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5.3 Noise

This section presents the noise impact assessment related to the Vaca Dixon Power Center Project (Project). This section relies on information from the Noise Study prepared for the Project (Appendix I). Section 5.3.1 describes the existing noise setting, including sensitive receptors and existing noise levels. Section 5.3.2 provides an overview of the regulatory setting related to noise. Section 5.3.3 identifies potential impacts that may result from Project construction and operation (including maintenance), as well as mitigation measures that should be considered during Project operation. Section 5.3.4 discusses cumulative impacts. Section 5.3.5 presents laws, ordinances, regulations, and standards (LORS) applicable to noise. Section 5.3.6 identifies regulatory agency contacts. Section 5.3.7 describes permits required for the Project related to noise. Section 5.3.8 provides references for this section.

5.3.1 Environmental Setting

5.3.1.1 Overview of Sound Measurement

Noise

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (Caltrans 2013).

Human Perception of Sound

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz and less sensitive to frequencies around and below 100 Hertz. Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; dividing the energy in half would result in a 3 dB decrease.

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not “sound twice as loud” as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy); that a change of 5 dBA is readily perceptible; and that an increase (or decrease) of 10 dBA sounds twice (half) as loud (Crocker 2007).

Sound Propagation and Shielding

Sound changes in both level and frequency spectrum as it travels from the source to the receptor. The most obvious change is the decrease in level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of sources (e.g., point or line, the path the sound will travel, site conditions, and obstructions). Noise levels from a point source typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance (e.g.,

construction, industrial machinery, ventilation units). Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at approximately 3 dBA per doubling of distance. The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, receives no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result from simply the geometric spreading of the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense woods, and man-made features such as buildings and walls, can substantially alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receptor. Structures can substantially reduce exposure to noise as well. The Federal Highway Administration's (FHWA) guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

Descriptors

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important factors of Project noise impacts. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent noise level (L_{eq}); it considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time.

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise is usually measured using Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.). It is also measured using the Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with an additional 5 dBA penalty to noise occurring during evening hours, between 7:00 p.m. and 10:00 p.m., and an additional 10 dBA penalty to noise occurring during the night, between 10:00 p.m. and 7:00 a.m., to account for the added sensitivity of humans to noise during these hours. Noise levels described by L_{dn} and CNEL usually differ by approximately 1 dBA. The relationship between the peak-hour L_{eq} value and the L_{dn}/CNEL depends on the distribution of noise generation during the day, evening, and night.

Groundborne Vibration

Vibration refers to groundborne noise and perceptible motion. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible, but without the effects associated with the shaking of a building, there is less adverse reaction.

Typical outdoor sources of vibration that propagate through the ground and create perceptible ground-borne vibration in nearby buildings include: construction equipment (e.g., pile drivers, large bulldozers, vibratory rollers, etc), steel-wheeled trains, and traffic on rough roads. If the roadway is fairly smooth, vibration from rubber-tired traffic is rarely perceptible (Federal Transit Administration [FTA] 2018).

Vibration amplitudes are usually expressed in peak particle velocity (PPV), or root mean squared (RMS) vibration velocity. The PPV and RMS velocity are normally described in inches per second (in/sec). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in the monitoring of blasting vibration because it is related to the stresses that are experienced by buildings. The vibration velocity level threshold of perception for humans is approximately 0.035 in/sec PPV.

5.3.1.2 Local Land Use and Noise Sources

The Project Site is on a flat plain which is surrounded mainly by agriculture with scattered residential and commercial land uses. The primary sources of noise on-site and in the surrounding area include motor vehicles, wind, and agricultural activities (e.g., farming equipment). The greatest vehicle noise occurs from vehicles on Interstate (I-) 5 (I-5) and Kilkenny Road.

Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. The Noise Element of the City of Vacaville General Plan (2015) identifies noise-sensitive land uses as residences, schools and hospitals. The CEC identifies residences, hospitals, libraries, schools, places of worship, or other facilities where quiet is an important attribute of the environment as noise-sensitive land uses (Title 20, California Code of Regulations, Section 1704, Appendix B).

Vibration-sensitive receptors, which are similar to noise-sensitive receptors, include residences and institutional uses, such as schools, churches, and hospitals. However, vibration-sensitive receptors also include buildings where vibrations may interfere with vibration-sensitive equipment that is affected by vibration levels that may be well below those associated with human annoyance (e.g., recording studies or medical facilities with sensitive equipment) or historic buildings that could sustain damage from strong vibrations.

The Project Site is in the vicinity of sensitive receptors identified in the Vacaville General Plan, the Solano County General Plan and in CEC's requirements for Opt-In Applications (Title 20, California Code of Regulations, Section 1704, Appendix B). The closest noise-sensitive receptors identified to the gen-tie area include the single-family residences in Solano County approximately 95 feet to the west. The closest noise-sensitive receptors to the BESS Project Area in the City of Vacaville include a single-family residence approximately 950 feet southwest of the southwest corner of the BESS Project Area, and multi-family residences approximately 1,250 feet to the west of the southwest corner of the BESS Project Area. The nearest sensitive receptors to the BESS Project Area in Solano County are single-family residences approximately 1,050 feet north of the edge of the northern boundary of the Project Area and a single-family residence approximately 1,950 feet to the east of the southeast corner of the BESS Project Area. The closest vibration-sensitive receptors include the commercial building approximately 160 feet to the west of the gen-tie installation area and 370 feet northwest of the northern boundary of the BESS Project Area. Sensitive receptor locations shown in in Figure 5.3-1.

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Figure 5.3-1 Location of Sensitive Receptors

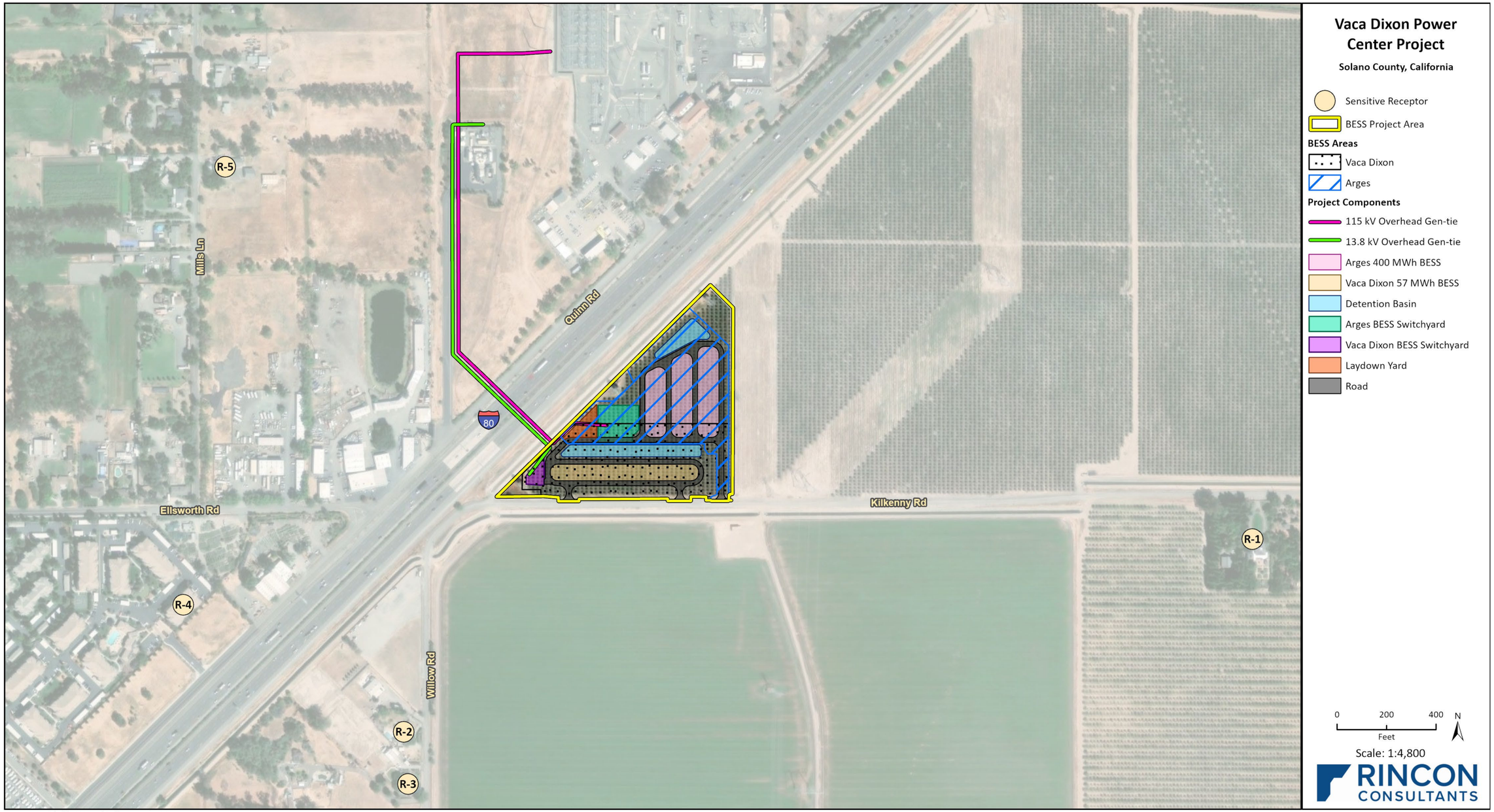

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Fig X Sensitive Receptors

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5.3.1.3 Existing Baseline Noise Environment

Noise Measurements

The most common source of noise in the BESS Project Area is vehicular traffic from I-80 and nearby industrial uses. To characterize ambient noise levels in the Project vicinity and at the Project Site, four short term (15 minute) and two long term (25 hour) noise level measurements were conducted on July 17 to July 18, 2025, to comply with the CEC's requirements for Opt-In Applications (Title 20, California Code of Regulations, Section 1704, Appendix B). The approximate noise measurement locations are shown in Figure 5.3-2. Short term noise measurement (ST)-1/long-term measurement (LT)-1 and ST-2/LT-2 were conducted at various single-family residences along Willow Road and Kilkenny Road to capture ambient noise levels at the closest sensitive receptors to the Project Site. ST-3 and ST-4 were conducted on the southwest and southeast corners of the BESS Project Area to capture ambient noise at the Project Site. On July 17-18, 2025, the daily high temperature was 66- and 71-degrees Fahrenheit, respectively, with 30 percent humidity. The average wind speed was 12 miles per hour and there was no precipitation.

The measurements were completed using a Piccolo II sound level meter fitted with a windscreen. The meter complies with American National Standards Institute (ANSI) Standard S1.4. The sound level meters were set to "slow" response and "A" weighting (dBA). The meters were calibrated prior to and after the monitoring period. All measurements were at least five feet above the ground and away from reflective surfaces.

Table 5.3-1 summarizes the results of the short-term noise measurements. The 24-hour long-term noise measurements are shown in Table 5.3-3 and Table 5.3-6, and the 25-hour long-term measurement results area shown in Table 5.3-4[1] and Table 5.3-7. Table 5.3-2, Table 5.3-5, and Table 5.3-8 summarize the L10, L50 and L90 percentile noise level descriptors for the short-term measurements and long-term measurements.

[1] The 24-hour long-term noise measurement is an industry standard to characterize ambient noise levels. To meet CEC's requirements for Opt-In Application (Title 20, California Code of Regulations, Section 1704, Appendix B), a 25-hour noise measurement was also taken.

Figure 5.3-2 Approximate Noise Measurement Locations – BESS Project Area

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Fig X Noise Monitoring Locations

Table 5.3-1 Short-Term (ST) Noise Level Measurement Results

Measurement Location	Measurement Location	Sample Times	Approximate Distance to Primary Noise Source	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
ST-1	Near single-family residence at 6875 Willow Road	12:23 – 12:39 p.m.	Approximately 650 feet to I-80 centerline	72	45	78
ST-2	Near single-family residence at 5310 Kilkenny Road	11:30 – 11:46 a.m.	Approximately 2,100 feet to I-80 centerline	55	44	77
ST-3	Southwest corner of BESS Project Area	12:06 – 12:21 p.m.	Approximately 190 feet to I-80 centerline	66	58	88
ST-4	Southeast corner of the BESS Project Area	11:49 – 12:04 p.m.	Approximately 840 feet to I-80 centerline	64	54	80

dBA = A-weighted decibels; L_{eq} = equivalent noise level; L_{min} = minimum noise level, L_{max} = maximum noise level

Table 5.3-2 Percentile Noise Level Descriptors (dBA) – Short Term (ST) Measurements

Measurement Location	L10[1] (dBA)	L50[2] (dBA)	L90[3] (dBA)
ST-1	75	72	68
ST-2	53	48	46
ST-3	67	63	61
ST-4	66	60	56

dBA = A-weighted decibels

[1] Peak Level – The noise level that is equaled or exceeded 10% of the time during a measurements period

[2] Median Level – The noise level that is equaled or exceeded 50% of the time during a measurements period

[3] Ambient Level – The noise level that is equaled or exceeded 90% of the time during a measurements period

Table 5.3-3 24-Hour Long-Term (LT-1) Noise Measurement Results

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
24-hour Measurement – July 17-18, 2025			
12:00 AM	55	12:00 PM	59
1:00 AM	54	1:00 PM	61
2:00 AM	53	2:00 PM	64
3:00 AM	57	3:00 PM	64
4:00 AM	59	4:00 PM	61
5:00 AM	63	5:00 PM	61
6:00 AM	62	6:00 PM	59
7:00 AM	61	7:00 PM	61
8:00 AM	59	8:00 PM	62
9:00 AM	59	9:00 PM	61
10:00 AM	59	10:00 PM	62
11:00 AM	58	11:00 PM	58
24-hour Noise Level (dBA CNEL)			**66**

dBA = A-weighted decibels; L_{eq} = equivalent noise level; CNEL = community equivalent noise level

See Figure 5.3-2for Approximate Noise Measurement Locations; see Appendix A of (Appendix I) for full measurement details.

Table 5.3-4 25-Hour Long-Term (LT-1) Noise Measurement Results

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
25-hour CEC Measurement – July 17-18, 2025			
12:00 AM	55	12:00 PM	59
1:00 AM	54	1:00 PM	61
2:00 AM	53	2:00 PM	64
3:00 AM	57	3:00 PM	64
4:00 AM	59	4:00 PM	61
5:00 AM	63	5:00 PM	61
6:00 AM	62	6:00 PM	59
7:00 AM	61	7:00 PM	61
8:00 AM	59	8:00 PM	62
9:00 AM	59	9:00 PM	61
10:00 AM	59	10:00 PM	62
11:00 AM	58	11:00 PM	58
		12:00 AM	54
25-hour Noise Level (dBA CNEL)			**66**

dBA = A-weighted decibels; L_{eq} = equivalent noise level; CNEL = community equivalent noise level

See Figure 5.3-2 for Approximate Noise Measurement Locations; see Appendix A of Appendix I for full measurement details.

Table 5.3-5 Percentile Noise Level Descriptors (dBA) – Long Term Measurement (LT-1)

Sample Time	L10[1] (dBA)	L50[2] (dBA)	L90[3] (dBA)
12:00 AM	68	63	60
1:00 AM	65	61	58
2:00 AM	65	61	59
3:00 AM	66	63	60
4:00 AM	69	66	64
5:00 AM	70	68	66
6:00 AM	69	67	64
7:00 AM	67	65	62
8:00 AM	71	65	61
9:00 AM	74	66	62
10:00 AM	79	69	63
11:00 AM	75	66	61
12:00 PM	77	67	61
1:00 PM	75	65	61
2:00 PM	76	68	63
3:00 PM	77	67	62
4:00 PM	73	65	61
5:00 PM	73	66	62
6:00 PM	73	65	62
7:00 PM	82	74	65
8:00 PM	71	66	64
9:00 PM	69	66	63
10:00 PM	74	67	64
11:00 PM	67	64	61
12:00 AM	65	62	59

dBA = A-weighted decibels

[1] Peak Level – The noise level that is equaled or exceeded 10% of the time during a measurements period

[2] Median Level – The noise level that is equaled or exceeded 50% of the time during a measurements period

[3] Ambient Level – The noise level that is equaled or exceeded 90% of the time during a measurements period

Table 5.3-6 24-Hour Long-Term (LT-2) Noise Measurement Results

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
25-hour CEC Measurement – July 17-18, 2025			
12:00 AM	52	12:00 PM	58
1:00 AM	52	1:00 PM	58
2:00 AM	**50**[1]	2:00 PM	62
3:00 AM	55	3:00 PM	64
4:00 AM	58	4:00 PM	61
5:00 AM	60	5:00 PM	58
6:00 AM	61	6:00 PM	60
7:00 AM	63	7:00 PM	60
8:00 AM	56	8:00 PM	58
9:00 AM	55	9:00 PM	57
10:00 AM	59	10:00 PM	60
11:00 AM	57	11:00 PM	60
24-hour Noise Level (dBA CNEL)			**65**

dBA = A-weighted decibels; L_{eq} = equivalent noise level; CNEL = community equivalent noise level

[1] Lowest recorded nighttime hour Leq.

See Figure 5.3-2 for Approximate Noise Measurement Locations; see Appendix A of Appendix I for full measurement details.

Table 5.3-7 25-Hour Long-Term (LT-2) Noise Measurement Results

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
25-hour CEC Measurement – July 17-18, 2025			
12:00 AM	52	12:00 PM	58
1:00 AM	52	1:00 PM	58
2:00 AM	**50**[1]	2:00 PM	62
3:00 AM	55	3:00 PM	64
4:00 AM	58	4:00 PM	61
5:00 AM	60	5:00 PM	58
6:00 AM	61	6:00 PM	60
7:00 AM	63	7:00 PM	60
8:00 AM	56	8:00 PM	58
9:00 AM	55	9:00 PM	57
10:00 AM	59	10:00 PM	60
11:00 AM	57	11:00 PM	60
		12:00 AM	61
25-hour Noise Level (dBA CNEL)			**66**

dBA = A-weighted decibels; L_{eq} = equivalent noise level; CNEL = community equivalent noise level

[1] Lowest recorded nighttime hour Leq.

See Figure 5.3-2 for Approximate Noise Measurement Locations; see Appendix A of Appendix I for full measurement details.

Table 5.3-8 Percentile Noise Level Descriptors (dBA) – Long Term Measurement (LT-2)

Sample Time	L10[1] (dBA)	L50[2] (dBA)	L90[3] (dBA)
12:00 AM	62	59	58
1:00 AM	63	59	57
2:00 AM	61	59	57
3:00 AM	63	60	58
4:00 AM	66	64	62
5:00 AM	67	66	64
6:00 AM	69	66	65
7:00 AM	66	62	59
8:00 AM	61	58	56
9:00 AM	62	58	55
10:00 AM	66	58	55
11:00 AM	66	58	54
12:00 PM	66	58	54
1:00 PM	64	56	54
2:00 PM	65	58	55
3:00 PM	68	57	54
4:00 PM	64	56	54
5:00 PM	61	57	55
6:00 PM	62	57	55
7:00 PM	64	60	58
8:00 PM	64	61	59
9:00 PM	63	61	60
10:00 PM	64	61	60
11:00 PM	64	60	58
12:00 AM	63	60	58

dBA = A-weighted decibels

[1] Peak Level – The noise level that is equaled or exceeded 10% of the time during a measurements period

[2] Median Level – The noise level that is equaled or exceeded 50% of the time during a measurements period

[3] Ambient Level – The noise level that is equaled or exceeded 90% of the time during a measurements period

Gen-Tie Noise Measurements

The most common source of noise in the gen-tie line vicinity is vehicular traffic from I-80 and nearby industrial uses. To characterize ambient noise levels in the gen-tie line vicinity, four short term (15-minute) and one long term (24-hour) noise level measurements were conducted on May 11 and May 12, 2023. The approximate noise measurement locations are shown in Figure 5.3-3. Short term noise measurement (ST)-1, ST-2, and ST-3 were conducted at various single-family residences along Mills Lane to capture ambient noise levels at the closest sensitive receptors to the gen-tie line. ST-4 was conducted at the mid-point of the gen-tie line to capture ambient noise at the gen-tie line. Long term noise measurement (LT) 1 was conducted along Mills Lane to capture ambient noise levels at the closest sensitive receptors to the gen-tie line.

Figure 5.3-3 Approximate Noise Measurement Locations – Gen-Tie

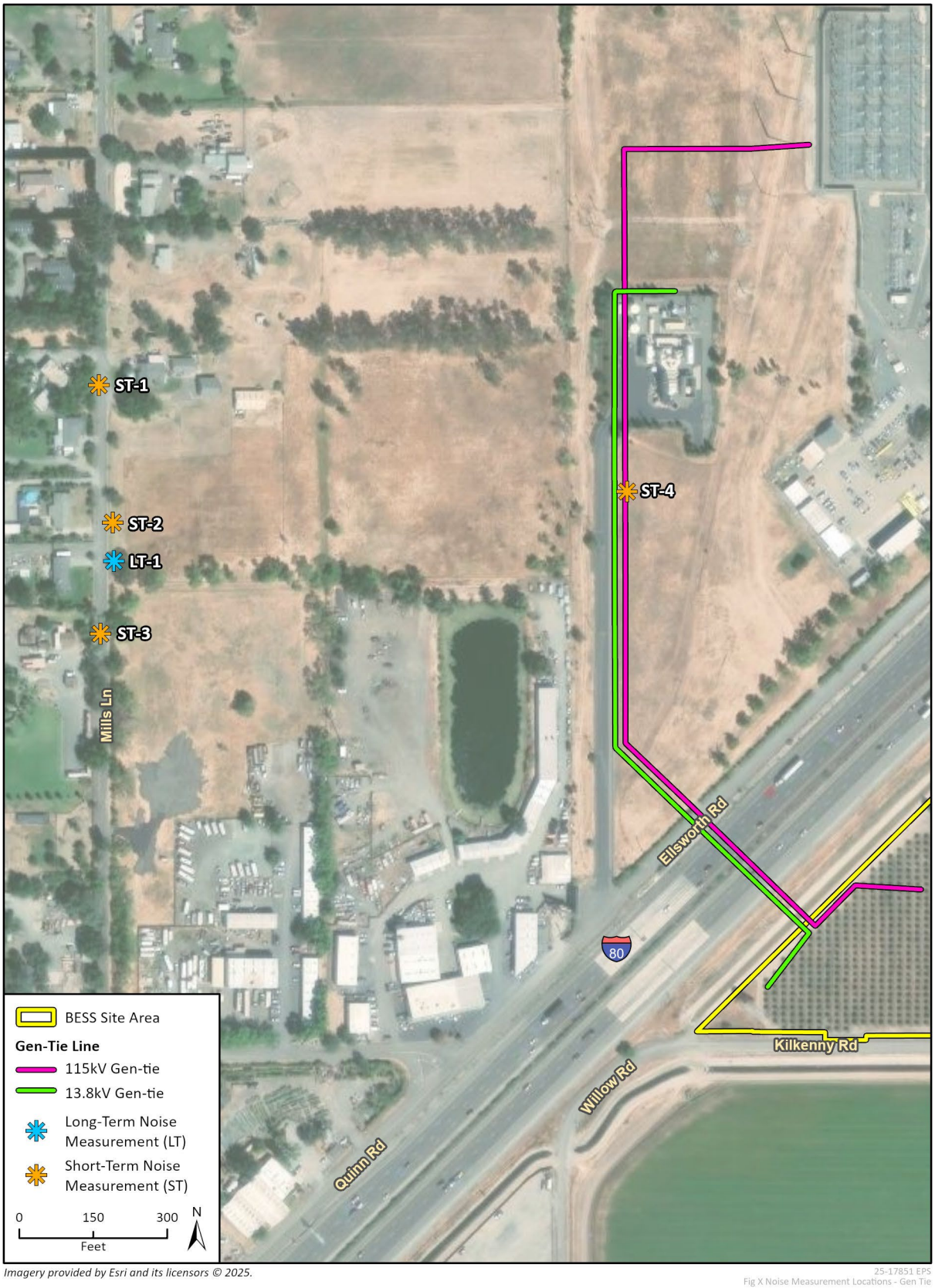

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Fig X Noise Measurement Locations - Gen Tie

Long-term sound level measurements were taken with an Extech 407780A sound level meter, which satisfies the American National Standards Institute (ANSI) standard for Type 2 instrumentation. The sound level meter was equipped with a windscreen during measurements. The sound level meter was set to "slow" response and "A" weighting (dBA). The meter was calibrated before and after the monitoring period. All measurements were at least five feet above the ground and away from reflective surfaces.

The sound level meter used for short-term noise monitoring (Larson Davis SoundTrack LxT) satisfies the American National Standards Institute (ANSI) standard for Type 1 instrumentation. The sound level meter was set to "slow" response and "A" weighting (dBA). The meter was field calibrated before and after the monitoring period. The measurement was at least five feet above the ground and away from reflective surfaces. During the measurements, the sound level meter was equipped with a windscreen during measurements. Table 5.3-9 and Table 5.3-10 summarize the results of the short-term and long-term noise measurements.

Table 5.3-9 Short-Term Noise Level Measurement Results – Gen-Tie Line

Measurement Location	Measurement Location	Sample Times	Approximate Distance to Primary Noise Source	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
ST-1	Single family residence along Mills Lane	10:34 – 10:49 a.m.	Approximately 1,615 feet to I-80 centerline; approximately 630 feet to nearby industrial uses	51	39	70
ST-2	Single family residence along Mills Lane	10:52 – 11:07 a.m.	Approximately 1,380 feet to I-80 centerline; approximately 455 feet to nearby industrial uses	53	40	77
ST-3	Single family residence along Mills Lane	11:08 – 11:23 a.m.	Approximately 1,240 feet to I-80 centerline; approximately 370 feet to nearby industrial uses	55	43	77
ST-4	Northwest corner of the Project Site	11:35 – 11:50 a.m.	Approximately 710 feet to I-80 centerline	50	46	63

dBA = A-weighted decibels; L_{eq} = equivalent noise level; L_{min} = minimum noise level, L_{max} = maximum noise level

Table 5.3-10 Long-Term Noise Measurement Results

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
24-hour Measurement – May 11-12, 2023			
10:27 a.m.	51	10:27 p.m.	52
11:27 a.m.	46	11:27 p.m.	51
12:27 p.m.	53	12:27 a.m.	50
1:27 p.m.	64	1:27 a.m.	51
2:27 p.m.	53	2:27 a.m.	51
3:27 p.m.	55	3:27 a.m.	53
4:27 p.m.	54	4:27 a.m.	55
5:27 p.m.	53	5:27 a.m.	56
6:27 p.m.	52	6:27 a.m.	60
7:27 p.m.	51	7:27 a.m.	50
8:27 p.m.	50	8:27 a.m.	49
9:27 p.m.	53	9:27 a.m.	47
24-hour Noise Level (dBA CNEL)			**61**

dBA = A-weighted decibels; L_{eq} = equivalent noise level; CNEL = community equivalent noise level

See Figure 5.3-3 for Approximate Noise Measurement Locations; see Appendix A of Appendix I for full measurement details.

5.3.2 Regulatory Setting

A review of existing relevant LORS was conducted to understand the regulatory context for noise surrounding the Project. These are detailed in Section 5.3.5, *Laws, Ordinances, Regulations, and Standards*.

5.3.3 Impact Analysis

The following subsections discuss the potential direct and indirect impacts related to noise from construction and operation and maintenance (O&M) of the Project.

5.3.3.1 Methodology and Significance Thresholds

Construction Noise

Construction noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. Using RCNM, construction noise levels were estimated at noise sensitive receptors near the Project Site. RCNM provides reference noise levels for standard construction equipment, with an attenuation rate of 6 dBA per doubling of distance for stationary equipment.

Variation in power imposes additional complexity in characterizing the noise source level from construction equipment. Power variation is accounted for by describing the noise at a reference distance from the equipment operating at full power to determine the L_{max} of the operation (FHWA 2006). Each phase of construction has a specific equipment mix, depending on the work to be accomplished during that phase. Each phase also has its own noise characteristics; some having higher continuous noise levels than others, and some have high-impact noise levels.

Construction activity would result in temporary noise in the Project vicinity, exposing surrounding nearby receptors to increased noise levels. Construction noise is typically loudest during activities that involve the installation of foundations and equipment if a pile driver is necessary and would be lower during the other construction phases (i.e., set modules, inverters and switchgear, and electrical wire installation and finish grading). Typical heavy construction equipment during construction activity could include pile drivers, rollers, dozers, loaders, graders, and dump trucks. It is assumed that diesel engines would power all construction equipment. Construction equipment would not all operate at the same time or location. In addition, construction equipment would not be in constant use during the eight-hour operating day.

Construction equipment is typically dispersed in various areas of a site, with only a limited amount of equipment operating near a given location at a particular time. For this reason, the FTA's *Transit Noise and Vibration Impact Assessment* document (page 177) recommends to "assume that all equipment operates at the center of the project." Therefore, it is standard industry practice to analyze average construction noise from the center of the project site, which represents the approximate center of where noise would be generated because equipment moves around the project site throughout the workday. For the Project, this would be 95 feet from the construction of the gen-tie line and 1,420 feet from the center of all other phases at the BESS Project Area (RCNM calculations are included in Appendix B of Appendix I).

Noise levels from each phase of construction were modeled in RCNM based on the equipment list provided by the applicant.

The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction in their *Transit and Noise Vibration Impact Assessment Manual* (FTA 2018). For residential uses, the daytime noise threshold is 80 dBA L_{eq} (8-hour). Additionally, as per VMC Section 8.10.060(O), noise associated with construction activities is required to take place between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday, or no time on Sundays or a national holiday. Construction noise would be significant if it exceeds these noise standards or would occur outside of the allowable hours. Since neither the City of Vacaville nor Solano County have quantified construction noise limits, the FTA standards are applied to sensitive receptors near the Project Site.

Construction Vibration

The Project does not include any substantial vibration sources associated with operation. Thus, construction activities have the greatest potential to generate ground-borne vibration affecting nearby receptors. The greatest vibratory source during construction would be an impact pile driver (if needed) and large bulldozer. Blasting would not be required for construction of the Project. Construction vibration estimates are based on vibration levels reported by the FTA (FTA 2018). Table 5.3-11 shows typical vibration levels for various pieces of construction equipment used in the assessment of construction vibration.

Table 5.3-11 Vibration Levels Measured during Construction Activities

Equipment	PPV at 25 feet (in/sec)
Impact Pile Driver	1.518
Vibratory Roller	0.21
Large Bulldozer	0.089
Loaded Trucks	0.076
Small Bulldozer	0.003
Bore/Drill Rig	0.089
Heavy-Duty Helicopter	0.020

PPV = peak particle velocity; in/sec = inches per second
Source: FTA 2018

Neither the City of Vacaville nor the County of Solano have adopted standards to assess vibration impacts during construction and operation. Therefore, vibration limits used in this analysis to determine a potential impact from construction activities are based on those outlined in the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). Groundborne vibration levels that could induce potential architectural damage to buildings are identified in Table 5.3-12. Based on FTA recommendations, limiting vibration levels to below 0.3 in/sec PPV at engineered concrete and masonry (no plaster) (which would apply to nearby commercial structures), and below 0.2 in/sec PPV at non-engineered timber and masonry buildings (which would apply to nearby residential structures) would prevent architectural damage.

Table 5.3-12 Groundborne Vibration Architectural Damage Criteria

Building Category	PPV (in/sec)
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Nonengineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

in/sec = inches per second; PPV = peak particle velocity
Source: FTA 2018

Operational Noise

Operational Stationary Noise

Under normal operation, the BESS facility would be remotely monitored with no personnel on-site except for periodic maintenance and infrequent battery augmentation activities. Maintenance and battery augmentation activities would not generate substantial noise. The noise sources on the Project Site after completion of construction would include stationary outdoor equipment such as transformers, inverters, and individual BESS units.

Noise level modeling for the BESS Project's combined worst case operational sources was developed using SoundPLAN noise modeling software, Version 9.0. SoundPLAN incorporates noise propagation algorithms and reference sound levels published by various government agencies and the scientific community. Noise sources and receivers are input using three-dimensional coordinates. Receivers were modeled at the average height of the human ear, which is five feet above ground elevation.

Propagation of modeled stationary noise sources was based on ISO Standard 9613-2, "Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation." The assessment methodology assumes that all receivers would be downwind of stationary sources. This is a worst-case assumption for total noise impacts since only some receivers would be downwind at any one time.

On-site noise sources were modeled based on information provided by the Applicants. Inverters would be Power Electronics Inverters or similar design. Manufacturer's specifications indicate that these units generate a noise level of 75 dBA at 1 meter. Transformers for the Project would also be Power Electronics or similar design. Manufacturer's specifications indicate that these units generate a noise level of 79 dBA at 1 meter with cooling fans. BESS units would be CATL units or similar design. Manufacturer's specifications indicate that these units generate a noise level of 75 dBA at 1 meter. For a conservative scenario, the units were assumed to operate at 100 percent of an hour for 24 hours.

An additional source of operational noise associated with the Project would be corona discharge from the energized transmission lines. The sound of corona is a phenomenon associated with all energized overhead electric power lines and is characteristic of an audible hum or crackling sound. Modern power lines are designed, constructed, and maintained so that, during dry conditions, they operate below the corona-inception voltage and generate a minimum of corona-related noise. Corona levels (and audible noise levels) are highest during heavy rain, when the conductors are wet, but the noise generated by the rainfall is usually greater than the noise generated by corona discharge. During corona activity, transmission lines (primarily those rated at 345 kV and above) can generate a small amount of sound energy (CPUC 1999). Corona sound energy for 13.8 kV and 115 kV lines is generally not perceptible.

The Project Site would be located in a mainly agricultural area with residences to the southwest, west, northwest, and east in the City of Vacaville and Solano County. The City of Vacaville Municipal Code Title 14.09.240.140 Noise (Vacaville 2022) includes noise standards and regulations. The noise standards applicable for the residential areas in the City of Vacaville, shown in Table 5.3-16, are 50 dBA L_{eq} between 7:00 a.m. to 10:00 p.m. and 45 dBA L_{eq} between 10:00 p.m. to 7:00 a.m. If the recorded ambient noise level exceeds the hourly L_{eq}, the allowable operational noise level would be three dB above the ambient noise levels. The quietest measured nighttime hourly L_{eq} was 50.1 dBA L_{eq}, resulting in a nighttime exterior noise standard of 53 dBA L_{eq}. The City of Vacaville's more stringent operational noise standards were conservatively applied to sensitive receptors in Solano County.

Traffic Noise

During operation of the Project Battery Energy Storage System (BESS), several operation and maintenance staff would visit the BESS facility twice per week on average. Therefore, this impact is addressed qualitatively.

5.3.3.2 Impact Evaluation Criteria

The potential for impacts related to noise were evaluated using relevant criteria described in the California Environmental Quality Act (CEQA) Environmental Checklist (Appendix G of the CEQA Guidelines). Specific to noise, the CEQA Environmental Checklist asks, would the Project:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the project area to excessive noise levels.

Impact NOI-1

Threshold:	Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less than Significant Impact. The Project-specific noise analysis focuses on the construction and operational impacts to determine if the Project would expose persons to or generate noise levels in excess of established standards.

Construction

Construction Equipment

The Project is planned to be constructed in two consecutive efforts for the Vaca Dixon 57 MWh BESS and Arges 400 MWh BESS components. Project construction activities for the Vaca Dixon 57 MWh and Arges 400 MWh BESS components are anticipated to occur in succession over the course of approximately 23 months, from July 1, 2027, to June 1, 2029 (Vaca Dixon 57 MWh BESS construction is anticipated to be completed in July of 2028). Operation of heavy equipment during construction would result in a temporary noise level increase. Project construction activities would involve the use of a variety of construction equipment throughout various phases of construction; these include transport of personnel and materials to the Project Site, use of heavy machinery for grading and clearing, potential operation of pile drivers for pile foundations, drilling/augering equipment for installation of gen-tie pole foundations, use of a heavy-duty helicopter to carry gen-tie lines across I-80 freeway and operation of other equipment used during construction.

To determine construction noise impacts, noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) Version 1.1, shown in Table 5.3-13. Over the course of a typical construction day, construction equipment during the gen-tie installation would be located as close as 95 feet to the nearest residential use to the west on Mills Road in Solano County and as close as 1,120 feet to the southwest on Willow Road in the City of Vacaville. Additionally, construction equipment used at the BESS Project Area would be located approximately 1,420 feet to the nearest residential use to the north from the center of construction activity in Solano County and approximately 1,490 feet to the nearest residential use to the southwest from the center of construction activity in the City of Vacaville. Construction activities would typically be located at an average distance further away over a potential 12-hour work day due to the nature of construction where equipment is mobile throughout the day. Table 5.3-13 shows the construction noise levels attributable to each construction phase modeled.

Table 5.3-13 Estimated Noise Levels by Construction Phase at Surrounding Land Uses

Construction Activity Phase	L_{eq} dBA			
	RCNM Reference Noise Level	Single Family Residential on Mills Lane to the North	Single-Family Residential on Willow Road to the Southwest	Multi-Family Residential on Ellsworth Lane to the West
Distance from BESS Facilities[1] (feet)	**50**	**1,420**	**1,490**	**2,200**
Access Road	80	51	51	47
Site Preparation	84	55	55	51
Grading	84	55	55	51
Install Foundations & Equipment	94	65	65	61
Set Modules, Inverters & Switchgear	73	44	44	40
Electrical Wire Installation & Finish Grading	82	53	53	49
Distance from Gen-Tie[2] (feet)	**50**	**95[3]**	**1,120**	**1,400[4]**
Gen-Tie Installation	81	75	54	52
Distance from Gen-Tie Over Freeway[5] (feet)	**50**	**785**	**1,310**	**1,430[4]**
Electrical Wire Installation & Finish Grading[6]	84	60	56	49

Calculations performed with the FHWA's RCNM software are included in Appendix B of Appendix I.

Noise levels rounded to the nearest whole number.

[1] Distance from center of the BESS Project Area to the nearest sensitive receptor property line.

[2] Distance from the gen-tie line to the nearest sensitive receptor property line

[3] Distance to residence located to the west on Mills Lane

[4] Distance to residence on Ellsworth Lane to the southwest.

[5] Distance from nearest electrical pole next to I-80 to sensitive receptors

[6] Equipment list from Electrical Wire Installation & Finish Grading with Heavy-Duty Helicopter included.

As shown in Table 5.3-13, construction noise levels at the nearest residential use to the west of the gen-tie installation would be up to 75 dBA Leq (8 hour). Furthermore, construction noise levels at the nearest residential uses to the north of the BESS Project area would be up to 65 dBA Leq (8 hour) during the installation of foundations and equipment. Therefore, construction noise levels would not exceed the FTA's residential construction noise threshold of 80 dBA Leq (8 hour). In addition, construction would occur within the allowed hours of the City of Vacaville Municipal Code. Therefore, construction noise impacts would be less than significant.

On-Site Operational Noise

On-Site Operational Noise - BESS

Following the methodology discussed in Section 3.3, Project operational noise levels were modeled and noise contours were estimated, as shown in Figure 5.3-4. Noise modeling indicates that Project operational noise levels at the nearest residential receiver property line to the southwest in the City of Vacaville would be 47.2 dBA L_{eq}, which would not exceed the City of Vacaville's nighttime threshold of 53 dBA, as discussed in Section5.3.3.2 above. Therefore, impacts would be less than significant.

On-Site Operational Noise – Gen-Tie Corona Discharge

The gen-tie line segments running between the BESS area to the CalPeak Power - Vaca Dixon Peaker Plant (combined 13.8 kV/115 kV collocated on singular poles) and the PG&E Vaca-Dixon Substation (115 kV) are located as close as approximately 95 feet east of the existing single-family residential property lines. These sensitive receptors are located in unincorporated Solano County, therefore the noise level standards presented in Table 5.3-17 would apply. Corona discharge noise may occur during both daytime and nighttime hours during operation of the Project, therefore the stricter nighttime noise threshold of 50 dBA is applicable. At a distance of 95 feet, corona discharge noise would attenuate and would be imperceptible – i.e., would not exceed the County's nighttime noise threshold of 50 dBA.

Operation of the Project components would not result in the exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or the applicable standards of other agencies. As a result, operation of the Project would be consistent with all local standards and operational noise impacts would be less than significant.

Off-Site Traffic Noise

During routine operation of the Project, operation and maintenance staff would visit the BESS Project Area periodically for maintenance and other operation activities. Maintenance trucks would be utilized to perform routine maintenance, including but not limited to equipment testing, monitoring, repair, routine procedures to ensure service continuity, and standard preventative maintenance.

Routine operations would typically require two workers in a medium duty utility truck to visit the facility up to twice per week. This amount of additional vehicle trips on nearby roadways would result in a negligible addition of roadway traffic noise and impacts would be less than significant.

Figure 5.3-4 Receptor Locations and Operational Noise Contours

Impact NOI-2

Threshold:	Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

Less than Significant Impact. The greatest potential source of vibration from construction activity would involve pile drivers if pile driving is needed for foundation installation. Pile driving construction equipment at the BESS Project Area may be used within 570 feet of the nearest commercial structure to the northwest and all other construction equipment may be used within 410 feet of the commercial structure to the northwest. Impact pile driving creates approximately 1.518 in/sec PPV at a distance of 25 feet (FTA 2018). These vibration levels would attenuate to 0.14 in/sec PPV for a pile driver at 570 feet and 0.003 in/sec PPV for a vibratory roller at 460 feet. Additionally, during the gen-tie installation, a large bulldozer may be used within 160 feet to the nearest commercial structure to the west. A large bulldozer creates approximately 0.089 in/sec PPV at 25 feet and would attenuate to 0.005 in/sec at a distance of 160 feet. These vibration levels are lower than the threshold of 0.3 in/sec PPV for commercial structures. The closest residential uses on Mills Lane are located further away and will, therefore, be below the 0.2 in/sec PPV threshold. Therefore, temporary impacts associated with construction would be less than significant.

The Project does not include substantial vibration sources associated with operation. Therefore, Project operation would not generate excessive groundborne vibration or groundborne noise levels. No impact would occur.

Impact NOI-3

Threshold:	For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

Overall Project

No Impact. The closest airport is the Nut Tree Airport, which is approximately 2.5 miles southwest of the Project Site. The Project Site lies outside the designated Airport Influence Area (AIA) of the Nut Tree Airport, as defined in the Solano County 1988 Airport Land Use Plan (Solano County 1988).

The Project Site is also located approximately 8.7 miles north of Travis Air Force Base (AFB) and falls within the AIA established by the Travis AFB Land Use Compatibility Plan (LUCP), which was adopted by the Solano County Airport Land Use Commission (ALUC) in 2024. Specifically, the Project is located in Compatibility Zone D of the LUCP. According to Travis AFB LUCP, Compatibility Zones A through C may be exposed to noise from Travis AFB and are subject to noise criteria restricting the types of development. Zone D is not listed as being directly exposed to noise from Travis AFB; however, development in Zone D is subject to a notice regarding aircraft operational impacts on the property attached to the property deed (Solano County 2024). Therefore, the Project would not expose people residing or working in the Project area to excessive noise levels related to airstrip/airport operation. No impact would occur.

5.3.4 Cumulative Impacts

Impacts of the Project would be cumulatively considerable if they would have the potential to combine with other past, present, or reasonably foreseeable projects to become significant. A list of closely related past, present, and reasonably foreseeable projects are provided in Table 5-1 of Chapter 5, *Environmental Analysis.*

Cumulative construction noise, operational noise, and vibration impacts would occur if cumulative projects could potentially impact the same sensitive receptors. Most of the related projects outside the immediate vicinity are located far from the Project Site and the closest cumulative projects to the Project Site are project ID-38 (5221 Quinn Road) and ID-41 (5131 Ellsworth Road), located approximately 1,050 feet east and 780 feet west of the gen-tie line, respectively. Similar to the Project, all cumulative development in the City would need to comply with the construction hours permitted by Section 8.10.060(O) of the VMC. The noise level from the gen-tie installation phase of 81 dBA L_{eq} at a distance of 50 feet was used as a representative construction noise level for projects ID-38 and ID-41. At a distance of 780 feet, construction noise levels would attenuate to 57 dBA L_{eq}, and at a distance of 1,050 feet, construction noise levels would attenuate to 55 dBA L_{eq} at the Project gen-tie line. The potential combined construction noise level of all three projects operating at the same time would be 75 dBA L_{eq} at the nearest sensitive receptor. Therefore, conservatively assuming that all three projects would be constructed at the same time, construction noise from the Project and the ID-38 and ID-41 cumulative projects would result in a less than significant construction noise impact. Operational noise sources from the BESS Project Area (e.g., mechanical equipment noise, noise from employees) would be localized and rapidly attenuate due to the Project's distance to cumulative projects. As discussed in Impact NOI-1, the Project's addition to traffic would not result in a noticeable traffic noise increase; thus, the Project's traffic noise increase would not be cumulatively considerable. Therefore, the Project would not contribute considerably to cumulative construction noise, operational noise, or vibration impacts.

5.3.5 Laws, Ordinances, Regulations, and Standards

The LORS that may apply to the Project related to noise are summarized in Table 5.3-14. The local LORS discussed in this section are the Solano County General Plan and City of Vacaville General Plan and Noise Ordinance.

Table 5.3-14 LORS Applicable to Noise

Jurisdiction	LORS	Applicability	Opt-In Application Reference	Project Conformity
Federal	40 CFR Part 205, Subpart B	Regulates noise limits for medium and heavy trucks.	Section 5.3.5.1	Trucks used for the Project would comply with these regulations
Federal	29 CFR 1910.95, 29 CFR 1926.52, and CFR 1926.101 (OSHA regulations)	Regulates on-site noise levels.	Impact NOI-1	The Project would not result in on-site noise levels in exceedance of OSHA regulations
State	California Environmental Quality Act (CEQA)	Requires state and local government agencies to inform decision makers and the public about the potential environmental impacts of the Project and to reduce environmental impacts to the extent feasible.	Throughout this Opt-In Application	The Project would comply with CEQA, as required by the California Energy Commission's Opt-In Application process.
State	Title 8, California Code of Regulations, General Industrial Safety Orders, Article 105, Control of Noise Exposure	Regulates on-site noise levels.	Impact NOI-1	The Project would not result in on-site noise levels in exceedance of Cal/OSHA regulations
Local	Solano County General Plan: Policy HS.P-48 Policy HS.P-51 Policy HS.P-52 City of Vacaville General Plan: Policy NOI-P4.1 Policy NOI-P4.2	Ensure that residential and other noise-sensitive uses are protected from exposure to harmful or annoying noise levels.	Impact NOI-2	The Project would be consistent with Solano County and City of Vacaville General Plan policies.
Local	City of Vacaville Code of Ordinances Title 14.09.240.140, *Noise*, and Section 8.10.060(O)	Contains the noise measurement criteria, exterior noise thresholds, and noise source exemptions for City of Vacaville, in addition to construction hours and requirements.	Impact NOI-2	The Project would be consistent with the noise thresholds stated within the City of Vacaville Code of Ordinances Title 14.09.240.140, *Noise* and Section 8.10.060(O).

5.3.5.1 Federal LORS

40 CFR Part 205, Subpart B

40 Code of Federal Regulations (CFR), Part 205, Subpart B establishes federal noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating). The federal truck pass by noise standard is 80 dBA at 15 meters (approximately 50 feet) from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

OSHA Regulations

OSHA regulates on-site noise levels. The permissible exposure level to noise for workers is 90 dBA over an 8-hour time-weighted average work shift, to protect hearing (29 CFR 1910.95 and for construction, 29 CFR 1926.52). If an employee is exposed to greater than 85 dBA as an 8-hour TWA, then a hearing conservation program is required to be implemented and to ensure exposure levels remain below 90 dBA 8-hour TWA through engineering controls or personal protective equipment (PPE) (29 CFR 1926.101 for construction-related PPE).

5.3.5.2 State LORS

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires state and local government agencies to inform decision makers and the public about the potential environmental impacts of the Project and to reduce environmental impacts to the extent feasible. Appendix G of the CEQA Guidelines includes criteria for evaluating potential impacts related to noise.

Cal/OSHA

Cal/OSHA has the same regulations as the federal OSHA regulations discussed above. The regulations are contained in Title 8, California Code of Regulations, General Industrial Safety Orders, Article 105, Control of Noise Exposure.

5.3.5.3 Local LORS

Vacaville General Plan

The Vacaville General Plan Noise Element (2015) includes noise policies and implementation programs to support the City's in establishing a pattern of land uses that minimize the exposure of community residents to excessive noise. The City's noise reduction and abatement strategy focuses on preventative techniques that protect noise-sensitive land uses from noise producing sources. Table 5.3-15 below provides noise performance standards for all noise sources for different receiving land uses. An acoustical analysis is required for all proposed projects that would locate noise sensitive land uses where the projected ambient noise level is greater than the respective "normally acceptable" noise level.

Table 5.3-15 Vacaville Land Use Compatibility Standards for Community Noise Environments

Type of Proposed Project	Community Noise Exposure in Decibels (CNEL) Day/Night Average Noise Level in Decibels (Ldn)			
	Clearly Acceptable	Normally Acceptable	Conditionally Acceptable	Clearly Unacceptable
Residential Low Density Single Family, Duplex, Mobile Homes	<50-60	55-70	70-72	75-85>
Residential – Multi-Family	<50-65	60-70	70-72	75-85>
Transient Lodging – Motels, Hotels	<50-65	60-70	70-80	80-85>
Schools, Libraries, Churches, Hospitals, Nursing Homes	<50-70	60-70	70-80	80-85>
Auditoriums, Concert Halls, Amphitheaters	–	50-70	–	65-85>
Sports Arenas, Outdoor Spectator Sports	–	50-75	–	70-85>
Playgrounds, Neighborhood Parks	<50-70	–	67.5-75	72.5-85>
Golf Courses, Riding Stables, Water Recreation, Cemeteries	<50-75	–	70-80	80-85>
Office Buildings, Business Commercial and Professional	<50-70	67.5-77.5	75-85>	–
Industrial, Manufacturing, Utilities, Agriculture	<50-75	70-80	80-85>	–

Normally Acceptable: Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction, without any special insulation requirements.

Conditionally Acceptable: Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features are included in the design.

Unacceptable: New construction or development should generally not be undertaken

Source: Table NOI-3 of 2035 Vacaville General Plan

Additionally, the following policies are relevant to the Project (City of Vacaville 2015):

Policy NOI-P4.1: Preclude the generation of annoying or harmful noise through conditions of approval on stationary noise sources, such as construction and property maintenance activity and mechanical equipment.

Policy NOI-P4.2: Require the following construction noise control measures:

- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction area.
- Utilize “quiet” air compressors and other stationary noise sources where technology exists.
- Limit hours of operation of outdoor noise sources through conditions of approval.

City of Vacaville Municipal Code

The City of Vacaville Municipal Code Title 14.09.240.140 Noise (Vacaville 2025) includes noise standards and regulations, shown in Table 5.3-16.

Table 5.3-16 Vacaville Noise Standards for Non-Transportation Sources

		Exterior Noise Levels		Interior Noise Levels	
Land Use Category	Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (7 a.m. to 10 p.m.)	Daytime (7 a.m. to 10 p.m.)	Nighttime (7 a.m. to 10 p.m.)
Residential	Hourly Leq, dBA	50	45	45	35
Residential	Maximum Level, dBA	70	65	–	–

L_{eq} = equivalent or energy-averaged sound level; L_{max} = Highest root-mean-square sound level measured over a given period of time

Notes: Each of the noise levels specified above shall be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

– Nontransportation Sources. Two standards apply to nontransportation noise sources: the hourly Leq, dBA, which is an hourly average sound level, and the maximum level, dBA. Table 5.3-16 shows the maximum hourly average and the peak daytime and nighttime noise standards for nontransportation sources when located near sensitive land uses. All uses shall comply with these standards. The noise standards for nontransportation sources shall not apply in the following situations:

a. To new uses if the ambient noise levels exceed the hourly Leq or the maximum level of the proposed noise generator, unless the additional noise generated would increase the projected, combined noise levels a minimum of three decibels;

b. To public parks or public playgrounds upon a finding by the decision maker that the location of the facilities within the park or playground reasonably limits the noise impacts upon other land uses;

c. For nuisance abatement related to residential generated noise sources including, but not limited to, children playing, lawn mowers, barking dogs, and musical equipment;

d. To residential caretaker units established in conjunction with nonresidential uses; or

e. To construction activity related to public improvement projects where the Director of Community Development has determined that full compliance with these standards cannot practically be achieved.

Source: City of Vacaville Municipal Code, Table 14.09.240.D

As described in VMC Section 8.10.060(O), construction, repair work or grading within 500 feet from any occupied residence between the hours of seven o'clock p.m. and seven o'clock a.m. Monday through Saturday requires notice to the City. No such construction, repair work or grading activities shall be allowed on Sundays or holidays.

Solano County General Plan Public Health and Safety Chapter

The Solano County General Plan Public Health and Safety Chapter includes noise policies and implementation programs to support the County's vision to create a place where people can live, work, and play in close proximity. The County's noise reduction and abatement strategy focuses on preventative techniques that protect noise-sensitive land uses from noise producing sources. Table 5.3-17 below provides noise performance standards for non-transportation noise sources for different receiving land uses.

Table 5.3-17 Solano County Nontransportation Noise Standards

	Outdoor Area (dBA)		Interior (dBA)
Receiving Land Use	**Daytime**	**Nighttime**	**Day and Night**
All Residential	55 L_{eq}/70 L_{max}	50 L_{eq}/65 L_{max}	35 L_{eq}/55 L_{max}
Transient Lodging[3]	55 L_{eq}/75 L_{max}	–	35 L_{eq}/55 L_{max}
Hospitals and Nursing Homes[4,5]	55 L_{eq}/75 L_{max}	–	35 L_{eq}/55 L_{max}
Theaters and Auditoriums[5]	–	–	30 L_{eq}/50 L_{max}
Churches, Meeting Halls, Schools, Libraries, etc.[5]	55 L_{eq}/75 L_{max}	–	35 L_{eq}/60 L_{max}
Office Buildings[5]	60 L_{eq}/75 L_{max}	–	45 L_{eq}/65 L_{max}
Commercial Building[5]	55 L_{eq}/75 L_{max}	–	45 L_{eq}/65 L_{max}
Playgrounds, Parks, etc.[5]	65 L_{eq}/75 L_{max}	–	–
Industry[5]	60 L_{eq}/80 L_{max}	–	50 L_{eq}/70 L_{max}

L_{eq} = equivalent or energy-averaged sound level; L_{max} = Highest root-mean-square sound level measured over a given period of time

[1] The standards shall be reduced by 5 dBA for sounds consisting primarily of speech or music, and for recurring impulsive sounds. If the existing ambient noise level exceeds the standards, then the noise level standards shall be increased at 5-dBA increments to encompass the ambient.

[2] Interior-noise-level standards are applied within noise-sensitive areas of the various land uses, with windows and doors in the closed positions.

[3] Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.

[4] Hospitals are often noise-generating uses. The exterior-noise-level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by either hospital staff or patients.

[5] The outdoor activity areas of these uses (if any), are not typically utilized during nighttime hours.

Source: Solano County General Plan Public Health and Safety Chapter, Table HS-5

Additionally, the following policies are relevant to the Project (County of Solano 2015):

Policy HS.P-48: Consider and promote land use compatibility between noise-sensitive and noise-generating land uses when reviewing new development proposals.

Policy HS.P-51: Develop strategies with residents and businesses to reduce noise conflicts.

Policy HS.P-52: Minimize noise conflicts between current and proposed land uses and transportation networks by encouraging compatible land uses around critical areas with higher noise potential.

5.3.6 Agencies and Agency Contact

Compliance with noise ordinance requirements would be enforced by the City of Vacaville and Solano County, if not for the exclusive authority of CEC through the Opt-in Application process. Table 5.3-18 provides contact information for agencies involved with noise.

Table 5.3-18 Agency Contacts for Noise

Issue	Agency	Contact
Noise exposure on sensitive receivers	City of Vacaville Department of Public Works and Planning	707-449-5170 publicworks@cityofvacaville.com

5.3.7 Permits and Permit Schedule

No permits outside the authority of the CEC are required for noise.

5.3.8 References

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