers (Gibbings et al. 2001). This study concluded that multipath from transmission towers could result in GPS-initialization errors (e.g., the system reports the wrong starting location) 1.1 percent to 2.3 percent of the time. This study also reported that GPS software was able to identify and correct these initialization errors within the normal startup time. This study reported initialization errors caused by electromagnetic interference from energized overhead transmission lines when the GPS receiver was located outside the vehicle, but concluded that “most, if not all of this effect can be eliminated by shielding the receiver and cables.” Placing the receiver inside the vehicle significantly reduced initialization errors.

PacifiCorp does not specifically track interference with GPS tractor navigation systems; however, these systems are widely used in other locations in PacifiCorp’s service area and several existing transmission lines up to 500-kV cross the area. Over the last 10 years, PacifiCorp has not been contacted about interference with tractor GPS navigation systems. Users of these systems have expressed concerns about the possibility of interference, but no specific examples have been reported.

5.2 Evaluation of Alternate Methods and Costs to Reduce Interference

Design options for reducing the radio noise from the transmission line include use of larger diameter conductors, or use of more conductors within the conductor bundles. Increasing the distance between phases of the lines (conductor bundles) may also result in a decrease in the radio noise. These line design options have been employed to minimize the generation of radio noise to acceptable levels.

6.0 Conclusion

The Background Information Exhibit demonstrates the Project will ensure public health and safety with respect to EMFs. Also, this Exhibit demonstrates that the Project’s AC electric fields and induced currents will comply with the Specific Standards for Transmission Lines under OAR 345-024-0090.

7.0 References

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Attachment 1. CAFE EMF Output

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

DIST FROM TOTALS

REFERENCE L5 L50 230A 230B 230C
(FEET) (DBA) (DBA)

| | | | | | |
|--------|------|------|------|------|------|
| -200.0 | 43.1 | 39.6 | 34.6 | 34.1 | 35.6 |
| -196.0 | 43.2 | 39.7 | 34.7 | 34.2 | 35.7 |
| -192.0 | 43.3 | 39.8 | 34.8 | 34.3 | 35.8 |
| -188.0 | 43.4 | 39.9 | 34.9 | 34.4 | 35.9 |
| -184.0 | 43.5 | 40.0 | 35.0 | 34.5 | 36.0 |
| -180.0 | 43.6 | 40.1 | 35.1 | 34.6 | 36.2 |
| -176.0 | 43.7 | 40.2 | 35.2 | 34.7 | 36.3 |
| -172.0 | 43.8 | 40.3 | 35.3 | 34.8 | 36.4 |
| -168.0 | 43.9 | 40.4 | 35.4 | 34.9 | 36.5 |
| -164.0 | 44.1 | 40.6 | 35.5 | 35.0 | 36.6 |
| -160.0 | 44.2 | 40.7 | 35.6 | 35.1 | 36.8 |
| -156.0 | 44.3 | 40.8 | 35.8 | 35.3 | 36.9 |
| -152.0 | 44.4 | 40.9 | 35.9 | 35.4 | 37.0 |
| -148.0 | 44.5 | 41.0 | 36.0 | 35.5 | 37.2 |
| -144.0 | 44.7 | 41.2 | 36.1 | 35.6 | 37.3 |
| -140.0 | 44.8 | 41.3 | 36.3 | 35.7 | 37.4 |
| -136.0 | 45.0 | 41.5 | 36.4 | 35.9 | 37.6 |
| -132.0 | 45.1 | 41.6 | 36.5 | 36.0 | 37.7 |
| -128.0 | 45.2 | 41.7 | 36.7 | 36.1 | 37.9 |
| -124.0 | 45.4 | 41.9 | 36.8 | 36.3 | 38.1 |
| -120.0 | 45.5 | 42.0 | 37.0 | 36.4 | 38.2 |
| -116.0 | 45.7 | 42.2 | 37.1 | 36.5 | 38.4 |
| -112.0 | 45.9 | 42.4 | 37.3 | 36.7 | 38.6 |
| -108.0 | 46.0 | 42.5 | 37.5 | 36.8 | 38.8 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | |
|--------|------|------|------|------|------|
| -104.0 | 46.2 | 42.7 | 37.6 | 37.0 | 39.0 |
| -100.0 | 46.4 | 42.9 | 37.8 | 37.2 | 39.2 |
| -96.0 | 46.6 | 43.1 | 38.0 | 37.3 | 39.4 |
| -92.0 | 46.8 | 43.3 | 38.1 | 37.5 | 39.6 |
| -88.0 | 47.0 | 43.5 | 38.3 | 37.7 | 39.8 |
| -84.0 | 47.2 | 43.7 | 38.5 | 37.9 | 40.0 |
| -80.0 | 47.4 | 43.9 | 38.7 | 38.0 | 40.3 |
| -76.0 | 47.6 | 44.1 | 38.9 | 38.2 | 40.5 |
| -72.0 | 47.8 | 44.3 | 39.1 | 38.4 | 40.8 |
| -68.0 | 48.1 | 44.6 | 39.3 | 38.7 | 41.1 |
| -64.0 | 48.3 | 44.8 | 39.5 | 38.9 | 41.4 |
| -60.0 | 48.6 | 45.1 | 39.7 | 39.1 | 41.7 |
| -56.0 | 48.8 | 45.3 | 39.9 | 39.3 | 42.0 |
| -52.0 | 49.1 | 45.6 | 40.1 | 39.6 | 42.3 |
| -48.0 | 49.4 | 45.9 | 40.4 | 39.8 | 42.7 |
| -44.0 | 49.7 | 46.2 | 40.6 | 40.0 | 43.0 |
| -40.0 | 50.0 | 46.5 | 40.8 | 40.3 | 43.4 |
| -36.0 | 50.3 | 46.8 | 40.9 | 40.6 | 43.8 |
| -32.0 | 50.6 | 47.1 | 41.1 | 40.8 | 44.2 |
| -28.0 | 50.9 | 47.4 | 41.3 | 41.1 | 44.6 |
| -24.0 | 51.2 | 47.7 | 41.4 | 41.4 | 45.0 |
| -20.0 | 51.5 | 48.0 | 41.5 | 41.7 | 45.3 |
| -16.0 | 51.7 | 48.2 | 41.6 | 41.9 | 45.5 |
| -12.0 | 51.8 | 48.3 | 41.6 | 42.2 | 45.7 |
| -8.0 | 51.9 | 48.4 | 41.6 | 42.4 | 45.7 |
| -4.0 | 51.9 | 48.4 | 41.6 | 42.6 | 45.6 |
| .0 | 51.8 | 48.3 | 41.5 | 42.7 | 45.4 |
| 4.0 | 51.7 | 48.2 | 41.4 | 42.9 | 45.1 |
| 8.0 | 51.5 | 48.0 | 41.3 | 42.9 | 44.7 |
| 12.0 | 51.3 | 47.8 | 41.2 | 42.9 | 44.4 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | |
|-------|------|------|------|------|------|
| 16.0 | 51.0 | 47.5 | 41.0 | 42.8 | 44.0 |
| 20.0 | 50.8 | 47.3 | 40.8 | 42.7 | 43.6 |
| 24.0 | 50.5 | 47.0 | 40.6 | 42.5 | 43.2 |
| 28.0 | 50.2 | 46.7 | 40.4 | 42.3 | 42.8 |
| 32.0 | 50.0 | 46.5 | 40.2 | 42.1 | 42.5 |
| 36.0 | 49.7 | 46.2 | 40.0 | 41.8 | 42.1 |
| 40.0 | 49.4 | 45.9 | 39.8 | 41.6 | 41.8 |
| 44.0 | 49.1 | 45.6 | 39.6 | 41.3 | 41.5 |
| 48.0 | 48.9 | 45.4 | 39.4 | 41.0 | 41.2 |
| 52.0 | 48.6 | 45.1 | 39.2 | 40.7 | 40.9 |
| 56.0 | 48.4 | 44.9 | 39.0 | 40.5 | 40.6 |
| 60.0 | 48.1 | 44.6 | 38.8 | 40.2 | 40.4 |
| 64.0 | 47.9 | 44.4 | 38.6 | 40.0 | 40.1 |
| 68.0 | 47.6 | 44.1 | 38.4 | 39.7 | 39.9 |
| 72.0 | 47.4 | 43.9 | 38.2 | 39.5 | 39.7 |
| 76.0 | 47.2 | 43.7 | 38.0 | 39.2 | 39.4 |
| 80.0 | 47.0 | 43.5 | 37.9 | 39.0 | 39.2 |
| 84.0 | 46.8 | 43.3 | 37.7 | 38.8 | 39.0 |
| 88.0 | 46.6 | 43.1 | 37.5 | 38.6 | 38.8 |
| 92.0 | 46.4 | 42.9 | 37.4 | 38.4 | 38.6 |
| 96.0 | 46.2 | 42.7 | 37.2 | 38.2 | 38.5 |
| 100.0 | 46.1 | 42.6 | 37.0 | 38.0 | 38.3 |
| 104.0 | 45.9 | 42.4 | 36.9 | 37.8 | 38.1 |
| 108.0 | 45.7 | 42.2 | 36.7 | 37.6 | 38.0 |
| 112.0 | 45.6 | 42.1 | 36.6 | 37.4 | 37.8 |
| 116.0 | 45.4 | 41.9 | 36.5 | 37.3 | 37.6 |
| 120.0 | 45.3 | 41.8 | 36.3 | 37.1 | 37.5 |
| 124.0 | 45.1 | 41.6 | 36.2 | 36.9 | 37.3 |
| 128.0 | 45.0 | 41.5 | 36.1 | 36.8 | 37.2 |
| 132.0 | 44.8 | 41.3 | 35.9 | 36.6 | 37.1 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | |
|-------|------|------|------|------|------|
| 136.0 | 44.7 | 41.2 | 35.8 | 36.5 | 36.9 |
| 140.0 | 44.6 | 41.1 | 35.7 | 36.4 | 36.8 |
| 144.0 | 44.4 | 40.9 | 35.6 | 36.2 | 36.7 |
| 148.0 | 44.3 | 40.8 | 35.4 | 36.1 | 36.5 |
| 152.0 | 44.2 | 40.7 | 35.3 | 35.9 | 36.4 |
| 156.0 | 44.1 | 40.6 | 35.2 | 35.8 | 36.3 |
| 160.0 | 44.0 | 40.5 | 35.1 | 35.7 | 36.2 |
| 164.0 | 43.8 | 40.3 | 35.0 | 35.6 | 36.1 |
| 168.0 | 43.7 | 40.2 | 34.9 | 35.5 | 36.0 |
| 172.0 | 43.6 | 40.1 | 34.8 | 35.3 | 35.9 |
| 176.0 | 43.5 | 40.0 | 34.7 | 35.2 | 35.8 |
| 180.0 | 43.4 | 39.9 | 34.6 | 35.1 | 35.6 |
| 184.0 | 43.3 | 39.8 | 34.5 | 35.0 | 35.5 |
| 188.0 | 43.2 | 39.7 | 34.4 | 34.9 | 35.4 |
| 192.0 | 43.1 | 39.6 | 34.3 | 34.8 | 35.4 |
| 196.0 | 43.0 | 39.5 | 34.2 | 34.7 | 35.3 |

1AUDIBLE NOISE CALCULATION - FAIR

DIST FROM TOTALS

REFERENCE L5 L50 230A 230B 230C
(FEET) (DBA) (DBA)

| | | | | | |
|--------|------|------|------|-----|------|
| -200.0 | 18.1 | 14.6 | 9.6 | 9.1 | 10.6 |
| -196.0 | 18.2 | 14.7 | 9.7 | 9.2 | 10.7 |
| -192.0 | 18.3 | 14.8 | 9.8 | 9.3 | 10.8 |
| -188.0 | 18.4 | 14.9 | 9.9 | 9.4 | 10.9 |
| -184.0 | 18.5 | 15.0 | 10.0 | 9.5 | 11.0 |
| -180.0 | 18.6 | 15.1 | 10.1 | 9.6 | 11.2 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | |
|--------|------|------|------|------|------|
| -176.0 | 18.7 | 15.2 | 10.2 | 9.7 | 11.3 |
| -172.0 | 18.8 | 15.3 | 10.3 | 9.8 | 11.4 |
| -168.0 | 18.9 | 15.4 | 10.4 | 9.9 | 11.5 |
| -164.0 | 19.1 | 15.6 | 10.5 | 10.0 | 11.6 |
| -160.0 | 19.2 | 15.7 | 10.6 | 10.1 | 11.8 |
| -156.0 | 19.3 | 15.8 | 10.8 | 10.3 | 11.9 |
| -152.0 | 19.4 | 15.9 | 10.9 | 10.4 | 12.0 |
| -148.0 | 19.5 | 16.0 | 11.0 | 10.5 | 12.2 |
| -144.0 | 19.7 | 16.2 | 11.1 | 10.6 | 12.3 |
| -140.0 | 19.8 | 16.3 | 11.3 | 10.7 | 12.4 |
| -136.0 | 20.0 | 16.5 | 11.4 | 10.9 | 12.6 |
| -132.0 | 20.1 | 16.6 | 11.5 | 11.0 | 12.7 |
| -128.0 | 20.2 | 16.7 | 11.7 | 11.1 | 12.9 |
| -124.0 | 20.4 | 16.9 | 11.8 | 11.3 | 13.1 |
| -120.0 | 20.5 | 17.0 | 12.0 | 11.4 | 13.2 |
| -116.0 | 20.7 | 17.2 | 12.1 | 11.5 | 13.4 |
| -112.0 | 20.9 | 17.4 | 12.3 | 11.7 | 13.6 |
| -108.0 | 21.0 | 17.5 | 12.5 | 11.8 | 13.8 |
| -104.0 | 21.2 | 17.7 | 12.6 | 12.0 | 14.0 |
| -100.0 | 21.4 | 17.9 | 12.8 | 12.2 | 14.2 |
| -96.0 | 21.6 | 18.1 | 13.0 | 12.3 | 14.4 |
| -92.0 | 21.8 | 18.3 | 13.1 | 12.5 | 14.6 |
| -88.0 | 22.0 | 18.5 | 13.3 | 12.7 | 14.8 |
| -84.0 | 22.2 | 18.7 | 13.5 | 12.9 | 15.0 |
| -80.0 | 22.4 | 18.9 | 13.7 | 13.0 | 15.3 |
| -76.0 | 22.6 | 19.1 | 13.9 | 13.2 | 15.5 |
| -72.0 | 22.8 | 19.3 | 14.1 | 13.4 | 15.8 |
| -68.0 | 23.1 | 19.6 | 14.3 | 13.7 | 16.1 |
| -64.0 | 23.3 | 19.8 | 14.5 | 13.9 | 16.4 |
| -60.0 | 23.6 | 20.1 | 14.7 | 14.1 | 16.7 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | |
|-------|------|------|------|------|------|
| -56.0 | 23.8 | 20.3 | 14.9 | 14.3 | 17.0 |
| -52.0 | 24.1 | 20.6 | 15.1 | 14.6 | 17.3 |
| -48.0 | 24.4 | 20.9 | 15.4 | 14.8 | 17.7 |
| -44.0 | 24.7 | 21.2 | 15.6 | 15.0 | 18.0 |
| -40.0 | 25.0 | 21.5 | 15.8 | 15.3 | 18.4 |
| -36.0 | 25.3 | 21.8 | 15.9 | 15.6 | 18.8 |
| -32.0 | 25.6 | 22.1 | 16.1 | 15.8 | 19.2 |
| -28.0 | 25.9 | 22.4 | 16.3 | 16.1 | 19.6 |
| -24.0 | 26.2 | 22.7 | 16.4 | 16.4 | 20.0 |
| -20.0 | 26.5 | 23.0 | 16.5 | 16.7 | 20.3 |
| -16.0 | 26.7 | 23.2 | 16.6 | 16.9 | 20.5 |
| -12.0 | 26.8 | 23.3 | 16.6 | 17.2 | 20.7 |
| -8.0 | 26.9 | 23.4 | 16.6 | 17.4 | 20.7 |
| -4.0 | 26.9 | 23.4 | 16.6 | 17.6 | 20.6 |
| .0 | 26.8 | 23.3 | 16.5 | 17.7 | 20.4 |
| 4.0 | 26.7 | 23.2 | 16.4 | 17.9 | 20.1 |
| 8.0 | 26.5 | 23.0 | 16.3 | 17.9 | 19.7 |
| 12.0 | 26.3 | 22.8 | 16.2 | 17.9 | 19.4 |
| 16.0 | 26.0 | 22.5 | 16.0 | 17.8 | 19.0 |
| 20.0 | 25.8 | 22.3 | 15.8 | 17.7 | 18.6 |
| 24.0 | 25.5 | 22.0 | 15.6 | 17.5 | 18.2 |
| 28.0 | 25.2 | 21.7 | 15.4 | 17.3 | 17.8 |
| 32.0 | 25.0 | 21.5 | 15.2 | 17.1 | 17.5 |
| 36.0 | 24.7 | 21.2 | 15.0 | 16.8 | 17.1 |
| 40.0 | 24.4 | 20.9 | 14.8 | 16.6 | 16.8 |
| 44.0 | 24.1 | 20.6 | 14.6 | 16.3 | 16.5 |
| 48.0 | 23.9 | 20.4 | 14.4 | 16.0 | 16.2 |
| 52.0 | 23.6 | 20.1 | 14.2 | 15.7 | 15.9 |
| 56.0 | 23.4 | 19.9 | 14.0 | 15.5 | 15.6 |
| 60.0 | 23.1 | 19.6 | 13.8 | 15.2 | 15.4 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | |
|-------|------|------|------|------|------|
| 64.0 | 22.9 | 19.4 | 13.6 | 15.0 | 15.1 |
| 68.0 | 22.6 | 19.1 | 13.4 | 14.7 | 14.9 |
| 72.0 | 22.4 | 18.9 | 13.2 | 14.5 | 14.7 |
| 76.0 | 22.2 | 18.7 | 13.0 | 14.2 | 14.4 |
| 80.0 | 22.0 | 18.5 | 12.9 | 14.0 | 14.2 |
| 84.0 | 21.8 | 18.3 | 12.7 | 13.8 | 14.0 |
| 88.0 | 21.6 | 18.1 | 12.5 | 13.6 | 13.8 |
| 92.0 | 21.4 | 17.9 | 12.4 | 13.4 | 13.6 |
| 96.0 | 21.2 | 17.7 | 12.2 | 13.2 | 13.5 |
| 100.0 | 21.1 | 17.6 | 12.0 | 13.0 | 13.3 |
| 104.0 | 20.9 | 17.4 | 11.9 | 12.8 | 13.1 |
| 108.0 | 20.7 | 17.2 | 11.7 | 12.6 | 13.0 |
| 112.0 | 20.6 | 17.1 | 11.6 | 12.4 | 12.8 |
| 116.0 | 20.4 | 16.9 | 11.5 | 12.3 | 12.6 |
| 120.0 | 20.3 | 16.8 | 11.3 | 12.1 | 12.5 |
| 124.0 | 20.1 | 16.6 | 11.2 | 11.9 | 12.3 |
| 128.0 | 20.0 | 16.5 | 11.1 | 11.8 | 12.2 |
| 132.0 | 19.8 | 16.3 | 10.9 | 11.6 | 12.1 |
| 136.0 | 19.7 | 16.2 | 10.8 | 11.5 | 11.9 |
| 140.0 | 19.6 | 16.1 | 10.7 | 11.4 | 11.8 |
| 144.0 | 19.4 | 15.9 | 10.6 | 11.2 | 11.7 |
| 148.0 | 19.3 | 15.8 | 10.4 | 11.1 | 11.5 |
| 152.0 | 19.2 | 15.7 | 10.3 | 10.9 | 11.4 |
| 156.0 | 19.1 | 15.6 | 10.2 | 10.8 | 11.3 |
| 160.0 | 19.0 | 15.5 | 10.1 | 10.7 | 11.2 |
| 164.0 | 18.8 | 15.3 | 10.0 | 10.6 | 11.1 |
| 168.0 | 18.7 | 15.2 | 9.9 | 10.5 | 11.0 |
| 172.0 | 18.6 | 15.1 | 9.8 | 10.3 | 10.9 |
| 176.0 | 18.5 | 15.0 | 9.7 | 10.2 | 10.8 |
| 180.0 | 18.4 | 14.9 | 9.6 | 10.1 | 10.6 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | |
|-------|------|------|-----|------|------|
| 184.0 | 18.3 | 14.8 | 9.5 | 10.0 | 10.5 |
| 188.0 | 18.2 | 14.7 | 9.4 | 9.9 | 10.4 |
| 192.0 | 18.1 | 14.6 | 9.3 | 9.8 | 10.4 |
| 196.0 | 18.0 | 14.5 | 9.2 | 9.7 | 10.3 |

1ELECTRIC FIELD CALCULATIONS

Hanwha Muddy Creek 230kV 2

Analysis 2026/4/30

| | DIST. FROM REFERENCE FEET | MAXIMUM HEIGHT FEET | SUBCON. GRADIENT (KV/CM) | NO. OF DIAM. (IN) | PHASE SUBCON. (DEGREES) | ANGLE |
|------|---------------------------------|---------------------------|--------------------------------|-------------------------|-------------------------------|-------|
| 230A | -9.27 | 52.04 | 17.47 | .95 | 1 | .0 |
| 230B | 9.27 | 41.02 | 17.46 | .95 | 1 | 120.0 |
| 230C | -9.27 | 30.00 | 17.79 | .95 | 1 | 240.0 |
| G1 | -1.00 | 67.58 | 2.33 | .70 | 1 | .0 |

SENSOR HT. = 3.3 FEET

DIST FROM

| REFERENCE POTENTIAL FEET (VOLTS) | E-FIELD (KV/METER) | THETA (DEGREES) | EY-FIELD (KV/METER) | THETAY (DEGREES) | EX-FIELD (KV/METER) | THETAX (DEGREES) | SPACE |
|---|-----------------------|--------------------|------------------------|---------------------|------------------------|---------------------|-------|
| -200.0 | .045 | 88.1 | .045 | -179.6 | .002 | 168.1 | 45.0 |
| -196.0 | .047 | 88.0 | .047 | 179.8 | .002 | 167.3 | 46.9 |
| -192.0 | .049 | 88.0 | .049 | 179.3 | .002 | 166.6 | 49.0 |
| -188.0 | .051 | 88.0 | .051 | 178.7 | .002 | 165.8 | 51.1 |
| -184.0 | .053 | 87.9 | .053 | 178.2 | .002 | 165.0 | 53.4 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | | | |
|--------|------|------|------|-------|------|-------|-------|
| -180.0 | .056 | 87.9 | .056 | 177.6 | .002 | 164.1 | 55.8 |
| -176.0 | .058 | 87.8 | .058 | 176.9 | .002 | 163.2 | 58.4 |
| -172.0 | .061 | 87.8 | .061 | 176.3 | .002 | 162.3 | 61.2 |
| -168.0 | .064 | 87.8 | .064 | 175.6 | .003 | 161.3 | 64.2 |
| -164.0 | .067 | 87.7 | .067 | 174.9 | .003 | 160.3 | 67.4 |
| -160.0 | .071 | 87.7 | .071 | 174.1 | .003 | 159.2 | 70.8 |
| -156.0 | .074 | 87.6 | .074 | 173.4 | .003 | 158.0 | 74.4 |
| -152.0 | .078 | 87.6 | .078 | 172.5 | .003 | 156.8 | 78.3 |
| -148.0 | .083 | 87.5 | .083 | 171.7 | .004 | 155.5 | 82.6 |
| -144.0 | .087 | 87.5 | .087 | 170.8 | .004 | 154.1 | 87.1 |
| -140.0 | .092 | 87.4 | .092 | 169.8 | .004 | 152.6 | 92.0 |
| -136.0 | .097 | 87.3 | .097 | 168.8 | .005 | 151.0 | 97.3 |
| -132.0 | .103 | 87.3 | .103 | 167.8 | .005 | 149.3 | 103.1 |
| -128.0 | .109 | 87.2 | .109 | 166.6 | .006 | 147.4 | 109.3 |
| -124.0 | .116 | 87.2 | .116 | 165.4 | .006 | 145.4 | 116.0 |
| -120.0 | .123 | 87.1 | .123 | 164.1 | .007 | 143.2 | 123.3 |
| -116.0 | .131 | 87.0 | .131 | 162.7 | .007 | 140.8 | 131.3 |
| -112.0 | .140 | 87.0 | .140 | 161.2 | .008 | 138.3 | 140.0 |
| -108.0 | .150 | 86.9 | .149 | 159.6 | .009 | 135.4 | 149.5 |
| -104.0 | .160 | 86.8 | .160 | 157.8 | .010 | 132.4 | 159.9 |
| -100.0 | .171 | 86.7 | .171 | 155.9 | .011 | 129.0 | 171.3 |
| -96.0 | .184 | 86.6 | .184 | 153.8 | .012 | 125.3 | 183.8 |
| -92.0 | .198 | 86.5 | .198 | 151.5 | .014 | 121.3 | 197.7 |
| -88.0 | .213 | 86.4 | .213 | 148.9 | .016 | 116.9 | 213.1 |
| -84.0 | .231 | 86.3 | .230 | 146.1 | .018 | 112.2 | 230.4 |
| -80.0 | .250 | 86.1 | .249 | 142.9 | .021 | 107.2 | 249.7 |
| -76.0 | .272 | 85.9 | .271 | 139.4 | .024 | 102.0 | 271.8 |
| -72.0 | .298 | 85.7 | .297 | 135.4 | .029 | 96.5 | 297.2 |
| -68.0 | .327 | 85.4 | .326 | 131.0 | .034 | 91.0 | 327.0 |
| -64.0 | .363 | 84.9 | .362 | 126.1 | .042 | 85.6 | 362.5 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | | | |
|-------|-------|------|-------|-------|------|--------|--------|
| -60.0 | .406 | 84.4 | .404 | 120.7 | .051 | 80.3 | 405.7 |
| -56.0 | .460 | 83.9 | .457 | 114.8 | .063 | 75.2 | 459.3 |
| -52.0 | .528 | 83.2 | .524 | 108.6 | .079 | 70.5 | 526.9 |
| -48.0 | .615 | 82.5 | .610 | 102.2 | .098 | 66.1 | 613.2 |
| -44.0 | .726 | 81.9 | .719 | 95.7 | .122 | 62.1 | 723.5 |
| -40.0 | .868 | 81.5 | .858 | 89.4 | .149 | 58.4 | 863.2 |
| -36.0 | 1.043 | 81.3 | 1.032 | 83.4 | .178 | 54.9 | 1037.0 |
| -32.0 | 1.255 | 81.5 | 1.242 | 77.9 | .206 | 51.3 | 1245.7 |
| -28.0 | 1.497 | 82.2 | 1.483 | 73.0 | .226 | 47.2 | 1483.9 |
| -24.0 | 1.753 | 83.3 | 1.741 | 68.6 | .229 | 41.7 | 1735.4 |
| -20.0 | 1.994 | 85.0 | 1.986 | 64.6 | .206 | 32.4 | 1970.3 |
| -16.0 | 2.175 | 87.1 | 2.173 | 60.7 | .162 | 12.6 | 2146.8 |
| -12.0 | 2.254 | 89.7 | 2.254 | 56.6 | .139 | -29.2 | 2221.6 |
| -8.0 | 2.203 | 92.6 | 2.201 | 51.8 | .194 | -68.3 | 2168.2 |
| -4.0 | 2.028 | 95.2 | 2.019 | 45.5 | .276 | -85.8 | 1994.6 |
| .0 | 1.774 | 97.1 | 1.760 | 36.8 | .331 | -93.9 | 1746.4 |
| 4.0 | 1.510 | 97.5 | 1.497 | 24.8 | .343 | -98.9 | 1492.4 |
| 8.0 | 1.304 | 95.7 | 1.298 | 9.8 | .317 | -103.2 | 1295.8 |
| 12.0 | 1.189 | 92.9 | 1.188 | -6.1 | .266 | -108.4 | 1183.8 |
| 16.0 | 1.145 | 91.0 | 1.144 | -20.2 | .207 | -115.7 | 1137.0 |
| 20.0 | 1.124 | 90.8 | 1.124 | -31.1 | .153 | -126.6 | 1115.6 |
| 24.0 | 1.098 | 91.4 | 1.098 | -39.2 | .113 | -142.6 | 1089.8 |
| 28.0 | 1.055 | 92.3 | 1.054 | -45.2 | .090 | -162.5 | 1047.6 |
| 32.0 | .994 | 93.1 | .993 | -49.8 | .080 | 178.0 | 988.8 |
| 36.0 | .923 | 93.8 | .921 | -53.5 | .075 | 162.8 | 918.3 |
| 40.0 | .845 | 94.3 | .843 | -56.5 | .072 | 152.1 | 841.9 |
| 44.0 | .767 | 94.7 | .764 | -59.1 | .068 | 144.6 | 764.5 |
| 48.0 | .692 | 94.9 | .689 | -61.5 | .064 | 139.1 | 689.8 |
| 52.0 | .621 | 95.1 | .619 | -63.6 | .058 | 135.0 | 619.7 |
| 56.0 | .557 | 95.2 | .554 | -65.6 | .052 | 131.7 | 555.6 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | | | |
|-------|------|------|------|--------|------|-------|-------|
| 60.0 | .499 | 95.2 | .497 | -67.5 | .047 | 129.0 | 497.7 |
| 64.0 | .447 | 95.1 | .445 | -69.3 | .042 | 126.7 | 445.9 |
| 68.0 | .401 | 95.1 | .399 | -71.0 | .037 | 124.6 | 400.1 |
| 72.0 | .360 | 95.0 | .359 | -72.7 | .032 | 122.8 | 359.5 |
| 76.0 | .324 | 94.9 | .323 | -74.4 | .028 | 121.0 | 323.8 |
| 80.0 | .293 | 94.7 | .292 | -76.0 | .025 | 119.4 | 292.4 |
| 84.0 | .265 | 94.6 | .264 | -77.5 | .022 | 117.9 | 264.7 |
| 88.0 | .241 | 94.5 | .240 | -79.1 | .019 | 116.5 | 240.3 |
| 92.0 | .219 | 94.3 | .218 | -80.6 | .017 | 115.1 | 218.8 |
| 96.0 | .200 | 94.2 | .199 | -82.0 | .015 | 113.8 | 199.8 |
| 100.0 | .183 | 94.1 | .183 | -83.4 | .014 | 112.5 | 182.9 |
| 104.0 | .168 | 93.9 | .168 | -84.8 | .012 | 111.2 | 167.9 |
| 108.0 | .155 | 93.8 | .154 | -86.2 | .011 | 109.9 | 154.6 |
| 112.0 | .143 | 93.7 | .142 | -87.5 | .010 | 108.7 | 142.7 |
| 116.0 | .132 | 93.6 | .132 | -88.8 | .009 | 107.5 | 132.1 |
| 120.0 | .123 | 93.5 | .122 | -90.0 | .008 | 106.4 | 122.5 |
| 124.0 | .114 | 93.4 | .114 | -91.3 | .007 | 105.2 | 113.9 |
| 128.0 | .106 | 93.3 | .106 | -92.5 | .006 | 104.1 | 106.2 |
| 132.0 | .099 | 93.2 | .099 | -93.6 | .006 | 103.0 | 99.2 |
| 136.0 | .093 | 93.1 | .093 | -94.8 | .005 | 101.9 | 92.8 |
| 140.0 | .087 | 93.0 | .087 | -95.8 | .005 | 100.9 | 87.1 |
| 144.0 | .082 | 92.9 | .082 | -96.9 | .004 | 99.8 | 81.8 |
| 148.0 | .077 | 92.8 | .077 | -98.0 | .004 | 98.8 | 77.0 |
| 152.0 | .073 | 92.7 | .073 | -99.0 | .004 | 97.8 | 72.6 |
| 156.0 | .069 | 92.6 | .069 | -99.9 | .003 | 96.8 | 68.6 |
| 160.0 | .065 | 92.6 | .065 | -100.9 | .003 | 95.8 | 64.9 |
| 164.0 | .062 | 92.5 | .061 | -101.8 | .003 | 94.8 | 61.5 |
| 168.0 | .058 | 92.4 | .058 | -102.7 | .003 | 93.9 | 58.3 |
| 172.0 | .055 | 92.4 | .055 | -103.6 | .002 | 93.0 | 55.4 |
| 176.0 | .053 | 92.3 | .053 | -104.4 | .002 | 92.1 | 52.7 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | | | |
|-------|------|------|------|--------|------|------|------|
| 180.0 | .050 | 92.3 | .050 | -105.2 | .002 | 91.2 | 50.2 |
| 184.0 | .048 | 92.2 | .048 | -106.0 | .002 | 90.3 | 47.9 |
| 188.0 | .046 | 92.1 | .046 | -106.8 | .002 | 89.4 | 45.7 |
| 192.0 | .044 | 92.1 | .044 | -107.5 | .002 | 88.6 | 43.7 |
| 196.0 | .042 | 92.0 | .042 | -108.3 | .002 | 87.8 | 41.8 |

1MAGNETIC FIELD CALCULATIONS

SENSOR HT. = 3.3 FEET

DIST FROM

| REFERENCE FEET | B-FIELD (GAUSS) | THETA (GAUSS) | BY-FIELD (GAUSS) | THETAY (GAUSS) | BX-FIELD | THETAX |
|-------------------|--------------------|------------------|---------------------|-------------------|-----------|--------|
| -200.0 | .00124633 | 26.1 | .00110502 | 94.7 | .00121394 | 11.6 |
| -196.0 | .00129810 | 26.6 | .00115025 | 94.1 | .00126253 | 11.3 |
| -192.0 | .00135311 | 27.2 | .00119835 | 93.5 | .00131399 | 10.9 |
| -188.0 | .00141164 | 27.8 | .00124957 | 92.9 | .00136854 | 10.6 |
| -184.0 | .00147400 | 28.4 | .00130421 | 92.3 | .00142642 | 10.2 |
| -180.0 | .00154051 | 29.0 | .00136257 | 91.7 | .00148788 | 9.8 |
| -176.0 | .00161155 | 29.7 | .00142500 | 91.0 | .00155322 | 9.4 |
| -172.0 | .00168753 | 30.4 | .00149189 | 90.3 | .00162274 | 9.0 |
| -168.0 | .00176891 | 31.2 | .00156370 | 89.6 | .00169680 | 8.5 |
| -164.0 | .00185620 | 31.9 | .00164091 | 88.8 | .00177576 | 8.1 |
| -160.0 | .00194998 | 32.7 | .00172410 | 88.0 | .00186003 | 7.6 |
| -156.0 | .00205090 | 33.6 | .00181390 | 87.2 | .00195008 | 7.1 |
| -152.0 | .00215967 | 34.5 | .00191104 | 86.3 | .00204638 | 6.5 |
| -148.0 | .00227712 | 35.4 | .00201636 | 85.4 | .00214948 | 6.0 |
| -144.0 | .00240417 | 36.4 | .00213079 | 84.4 | .00225998 | 5.4 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | | |
|--------|-----------|-------|-----------|------|-----------|-------|
| -140.0 | .00254187 | 37.4 | .00225543 | 83.4 | .00237853 | 4.7 |
| -136.0 | .00269140 | 38.5 | .00239154 | 82.4 | .00250582 | 4.0 |
| -132.0 | .00285411 | 39.7 | .00254056 | 81.3 | .00264264 | 3.3 |
| -128.0 | .00303156 | 40.9 | .00270418 | 80.1 | .00278983 | 2.6 |
| -124.0 | .00322551 | 42.2 | .00288435 | 78.9 | .00294830 | 1.7 |
| -120.0 | .00343799 | 43.6 | .00308333 | 77.6 | .00311904 | .9 |
| -116.0 | .00367134 | 45.0 | .00330379 | 76.3 | .00330310 | -.1 |
| -112.0 | .00392827 | 46.6 | .00354884 | 74.9 | .00350164 | -1.1 |
| -108.0 | .00421191 | 48.3 | .00382214 | 73.5 | .00371585 | -2.2 |
| -104.0 | .00452590 | 50.0 | .00412797 | 72.0 | .00394699 | -3.4 |
| -100.0 | .00487450 | 52.0 | .00447139 | 70.4 | .00419640 | -4.8 |
| -96.0 | .00526266 | 54.0 | .00485836 | 68.7 | .00446544 | -6.2 |
| -92.0 | .00569622 | 56.2 | .00529586 | 67.0 | .00475551 | -7.9 |
| -88.0 | .00618201 | 58.6 | .00579209 | 65.2 | .00506807 | -9.7 |
| -84.0 | .00672809 | 61.2 | .00635658 | 63.3 | .00540466 | -11.8 |
| -80.0 | .00734399 | 64.0 | .00700034 | 61.4 | .00576705 | -14.1 |
| -76.0 | .00804094 | 67.0 | .00773591 | 59.4 | .00615749 | -16.8 |
| -72.0 | .00883221 | 70.3 | .00857721 | 57.4 | .00657938 | -19.9 |
| -68.0 | .00973346 | 73.9 | .00953917 | 55.2 | .00703836 | -23.6 |
| -64.0 | .01076309 | 77.9 | .01063678 | 53.1 | .00754455 | -27.9 |
| -60.0 | .01194259 | -97.7 | .01188329 | 50.8 | .00811641 | -33.0 |
| -56.0 | .01329673 | -92.9 | .01328702 | 48.5 | .00878709 | -39.0 |
| -52.0 | .01485356 | -87.6 | .01484593 | 46.1 | .00961399 | -46.1 |
| -48.0 | .01664373 | -81.7 | .01653902 | 43.6 | .01069029 | -54.2 |
| -44.0 | .01869888 | -75.1 | .01831340 | 40.8 | .01215403 | -63.1 |
| -40.0 | .02104797 | -67.8 | .02006677 | 37.8 | .01418451 | -72.5 |
| -36.0 | .02371042 | -59.6 | .02162771 | 34.2 | .01697370 | -81.8 |
| -32.0 | .02668425 | -50.4 | .02274494 | 29.8 | .02066462 | 269.7 |
| -28.0 | .02992756 | -40.2 | .02311603 | 23.7 | .02525531 | 262.2 |
| -24.0 | .03333385 | -28.8 | .02252729 | 14.8 | .03047352 | 255.8 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | | |
|-------|-----------|--------|-----------|-------|-----------|-------|
| -20.0 | .03670800 | -16.2 | .02123168 | .6 | .03565549 | 250.4 |
| -16.0 | .03976080 | -2.6 | .02056547 | -20.7 | .03973088 | 245.7 |
| -12.0 | .04214733 | 12.0 | .02265712 | -45.5 | .04146997 | 241.0 |
| -8.0 | .04355820 | 27.1 | .02778425 | -65.5 | .04003830 | 235.7 |
| -4.0 | .04382613 | 42.4 | .03369627 | -78.2 | .03558638 | 228.5 |
| .0 | .04297738 | 57.5 | .03806413 | -86.1 | .02943055 | 217.8 |
| 4.0 | .04119602 | 72.1 | .03973086 | 268.4 | .02367469 | 201.4 |
| 8.0 | .03873995 | 86.0 | .03867097 | 264.0 | .02030939 | 179.6 |
| 12.0 | .03586796 | 99.1 | .03554935 | 259.8 | .01975096 | 158.0 |
| 16.0 | .03280189 | 111.2 | .03126880 | 255.1 | .02058576 | 141.9 |
| 20.0 | .02971535 | 122.4 | .02665889 | 249.6 | .02136288 | 131.2 |
| 24.0 | .02673430 | 132.7 | .02232292 | 243.2 | .02147272 | 123.9 |
| 28.0 | .02394185 | 142.1 | .01860407 | 235.7 | .02087252 | 118.6 |
| 32.0 | .02138506 | 150.6 | .01562185 | 227.3 | .01974095 | 114.4 |
| 36.0 | .01908296 | 158.3 | .01333894 | 218.6 | .01829521 | 110.9 |
| 40.0 | .01703473 | 165.3 | .01163262 | 209.9 | .01671750 | 107.9 |
| 44.0 | .01522696 | 171.5 | .01035530 | 201.8 | .01513623 | 105.0 |
| 48.0 | .01363934 | 177.2 | .00937442 | 194.5 | .01363081 | 102.4 |
| 52.0 | .01224873 | -177.7 | .00858963 | 188.1 | .01224353 | 99.8 |
| 56.0 | .01103174 | -173.0 | .00793334 | 182.6 | .01099165 | 97.4 |
| 60.0 | .00996621 | -168.8 | .00736343 | 178.0 | .00987694 | 95.0 |
| 64.0 | .00903201 | -164.9 | .00685495 | 174.0 | .00889244 | 92.7 |
| 68.0 | .00821127 | -161.4 | .00639341 | 170.5 | .00802691 | 90.5 |
| 72.0 | .00748843 | -158.2 | .00597035 | 167.6 | .00726748 | 88.4 |
| 76.0 | .00685001 | -155.3 | .00558058 | 165.0 | .00660131 | 86.4 |
| 80.0 | .00628450 | -152.6 | .00522067 | 162.7 | .00601631 | 84.4 |
| 84.0 | .00578204 | -150.1 | .00488803 | 160.7 | .00550158 | 82.5 |
| 88.0 | .00533420 | -147.7 | .00458057 | 158.9 | .00504754 | 80.7 |
| 92.0 | .00493385 | -145.6 | .00429640 | 157.3 | .00464582 | 79.0 |
| 96.0 | .00457485 | -143.6 | .00403379 | 155.9 | .00428926 | 77.3 |

**Preliminary Application for Site Certificate
Electromagnetic Frequencies from Transmission Lines**

| | | | | | | |
|-------|-----------|--------|-----------|-------|-----------|------|
| 100.0 | .00425197 | -141.7 | .00379111 | 154.5 | .00397172 | 75.7 |
| 104.0 | .00396076 | -140.0 | .00356680 | 153.3 | .00368796 | 74.2 |
| 108.0 | .00369738 | -138.4 | .00335942 | 152.2 | .00343354 | 72.8 |
| 112.0 | .00345851 | -136.9 | .00316760 | 151.2 | .00320464 | 71.4 |
| 116.0 | .00324132 | -135.4 | .00299006 | 150.2 | .00299804 | 70.1 |
| 120.0 | .00304336 | -134.1 | .00282561 | 149.4 | .00281097 | 68.9 |
| 124.0 | .00286247 | -132.8 | .00267318 | 148.5 | .00264108 | 67.7 |
| 128.0 | .00269682 | -131.7 | .00253175 | 147.8 | .00248633 | 66.6 |
| 132.0 | .00254478 | -130.5 | .00240039 | 147.0 | .00234497 | 65.6 |
| 136.0 | .00240495 | -129.5 | .00227828 | 146.3 | .00221552 | 64.5 |
| 140.0 | .00227607 | -128.5 | .00216464 | 145.7 | .00209665 | 63.6 |
| 144.0 | .00215706 | -127.5 | .00205877 | 145.1 | .00198724 | 62.7 |
| 148.0 | .00204696 | -126.6 | .00196003 | 144.5 | .00188631 | 61.8 |
| 152.0 | .00194491 | -125.7 | .00186784 | 143.9 | .00179300 | 60.9 |
| 156.0 | .00185017 | -124.9 | .00178167 | 143.4 | .00170654 | 60.1 |
| 160.0 | .00176207 | -124.1 | .00170104 | 142.9 | .00162628 | 59.4 |
| 164.0 | .00168001 | -123.4 | .00162552 | 142.4 | .00155163 | 58.6 |
| 168.0 | .00160346 | -122.7 | .00155470 | 142.0 | .00148207 | 57.9 |
| 172.0 | .00153195 | -122.0 | .00148822 | 141.5 | .00141715 | 57.3 |
| 176.0 | .00146505 | -121.3 | .00142575 | 141.1 | .00135646 | 56.6 |
| 180.0 | .00140237 | -120.7 | .00136699 | 140.7 | .00129963 | 56.0 |
| 184.0 | .00134358 | -120.1 | .00131167 | 140.3 | .00124634 | 55.4 |
| 188.0 | .00128836 | -119.5 | .00125952 | 139.9 | .00119630 | 54.9 |
| 192.0 | .00123644 | -119.0 | .00121033 | 139.6 | .00114925 | 54.3 |
| 196.0 | .00118755 | -118.5 | .00116388 | 139.2 | .00110494 | 53.8 |