EXHIBIT X
NOISE

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Attachment X1: Source Contributions at Each Modeled Receptor *(Confidential and Not for Public Distribution)*

Introduction

This Exhibit provides a noise assessment for the proposed Facility in accordance with OAR 345-021-0010(1)(x) and includes an analysis of the Facility's compliance with applicable DEQ noise regulations. For this Exhibit the analysis area described in OAR 345-001-0010(2) and the study area described in OAR 345-01-0010(57) refer to the same areas and are defined as lands within the Facility site boundary, and those areas approximately 2.5 miles from the Facility site boundary.

OAR 345-021-0010(1)(x) *Information about noise generated by construction and 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.*

X.1 Acoustical Background

Noise is generally defined as unwanted sound, and is a fluctuating atmospheric pressure wave. Environmental noise is generally measured and described in terms of sound pressure level (SPL), which is a logarithmic measure of the effective sound pressure of a sound relative to a reference value. It is measured in decibels (dB) relative to a standard reference level. The commonly used "zero" reference sound pressure in air is 20 micropascals (µPa) root mean square (RMS), which is usually considered the threshold of human hearing (at 1 kilohertz (kHz).

The acoustic output (or noise emission) of a specific noise source, such as a wind turbine, is typically measured and presented in terms of sound power level (SWL). SWL can be thought of as the amount of watts of acoustic power a source has. The SWL of a source is independent of distance and environmental conditions, unlike the SPL of a source.

The number of fluctuation cycles or pressure waves per second of a particular sound is the frequency of the sound. The human ear is less sensitive to higher and lower frequencies than to mid-range frequencies. Therefore, sound level meters used to measure environmental noise generally incorporate a filtering system that discriminates against higher and lower frequencies in a manner similar to the human ear to produce noise measurements that approximate the normal human perception of noise at moderate sound levels. Measurements made using this filtering system are termed "A-weighted decibels," abbreviated as dBA.

There are several different ways to measure noise (noise metrics), depending on the source of the noise, the receiver, and the reason for the noise measurement. Table X1 summarizes the technical noise terms used in this exhibit.

Table X1: Definitions of Acoustical Terms

Term	Definitions
Ambient noise level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals.
A-weighted SPL (dBA)	The SPL in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Statistical noise level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (for example, L_{50} is the level exceeded 50 percent of the time or median sound level).

Table X2 shows the relative A-weighted noise levels of common sounds measured for various sound sources.

Table X2. Typical Sound Levels Measured in the Environment and Industry

Noise Source At a Given Distance	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
Civil defense siren (100 ft)	130		
Jet takeoff (200 ft)	120		Pain threshold
	110	Rock music concert	
Pile driver (50 ft)	100		Very loud
Ambulance siren (100 ft)			
	90	Boiler room	
Freight cars (50 ft)		Printing press plant	
Pneumatic drill (50 ft)	80	In kitchen with garbage disposal running	
Freeway (100 ft)			
	70		Moderately loud
Vacuum cleaner (10 ft)	60	Data processing center	
Department Store; Light traffic (100 ft)	50	Private business office	
Large transformer (200 ft)	40		Quiet
Soft whisper (5 ft)	30	Quiet bedroom	
	20	Recording studio	
	10		Hearing threshold

Source: Beranek (1988).

X.2 Field Survey Area and Facility Site

The field survey area for noise impacts includes lands within the Facility site boundary, as well as lands within 2.5 miles of the Facility site boundary to address areas that could potentially be affected by construction or operational noise resulting from the Facility.

X.3 Existing Noise Conditions

For the purposes of this exhibit, the Facility is assumed to be located on "previously unused" land, as defined in OAR Chapter 340, Division 35. In accordance with these rules, this exhibit assumes an L_{50} ambient noise level of 26 dBA.

X.4 Predicted Noise Levels

The applicant shall include:

OAR-345-021-0010(1)(x)(A) *Predicted noise levels resulting from construction and operation of the proposed facility*.

RESPONSE

The following sections described the predicted noise levels resulting from construction and operation of the proposed Facility.

X.4.1 Construction

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control studied noise from individual pieces of construction equipment, as well as from construction sites of power plants and other types of facilities (EPA, 1974). These data, as well as data collected by Bolt and the Empire State Electric Energy Research Corporation (Bolt et. al., 1977) have been used by the Federal Highway Administration to create a national construction noise model (called the Roadway Construction Noise Model [RCNM]). The RCNM is used to estimate noise from construction activities using measured reference data and an "acoustical usage factor" to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. The RCNM is based on conservative data because the evolution of construction equipment has generally been toward quieter design. Because specific information about types, quantities, and operating schedules of construction equipment can vary throughout construction of a wind generation facility, RCNM was used to estimate noise levels from five general phases of wind turbine construction.

The five modeled phases of construction were: clearing, turbine foundation excavation, pouring of the turbine foundation, erection of the turbine, and finish grading. The equipment assumed to be active in any one location under each phase of construction were as follows:

- **Clearing.** The construction noise calculation for the clearing phase assumes two bulldozers, one chain saw, one backhoe and two dump trucks operating simultaneously at default usage factors (40% operation at full power in any one-hour period for dozers, backhoes and dump trucks, and 20% for chain saws). The inclusion of a chain saw is conservative since there are very few trees within the Facility site boundary.

- **Excavation.** The construction noise calculation for the excavation phase assumes four backhoes and four dump trucks operating simultaneously at default usage factors (40% operation at full power in any one-hour period).

- **Foundation.** The construction noise calculation for the foundation phase assumes three concrete mix trucks operating simultaneously at default usage factors (40% operation at full power in any one-hour period).

- **Erection.** The construction noise calculation for the erection phase assumes two cranes, one flatbed truck, pneumatic tools, and a welder operating simultaneously at default usage factors (16% operation at full power in any one-hour period for the cranes, 40% for the flatbed truck and the welder, and 50% for the pneumatic tools).

- **Finishing.** The construction noise calculation for the finishing phase assumes two backhoes, two rollers, two compactors, and a dump truck operating simultaneously at default usage factors (40% operation at full power in any one-hour period for the backhoes and the dump truck, and 20% for the rollers and compactors).

Table X3 shows the total composite noise level at a reference distance of 50 ft, based on the equipment operating for each phase of construction and the typical usage factor for each piece of equipment. For informational purposes, the noise level at 1,300 ft (the distance between a proposed turbine site and the nearest on-site residence [i.e. the nearest residence inside the Facility site boundary]), and 3,000 ft (the distance between a proposed turbine site and the nearest off-site residence [i.e., the nearest residence outside the Facility site boundary]) is also shown. The calculated levels at the nearest on-site and off-site residences are conservative because the only attenuating mechanism considered was geometric spreading, which results in an attenuation rate of 6 dBA per doubling of distance; attenuation related to the presence of structures, trees or vegetation, ground effects, and terrain is not included in the calculation.

Table X3: Composite Construction Site Noise Levels

Construction Phase	Composite Equipment Noise Level at 50 ft, Leq* (dBA)	Composite Equipment Noise Level at 1,300 ft, Leq (dBA)	Composite Equipment Noise Level at 3,000 ft, Leq (dBA)
Clearing	88	59	52
Excavation	88	59	52
Foundation	86	58	50
Erection	86	57	50
Finishing	85	57	50

**Leq = hourly equivalent levels*

X.4.2 Operations

Operational noise sources included in the Facility will be made up of wind turbines and three Facility substations. The Facility will use turbines up to 3.0 MW in size. The minimum turbine layout is 166, 3.0-MW turbines. The maximum turbine layout is 219, 1.6-MW

turbines. Exhibit C describes the two proposed turbine layouts in greater detail. Table X4 presents the potential turbine dimensions for the GE 82.5 1.6-MW and Vestas V112 3.0-MW turbines.

Table X4: **Potential Turbine Dimensions**

Turbines	Minimum Layout (Vestas V112 3.0-MW)	Maximum Layout (GE 82.5 1.6-MW)
Tower Type	Tubular	Tubular
Turbine rotor-diameter	367 ft (112 m)	270.7 ft (82.5 m)
Turbine hub height	308 ft (94 m)	262 ft (80 m)
Total Turbine Height	492 ft (150 m)	397.9 ft (121.3 m)

Source: Exhibit B, Table B1.
Notes: All values are approximate.

As described in Exhibit B, the Applicant seeks micrositing flexibility for the Facility with regard to the final layout for turbines and associated access roads and collector cables. Exhibit C contains a definition and map of the micrositing area. Before construction, the Applicant will determine the number of turbines to be constructed, the spacing between turbines, and their precise locations within the corridor, based on the wind turbine models selected and other various siting criteria. To demonstrate that the Applicant will design the Facility in compliance with the noise standards, noise analyses were conducted for both the maximum (all 1.6-MW units) turbine layout and the minimum (all 3.0-MW units) turbine layout. Noise levels were predicted at all known residential properties within the Facility site boundary as well as all identified residential properties within 2.5 miles of the Facility site boundary. The potential layouts presented in Exhibit C were used to develop the noise model. As previously mentioned, the Applicant will submit for the EFSC review an acoustical analysis of the final Facility design, along with evidence, including any noise waivers demonstrating compliance with OAR 340-035-0035. The Applicant will not start construction of major Facility components until the EFSC is satisfied that the Facility has fulfilled the requirements of OAR 340-035-0035.

The CADNA/A noise model by Datakustik GmbH of Munich, Germany, was used in the analysis of noise levels from the Facility. CADNA/A is a sophisticated software program that enables complete noise modeling of complex industrial noise sources. The sound propagation factors used in the model have been adopted from the International Organization for Standardization (ISO) standard 9613 (ISO, 1993) and VDI 2714 (VDI, 1988). Noise levels inputs, in terms of dBA, to the CADNA/A model, were obtained from the manufacturer for each frequency band as hourly equivalent levels (Leq), and therefore the predicted model output was also expressed as Leq in dBA.

As part of the noise modeling, each wind turbine was considered to be a point source of noise at the hub height identified in Table X4. Table X5 presents the maximum manufacturer stated overall and octave band SWLs determined in accordance with IEC 61400-11 (2002) for the GE 82.5 1.6-MW turbine and the Vestas V112 3.0-MW turbine. Although not required by the rule, the octave band levels shown in Table X5 were conservatively adjusted upwards by 2 dBA in the model to reflect the reported uncertainty

in the manufacturer guaranteed SWLs. This adjustment reflects the typical SWL under warranty by the turbine manufacturer.

Table X5: Maximum Modeled Octave Band SWLs

Turbine	Overall (dBA)	Octave Band Center Frequency (Hertz [Hz], A-weighted)							
		63	125	250	500	1,000	2,000	4,000	8,000
GE 1.6-MW Turbine	106	85	94	99	101	100	97	89	86
Vestas 3.0-MW Turbine	106	87	94	96	100	100	99	93	80
Substation Transformers [a]	106	83	95	97	103	100	96	91	82

[a]*Transformers are expected to have a National Electrical Manufacturers Association (NEMA) sound rating of 87 dBA or less.*

Although unlikely, if the final turbine type selected has a greater noise emission level than the turbines modeled here, the pre-construction noise model assessment will take this into account and final siting will occur to ensure that Facility noise levels meet standards.

Figure X1 and Figure X2 show the location of noise sensitive properties in the vicinity of the Facility and present the noise contours for the 1.6-MW and 3.0-MW turbine layouts, respectively. The noise contours in Figure X1 and Figure X2 include the contributions from the Facility Collector Substations.

The model results are presented in Table X6 for the 1.6-MW maximum turbine layout and in Table X7 for the 3.0-MW minimum turbine layout. Table X6 and Table X7 focus on, and present data for, receptors for which predicted noise levels approach or exceed the ambient degradation standard (i.e., the 10 dBA above background, or 36 dBA standard – see Section X.5.1 for more information on the ambient degradation standard). Therefore, receptors that are predicted to have noise levels below 32 dBA are not shown in the table.

Table X6: Summary of Predicted Noise Levels (dBA)—GE 1.6-MW Turbines

Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA	Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA	Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA
R103*	45	R129*	46	R149	35
R104	34	R130*	46	R150	35
R105	34	R131*	46	R153	32
R106	34	R132*	44	R154	32
R108	33	R133*	44	R155	32
R111	36	R134*	40	R156	36
R112	36	R135	36	R157	33
R113*	37	R136	34	R158*	43

Table X6: Summary of Predicted Noise Levels (dBA)—GE 1.6-MW Turbines

Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA	Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA	Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA
R114	36	R137	35	R163*	39
R116*	48	R139	36	R164*	45
R117	36	R140	36	R165*	40
R120*	48	R141	36	R166*	43
R121*	48	R142	35	R167*	32
R122*	47	R143	35	R176	36
R124*	47	R144	35	R177	35
R125*	38	R145	35	-	-
R126*	38	R146	33	-	-
R127	35	R147	36	-	-
R128*	41	R148	34	-	-

** Properties with a legally effective easement or real covenant that benefits the property authorizing the Facility to increase the ambient statistical noise levels by more than 10 dBA at the appropriate measurement point.*

Table X7: Summary of Predicted Noise Levels (dBA)—Vestas 3.0-MW Turbines

Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA	Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA	Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA
R103*	43	R126	35	R144	32
R104	32	R127	33	R147	33
R105	32	R128*	39	R148	33
R106	32	R129*	44	R149	34
R111	33	R130*	44	R150	34
R112	34	R131*	44	R156	34
R113	34	R132*	43	R158*	42
R114	33	R133*	43	R163*	38
R116*	43	R134*	36	R164*	43
R117	33	R135	32	R165*	39
R120*	44	R139	33	R166*	43
R121*	44	R140	33	R176	34

Table X7: Summary of Predicted Noise Levels (dBA)—Vestas 3.0-MW Turbines

Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA	Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA	Receptor ID	Predicted Project-Related Noise Level, L_{50} dBA
R122*	44	R141	32	-	-
R124*	45	R142	32	-	-
R125	36	R143	32	-	-

** Properties with a legally effective easement or real covenant that benefits the property authorizing the Facility to increase the ambient statistical noise levels by more than 10 dBA at the appropriate measurement point.*

As requested by the EFSC in the Project Order, Attachment X1 provides data on the predicted contribution (in dBA) of each project turbine and substation to noise levels at each modeled noise–sensitive receptor.

X.5 Compliance with OAR 340-035-0035

OAR 345-021-0010(1)(x)(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.*

RESPONSE

The following sections present an analysis of the proposed Facility's compliance with the applicable noise regulations in OAR 340-035-0035.

X.5.1 Summary of Applicable Noise Regulations

OAR 340-035-0035, *Noise Control Regulations for Industry and Commerce*, contains the noise standards and regulations for industrial and commercial facilities, including wind energy facilities, in the State of Oregon.

For the purposes of this Exhibit, the Facility is assumed to be a new facility located on a previously unused site. OAR 340-035-0035(1)(b)(B)(i) states that for new facilities on previously unused sites, the Facility shall not cause noise levels generated or indirectly caused by that noise source to increase the ambient statistical noise levels, L_{10} or L_{50}, by more than 10 dBA in any one hour (also referred to as the ambient degradation test) , where a landowner has not waived the ambient degradation standard. Based on an assumed background level of 26 dBA (per OAR 340-035-0035(1)(b)(B)(iii)(I)) noise levels will cause an impact at levels greater than 36 dBA. In addition OAR 340-035-0035 states that noise levels shall not exceed the levels specified in Table X8 (also referred to as the ambient noise standard), as measured at an appropriate measurement point, as specified in the rule. The most restrictive of these standards will be a nighttime L_{50} of 50 dBA.

OAR 340-035-0035(1)(b)(B)(iii) specifically addresses noise levels generated or caused by wind energy facilities, as follows:

- OAR 340-035-0035(1)(b)(B)(iii)(I) establishes the option for a proposed wind energy facility to assume a background L_{50} ambient noise level of 26 dBA.

- OAR 340-035-0035(1)(b)(B)(iii)(III) states that noise levels from a wind energy facility may increase the ambient statistical noise levels L_{10} and L_{50} by more than 10 dBA (but not above the limits specified in Table X8), 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 energy facility is located. The easement or covenant must authorize the wind energy facility to increase the ambient statistical noise levels, L_{10} or L_{50} on the sensitive property by more than 10 dBA at the appropriate measurement point.

- OAR 340-035-0035(1)(b)(B)(iii)(IV) requires a proposed wind energy facility to satisfy the ambient noise standard, where a landowner has not waived the standard, by predicting facility noise levels at the appropriate measurement point, assuming that all of the proposed wind Facility's turbines are operating between cut-in speed and the wind speed corresponding to the maximum SWL established by IEC 61400-11 (2002). These predictions are to be compared to the assumed ambient noise level of 26 dBA, or to the actual ambient background L_{10} and L_{50} noise levels, if measured. The Facility will comply with the 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.

- OAR 340-035-0035(1)(b)(B)(iii)(VI) requires that the Facility predict compliance with the ambient noise standards (Table X8) set forth in the regulations. Compliance must occur at the appropriate measurement point, with reference to the turbine's maximum SWL, following procedures established by IEC 61400-11 (2002), and assuming that all of the Facility's turbines are operating at the maximum SWL.

Table X8: State of Oregon Statistical Noise Limits for Industrial and Commercial Sources (OAR 340-035-0035)

Statistical Descriptor	Maximum Permissible Statistical Noise Levels (dBA)	
	Daytime (7:00 a.m. – 10:00 p.m.)	Nighttime (10:00 p.m. – 7:00 a.m.)
L_{50}	55	50
L_{10}	60	55
L_1	75	60

Source: "Table 8" of OAR 340-035-0035: New Industrial and Commercial Noise Source. Standards and OAR 340-035-0035(1)(b)(B)(i).

X.5.2 Analysis of Facility Compliance

X.5.2.1 Maximum Allowable Noise Level

Assuming an ambient level of 26 dBA, the maximum allowable noise level increase as a result of operations at the Facility, as measured at a noise-sensitive property, is 10 dBA over the ambient level across the entire range of wind speeds between the cut-in wind speed and the wind speed corresponding to the maximum SWL, or 36 dBA (26 dBA +10 dBA). In

accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), the 36-dBA level must not be exceeded when all turbines operate at the maximum SWL established by IEC 61400-11 (2002). At wind speeds corresponding to SWLs less than maximum (for example, during cut-in wind speeds), the resulting noise level also will be less. Therefore, it is not necessary to predict noise levels for each wind speed between cut-in and the maximum SWL when assuming an ambient level of 26 dBA.

If the Facility noise levels comply with the OAR 340-035-0035(1)(b)(B)(iii)(IV) and do not exceed 36 dBA at a receptor, it necessarily also complies with OAR 340-035-0035(1)(b)(B)(iii)(VI), namely, the Table X8 limit of 50 dBA, at that same receptor.

In addition to the foregoing limits, OAR 340-035-0035(1)(f) establishes standards that regulate octave band SPLs and audible discrete tones. Such standards can be applied by the DEQ when it believes subsections OAR 340-035-0035(1)(a), (b), or (c) do not adequately protect the health, safety, or welfare of the public. Impulse sound is also regulated in OAR 340-035-0035(1)(d), but wind turbines do not generate impulse sound.

The noise limits apply at "appropriate measurement points" on "noise-sensitive property." The "appropriate measurement point" is defined in OAR 340-035-0035 as whichever of the following is farther from the noise source:

- 25 ft (7.6 m) toward the noise source from that point on the noise-sensitive building nearest the noise source
- That 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 foregoing criteria in more than an incidental manner." Residences and one school house are the only noise-sensitive property identified.

X.5.2.2 Methods and Assumptions

As previously mentioned, the CADNA/A noise model by Datakustik GmbH of Munich, Germany, was used in the analysis of noise levels from the Facility. For the purposes of the analysis, because the Facility noise is anticipated to be from steady state noise sources, it was assumed that Leq was functionally equal to L_{50}. Thus, the Leq CADNA/A output is directly compared to the L_{50} OAR standards to determine compliance with the noise impact thresholds.

Atmospheric absorption for conditions of 10° Celsius (C) and 70 percent relative humidity (conditions that favor propagation and therefore produce conservative results) was computed in accordance with ISO 9613-1 and the Alternative Ground attenuation calculation method, as described in ISO 9613-2, as requested by the ODOE. No site-specific wind data were included in the model; instead, wind conditions favorable to noise propagation were assumed in all directions at all times. Topography was included in the model. This model and methodology have been previously required by the ODOE.

All turbines and the Facility substation were assumed to be operating at the maximum manufacturer stated SWLs shown in Table X5. The modeled turbine levels were increased

2 dBA above the estimated maximum SWL shown in Table X5 consistent with typical SWLs under warranty.

X.5.3 Construction

OAR 340-035-0035(5)(g) specifically exempts construction activity. Therefore, by regulatory definition, there will be no construction noise impacts. Section X.4.1 and Table X3 present the expected construction noise levels.

Decommissioning activities will be similar to the activities anticipated during the construction phase, but shorter in duration. Therefore, decommissioning will not cause a significant noise impact.

X.5.4 Operations

The maximum operational noise levels for the 1.6-MW and 3.0-MW turbine layouts based on the turbine dimensions identified in Table X4 are presented in Table X6 and Table X7, respectively, and in Figure X1 and Figure X2, respectively.

As shown in Table X6 and Table X7, the L_{50} 50-dBA nighttime limit in Table 8 of OAR chapter 340, division 35 is not exceeded at any of the modeled noise-sensitive properties under either the 1.6-MW (maximum) or the 3.0-MW (minimum) turbine layout. Table X6 and Table X7 also indicate the noise-sensitive properties for which the applicant has secured noise waivers. Table X6 and Table X7 indicate that the applicant has secured noise waivers for all properties predicted to have maximum operational noise levels in excess of 36 dBA. Therefore, no ambient degradation impacts (i.e., noise levels in excess of 36 dBA) are predicted to occur at properties where the Applicant has not secured a legally effective easement or real covenant that benefits the property authorizing the Facility to increase the ambient statistical noise levels by more than 10 dBA at the appropriate measurement point.

As stated in Section X.1, after the precise turbine types and turbine layouts have been selected, and before construction of the Facility, the Applicant will submit for the ODOE's administrative review, pursuant to a EFSC-approved methodology, the IEC 61400-11 (2002) or other appropriate acoustical test reports for the selected turbines, along with an acoustical analysis of the Facility performed with the same methodology as this analysis. At that time, the Applicant will also submit to the ODOE evidence that it has secured the noise easements necessary for sensitive receptors at which the standard will otherwise be exceeded, so that Facility noise levels will not exceed allowed levels under the applicable OAR standards.

X.6 Proposed Mitigation Measures

OAR 345-021-0010(1)(x)(C) *Any measures the applicant proposes to reduce noise levels or noise impacts or to address public complaints about noise from the facility.*

RESPONSE

The Applicant proposes to secure noise easements or waivers necessary to ensure that Oregon noise standards are met at all noise-sensitive receptors. In addition, the Applicant proposes the conditions discussed in Section X.8.

X.7 Proposed Monitoring Measures

OAR 345-021-0010(1)(x)(D) *Any measures the applicant proposes to monitor noise generated by operation of the facility.*

RESPONSE

The Applicant will monitor as necessary to comply with OAR 340-035-0035.

X.8 Proposed Site Certificate Conditions

Similar to the conditions proposed by previously-approved wind energy facilities in the vicinity of the Facility, the Applicant proposes the following conditions:

Condition 98
To reduce construction noise impacts at nearby residences, the certificate holder shall:

(a) Confine the noisiest operation of heavy construction equipment to the daylight hours;

(b) Require contractors to install and maintain exhaust mufflers on all combustion engine powered equipment; and

(c) Establish a complaint response system at the Construction Manager's office to address noise complaints.

Condition 99
Before beginning construction, the certificate holder shall provide to the Department:

(a) Information that identifies the final design locations of all turbines to be built at the Facility.

(b) The maximum sound power level for the substation transformers and the maximum sound power level and octave band data for the turbines selected for the Facility based on manufacturers' warranties or confirmed by other means acceptable to the Department.

(c) The results of the noise analysis of the Facility to be built according to the final design performed in a manner consistent with the requirements of OAR 340-035-0035(1)(b)(B)(iii) (IV) and (VI) demonstrating to the satisfaction of the Department that the total noise generated by the Facility (including the noise from turbines and substation transformers) would meet the ambient degradation test and maximum allowable test at the appropriate measurement point for all potentially-affected noise sensitive properties.

(d) For each noise-sensitive property where the certificate holder relies on a noise waiver to demonstrate compliance in accordance with OAR 340-035-0035(1)(b)(B)(iii)(III), a copy of the legally effective easement or real covenant pursuant to which the owner of the property authorizes the certificate holder's operation of the Facility to increase ambient statistical noise levels L10 and L50 by more than 10 dBA at the appropriate measurement point. The legally-effective easement or real covenant must: include a legal description of the burdened property (the noise sensitive property); be recorded in the real property records of the County; expressly benefit the certificate holder; expressly run with the land and bind all future owners, lessees, or holders of any interest in the burdened property; and not be subject to revocation without the certificate holder's written approval.

Condition 100

During operation of the Facility, the certificate holder shall maintain a complaint response system to address noise complaints. The certificate holder shall promptly notify the Department of any complaints received regarding Facility noise and actions taken by the certificate holder to address those complaints. In response to a complaint from the owner of a noise sensitive property regarding noise levels during operation of the Facility, the Council may require the certificate holder to monitor and record the statistical noise levels to verify that the certificate holder is operating the Facility in compliance with the noise control regulations.

X.9 Conclusion

This noise analysis concludes that applicable DEQ noise regulations will be met for the construction and operation of the Facility. The Applicant has provided information about the predicted noise levels during the Facility's construction and operation in accordance with OAR 345-021-0010(1)(x)(A), and included an analysis of the Facility's compliance with applicable DEQ noise regulations per OAR 345-021-0010(1)(x)(B). In addition, pursuant to OAR 345-021-0010(1)(x)(C) and (D), the Applicant has provided information demonstrating that it has or will secure noise waivers where necessary and will implement the proposed conditions to address noise, including addressing any complaints from the public. Accordingly, the Applicant has provided sufficient evidence to support the EFSC's finding that the Facility complies with applicable DEQ noise control standards in OAR 340-035-0035.

X.10 References

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Figures

ATTACHMENT

Attachment X1: **Source Contributions at Each Modeled Receptor** ***(Confidential and Not for Public Distribution)***