DUDEK
MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 800.450.1818 F 760.632.0164

MEMORANDUM

To:	Nighthawk Energy Storage, LLC (Applicant)
From:	Mark Storm, INCE Bd. Cert. (Dudek)
Subject:	Nighthawk Energy Storage Project – Operational and Construction Noise Analysis
Date:	February 21, 2024
cc:	Bradley Cole (Dudek)
Attachments:	Figure 1 – Baseline Short-Term Noise Level Measurement Locations Figure 2 – Project Operation Noise Levels Attachment A – Baseline Field Noise Measurement Data Attachment B – Construction Noise Prediction Worksheets

Dudek has prepared the following predictive noise analysis of proposed operational and construction noise levels for the proposed Nighthawk Energy Storage Project (project) and offers a discussion with respect to relevant City of Poway, California (Poway) and City of San Diego, California (San Diego) Noise Ordinance standards.

Executive Summary

When performed during allowable hours (7 a.m. to 7 p.m.) per San Diego municipal code, predicted noise emission from anticipated project construction activities—both from the project site adjoining Kirkham Way on which battery energy storage facilities will be constructed, and along the gen-tie alignment—are expected to be compliant with the San Diego construction noise threshold of 75 dBA 12-hour L_{eq} at the nearest offsite San Diego residentially-zoned land uses. The nearest residential noise-sensitive offsite receptors in Poway are more distant from the project, and on that basis compliance with Poway's 75 dBA 8-hour L_{eq} construction noise limit during allowable hours (7 a.m. to 5 p.m.) is also expected.

The proposed project facilities predicted noise propagation from the project during normal operation is expected to be compliant with Poway noise limits at the project boundary, which adjoins light industrial uses and an open space area to the west.

Introduction

The following subsections should help acquaint the reader with technical terms used to frame the presentation and discussion of noise assessment, summarize the project under study, and highlight relevant regulations and standards upon which project construction and operation noise levels are assessed to determine predicted compliance.

Acoustical Fundamentals

The following paragraphs provide the reader a summary of acoustical terminology and concepts that the foregoing analyses will use to evaluate potential noise and vibration impacts associated with the proposed Project.

Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receptor, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receptor determine the sound level and characteristics of the noise perceived by the receptor. The field of acoustics deals primarily with the propagation and control of sound.

Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

Sound Pressure Levels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

A-weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an "A-weighted" sound level (expressed in units of dBA) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with highway-traffic noise. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dBA.

Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3-dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different than what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000 Hz–8,000 Hz) range (Caltrans 2013). In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound, would generally be perceived as barely detectable by average healthy human hearing.

Noise Descriptors

Noise in our daily environment fluctuates over time at varying rates. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors are utilized in this analysis.

- Equivalent Sound Level (L_{eq}): L_{eq} represents an energy average of the sound level occurring over a specified period. For example, the 1-hour A-weighted equivalent sound level (L_{eq1h}) is the energy average of A-weighted sound levels occurring during a one-hour period, and is the basis for noise abatement criteria (NAC) used by Caltrans and the Federal Highway Administration (FHWA). In this study, a 12-hour L_{eq} (L_{eq12h}) is used to assess construction noise compliance with the San Diego threshold. Note that L_{eq} is not an arithmetic average of varying dB levels over a period of time, it accounts for greater sound energy represented by higher decibel contributions.
- Percentile-Exceeded Sound Level (L_{xx}): L_{xx} represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10% of the time, and L_{90} is the sound level exceeded 90% of the time).

- Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period.
- Day-Night Level (L_{dn}): L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.
- Community Noise Equivalent Level (CNEL): Similar to L_{dn}, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m., and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

- Geometric Spreading – Sound from a localized source (i.e., an ideal point source) propagates uniformly outward in a spherical pattern (or hemispherical when near a surface). The sound level attenuates (or decreases) at a rate of 6 decibels for each doubling of distance from a point source. Roadways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 decibels for each doubling of distance from a line source.
- Ground Absorption – The propagation path of noise from a sound emission source to a receptor is usually horizontal and proximate to the ground. Under these conditions, noise attenuation from ground absorption and reflective-wave canceling can add to the attenuation associated with geometric spreading. For acoustically "hard" paths over which sound may traverse (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or "soft" sites (i.e., those sites with an absorptive ground surface between the source and the receptor, such as fresh-fallen snow, soft dirt, or dense vegetative ground cover), an additional ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to cylindrical spreading for line source sound propagation, the excess ground attenuation results in an overall drop-off rate of 4.5 decibels per doubling of distance.
- Atmospheric Effects – Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound pressure levels can also be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects when distances between a source and receptor are large.
- Shielding by Natural or Human-Made Features – A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receptor specifically to reduce noise. A barrier that breaks the line of sight between a source and a receptor will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. While a line of trees may visually

occlude the direct line between a source and a receptor, its actual noise-reducing effect is usually negligible because it does not create a solid barrier. Deep expanses of dense wooded areas, on the other hand, can offer noise reduction under the right conditions.

Project Background

The proposed project site is located on approximately nine (9) of the northern-most acres of an 82-acre parcel (APN 320-031-0300) located south of Kirkham Way and is currently designated as a Mineral Resource Extraction (MRE) zone within the Planned Community 7 – South Poway Business Park. The project will consist of modular battery energy storage enclosures, inverters, medium-voltage (MV) transformers, a generation transmission line route and tie-in, and a high-voltage (HV) step-up substation transformer that would exhibit up to 300 megawatts (MW) of battery energy storage system (BESS) performance.

The proposed 138 kilovolt (kV) gen-tie line and associated fiber optic telecommunication lines would connect to the Sycamore substation and traverse parcels 325-070-1600, 325-070-1300, and 325-070-1100, which are entirely under the jurisdiction of San Diego. Because the gen-tie line would be located below-grade, its post-construction operation noise levels would be negligible and are not studied herein.

Regulatory Setting

Federal Guidance

In its Transit Noise and Vibration Impact Assessment (TNaVIA) guidance manual, the Federal Transit Administration (FTA) recommends a daytime construction noise level threshold of 80 dBA L_{eq} over an 8-hour period (FTA 2018) when detailed construction noise assessments are performed to evaluate potential impacts to community residences surrounding a project. Although this FTA guidance is not a regulation, it can serve as a quantified standard in the absence of such noise limits at the state and local jurisdictional levels.

With respect to vibration, the TNaVIA guidance manual includes thresholds for assessing building damage risk and human annoyance. Akin to the aforementioned guidance for airborne noise from construction activities, 0.2 ips PPV is recommended as a limit for "non-engineered timber and masonry buildings" when local regulations lack such standards.

City of Poway

General Plan

Operational noise levels from the project is expected to be compatible with the existing outdoor sound environment in the area, which comprises current commercial, industrial, and storage-type land uses. According to the Noise Hazards section of City General Plan Public Safety Element (City of Poway 1991), the day-night noise level (L_{dn}) range for such uses can be as high as 75 dBA and still considered "normally acceptable."

Noise Ordinance

Chapter 8.08.040 of the Poway Municipal Code prescribes exterior noise limits at the boundaries of the parcel containing the noise source, which are 70 dBA hourly L_{eq} anytime for industrial land uses like the project site (City of Poway 2021) and others that generally surround it. The only exception is an adjoining property parcel to the west of the project (City of

Poway 2022), which is zoned as Open Space (OS) and thus limited to 40 dBA hourly L_{eq} at night. However, at such boundaries of dissimilar zoning, the arithmetic average of the two limits apply, meaning that 55 dBA hourly L_{eq} (i.e., [70+40]/2) would be the nighttime threshold along most of the project's western boundary.

With respect to construction activity, Poway Municipal Code prohibits hours during which is can occur (i.e., outside of 7 a.m. to 5 p.m., unless allowed by the "City Engineer") and applies an eight-hour L_{eq} threshold of 75 dBA "during any 24-hour period when measured at or within the property lines of any property which is developed and used either in part or in whole for residential purposes." Higher sound levels are allowed, but only for fractions of the cumulative 8-hour period.

City of San Diego

Noise Ordinance

Section 59.5.0404 part (a) of the City of San Diego Municipal Code prohibits construction activities between the hours of 7:00 pm and 7:00 am and on Sundays and holidays. Further, part (b) of the aforementioned section also prohibits construction noise with an average sound level greater than 75 dBA from 7:00 am to 7:00 pm of any property zoned as residential.

Existing Conditions

Sound pressure level (SPL) measurements were conducted near the proposed project site on September 19, 2022, to quantify and characterize the existing outdoor ambient sound levels. Table 3 provides the location, date, and time period at which these baseline noise level measurements were performed by an attending Dudek field investigator using a Rion-branded Model NL-52 sound level meter (SLM) equipped with a 0.5-inch, pre-polarized condenser microphone with pre-amplifier. The SLM meets the current American National Standards Institute standard for a Type 1 (Precision Grade) sound level meter. The accuracy of the SLM was verified using a field calibrator before and after the measurements, and the measurements were conducted with the microphone positioned approximately 5 feet above the ground.

Four (4) short-term (ST) noise level measurement locations (ST1 through ST4) intended to be representative of the outdoor ambient sound environment for existing noise-sensitive receivers in the vicinity of the proposed project were selected near the proposed project site. These locations are depicted as receivers ST1 through ST4 on Figure 1, Baseline Short-Term Noise Level Measurement Locations. The measured L_{eq} and L_{max} noise levels at these surveyed locations are provided in Table 3. The primary noise sources at the sites identified in Table 3 consisted of existing quarry operations noise, distant construction noise, conversation/yelling, distant traffic along adjacent roadways, distant aircraft, rustling leaves, a pool pump, and birdsong. As shown in Table 3, the measured SPL ranged from 43.8 dBA L_{eq} at ST1 to 48.9 dBA L_{eq} at ST4. Beyond the summarized information presented in Table 1, detailed noise measurement data is included in Attachment A, Baseline Noise Measurement Field Data.

Table 1. Measured Baseline Outdoor Ambient Noise Levels

Site	Location/Address	Date (mm/dd/yy) Time (hh:mm)	Leq (dBA)	Lmax (dBA)
ST1	11225 Beeler Canyon Road	09/19/22 11:30 – 11:45	43.8	50.6
ST2	11431 Stockwood Cove	09/19/22 12:30 – 12:45	47.3	58.0
ST3	14109 Green Valley Court	09/19/22 13:10 – 13:25	48.9	55.3
ST4	14237 Green Valley Court	09/19/22 13:45 – 14:00	44.8	51.9

Source: Attachment A.
Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval; dBA = A-weighted decibels; ST = short-term noise measurement locations.

Generally, the measured samples of daytime L_{eq} agree with expectations: all of the measured locations are fairly rural, with distant roadway traffic, construction, and ambient noise (birds, rustling leaves, etc.) making up the majority of the noise contribution at each site.

Impact Assessment

Methodology

Onsite Equipment Operation

Using DataKustik's CadnaA software, which models three-dimensional outdoor sound propagation based on International Organization for Standardization (ISO) 9613-2 algorithms and relevant reference data, an operational scenario of the proposed project was modeled for purposes of this analysis. The modeled scenario included the following operating assumptions for the anticipated noise sources: 330 battery energy storage enclosures (each with eight [8] cooling system fans operating at 40% capacity[1]; 83 medium voltage (MV) transformers; and 1 high-voltage (HV) transformer operating nominally at 300 MVA. Facilities are expected to operate at any time, either discharging or charging onsite batteries, up to 24 hours a day, 365 days a year.

The predictive analysis assumes that all the above equipment is operating under a charging or discharging condition that may last up to a full continuous hour. For purposes of this preliminary analysis, the overall A-weighted levels appearing in Table 2 were used to define the individual project sound sources.

1 This cooling system fan capacity setting is consistent with confidential operational data provided by the Applicant's candidate supplier of on-site equipment, which accounts for expected seasonal environmental conditions in the vicinity of the proposed project site.

Table 2. Sound Power Levels for the Modeled Individual Sources of Outdoor Noise Emission

Source	Sound Level per Octave Band Center Frequency (OBCF)									Overall Sound Level (dBA)
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	
Eight-fan BESS[a]	40.4	58.4	70.3	84.1	82.5	76.2	77.4	75.7	64.7	91.1
HV transformer[b]	63	82	94	96	102	99	95	90	81	105.4
MV transformer[c]	30	49	61	63	69	66	62	57	48	72.4

Notes: OBCF = Octave Band Center Frequency in cycles per second (Hertz [Hz]); dBA = A-weighted decibels; BESS = battery energy storage system; HV = high voltage; MV = medium voltage.

a Reference sound power level data shown herein, based upon data provided by the Applicant's candidate supplier of on-site equipment, represents the aforementioned 40% capacity setting for cooling fan operation.

b Based on the Applicant-provided sound pressure level, converted to sound power and with OBCF granularity based on the Electric Power Plant Environmental Noise Guide (Edison Electric Institute 1984).

c Estimated with Electric Power Plant Environmental Noise Guide (Edison Electric Institute 1984), results in sound pressure level (SPL) at 2 meters comparable to 89 dBA per Applicant candidate supplier recommendations.

The sound propagation model conservatively neglects terrain and thus assumes flat topography, since the planned grade for the site is meant to be comparable to that of Kirkham Way. Topography to the east and west of the planned project site slope downward into existing valleys. For purposes of this assessment, remnants of short hills at the south side of the project site are ignored—but in reality, they would help occlude some of the sound in this direction towards distant communities south of Poway. Additional modeling assumptions and parameters are as follows: reflection order = 1 (i.e., one "bounce" of a direct sound ray on an encountered structure or barrier is considered); ground absorption = 0.8 (on the 0-1 spectrum for this coefficient, intends to reflect the surrounding desert landscape; calm winds (less than 0.5 meters per second in any direction); temperature = 68 degrees Fahrenheit; and 70% relative humidity. In addition, per the current layout of equipment, a 12-foot-tall wall surrounds the site.

Construction

Construction noise is considered a short-term and temporary environmental noise impact and would be considered significant if project onsite or offsite construction activities, occurring within allowable hours of operation, resulted in excessive noise exposure levels at a Poway or San Diego residential receptor. Nearest noise-sensitive land uses in the vicinity of the project include San Diego residences to the southwest of the project site (~2,475 feet from the project site construction boundary), west of the transmission line route (~390 feet from the gen-tie construction boundary) and east of the transmission line route (~330 feet from the gen-tie construction boundary). Although additional residences and other noise-sensitive receivers are further afield, the construction noise assessment focused on project-attributed noise exposure levels predicted to occur at these nearest existing residences. Construction noise levels at more distant receivers would be substantially lower, consistent with established acoustical principles of attenuation with geometric divergence and other factors.

Project-generated construction noise will vary depending on the construction process, the type of equipment involved, the location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week), and the duration of the construction work. Using information provided by the project applicant as well as typical equipment identified by CalEEMod for this type and size of development, project construction noise per each of five distinct phases was calculated using a spreadsheet-based model emulating the Federal Highway Administration (FHWA) Roadway Construction Noise Model (FHWA 2008). Table 3 presents the equipment list used for the construction noise analysis.

Table 3. Construction Equipment Roster Assumptions by Phase/Activity

Construction Activity/Phase	Equipment Type	Total Equipment Quantity	Allowable Operation Time (hours)
Site Preparation	grader	2	8
	front end loader	2	8
	backhoe	2	8
	skid-steer	2	8
Collector Substation Site Preparation	dozer	2	8
	backhoe	2	8
Grading	grader	2	8
	compactor (ground)	2	8
	roller	2	8
	front end loader	2	8
	backhoe	2	8
	skid-steer	2	8
Collector Substation Grading	dozer	2	8
	roller	2	8
	backhoe	2	8
Battery Container Installation	crane	2	8
	compressor (air)	2	8
	excavator	2	8
	generator	2	8
	compactor (ground)	2	8
	roller	2	8
	gradall	2	8
	backhoe	2	8
	skid-steer	2	8
Collector Substation Installation	man lift	2	8
	compressor (air)	2	8
	auger drill rig	2	8
	crane	2	8
	excavator	2	8
	generator	2	8
	roller	2	8
	gradall	2	8
	slurry trenching machine	2	8
	backhoe	2	8

Table 3. Construction Equipment Roster Assumptions by Phase/Activity

Construction Activity/Phase	Equipment Type	Total Equipment Quantity	Allowable Operation Time (hours)
	dozer	2	8
	skid-steer	2	8
Gen-Tie Trenching	slurry trenching machine	2	8
	backhoe	2	8
	pumps	2	8
	dump truck	2	8
	skid-steer	2	8
Gen-Tie Duct Bank and Vault Installation	man lift	2	8
	generator	2	8
	backhoe	2	8
	crane	2	8
	concrete pump truck	3	8
	skid-steer	2	8
Gen-Tie Jack-and-Bore	backhoe	1	8
	boring jack power unit	1	8
	horizontal boring hydr. jack	1	8
	dump truck	1	8
	welder / torch	1	8
	skid-steer	1	8
Gen-Tie Road Resurface and Clean-up	paver	1	8
	roller	1	8
	backhoe	1	8
	flat bed truck	1	8
	skid-steer	1	8
Decommissioning	concrete saw	2	8
	crane	2	8
	dozer	2	8
	backhoe	2	8

Source: Dudek 2022

Using the provided construction information appearing in Table 3, aggregate construction noise exposure levels at three of the short-term measurement locations (ST1, ST2, and ST4) are predicted per the following assumption: usage of the shortest activity-to-receptor distance for the loudest equipment type and quantity associated with the studied construction phase, with less noisy equipment types at successive distance increments of 50 feet.

This method is considered a conservative approach to assess what might be characterized as a peak exposure level, applicable to not more than approximately 10%–15% of the total construction period and when the studied construction activity is taking place with loudest equipment along the property boundary closest to these nearest off-site receivers.

Prediction Results

Onsite Equipment Operation

As shown on Figure 2 (Project Operation Noise Levels) and Table 4, the predicted aggregate sound emission from a 1-hour-long period of all operating battery energy storage enclosures, MV transformers, and the HV transformer stays below 53 dBA L_{eq} at all boundary lines of the project property, and thus below the applicable Poway exterior noise thresholds.

Table 4. Predicted Operational Sound Pressure Levels at Modeled Receptors

Modeled Receptor (Location)	Receiving Zoning and Land Use	Sound Pressure Level (dBA Leq)	Poway Noise Limit (dBA Leq) and Compliance?
M1 (13367 Kirkham Way)	Planned Community 7 (PC-7) Light Industrial – Outside Storage (LI-S)	44.9	70 – yes
M2 (edge of APN-3202201300)	Planned Community 7 (PC-7) Open Space (OS)	45.3	55 – yes
M3 (edge of APN-3202201300)	Planned Community 7 (PC-7) Open Space (OS)	44.9	55 – yes
M4 (edge of APN-3202201300)	Planned Community 7 (PC-7) Open Space (OS)	44.3	55 – yes
M5 (13370 Kirkham Way)	Planned Community 7 (PC-7) Light Industrial (LI)	44.2	70 – yes
M6 (13400 Kirkham Way)	Planned Community 7 (PC-7) Light Industrial (LI)	47.9	70 – yes
M7 (12120 Kear Place)	Planned Community 7 (PC-7) Industrial Park (IP)	50.9	70 – yes
M8 (12110 Tech Center Drive)	Planned Community 7 (PC-7) Light Industrial (LI)	50.7	70 – yes
M9 (eastern Project property line)	Planned Community 7 (PC-7) Mineral Resource Extraction (MRE)	52.9	70 – yes

Notes: dBA = A-weighted decibels; L_{eq} = energy-equivalent level.

Figure 2 displays the predicted aggregate project operational noise as concentric bands of different colors representing 5-decibel-wide ranges of sound pressure level, consistent with the color band legend appearing at the bottom right of the image.

Project Construction

Attachment B (Construction Noise Prediction Worksheets) displays the construction noise model worksheets that emulate the FHWA RCNM and include energy-averaging over a 12-hour period as expected by the San Diego for residential properties under its jurisdiction. Table 5 shows that prediction results of both scenarios yield predicted 12-hour L_{eq} values that do not exceed the aforesaid San Diego threshold of 75 dBA.

Table 5. Predicted Construction Noise at Modeled Receptors

Construction Activity/Phase	Noise Exposure Level (12-hour dBA Leq) at Indicated Location		
	ST1	ST2	ST4
Site Preparation	45	42	40
Collector Substation Site Preparation	41	38	36
Grading	45	43	41
Collector Substation Grading	42	39	37
Battery Container Installation	45	43	41
Collector Substation Installation	47	44	42
Gen-Tie Trenching	58	60	61
Gen-Tie Duct Bank and Vault Installation	57	59	60
Gen-Tie Jack-and-Bore	55	57	58
Gen-Tie Road Resurface and Clean-up	53	55	56
Decommissioning	46	44	41

Notes: dBA = A-weighted decibels; L_{eq} = energy-equivalent level.

The magnitudes of the predicted construction noise levels appearing in Table 5 are comparable to or exceed the baseline sample Leq values appearing in Table 1, but such increases in the outdoor ambient sound environment attributed to project construction activity would be temporary and not occur once they area completed and the project operates from its site as expected.

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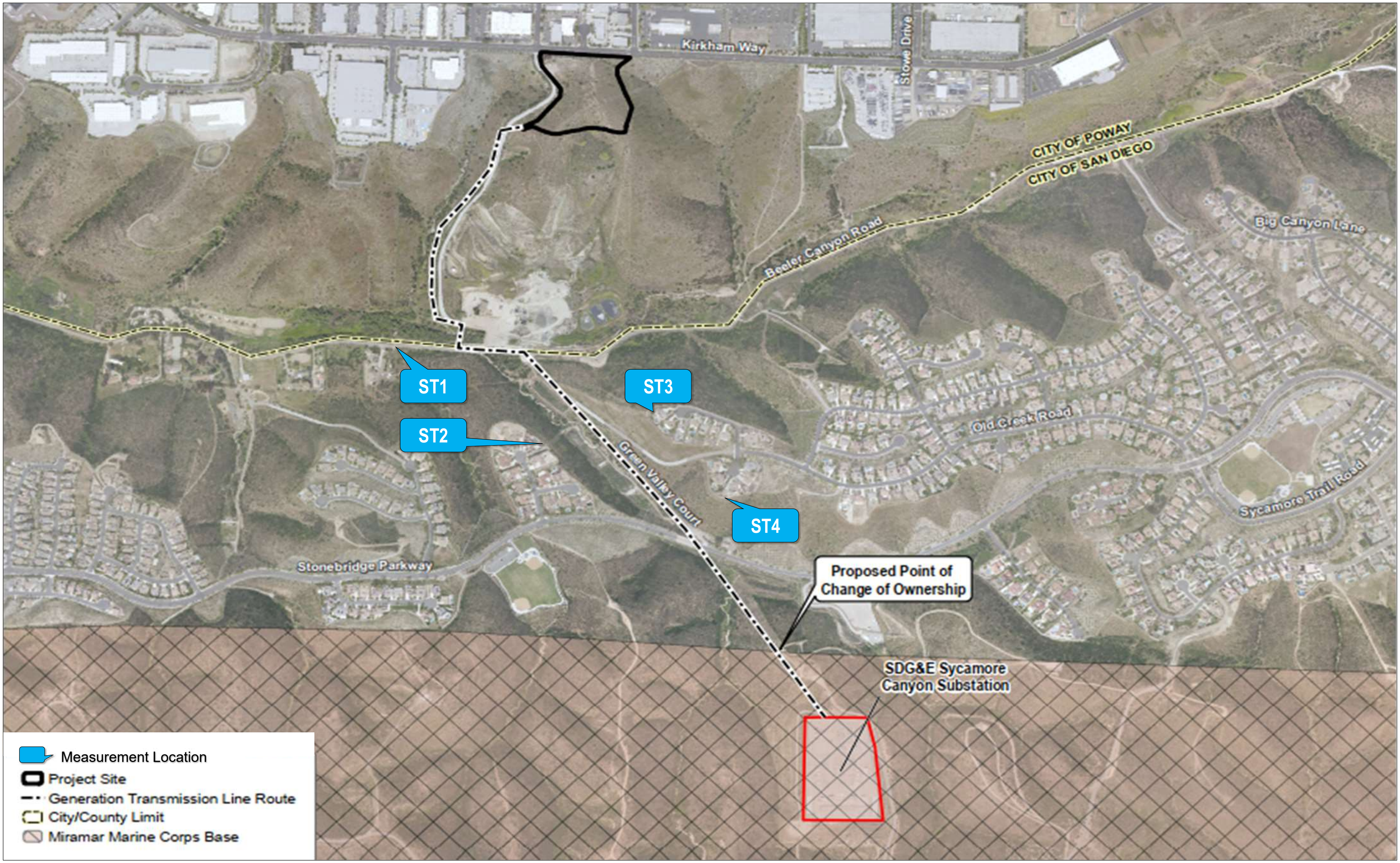


SOURCE: Dudek 2022

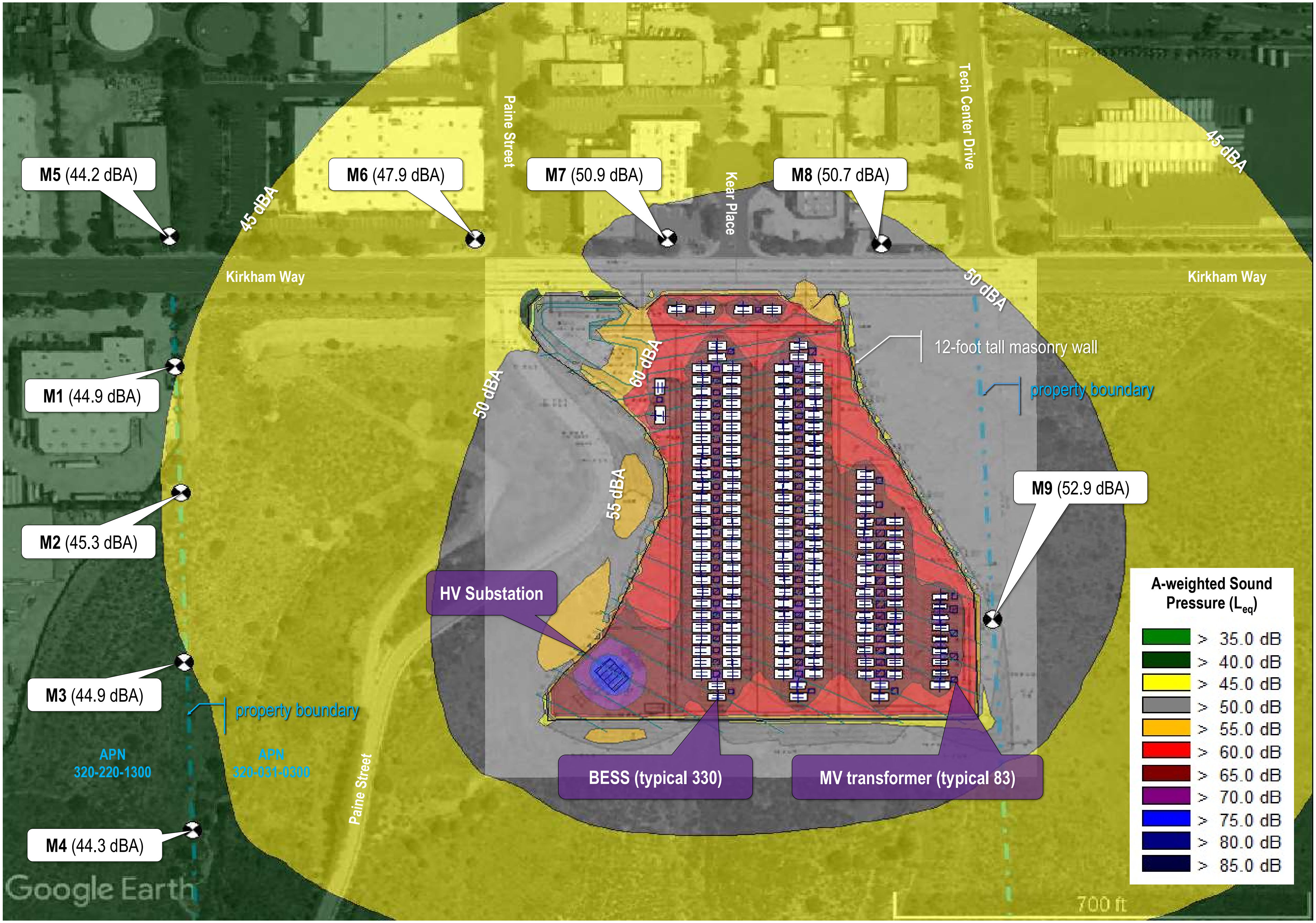
DUDEK

0 472.5 945 Feet

FIGURE 1

Baseline Short-Term Noise Level Measurement Locations

Nighthawk Energy Storage Project (Dudek No. 12655.07)



SOURCES: Google 2022; Arevon 2023; Dudek 2024

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FIGURE 2

Project Operation Noise Levels (at full 300 MW / 1200 MWH capacity)

Nighthawk Energy Storage Project (Dudek No. 14815.16)

Attachment A

Baseline Field Noise Measurement Data

FORMS DUDEK FIELD DATA REPORT

Field Noise Measurement Data

Record: 1471	
Project Name	*Nighthawk*
Observer(s)	*Connor Burke*
Date	*2022-09-19*

Meteorological Conditions	
Temp (F)	*77*
Humidity % (R.H.)	*47*
Wind	*Calm*
Wind Speed (MPH)	*2*
Wind Direction	*East*
Sky	*Sunny*

Instrument and Calibrator Information	
Instrument Name List	*(ENC) Rion NL-52*
Instrument Name	*(ENC) Rion NL-52*
Instrument Name Lookup Key	*(ENC) Rion NL-52*
Manufacturer	*Rion*
Model	*NL-52*
Serial Number	*553896*
Calibrator Name	*(ENC) LD CAL150*
Calibrator Name	*(ENC) LD CAL150*
Calibrator Name Lookup Key	*(ENC) LD CAL150*
Calibrator Manufacturer	*Larson Davis*
Calibrator Model	*LD CAL150*
Calibrator Serial #	*5152*
GPS Assistance Used	*Yes*
Pre-Test (dBA SPL)	*94*
Post-Test (dBA SPL)	*94*
Windscreen	*Yes*
Weighting?	*A-WTD*
Slow/Fast?	*Slow*
ANSI?	*Yes*

Monitoring	
Record #	*1*
Site ID	*ST1*
Site Location Lat/Long	*32.927502, -117.042160*
Begin (Time)	*11:30:00*
End (Time)	*11:45:00*
Leq	*43.8*
Lmax	*50.6*
Lmin	*36*
Other Lx?	*L90, L50, L10*
L90	*38.2*
L50	*42.5*
L10	*47.50*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Distant construction sounds*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Traffic*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

FORMS DUDEK FIELD DATA REPORT

Description / Photos

Site Photos

Photo	

Monitoring

Record #	*2*
Site ID	*ST2*
Site Location Lat/Long	*32.925222, -117.038787*
Begin (Time)	*12:30:00*
End (Time)	*12:45:00*
Leq	*47.3*
Lmax	*58*
Lmin	*36.5*
Other Lx?	*L90, L50, L10*
L90	*38.9*
L50	*44.2*
L10	*50.8*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Distant construction*
Other Noise Sources (Background)	*Birds, Rustling Leaves*
Other Noise Sources Additional Description	*Truck loading at granite quarry. Dozer plowing*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

FORMS FIELD DATA REPORT

Description / Photos

Site Photos

Photo	

Monitoring

Record #	*3*
Site ID	*ST3*
Site Location Lat/Long	*32.925943, -117.036170*
Begin (Time)	*13:10:00*
End (Time)	*13:25:00*
Leq	*48.9*
Lmax	*55.3*
Lmin	*44.6*
Other Lx?	*L90, L50, L10*
L90	*45.9*
L50	*47.7*
L10	*51.6*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Quarry noise*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Conversations / Yelling, Distant Traffic*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Description / Photos

Site Photos

Photo	

Monitoring

Record #	*4*
Site ID	*ST4*
Site Location Lat/Long	*32.924796, -117.034823*
Begin (Time)	*13:45:00*
End (Time)	*14:00:00*
Leq	*44.8*
Lmax	*51.9*
Lmin	*41.2*
Other Lx?	*L90, L50, L10*
L90	*41.9*
L50	*43.7*
L10	*46.5*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Conversations / Yelling, Distant Traffic*
Other Noise Sources Additional Description	*Pool pump at nearest residence*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

FORMS FIELD DATA REPORT

Description / Photos

Site Photos

Photo	

Attachment B
Construction Noise Prediction Worksheets

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at residential land use, per SD guidance = 75
allowable hours over which Leq is to be averaged = 12

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 12-hour Leq
Site Preparation	grader	2	40	85		2190	0.1		45.2	8	480	42
	front end loader	2	40	79		2290	0.1		38.7	8	480	36
	backhoe	2	40	78		2340	0.1		37.5	8	480	35
	skid-steer*	2	40	80		2240	0.1		39.9	8	480	37
										Total for Site Preparation Phase:		**44.7**
Collector Substation Site Preparation	dozer	2	40	82		2190	0.1		42.2	8	480	39
	backhoe	2	40	78		2240	0.1		37.9	8	480	35
										Total for Collector Substation Site Preparation Phase:		**40.9**
Grading	grader	2	40	85		2190	0.1		45.2	8	480	42
	compactor (ground)	2	20	80		2240	0.1		39.9	8	480	34
	roller	2	20	80		2290	0.1		39.7	8	480	34
	front end loader	2	40	79		2390	0.1		38.2	8	480	36
	backhoe	2	40	78		2440	0.1		37.0	8	480	34
	skid-steer*	2	40	80		2340	0.1		39.5	8	480	37
										Total for Grading Phase:		**45.3**
Collector Substation Grading	dozer	2	40	82		2190	0.1		42.2	8	480	39
	roller	2	20	80		2240	0.1		39.9	8	480	34
	backhoe	2	40	78		2290	0.1		37.7	8	480	35
										Total for Collector Substation Grading Phase:		**41.7**
Battery Container Installation	crane	2	16	81		2240	0.1		40.9	8	480	34
	compressor (air)	2	40	78		2490	0.1		36.8	8	480	34
	excavator	2	40	81		2290	0.1		40.7	8	480	38
	generator	2	50	72		2940	0.1		28.9	8	480	27
	compactor (ground)	2	20	80		2340	0.1		39.5	8	480	34
	roller	2	20	80		2390	0.1		39.2	8	480	33
	gradall	2	40	83		2190	0.1		43.2	8	480	40
	backhoe	2	40	78		2540	0.1		36.5	8	480	34
	skid-steer*	2	40	80		2440	0.1		39.0	8	480	36
										Total for Battery Container Installation Phase:		**45.4**
Collector Substation Installation	man lift	2	20	75		2690	0.1		32.9	8	480	27
	compressor (air)	2	40	78		2640	0.1		36.1	8	480	33
	auger drill rig	2	20	84		2190	0.1		44.2	8	480	38
	crane	2	16	81		2290	0.1		40.7	8	480	34
	excavator	2	40	81		2340	0.1		40.5	8	480	38
	generator	2	50	72		2740	0.1		29.7	8	480	28
	roller	2	20	80		2390	0.1		39.2	8	480	33
	gradall	2	40	83		2240	0.1		42.9	8	480	40
	slurry trenching machine	2	40	80		2440	0.1		39.0	8	480	36
	backhoe	2	40	80		2490	0.1		38.8	8	480	36
	dozer	2	40	80		2540	0.1		38.5	8	480	36
	skid-steer*	2	40	80		2590	0.1		38.3	8	480	36
										Total for Collector Substation Installation Phase:		**46.7**
Gen-Tie Trenching	slurry trenching machine	2	50	80		460	0.1		55.8	8	480	54
	backhoe	2	40	78		560	0.1		51.9	8	480	49
	pumps	2	50	77		610	0.1		50.1	8	480	48
	dump truck	2	40	76		660	0.1		48.3	8	480	46
	skid-steer*	2	40	80		510	0.1		54.8	8	480	52
										Total for Gen-Tie Trenching Phase:		**57.8**
Gen-Tie Duct Bank and Vault Installation	man lift	2	20	75		660	0.1		47.3	8	480	42
	generator	2	50	72		710	0.1		43.6	8	480	42
	backhoe	2	40	78		610	0.1		51.1	8	480	48
	crane	2	16	81		460	0.1		56.8	8	480	50
	concrete pump truck	3	20	81		510	0.1		55.8	8	480	52
	skid-steer*	2	40	80		560	0.1		53.9	8	480	51
										Total for Gen-Tie Duct Bank and Vault Installation Phase:		**56.9**
Gen-Tie Jack-and-Bore	backhoe	1	40	78		610	0.1		51.1	8	480	45
	boring jack power unit	1	50	80		460	0.1		55.8	8	480	51
	horizontal boring hydr. jack	1	25	80		510	0.1		54.8	8	480	47
	dump truck	1	40	76		660	0.1		48.3	8	480	43
	welder / torch	1	40	73		710	0.1		44.6	8	480	39
	skid-steer*	1	40	80		560	0.1		53.9	8	480	48
										Total for Gen-Tie Jack-and-Bore Phase:		**54.8**
Gen-Tie Road Resurface and Clean-up	paver	1	50	77		610	0.1		50.1	8	480	45
	roller	1	20	80		460	0.1		55.8	8	480	47
	backhoe	1	40	78		560	0.1		51.9	8	480	46
	flat bed truck	1	40	74		660	0.1		46.3	8	480	41
	skid-steer*	1	40	80		510	0.1		54.8	8	480	49
										Total for Gen-Tie Road Resurface and Clean-up Phase:		**53.4**
Decommissioning	concrete saw	2	20	90		2190	0.1		50.2	8	480	44
	crane	2	16	81		2290	0.1		40.7	8	480	34
	dozer	2	40	82		2240	0.1		41.9	8	480	39
	backhoe	2	40	78		2340	0.1		37.5	8	480	35
										Total for Decommissioning Phase:		**46.2**

Notes

* https://ia.cpuc.ca.gov/Environment/info/ene/mesa/attachment/A1503003%20ED-SCE-01%20Q.PD-01%20Attachment%20(Revised%20Noise%20Levels%20Construction%20Equipment).pdf

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at residential land use, per SD guidance = 75
allowable hours over which Leq is to be averaged = 12

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 12-hour Leq
Site Preparation	grader	2	40	85		2780	0.1		42.5	8	480	40
	front end loader	2	40	79		2880	0.1		36.1	8	480	33
	backhoe	2	40	78		2930	0.1		34.9	8	480	32
	skid-steer*	2	40	80		2830	0.1		37.3	8	480	35
									Total for Site Preparation Phase:			**42.1**
Collector Substation Site Preparation	dozer	2	40	82		2780	0.1		39.5	8	480	37
	backhoe	2	40	78		2830	0.1		35.3	8	480	33
									Total for Collector Substation Site Preparation Phase:			**38.2**
Grading	grader	2	40	85		2780	0.1		42.5	8	480	40
	compactor (ground)	2	20	80		2830	0.1		37.3	8	480	32
	roller	2	20	80		2880	0.1		37.1	8	480	31
	front end loader	2	40	79		2980	0.1		35.7	8	480	33
	backhoe	2	40	78		3030	0.1		34.5	8	480	32
	skid-steer*	2	40	80		2930	0.1		36.9	8	480	34
									Total for Grading Phase:			**42.7**
Collector Substation Grading	dozer	2	40	82		2780	0.1		39.5	8	480	37
	roller	2	20	80		2830	0.1		37.3	8	480	32
	backhoe	2	40	78		2880	0.1		35.1	8	480	32
									Total for Collector Substation Grading Phase:			**39.0**
Battery Container Installation	crane	2	16	81		2830	0.1		38.3	8	480	32
	compressor (air)	2	40	78		3080	0.1		34.3	8	480	32
	excavator	2	40	81		2880	0.1		38.1	8	480	35
	generator	2	50	72		3530	0.1		26.7	8	480	25
	compactor (ground)	2	20	80		2930	0.1		36.9	8	480	31
	roller	2	20	80		2980	0.1		36.7	8	480	31
	gradall	2	40	83		2780	0.1		40.5	8	480	38
	backhoe	2	40	78		3130	0.1		34.1	8	480	31
	skid-steer*	2	40	80		3030	0.1		36.5	8	480	34
									Total for Battery Container Installation Phase:			**42.8**
Collector Substation Installation	man lift	2	20	75		3280	0.1		30.6	8	480	25
	compressor (air)	2	40	78		3230	0.1		33.8	8	480	31
	auger drill rig	2	20	84		2780	0.1		41.5	8	480	36
	crane	2	16	81		2880	0.1		38.1	8	480	31
	excavator	2	40	81		2930	0.1		37.9	8	480	35
	generator	2	50	72		3330	0.1		27.4	8	480	26
	roller	2	20	80		2980	0.1		36.7	8	480	31
	gradall	2	40	83		2830	0.1		40.3	8	480	38
	slurry trenching machine	2	40	80		3030	0.1		36.5	8	480	34
	backhoe	2	40	80		3080	0.1		36.3	8	480	34
	dozer	2	40	80		3130	0.1		36.1	8	480	33
	skid-steer*	2	40	80		3180	0.1		35.9	8	480	33
									Total for Collector Substation Installation Phase:			**44.2**
Gen-Tie Trenching	slurry trenching machine	2	50	80		375	0.1		57.8	8	480	56
	backhoe	2	40	78		475	0.1		53.5	8	480	51
	pumps	2	50	77		525	0.1		51.5	8	480	50
	dump truck	2	40	76		575	0.1		49.7	8	480	47
	skid-steer*	2	40	80		425	0.1		56.6	8	480	54
									Total for Gen-Tie Trenching Phase:			**59.6**
Gen-Tie Duct Bank and Vault Installation	man lift	2	20	75		575	0.1		48.7	8	480	43
	generator	2	50	72		625	0.1		44.9	8	480	43
	backhoe	2	40	78		525	0.1		52.5	8	480	50
	crane	2	16	81		375	0.1		58.8	8	480	52
	concrete pump truck	3	20	81		425	0.1		57.6	8	480	54
	skid-steer*	2	40	80		475	0.1		55.5	8	480	53
									Total for Gen-Tie Duct Bank and Vault Installation Phase:			**58.5**
Gen-Tie Jack-and-Bore	backhoe	1	40	78		525	0.1		52.5	8	480	47
	boring jack power unit	1	50	80		375	0.1		57.8	8	480	53
	horizontal boring hydr. jack	1	25	80		425	0.1		56.6	8	480	49
	dump truck	1	40	76		575	0.1		49.7	8	480	44
	welder / torch	1	40	73		625	0.1		45.9	8	480	40
	skid-steer*	1	40	80		475	0.1		55.5	8	480	50
									Total for Gen-Tie Jack-and-Bore Phase:			**56.6**
Gen-Tie Road Resurface and Clean-up	paver	1	50	77		525	0.1		51.5	8	480	47
	roller	1	20	80		375	0.1		57.8	8	480	49
	backhoe	1	40	78		475	0.1		53.5	8	480	48
	flat bed truck	1	40	74		575	0.1		47.7	8	480	42
	skid-steer*	1	40	80		425	0.1		56.6	8	480	51
									Total for Gen-Tie Road Resurface and Clean-up Phase:			**55.1**
Decommissioning	concrete saw	2	20	90		2780	0.1		47.5	8	480	42
	crane	2	16	81		2880	0.1		38.1	8	480	31
	dozer	2	40	82		2830	0.1		39.3	8	480	37
	backhoe	2	40	78		2930	0.1		34.9	8	480	32
									Total for Decommissioning Phase:			**43.5**

Notes

* https://ia.cpuc.ca.gov/Environment/info/ene/mesa/attachment/A1503003%20ED-SCE-01%20Q.PD-01%20Attachment%20(Revised%20Noise%20Levels%20Construction%20Equipment).pdf

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at residential land use, per SD guidance = 75
allowable hours over which Leq is to be averaged = 12

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 12-hour Leq
Site Preparation	grader	2	40	85		3340	0.1		40.4	8	480	38
	front end loader	2	40	79		3440	0.1		34.0	8	480	31
	backhoe	2	40	78		3490	0.1		32.8	8	480	30
	skid-steer*	2	40	80		3390	0.1		35.2	8	480	32
									Total for Site Preparation Phase:			**40.0**
Collector Substation Site Preparation	dozer	2	40	82		3340	0.1		37.4	8	480	35
	backhoe	2	40	78		3390	0.1		33.2	8	480	30
									Total for Collector Substation Site Preparation Phase:			**36.0**
Grading	grader	2	40	85		3340	0.1		40.4	8	480	38
	compactor (ground)	2	20	80		3390	0.1		35.2	8	480	29
	roller	2	20	80		3440	0.1		35.0	8	480	29
	front end loader	2	40	79		3540	0.1		33.6	8	480	31
	backhoe	2	40	78		3590	0.1		32.5	8	480	30
	skid-steer*	2	40	80		3490	0.1		34.8	8	480	32
									Total for Grading Phase:			**40.5**
Collector Substation Grading	dozer	2	40	82		3340	0.1		37.4	8	480	35
	roller	2	20	80		3390	0.1		35.2	8	480	29
	backhoe	2	40	78		3440	0.1		33.0	8	480	30
									Total for Collector Substation Grading Phase:			**36.8**
Battery Container Installation	crane	2	16	81		3390	0.1		36.2	8	480	29
	compressor (air)	2	40	78		3640	0.1		32.3	8	480	30
	excavator	2	40	81		3440	0.1		36.0	8	480	33
	generator	2	50	72		4090	0.1		24.8	8	480	23
	compactor (ground)	2	20	80		3490	0.1		34.8	8	480	29
	roller	2	20	80		3540	0.1		34.6	8	480	29
	gradall	2	40	83		3340	0.1		38.4	8	480	36
	backhoe	2	40	78		3690	0.1		32.1	8	480	29
	skid-steer*	2	40	80		3590	0.1		34.5	8	480	32
									Total for Battery Container Installation Phase:			**40.7**
Collector Substation Installation	man lift	2	20	75		3840	0.1		28.6	8	480	23
	compressor (air)	2	40	78		3790	0.1		31.8	8	480	29
	auger drill rig	2	20	84		3340	0.1		39.4	8	480	34
	crane	2	16	81		3440	0.1		36.0	8	480	29
	excavator	2	40	81		3490	0.1		35.8	8	480	33
	generator	2	50	72		3890	0.1		25.5	8	480	24
	roller	2	20	80		3540	0.1		34.6	8	480	29
	gradall	2	40	83		3390	0.1		38.2	8	480	35
	slurry trenching machine	2	40	80		3590	0.1		34.5	8	480	32
	backhoe	2	40	80		3640	0.1		34.3	8	480	32
	dozer	2	40	80		3690	0.1		34.1	8	480	31
	skid-steer*	2	40	80		3740	0.1		34.0	8	480	31
									Total for Collector Substation Installation Phase:			**42.1**
Gen-Tie Trenching	slurry trenching machine	2	50	80		330	0.1		59.0	8	480	57
	backhoe	2	40	78		430	0.1		54.5	8	480	52
	pumps	2	50	77		480	0.1		52.4	8	480	51
	dump truck	2	40	76		530	0.1		50.5	8	480	48
	skid-steer*	2	40	80		380	0.1		57.7	8	480	55
									Total for Gen-Tie Trenching Phase:			**60.7**
Gen-Tie Duct Bank and Vault Installation	man lift	2	20	75		530	0.1		49.5	8	480	44
	generator	2	50	72		580	0.1		45.6	8	480	44
	backhoe	2	40	78		480	0.1		53.4	8	480	51
	crane	2	16	81		330	0.1		60.0	8	480	53
	concrete pump truck	3	20	81		380	0.1		58.7	8	480	55
	skid-steer*	2	40	80		430	0.1		56.5	8	480	54
									Total for Gen-Tie Duct Bank and Vault Installation Phase:			**59.6**
Gen-Tie Jack-and-Bore	backhoe	1	40	78		480	0.1		53.4	8	480	48
	boring jack power unit	1	50	80		330	0.1		59.0	8	480	54
	horizontal boring hydr. jack	1	25	80		380	0.1		57.7	8	480	50
	dump truck	1	40	76		530	0.1		50.5	8	480	45
	welder / torch	1	40	73		580	0.1		46.6	8	480	41
	skid-steer*	1	40	80		430	0.1		56.5	8	480	51
									Total for Gen-Tie Jack-and-Bore Phase:			**57.6**
Gen-Tie Road Resurface and Clean-up	paver	1	50	77		480	0.1		52.4	8	480	48
	roller	1	20	80		330	0.1		59.0	8	480	50
	backhoe	1	40	78		430	0.1		54.5	8	480	49
	flat bed truck	1	40	74		530	0.1		48.5	8	480	43
	skid-steer*	1	40	80		380	0.1		57.7	8	480	52
									Total for Gen-Tie Road Resurface and Clean-up Phase:			**56.2**
Decommissioning	concrete saw	2	20	90		3340	0.1		45.4	8	480	40
	crane	2	16	81		3440	0.1		36.0	8	480	29
	dozer	2	40	82		3390	0.1		37.2	8	480	34
	backhoe	2	40	78		3490	0.1		32.8	8	480	30
									Total for Decommissioning Phase:			**41.4**

Notes

* https://ia.cpuc.ca.gov/Environment/info/ene/mesa/attachment/A1503003%20ED-SCE-01%20Q.PD-01%20Attachment%20(Revised%20Noise%20Levels%20Construction%20Equipment).pdf