

# **Application for Site Certificate for the Muddy Creek Energy Park**

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## **Exhibit O. State and Local Laws and Regulations**

### **Part 3. Noise and Cooling Towers**

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

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

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## Acronyms and Abbreviations

| Acronym/Abbreviation | Definition  |
|----------------------|---|
| Applicant            | Muddy Creek Energy Park, LLC                                |
| dB                   | decibel   |
| dba                  | A-weighted decibels   |
| dB(L)                | Linear decibels   |
| EFSC                 | Oregon Energy Facility Siting Council                       |
| Facility             | Muddy Creek Energy Park                                     |
| Hz                   | Hertz   |
| IEC                  | International Electrotechnical Commission                   |
| L <sub>1</sub>       | Sound level exceeded 1% of the time.                        |
| L <sub>10</sub>      | Intrusive sound level: Sound level exceeded 10% of the time |
| L <sub>50</sub>      | Median sound level: Sound level exceeded 50% of the time    |
| L <sub>eq</sub>      | Equivalent continuous sound level                           |
| L <sub>max</sub>     | Maximum sound level   |
| LNTE                 | Low noise trailing edge                                     |
| L <sub>p</sub>       | Sound pressure level  |
| L <sub>w</sub>       | Sound power level   |
| NSR                  | Noise sensitive receptor                                    |
| OAR                  | Oregon Administrative Rules                                 |
| ODEQ                 | Oregon Department of Environmental Quality                  |
| ORS                  | Oregon Revised Statutes                                     |
| UTM                  | Universal Transverse Mercator                               |

## 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 facility, a 150-MW battery energy storage system (BESS) project, and related or supporting facilities on private land in Linn County, Oregon. The Facility's Site Boundary contains 1,590 acres. 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 information contained herein supports demonstration of compliance with the State and Local Laws and Regulations approval standard for Oregon Administrative Rules (OAR) 345-022-00160.

## 2.0 Noise Background Information: Acoustic Terminology

Airborne sound is described as the rapid fluctuation or oscillation of air pressure above and below atmospheric pressure, creating a sound wave. Sound is characterized by properties of the sound waves, which are frequency, wavelength, period, amplitude, and velocity. Noise is defined as unwanted sound. A sound source is defined by a sound power level ( $L_w$ ), which is independent of any external factors. The acoustic sound power is the rate at which acoustical energy is radiated outward and is expressed in units of watts. A sound pressure level ( $L_p$ ) is a measure of this fluctuation and can be directly determined with a microphone or calculated from information about the source sound power level and the surrounding environment through predictive acoustic modeling. While the sound power of a source is strictly a function of the total amount of acoustic energy being radiated by the source, the sound pressure levels produced by a source are a function of the distance from the source and the effective radiating area or physical size of the source. In general, the magnitude of a source's sound power level is always considerably higher than the observed sound pressure level near a source since the acoustic energy is being radiated in various directions.

Sound levels are presented on a logarithmic scale to account for the large pressure response range of the human ear and are expressed in units of decibels (dB). A dB is defined as the ratio between a measured value and a reference value usually corresponding to the lower threshold of human hearing defined as 20 micropascals. Conversely, sound power is commonly referenced to 1 picowatt, which is one trillionth of a watt. Broadband sound includes sound energy summed across the frequency spectrum. In addition to broadband sound pressure levels, analysis of the various frequency components of the sound spectrum is often completed to determine tonal characteristics. The unit of frequency is hertz (Hz), which corresponds to the rate in cycles per second that sound

pressure waves are generated. Typically, a sound frequency analysis examines 11 octave bands (or 33 1/3 octave) ranging from 20 Hz (low) to 20,000 Hz (high). This range encompasses the entire human audible frequency range. Since the human ear does not perceive every frequency with equal loudness, spectrally varying sounds are often adjusted with a weighting filter. The A-weighted filter is applied to compensate for the frequency response of the human auditory system. Sound exposure in acoustic assessments is commonly measured and calculated as A-weighted dB (dBA).

Unweighted sound levels are referred to as linear. Linear dB (dBL) is used to determine a sound's tonality and to engineer solutions to reduce or control noise as techniques are different for low and high frequency noise.

Sound can be measured, modeled, and presented in various formats, with the most common metric being the equivalent sound level ( $L_{eq}$ ). The equivalent sound level has been shown to provide both an effective and uniform method for comparing time-varying sound levels and is widely used in acoustic assessments. However, in the state of Oregon, statistical sound levels are referenced in the noise regulations including the intrusive noise level ( $L_{10}$ ) and the median sound level ( $L_{50}$ ). The  $L_{10}$  sound level metric is the sound level exceeded for a small percent of the time and closely corresponds to short-term, higher-level, intrusive noises (such as vehicle pass-by noise near a roadway). The  $L_{50}$  is the level exceeded 50 percent of the time and is typically referred to the median sound level over a given period. Table O3-1 shows the relative A-weighted noise levels of common sounds measured in the environment and industry.

**Table O3-1. Sound Pressure Levels ( $L_p$ ) and Relative Loudness**

| Noise Source or Activity   | Sound Level (dBA) | Subjective Impression | Relative Loudness (Perception of Different Sound Levels) <sup>1</sup> |
|--|-------------------|-----------------------|---|
| Jet aircraft takeoff from carrier (50 ft.)                           | 140               | Threshold of pain     | 64 times as loud  |
| 50-hp siren (100 ft.)  | 130               | Uncomfortably loud    | 32 times as loud  |
| Loud rock concert near stage<br>Jet takeoff (200 ft.)                | 120               |                       | 16 times as loud  |
| Float plane takeoff (100 ft.)  | 110               |                       | 8 times as loud   |
| Jet takeoff (2,000 ft.)  | 100               | Very loud             | 4 times as loud   |
| Heavy truck or motorcycle (25 ft.)                                   | 90                |                       | 2 times as loud   |
| Garbage disposal<br>Food blender (2 ft.)<br>Pneumatic drill (50 ft.) | 80                | Loud                  | Reference loudness <sup>1</sup>                                       |
| Vacuum cleaner (10 ft.)  | 70                | Moderate              | 1/2 as loud   |
| Passenger car at 65 mph (25 ft.)                                     | 65                |                       | -   |
| Large store air-conditioning unit (20 ft.)                           | 60                |                       | 1/4 as loud   |
| Light auto traffic (100 ft.)   | 50                | Quiet                 | 1/8 as loud   |

| Noise Source or Activity  | Sound Level (dBA) | Subjective Impression | Relative Loudness (Perception of Different Sound Levels) <sup>1</sup> |
|---|-------------------|-----------------------|---|
| Quiet rural residential area with no activity                           | 45                |                       | -   |
| Bedroom or quiet living room<br>Bird calls                              | 40                | Faint                 | 1/16 as loud  |
| Typical wilderness area   | 35                |                       | -   |
| Quiet library, soft whisper (15 ft.)                                    | 30                | Very quiet            | 1/32 as loud  |
| Wilderness with no wind or animal activity                              | 25                | Extremely quiet       | -   |
| High-quality recording studio   | 20                |                       | 1/64 as loud  |
| Acoustic test chamber   | 10                | Just audible          | -   |
| N/A   | 0                 | Threshold of hearing  | -   |
| Source: Adapted from Bolt, Beranek and Newman, Inc., 1988 and EPA 1971. |                   |                       |   |
| 1. Reference loudness as compared to the other values presented.        |                   |                       |   |

### 3.0 Predicted Noise Levels – OAR 345-022-0160(2)(a)

*(2) Information about noise generated by operation of the proposed facility, providing evidence to support a finding by the Council that the proposed facility complies with the Oregon Department of Environmental Quality’s noise control standards in OAR 340-035-0035, including:*

*(a) Predicted noise levels resulting from construction and operation of the proposed facility;*

#### 3.1 Construction Noise Assessment **(PENDING)**

Potential noise impacts associated with Facility construction are being reviewed; however, according to OAR 340-035-0035(5)(g), sound originating from construction sites is exempt from state noise regulations. Construction of the Facility will require the use of heavy construction equipment that may be periodically audible at off-site noise sensitive receptors (NSRs). Construction of the Facility may cause short-term increases in the ambient sound levels. The list of construction equipment that may be used on the Facility and estimates of construction sound levels are presented in Table O3-2 at a reference distance of 50 feet and far field distance of 2,000 feet. The variation in power and usage imposes additional complexity in characterizing construction noise levels. The estimated composite site noise level assumes that all equipment would operate simultaneously at the given usage load rating, over a standard eight-hour workday, to calculate the composite average daytime  $L_{eq}$ . Usage factor accounts for the fraction of time that the equipment is in use over the specified time period.

**Table 03-2. Estimated  $L_{max}$  Sound Pressure Levels from Construction Equipment**

| Equipment     | $L_{max}$ Equipment Sound Level at 50 feet (dBA) | Usage Factor (%) <sup>1</sup> | Equipment Sound Level at 50 feet, $L_{eq}$ (dBA) | Equipment Sound Level at 2,000 feet, $L_{eq}$ (dBA) | Composite Equipment Sound Level at 2,000 feet, $L_{eq}$ (dBA) |
|---------------|--|-------------------------------|--|---|---|
| Crane         | 85   | 16                            | 77   | 34  | 48  |
| Forklift      | 80   | 40                            | 76   | 33  |   |
| Backhoe       | 80   | 40                            | 76   | 33  |   |
| Grader        | 85   | 40                            | 81   | 38  |   |
| Man basket    | 85   | 20                            | 78   | 35  |   |
| Dozer         | 88   | 40                            | 84   | 41  |   |
| Loader        | 88   | 40                            | 84   | 41  |   |
| Scissor Lift  | 85   | 20                            | 78   | 35  |   |
| Truck         | 85   | 40                            | 81   | 38  |   |
| Welder        | 73   | 40                            | 69   | 26  |   |
| Compressor    | 80   | 40                            | 76   | 33  |   |
| Concrete Pump | 77   | 50                            | 74   | 31  |   |

Data compiled in part from the following sources: FHWA 2006, Bolt Beranek and Newman, Inc. 1977.  
1. Percentage of time during operation that a piece of construction equipment is operating at full power.

The construction of the Facility may cause short-term but unavoidable noise impacts. The sound levels resulting from construction activities vary significantly depending on several factors such as the type and age of equipment, the specific equipment manufacturer and model, the operations being performed, and the overall condition of the equipment and exhaust system mufflers.

Reasonable efforts will be made to minimize the impact of noise resulting from construction activities. As the design of the Facility progresses and construction scheduling is finalized, the construction engineer normally notifies the community via public notice or alternative method of the expected Facility construction commencement and duration to help minimize the effects of construction noise. Candidate construction noise mitigation measures include scheduling louder construction activities during daytime hours and equipping internal combustion engines with appropriately sized muffler systems to minimize excessive noise emissions.

### 3.2 Operational Noise Assessment (PENDING)

This section describes the model used for the assessment; input assumptions used to calculate noise levels due to the Facility’s normal operation; a conceptual noise mitigation strategy, and the results of the noise impact analysis.

### ***3.2.1 Solar and Battery Energy Storage Facilities***

The principal sources of noise associated with the solar facilities are the BESS cooling units, the electrical components of the inverters, and the inverter step-up transformers associated with each inverter skid that are distributed throughout the Facility layout. The inverter skids and battery storage units are mounted on pads at grade level.

### ***3.2.2 Substation***

The primary ongoing noise sources at substations are the transformers, which generate sound generally described as a low humming. There are three main sound sources associated with a transformer: core noise, load noise, and noise generated by the operation of the cooling equipment. The core vibrational noise is the principal noise source and does not vary significantly with electrical load.

Transformer noise varies with transformer dimensions, voltage rating, and design, and attenuates with distance. The noise produced by substation transformers is primarily caused by the load current in the transformer's conducting coils (or windings) and consequently the main frequency of this sound is twice the supply frequency (60 Hz). The characteristic humming sound consists of tonal components generated at harmonics of 120 Hz. Most of the acoustical energy resides in the fundamental tone (120 Hz) and the first three or four harmonics (240, 360, 480, and 600 Hz).

Circuit-breaker operations may also cause audible noise, particularly the operation of air-blast breakers, which is characterized as an impulsive sound event of very short duration and expected to occur no more than a few times throughout the year. Because of its short duration and infrequent occurrence, circuit breaker noise was not considered in this analysis.

### ***3.2.3 Generation-tie Lines***

Noise generated by transmission lines typically contributes little to area noise levels when compared to other common sources such as vehicles, aircraft, and agricultural and industrial sources. Transmission line sound sources will consist primarily of corona noise in addition to Aeolian noise, and noise associated with maintenance activities. Transmission line noise (also known as corona noise) is caused by the partial electrical breakdown of the insulating properties of air around the electrical conductors and overhead power lines. Audible noise generated by corona on transmission lines is composed of two major components. The higher frequencies of the broadband component distinguish it from more common outdoor environmental noise. The random phase relationship of the pressure waves generated by each corona source along a transmission line results in a characteristic sound commonly described as hum or crackling. The second component is a lower-frequency sound that is superimposed over the broadband noise. The corona discharges produce positive and negative ions that, under the influence of the alternating electric field around alternating current conductors, are alternately attracted to and repelled from the conductors. This motion establishes a sound-pressure wave having a frequency twice that of the voltage (i.e., 120 Hz for a 60-Hz system). Higher harmonics (e.g., 240 Hz) may also be present, but

they are generally of lower significance (EPRI 2015). Corona activity increases with increasing altitude, and with increasing voltage in the line, but is generally not affected by system loading. The relative magnitude of hum and broadband noise may be different depending on weather conditions at the line. According to the Electric Power Research Institute, when the line is wet (such as during rainy weather conditions), the broadband component typically dominates; however, under icing conditions, the lower frequency components may be more prevalent (EPRI 2015).

Corona noise levels during precipitation may vary over a wide range. During the initial stages, when the conductors are not thoroughly wet, there may be considerable fluctuation in the noise level as the precipitation intensity varies. When the conductors are thoroughly wet, the noise fluctuations will often be less significant, because even as the intensity of precipitation diminishes the conductors will still be saturated, which can result in corona discharge. The variation in noise levels during rain depends greatly on the condition of the conductor surface and on the voltage gradient at which the conductors are operating. At high operating gradients, the audible noise is less sensitive to rain rate than at low gradients. Consequently, the variation in noise levels is less for the higher gradients. In different weather conditions the relative magnitudes of random noise and hum may be different. Noise levels in fog and snow usually do not attain the same magnitude as compared to rain, and elevated noise levels during fog and snow are usually for a shorter duration in proportion to the event (EPRI 1982).

During fair weather conditions, corona occurs only at scratches or other imperfections in the conductor surface or where dust has settled on the line. These limited sources are such that the corona activity is minimal, and the audible noise generated is very low. Generally, the fair-weather audible noise of transmission lines cannot be distinguished from ambient noise at the edge of the right-of-way.

Corona noise is not generally an issue at substations. The presence of equipment such as circuit breakers, switches, and measuring devices reduces the electromagnetic field gradient on the buses to a great extent. In addition, the distance from most of the buses to the perimeter of the substation is considerable (on average, greater than 100 meters). Consequently, low levels of corona noise would likely not be readily detectable immediately outside the substation fence line (EPRI 1982).

In addition to corona noise, wind blowing across power lines and power poles can generate noise when airflow is non-laminar or turbulent. Aeolian, or wind, noise is produced when a steady flow of wind interacts with a solid object, such as a tower. The interaction produces oscillating forces on the object that in turn can radiate sound as a dipole source at a given frequency.

The occurrence of Aeolian noise is dependent on several factors and is difficult to predict. Wind noise from a stationary source requires perfect conditions: to produce any sound, the wind must blow for enough time in a specific direction at a specific speed; a slight deviation in either the direction or intensity would disrupt the conditions necessary to produce noise. Wind can create a variety of sounds, ranging from a low hum to a snapping sound to a high whistle. Aeolian noise is not considered a significant.

### **3.3 Acoustic Modeling Analysis (PENDING)**

The program anticipated to be used for the Facility acoustic analysis is DataKustik GmbH's computer-aided noise abatement program (CadnaA; DataKustik 2025). Further details pertaining to CadnaA are given in the following subsection.

#### ***3.3.1 CadnaA***

The acoustic modeling analysis will be conducted using the most recent version of CadnaA, a comprehensive three-dimensional acoustic software model that conforms to the International Organization for Standardization (ISO) standard ISO 9613-2 "Attenuation of Sound during Propagation Outdoors" (ISO 1996). The engineering methods specified in this standard consist of full (1/1) octave band algorithms that incorporate geometric spreading due to wave divergence, reflection from surfaces, atmospheric absorption, screening by topography and obstacles, ground effects, source directivity, heights of both sources and receptors, seasonal foliage effects, and meteorological conditions.

#### ***3.3.2 Corona and Field Effects Program***

Transmission line corona sound levels will be evaluated using Corona 3, a DOS-based computer model developed by the Bonneville Power Administration (BPA; BPA 1991). The Corona 3 program uses the algorithms developed by BPA to predict a variety of outputs including electric and magnetic fields and audible noise. The inputs to the Corona 3 model are line voltage, load flow (current), and the physical dimensions of the line (number of phases, conductor diameter, spacing, height, and subconductor configuration), and site elevation.

The BPA method of calculating audible noise from transmission lines is based on long-term statistical data collected from operating and test transmission lines. This method calculates the  $L_{50}$  noise level during rainy conditions of 1 millimeter per hour. Long-term measurements show that  $L_{50}$  audible noise levels occur at this rain rate. Results during fair weather conditions are also evaluated. Additional details regarding the Corona 3 program are provided in the Background Exhibit Attachment 2.

#### ***3.3.3 Solar and Battery Energy Storage Facilities***

It is expected that Facility equipment would potentially operate consistently during both daytime and nighttime hours. The projected operational noise levels are based on Applicant-supplied manufacturer sound power level data. The BESS unit sound power information is based on manufacturer data testing in accordance with ISO 3744: 2011-02.

#### ***3.3.4 Substations***

The Facility includes a collector substation located inside the limit of disturbance. The collector substation will include a generator step-up transformer.

## 4.0 Assessment of Compliance with Applicable Noise Regulations – OAR 345-022-0160(2)(b)

*(b) An analysis of the proposed facility's compliance with the applicable noise regulations in OAR 340-035-0035, including a discussion and justification of the methods and assumptions used in the analysis;*

### 4.1 State Noise Regulations

OAR Chapter 340, Division 35 prescribes noise regulations applicable throughout the State of Oregon, with specific requirements in OAR 340-035-0035. This standard provides guidance for new noise sources on a previously used site:

*OAR 340-035-0035(1)(b)(A) New Sources Located on Previously Used Sites. No person owning or controlling a new industrial or commercial noise source located on a previously used industrial or commercial site shall cause or permit the operation of that noise source if the statistical noise levels generated by that new source and measured at an appropriate measurement point, specified in subsection (3)(b) of this rule, exceed the levels specified in Table 8, except as otherwise provided in these rules. For noise levels generated by a wind or solar energy facility of any size and any associated equipment or machinery, subparagraph (1)(b)(B)(iii) applies.*

Table O3-3 gives statistical noise limits as summarized below. All limits are presented in terms of A-weighted decibels (dBA). The  $L_{50}$  is the median sound level (50 percent of the measurement interval is above this level, 50 percent is below). The noise limits apply at “appropriate measurement points” on “noise sensitive property.” The noise limits apply at “appropriate measurement points” on “noise sensitive property.”<sup>1</sup> The appropriate measurement point is defined as whichever of the following is farther from the noise source:

- 25 feet toward the noise source from that point on the noise sensitive building nearest the noise source; or
- The point on the noise sensitive property line nearest the noise source.

“Noise sensitive property” is defined as “real property normally used for sleeping, or normally used as schools, churches, hospitals or public libraries. Property used in industrial or agricultural activities is not Noise Sensitive Property unless it meets the above criteria in more than an incidental manner.”

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<sup>1</sup> OAR 340-035-0035(3)(b)

**Table O3-3. New Industrial and Commercial Noise Standards**

| Statistical Descriptor | Maximum Permissible Statistical Noise Levels (dBA) |                                 |
|------------------------|--|---------------------------------|
|                        | Daytime<br>(7:00 a.m. – 10 p.m.)                   | Nighttime<br>(10 p.m. – 7 a.m.) |
| L <sub>50</sub>        | 55   | 50                              |
| L <sub>10</sub>        | 60   | 55                              |
| L <sub>1</sub>         | 75   | 60                              |

Source: OAR 340-035-0035, Table 8.

The standard also provides guidance for new noise sources on a previously unused site, which is defined in OAR 340 -035-0015(47) as property which has not been used by any industrial or commercial noise source during the 20 years immediately preceding commencement of construction of a new industrial or commercial source on that property. The standard reads as follows:

*OAR 340-035-0035(1)(b)(B) New Sources Located on Previously Unused Site:*

*OAR 340-035-0035(1)(b)(B)(i) No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L10 or L50, by more than 10 dBA in any one hour, or exceed the levels specified in Table 8, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule, except as specified in subparagraph (1)(b)(B)(iii).*

*OAR 340-035-0035(1)(b)(B)(ii) The ambient statistical noise level of a new industrial or commercial noise source on a previously unused industrial or commercial site shall include all noises generated or indirectly caused by or attributable to that source including all of its related activities. Sources exempted from the requirements of section (1) of this rule, which are identified in subsections (5)(b)–(f), (j), and (k) of this rule, shall not be excluded from this ambient measurement.*

*OAR 340-035-0035(1)(b)(B)(iii) For noise levels generated or caused by a wind or solar energy facility:*

*(I) The increase in ambient statistical noise levels is based on an assumed background L50 ambient noise level of 26 dBA or the actual ambient background level. The person owning the wind or solar energy facility may conduct measurements to determine the actual ambient L10 and L50 background level.*

*(II) The “actual ambient background level” is the measured noise level at the appropriate measurement point as specified in subsection (3)(b) of this rule using generally accepted noise engineering measurement practices. Background noise measurements shall be obtained at the appropriate measurement point, and for*

*wind energy facilities synchronized with wind speed measurements of hub height conditions at the nearest wind turbine location. “Actual ambient background level” does not include noise generated or caused by the proposed wind or solar energy facility.*

*(III) The noise levels from a wind or solar energy facility may increase the ambient statistical noise levels L10 and L50 by more than 10 dBA (but not above the limits specified in Table 8), if the person who owns the noise sensitive property executes a legally effective easement or real covenant that benefits the property on which the wind or solar energy facility is located. The easement or covenant must authorize the wind or solar energy facility to increase the ambient statistical noise levels, L10 or L50 on the sensitive property by more than 10 dBA at the appropriate measurement point.*

*(IV) For purposes of determining whether a proposed wind energy facility would satisfy the ambient noise standard where a landowner has not waived the standard, noise levels at the appropriate measurement point are predicted assuming that all of the proposed wind facility’s turbines are operating between cut-in speed and the wind speed corresponding to the maximum sound power level established by IEC 61400-11 (version 2002-12). These predictions must be compared to the highest of either the assumed ambient noise level of 26 dBA or to the actual ambient background L10 and L50 noise level, if measured. The facility complies with the noise ambient background standard if this comparison shows that the increase in noise is not more than 10 dBA over this entire range of wind speeds.*

*(V) For purposes of determining whether an operating wind energy facility complies with the ambient noise standard where a landowner has not waived the standard, noise levels at the appropriate measurement point are measured when the facility’s nearest wind turbine is operating over the entire range of wind speeds between cut-in speed and the wind speed corresponding to the maximum sound power level and no turbine that could contribute to the noise level is disabled. The facility complies with the noise ambient background standard if the increase in noise over either the assumed ambient noise level of 26 dBA or to the actual ambient background L10 and L50 noise level, if measured, is not more than 10 dBA over this entire range of wind speeds.*

*(VI) For purposes of determining whether a proposed wind energy facility would satisfy the Table 8 standards, noise levels at the appropriate measurement point are predicted by using the turbine’s maximum sound power level following procedures established by IEC 61400-11 (version 2002-12), and assuming that all of the proposed wind facility’s turbines are operating at the maximum sound power level.*

*(VII) For purposes of determining whether an operating wind energy facility satisfies the Table 8 standards, noise generated by the energy facility is measured at the appropriate measurement point when the facility's nearest wind turbine is operating at the wind speed corresponding to the maximum sound power level and no turbine that could contribute to the noise level is disabled.*

## **4.2 Exemptions to State Noise Regulations**

OAR 340-035-0035(5) specifically exempts construction activity from the state noise standards and regulations, as indicated below. This section also provides an exemption for maintenance of capital equipment, the operation of aircraft (such as helicopters used in Project construction), and sounds created by activities related to timber harvest.

*OAR 340-035-0035(5) (5) Exemptions: Except as otherwise provided in subparagraph (1)(b)(B)(ii) of this rule, the rules in section (1) of this rule shall not apply to:*

*[section abridged for brevity]*

*(b) Warning devices not operating continuously for more than 5 minutes;*

*(g) Sounds that originate on construction sites.*

*(h) Sounds created in construction or maintenance of capital equipment;*

*(j) Sounds generated by the operation of aircraft and subject to pre-emptive federal regulation. This exception does not apply to aircraft engine testing, activity conducted at the airport that is not directly related to flight operations, and any other activity not pre-emptively regulated by the federal government or controlled under OAR 340-035-0045;*

*(k) Sounds created by the operation of road vehicle auxiliary equipment complying with the noise rules for such equipment as specified in OAR 340-035-0030(1)(e);*

*(m) Sounds created by activities related to the growing or harvesting of forest tree species on forest land as defined in subsection (1) of ORS 526.324.*

OAR 340-035-0035(6) allows for some exceptions to the state noise regulations:

*OAR 340-035-0035(6) Exceptions: Upon written request from the owner or controller of an industrial or commercial noise source, the Department may authorize exceptions to section (1) of this rule, pursuant to rule 340-035-0010, for:*

*(a) Unusual and/or infrequent events;*

*(b) Industrial or commercial facilities previously established in areas of new development of noise sensitive property;*

*(c) Those industrial or commercial noise sources whose statistical noise levels at the appropriate measurement point are exceeded by any noise source external to the industrial or commercial noise source in question;*

*(d) Noise sensitive property owned or controlled by the person who controls or owns the noise source;*

*(e) Noise sensitive property located on land zoned exclusively for industrial or commercial use.*

### **4.3 County and Municipal Noise Regulations**

There are no quantitative noise limits in Linn County. Per LCC 903-120 (I) stipulates Linn County “shall utilize its agency involvement program to request comments on the impact of land use decisions which may adversely affect noise control standards.” In addition, LCC 933.100 (1) stipulates “Limiting the manner in which the use is conducted, including restricting the time a certain activity may take place and restraints to minimize such environmental effects including, but not limited to noise, vibration, air pollution, glare and odor”

### **4.4 Existing Conditions**

A wide range of noise settings occur within the acoustic Analysis Area. The background sound level will vary spatially and is related to various physical characteristics such as topography, land use, proximity to transportation corridors and terrain coverage including extent and height of exposed vegetation. The acoustic environment will also vary due in part to surrounding land use and population density. Areas in proximity to major transportation corridors such as interstate highways and areas with higher population densities and are expected to generally have higher existing ambient sound levels as compared to open and rural lands.

### **4.5 Facility Compliance**

Construction activities are categorically exempt under OAR 340-035-0035(5)(g). As construction noise is short-term, it is not expected to result in significant long-term impacts.

Operational modeling results are pending. The Facility anticipates compliance with the applicable 50 dBA standard.

## **5.0 Measures to Reduce Noise Levels or Impacts to Address Public Complaints – OAR 345-022-0160(2)(c)**

*(c) Any measures the applicant proposes to reduce noise levels or noise impacts or to address public complaints about noise from the facility;*

During construction, the following mitigation measures will be considered and incorporated into the Facility’s contract specifications, as necessary and appropriate, to minimize Facility noise levels to the extent practicable:

- Construction site and access road speed limits will be established and enforced during the construction period.

- Electrically-powered equipment will be used instead of pneumatic or internal combustion powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas will be located as far as practicable from NSRs.
- The use of noise-producing signals, including horns, whistles, alarms, and bells, will be for safety warning purposes only.
- Noise-producing construction equipment and vehicles using internal combustion engines will be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed “package” equipment (e.g., arc-welders, air compressors) will be equipped with shrouds and noise control features that are readily available for that type of equipment.

Final substation transformer, solar inverters/transformers, BESS specifications and noise warranty data will be reviewed by an acoustician to ensure compliance with OAR 340-035-0035.

## **6.0 Noise Monitoring – OAR 345-022-0160(2)(d)**

*(d) Any measures the applicant proposes to monitor noise generated by operation of the facility; and*

Noise monitoring is not currently proposed for the Facility pending completion of the Construction and Operations noise assessment.

## **7.0 Owners of Noise Sensitive Properties – OAR 345-022-0160(2)(e)**

*(e) A list of the names and addresses of all owners of noise sensitive property, as defined in OAR 340-035-0015, within one mile of the proposed site boundary.*

Attachment O3-2 (PENDING) contains the names and addresses of all owners of noise sensitive properties within 1 mile of the Project Site Boundary.

## **8.0 Evaporative Cooling Towers – OAR 345-022-0160(3)**

*OAR 345-022-0160(3) If the proposed facility has an evaporative cooling tower, information about the cooling tower plume, including:*

*(a) The predicted size and frequency of occurrence of a visible plume and an assessment of its visual impact;*

*(b) The predicted locations and frequency of occurrence of ice formation on surfaces and ground level fogging and an assessment of significant potential adverse impacts, including, but not limited to, traffic hazards on public roads;*

*(c) The predicted locations and rates of deposition of solids released from the cooling tower (cooling tower drift) and an assessment of significant potential adverse impacts to soils, vegetation and other land uses;*

*(d) Any measures the applicant proposes to reduce adverse impacts from the cooling tower plume or drift;*

*(e) The assumptions and methods used in the plume analysis; and*

*(f) The applicant's proposed monitoring program, if any, for cooling tower plume impacts.*

The Facility does not include an evaporative cooling tower, so OAR 345-022-0160(3) is not applicable.

## **9.0 References**

Bolt, Beranek and Newman, Inc. 1977. Power Plant Construction Noise Guide, prepared for the Empire State Electric Energy Research Corporation, Report No. 3321.

DataKustik (DataKustik GmbH). 2025. Computer-Aided Noise Abatement Model CadnaA, Version MR 1 Munich, Germany.

EPA (U.S. Environmental Protection Agency). 1971. Community Noise. NTID300.3 (N-96-01 IIA-231). Prepared by Wylie Laboratories.

EPRI (Electric Power Research Institute). 1982. Field Effects of Overhead Transmission Lines and Stations.: Transmission Line Reference Book: 345 KV and Above. Second ed., Palo Alto, California.

EPRI. 2015. The Integrated Grid – a Benefit-Cost Framework. Palo Alto, California.

FHWA (Federal Highway Administration). 2006. FHWA Roadway Construction Noise Model User's Guide, FHWA-HEP-05-054, January.

GE (General Electric Company). 2022. Technical Documentation Wind Turbine Generator Systems, 2.x-127 with LNTE – 60 Hz. Rev. 03-EN.

ISO (International Organization for Standardization). 1996. Standard ISO 9613-2 Acoustics – Attenuation of Sound during Propagation Outdoors. Part 2 General Method of Calculation. Geneva, Switzerland.

Bolt Beranek and Newman Inc. Electric Power Plant Environmental Noise Guide – 2nd Edition. Edison Electric Institute. Washington, DC, 1st Ed. 1978, 2nd Ed., 1984

Linn County. 2011. Linn County Comprehensive Plan. Chapter 903 Natural Resources Element Code <https://www.linncountyor.gov/media/23951>

Linn County. 2025. Linn County Land Development Code. Condition, Requirements, & Decision Criteria <https://www.linncountyor.gov/media/23891>

## 10.0 Approval Standards and Submittal Requirements

**Table 03-4. Approval Standards and Submittal Requirements Matrix**

| Requirements  | Location    |
|---|-------------|
| OAR 345-022-0160 State and Local Laws and Regulations   | -           |
| <b>Submittal Requirements</b>   |             |
| To assist the Council in determining compliance with all state and local laws and regulations applicable to EFSC and the siting process, submit the following, as directed by the project order described in OAR 345-015-0160:  | -           |
| (2) Information about noise generated by operation of the proposed facility, providing evidence to support a finding by the Council that the proposed facility complies with the Oregon Department of Environmental Quality’s noise control standards in OAR 340-035-0035, including: | Section 4.0 |
| (a) Predicted noise levels resulting from construction and operation of the proposed facility;  | Section 4.1 |
| (b) An analysis of the proposed facility’s compliance with the applicable noise regulations in OAR 340-035-0035, including a discussion and justification of the methods and assumptions used in the analysis;  | Section 4.2 |
| (c) Any measures the applicant proposes to reduce noise levels or noise impacts or to address public complaints about noise from the facility;  | Section 4.3 |
| (d) Any measures the applicant proposes to monitor noise generated by operation of the facility; and  | Section 4.4 |
| (e) A list of the names and addresses of all owners of noise sensitive property, as defined in OAR 340-035-0015, within one mile of the proposed site boundary.   | Section 4.5 |
| (3) If the proposed facility has an evaporative cooling tower, information about the cooling tower plume, including:  | Section 5.0 |
| (a) The predicted size and frequency of occurrence of a visible plume and an assessment of its visual impact;   | Section 5.1 |
| (b) The predicted locations and frequency of occurrence of ice formation on surfaces and ground level fogging and an assessment of significant potential adverse impacts, including, but not limited to, traffic hazards on public roads;   | Section 5.2 |
| (c) The predicted locations and rates of deposition of solids released from the cooling tower (cooling tower drift) and an assessment of significant potential adverse impacts to soils, vegetation and other land uses;  | Section 5.3 |
| (d) Any measures the applicant proposes to reduce adverse impacts from the cooling tower plume or drift;  | Section 5.4 |
| (e) The assumptions and methods used in the plume analysis; and   | Section 5.5 |

**Preliminary Application for Site Certificate  
Exhibit O3. Noise and Cooling Towers**

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| <b>Requirements</b>   | <b>Location</b> |
|---|-----------------|
| (f) The applicant's proposed monitoring program, if any, for cooling tower plume impacts. | Section 5.6     |

# Figures

**(PENDING)**

# **Attachment 03-1. Tabulated Summary of Acoustic Modeling Results by Receptor Location**

**(PENDING Confidential - provided under separate cover)**

## **Attachment 03-2. Owners of Noise Sensitive Properties**

**(PENDING Confidential – provided under separate cover)**