Request No. 64:

Refer to the Application, SAR, Attachment G, Noise Assessment Report. Provide a map that displays and labels each noise receptor listed in the report.

Original Response:

Maps showing the location of each receptor, and their corresponding labels, are provided in Figures 5 through Figures 8 in Appendix C of the Noise Assessment Report, SAR Attachment D.

Supplemental Response:

Please see the attached Noise Assessment Report, SAR Attachment D. This report is the same as that provided at the time of filing the Application, except for two corrections to Figure 7 and Figure 8 in Appendix C. Figure 8 was inadvertently provided as a duplicate of Figure 5 and the Figure showing the Southeast Quadrant was mislabeled, but this has been corrected so that all four quadrants of the Project area are represented in the receptor maps in Appendix C. The other data in the report remains unchanged.

Responding Witness: Eddie Duncan

Noise Assessment Report

7/24/2025

Exie Solar

Geronimo Power

Paxwood Acoustics

Contents

Tables

Figures

Version Notice (10/24/25): *This report is the same as the original published on 7/24/25, except for two corrections to Figure 7 and Figure 8 in Appendix C. In the original version Figure 8 was a duplicate of Figure 5, but this has been corrected in this version so that all four quadrants are of the Project area are represented in the receptor maps in Appendix C.*

1.0 Introduction

Geronimo Power ("Applicant") is planning to develop a 110 MW (AC) solar project in Green County, Kentucky ("Project"), west of Exie. Paxwood Acoustics was retained by the Applicant to conduct a noise assessment of the Project.

Based on the information provided in this report, the Project is expected to produce sound levels that are below the commonly-used community noise guidelines which are discussed in Section 3.2.

This report includes:

- A description of the Project,
- A discussion of noise standards and guidelines,
- Sound propagation modeling procedure and results, and
- Conclusions

In addition, an introduction to acoustics is provided in Appendix A, model input data is in Appendix B, tabular model results are reported in Appendix C and information about Paxwood Acoustics is provided in Appendix D.

2.0 Project Description

The proposed Project is a 110 MW (AC) photovoltaic solar project that would be located in Green County, Kentucky, west of Exie, in the Liletown area. The Project would stretch from approximately Kentucky Route 218 in the north to Maple Hill Church Road in the south. Both Liletown Road and Edmonton Road (US Route 68) transect the Project area.

The primary equipment that has the potential to produce sound includes 25 centralized inverters located on skids throughout the solar arrays, medium voltage transformers that are co-located on each inverter skid, and two high voltage transformers at the Project substation. The substation is planned to be located centrally to the Project on Liletown Road.

The Project is unlikely to use the inverters at night for VAR[1] support, so the only source of sound at night would be the transformers which remain energized. Additional information on the inverters and transformers is provided in Section 4.2.

The Project area is composed primarily of agricultural land use with some forested areas. There are rural residences in the area of the Project. A map of the proposed Project showing the solar arrays, inverters, substation, modeled receptors, and the surrounding area is provided in Figure 1.

[1] Volt-ampere reactive. Inverters can be used for VAR support which helps to manage reactive power on the grid.

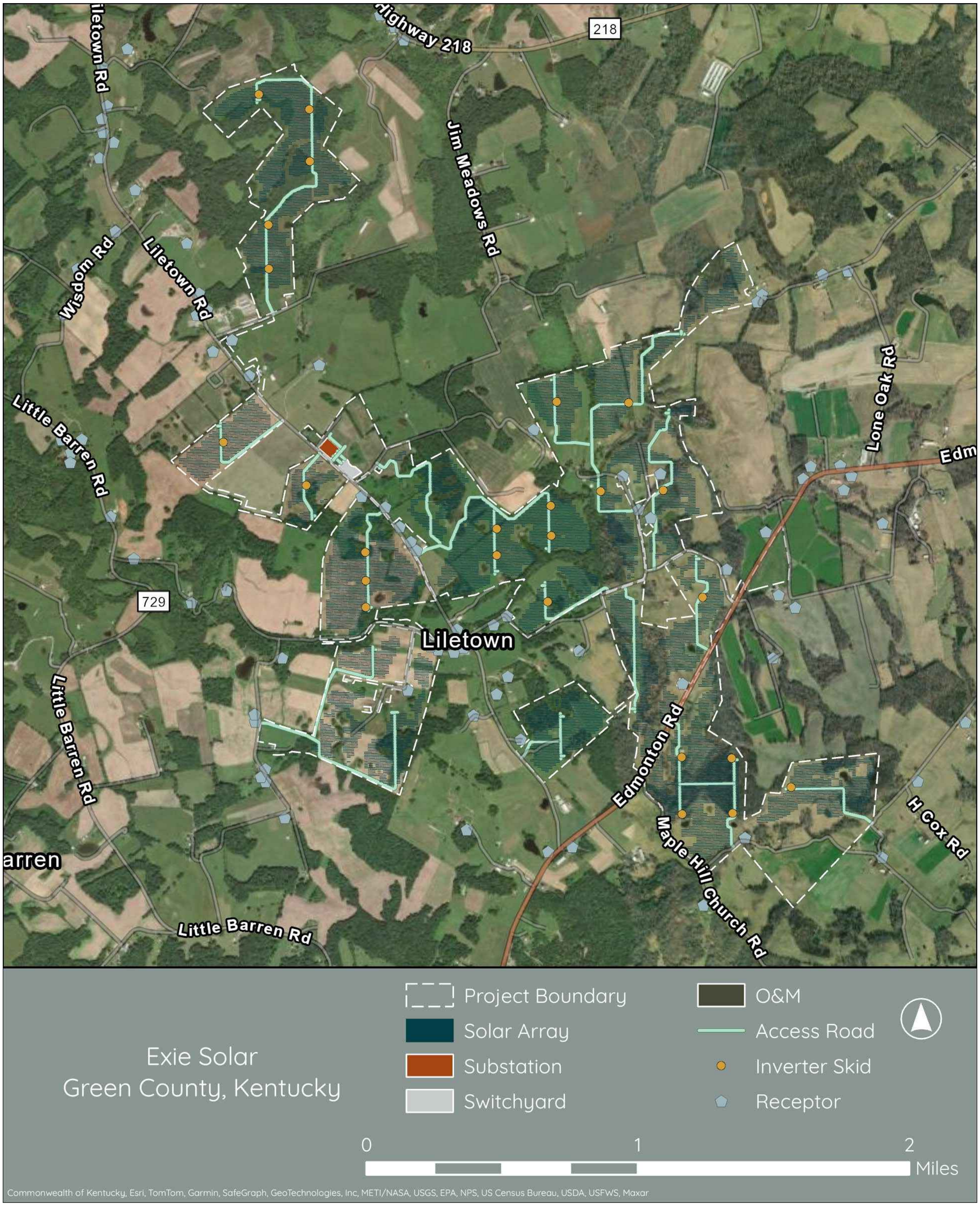

Figure 1: Map of the Project and Surrounding Area

3.0 Noise Standards

3.1 Local Standards & State Regulations

There are no local or state sound level limits that apply to the Project.

3.2 Community Noise Guidelines

EPA Guidelines

In 1974, the EPA's Office of Noise Abatement and Control published the guidance document, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." The guidance identifies a day-night level (L_{dn}) of 55 dBA as being protective of public health and welfare with a margin of safety for outdoor residential areas and other outdoor areas where people spend time and for which quiet is a basis for use. The L_{DN} is the average sound level over the course of 24 hours with a 10 dB penalty applied to nighttime (10 PM to 7 AM) sound levels. An L_{dn} of 55 dBA equates approximately to a continuous equivalent level (L_{eq}) of 48 to 49 dBA. The day-night level and other acoustical metrics are discussed further in Appendix A.

World Health Organization Guidelines

The World Health Organization ("WHO") has published community noise guidelines[2] that provide guideline sound levels for specific environments to protect against specified effects. The guidelines are based on scientific knowledge of health impacts due to community noise. The most relevant guidelines from the WHO document for these Projects are:

- 55 dBA $L_{eq(16\text{-}hr)}$ to protect against serious annoyance during the day and evening in an outdoor living environment.
- 50 dBA $L_{eq(16\text{-}hr)}$ to protect against moderate annoyance during the day and evening in an outdoor living environment.
- 45 dBA $L_{eq(8\text{-}hr)}$ and 60 dBA L_{fmax} to protect against sleep disturbance outside a bedroom window.
- 70 dBA $L_{eq(24\text{-}hr)}$ and 110 L_{fmax} outdoors or indoors to protect against hearing impairment.

This noise assessment provides a comparison of the projected sound levels from the Project with these community noise guidelines.

[2] WHO, "Guidelines for Community Noise", 1999.

4.0 Sound Propagation Modeling

4.1 Modeling Procedure & Settings

Sound propagation modeling was completed using the modeling software CadnaA made by DataKustik GmbH. CadnaA implements the international sound propagation standard, ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation." Both CadnaA and the ISO 9613-2 standard are used by noise control professionals across the United States and are regularly relied upon by local and state jurisdictions. The model takes into account source sound emissions, topography, receptor locations, and several other factors. It calculates sound levels for meteorological conditions that are favorable for sound propagation, assuming that all receptors are downwind of the sound sources.

For this assessment, USGS terrain data was used for the Project to create the three-dimensional topography throughout the surrounding area. Other site features, including the proposed locations of equipment, the receptor locations, and Project boundaries, were provided by the Applicant. Model settings and input data are provided in Appendix B.

4.2 Modeled Sound Sources

Inverter Skids

The model included sound emissions from 25 centralized inverter skids each of which included six individual inverters (TMEIC Ninja 840 kW) and a medium voltage transformer ("MVT") (3780 kVA ONAN5/5040 kVA ONAF6, 150 kV BIL). The rated sound pressure level of each MVT based on the size and the NEMA TR1 standard[3] is 67 dBA ONAF[4] and 64 dBA ONAN[5]. Sound emissions from the inverters were based on a test report provided by the manufacturer which indicates an average sound level of 79 dBA at 3 feet. Modeled sound power levels for the inverters on each skid and the MVTs are provided in Appendix B.

Substation Transformers

Two high voltage transformers ("HVT") (72/96/120 MVA, 750 kV BIL) were modeled at the Project substation. The specified sound pressure level of each HVT is 72 dBA ONAF and 69 dBA ONAN. Modeled sound power levels for the HVTs are provided in Appendix B.

---

[3] NEMA TR 1-2013 (R2019), Transformers, Regulators, and Reactors.

[4] ONAF: Oil Natural Air Forced

[5] ONAN: Oil Natural Air Natural

4.3 Model Results of Project Operations

Sound levels were calculated throughout the area at a grid of receptors that were spaced every 50 feet (15 meters). Each receptor was placed 5 feet (1.5 meters) above ground level representing the approximate ear height of a listener. Based on the grid of receptors, sound level iso-lines are generated throughout the area so that the projected sound levels can be shown all along the Project property line and the surrounding area. In addition, sound levels were calculated at 90 discrete receptors throughout and around the Project area at a height of 5 feet (1.5 meters) above ground level, representing area residences.

The inverters and transformers may produce sound during the day, but only the transformers would produce sound at night as they remain energized. As such, two model scenarios are included in this assessment:

- Daytime Scenario: Includes all inverters and the transformers (ONAF mode) operating simultaneously.
- Nighttime Scenario: Only includes the transformers (ONAN mode).

The model results for the daytime scenario are presented in Figure 2, and the results for the nighttime scenario are presented in Figure 3. Sound levels are represented by sound level isolines in 1 dB intervals with grey dashed lines while the 5 dB intervals are represented by solid color lines. The highest projected sound level at a residence and at the Project property line is called out on each map for ease of reading. Projected sound levels at each receptor are provided in tabular format in Appendix C.

As shown in Figure 2 and Figure 3, the highest projected sound level at a non-participating residential receptor is 37 dBA during the day and 26 dBA at night. The highest projected sound levels at the Project boundary occur near the substation, where the highest projected sound level is 48 dBA during the day and 44 dBA at night. These projected sound levels are less than the community noise guidelines discussed in Section 3.2.

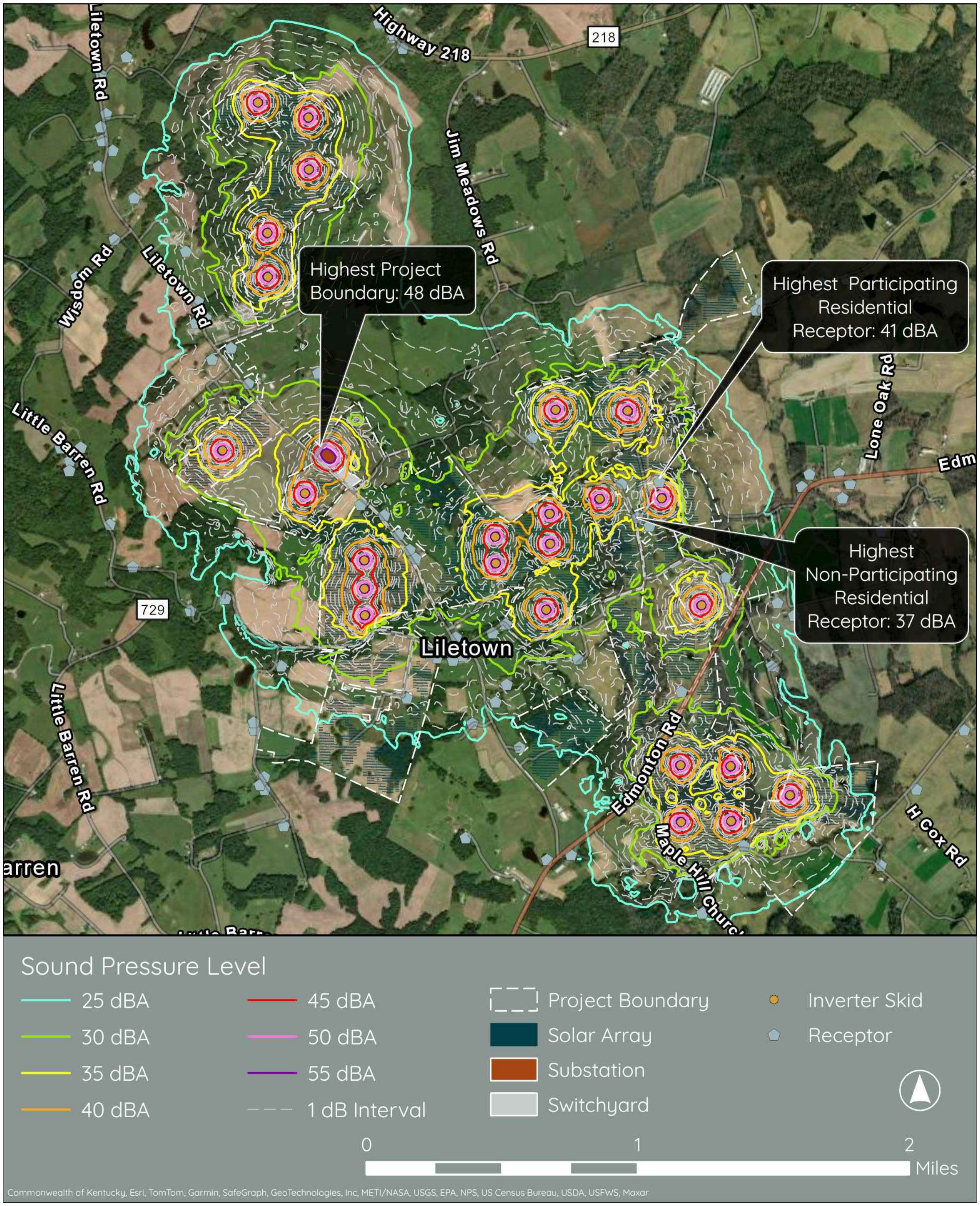

Figure 2: Map of Modeled Sound Pressure Levels, Daytime

f Modeled Sound Pressure Levels, Nighttime

4.4 Sound Levels from Construction Activities

Construction Activities & Scheduling

Construction of a solar power project involves several different phases or activities that do not occur all at once but may have some degree of over overlap in terms of their scheduling. The primary categories of activities include:

- Groundwork or site preparation which includes clearing, grading, and access construction;
- Array preparation which typically includes pile driving or drilling to prepare the base supports for the arrays;
- Racking and solar panel installation;
- Electrical work including trenching or horizontal drilling (HDD) for cables;
- Substation construction; and
- Equipment Installation including inverters and transformers.

While construction of the entire Project is expected to last approximately 12 to 18 months, all of these activities are intermittent, and for a given area occur over a relatively short period of time.

Construction Equipment & Sound Levels

While some construction activities produce little noise such as assembly and wiring, some involve the use of heavy machinery. Sound levels from some of the louder machinery that may be used during construction are provided in Table 1. Sound levels from construction will vary by location and distance to the equipment, but those provided in Table 1 are representative of some of the closest sensitive receptor distances. Receptors at further distances would result in lower sound levels than those shown in Table 1.

The primary source of the reference sound pressure levels that was used to generate the projected levels in Table 1 is the source emission data from NCHRP 25-49[6] which was used in the development of the Federal Highway Administration's (FHWA) Roadway Construction Noise Model 2.0 (RCNM 2.0). Sound levels from the construction equipment were calculated using ISO 9613-2, the same standard used for calculating the operational sound levels, with hard ground (G=0), flat terrain, and no attenuation due to forests, all conservative assumptions.

[6] National Cooperative Highway Research Program 25-49, Development of a Highway Construction Noise Prediction Model, 2018.

Lastly, both the maximum (L_{max}) and equivalent continuous sound level (L_{eq}) are reported in Table 1 for most equipment. One or more sound level parameters may be well suited to describe the amplitude of the sound experienced by a listener depending on the nature of the equipment. For example, the bucket on an excavator may hit a rock which can cause a louder short-term sound, while at other times, the primary sound from the excavator is the engine which is relatively consistent during the operation. The area in which a source operates also helps determine the best parameter to use. For example, a grader is best described by the maximum sound level because it only briefly passes by a listener location. It is for these reasons that both the L_{max} and L_{eq} values are provided for some equipment, but only L_{max} is provided for other equipment. For equipment where only the L_{max} is provided, the L_{eq} is listed as not applicable ("NA").

Table 1: Projected Sound Levels (dBA) from Construction Equipment

Equipment	Reference Point (50 ft)		Closest Panel to Non-Participating Residence (220 ft)		Closest Inverter to Non-Participating Residence (510 ft)	
	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}
Rock Drill	95	91	81	78	74	71
Solar Post Pile Driver	92	86	79	73	72	66
Forklift	88	NA	75	NA	69	NA
HDD	88	74	75	61	68	54
Concrete Pump Truck	88	83	75	70	68	64
Excavator	87	76	74	63	67	56
Dozer	86	80	73	67	66	60
Roller	82	NA	69	NA	63	NA
Concrete Mixer Truck	82	81	69	68	63	61
Grader	78	NA	65	NA	59	NA
Crane	76	74	63	61	56	54
Plate Compactor	75	NA	62	NA	56	NA
Flat Bed Truck Passby	74	NA	61	NA	55	NA
Man Lift	73	72	60	59	54	63
Dump Truck Passby	73	NA	60	NA	53.5	NA
Generator	68	67	55	54	49	48

5.0 Conclusions

Paxwood Acoustics conducted a noise assessment of the proposed Exie Solar Project located in Green County, Kentucky. The Project will have a total capacity of 110 MW (AC). This noise assessment included identification of the primary and secondary Project equipment that can create sound, a discussion of noise standards and community noise guidelines, sound propagation modeling to project operational sound levels throughout the surrounding area, and information on construction noise.

As discussed in Section 4.3, the highest projected sound level at a non-participating residential receptor is 37 dBA during the day and 26 dBA at night. The highest projected sound level at the Project boundary is 48 dBA during the day and 44 dBA at night. These sound levels are below the community noise guidelines discussed in Section 3.2.

As discussed in Section 4.4, sound levels from construction activities will vary depending on the phase of construction, equipment being used, and the distances between the construction activities and the receptors. However, construction in any given area will occur over a relatively brief period limiting potential impacts.

Appendix A: Introduction to Acoustics

Sound, Sources, and Perception

Sound in air is caused by fluctuations in air pressure which can be due to a variety of sources. The sources of sound can generally be grouped into three major categories: anthropogenic, biogenic, and geophonic. Anthropogenic sounds are human caused sounds such as voices, instruments, vehicles, and mechanical and electrical equipment. Biogenic sounds are those that are caused by organisms such as animal calls or animal interaction with the environment. And lastly geophonic sounds are those caused by the environment itself such as waves hitting a shoreline or wind interacting with plants or other objects.

There are three primary characteristics of sound that affect human perception: frequency which may also be referred to as pitch or tone, amplitude which relates to perceived loudness or volume, and temporal fluctuations, which is to say that sound can change with time.

Frequency

Humans can hear sound over a range of frequencies typically from 20 Hz to 20,000 Hz. While not strictly defined, this range can be divided into three subranges which are described as low frequency (20 Hz to around 250 Hz), mid frequency (around 250 Hz to around 4,000 Hz), and high frequency (around 4,000 Hz to 20,000 Hz). The mid frequency range is where most human speech occurs. More defined ranges of frequency are divided into octave bands (31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, and 16 kHz), or even further into 1/3 octave bands which are three smaller bands within each octave band. Sound below 20 Hz is referred to infrasound and is not typically audible to the human ear. Sound above 20,000 Hz is referred to as ultrasound and is also not audible to the human ear.

Most sounds are broadband in nature and contain energy at a range of frequencies. If however, a sound contains notably more energy at a specific frequency compared to the adjacent frequencies, then the sound can be perceived as a tone, such as a note in music.

Amplitude

Humans can hear sound over a wide range of pressures, from approximately 20 micropascals to over 20 million micropascals. Sound can occur outside of this range, but below 20 micropascals is typically inaudible to humans and above 20 million micropascal can cause pain. In acoustics, this wide range of audible sound pressures is compressed using a logarithmic scale to create a range of sound pressure levels from 0 dB (20 micropascals) to 120 dB (20 million micropascals). It is in this logarithmic scale, denoted as decibel or dB, that acousticians and environmental regulations quantify the amplitude of sound.

Temporal Changes

Both frequency and amplitude can change with time. A sound may be constant in both frequency and level, but this is fairly uncommon. If one considers the fluctuation in sounds from people having conversations, birds chirping, or vehicles passing by, it becomes apparent how much sound can change from one instance to the next. It is for this reason that acousticians use a variety of metrics to define and describe sound. These metrics are discussed further below.

Weighting Networks, Sound Pressure Level, and Metrics

Weighting Networks

Humans are most sensitive to sound between 500 Hz and 5 kHz. Our sensitivity with sound decreases below 500 Hz and above 5 kHz. In order to account for this varying sensitivity, the A-weighting network or filter was developed to mimic the sensitivity of the human ear and how we perceive loudness. A-weighting discounts sound in varying degrees by frequency below 500 Hz and above 5,000 Hz. Between 1,000 Hz and 4,000 Hz, the A-weighting network amplifies sound slightly to account for the increased sensitivity of the human ear in that range. Since the A-weighting network accounts for human sensitivity at difference frequencies, it is widely used in environmental acoustics and most environmental regulations. When a sound level is A-weighted, an “A” is typically added to the end of the abbreviation for decibel: dBA.

There are other weighting networks with different purposes, such as C, G, or Z, but A-weighting is most used in environmental acoustics. If a sound is not weighted or sometimes referred to as unweighted, it is considered Z-weighted or dBZ.

Sound Pressure Level

As was discussed previously, in acoustics, the amplitude of sound is often referred to in terms of sound pressure level. Representative sound pressure levels of some common sound sources and environments are shown in Figure 4. The sound levels presented in Figure 4 are meant to be illustrative, so any specific source or environment may be similar to or fall outside of the ranges shown in the graphic.

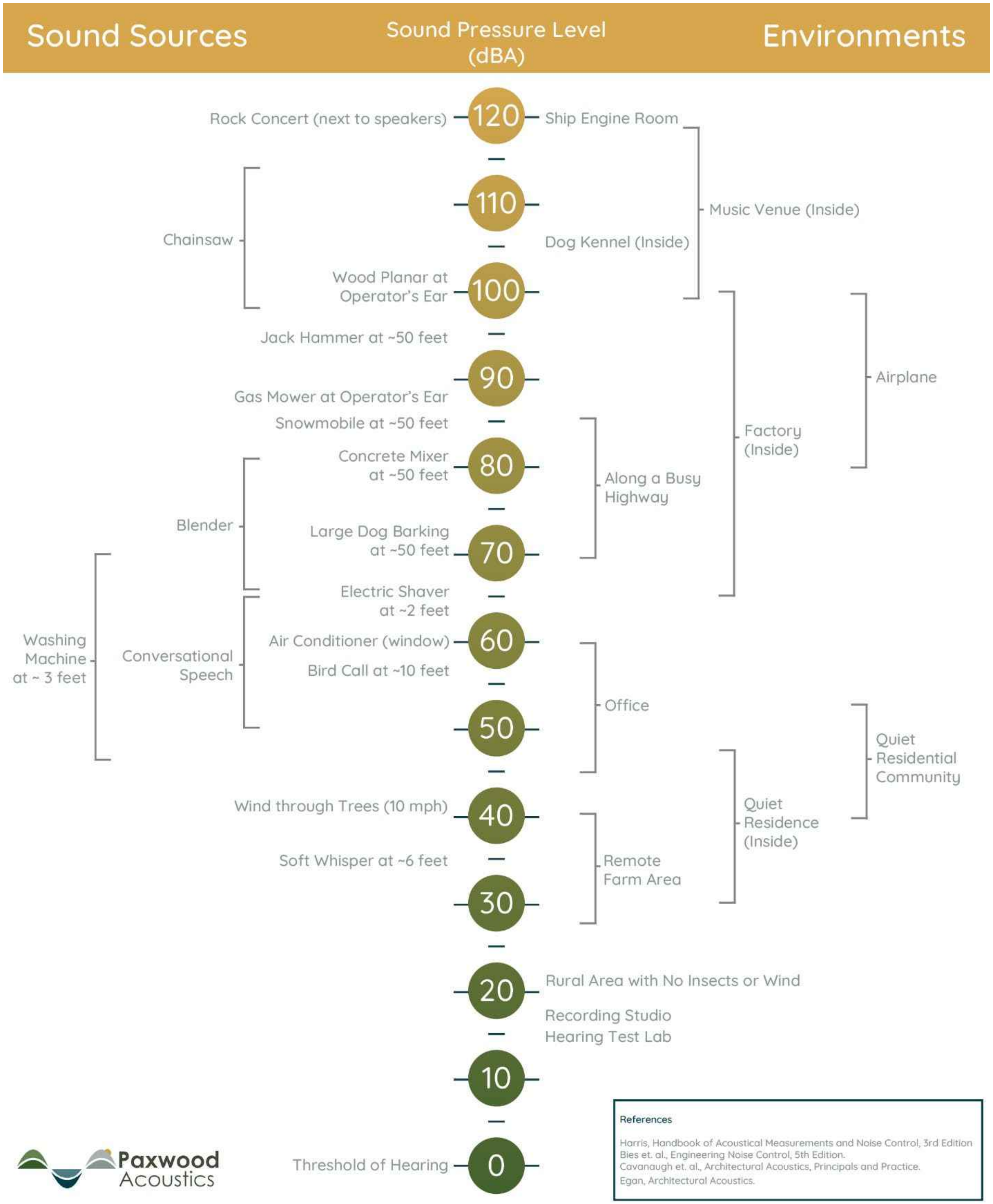

Figure 4: Representative Sound Pressure Levels (dBA) of Common Sound Sources & Environments

Since sound is a logarithmic function, one cannot use regular arithmetic operations to add and subtract sound levels. So, for example, conversational speech typically occurs at a level between 55 dBA and 65 dBA. If one person is speaking at a level of 60 dBA and another person is also speaking at a level of 60 dBA, the total sound level is not 120 dBA. (And a good thing too, otherwise, two people talking at the same time would quickly approach the threshold of pain, 120 dBA.) Instead, two voices at the same level only causes an increase of 3 dB, so 60 dBA plus 60 dBA equals 63 dBA.

In terms of perception of sound level there are two helpful rules of thumb to be aware of: 1) A change in sound level of 10 dB is perceived as a halving or doubling of loudness, depending on if the amplitude of the sound decreased or increased, and 2) Changes in sound level of less than 3 dB are generally considered not perceptible.

Sound Level Metrics

With sound levels in an environment continuously changing, different sound level metrics are used to describe the sound level versus time. Some common sound level metrics are briefly described below:

- Equivalent Continuous Sound Level (L_{eq}): The L_{eq} is the level of the average sound pressure over a specified period of time. It takes into account quieter, long-term sound levels along with louder, short-duration sound levels to provide an overall sound level for a given time period. The louder sound levels, even with a short-duration, can have a strong influence on the L_{eq}. The L_{eq} is often used in environmental acoustics to convey an average representation of the acoustical environment, even though it is influenced more strongly by higher sound levels that occur over the specified interval. An L_{eq} may be as short as 1-second or up to an hour or more depending on the purpose of the quantification.
- Statistical Sound Levels (L_n): Statistical sound levels or percentile sound levels describe the level that is exceeded for a specified percentage of time. The L_{10}, for example, is the level that is exceeded 10% of the time. The L_{50}, is the median sound level: half the time the sound level is above the L_{50} and half the time the sound level is below the L_{50}. And the L_{90} is the sound level that is exceeded 90% of the time.
- Maximum Sound Level (L_{max}): The phrase "maximum sound level" may be used to describe the maximum L_{eq} or L_n over a given time period, but it can also be used to describe the sound level over a very short-duration typically using either a 1-second time constant which is referred to as slow-response, or a 125-millisecond time constant which is referred to as a fast-response. If the L_{max} metric is being used, it is good practice to note which time constant is being applied by adding the notation S or F to the abbreviation: L_{Smax} or L_{Fmax}. The most appropriate time constant to use depends on the specific context of the quantification.

- Day-Night Level (L_{dn}): The L_{dn} is similar to the L_{eq} except that it is specifically applied over an entire day or 24 hour period with a 10 dB penalty applied to sound levels between 10 PM and 7 AM to account for greater sensitivity at night.

Appendix B: Model Settings & Input

Table 2: Sound Propagation Model Settings

Model Parameter	**Setting**
Ground Attenuation	ISO 9613-2 spectral ground attenuation with a ground factor of 0 at the inverter skids and pond areas, 0.5 in gravel areas, and 1.0 elsewhere.
Topography	USGS terrain.
Foliage Attenuation	No attenuation due to forest was taken into account in the model.
Atmospheric Attenuation	Based on 70% relative humidity and 10° C.
Search Radius	3.1 miles (5,000 meters).
Receptor Grid	50 feet by 50 feet (15 meters by 15 meters) over the entire Project parcel at a height of 5 feet (1.5 meters).

Table 3: Modeled Point Source

Source	**Sound Power Level (dBA)**		**Relative Height (m)**	**Coordinates (NAD83 Z18N)**		**Elevation (m)**
	Day	**Night**		**X (m)**	**Y (m)**	
High Voltage Transformer	95	90	3.1	624979	4112949	239
High Voltage Transformer	95	90	3.1	625003	4112927	239
Inverter TMEIC Ninja 840 kW x 6	96		1.5	624574	4115035	250
Inverter TMEIC Ninja 840 kW x 6	96		1.5	624872	4114946	257
Inverter TMEIC Ninja 840 kW x 6	96		1.5	624876	4114638	257
Inverter TMEIC Ninja 840 kW x 6	96		1.5	624629	4114262	243
Inverter TMEIC Ninja 840 kW x 6	96		1.5	624632	4114001	234
Inverter TMEIC Ninja 840 kW x 6	96		1.5	624362	4112971	233
Inverter TMEIC Ninja 840 kW x 6	96		1.5	626767	4113208	226
Inverter TMEIC Ninja 840 kW x 6	96		1.5	626340	4113212	236
Inverter TMEIC Ninja 840 kW x 6	96		1.5	626969	4112688	242
Inverter TMEIC Ninja 840 kW x 6	96		1.5	626601	4112684	230

Source	Sound Power Level (dBA) Day	Sound Power Level (dBA) Night	Relative Height (m)	Coordinates (NAD83 Z18N) X (m)	Coordinates (NAD83 Z18N) Y (m)	Elevation (m)
Inverter TMEIC Ninja 840 kW x 6	96		1.5	627204	4112053	238
Inverter TMEIC Ninja 840 kW x 6	96		1.5	626285	4112027	223
Inverter TMEIC Ninja 840 kW x 6	96		1.5	626307	4112419	228
Inverter TMEIC Ninja 840 kW x 6	96		1.5	626305	4112596	241
Inverter TMEIC Ninja 840 kW x 6	96		1.5	625982	4112461	237
Inverter TMEIC Ninja 840 kW x 6	96		1.5	625984	4112303	236
Inverter TMEIC Ninja 840 kW x 6	96		1.5	624854	4112717	238
Inverter TMEIC Ninja 840 kW x 6	96		1.5	625204	4112320	232
Inverter TMEIC Ninja 840 kW x 6	96		1.5	625206	4112152	229
Inverter TMEIC Ninja 840 kW x 6	96		1.5	625208	4111994	234
Inverter TMEIC Ninja 840 kW x 6	96		1.5	627080	4111105	264
Inverter TMEIC Ninja 840 kW x 6	96		1.5	627376	4111099	254
Inverter TMEIC Ninja 840 kW x 6	96		1.5	627084	4110769	264
Inverter TMEIC Ninja 840 kW x 6	96		1.5	627381	4110773	260
Inverter TMEIC Ninja 840 kW x 6	96		1.5	627730	4110927	262
Inverter Transformer	82	77	1.5	624574	4115035	250
Inverter Transformer	82	77	1.5	624872	4114946	257
Inverter Transformer	82	77	1.5	624876	4114638	257
Inverter Transformer	82	77	1.5	624629	4114262	243
Inverter Transformer	82	77	1.5	624632	4114001	234
Inverter Transformer	82	77	1.5	624362	4112971	233
Inverter Transformer	82	77	1.5	626767	4113208	226

Source	Sound Power Level (dBA) Day	Sound Power Level (dBA) Night	Relative Height (m)	Coordinates (NAD83 Z18N) X (m)	Coordinates (NAD83 Z18N) Y (m)	Elevation (m)
Inverter Transformer	82	77	1.5	626340	4113212	236
Inverter Transformer	82	77	1.5	626969	4112688	242
Inverter Transformer	82	77	1.5	626601	4112684	230
Inverter Transformer	82	77	1.5	627204	4112053	238
Inverter Transformer	82	77	1.5	626285	4112027	223
Inverter Transformer	82	77	1.5	626307	4112419	228
Inverter Transformer	82	77	1.5	626305	4112596	241
Inverter Transformer	82	77	1.5	625982	4112461	237
Inverter Transformer	82	77	1.5	625984	4112303	236
Inverter Transformer	82	77	1.5	624854	4112717	238
Inverter Transformer	82	77	1.5	625204	4112320	232
Inverter Transformer	82	77	1.5	625206	4112152	229
Inverter Transformer	82	77	1.5	625208	4111994	234
Inverter Transformer	82	77	1.5	627080	4111105	264
Inverter Transformer	82	77	1.5	627376	4111099	254
Inverter Transformer	82	77	1.5	627084	4110769	264
Inverter Transformer	82	77	1.5	627381	4110773	260
Inverter Transformer	82	77	1.5	627730	4110927	262

Table 4: Modeled Sound Power Level (dBZ) by Octave Band Frequency[7]

Source	Full Octave Band Center Frequency (Hz)									Overall Sound Power Level	
	31.5	63	125	250	500	1000	2000	4000	8000	dBA	dBZ
Medium Voltage Transformer (ONAF)	71	65	81	82	83	72	63	56	51	82	87
Medium Voltage Transformer (ONAN)	53	52	75	77	79	64	54	42	36	77	82
High Voltage Transformer (ONAF)	84	78	94	95	96	85	76	69	64	95	100
High Voltage Transformer (ONAN)	66	65	88	90	92	77	67	55	49	90	95
TMEIC Ninja Inverter 840 kW x 6	94	86	86	96	96	91	85	79	73	96	101

[7] Spectral levels for the transformers were derived from the *Handbook of Acoustical Measurements and Noise Control, Third Edition*, Cyril M. Harris (ed.), 1998.

Appendix C: Tabular Model Results & Receptor Maps

Table 5: Tabular Model Results for Each Discrete Receptor[8]

Receptor ID	Participation Status	Projected Sound Pressure Level (dBA)		Coordinates (UTM NAD83 Z16N)		Elevation (m)
		Daytime	Nighttime	X (m)	Y (m)	
1	Non-Participating	20	9	623419	4113736	233
2	Participating	29	14	625748	4111867	220
3	Non-Participating	24	9	626125	4111215	244
4	Non-Participating	28	12	624146	4114156	239
5	Non-Participating	20	8	624611	4111039	243
6	Non-Participating	23	7	625432	4115360	264
7	Non-Participating	14	3	622428	4114018	220
8	Participating	37	15	627456	4110631	264
9	Non-Participating	23	10	624552	4111320	238
10	Non-Participating	29	13	625635	4111745	223
11	Non-Participating	20	5	627557	4113851	251
12	Non-Participating	37	16	626824	4112578	240
13	Non-Participating	29	14	625592	4111767	222
14	Non-Participating	21	6	623794	4115308	254
15	Non-Participating	22	6	627801	4112760	232
16	Non-Participating	30	12	626472	4111739	247
17	Non-Participating	26	8	627579	4112444	231
18	Participating	29	13	625731	4111731	223
19	Non-Participating	22	6	626289	4110548	255
20	Non-Participating	21	5	628021	4112839	238
21	Non-Participating	27	7	627210	4110231	270
22	Non-Participating	27	12	625456	4111507	230
23	Non-Participating	33	21	625409	4112475	241
24	Non-Participating	26	8	627622	4111697	245
25	Non-Participating	23	9	623840	4114472	233
26	Non-Participating	26	10	625846	4111357	240
27	Non-Participating	29	20	624517	4113372	233
28	Non-Participating	21	4	628086	4112778	237
29	Non-Participating	13	2	622298	4114444	231
30	Participating	30	23	624931	4113434	237
31	Non-Participating	23	10	624548	4111363	237

[8] Maps of the receptor locations showing the receptor IDs are provided following the table.

Receptor ID	Participation Status	Projected Sound Pressure Level (dBA)		Coordinates (UTM NAD83 Z16N)		Elevation (m)
		Daytime	Nighttime	X (m)	Y (m)	
32	Non-Participating	21	7	623649	4114812	239
33	Non-Participating	22	12	623832	4112286	229
34	Non-Participating	22	12	623523	4112993	245
35	Non-Participating	17	1	628763	4111316	272
36	Non-Participating	20	8	624613	4110964	245
37	Non-Participating	34	19	625475	4112386	242
38	Non-Participating	17	3	627917	4113971	248
39	Non-Participating	29	13	625788	4111758	223
40	Participating	28	17	624415	4113583	231
41	Non-Participating	27	14	624218	4113859	227
42	Non-Participating	21	4	628042	4112693	231
43	Non-Participating	17	2	628066	4113991	249
44	Non-Participating	33	16	626203	4113050	240
45	Non-Participating	29	11	626049	4111587	242
46	Non-Participating	14	3	622459	4114192	225
47	Non-Participating	27	14	624204	4113731	230
48	Non-Participating	26	8	627655	4112071	240
49	Non-Participating	21	5	627528	4113808	251
50	Non-Participating	21	6	623674	4114972	243
51	Non-Participating	20	8	624586	4110992	244
52	Non-Participating	27	11	625983	4111483	239
53	Non-Participating	22	6	625377	4115439	267
54	Non-Participating	30	10	627086	4111545	248
55	Non-Participating	19	3	628479	4110967	271
56	Non-Participating	15	4	622618	4114093	223
57	Non-Participating	20	9	623455	4113764	233
58	Non-Participating	21	6	623642	4114894	242
59	Non-Participating	22	11	623459	4112916	251
60	Non-Participating	22	12	623694	4112536	231
61	Participating	37	16	626731	4112777	240
62	Participating	41	19	626954	4112789	244
63	Non-Participating	26	15	624381	4112097	217
64	Non-Participating	33	15	626044	4111946	220
65	Non-Participating	23	4	628269	4110515	254
66	Participating	31	12	627347	4112223	238
67	Non-Participating	20	3	628271	4112495	241
68	Non-Participating	34	19	625508	4112335	242
69	Non-Participating	20	10	623403	4112990	241
70	Non-Participating	21	7	623629	4114661	237

Receptor ID	Participation Status	Projected Sound Pressure Level (dBA)		Coordinates (UTM NAD83 Z16N)		Elevation (m)
		Daytime	Nighttime	X (m)	Y (m)	
71	Non-Participating	20	7	624727	4110750	246
72	Non-Participating	32	14	625965	4111893	221
73	Non-Participating	22	6	627845	4112834	233
74	Non-Participating	22	7	623712	4114754	242
75	Non-Participating	21	7	625806	4110678	259
76	Non-Participating	23	9	623723	4114226	231
77	Non-Participating	25	7	627754	4111997	242
78	Non-Participating	35	27	625183	4112654	238
79	Participating	34	24	625323	4112591	242
80	Non-Participating	24	7	626431	4110577	259
81	Non-Participating	27	13	624712	4111697	225
82	Participating	36	15	626896	4112528	241
83	Non-Participating	24	13	624174	4112025	215
84	Non-Participating	20	5	623644	4115203	251
85	Non-Participating	27	15	624265	4113761	229
86	Non-Participating	27	16	624301	4113515	232
87	Non-Participating	22	11	623455	4112855	251
88	Non-Participating	22	6	625292	4115509	263

Figure 5: Receptor Map, Northwest Quadrant

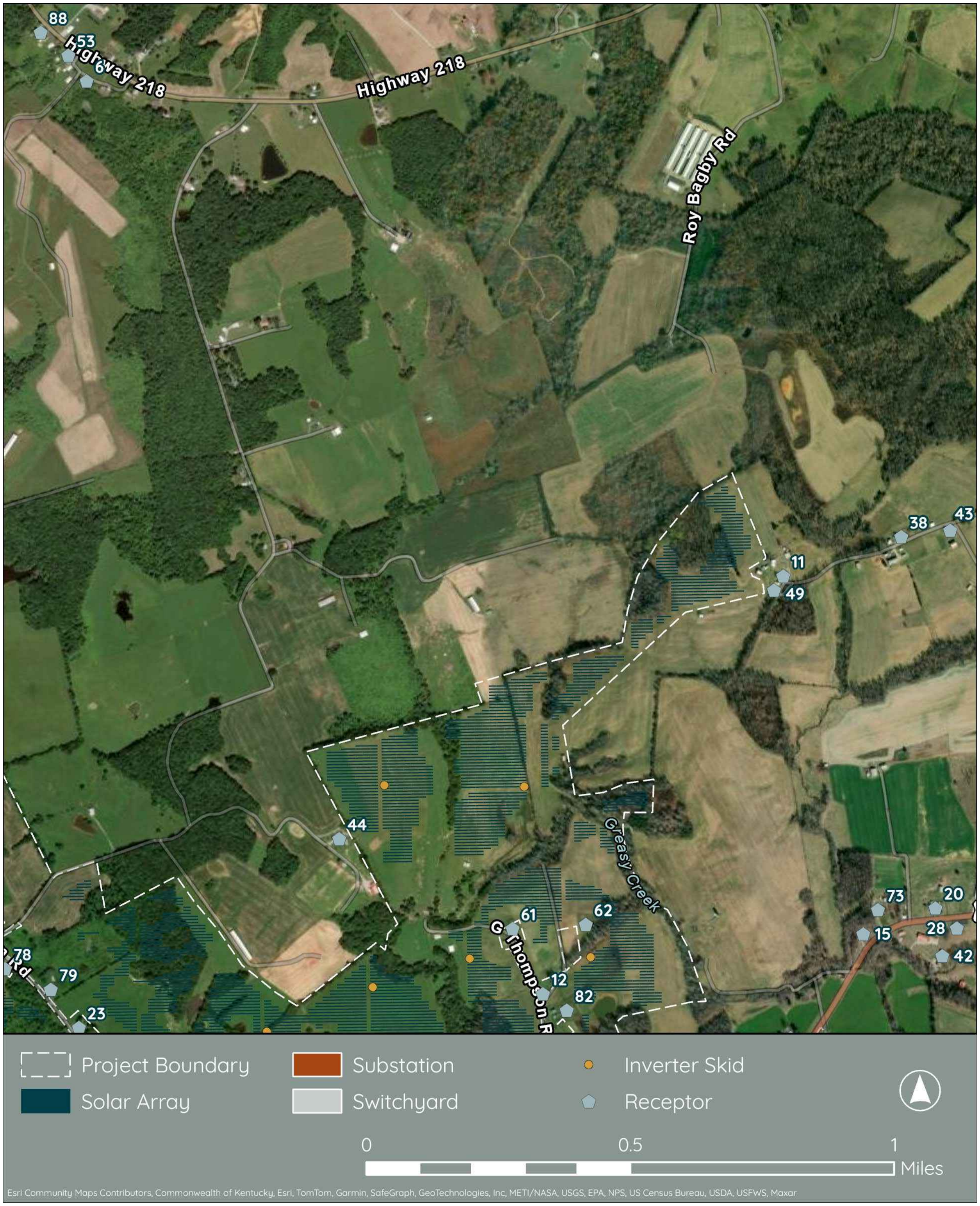

Figure 6: Receptor Map, Northeast Quadrant

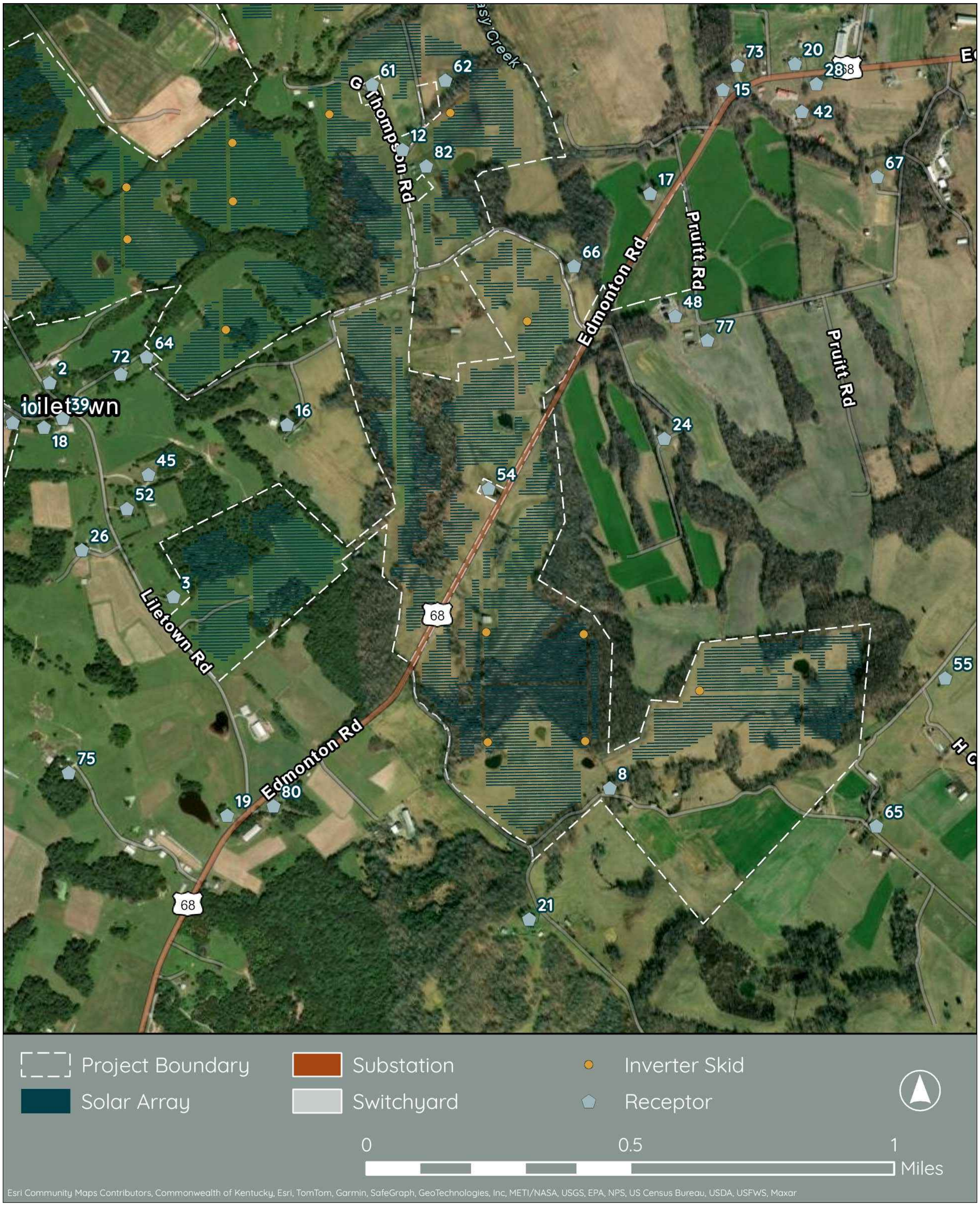

Figure 7: Receptor Map, Southeast Quadrant

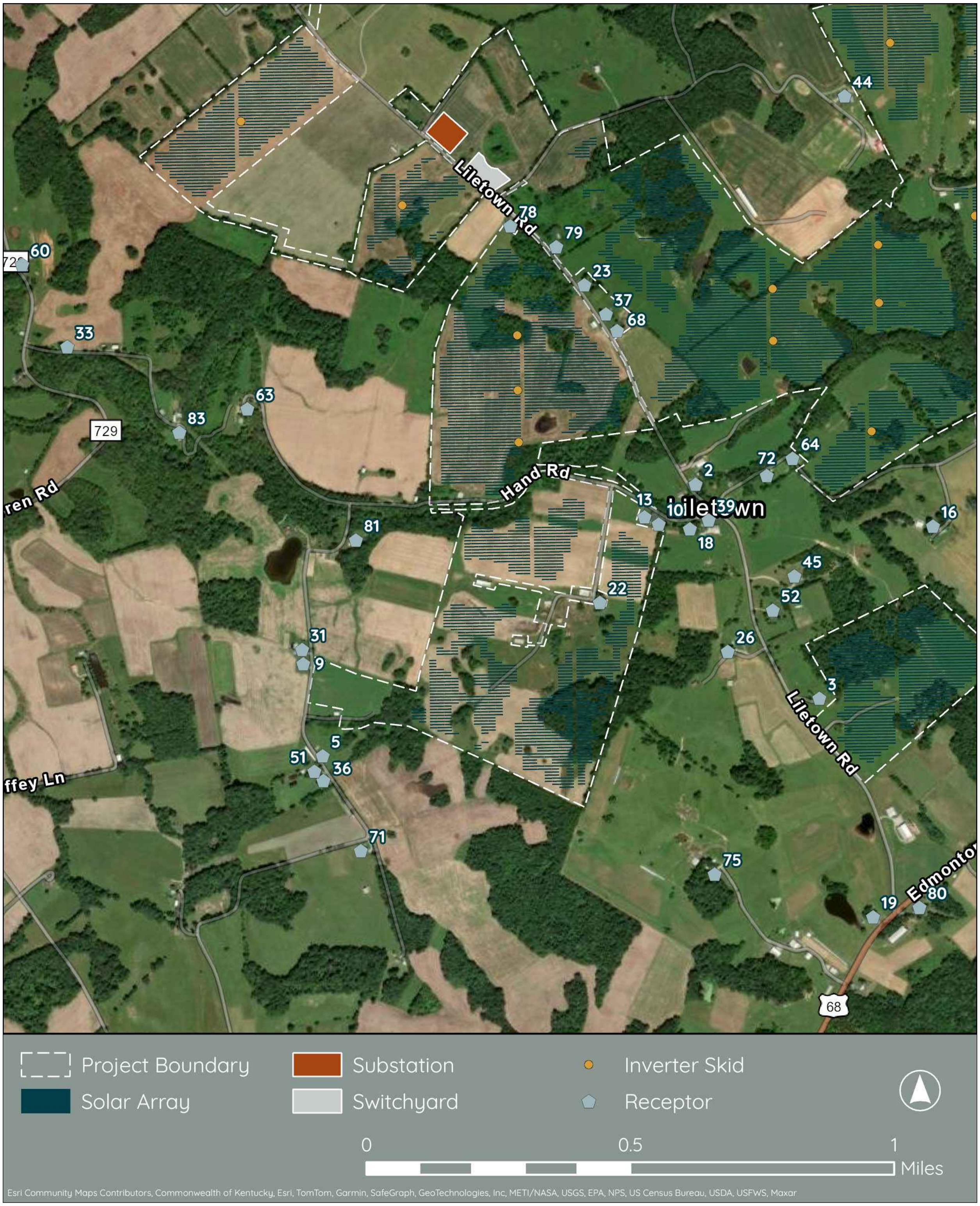

Figure 8: Receptor Map, Southwest Quadrant

Appendix D: Qualifications

Paxwood Acoustics provides professional consulting services in acoustics and noise control engineering with a focus on environmental permitting and compliance. Eddie Duncan, Principal Consultant, is a Board-Certified Noise Control Engineer (#09002) through the Institute of Noise Control Engineering and is a member of the Acoustical Society of America. Mr. Duncan has been practicing acoustic consulting for over 20 years. In that time, he has managed over 450 acoustics projects and has worked on 120+ wind power projects, 85+ solar projects, and 70+ transmission projects. He has also managed noise assessments for a growing portfolio of BESS projects which have often been a component of other renewable energy projects.

Request No. 65:

Refer to SAR, Attachment D, Appendix A. Provide a table for the Construction Sound Model results. Include the results for pile driving in the table.

Original Response:

The generalized solar construction noise model provides sound levels at various distances for a variety of equipment (shown in Table 1 of SAR Attachment D). This methodology does not provide a specific construction noise model that provides the sound levels at all modeled receptors for the reasons discussed in Response to Request No. 21. Given the transient nature of construction, the expected sound levels at a given residence will change moment by moment. Applicant will supplement this response based on additional modeling.

Supplemental Response:

As discussed in prior responses, construction noise would be temporary and variable as construction equipment moves through the Project site, and would also vary based on environmental factors such as humidity and wind. As a result, noise from pile driving and other construction activities would be constantly fluctuating throughout the construction phase based on these variables. Because modeling depends on static data for a snapshot in time, any modeling would not accurately capture the variable sound levels produced during construction, particularly for maximum construction noise. No additional modeling would be responsive to this request as a result.

Responding Witness: Eddie Duncan