APPENDIX M

Acoustical Assessment Report

Acoustical Assessment Report for the JVR Energy Park Project Major Use Permit PDS2018-MUP-18-022 Jacumba Hot Springs, San Diego County, California

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EXECUTIVE SUMMARY

Dudek has prepared this acoustical assessment report for the proposed JVR Energy Park Project (Proposed Project), which includes a 90-megawatt photovoltaic (PV) solar facility, a battery energy storage system of up to 90 megawatts, a collector substation, and ~~aswitchyard~~ Switchyard Facilities. After completion of construction, the ~~switchyard~~ Switchyard Facilities would be owned and operated by San Diego Gas & Electric. This assessment evaluates noise impacts associated with the continuously operating outdoor electro-mechanical equipment, intermittent short-term onsite PV panel washing activities, and short-term construction noise to sensitive land uses located within the vicinity of the Proposed Project.

Field measurements of the existing outdoor ambient sound environment (baseline) were performed at several locations in the Proposed Project vicinity, including the community of Jacumba Hot Springs, which is located adjacent to the southwest portion of the Project site. This field survey determined that the existing outdoor hourly sound levels are comparable to—or lower than—the 50 dBA hourly energy-equivalent sound level (L_{eq}) and 45 dBA hourly L_{eq} thresholds, pursuant to the Noise Ordinance, Section 36.404, for daytime and nighttime noise exposure at a residential receptor, respectively.

The operation of the proposed solar energy generation and storage facility is expected to include a transformer (and ancillary electrical components) at the collector substation, ~~a switchyard~~ Switchyard Facilities, and inverter/transformer platforms distributed at 25 locations within the solar facility. The battery energy storage system would include a total of 75 battery storage containers. Three battery storage containers would be located adjacent to each of the 25 inverter/transformer platform locations throughout the solar facility. Each battery storage container would include noise-producing cooling systems (i.e., air conditioners). This analysis found that the operational noise levels of the Proposed Project would be compliant with the San Diego County Noise Ordinance threshold of 45 dBA hourly Leq nighttime limit if the Proposed Project's equipment and layout is the same as what was evaluated herein; however, if the equipment was to change and/or the layout is different from what was evaluated, operational noise levels have the potential to exceed the County's Noise Ordinance threshold and impacts may be potentially significant (**Impact NOI-1**). Mitigation Measure **M-NOI-1** is required to ensure predicted stationary equipment operation noise levels are compliant with the County nighttime standard. **M-NOI-1** requires the Proposed Project applicant to resubmit for County review and approval a revised stationary equipment operation noise assessment if the Proposed Project applicant incorporates any future Proposed Project design changes or related factors that have not been captured in this Acoustical Assessment Report. Within implementation of mitigation measure **M-NOI-1**, **Impact NOI-1** would be reduced to less than significant.

Mobile operating equipment would be utilized to cleanse the PV panel surfaces. The PV cleaning operation would consist of a service frequency of four times per year and would occur only during the daytime hours of operation, therefore, the cleaning operation would be subject to the noise level limit of 50 dBA hourly Leq.

As noted in Section 3.2.5, Mobile Equipment Noise Levels at Property Lines, when the PV washing operations occur at a distance of 250 feet or greater from the nearest Proposed Project property line that adjoins an offsite commercial property, a self-propelled washer vehicle (e.g., Mazaka, MultiOne, or comparable tractor/excavator based system of up to ~~34.6~~ 63 kW rated power) may be used to perform PV panel surface cleansing during daytime hours. Where the activity occurs in proximity to a Proposed Project property line that adjoins an offsite property having a rural or residential zoning classification per the County (i.e., akin to "Noise Zone (1)" per its Table 36.404 from the County's Noise Ordinance), this minimum distance value increases to 450 feet. If this PV panel cleaning activity ~~occurs~~ were to occur less than either of these distance values, the Proposed Project could have a potentially significant impact (**Impact NOI-2**). For this reason, the Applicant is incorporating Project Design Feature **PDF-NOI-1** into the Proposed Project. **PDF NOI-1** imposes distance constraints for a self-propelled PV panel washer as studied herein. Further, ~~M~~mitigation measure **M-NOI-2** would be required to ensure that the Proposed Project PV panel washing process complies with the County's Noise Ordinance. **M-NOI-2** requires the Proposed Project applicant to prepare and submit for County review and approval a PV panel washing plan that includes specified limits on noise emission levels from self-propelled and towed (or quieter self-propelled, per **PDF-NOI-1**) options of PV panel washing systems, and partial-hour duration restrictions on operating equipment based on distance to a Proposed Project property line. With implementation of mitigation measure **M-NOI-2**, **Impact NOI-2** would be reduced to less than significant. Operation noise from the ~~switchyard~~ Switchyard Facilities would include infrequent, intermittent operation of closed gas circuit type circuit breakers that would also be predicted to comply with the nighttime County noise limit. Operational noise impacts from the ~~switchyard~~ Switchyard Facilities would be less than significant.

When onsite mobile PV panel washing activity may occur in accordance with the analysis herein and with implementation of mitigation measure **M-NOI-2**, its predicted noise emission combined with onsite operation of stationary equipment sound sources is expected to yield a CNEL that is compliant with the County's exterior and interior noise thresholds for offsite NSLU and hence result in a less than significant impact.

Proposed Project construction is anticipated to include several phases of activity involving typical heavy construction equipment and vehicles. Additionally, mobile post-driving machines are anticipated to install foundation elements for the single-axis tracking assemblies upon which the 300,000 PV panels are to be mounted. Construction noise expected from sequential activities involved in developing the ~~switchyard~~ Switchyard Facilities and the paved access driveway

(connecting it to the Carrizo Gorge Road) would be compliant with the County's construction noise thresholds due largely to the distance (3,500 feet) between any construction activity sound sources and the nearest NSLU. For multiple source-to-receptor distances (i.e., between average positions of anticipated construction activities and Proposed Project property line positions adjoining NSLU), prediction of aggregate noise from the anticipated sequence of these phased construction activities is anticipated to be compliant with the County's construction noise thresholds of 75 decibels Leq for an 8-hour metric between 7:00 a.m. to 7:00 p.m., and the impulse noise limit of 82 dBA maximum sound level [Lmax], pursuant to the Noise Ordinance Sections 36.408 through 36.410 (County of San Diego 2009a). However, should Proposed Project construction phases or other activities overlap in schedule or otherwise occur concurrently, the Proposed Project does have the potential to exceed these thresholds and impacts may be potentially significant (**Impact NOI-3**); therefore, Mitigation measure **M-NOI-3** would be required to ensure construction noise emission is compliant with these County standards. **M-NOI-3** would require the Proposed Project applicant to prepare and submit for County review and approval a Construction Noise Management Plan that includes specified limits on noise emission levels from heavy construction equipment, and duration restrictions on operating equipment based on distance to a Proposed Project property line. With implementation of mitigation measure **M-NOI-3**, **Impact NOI-3** would be reduced to less than significant. Additionally, should Proposed Project construction phases or other activities overlap in schedule or otherwise occur concurrently, the Construction Noise Management Plan as outlined in **M-NOI-3** would include specified distance restrictions that when implemented would help ensure such concurrence does not cause logarithmically combined noise levels to exceed the County's standard per Section 36.409 of the Noise Ordinance.

Ground-borne vibration associated with normal operations of the Proposed Project facilities, including the ~~switchyard~~ Switchyard Facilities and substation, is expected to be less than significant at the nearest NSLU. Vibration velocity levels associated with anticipated construction activities, involving either conventional heavy equipment or specialized processes such as the aforementioned post- driving machine, were predicted to be less than Federal Transit Administration guidance-based thresholds as accepted and incorporated in the County's Guidelines for Determining Significance (County of San Diego 2009b).

In summary, with implementation of **PDF-NOI-1** and mitigation measures **M-NOI-1 through M-NOI-3**, the Proposed Project's noise impacts (**Impacts NOI-1 through NOI-3**) would be reduced to less than significant. Further, the existing and planned energy production and transmission projects, which include the Sunrise Powerlink, Southwest Powerlink, and an existing 138-kilovolt transmission line that transect the Proposed Project, within the vicinity of the Proposed Project are located at sufficient distances from the NSLU; therefore, cumulative noise and vibration impacts would not be cumulatively considerable.

The detailed acoustical assessment and its various predictive analyses presented herein reflects consideration of updates to the Proposed Project description and site plan as current as March 29, 2021. By way of example, some Project components are now anticipated to be elevated above the 100-year flood zone, and this change was adopted as a revised input to the predictive stationary operations noise modeling. Hence, prediction results appearing in this version of the AAR may appear different from the earlier version supporting the Draft EIR; however, potential noise impact significance determinations and corresponding mitigation measures have remained as-is.

Additionally, the analysis herein reflects incorporation of PDF-NOI-1 into the Proposed Project for the PV panel washing process, resulting in estimated hourly L_{eq} for the self-propelled washer analysis scenarios that may be less than those disclosed in the Draft EIR.

1 INTRODUCTION

1.1 Project Description

The site for the proposed JVR Energy Park Project (Proposed Project) is located in southeastern San Diego County, within San Diego County's Mountain Empire Subregional Plan area (see Figure 1, Project Location). The Proposed Project would be located to the south of Interstate 8, immediately east of the community of Jacumba Hot Springs, and immediately north of the U.S./Mexico international border. The Project site is located entirely on private land under the County of San Diego's (County) land use jurisdiction. The Project site includes right-of-way (ROW) easements for Old Highway 80, San Diego Gas & Electric (SDG&E) easements, and an easement for the San Diego and Arizona Eastern Railway. The ~~proposed solar facility~~ revised Proposed Project would cover approximately ~~643~~623 acres within the 1,356-acre Project site. The reduction is acreage is the result of increased setbacks from Jacumba Community Park and along Old Highway 80 ~~(shown on Figure 2, Project Components)~~. As discussed below, this report analyzes and reports impacts associated with the 623-acre revised Proposed Project (shown on Figure 2, Project Components). Primary access to the Project site would be provided via an access driveways from Old Highway 80, with additional access off of Carrizo Gorge Road.

The Proposed Project area has been revised by increasing the Project's setbacks and realignment of an existing water main, a net reduction of 17 acres (see Section 1.2 Project Description of Chapter 1 in the Final EIR). Project components would also be elevated above the 100-year flood zone, as described below in Section 1.3.2.2. This report has been updated from an earlier version to account for the changed Project area and, where appropriate, predictively reports impacts associated with the revised Project area. The elevation of some Project components has also been taken into account in this revised report.

1.1.1 Proposed Project

The Proposed Project is a solar energy generation and storage facility that would produce a rated capacity of up to 90 megawatts of AC generating capacity. The power produced by the proposed solar facility would be delivered to an existing SDG&E 138-kilovolt (kV) transmission line that transects the Project site. The Proposed Project would include the following primary components:

- Approximately 300,000 photovoltaic (PV) modules mounted on support structures (single-axis solar trackers)
- A 1,000- to 1,500-volt direct current (DC) underground collection system linking the modules to the inverters
- 25 inverter/transformer platforms, located throughout the solar facility, to convert the power generated by the modules into a compatible form for use with the transmission network

- Approximately 5,000 feet of 34.5 kV underground AC collection system and 50 feet of overhead AC feeders, approximately 30 feet tall linking the inverters to the on-site collector substation
- An on-site collector substation located within an approximately 27,360-square-foot area (152 feet by 180 feet)
- A 138 kV ~~switchyard~~ Switchyard Facilities adjacent to the on-site collector substation to transfer power from the on-site collector substation to the existing SDG&E 138 kV transmission line
- A 138 kV, 220-foot-long 65-foot-high overhead slack span transmission line to connect the on-site collector substation to the ~~switchyard~~ Switchyard Facilities
- 138 kV, 1,860-foot-long 70 to 115-foot-high overhead transmission lines (gen-tie) to loop the ~~switchyard~~ Switchyard Facilities into the existing SDG&E Boulevard – East County 138 kV transmission line
- A battery energy storage system of up to 90 megawatts (or 180 megawatt hours) comprised of battery storage containers located adjacent to the inverter/transformer pads (up to 3 containers at each location for a total of 75 containers on site)
- Additional features, including fiber-optic lines, control systems, five meteorological weather stations, site access driveways, improvements within the SDG&E Transmission Corridor, security fencing and signage, lighting, water tanks (fire protection), fuel modification zones (FMZs), and landscaping

1.1.2 Switchyard Facilities

The 138 kV ~~switchyard~~ Switchyard Facilities pad located adjacent to the proposed collector substation would cover an area of approximately 140,000 square feet. Within this area would be 8-foot-high security fence (445 feet by 300 feet) surrounded by a 5-foot shoulder for grounding protection inside the fence. Drainage facilities would be installed to control runoff and protect the ~~switchyard~~ Switchyard Facilities from erosion. The 138 kV insulated electrical bus, steel support structures and foundations would be installed to support the following electrical equipment:

- Two 138 kV bays in a ring bus configuration
- Three Gas Insulated Circuit Breakers with four current transformers each
- 12 Gang Operated Air Break (GOAB) switches
- Nine 98 kV surge arrestors
- Nine 138 kV Single Bushing Potential Transformers

- Two 138 kV-240V/120V Station Service Transformers
- Control Enclosure
- Security and lighting systems

1.2 Environmental Settings and Existing Conditions

1.2.1 Regional and Local Setting

The Proposed Project is located immediately to the east of the community of Jacumba Hot Springs and immediately north of the U.S./Mexico International Border, as presented in Figure 3, Land Use Designations and Zoning. Jacumba Hot Springs is a census-designated place (CDP) having a population of 561 residents and a population density of 92 people per square mile (USCB 2010).

1.2.2 Existing Noise Conditions

The outdoor ambient sound environment of the Proposed Project vicinity includes contribution from local roadways and highway traffic, construction noise, and barking dogs. Localized acoustical contributors proximate to a listener in the community of Jacumba Hot Springs may include nearby traffic noise from local roadways, rustling leaves and other wind-induced noise, and the operation of mechanical equipment (e.g., HVAC units) associated with residential and commercial land uses. At other Proposed Project areas as shown by Figure 2, the acoustical environment may be dominated by traffic on Interstate 8, Carrizo Gorge Road, or Old Highway 80.

Although Jacumba Airport is within 1,000 feet of the southern boundary of the Project site, the average aircraft operations frequency of 34 flights per week (AirNav.com 2020) among which only 80% are single-engine powered flight (SDCRAA 2011) suggests that aviation noise is infrequent. The Jacumba Airport Land Use Compatibility Plan (ALUCP) indicates that aviation noise is less than 50 dBA CNEL east of parcels APN 66015005 and APN 6615006 that abut Old Highway 80 and are approximately 1,330 feet west-northwest of the airport's western property boundary (SDCRAA 2011).

1.3 Methodology and Equipment

1.3.1 Noise Measuring Methodology and Procedures

Sound pressure level (SPL) measurements were conducted on January 9, 2019, at the Project site boundary and at nearby representative noise-sensitive land use (NSLU) to determine the existing outdoor ambient noise levels. The measurements were made using a calibrated Rion NL-52 integrating sound level meter (SLM) equipped with 0.5-inch pre-polarized condenser microphone with a pre-amplifier. This SLM meets the current American National Standards Institute (ANSI)

standard for a Type 1 (Precision Grade) SLM. The SLM (serial number [SN] 00553896) was positioned on a tripod at a height of approximately 5 feet above the ground and fitted with a wind screen. Pursuant to Section 36.403 of the County's Noise Ordinance, the SPL measurements were performed with the SLM set to A-weighting and "slow" response. Performance of these measurements in the field by an attending Dudek field investigator was compatible with appropriate portions of International Organization of Standardization (ISO) 1996-1: Description, Measurement and Assessment of Environmental Noise (ISO 2003).

The SPL measurements were conducted near NSLU locations for 10 minutes at each area depicted by Sites ST1 through ST6 as shown on Figure 4, Noise Measurement Locations. The measured average, maximum and minimum noise levels are shown in Table 1. These metrics, and other relevant acoustical terminology used to present and discuss this noise assessment, can be found in Appendix A of this report. The measured average ambient noise levels ranged from approximately 25 dBA L_{eq} at Site ST5, located near the southwest boundary of the Project site, to 49 dBA L_{eq} at Site ST2, located at a NSLU (a residence), located in the center of the Project site. At Site ST2 the dominant noise source was traffic from Old Highway 80. Detailed notes regarding survey field data collection, along with sample photographs of the measurement locations, appear in Appendix B of this report.

Table 1
Measured Outdoor Ambient Noise Levels in Proposed Project Vicinity

Site	Location	Start Time	Outdoor Ambient Sound ~~Noise~~ Level (dBA)		
			Leq[1]	*Lmax*[2]	*Lmin*[3]
ST1	West side of Project site	10:55 a.m.	41.2	48.1	32.8
ST2	Residence at center of Project site	12:10 p.m.	49.2	66.9	32.1
ST3	East side of Project site	12:30 p.m.	46.1	63.6	31.9
ST4	Adjacent to nearest residence, approx. 50 feet west of Project site	11:50 a.m.	36.2	47.7	29.7
ST5	Southwest side of Project Site	11:15 a.m.	35.3	48.0	29.0
ST6	Residence at north boundary of Project site	11:30 a.m.	36.0	47.3	31.9

1 Energy-equivalent ~~Continuous~~ continuous ~~s~~Sound ~~l~~Level ~~(Time-Average Sound Level)~~ for measurement period
2 Maximum ~~Sound~~ sound ~~l~~Level for measurement period
3 Minimum ~~Sound~~ sound ~~l~~Level for measurement period
dBA = A-weighted decibels

An unattended "long-term" (LT1) continuous 24-hour SPL measurement was also conducted at a position near the eastern fence line of the Jacumba Community Park, approximately 400 feet due east of the ST1 field survey location. Measured Leq during nighttime hours, sampled at five-

minute intervals, ranged from as low as 31 dBA to as high as 51 dBA. Hourly Leq values calculated from these successive five-minute duration intervals ranged from 33 to 44 dBA, and are presented as a plot versus time in Appendix B. The calculated CNEL value from these sequential L_{eq} intervals over the monitored 24-hour period is 46.4 dBA.

1.3.2 Noise Calculations

Proposed-Project-attributed construction and post-construction operation noise levels at studied NSLU and property line positions were quantitatively predicted with techniques and reference data as described in the following paragraphs.

1.3.2.1 Construction

An Excel-based model using reference noise level data and algorithms comparable to those incorporated by the Federal Highway Administration's Roadway Construction Noise Model (RCNM) User's Guide (FHWA 2006) was used to assess potential impacts due to noise from the Proposed Project construction activities. Akin to the RCNM, prediction model input variables consist of equipment type and quantities involved (e.g., two excavators, a loader, a dump truck), and an "acoustical usage factor" (AUF) for each piece of equipment that represents the portion of a sample hour (expressed as a cumulative percentage) during which the type of equipment is operating at full power or otherwise emitting a maximum noise level (L_{max}~~max~~) at a reference distance of 50 feet. The RCNM has default AUF values in its parameter database for various pieces of equipment, which were derived from an extensive empirical study of typical construction activity patterns and measured noise levels. The Excel-based model adopts these default AUF values for purposes of this construction noise analysis, which predicts aggregate construction noise level at a receptor position location a user-specified distance from a set of operating equipment for a distinct phase or studied activity.

Additionally, the construction noise prediction model considers the estimated number of hours during a typical eight-hour workday when the equipment would actually be present and operating with respect to a studied distance to the noise-sensitive receiver position of interest. This is important because the County's construction noise standard, as indicated in Section 36.409 of the County of San Diego's Noise Ordinance (County of San Diego 2009a) is not an hourly Leq, but an Leq evaluated over an 8-hour period. In other words, the County's eight-hour Leq limit of 75 dBA allows for construction noise emission to be higher than 75 dBA within a single hour, so long as the energy-average over the full 8- hour workday complies with the 75 dBALeq threshold.

1.3.2.2 Operation

On-site Stationary Sources

Predicted noise levels associated with the post-construction operation of the Proposed Project on-site stationary equipment have been calculated with a Microsoft Excel workbook that incorporates the following algorithms:

- Point-source sound propagation (i.e., geometric divergence, known casually as the "6 dB per doubling of distance" rule of thumb) for the battery storage containers and inverter/transformer platforms which would be installed at 25 locations throughout the solar facility, and the planned step-up transformer at the Proposed Project collector substation.
- In addition to aforementioned geometric divergence, attenuation due to atmospheric acoustical absorption (Aatm) and ground surface acoustical absorption (Agrnd) that are expressed as follows:

  $\mathbf{A_{atm}}$ = 4.16*(d_{rcvr}/3280), where d_{rcvr} is the source-to-receiver distance in feet, and assumes the attenuation rate at 1kHz is representative for overall A-weighted broadband sound at standard air conditions (i.e., 10°C, 70% relative humidity, and 1 atmosphere of pressure).

  $\mathbf{A_{grnd}}$ = the greater of zero or 4.8–[(h_s+h_r)/(~~d_{rcvr}/3.28~~)]*[17+~~300~~984/(~~d_{rcvr}/3.28~~)], where h_s is the average source height (in feet), and h_r is the average receiver height (in feet).

These above expressions, as well as geometric divergence from point-type sound sources, are described in Noise & Vibration Control Engineering (Beranek and Ver 1992), and Agrnd is also referenced in International Organization of Standardization (ISO) 9613-2 (ISO 1996).

Input sound level data used in the Excel-based operational model of stationary noise emission sources includes the following reference values, derivations, and assumptions that reflect the Proposed Project design:

- Inverter/transformer platforms – Inverter/transformer platforms will be installed at 25 locations throughout the solar facility. Two inverters and one transformer will be installed at each location. At each location, the inverter/transformer platforms would be positioned adjacent to three battery storage containers.

  As discussed in Chapter 1 of the Final EIR, the inverter/transformer platforms would be elevated above the 100-year flood zone. Depending on the flood depth at each of the 25 locations, the platforms would be elevated between approximately 18 inches and 4 feet 6 inches above the adjacent ground surface level. For purposes of this acoustical assessment, all modeled platforms are conservatively assumed to have h_s = 15 feet above grade,

representing the highest possible top horizontal surface elevation of installed equipment after accounting for this Project modification to raise equipment above the 100-year flood zone. The receiver height, h_r, is uniformly five feet above grade. This is a conservative analysis because: (1) much of the Proposed Project's noise generating equipment would have a height lower than 15 feet above grade; and, (2) the noise sources on the equipment would likely not be mounted on the very top of the equipment. However, this height assumption does not materially alter predicted sound levels.[1]

Each inverter is considered comparable to an SMA SC2475 (rated for 1.8 megawatts at 50°C), which exhibits 64.7 dBA at 10 meters (SMA 2020). This analysis assumes that the estimated point-type SPL from each platform transformer (SPLtran) serving this inverter pair will be 30.7 dBA at a distance of 492 feet, consistent with the following expression from Noise & Vibration Control Engineering (Beranek and Ver 1992):

SPLtran = 26+8.5*LOG(MVA) = 26+8.5*LOG(3.6) = 26+4.7 = 30.7 dBA

By way of logarithmic summation, the combined SPL from an inverter/transformer platform (i.e., two inverters served by a transformer) is 64.2 dBA at 50 feet. For purposes of the prediction model, this reference sound level is used to define a point-type source of sound emission from the approximate centroid of each platform

- Battery storage containers – Three battery storage containers are proposed at each of the 25 abovementioned locations for the inverter/transformer platforms (thus, a total of 75 battery storage containers). Consistent with the Project description, e~~E~~ach battery storage container ~~requires~~ features internal air-conditioning for thermal management, which implies a corresponding air-cooled condenser (ACC or "cooling unit") that would be exposed to the outdoors and, for purposes of this analysis, individually produces noise as high as ~~56.8~~ 53.8 dBA SPL at a distance of 50 feet. This noise emission level for the cooling unit ~~(HVAC unit)~~ is based on available sound power level data from the manufacturer (Daikin Applied 2013) for a "025D" model with a "quiet" condenser ~~and includes an added +3 dBA margin to cover potential reflection (up to +3 dBA) due to proximity of the battery storage container surface~~ (or comparably performing equipment from an alternative supplier). For purposes of the prediction model, this reference sound level is used to define a point-type source of sound emission from the approximate

[1] Because the receiver height (hr) is effectively held constant for purposes of this assessment, and as these conservative source heights (hs) are small with respect to the source-to-receiver horizontal distances (drcvr), any small variance in hs results in a very small change to the actual distance (i.e., the hypotenuse of the distance "triangle" formed by the vertical plane connecting a point source and a distant receptor position) used to predict distance-based sound attenuation. Consequently, such a change in hs (e.g., from a previously assumed 10 feet above grade associated with the Draft EIR analysis to up to 15 feet above grade due to accommodating aforementioned 100-year floodplain elevation adjustments of equipment) would result in a miniscule change in the hypotenuse length, and thus no more than a sub-decibel change in the predicted sound level at the receptor.

centroid of each battery storage container. In the previous version of this analysis to support the Draft EIR, a +3 dBA margin was conservatively added to the reference sound level to account for potential surface reflection; however, subsequent consideration found this unnecessary: the conversion of sound power level to SPL already accounts for this directivity (i.e., hemispherical sound propagation instead of spherical sound propagation).[2]

The battery storage containers would also be elevated above the 100-year flood zone. Depending on the flood depth at each of the 25 locations, the containers would be elevated between approximately 18 inches and 4 feet 6 inches above the adjacent ground surface level. For purposes of this assessment, all modeled battery storage containers—akin to the aforementioned inverter/transformer platforms—are conservatively assumed to have h_s = 15 feet above grade, representing the highest possible top horizontal surface elevation of installed equipment after accounting for this Project modification to raise equipment above the 100-year flood zone. The receiver height, h_r, is uniformly five feet above grade.

Because the receiver height (h_r) is effectively held constant for purposes of this assessment, and as these conservative source heights (h_s) are small with respect to the source-to-receiver horizontal distances (d_{rcvr}), any small variance in h_s results in a very small change to the actual distance (i.e., the hypotenuse of the distance "triangle" formed by the vertical plane connecting a point source and a distant receptor position) used to predict distance-based sound attenuation. Consequently, a change in h_s (e.g., from a previously assumed 10' above grade associated with the Draft EIR analysis to up to 15' above grade due to accommodating afore-mentioned 100-year floodplain elevation adjustments of equipment for the Final EIR) would result in a miniscule change in the hypotenuse length, and thus no more than a sub-decibel change in the predicted sound level at the receptor.

The Excel-based model, with input and output values appearing in Appendix C, logarithmically combines the acoustical contribution of an inverter/transformer platform and three battery storage container HVAC units, yielding an aggregate point-type source SPL of ~~66.1~~ 65.3 dBA at 50 feet,

[2] The conversion of sound power level (Lw) to sound pressure level (Lp) for a point source with spherical sound propagation involves an -11 decibel (dB) adjustment. For instance, a point source having Lw of 70 dB would be 59 dB Lp at a distance of 1 meter. If this source is close to a potentially sound-reflective surface, the sound propagation would be considered hemispherical, so the adjustment would be -8 dB, or -11 dB plus 3 dB, since the sound energy in the other half of the sphere normally propagating away in the other direction is now reflected and traveling in the same direction as the unblocked half. So for this example, the Lp would be 62 dB at 1 meter to account for this hemispherical propagation. To account for this propagation, the analysis in the Draft EIR added +3 dB to the calculated battery container cooling unit Lp. However, upon further review, the calculated Lp of 53.8 dBA at 50' from the manufacturer-provided Lw of 85.5 dBA already accounts for this hemispherical sound propagation adjustment. Accordingly, the added +3 dB is unnecessary to estimate the battery container cooling unit's Lp and has been removed from the analysis.

at each of 25 locations across the Project area. Another major stationary noise emitter within the Project site and included in the operational noise model is as follows:

- Collector substation transformer – The Proposed Project on-site collector substation will feature a single 34.5 kV to 135 kV transformer rated to handle 180 MVA (90 MVA from the aggregate PV solar panel electricity production, plus 90 MVA from the battery storage units). This analysis assumes that the estimated point-type SPL from this substation transformer (SPLsub) will be 45.2 dBA at a distance of 492 feet, consistent with the following expression from Noise & Vibration Control Engineering (Beranek and Ver 1992):

  SPLsub = 26+8.5*LOG(MVA) = 26+8.5*LOG(180) = 26+19.2 = 45.2 dBA

For purposes of this assessment, the substation transformer—like the aforementioned inverter/transformer platforms and battery storage containers—are conservatively assumed to have h_s = 15 feet above grade.

Locations of these stationary operating equipment sound sources and the studied NSLU and Proposed Project property line positions were geo-referenced to a common coordinate system (State plane coordinates), which allowed for accurate source-to-receiver distance values (drcvr) on which the predicted noise levels depend. Based on these input data and techniques, predicted operation noise levels were evaluated at each studied NSLU. Additionally, as shown in Figure 5, Predicted Project Operations Noise Contour, the anticipated noise level encompassing the inverter/transformer platforms, the battery storage container HVAC units, and the collector substation transformer were evaluated across the Project site and immediate vicinity.

The proposed 138 kV ~~switchyard~~ Switchyard Facilities would be located easterly adjacent to the collector substation, and as listed in Section 1.1.2, ~~switchyard~~ Switchyard Facilities, would be expected to contain circuit breakers, overhead electrical bus work, switches and controls that occasionally produce noise. However, the character and long-duration magnitude of these sources contrasts with the continuous noise emission of the adjoining collector substation step-up transformer. As described in a recent acoustical report for a larger substation/ Switchyard Facilities site, "cycling of the capacitors and associated circuit-breaker and switching operations can also cause short duration audible impulse noise with the magnitude varying with voltage, load, and operation speed. However, the noise generated by the cycling of the capacitors and associated circuit-breaker and switching operations is of very short duration (5 seconds or less), occurs only once or twice a year, and do not significantly contribute to the substation's overall noise level" (Acentech 2015). Furthermore, the multiple 138 kV circuit breakers planned for the ~~switchyard~~ Switchyard Facilities will feature sulfur hexafluoride (SF6) closed gas circuits that, unlike air blast circuit breakers (ABCB), do not exhaust to the atmosphere and therefore operate at much quieter noise levels. For these reasons, noise emission from the ~~switchyard~~ Switchyard Facilities

equipment is expected to be intermittent, acoustically insignificant compared to the continuously operating substation transformer, and therefore not included in the predictive operation noise modeling for the Proposed Project. Similarly, sound that may be produced from corona associated with the interconnection lines would be much lower in magnitude than that of the continuously operating substation transformer and on such basis has been excluded from the operation noise prediction model for the Proposed Project.

Although the PV solar panels will be mounted on support structure that allows single-axis rotation for tracking, the low horsepower (HP) and low revolution-per-minute (rpm) motors are anticipated to operate only intermittently. Based on previous Dudek project experience, measured 1-minute Leq at a distance of 15 feet from such a typical tracker motor is approximately 38 dBA. Corrected for distance, this is also consistent with a calculation of noise emission for a small electric motor (e.g., 3/4 HP, 870 rpm, drip-proof type) per Engineering Noise Control (Bies and Hansen 1996). At a distance of 50 feet, the amplitude would be less than 28 dBA Leq, which is much less than the Leq values at 50 feet for the aforementioned inverter/transformer platforms and the battery storage container cooling systems, as well as the measured outdoor ambient Leq values in Table 1. For these reasons, tracker motor noise emission is not considered a significant acoustical contributor and is hence not included in the predictive operation noise modeling for the Proposed Project.

Mobile Sources (PV Panel Washing)

Regular cleaning of the Proposed Project installed PV panels is anticipated to involve use of a self-propelled powered mechanical system (e.g., MultiOne Solar Panel Washer, Mazaka ~~Solar~~ Tractor Mounted Panel Cleaner, ~~or~~ comparable motorized equipment [~~Groundwork Group LLC 2019~~ Mazaka 2021; MultiOne 2016]), or an alternative method at an anticipated frequency of four times per year. For purposes of this noise analysis, and based on the proximity of the PV panels to be cleaned, this ~~system~~ washing process could ~~operate~~ occur as close as 50 feet to the property line adjoining the ~~S80~~ S92-zoned land ~~south of Old Highway 80 and~~ south of Interstate 8 near the northeastern corner of the Proposed Project, as close as 83 feet to the property line adjoining Jacumba Hot Springs residential uses north of Seeley Avenue, and as close as 100 feet to the adjoining property lines of existing residential uses on the eastern portion of Jacumba Hot Springs located between Holtville Avenue and Seeley Avenue and the existing residential use on the south side of Old Highway 80. Additionally, the PV panel washing activity could occur as close as 83 feet to existing commercial land use along Carrizo Gorge Road (see land zoned C44 by the County, as depicted in Figure 3).

Assuming operation of the self-propelled vehicle and cleaning apparatus is comparable to a tractor having comparable rated power (~~34.6~~ 63 kW for the Mazaka models) (Groundwork Group LLC 2019), the predicted noise level could conservatively be as high as 86 dBA Lmax at a distance of

5 meters (Rigolett 2020). However, expected noise level over an entire hour would be less as the motorized equipment would be expected to have, on average, a 50% "acoustical usage factor" (AUF) comparable to most types of construction equipment (FHWA 2006), and it would travel in parallel with the PV panel tracker arrays. Note the context of AUF is the portion of a time period that equipment is operating at full power (and thus making maximum noise [Lmax]). According to its specification, the MultiOne (or comparable equipment such as the Mazaka) travels at an average work speed of 1 mile per hour (MultiOne 2016). Given this work speed, the Draft EIR conservatively described five scenarios of potential operation and proximity of the solar panel washer to a nearest NSLU. Four of these scenarios remain applicable for study as a result of the afore-mentioned changes in Proposed Project acreage and setbacks, and are listed could be described conservatively as ~~one of the following scenarios~~ follows:

1. The washer is cleaning a solar panel array row that is perpendicular to the Proposed Project boundary, such as the area north of Seeley Avenue. In this case, the mobile washer could be as close as 83 feet to the nearest NSLU or as far away as 283 feet (i.e., the end of the tracker array structure, where the washer would then turn around to clean the next row of panels). Assuming the washer would be as close as 83 feet for up to 15 minutes, 283 feet for up to 15 minutes, and an average distance of 183 feet for up to 30 minutes, the estimated hourly noise level would be 62 dBA L_{eq}.
2. The washer is cleaning a solar panel array element that is parallel to the Proposed Project boundary, such as the area east of the Jacumba Hot Springs community between Seeley Avenue and Holtville Avenue. In this case, the mobile washer could be as close as 100 feet to the nearest NSLU or as far away as 633 feet. (i.e., the other end of the tracker array structure, where the washer would then turn around to clean the next line of panels). Assuming the washer would be as close as 100 feet for up to 15 minutes, 633 feet for up to 15 minutes, and an average distance of 366 feet for up to 30 minutes, the estimated hourly noise level would be 59 dBA Leq.
3. ~~The washer is cleaning a solar panel array element that is parallel to the Proposed Project boundary, such as the area east of the S80-zoned land south of Old Highway 80. In this case, the mobile washer could be as close as 50 feet to the nearest NSLU position or as far away as 633 feet. (i.e., the other end of the tracker array structure, where the washer would then turn around to clean the next line of panels). Assuming the washer would be as close as 50 feet for up to 15 minutes, 633 feet for up to 15 minutes, and an average distance of 341 feet for up to 30 minutes, the estimated hourly noise level would be 67 dBA Leq.~~

~~4~~ 3. The washer is cleaning a solar panel array element that is perpendicular to the Proposed Project boundary, such as the ~~S80~~ S92-zoned land south of Interstate 8 that is north of the northeast corner of the Proposed Project. In this case, the mobile washer could be as close as 50 feet to the boundary line or as far away as 283 feet (i.e., the other end of the tracker array structure, where the washer

would then turn around to clean the next line of panels). Assuming the washer would be as close as 50 feet for up to 15 minutes, 283 feet for up to 15 minutes, and an average distance of 167 feet for up to 30 minutes, the estimated hourly noise level would be 67 dBA Leq.

~~5~~ 4. The washer is cleaning a solar panel array element that is neither parallel with nor perpendicular to the Proposed Project boundary, such as the C44-zoned land along Carrizo Gorge Road to the north. In this case, the mobile washer could be as close as 83 feet to the boundary line or as far away as 225 feet, based on its perpendicular distance to the property line during operation. Assuming the washer would be as close as 50 feet for up to 15 minutes, 225 feet for up to 15 minutes, and an average distance of 154 feet for up to 30 minutes, the estimated hourly noise level would be 63 dBA Leq.

Detailed worksheets contained in Appendix C of this report show the following findings:

- When the self-propelled PV panel washer respects a 250-foot distance restriction in **PDF-NOI-1**, predicted hourly L_{eq} values for the same four scenarios are less than 55 dBA hourly L_{eq} that represents the arithmetic average of 60 dBA for commercial (or other County-classified Noise Zone 3 receiving land use) and 50 dBA for the source land usage; and,
- When the self-propelled PV panel washer respects a 450-foot distance restriction in PDF-NOI-1, predicted hourly L_{eq} values for the same four scenarios are less than 50 dBA hourly L_{eq} that represents the arithmetic average of 50 dBA for rural and/or residential (or other County-classified Noise Zone 1 receiving land use) and 50 dBA for the source land usage.

Alternatively, a portable pressure washer, transported across the site by a standard pick-up truck and as described to in PDF-NOI-1, would include the following sound sources:

- IPC Eagle Wash Station (or comparable technology) – a pressure washer system based on a gasoline powered Honda GX-160 engine having a reference noise level of 99 dBA Lmax at 9 feet (Soitec Solar Development LLC 2013), but contained within a "Zombie Box" enclosure (or comparable noise-reducing technology) capable of 18 dBA of noise reduction (ZombieBox International 2020) and thus yielding 81 dBA Lmax at 9 feet.
- Pick-up truck (55 dBA Lmax at 50 feet [FHWA 2006]).

The pressure washer would be assumed to have an AUF of 20%, representing occasional usage of its highest-pressure setting (and hence highest noise level). Towed along with a washer fluid tank by the pick-up truck, assumed to operate (on average) at low speeds representing an AUF of 25%, the estimated noise levels from the combined equipment are as follows for the same ~~five~~ four preceding location-dependent scenarios studied for the self-propelled PV panel washer:

1. The pickup truck and pressure washer is cleaning a solar panel array row that is perpendicular to the Proposed Project boundary, such as the area north of Seeley Avenue. In this case, the

mobile washer could be as close as 83 feet to the nearest NSLU or as far away as 283 feet (i.e., the end of the tracker array structure, where the washer would then turn around to clean the next row of panels). Assuming the washer would be as close as 83 feet for up to 15 minutes, 283 feet for up to 15 minutes, and an average distance of 183 feet for up to 30 minutes, the estimated hourly noise level would be 49 dBA Leq.

2. The pickup truck and pressure washer is cleaning a solar panel array element that is parallel to the Proposed Project boundary, such as the area east of the Jacumba Hot Springs community between Seeley Avenue and Holtville Avenue. In this case, the equipment could be as close as 100 feet to the nearest NSLU or as far away as 633 feet. (i.e., the other end of the tracker array structure, where the pick-up truck would then turn around to clean the next line of panels). Assuming the washer would be as close as 100 feet for up to 15 minutes, 633 feet for up to 15 minutes, and an average distance of 366 feet for up to 30 minutes, the estimated hourly noise level would be 46 dBA Leq.

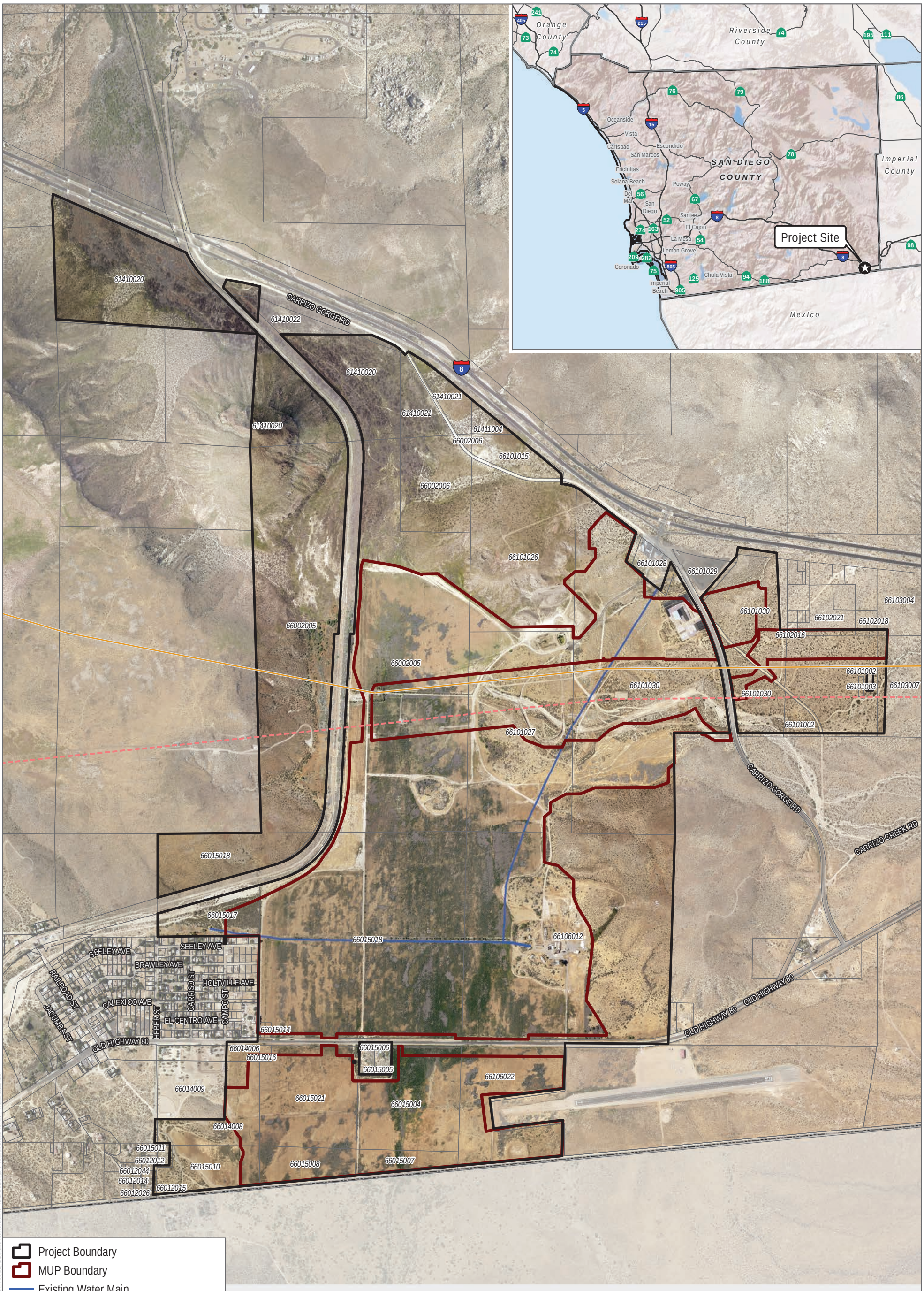
3. ~~The pickup truck and pressure washer is cleaning a solar panel array element that is parallel to the Proposed Project boundary, such as the area east of the S80-zoned land south of Old Highway 80. In this case, the equipment could be as close as 50 feet to the nearest NSLU or as far away as 633 feet. (i.e., the other end of the tracker array structure, where the pick-up truck would then turn around to clean the next line of panels). Assuming the washer would be as close as 50 feet for up to 5 minutes, 633 feet for up to 5 minutes, and an average distance of 341 feet for up to 10 minutes, the estimated hourly noise level would be 49 dBA Leq. Note that this sample hour includes up to 40 minutes of pressure washer idling time, which would be expected since the portable pressure washer and its operator would need to de-activate the equipment and move to a different location corresponding with proximity to the next set of panels to be cleansed.~~

4 3. The pickup truck and pressure washer is cleaning a solar panel array element that is perpendicular to the Proposed Project boundary, such as the S80-zoned land south of Interstate 8 that is north of the northeast corner of the Proposed Project. In this case, the equipment could be as close as 50 feet to the boundary line or as far away as 283 feet (i.e., the other end of the tracker array structure, where the pick-up truck would then turn around to clean the next line of panels). Assuming the washer would be as close as 50 feet for up to 5 minutes, 283 feet for up to 5 minutes, and an average distance of 167 feet for up to 10 minutes, the estimated hourly noise level would be 49 dBA Leq.

5 4. The pickup truck and pressure washer is cleaning a solar panel array element that is neither perpendicular nor parallel to the Proposed Project boundary, such as the C44- zoned land along Carrizo Gorge Road to the north. In this case, the equipment could be as close as 83 feet to the boundary line or as far away as 225 feet, based on its perpendicular distance to the property line during operation. Assuming the washer would be as close as 50 feet for up to 15

minutes, 225 feet for up to 15 minutes, and an average distance of 154 feet for up to 30 minutes, the estimated hourly noise level would be 49 dBA Leq.

Calculation details for these estimated noise levels for the ~~self-propelled PV panel washers and~~ enclosed portable gasoline-powered pressure washers appears in Appendix C. Compared to the self-propelled tractor-mounted PV panel washer, exemplified by the Mazaka or MultiOne units, the method involving a portable pressure washer (akin to the IPC Eagle) transported by a standard pick-up truck can yield~~s~~ lower predicted hourly sound levels and can operate at distances to the Proposed Project property line that are within the 250-foot or 450-foot distances.



SOURCE: Kimley-Horn 2020; SANGIS 2017, 2020

DUDEK

0 500 1,000 Feet

FIGURE 1

Project Location

JVR Energy Park Project

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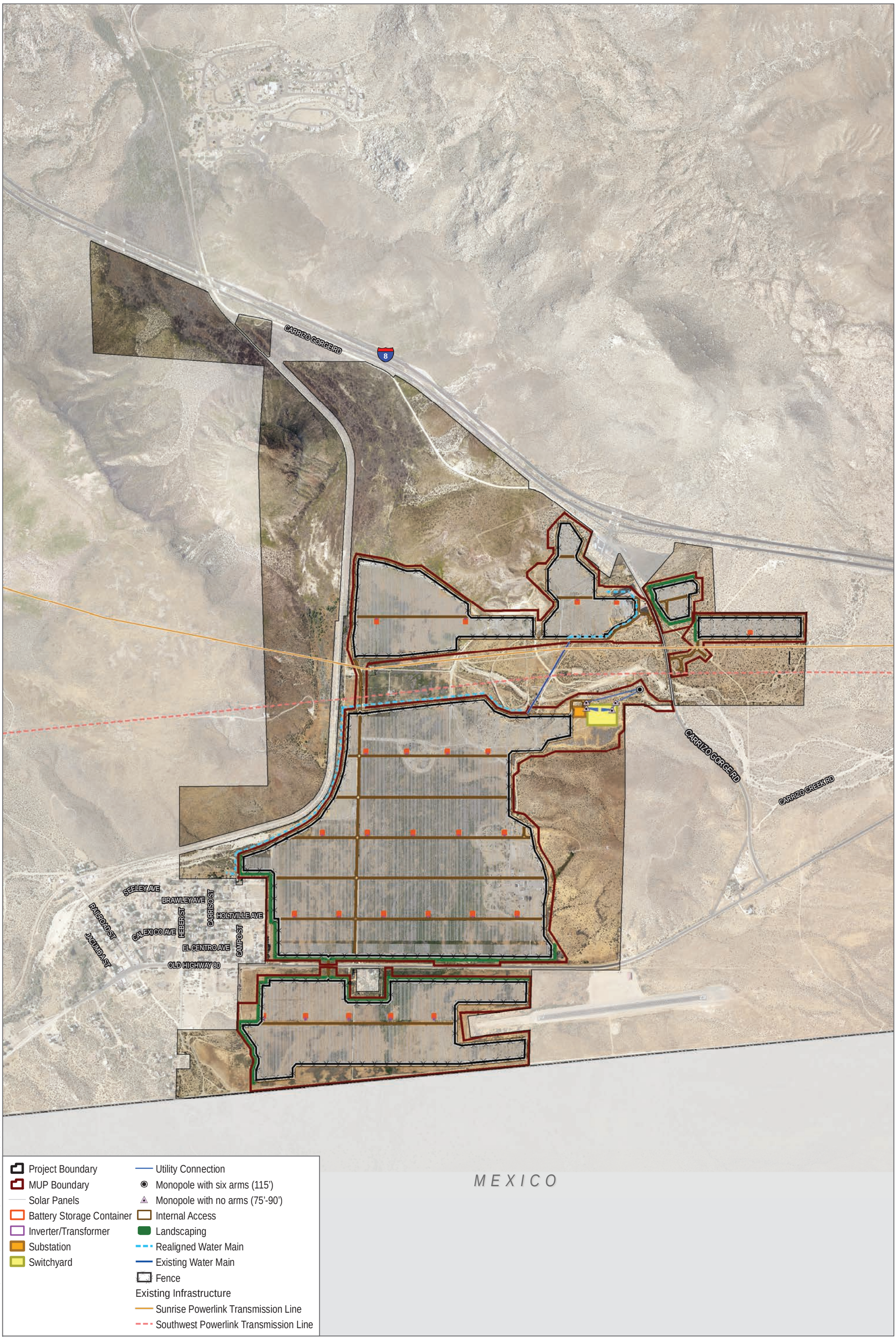

SOURCE: Kimley-Horn 2021; SANGIS 2017, 2021

DUDEK

0 500 1,000 Feet

FIGURE 2

Project Components

JVR Energy Park Project

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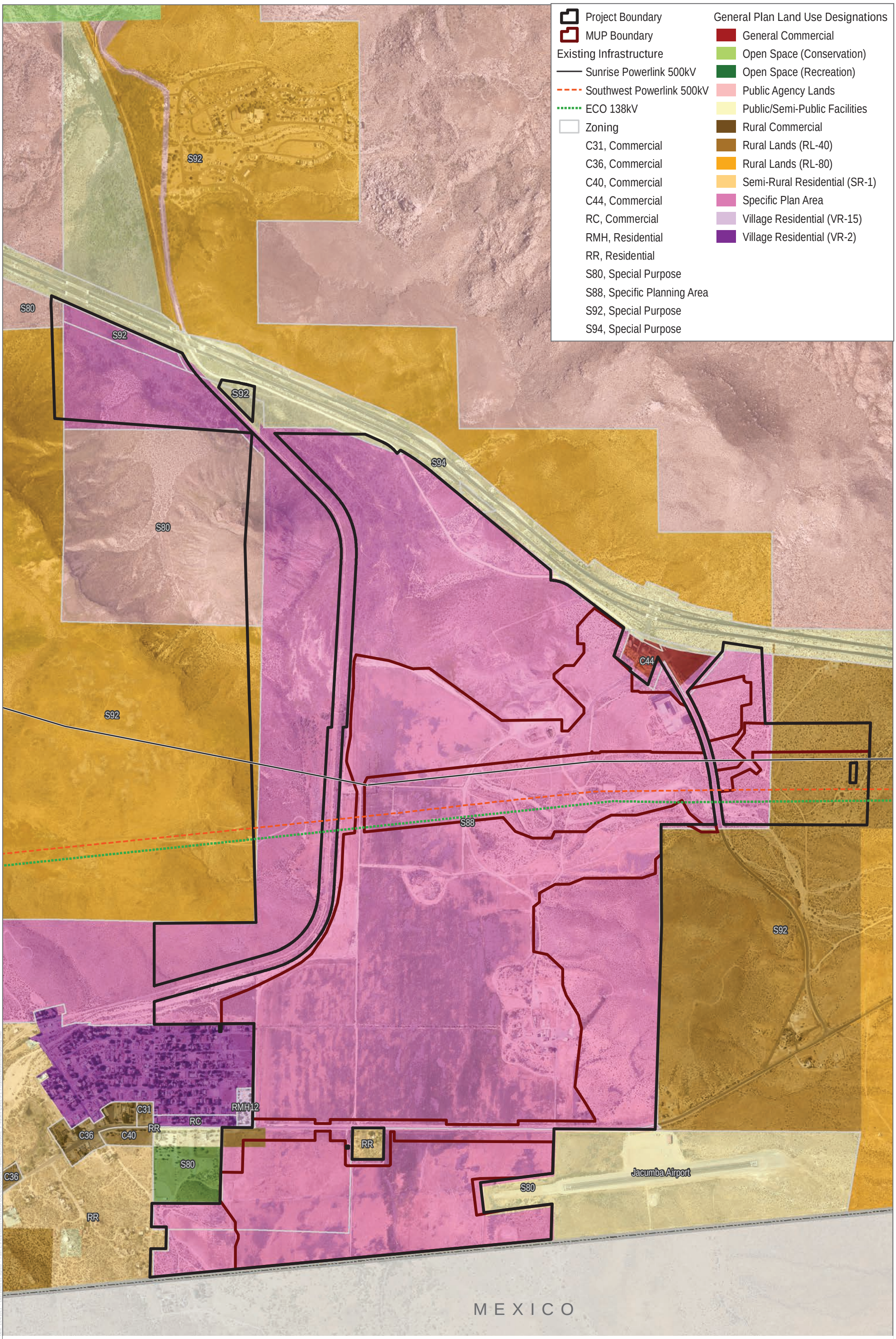

SOURCE: Kimley-Horn 2021; SANGIS 2017, 2021

DUDEK

0 500 1,000 Feet

FIGURE **3**

Land Use Designations and Zoning

JVR Energy Park Project

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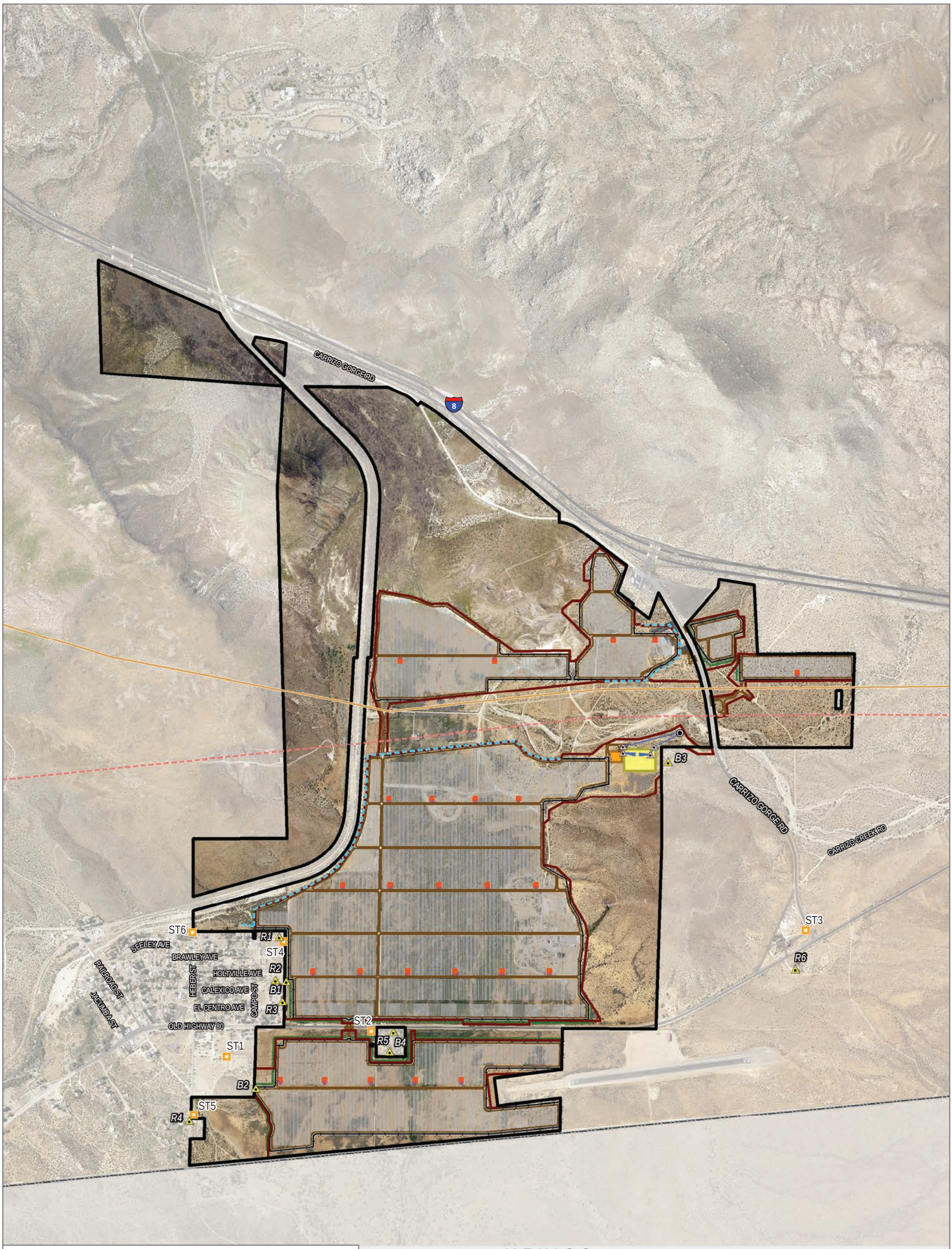

SOURCE: Kimley-Horn 2021; SANGIS 2017, 2021

DUDEK

0 500 1,000 Feet

FIGURE 4

Noise Measurement Locations

JVR Energy Park Project

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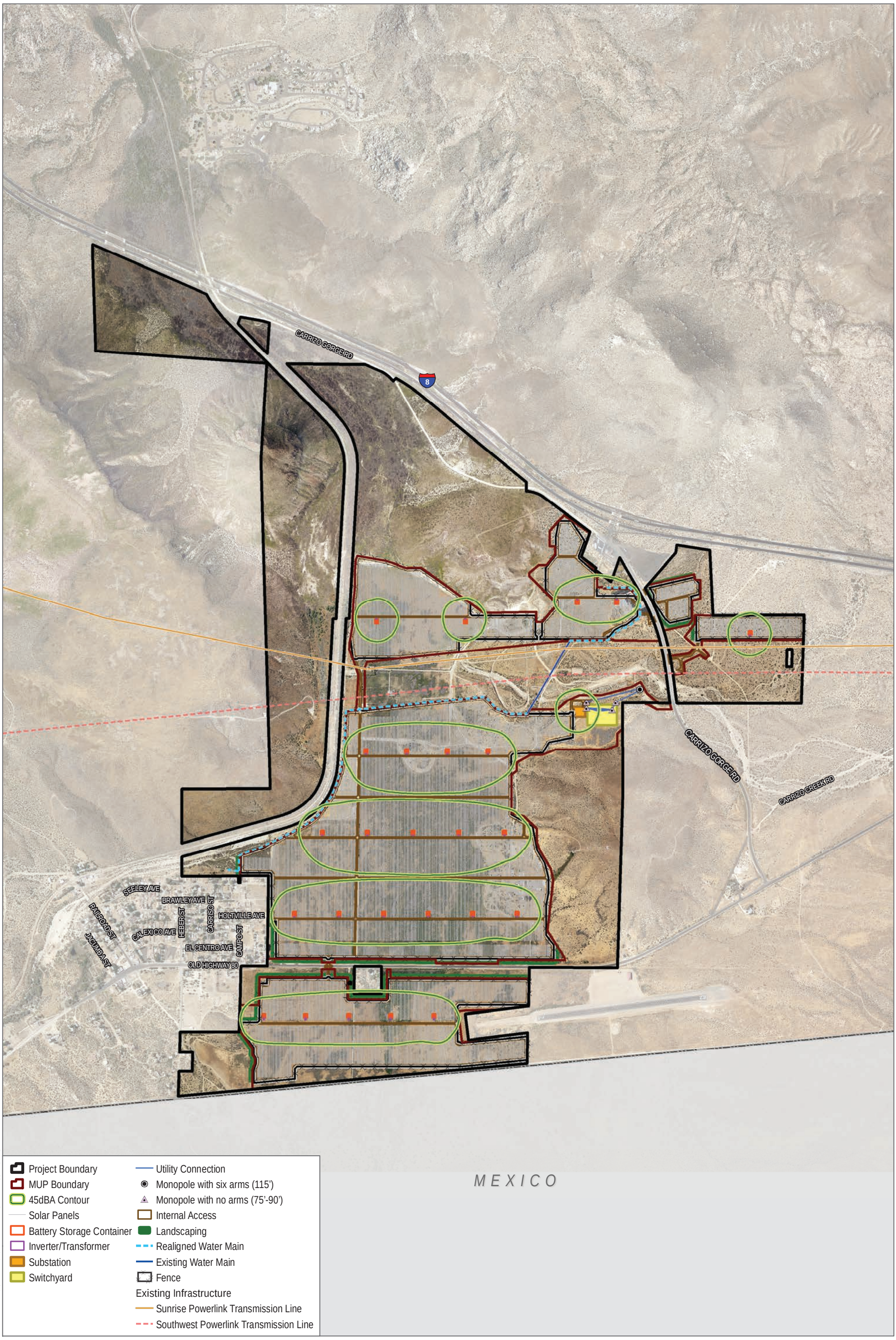

SOURCE: Kimley-Horn 2021; SANGIS 2017, 2021

DUDEK

0 500 1,000 Feet

FIGURE **5**

Predicted Project Operations Noise Contour (45 dBA Leq)

JVR Energy Park Project

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2 NOISE-SENSITIVE LAND USES AFFECTED BY AIRBORNE NOISE

2.1 Potential Noise Impacts

The Proposed Project would consist of a solar energy generation and battery energy storage system, with neither dedicated office space nor any related habitable components. As such, no portion of the Proposed Project would involve the creation of new NSLU. The nearest existing residential NSLU in the community of Jacumba Hot Springs is located within 50 feet of the Project site boundary.

2.2 Off-Site Direct and Cumulative Noise Impacts

The Proposed Project would have a short-term construction-related potential to generate temporary increases in outdoor ambient noise levels. Construction is estimated to take approximately 13 months. Grading for the Proposed Project is designed to be balanced, thus, there would be no import or export of dirt. However, there would be worker vehicles and truck material deliveries to the site. It is anticipated that up to 500 construction workers per day would visit the Project site during construction (including truck trips).

The San Diego Association of Governments (SANDAG) Transportation Forecast Information Center (TFIC) forecasts that Old Highway 80 should experience a total average weekday traffic (AWT) volume of 5,300 vehicles in 2020 (SANDAG 2019). Using calculation methods from the Federal Transit Administration (FTA), and assuming 50 miles per hour vehicle speed and daytime traffic represents 85% of the AWT total, estimated traffic noise would be 63 dBA Ldn at a distance of 75 feet from the roadway centerline (FTA 2018).

Conservatively assuming one worker per vehicle making a trip to and from the Project site, the total of 1,000 Proposed-Project-related vehicles (i.e., making one-way trips) added to the daytime portion of the 5,300 AWT baseline would result in only a 19% increase in daily traffic volume and hence less than a dB change to the daily traffic noise (e.g., assessed as CNEL or Ldn). Since the pre-Proposed-Project traffic noise level already exceeds 60 dBA, and a change in traffic noise would have to be 3 dB in order to be considered perceptible (Caltrans 2009), this less than 1 dB change in traffic noise would therefore be considered a less than significant cumulative noise impact.

The Proposed Project is designed to operate under remote monitoring, with few site visitors to conduct periodic inspection and maintenance of on-site systems. Hence, AWT attributed to these infrequent trips (likely numbering less than one trip per week) added to existing volumes on Old Highway 80 would be considered a less than significant impact on the basis of changing the pre-existing noise at existing or reasonably foreseeable future NSLU by less than a 1 dB, which would not be considered a perceptible increase.

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3 PROJECT-GENERATED AIRBORNE NOISE

3.1 Guidelines for the Determination of Significance

The County of San Diego has adopted various noise policies and standards contained within the County's General Plan Noise Element and the County Noise Ordinance.

County of San Diego – General Plan Noise Element

The County has established exterior noise guidelines in the Noise Element of its adopted General Plan (County of San Diego 2011). These guidelines identify compatible exterior noise levels for various land use types. "Exterior noise" means noise measured at an outdoor living area that meets specified minimum area requirements for single-family detached dwelling projects, and for other projects it means noise measured at all exterior areas that are provided for group or private usable open space.

The Noise Element states that an acoustical study is required if it appears that a NSLU would be subject to noise levels of CNEL equal to 60 dB or greater. An "NSLU" is defined as any residence, hospital, school, hotel, resort, library, or any other facility where quiet is an important attribute of the environment.

County of San Diego – Noise Ordinance

Noise thresholds for stationary sources and construction noise are regulated through the County's Noise Ordinance, Chapter 4, Noise Abatement and Control. Section 36.404 includes sound level limits for non-construction-related stationary noise sources, and Section 36.409 includes time and noise limitations for construction equipment. Section 36.410 includes noise restrictions for impulsive construction equipment. All of these sections are summarized in the following paragraphs.

Section 36.404 Sound Level Limits – Non-Construction Activities

This section in the County's Noise Ordinance includes 1-hour average sound level limits applicable to the Proposed Project's operation-related (non-construction) noise sources, such as mechanical equipment (e.g., inverters, transformers), operation-related traffic (vehicle movement, engine noise), and outdoor human activity in defined limited areas.

The allowable noise limits depend upon the zoning district and time of day. Currently, the Project site's zoning is largely Specific Plan (S-88), which allows for different uses. According to Section 36.404(a) and (c) of the County's noise ordinance, the County's noise standards that applies to S-88 zoning depends on the use being made of the property. The current use of the property is largely rural, and the nearest adjoining noise-sensitive receptors to the west of the Project site in Jacumba

Hot Springs are either Rural Residential (RR) or Residential Mobile Home (RMH). Thus, both the Project site and these adjoining and surrounding properties apply the same stringent noise standard per Section 36.404(a), reproduced in Table 2, which is a 1-hour average sound limit level of 50 dB between 7:00 a.m. to 10:00 p.m. and 45 dB between 10:00 p.m. and 7:00 a.m. Because the noise-generating components of the Proposed Project (PV inverters, battery storage container) may operate during the early morning hours before 7:00 a.m., the Proposed Project would be subject to the more restrictive nighttime noise standard of 1- hour 45 dB average at the property boundaries.

Per Section 36.404(d), if measured existing outdoor ambient sound levels are higher than those shown in Table 2, the allowable one-hour Leq at the property line would be this measured ambient level (i.e., without sound contribution from the Proposed Project) plus 3 dBA. Because measured daytime outdoor ambient sound levels as presented in Table 1 and nighttime hourly Leq plotted in Appendix B do not exceed 50 dBA and 45 dBA, respectively, there would appear to be no current rationale for the applicable hourly Leq thresholds from Table 2 to be upgraded to higher quantities.

Per Section 36.404(e), where the Proposed Project boundary abuts a commercial zone or S-94 property, the applicable nighttime hourly Leq threshold would be 50 dBA: an arithmetic average of the residential and commercial noise limits.

Table 2
County of San Diego Exterior Noise Standards

Zone	Time	One-Hour Sound Level Limits (dB)
(1) R-S, R-D, R-R, R-MH, A-70, A- 72, S-80, S-81, S-87, S-90, S-92 and R-V and R-U with a density of less than 11 dwelling units per acre	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	50 45
(3) S-94, V4 and all commercial zones (C-44)	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	60 55
(7) S-88 (see subsection (c))		

Source: County of San Diego Noise Ordinance, Section 36.404.

Section 36.409 – Construction Equipment

Section 36.409 limits allowable construction noise to no more than 75 dB over an 8-hour period between 7:00 a.m. and 7:00 p.m. when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

Section 36.410 Sound Limitations on Impulsive Noise

In addition to the general limitations on sound levels in Section 36.404 and the limitations on construction equipment in Section 36.409, the following additional sound-level limitations shall apply:

(a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 3, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25% of the minutes in the measurement period, as described in subsection (c), below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 3 are as described in the County Zoning Ordinance.

Table 3
County of San Diego Code Section 36.410, Maximum Sound Level (Impulsive) Measured at Occupied Property in Decibels (dBA)

Occupied Property Use	Decibels (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

(b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 3, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25% of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 4 are as described in the County Zoning Ordinance.

(c) The minimum measurement period for any measurements conducted under this section shall be 1 hour. During the measurement period, a measurement shall be conducted every 1 minute from a fixed location on an occupied property. The measurements shall measure the maximum sound level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise exceeds the maximum sound level for any portion of any minute, it would be deemed that the maximum sound level was exceeded during that minute.

Table 4
County of San Diego Code Section 36.410, Maximum Sound Level (Impulsive) Measured at Occupied Property in Decibels (dBA) for Public Road Projects

Occupied Property Use	Decibels (dBA)
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

3.2 Potential Operational Noise Impacts (Non-Construction Noise)

On-site noise sources associated with the Proposed Project would include inverter/transformer platforms and three battery storage containers that would be distributed at each 25 locations within the solar facility. The electrical transformer located within the collector substation would also generate a relatively steady-state source of continuous noise. The following subsections discuss these Proposed-Project-attributed operational noise sources.

3.2.1 Inverter/Transformer Platforms

Inverters and transformers would be installed at 25 locations within the solar facility. Each location would include up to two inverters and one transformer. The inverter/transformer platforms would also be elevated above the 100-year flood zone. Depending on the flood depth at each of the 25 locations, the inverter/transformer platforms would be elevated between approximately 18 inches and 4 feet 6 inches above the adjacent ground surface level.

As introduced in Section 1.3.2.2, Operation, the combined SPL from an inverter/transformer platform (i.e., two inverters served by a transformer) is 64.2 dBA at 50 feet. Since these inverter/transformer platforms are no closer than 300 feet to the nearest Proposed Project boundary and would operate ~~during daytime hours~~ when electricity is received from the PV panels and to handle charging and discharging of the battery energy storage system, noise from individual inverter/transformer platforms would be less than 44 dBA (based on sound propagation with distance) and thus not exceed the County's ~~daytime~~ nighttime noise standard of ~~50~~ 45 dBA hourly Leq at the nearest residential property line.

3.2.2 Battery Energy Storage System

The proposed battery energy storage system would consist of static equipment installed within containers, each of which features an air conditioning unit for cooling purposes and a self-extinguishing fire system. The containers would be approximately 55 feet long by approximately 10 feet in height, and approximately 19 feet wide. The battery storage containers would also be elevated above the 100-year flood zone. Depending on the flood depth at each of the 25 locations,

the containers would be elevated between approximately 18 inches and 4 feet 6 inches above the adjacent ground surface level.

~~With respect to~~ For potential long-term operational noise associated with the battery energy storage system, the HVAC unit for each container would be a primary source of noise generation and expected to operate 24 hours a day, 7 days a week, so as to keep the batteries from overheating. As introduced in Section 1.3.2.2, this noise analysis for the Proposed Project assumes that the HVAC unit for each container would be a Daikin Applied Model 025D "quiet" unit ~~or~~ comparably performing ~~unit~~ equipment having the same or lower sound emission level: ~~56.8~~ 53.8 dBA at 50 feet. For purposes of the prediction model, this reference sound level is used to define a point-type source of sound emission from the approximate centroid of each battery storage container. Since each of the 25 inverter/transformer platform locations on-site will be accompanied by three of these battery storage containers, the logarithmically combined noise level from three Model 025D cooling units would be ~~61.6~~ 58.6 dBA at 50 feet (i.e., ~~56.8~~ 53.8 + 10*LOG[3] = ~~56.8~~ 53.8 + 4.8 = ~~61.6~~ 58.6). At a distance of no less than 300 feet to the nearest Proposed Project property line, the noise emission from three Model 025D units would be less than ~~41~~ 39 dBA and thus compliant with the County's nighttime hourly Leq threshold of 45 dBA.

3.2.3 Collector Substation

The Proposed Project on-site collector substation would include a single 34.5 kV to 135 kV transformer rated to handle 180 MVA (90 MVA from the aggregate PV solar panel electricity production, plus 90 MVA from the battery storage units). As introduced in Section 1.3.2.2, this analysis assumes that the estimated SPL from the proposed substation transformer (SPLsub) will be 45.2 dBA at a distance of 492 feet. Since this transformer is no closer than 650 feet to the nearest Proposed Project boundary, the expected level at that receiving distance would be less than ~~43~~ 38 dBA and thus compliant with the County's nighttime hourly Leq standard of 45 dBA.

3.2.4 Stationary Equipment Noise Levels at Property Lines

The preceding paragraphs have studied—individually—each of the three major stationary sources of noise production associated with normal operation of the Proposed Project. However, at any time the nearby NSLU and their property lines will be exposed to acoustical contribution from multiple operating inverter/transformer platforms and battery storage container HVAC units distributed across the site, along with operation of the collector substation transformer. For this reason, and as introduced in Section 1.3.2.2, this analysis also predicted sound propagation for a scenario that includes all three categories of equipment operating concurrently.

Figure 4 includes short-term ("ST") sound level monitoring locations listed in Table 1, of which four (ST2, ST4, ST5, and ST6) are effectively on the anticipated Proposed Project property line.

Two additional Proposed Project property boundary locations ("B1" and "B2", also appearing in Figure 4) were included in this study to represent property line positions considered closest to anticipated operating inverter/transformer platforms and battery storage containers that would emit noise during Proposed Project operation. Boundary line position "B3" represents a location near the collector substation that abuts the S-92 zoned adjoining land to the east of the Proposed Project. Supplementing these three boundary line positions studied in the Draft EIR, an additional boundary line position "B4" has been added herein (to support the Final EIR) to represent a location along the southern property line of an existing residential land use on the southern side of Old Highway 80. Therefore, Table 5 presents the predicted Proposed-Project-attributed operation noise levels at these ~~seven~~ eight property line positions along with nearest representative NSLU locations that are subsequently discussed in Section 3.2.6, Equipment Noise Levels at Nearest NSLU. Appendix C displays the input parameters, including individual sound source emission positions in state- plane coordinates, distances between these source positions and the studied NSLU locations, and individual source acoustical contributions to the aggregate SPL values displayed in Table 5.

Table 5
Predicted Proposed Project Stationary Equipment Operations Noise Levels at Property Line and Off-Site Locations

Receiver Locations (Property Line Positions and Noise-Sensitive Land Uses)	One-Hour Average Noise Level (L_{eq1h}, dBA) at the Receiver Location	
	*All Proposed Project Sources**	*Collector Substation Transformer Only*
ST2 = near 44993 Old Highway 80	~~43.7~~ 43.2	~~13.4~~ 13.1
ST4 = Corner of Seeley Avenue and Laguna Street	~~41.6~~ 41.2	~~12.7~~ 12.7
ST5 = Railroad Street, south of Heber Street	~~35.2~~ 34.3	~~6.2~~ 6.2
ST6 = Corner of Heber Street and Seeley Avenue	~~34.6~~ 33.8	~~9.4~~ 9.7
B1 = Corner of Holtville Avenue and Laguna Street	~~44.4~~ 43.6	~~11.9~~ 12.0
B2 = southeastern corner of Jacumba Community Park	~~43.8~~ 44.1	~~8.3~~ 8.4
B3 = east of the ~~switchyard~~ Switchyard Facilities, adjoining S-92 zoned land	~~39.3~~ 38.4	~~36.9~~ 36.0
B4 = southern property line of apparent residence at 45093 Old Highway 80	44.7	13.0
R1 = Residence north of Seeley Avenue and Laguna Street	40.7	~~12.3~~ 12.8
R2 = Residence on the south side of Holtville Avenue, east of Campo Street	~~41.0~~ 42.1	~~11.3~~ 11.7

Table 5
Predicted Proposed Project Stationary Equipment Operations
Noise Levels at Property Line and Off-Site Locations

Receiver Locations (Property Line Positions and Noise-Sensitive Land Uses)	One-Hour Average Noise Level (L_{eq1h}, dBA) at the Receiver Location	
	*All Proposed Project Sources**	*Collector Substation Transformer Only*
R3 = Residences within "Wagon Wheel Trailer Park" located at 44726 Old Highway 80	~~41.5~~ 42.2	~~11.0~~ 11.4
R4 = Apparent residence on the west side of Railroad Street, south of Old Highway 80	~~34.2~~ 34.3	~~5.7~~ 6.2
R5 = Apparent residence at 45093 Old Highway 80	~~43.8~~ 43.3	~~13.6~~ 13.7
R6 = Apparent residence at 45851 Old Highway 80	~~28.8~~ 28.1	~~17.6~~ 17.1

* Includes Proposed Project inverter/transformer platforms and battery storage HVAC units; and, the collector substation step-up transformer (34.5 kV to 138 kV).

Predicted aggregate operation noise values for all Proposed Project sources presented in Table 5 are less than 45 dBA Leq, the County's nighttime noise threshold. For comparison purposes, Table 5 also presents, at the same studied receptor positions, predicted noise levels solely attributed to the collector substation transformer. Figure 5 illustrates predicted aggregate stationary equipment operation noise across a horizontal receiving plane five feet above grade, and demonstrates via 45 dBA noise contours that compliance with the nighttime County threshold of 45 dBA Leq is expected at the property lines. Thus, the predicted noise impacts associated with operation of on-site equipment, including the inverter/transformer platforms, battery storage container cooling units, and the collector substation, received at these NSLU is anticipated to be less than significant if the Proposed Project's equipment and layout remains as designed and studied within this Acoustical Assessment Report. However, if the layout and/or equipment of the Proposed Project were to change from what is studied herein, the stationary operational noise levels from the Proposed Project may have the potential to exceed the County's noise standards and impacts would be **potentially significant** (**Impact NOI-1**). Therefore, mitigation measure **M-NOI-1**, as detailed in Section 5, Mitigation Measures, would be required to ensure that any modifications to the Proposed Project would require further noise review for compliance. Therefore, with the implementation of **M-NOI-1**, the noise levels from the Proposed Project's stationary noise sources would be reduced to less than significant.

3.2.5 Mobile Equipment Noise Levels at Property Lines

Section 1.3.2.2 described ~~five~~ four PV panel washing scenarios involving usage of a self-propelled powered mechanical system (i.e., resembling a tractor with a mounted wash-roller apparatus)

traveling at low velocity along the rows of PV linear panel arrays that are proximate to residentially zoned property lines that adjoin the Proposed Project. In summary, the estimated hourly noise levels associated with these activity scenarios as described using this self-propelled system range from 59 dBA to 67 dBA Leq at the property line, which means that the County's daytime hourly thresholds as follows would be exceeded:

- 50 dBA Leq, where the Proposed Project S88-zoned land boundary adjoins offsite property zoned residential, agricultural, or others in the same "Noise Zone (1)" category per Table 36.404 of the County's noise ordinance; and,
- 55 dBA Leq, where the Proposed Project S88-zoned land boundary adjoins offsite property zoned commercial (i.e., "Noise Zone 3" category per Table 36.404 of the County's noise ordinance). The 55 dBA value is an arithmetic average of 50 dBA and 60 dBA, per 36.404(e) of the County Noise Ordinance where Noise Zones 1 and 3 meet.

But cleaning PV panel rows that are sufficiently more distant from the Proposed Project boundary would yield lower predicted hourly Leq values compliant with the County's 36.404(a) daytime standard. For example, this powered mechanical system could be used as long as the distance between the operating mobile equipment and the residentially zoned property line is at least 450 feet over an hourly period. This 450-foot distance between the mobile equipment and the receiving property line yields, on the basis of sound propagation and naturally occurring sound attenuation due to atmospheric absorption and ground surface effects, a predicted hourly noise level of less than 50 dBA Leq for the PV panel cleansing operation and would therefore be compliant with the County's 36.404(a) daytime limit of 50 dBA at the property line.

Where the self-propelled PV panel washer may be near commercially-zoned property, the minimum allowable distance to the property line would be 250 feet, which is substantially less than the aforementioned 450-foot distance buffer due to the less stringent noise limit: 55 dBA, rather than 50 dBA.

The alternative and quieter PV panel washing method involving a portable pressure washer towed by a pick-up truck is also described in Section 1.3.2.2 and predicted to have a lower range of hourly Leq values: 46 dBA to 49 dBA for the same ~~five~~ four studied scenarios. Usage of this alternative equipment would result in levels that are less than the County's daytime threshold of 50 dBA hourly Leq where offsite residential or rural zoned property adjoins the Proposed Project. These predicted levels are also less than the 55 dBA hourly Leq daytime limit where offsite commercially zoned property adjoins the Proposed Project.

~~However,~~ ~~s~~Since the PV panel cleaning activity would occur less than 450 feet of a NSLU property line, the Proposed Project could have a **potentially significant impact** (**Impact NOI-2**). For this reason, the Applicant will implement Project Design Feature PDF-NOI-1 as follows:

PDF-NOI-1 The Applicant commits to restricting usage of a self-propelled PV panel washing apparatus, having an estimated hourly Leq noise level of 83 dBA at 16 feet, within 450 feet of a County-classified Noise Zone 1 property or within 250 feet of a County-classified Noise Zone 3 property. Within these distances, and respecting additional temporal and distance conditions per relevant portions of the Photo-Voltaic Panel Washing Plan (PVPWP) prepared and implemented per M-NOI-2, the Applicant commits to using PV panel washing methodology, such as a pick-up truck towed and enclosed IPC Eagle wash station, or other means, that exhibits hourly Leq no greater than 74 dBA at 9 feet.

Implementation of both PDF-NOI-1 and ~~M~~mitigation measure **M-NOI-2,** as detailed in Section 5, would be required to reduce this impact for the Proposed Project mobile operations to a less than significant level.

3.2.6 Equipment Noise Levels at Nearest NSLU

Stationary Equipment

Using the same noise prediction methods applied in Section 3.2.4, Stationary Equipment Noise Levels at Property Lines, to estimate the aggregate Proposed-Project-attributed operation noise levels at the studied property line positions, the last six rows of Table 5 indicate that Proposed-Project-attributed operational noise exposures at ~~five of~~ the listed NSLU would be less than 45 dBA hourly Leq, thus demonstrating that potential noise impact is anticipated to be less than significant per the County standards.

At known existing NSLU in the community of Jacumba Hot Springs nearest to the Proposed Project site, noise attributed to normal operations of stationary equipment would not cause the outdoor ambient sound level to exceed 56.4 dBA CNEL, which represents a significant impact level based on the arithmetic sum of the measured existing outdoor ambient CNEL at the long-term ("LT", 24-hour continuous sound level monitoring) plus 10 dBA as allowed by Section 4.1.A.ii of the County's Noise Guidelines for Determining Significance. The predicted hourly L_{eq} values, if considered samples of hourly exposure from generally continuous noise emission attributed to normal operation of stationary noise sources associated with the Proposed Project, at nearest NSLU positions R-1, R-2, R-3, R-4, R-5, and R-6 as appearing in Figure 2.9-2 translate into CNEL values ranging between 35 dBA and 50 dBA for these six locations.

Thus, the predicted noise levels associated with operation of on-site stationary equipment as currently shown in the Proposed Project plot plans, including the PV panel array, inverter/transformer platforms, battery container cooling systems, and the collector substation, received at these NSLU would not result in exceedances of the County's noise standards. However, if the layout and/or types of stationary equipment of the Proposed Project were to change from what is studied herein, the stationary operational noise levels from the Proposed Project may have the potential to exceed the County's noise standards and impacts would be potentially significant (Impact NOI-1).

Mobile Equipment

As a result of the predicted hourly Leq values for the self-propelled PV panel washing option, and conservatively assuming the PV panel washing process would occur in proximity of an NSLU for the entirety of a 12-hour daytime period, the Draft EIR correspondingly calculated CNEL at NSLU positions R-1 and R-2 due to self-propelled means of PV panel washing at 59 dBA and 56 dBA, respectively. When logarithmically combined with estimated stationary operations noise levels at these positions, the total Proposed Project CNEL values were calculated as 60 dBA and 57 dBA, respectively, and thus would exceed the 56.4 dBA CNEL exterior noise limit (i.e., measured outdoor ambient of 46.4 + 10 dB) for NSLU per the Section 4.1.A.ii of the County's Noise Guidelines for Determining Significance.

However, upon further analysis after public review of the Draft EIR, the Draft EIR's assumption that PV panel washing would occur in proximity to an NSLU or its property line adjoining the Proposed Project for the entire 12-hour daytime period (7:00 a.m. to 7:00 p.m.) was determined to be unrealistic and overly conservative. Instead, and as reflected herein to support findings for the Final EIR, a conservative analysis appropriately assumes that mobile PV panel washing would occur nearest to the NSLU or property line of interest for up to five (5) of those 12 daytime hours. This assumption is based upon the Proposed Project Applicant's experience at other utility scale solar projects and equipment specifications. During the remaining seven (7) hours, the PV panel washing activity would occur at greater distances—representing the progress of PV panel washing to portions of the Proposed Project site's PV panels that are further away from the NSLU or property line.

With this revised assumption, the predicted CNEL at these studied NSLU would be less than previously estimated for both the self-propelled and portable/towed options for PV panel washing. By way of example, using the same hourly Leq estimates for the self-propelled option over a 5-hour period, and then downwardly adjusting those Leq estimates for washing that occurs at an additional 300 feet away from the NSLU, this new assumption would result in combined CNEL values (i.e., PV panel washing noise logarithmically summed with stationary noise levels) that are 56 dBA and 54 for R-1 and R-2, respectively, and are hence compliant with the County's exterior noise level standard for NSLU.

Despite this finding, the Applicant will implement the aforementioned **PDF-NOI-1**. With implementatoin of **PDF-NOI-1**, hourly Leq levels for the self-propelled PV panel washing option are expected to be compliant with the relevant County noise ordinance standards (i.e., 55 dBA or 50 dBA, depending on the receiving land use and its corresponding Noise Zone designation) as appearing in Appendix C of this AAR and as summarized by scenario as follows:

- **Scenario 1** (perpendicular row, north of Seeley Ave. [near R-1]) – distance to property line = 450 feet, estimated hourly Leq = 49 dBA
- **Scenario 2** (parallel row, east of land between Seeley and Holtville [near R-2]) – distance to property line = 450 feet, estimated hourly Leq = 49 dBA
- **Scenario 3** (perpendicular row, south of land south of Interstate 8 highway – distance to property line = 450 feet, estimated hourly Leq = 49 dBA
- **Scenario 4** (on-parallel [angled] PV panel row, adjoining C44 zoned land) – distance to property line = 250 feet, estimated hourly Leq = 55 dBA

Furthermore, Appendix C of this report shows that incorporation of these above findings and related calculations allow the following estimates of CNEL at NSLU R-1, R-2 and R-5 for the following scenarios of combined self-propelled and portable/towed equipment that reflect the new assumption regarding proximity of PV panel washing activities. These assumptions represent a conservative approach to analyzing panel washing operations as, based upon the Project Applicant's experience at other utility scale solar projects and equipment specifications, the equipment is likely to move quickly through the panel arrays and will not be in close proximity to any particular property line for the periods of time referenced below.

- R-1: with stationary source operations noise of 47 dBA CNEL, this value logarithmically added to estimated mobile PV panel washing yields 50 dBA CNEL and involves the following PV panel washing activities: self-propelled option no closer than 450 feet to the property line for 5 hours, and no closer than 750 feet for the remaining 7 hours; plus portable/towed option operating within 83 feet to 283 feet of the property line for 5 hours, and 383 feet to 583 feet for the remaining 7 hours.
- R-2: with stationary source operations noise of 49 dBA CNEL, this value logarithmically added to estimated mobile PV panel washing yields 50 dBA CNEL and involves the following PV panel washing activities: self-propelled option no closer than 450 feet to the property line for 5 hours, and no closer than 750 feet for the remaining 7 hours; plus portable/towed option operating within 100 feet to 450 feet of the property line for 5 hours, and 400 feet to 750 feet for the remaining 7 hours.
- R-5: with stationary source operations noise of 47.4 dBA CNEL, this value logarithmically added to estimated mobile PV panel washing yields 51 dBA CNEL and involves the

following PV panel washing activities: self-propelled option no closer than 450 feet to the property line for 5 hours, and no closer than 750 feet for the remaining 7 hours; plus portable/towed option operating within 100 feet to 300 feet of the property line for 5 hours, and 400 feet to 600 feet for the remaining 7 hours.

As all three of these studied NSLU, representing those that are closest to PV panels that would need seasonal washing, are expected to experience combined stationary and mobile source CNEL that are less than the County's exterior noise limits, impacts are considered less than significant.

NSLU Interior Noise Assessment

Based on the preceding analysis, predicted exterior CNEL levels attributed to operation of the Proposed Project (including seasonal occurrence of onsite PV panel washing activity) would not exceed the County's exterior threshold of 56.4 dBA CNEL. The arithmetic difference between this outdoor significance threshold and the interior significance threshold of 45 dBA CNEL is less than 12 dB, which according to the California State Planning Guidelines represents the low end of a "typical range of noise reduction provided by residential dwellings (12 to 18 dB with windows partially open)" (State of California 2017). Hence, one can reasonably expect interior noise level due to Proposed Project operation within these studied nearest NSLU to be compliant with the interior threshold and thus result in a less than significant impact with respect to Section 4.1.B of the County's Noise Guidelines for Determining Significance.

3.2.7 Cumulative Impacts

While there are a number of existing and planned energy production and transmission projects in the shared vicinity of southeastern San Diego County, Figure 5 illustrates that the propagated sound levels from operating Proposed Project features (inverter/transformer platforms, battery storage container cooling systems, and the collector substation) attenuates to a sound level less than 45 dBA within the boundary. At such relatively low noise levels, and because noise from other projects (e.g., operation of the ECO Substation, Jacumba Solar, and potential new facilities including Campo Wind Energy, Cameron Solar, and Boulevard Solar) would similarly diminish with distance, the opportunity for a "cumulatively considerable" effect as defined by the San Diego County Noise Report Format and Requirements (County of San Diego 2009b) guidance would be very unlikely.

3.3 Construction Noise and Impacts

3.3.1 Summary of Anticipated Construction Activities

The construction of the proposed solar facility would consist of several phases, including site preparation, development of staging areas and site access driveways, solar array assembly and installation, and construction of electrical transmission facilities as summarized in the following

paragraphs. This analysis presumes that these site preparation activities and other construction phases are distinct and sequential, such that no NSLU or boundary line position would be expected to witness or experience concurrent activities with all equipment impractically "stacked" together at a geographically common position or otherwise operating in a manner not reflecting typical construction practice.

Clearing and Grading. Construction of the Proposed Project would involve clearing and grubbing of the existing vegetation; grading necessary for the construction of access and service driveways and the installation of solar arrays; trenching for the electrical DC and alternating current AC collection system including the telecommunication lines; installation of the inverter stations; construction of 34.5 kV collection systems leading to the Proposed Project substation; and construction of the Proposed Project substation and the gen-tie line from the Proposed Project substation to the adjacent 138 kV high-voltage facilities.

Collection System Trenching. Trenching requirements for the DC electrical collection system and telecommunication lines would consist of a trench up to approximately 3 to 4 feet deep and 1 to 2 feet wide. The trenches may be filled with sand or another inert material to provide insulation and heat dissipation for the direct buried cable within the collection system. Excessive material from the foundation and trench excavations would be used for site leveling.

PV System Construction Overview. Proposed Project construction would include several phases occurring simultaneously with the construction of (1) PV systems assembly consisting of pile-driving of support racks and the placement of panels on support racks, (2) trenching and installation of the DC and AC collection system; (3) point of interconnection upgrades; and (4) the grading of access driveways.

Soil Stabilization. To reduce fugitive dust and erosion, the disturbed areas on the Project site would either be treated in one of the following methods, or a combination of both: Treatment with a permeable nontoxic soil binding agent (preferred method), and/or placement of disintegrated granite (DG) or other base material (good for driveways).

Construction Personnel, Traffic, and Equipment. The number of workers expected on the site during construction would vary over the construction period, with a maximum of 1,000 trips a day during the most intense phase of construction (i.e., the racks and panels installation). Deliveries of equipment and supplies to the site would also vary over the construction period but are expected to average about 40 to 70 daily trips.

It is assumed that all employees would arrive within the morning peak hour and depart within the evening peak hour, and delivery truck trips would be distributed evenly throughout a 12-hour-shift day, between the hours of 7:00 a.m. and 7:00 p.m. Since the surrounding area is rural, traffic is very

low on the local roads surrounding the Project site. Implementation of the Proposed Project would result in a temporary increase in traffic along these roads, but not to the level of the road carrying capacity. No road closures are anticipated during Proposed Project construction. With the implementation of Project Design Feature (PDF) WF-1, as described in Chapter 1, a County-required Traffic Control Plan to provide safe and efficient traffic flow in the area and on the Project site would be prepared prior to construction. The Traffic Control Plan would be prepared in consultation with the County of San Diego and would contain Proposed-Project-specific measures for noticing, signage, policy guidelines, and the limitation of lane closures to off-peak hours (although it is noted that no requirement for lane closures has beenidentified).

During the peak of construction, a typical day would include the transportation of parts, movement of heavy equipment, and transportation of materials.

Similar to the Proposed Project, the construction of the ~~switchyard~~ Switchyard Facilities and its 1,390-foot-long asphalt- paved access driveway would consist of several phases, including site preparation (i.e., clearing and grading of the ~~switchyard~~ Switchyard Facilities site work area and access driveway), setting foundations for the electrical equipment, laying conduit and grounding, and paving the access driveway. Transmission line tie-ins would also involve site preparation, erecting steel poles, and installing the conductors.

Upon conclusion of the Proposed Project's expected 35-year lifespan, the solar facility would be dismantled and its materials recycled or removed. For purposes of this noise assessment, sequential activities associated with the decommissioning process and activities would be considered analogous to studied construction phases herein. Examples include as follows:

- Removal of detachable aboveground structures and components would involve equipment and activities akin to those that would install the PV system during construction.
- Upon removal and/or recycling of aboveground structures and components, restoring the site surface and hydroseeding would be comparable to the site preparation phase during construction.
- Subsurface post elements for the PV system support structure would likely be extracted or otherwise removed by vibratory equipment similar in characteristics and noise generation to the anticipated pile-driving type post installation methods and means.

In sum, there are no anticipated decommissioning activities that would be louder than their construction-related counterparts. Therefore, the analysis of construction noise and vibration can conservatively be used to assess noise and vibration from comparable decommissioning activities and their participating equipment.

3.3.2 Anticipated Construction Noise

3.3.2.1 Proposed Project

Construction activities would occur during the County's allowable hours of operation (Monday through Saturday from 7:00 a.m. to 7:00 p.m.). The noise levels generated by construction equipment would vary greatly depending upon factors such as the type and specific model of the equipment, the operation being performed and the condition of the equipment. The average sound level of the construction activity also depends upon the amount of time that the equipment operates and the intensity of the construction during the time period.

Construction equipment would include standard equipment such as graders, scrapers, backhoes, loaders, cranes, dozers, water trucks, portable generators and air-compressors, and miscellaneous trucks. The maximum noise level ranges for various pieces of construction equipment at a distance of 50 feet are depicted in Table 6. The maximum noise levels at 50 feet for typical equipment would range up to 85 dB for the type of equipment normally used for this type of project. The hourly average noise levels would vary, but construction noise levels of up to approximately 75 to 80 dB at 50 feet are typical for the anticipated construction activities. Construction noise in a well-defined area typically attenuates at approximately 6 dB per doubling of distance. When the sites have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, an excess ground attenuation value of 1.5 dB per doubling distance can be assumed (Caltrans 2009).

Table 6
Typical Construction Equipment Noise Emission Levels

Equipment Description	Impact Device?	Acoustical Use Factor (percent)	Measured L_{max} at 50 Feet (dBA, slow)
Auger drill rig	No	20	84
Backhoe	No	40	78
Compactor (ground)	No	20	83
Compressor (air)	No	40	78
Concrete pump truck	No	20	81
Crane	No	16	81
Dozer	No	40	82
Drill rig truck	No	20	79
Dump truck	No	40	76
Excavator	No	40	81
Flat-bed truck	No	40	74
Front-end loader	No	40	79
Generator (<25 KVA, VMS signs)	No	50	73
Gradall	No	40	83
Man lift	No	20	75
Paver	No	50	77
Pickup truck	No	40	75

Table 6
Typical Construction Equipment Noise Emission Levels

Equipment Description	Impact Device?	Acoustical Use Factor (percent)	Measured L_{max} at 50 Feet (dBA, slow)
Roller	No	20	80
Scraper	No	40	84
Slurry trenching machine	No	50	80

Source: FTA 2006.

Using the Excel-based construction noise model introduced in Section 1.3.2.1, Construction, that emulates the FHWA RCNM and includes a temporal parameter to account for actual equipment operating presence and time (within an 8-hour work shift) at a specified distance to a studied receptor, activity-specific construction noise was estimated for up to three source-to-receiver distance values as follows:

- 50 feet from an assumed geographic center-point for the indicated construction activity to a location on the Proposed Project boundary that adjoins a NSLU property line
- 83 feet between the geographic activity center and the NSLU property line, which is the closest expected distance between a Proposed Project boundary line location to the nearest expected post-driving for the PV panel support structure foundations
- Approximately 300 feet between a Proposed Project boundary location and the nearest inverter/transformer platform

At these studied distances, not all construction equipment anticipated for a phase will be clustered at the same location. By way of example, it would be unreasonable to assume that all 20 anticipated all- terrain vehicles (ATV) expected for usage across the entire Project site would be present at any of these three nearest distances. Instead, and reflecting expectation of how Proposed Project construction activity will likely unfold, this analysis assumes that equipment expected for each phase will be distributed across the Project site; hence, only a portion of the listed equipment will be as close as the indicated distance and for only a portion of the full eight-hour period against which the construction noise is being assess against the County's 8-hour Leq threshold.

Additionally, this analysis presumes that phased construction activity is sequential. If any activities were to be concurrent, then only one of these activities would be proximate to the Proposed Project boundary (i.e., one of the above-listed source-to-receiver distances, as appropriate) and any others would be sufficiently distant so as to not cause a cumulative additive effect that would risk exceeding the County's construction noise limit of 75 dBA 8-hour Leq. By way of illustration, a construction activity that generates 75 dBA at the Proposed Project boundary adjoining an occupied property could be concurrent with another activity—further away—that generates less than 65 dBA. This is due to the principles of logarithmic addition for sound levels, where the logarithmic sum of any two values

that are more than 10 dB apart is simply the larger value. Putting this in a geographic context, for two activities producing the same noise level, the more distant activity would need to be at least 3 times further away than the activity closer to the receptor.

Consequently, and as shown in Table 7, predicted 8-hour Leq values during construction at the property line adjoining the nearest NSLU are estimated to range from 29 dBA to 75 dBA depending on phase, activity, and sound propagation distance. Under these conditions, noise exposures from construction activities involving conventional heavy equipment and processes would comply with the County's 8-hour 75 dBA Leq standard at the property lines. The construction noise analysis input and output is provided in Appendix D. Were actual conditions to be different from these predictions, (i.e., should Proposed Project construction phases or other activities overlap in schedule or otherwise occur concurrently), the Proposed Project does have the potential to exceed the 8-hour Leq County threshold at the Project boundary and impacts may be **potentially significant** (**Impact NOI-3**). Thus, mitigation measure **M-NOI-3** as detailed in Section 5 would be required to ensure the Proposed Project is compliant with the County's 75 dBA 8-hour Leq during construction. With implementation of this mitigation, the impact would be reduced to less than significant.

In the context of this noise analysis, "conventional" includes all anticipated stationary and mobile heavy construction equipment; however, it does not include post-driving processes for installation of PV panel array structure supports. Noise from the post-driving processes, involving equipment comparable to vibratory pile-drivers, are studied separately in Section 3.3.3, Potential Impulsive Noise Impacts, of this assessment.

Table 7
Conventional Construction Equipment Noise Prediction Results

Construction Phase or Activity	Eight-Hour L_{eq} (dBA) at Indicated Source-to-Receiver Distance		
	Nearest NSLU (50 Feet)[A]	*Nearest NSLU (83 Feet)*[B]	*Nearest NSLU (300 Feet)*[C]
Perimeter fence installation	74	65	54
Site preparation (clearing)	73	64	53
Site preparation (earth-moving)	74	65	54
Site preparation (grading)	74	65	54
Underground work (trenching)	75	65	55
Underground work (back-filling)	75	65	55
System installation	N/A[D]	75	60
Battery energy storage unit installation	N/A[D]	N/A[D]	64
Testing and commissioning	51	45	31
Site cleanup and restoration	75	69	55

NSLU = noise-sensitive land use

[A] Distance to access road near Proposed Project property line

[B] Distance to PV tracker support structure
[C] Distance to inverter/transformer platform and battery storage containers
[D] Not applicable (distance does not occur for this activity)

3.3.2.2 Switchyard Facilities

Because the nearest existing residential land use is approximately 3,500 feet away from the ~~switchyard~~ Switchyard Facilities work area and its access route, the predicted 8-hour noise levels from anticipated construction activities associated with the ~~switchyard~~ Switchyard Facilities and transmission line tie-ins are expected to range from 25 dBA to 60 dBA. Compared to the County's 8-hour standard of 75 dBA Leq8hr, this construction noise level range would be considered less than significant. Further, because it is more than 10 dBA less than the 75 dBA limit, the estimated construction noise level range for ~~switchyard~~ Switchyard Facilities construction activity would not cause a significant additive effect to other Proposed Project construction noise assessed at the same noise-sensitive receptor location. The combination of such noise level exposures is logarithmic; hence, a level of 60 dBA logarithmically added to 75 dBA would yield 75 dBA. Impacts would be **less than significant**.

3.3.3 Potential Impulsive Noise Impacts

Each tracker assembly, on which an array of PV panels would be arranged (and thus tilt in unison), would be installed on 4- to 6-inch-diameter pipes or beams. The beams would be driven into grade using a pile/vibratory/rotary driving technique similar to that used to install freeway guardrails. Most foundations would be driven to approximate depths of 10 to 15 feet deep.

It is anticipated that a RGT Model RG21T vibratory pile driver or comparable machine would be used. Based on data provided by the equipment vendor for this product and based on prior project experience, this size and type of equipment is anticipated to generate a maximum noise level of approximately 85 dBA at a distance of 50 feet (RGT 2014). At a distance of 83 feet, which is the shortest distance between the expected pile driving activity and the property boundary of any existing occupied residence, the maximum noise level from this post-driving process would be approximately 80 dBA and thus 2 dB less than the 82 dB criterion of Section 36.410. Thus, noise from post driving activity would comply with the County's impulsive noise criterion and would result in a less than significant noise impact. With respect to compliance with Section 36.409, the post driving noise has already been included in the predicted results for the System Installation phase as appearing in Table 7.

3.3.4 Cumulative Impacts

While there are a number of planned energy production and transmission projects in the shared vicinity of southeastern San Diego County, the opportunity for a "cumulatively considerable" effect would be very unlikely. Construction noise attenuates rapidly with distance, and thus the conditions

for a potential cumulatively considerable effect at a studied NSLU, such as those in the community of Jacumba Hot Springs, would need to require a combination of multiple concurrent and proximate major construction projects. Since such conditions are not foreseen at this time, cumulative noise impacts for the Proposed Project would **not be cumulatively considerable**.

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4 GROUNDBORNE VIBRATION IMPACTS

Operation of the Proposed Project largely involves stationary equipment installed on massive platforms and post-driven foundations; therefore, ground-borne vibration expected from these systems distributed across the Project area is not expected to create perceptible levels of vibration velocity at the nearest sensitive receptors, which in this context would be the previously studied NSLU. Groundborne vibration attenuates rapidly through intervening soils and rock strata as it propagates from the source to a sensitive receptor.

Construction activities, on the other hand, present more likely opportunities for vibration impact due to the anticipated operation of conventional heavy construction equipment (e.g., graders) studied for noise emission under Section 3.3.2, Anticipated Construction Noise, and post-driving processes evaluated for airborne noise impact under Section 3.3.3. The following sections present an assessment of vibration levels and potential impact for each of these two types of expected on-site construction activities.

4.1 Guidelines for Determination of Significance

Per the County's Guidelines for Determining Significance for Noise (County of San Diego 2009b), the County of San Diego refers to Federal Transit Administration (FTA) guidance for evaluation criteria to assess potential ground-borne vibration impact at sensitive receptors such as residences (and other occupied structures where inhabitants normally sleep). At such sensitive receptors, the following impact criteria are established:

- A vibration velocity level of 0.004 ips root mean squared (rms) would be considered a significant impact with respect to "frequent events", which for purposes of this analysis would be assumed to mean regular operation of conventional construction equipment, such as active bulldozers or graders that may momentarily work in an area near a sensitive receptor. Expressed as a PPV value, and assuming a crest value of 4 as adopted by the FTA (FTA 2006), this criterion would be 0.016 ips.
- For "infrequent events" (i.e., less than seventy [70] events per day), the threshold would be 0.01 ips rms. Expressed as a PPV value, and assuming the same crest value of 4, this criterion would become 0.04 ips.
- A vibration velocity level of 0.1 ips PPV would be considered a significant impact with respect to operation of post-driving equipment (i.e., pile drivers).

4.2 Potential Impacts

4.2.1 Conventional Construction Equipment

At 83 feet, the nearest potential distance between operating construction equipment and a sensitive receptor position (e.g., occupied residence), the predicted ground-borne vibration velocity level from a large bulldozer (PPVequip) would be 0.01 inches per second PPV and thus compliant with the FTA-based guideline threshold. This finding is based on a reference vibration velocity level (PPVref) of 0.089 inches per second PPV for the bulldozer at a reference source-to- receptor distance of 25 feet (FTA 2006), and using these quantities as inputs in the following expression for estimating PPV at a sensitive receptor:

$$PPVequip = PPVref * (25/D)^{1.5}$$

Where D is the distance (in feet) between the vibration-producing equipment and the sensitive receptor.

By complying with this County-adopted standard, vibration from operating conventional construction equipment would not be expected to cause a significant adverse effect at sensitive receptors.

4.2.2 Post-Driving Process

At 83 feet, the nearest potential distance between an anticipated post-driving machine and a sensitive receptor position (e.g., occupied residence), the predicted ground-borne vibration velocity level (PPVequip) would be 0.03 inches per second PPV and thus compliant with the County's threshold of 0.1 inches per second. This finding is based on a reference vibration velocity level (PPVref) of 0.17 inches per second PPV at a reference distance of 25 feet for the post-driver, assuming it compares with a "pile driver (sonic)" per FTA guidance (FTA 2006). By complying with this County-adopted standard, vibration due to normal operation of the post-driving equipment would not be expected to cause a significant adverse effect at sensitive receptors.

5 MITIGATION MEASURES

M-NOI-1 **Stationary Equipment**: The Proposed Project would comply with the County's Noise Ordinance §36.404 based upon the current proposed layout of the Proposed Project and the anticipated major noise producing operating stationary equipment (Equipment) deployed for the Proposed Project. The Equipment modeled in the Acoustical Analysis Report (AAR) prepared for the EIR was selected as representative technology at the time this AAR was prepared. The Project applicant may propose to use different Equipment than what was used to perform the noise modeling in the AAR or propose a change in the Equipment layout. If different Equipment is selected and/or the layout of Equipment is changed subsequent to Project approval, the applicant will be required to submit a revised AAR, and a revised site plan if needed, as follows:

a. The Project applicant shall retain a County Approved CEQA Noise Consultant to prepare a new predictive operations noise analysis in accordance with the County's Noise Report Format and Content requirements.

b. Any proposed Equipment selections, equipment duty cycles, Project layout alterations, and/or the addition, modification, reduction of the preceding equipment noise limits and measures may be approved, if they are demonstrated to comply with applicable outdoor hourly Leq noise limits per Section 36.404(a) of the County's Noise Ordinance at the property line.

c. The above identified measures shall take place prior to approval of any building plans for the Proposed Project. Any alterations or modifications proposed and approved pursuant to this procedure shall be included in the proposed Project design plans.

M-NOI-2 **PV Panel Washing Protocol:** To ensure noise from mobile operating equipment associated with regular cleansing of Project PV panel surfaces complies with daytime County noise standards, the following shall be implemented:

a. As part of the Project operations and maintenance program, the Applicant shall prepare a PV Panel Washing Plan (PVPWP) that addresses the usage of self-propelled or towed washing systems during the expected quarterly (or other frequency as reasonably anticipated annually) PV panel washing. The PVPWP shall demonstrate compliance with the County Noise Ordinance for avoiding potential impacts caused by operating PV panel washing equipment and vehicle noise sufficiently proximate to the property line of the property on which the noise is produced or at any location that is receiving the noise. The PVPWP

shall be submitted to County Planning & Development Services (PDS) a minimum of 30 days prior to the first PV panel washing. The County shall review the PVPWP to ensure compliance with the County Noise Ordinance prior to any panel washing. A subsequent plan shall be submitted to County PDS if there are any anticipated changes to the panel washing in the future. The subsequent Plan shall be submitted to the County 30 days prior to any new PV panel washing procedures occur. Components of the PVPWP shall include the following:

- Affected property owners shall be notified in writing two weeks prior to the use of PV panel washing activity with 500 feet of their property boundaries.
- ~~Noise emission from a self-propelled PV panel washer (Mazaka, MultiOne, or comparable) must not exceed 83 dBA Leq at 16 feet over a full hour; and, its operation must be restricted to daytime operation at the specified distance between it and a position along the property line that adjoins S80, RR or similar County-classified Noise Zone 1 property:~~

  ~~within 150 feet – not permitted;~~

  ~~150 to 250 feet – up to five minutes within any hour;~~

  ~~250 to 300 feet – up to fifteen minutes within any hour;~~

  ~~300 to 450 feet – up to thirty minutes within any hour and,~~

  ~~beyond 450 feet – no restriction.~~

- ~~Noise emission from a self-propelled PV panel washer (Mazaka, MultiOne, or comparable) must not exceed 83 dBA Leq at 16 feet over a full hour; and its operation must be restricted to daytime operation at the specified distance between it and a position along the property line that adjoins C44 or similar County-classified Noise Zone 3 property:~~

  ~~within 100 feet – not permitted;~~

  ~~100 to 150 feet – up to five minutes within any hour; 150 to 200 feet – up to fifteen minutes within any hour;~~

  ~~200 to 250 feet – up to thirty minutes within any hour; and, beyond 250 feet – no restriction.~~

- Noise emission from a pick-up truck (or ATV) and its towed IPC Eagle wash station (or ~~comparable~~ equipment that emits comparable noise) must not exceed 74 dBA Leq at 9 feet over a full hour; and, its operation must be restricted to daytime operation at

the specified distance between it and a position along the property line that adjoins S80, RR or similar County-classified Noise Zone 1 property:

within 50 feet – not permitted;

50 to 75 feet – up to five minutes within any hour;

75 to 100 feet – up to fifteen minutes within any hour;

100 to 125 feet – up to forty-five minutes within any hour; and, beyond 125 feet – no restriction.

- Noise emission from a pick-up truck (or ATV) and its towed IPC Eagle wash station (or ~~comparable~~ equipment that emits comparable noise) must not exceed 74 dBA Leq at 9 feet over a full hour; and, its operation must be restricted to daytime operation at the specified distance between it and a position along the property line that adjoins C44 or similar County-classified Noise Zone 3 property:

  within 25 feet – not permitted;

  25 to 40 feet – up to five minutes within any hour; 40 to 60 feet – up to fifteen minutes within any hour;

  60 to 75 feet – up to thirty minutes within any hour; and, beyond 75 feet – no restriction.

- Visual guides (flags, reflectors, or other markers) shall clearly delineate distances or zones of operation allowed for either of the afore-mentioned PV panel washing systems (self-propelled or towed).

b. Operators of the PV panel washing equipment shall be informed of the PVPWP as part of customary on-site Project training and awareness of County noise standard compliance to avoid potential noise impacts to the Jacumba Hot Springs community.

M-NOI-3 **Construction Noise Management Plan:** Prior to construction, the Applicant shall prepare a construction noise management plan (CNMP) which establishes construction activity restrictions in order to reliably achieve compliance with the County's 8-hour 75 dBA Leq standard at the Project property lines adjoining existing occupied properties (defined by Section 36.402.m as "property on which there is a building for which a certificate of occupancy has been issued"). The CNMP shall demonstrate compliance with the County Noise Ordinance for avoiding potential impacts caused by operating construction equipment and vehicle noise sufficiently proximate to these property lines of occupied properties.

The CNMP shall be submitted to County Planning & Development Services (PDS) thirty (30) days prior to any land disturbance. Components of the CNMP shall include the following:

a. Affected property owners shall be notified in writing two weeks prior to construction activity within 500 feet of their property boundaries.

b. In order to comply with the County Noise Ordinance (Section 36.409 – Construction Equipment), the acoustical usage factors (AUF) of heavy construction equipment used on the Project site shall be comparable to those listed on Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) User's Guide Table 1, reference L_{max} values at 50 feet shall be the lower of either the "Spec. 721.560" or "Actual Measured" values from the same RCNM User's Guide Table 1, and duration of heavy equipment operating for construction shall comply with the following limitations by activity, for the specified distance between the indicated heavy equipment operations and a position along the property line of an occupied parcel:

- Perimeter fence installation – up to two flatbed trucks and a front-end loader:

  within 15 feet – not permitted;

  15 to 25 feet – no more than twenty minutes per 8-hour period; 25 to 50 feet – no more than one hour per 8-hour period;

  50 to 75 feet – no more than 4 hours per 8-hour period; and, beyond 75 feet – no restriction.

- Site preparation (clearing) – water truck and tractor (mowing attachment):

  within 20 feet – not permitted;

  20 to 25 feet – no more than twenty minutes per 8-hour period; 25 to 50 feet – no more than thirty minutes per 8-hour period; 50 to 75 feet – no more than 2 hours per 8-hour period;

  75 to 100 feet – no more than 4 hours per 8-hour period;

  and, beyond 100 feet – no restriction.

- Site preparation (earth-moving) – bulldozer, water truck, and scraper:

  within 25 feet – not permitted;

  25 to 50 feet – no more than twenty minutes per 8-hour period;

50 to 75 feet – no more than one hour per 8-hour period;

75 to 100 feet – no more than three hours per 8-hour period; 100 to 125 feet – no more than six hours per 8-hour period; and, beyond 125 feet – no restriction.

- Site preparation (grading) – flatbed truck, grader, water truck, and sheepsfoot roller:

  within 25 feet – not permitted;

  25 to 50 feet – no more than twenty minutes per 8-hour period; 50 to 75 feet – no more than one hour per 8-hour period;

  75 to 100 feet – no more than three hours per 8-hour period; 100 to 125 feet – no more than six hours per 8-hour period; and, beyond 125 feet – no restriction.

- Underground work (trenching) – excavator, sheepsfoot roller, water truck, 5kW generator, and gradall (4x4 forklift):

  within 25 feet – not permitted;

  25 to 50 feet – no more than twenty minutes per 8-hour period; 50 to 75 feet – no more than 1.5 hours per 8-hour period;

  75 to 100 feet – no more than 3 hours per 8-hour period; and, beyond 100 feet – no restriction.

- Underground work (back-filling) – Aussie padder, sheepsfoot roller, water truck, 5kW generator, and gradall (4x4 forklift):

  within 25 feet – not permitted;

  25 to 50 feet – no more than twenty minutes per 8-hour period; 50 to 75 feet – no more than 1.5 hours per 8-hour period;

  75 to 100 feet – no more than 3 hours per 8-hour period; and,

  beyond 100 feet – no restriction.

- System installation – gradall (4x4 forklift), crane, ATV, vibratory pile driver (RGT Model RG21T or comparable), pick-up truck, and 5kW generator:

  within 25 feet – not permitted;

  25 to 50 feet – no more than twenty minutes per 8-hour period; 50 to 75 feet – no more than 1.5 hours per 8-hour period;

75 to 100 feet – no more than 4 hours per 8-hour period; and, beyond 100 feet – no restriction.

All construction equipment operations shall incorporate all recommended noise reducing measures such as, but not limited to, limiting construction equipment operations, installation of temporary noise barriers, and implementation of the recommendations within the CNMP to demonstrate compliance with the County Code Noise Ordinance, Sections 36.408 and 36.409.

Concurrent construction activities may occur so long as next closest construction activity to the same studied property line position is at least four times its "no restriction" distance away. By way of example, if earth-moving was occurring near a fixed point on the potentially affected property line, the next-closest set of earth-moving equipment performing like work, or perhaps an overlapping and comparable scheduled activity (e.g., grading), would be permitted if no closer than 500 feet (= 4 x 125') from the same receptor point.

c. If distance buffers or duration limits cannot be maintained, then the Project Applicant or its contractor will implement on-site temporary sound abatement measures, such as a field-erected noise barrier (e.g., sound blankets) of sufficient height and horizontal extent, or the placement of storage containers and other similarly solid sound-occluding structures, with the goal of reducing construction activity noise exposure at the Project property line to comply with County standards.

d. The CNMP will also include direction for the Project applicant or its contractor(s) to implement the following:

- Trucks and other engine-powered equipment shall be equipped with noise reduction features, such as mufflers and engine shrouds, which are no less effective than those originally installed by the manufacturer;
- Trucks and other engine-powered equipment shall be operated in accordance with posted speed limits and limited engine idling requirements;
- Usage of truck engine exhaust compression braking systems shall be limited to emergencies;
- Back-up beepers for all construction equipment and vehicles shall be adjusted to the lowest noise levels possible, provided that Occupational

Safety and Health Administration (OSHA) and Cal OSHA's safety requirements are not violated;

- Vehicle horns shall be used only when necessary, as specified in the contractor's specifications; and,
- Radios and other noise-generating "personal equipment" shall be prohibited.

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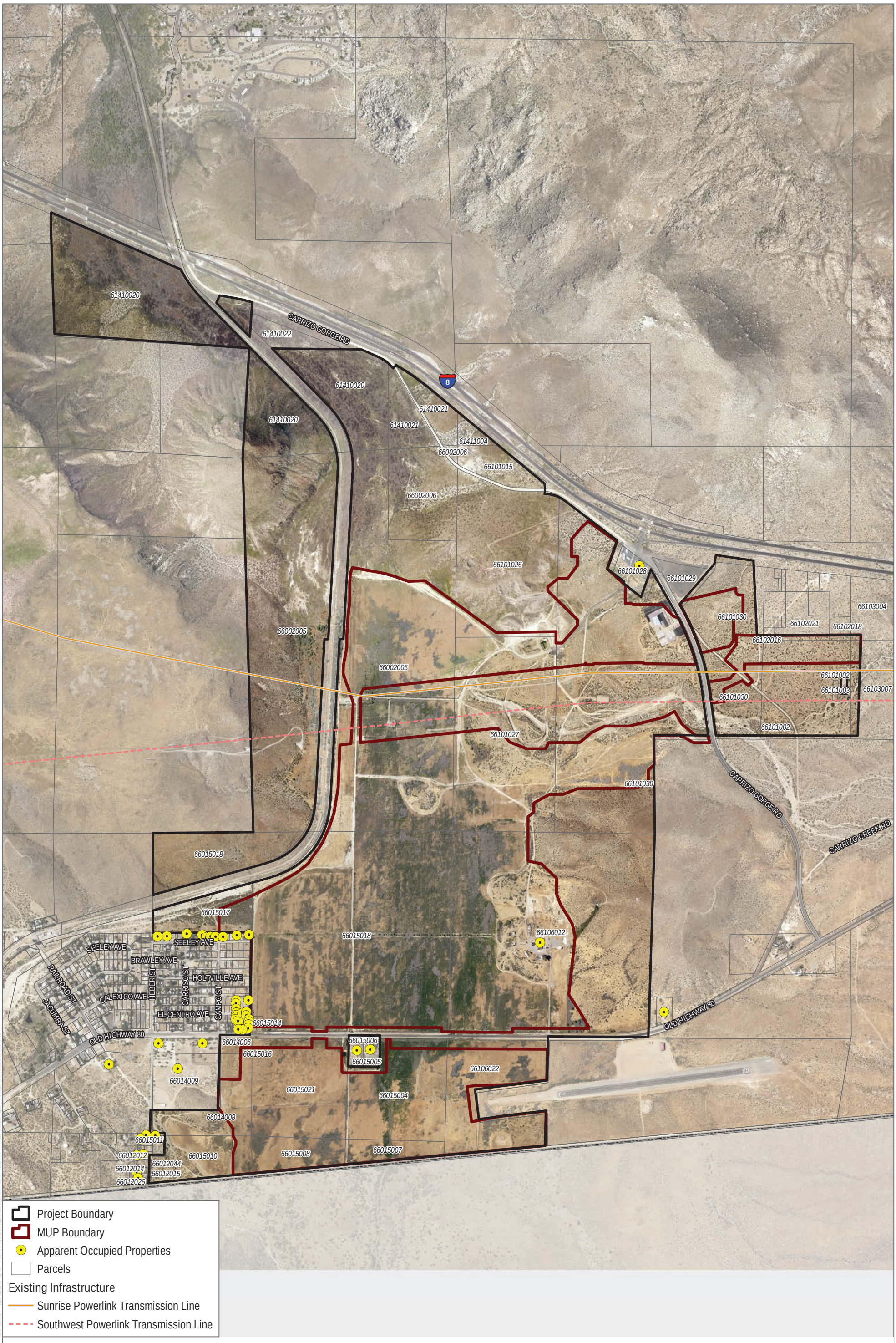

SOURCE: Kimley-Horn 2021; SANGIS 2017, 2021

DUDEK

0 500 1,000 Feet

FIGURE **6**

Apparent Occupied Properties

JVR Energy Park Project

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6 SUMMARY OF PROJECT IMPACTS, DESIGN CONSIDERATIONS, NOISE MITIGATION, AND CONCLUSIONS

This analysis identified potentially significant noise impacts for stationary sound sources (**Impact NOI-1)** and seasonal onsite mobile PV panel washing process sound sources (**Impact NOI-2**). With implementation of mitigation measure **M-NOI-1**, the Proposed Project operation is expected to be compliant with the San Diego County Noise Ordinance nighttime noise threshold of 45 dBA hourly Leq with respect to stationary sound sources. In addition, with the implementation of **PDF-NOI-1** and **M-NOI-2**, the Proposed Project operation would be compliant with the applicable San Diego County Noise Ordinance daytime noise thresholds for daytime operation of PV panel washing activities (when they occur). Thus, the Proposed Project would have a less than significant impacts with implementation mitigation measures **M-NOI** and **M-NOI-2**.

Predicted exterior noise level exposures at studied nearby offsite NSLU due to operation of Proposed Project onsite stationary sound sources are expected to be compliant with the exterior noise threshold per Section 4.1.A.ii of the County's Noise Guidelines for Determining Significance. Additionally, when PV panel washing may occur onsite during daytime hours, the logarithmic combination of stationary source noise emission and mobile PV panel washing activity noise is also expected to comply with the same exterior noise threshold (56.4 dBA CNEL) at the exteriors of studied NSLU. Conservatively assuming minimum exterior-to-interior sound transmission loss of 12 dB, per State of California Planning Guidelines, for typical residential home construction with an open window, the combined stationary operations and mobile PV panel washing noise level predicted inside the studied NSLU would be compliant with 45 dBA CNEL interior threshold per Section 4.1.B of the County's Noise Guidelines for Determining Significance. Based on compliance with these County guidelines, exterior and interior noise level impacts due to Proposed Project operation are expected to be less than significant.

Operation of the ~~switchyard~~ Switchyard Facilities, adjacent to the Proposed Project collector substation, may produce infrequent and/or intermittent noise (e.g., due to circuit breaker operation) that would be considered less than significant when compared to the continuous noise emission from the collector substation step-up transformer. Predicted noise from this collector substation transformer, assessed at the closest Proposed Project property line that adjoins S92-zoned land to the east, would be less than the 45 dBA hourly Leq nighttime limit and thus would result in a less than significant impact.

Predicted noise from conventional heavy construction equipment from specialized post-driving machines that are anticipated to prepare the site and erect the Proposed Project facilities are estimated to be compliant with the County's construction noise thresholds of 75 dBA for an 8-hour Leq metric during an allowable daytime construction period (7:00 a.m. to 7:00 p.m., Monday through Saturday), and the impulse noise limit of 82 dBA maximum sound level

[Lmax]. However, should the Proposed Project construction phases or other activities overlap in schedule or otherwise occur concurrently, the Proposed Project does have the potential to exceed these thresholds and impacts may be potentially significant (**Impact NOI-3**). With the implementation of mitigation measure **M-NOI-3**, impacts from the Proposed Project's construction would be less than significant.

Ground-borne vibration associated with normal operations of the Proposed Project facilities is expected to be negligible at the property lines and nearest NSLU. Vibration velocity levels associated with anticipated construction activities, involving either conventional heavy equipment or specialized processes such as the aforementioned post-driving machine, are found to be less than County-adopted FTA guidance-based thresholds and are thus expected to result in less than significant impacts.

In summary, the Proposed Project would have less than significant noise or vibration impacts at property line or NSLU positions with the incorporation of Project Design Feature PDF-NOI-1 and noise mitigation measures **M-NOI-1, M-NOI-2, and M-NOI-3**. Further, as other existing and planned energy production and transmission projects in the same San Diego County geographic region are sufficiently distant from NSLU near the Proposed Project, cumulative noise and vibration impacts would not be cumulatively considerable.

7 CERTIFICATION

This report has been prepared by Mark Storm, a County of San Diego-approved CEQA Consultant for Noise.

_____

Mark Storm, INCE Bd.
Cert. Senior Acoustician

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8 REFERENCES

Acentech. 2015. Mesa 500 Kilovolt (kV) Substation Project Technical Noise Report. Report No. 4403. February. http://www.cpuc.ca.gov/Environment/info/ene/mesa/attachment/DraftEIR/38AppendixJNoiseBackgroundReports.pdf.

AirNav.com. 2020. "L78 Jacumba Airport Operational Statistics." http://www.airnav.com/airport/L78.

Beranek, L., and I. Ver, eds. 1992. *Noise and Vibration Control Engineering.* John Wiley & Sons. New York, New York.

Bies and Hansen. 1996. *Engineering Noise Control*. 2nd edition. E & FN Spon. Caltrans (California Department of Transportation). 2009. *Technical Noise Supplement*.

County of San Diego. 2009a. *San Diego County Code of Regulatory Ordinances. Title 3, Division 6, Chapter 4: Noise Abatement and Control.* Amended by Ordinance No. 9962 (N.S.). January 1.

County of San Diego. 2009b. *County of San Diego Guidelines for Determining Significance – Noise.* Land Use and Environment Group. January 27.

County of San Diego. 2011. *San Diego County General Plan, Chapter 8, Noise Element.* August 3, 2011. https://www.sandiegocounty.gov/content/dam/sdc/pds/gpupdate/docs/GP/NoiseElement.pdf.

Daikin Applied. 2013. Quiet Condenser Option for Daikin Applied Air Handling Systems. A/SP 31-309 (05/10). https://www.daikinapplied.com/o365/GetDocument/Doc100/ASP_31_309_Quiet_Condenser_Option_flyer.pdf/.

FAA (Federal Aviation Administration). 2012. Advisory Circular. Noise Levels for U.S. Certificated and Foreign Aircraft. AC No: 36-1H, Change 1. May 25. https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_36-1H.pdf.

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

FTA (Federal Transit Administration). 2006. *Transit Noise and Vibration Impact Assessment*. FTA-VA-90-1003-06. May.

FTA. 2018. "Noise Impact Assessment Spreadsheet." https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/noise-impact-assessment-spreadsheet.

~~Groundwork Group LLC. 2019. "Solar Panel Cleaners." https://groundworkexperts.com/products/solar-panel-cleaners/.~~

ISO (International Organization of Standardization). 1996. *Acoustics – Attenuation of Sound During Propagation Outdoors -- Part 2: General Method of Calculation*. 9613-2. December.

ISO. 2003. *Description, Measurement and Assessment of Environmental Noise – Part 1*. 1996-1. August.

Mazaka. 2021. Tractor Mounted Panel Cleaner. MA40BA. https://www.mazakaheavyindustry.com/kopyas%C4%B1-tractor-mounted-panel-clean

MultiOne. 2016. "Solar Panel Washer." Accessed May 10, 2019. http://www.multione.com/wp-content/uploads/2016/06/46_Solar_panel_washer.pdf.

Rigolett. 2020."Tractors." https://rigolett.home.xs4all.nl/ENGELS/equipment/tractorframe.htm.

RTG (Rammtechnik GMBH). 2014. RG 21 T # 0224 I V01 en 07.2013 (technical data sheet).

SANDAG (San Diego Association of Governments). 2019. "Transportation Forecast Information Center." Series 12. Year 2020. http://tfic.sandag.org/.

SDCRAA (San Diego County Regional Airport Authority). 2011. *Jacumba Airport Land Use Compatibility Plan*. December.

Soitec Solar Development LLC. 2013. *Acoustical Assessment Report for the Tierra del Sol Solar Farm Project*. December. https://www.sandiegocounty.gov/pds/ceqa/Soitec-Solar-EIR.html.

State of California. 2017. General Plan Guidelines. Governor's Office of Planning and Research. https://opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf

USCB (United States Census Bureau). 2010. "Census Interactive Population Search: CA - Jacumba CDP."

SMA. 2020. SC2200-3000-EV-DS-en-58. Accessed March 8, 2020. https://files.sma.de/dl/23869/SC2200-3000-EV-DS-en-58.pdf.

ZombieBox International. 2020. "ZombieBox Product Performance & Accessories." Accessed June 2, 2020. https://www.zombie-box.com/products.

APPENDIX A

Definitions

APPENDIX A
Definitions

Term	Definition
ambient noise level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-weighted sound level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
community noise equivalent level (CNEL)	CNEL is the A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during the nighttime hours (10 p.m. to 7 a.m.) and 5 dB added to the sound during the evening hours (7 p.m. to 10 p.m.).
decibel (dB)	A unit for measuring sound pressure level and is equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.
equivalent continuous sound level (L_{eq})	The sound level corresponding to a steady state sound level containing the same total energy as a varying signal over a given sample period. L_{eq} is designed to average all of the loud and quiet sound levels occurring over a time period.
maximum A-weighted sound level (L_{max})	The greatest sound level measured on a sound level (L_{max}) meter during a designated time interval or event using fast time-averaging and A-weighting.

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APPENDIX B

Field Noise Measurement Data

DUDEK
CREATOR OF KERATA TECHNOLOGY

FIELD DATA REPORT

Field Noise Measurement Data

Record: 1118	
Project Name	*Jacumba Solar*
Observer(s)	*Connor Burke*
Date	*2019-01-08*

Meteorological Conditions	
Temp (F)	*55*
Humidity % (R.H.)	*55*
Wind	*Steady*
Wind Speed (MPH)	*11*
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*
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	*32.615676, -116.185330*
Begin (Time)	*10:55:00*
End (Time)	*11:05:00*
Leq	*41.2*
Lmax	*48.1*
Lmin	*32.8*
Other Lx?	*L90, L50, L10*
L90	*34*
L50	*40.7*
L10	*44.6*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Distant traffic*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Dog Barking, Distant Traffic, Rustling Leaves*
Other Noise Sources Additional Description	*Planes from Jacumba Airport*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

DUDEK
CREATOR OF KERATA TECHNOLOGY

FIELD DATA REPORT

Description / Photos

Site Photos

Photo	

Monitoring

Record #	*2*
Site ID	*ST5*
Site Location Lat/Long	*32.614279, -116.187224*
Begin (Time)	*11:15:00*
End (Time)	*11:25:00*
Leq	*35.3*
Lmax	*48*
Lmin	*29*
Other Lx?	*L90, L50, L10*
L90	*30.2*
L50	*32.9*
L10	*37.5*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Distant construction*
Other Noise Sources (Background)	*Distant Conversations / Yelling, Distant Dog Barking, Distant Industrial, Distant Traffic, Rustling Leaves*
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	
Comments / Description	*Facing east*

Monitoring

Record #	*3*
Site ID	*ST6*
Site Location Lat/Long	*32.621363, -116.187373*
Begin (Time)	*11:30:00*
End (Time)	*11:40:00*
Leq	*36*
Lmax	*47.3*
Lmin	*31.9*
Other Lx?	*L90, L50, L10*
L90	*32.6*
L50	*34.9*
L10	*37.9*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Rustling leaves*
Other Noise Sources (Background)	*Birds*
Other Noise Sources Additional Description	*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	
Comments / Description	*Facing north*

Monitoring

Record #	*4*
Site ID	*ST4*
Site Location Lat/Long	*32.621016, -116.183699*
Begin (Time)	*11:50:00*
End (Time)	*12:00:00*
Leq	*36.2*
Lmax	*47.7*
Lmin	*29.7*
Other Lx?	*L90, L50, L10*
L90	*30.6*
L50	*32.7*
L10	*37.1*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Distant traffic*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Dog Barking, Distant Traffic, Rustling Leaves*
Other Noise Sources Additional Description	*Wind through fences.*
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	
Comments / Description	*Facing south east*

Monitoring

Record #	*5*
Site ID	*ST2*
Site Location Lat/Long	*32.617364, -116.179002*
Begin (Time)	*12:10:00*
End (Time)	*12:20:00*
Leq	*49.2*
Lmax	*66.9*
Lmin	*32.1*
Other Lx?	*L90, L50, L10*
L90	*37.3*
L50	*40.8*
L10	*47.8*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Dog Barking, Distant Traffic*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

DUDEK
CREATOR OF KERATA TECHNOLOGY

FIELD DATA REPORT

Source Info and Traffic Counts	
Number of Lanes	*2*
Lane Width (feet)	*10*
Roadway Width (feet)	*20*
Roadway Width (m)	*6.1*
Distance to Roadway (feet)	*60*
Distance to Roadway (m)	*18.3*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Estimated Vehicle Speed (MPH)	*50*

Traffic Counts	
Vehicle Count Summary	*A 4, MT 0, HT 0, B 0, MC 0*
Select Method for Recording Count Duration	*Enter Manually*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*10*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Use Counter (+/-)*
Number of Vehicles - Autos	*4*
Number of Vehicles - Medium Trucks	*0*
Number of Vehicles - Heavy Trucks	*0*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo

Comments / Description	*Facing south west*

DUDEK
CREATOR OF KERATA TECHNOLOGY

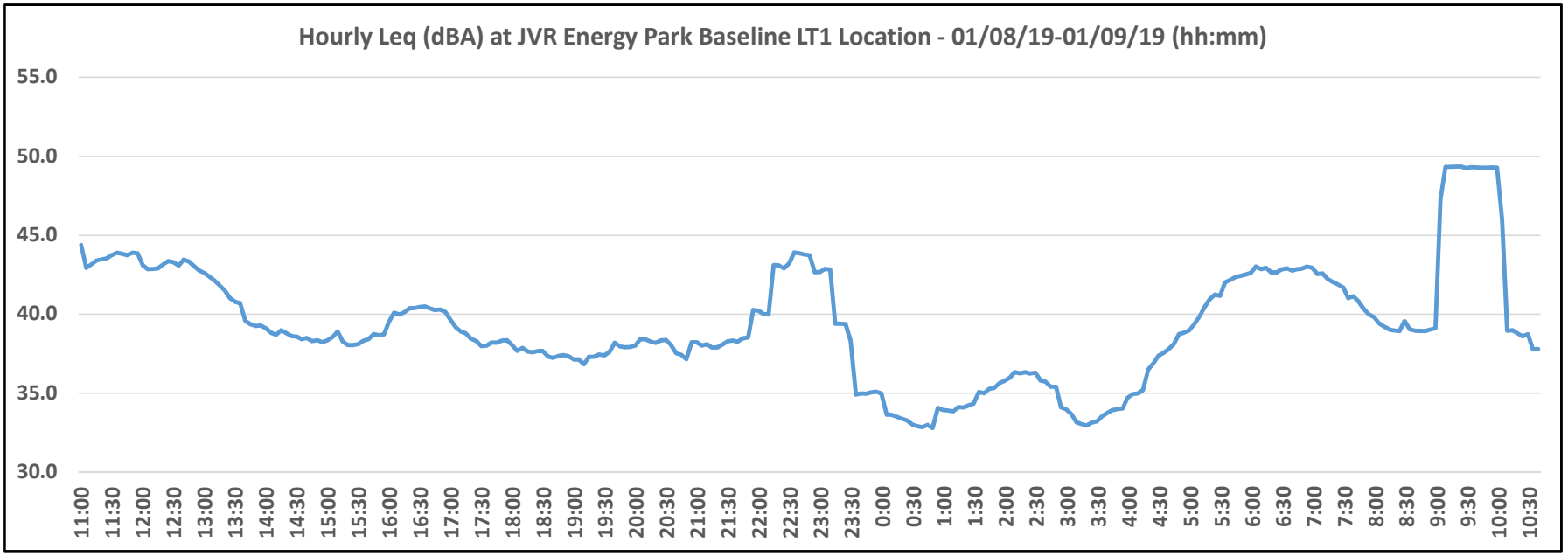
FIELD DATA REPORT

Monitoring	
Record #	*6*
Site ID	*ST3*
Site Location Lat/Long	*32.621553, -116.158855*
Begin (Time)	*00:30:00*
End (Time)	*00:40:00*
Leq	*46.1*
Lmax	*63.6*
Lmin	*31.9*
Other Lx?	*L90, L50, L10*
L90	*35*
L50	*38.3*
L10	*46.3*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Industrial, Distant Traffic, Rustling Leaves*
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	
Comments / Description	*Facing North west*


Hourly Leq (dBA) at JVR Energy Park Baseline LT1 Location - 01/08/19-01/09/19 (hh:mm)
55.0
50.0
45.0
40.0
35.0
30.0
11:00
11:30
12:00
12:30
13:00
13:30
14:00
14:30
15:00
15:30
16:00
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22:00
22:30
23:00
23:30
0:00
0:30
1:00
1:30
2:00
2:30
3:00
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4:00
4:30
5:00
5:30
6:00
6:30
7:00
7:30
8:00
8:30
9:00
9:30
10:00
10:30

APPENDIX C

Operation Noise Input Parameters
Prediction Results

Appendix C using Excel grid, and includes substation

Individual Project Sound Sources

grid size (ft)		*Source Tag*	**P01**	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**	**P12**	**P13**	**P14**	**P15**	**P16**	**P17**	**P18**	**P19**	**P20**	**P21**	**P22**	**P23**	**P24**	**P25**	**T1**
x	48	Source X-coordinate	3504	4128	4800	5472	6096	3984	4656	5328	6720	6672	7392	4416	5088	5808	6480	7200	5088	5712	6336	6960	5232	6576	8304	8928	10944	8304
y	48	Source Y-coordinate	8304	8304	8304	8304	8304	6720	6720	6720	6720	6720	6720	5472	5472	5472	5472	5472	4224	4224	4224	4224	2208	2208	1872	1872	2400	3600
		Source Description																										
		inverter/transformer platform (ITP, combo noise level)	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	45.2
		battery storage HVAC units (combined for 3)	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	
		Source Combined SPL (dBA)	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	45.2
rcvr height (feet)	5	Source Reference Distance (ft.)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	492
source height (feet)	15																											

Calc'd CNEL	Receiver Tag	Receiver Location X-coord	Receiver Location Y-coord	**Aggregate SPL**	Individual Source Contributions (to the Aggregate SPL at left, in dBA)																									
44.4	**ST1**	2688	7920	**37.7**	34.6	29.3	25.2	22.0	19.5	27.5	24.4	21.6	19.1	16.9	14.6	21.2	19.5	17.5	15.7	13.8	16.0	14.9	13.6	12.3	10.6	8.9	5.7	4.7	1.9	8.3
49.9	**ST2**	4800	7584	**43.2**	29.4	33.7	36.9	33.7	29.4	31.7	34.9	33.4	29.4	25.7	22.4	25.2	25.3	24.2	22.5	20.4	19.7	19.3	18.5	17.4	13.0	12.3	9.5	8.6	6.2	13.1
34.8	**ST3**	11088	6096	**28.1**	6.5	8.0	9.6	11.2	12.8	8.4	10.1	11.9	13.8	15.9	18.3	9.5	11.2	13.2	15.3	17.6	10.6	12.2	13.9	15.6	8.6	11.4	14.0	15.0	18.5	18.1
47.9	**ST4**	3552	6240	**41.2**	25.7	25.3	23.9	22.0	20.1	38.0	31.6	27.0	23.5	20.6	17.9	32.0	27.8	24.0	21.1	18.4	23.3	21.4	19.5	17.5	16.2	14.1	10.1	8.9	5.5	12.7
41.0	**ST5**	2256	8736	**34.3**	30.6	26.5	23.1	20.2	17.9	22.7	20.6	18.6	16.6	14.6	12.7	17.7	16.3	14.7	13.2	11.5	13.2	12.2	11.1	9.9	8.3	6.7	3.6	2.7	0.2	6.2
40.5	**ST6**	2256	6096	**33.8**	23.3	21.7	19.7	17.8	16.0	27.0	23.5	20.6	18.1	15.9	13.7	24.7	21.6	18.8	16.5	14.2	19.6	17.6	15.8	14.0	14.5	11.8	7.8	6.5	3.0	9.6
50.3	**B1**	3552	6720	**43.6**	28.6	28.0	26.0	23.5	21.2	42.1	32.5	27.4	23.7	20.7	18.0	29.1	26.2	23.1	20.5	17.9	21.5	20.0	18.3	16.6	14.7	12.9	9.2	8.1	5.0	12.0
50.8	**B2**	3120	8352	**44.1**	43.2	33.4	28.0	24.2	21.3	27.0	24.7	22.3	19.9	17.7	15.5	20.6	19.3	17.6	16.0	14.2	15.5	14.6	13.5	12.3	10.0	8.6	5.6	4.6	2.2	8.4
45.0	**B3**	9072	3648	**38.3**	8.1	9.2	10.5	11.6	12.6	11.5	13.1	14.7	16.2	17.8	19.2	14.2	16.1	18.3	20.5	22.9	17.3	19.6	22.1	25.0	17.1	21.7	26.4	27.4	24.7	36.0
51.4	**B4**	5088	7872	**44.7**	28.3	33.0	40.2	39.1	32.6	28.6	31.4	31.8	29.5	26.3	23.1	23.5	23.9	23.4	22.2	20.4	18.7	18.5	17.9	17.1	12.2	11.7	9.2	8.4	6.2	12.9
47.4	**R1**	3552	6144	**40.7**	25.2	24.8	23.5	21.7	19.8	36.9	31.2	26.8	23.4	20.5	17.8	32.6	28.0	24.2	21.2	18.4	23.6	21.7	19.7	17.7	16.5	14.3	10.3	9.0	5.6	12.8
48.8	**R2**	3456	6768	**42.1**	29.0	28.0	25.8	23.3	21.0	40.0	31.6	26.8	23.2	20.3	17.6	28.5	25.6	22.6	20.0	17.5	21.1	19.6	18.0	16.3	14.5	12.6	9.0	7.9	4.7	11.7
48.9	**R3**	3552	7056	**42.2**	31.2	30.2	27.5	24.5	21.9	39.7	32.0	27.2	23.6	20.6	17.9	27.2	24.9	22.3	19.9	17.5	20.3	19.0	17.5	16.0	13.8	12.1	8.6	7.5	4.6	11.4
41.0	**R4**	2304	8832	**34.3**	30.7	26.6	23.2	20.3	18.0	22.5	20.5	18.5	16.5	14.6	12.7	17.5	16.2	14.6	13.1	11.5	13.1	12.1	11.0	9.9	8.1	6.5	3.6	2.6	0.2	6.1
50.0	**R5**	5136	7584	**43.3**	27.3	31.3	35.9	35.9	31.6	29.7	33.6	34.8	31.4	27.5	23.9	24.8	25.4	24.9	23.4	21.4	19.7	19.6	19.0	18.0	13.1	12.5	9.9	9.1	6.8	13.7
34.8	**R6**	10896	6672	**28.1**	7.3	8.8	10.5	12.2	14.0	8.9	10.7	12.5	14.5	16.6	19.2	9.8	11.5	13.5	15.5	17.8	10.5	12.1	13.7	15.3	8.2	10.7	12.8	13.6	16.5	17.1

Source-to-Receiver Distances (feet)

Receiver Tag																											
B1	1585	1685	2017	2489	2997	432	1104	1776	2448	3120	3840	1518	1979	2578	3183	3856	2931	3301	3739	4224	4815	5432	6789	7239	8562	5685
B2	387	1009	1681	2352	2976	1847	2241	2746	3310	3909	4573	3158	3488	3940	4425	4994	4573	4874	5233	5638	6497	7049	8298	8702	9831	7032
B3	7258	6791	6319	5885	5526	5943	5379	4843	4344	3898	3501	5001	4382	3739	3169	2614	4025	3409	2796	2189	4101	2882	1935	1782	2250	769
B4	1642	1053	519	578	1097	1596	1230	1177	1469	1959	2576	2492	2400	2506	2774	3197	3648	3701	3856	4100	5666	5856	6808	7124	8015	5347
R1	2161	2235	2495	2890	3337	720	1245	1867	2515	3173	3883	1095	1677	2354	3004	3709	2459	2890	3382	3912	4280	4964	6390	6867	8286	5390
R2	1537	1677	2041	2534	3054	530	1201	1873	2544	3216	3936	1613	2084	2685	3290	3962	3022	3400	3843	4330	4894	5525	6890	7343	8669	5791
R3	1249	1375	1765	2290	2834	547	1154	1808	2471	3138	3855	1804	2206	2757	3329	3977	3222	3562	3971	4431	5131	5714	7032	7468	8736	5876
R4	1311	1899	2551	3212	3829	2699	3161	3689	4257	4852	5509	3969	4364	4855	5360	5938	5384	5731	6123	6551	7242	7882	9189	9608	10771	7961
R5	1784	1239	795	795	1200	1440	988	885	1222	1762	2416	2231	2113	2216	2503	2953	3360	3409	3568	3823	5377	5566	6532	6856	7785	5090
R6	7570	6962	6311	5664	5070	6912	6240	5568	4896	4224	3504	6590	5931	5228	4576	3886	6303	5733	5176	4635	7212	6212	5455	5188	4272	4019

Notes:
Air absorption assumes 1kHz OBCF represents (dBA), attenuation equation is from Noise & Vibration Control Engineering (Beranek & Ver, 1992), eq. 5.7
Ground absorption equation is from Noise & Vibration Control Engineering (Beranek & Ver, 1992), eq. 5.9; which is the same as ISO 9613-2 eq. 10
Each inverter/transformer platform features a pair of SMA SC-2475-EV inverters and a 3.6MVA transformer

Appendix C

State Plane Coordinates

Individual Project Sound Sources

		Source Name	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP	ITP
	feet	*Source Tag*	**P06**	**P07**	**P08**	**P09**	**P10**	**P12**	**P13**	**P14**	**P15**	**P17**	**P18**	**P19**	**P20**	**P21**	**P24**	**P01**	**P02**	**P03**	**P04**	**P05**	**P25**	**P23**	**P22**	**P16**	**P11**
h_r	5	Source X-coordinate	6582678	6583356	6584039	6584717	6585396	6583104	6583788	6584485	6585182	6583768	6584388	6585008	6585628	6583931	6587593	6582208	6582848	6583507	6584146	6584805	6589629	6586992	6585287	6585880	6586074
h_s	15	Source Y-coordinate	1805261	1805261	1805261	1805261	1805261	1806501	1806501	1806501	1806501	1807741	1807741	1807741	1807741	1809818	1810116	1803707	1803707	1803707	1803707	1803707	1809548	1810116	1809818	1806501	1805263
		Source Description																									
		inverter/transformer platform (ITP, combo noise level)	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2
		battery storage HVAC units (combined for 3)	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6
		Source Combined SPL (dBA)	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3	65.3
		Source Reference Distance (ft.)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Receiver Location

Receiver Tag	X-coord	Y-coord	**Aggregate SPL**	Individual Source Contributions (to the Aggregate SPL at left, in dBA)																							
ST1	6581442	1804087	**38**	27.8	24.7	21.8	19.3	17.0	21.5	19.7	17.8	15.9	16.3	15.1	13.9	12.6	10.7	4.8	35.1	29.6	25.5	22.4	19.7	2.1	5.8	9.0	14.0	14.9
ST2	6583522	1804450	**43**	31.9	35.5	33.9	29.7	25.8	25.5	25.7	24.6	22.8	20.0	19.6	18.8	17.7	13.0	8.8	29.2	33.5	36.6	33.8	29.4	6.4	9.6	12.3	20.7	22.6
ST3	6589726	1805726	**28**	8.5	10.3	12.1	14.1	16.2	9.6	11.4	13.3	15.4	10.5	12.1	13.8	15.5	8.5	14.5	6.8	8.3	9.9	11.5	13.2	18.0	13.7	11.2	17.7	18.5
ST4	6582260	1805740	**41**	38.2	31.7	27.0	23.4	20.5	32.2	27.8	24.2	21.1	23.4	21.5	19.6	17.7	16.0	9.0	25.9	25.4	24.0	22.2	20.2	5.6	10.1	13.9	18.5	18.0
ST5	6580971	1803255	**34**	22.8	20.7	18.6	16.6	14.6	17.8	16.4	14.8	13.2	13.3	12.3	11.2	10.1	8.2	2.8	30.6	26.5	23.1	20.4	17.9	0.3	3.7	6.6	11.6	12.8
ST6	6580954	1805866	**34**	27.1	23.6	20.6	18.1	15.8	24.7	21.6	18.9	16.5	19.7	17.7	15.8	14.1	14.3	6.5	23.5	21.8	19.8	17.9	16.0	3.0	7.8	11.7	14.3	13.7

Receiver Tag	Source-to-Receiver Distances (feet)																									
ST1	1705	2245	2850	3479	4125	2931	3366	3884	4451	4331	4693	5106	5556	6248	8613	855	1457	2100	2731	3384	9841	8194	6901	5052	4779
ST2	1170	828	962	1445	2043	2093	2069	2266	2639	3301	3404	3611	3908	5384	6977	1509	1003	743	970	1483	7956	6645	5651	3126	2679
ST3	7064	6387	5706	5031	4355	6667	5989	5298	4610	6290	5706	5130	4567	7094	4881	7785	7168	6539	5934	5319	3823	5172	6037	3924	3681
ST4	636	1196	1842	2503	3172	1136	1707	2351	3019	2505	2921	3399	3917	4407	6898	2034	2116	2385	2773	3257	8295	6445	5079	3699	3843
ST5	2633	3116	3665	4249	4858	3884	4297	4783	5316	5286	5639	6034	6466	7199	9535	1316	1930	2575	3207	3860	10703	9128	7854	5885	5483
ST6	1827	2477	3144	3811	4483	2242	2905	3588	4276	3382	3913	4467	5036	4948	7883	2497	2872	3343	3854	4415	9424	7384	5865	4967	5156

Notes:

Air absorption assumes 1kHz OBCF represents (dBA), attenuation equation is from Noise & Vibration Control Engineering (Beranek & Ver, 1992), eq. 5.7.

Ground absorption equation is from Noise & Vibration Control Engineering (Beranek & Ver, 1992), eq. 5.9; which is the same as ISO 9613-2 eq. 10.

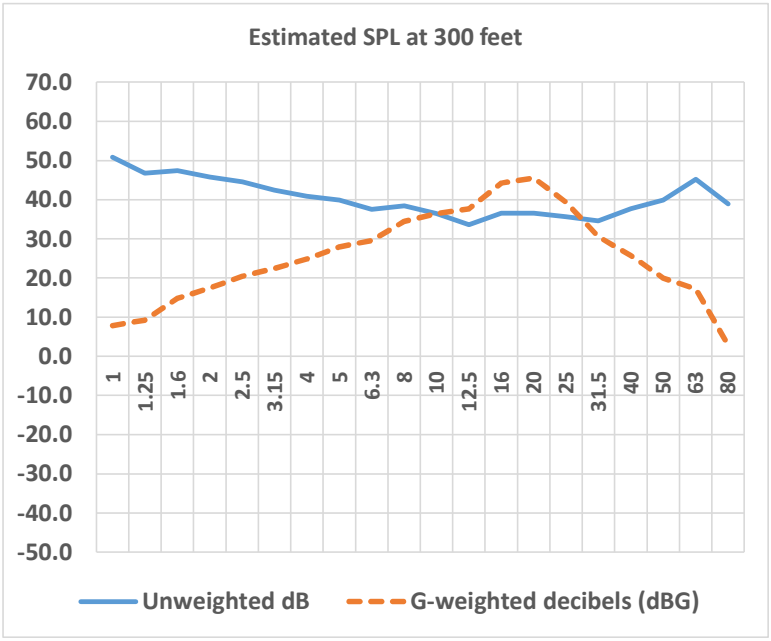
Each inverter/transformer platform features a pair of SMA SC-2475-EV inverters and a 3.6MVA transformer.

State Plane Coordinates of ITP locations based on March 29, 2021 Project site layout information.

h_r = height of receiver (above grade = 0 feet); h_s = height of source (above grade = 0 feet)

8 = dB added to Xantrex GT500 on the basis of the SMA SC2475 rated at 1.8MW, while the former is only 0.5MW and using EEPENG p. 4-17, Table 4.5 calcs

			at 50 feet		at 300 feet	
1/3-OBCF (Hz)	dBG adj.	1/3-OBCF (Hz)	dB	dBG value	dB	dBG value
0.25	-88	0.25		-88		
0.315	-80	0.315		-80		
0.4	-72.1	0.4		-72.1		
0.5	-64.3	0.5		-64.3		
0.63	-56.6	0.63		-56.6		
0.8	-49.5	0.8		-49.5		
1	-43	1	66.4	23.4	50.8	7.8
1.25	-37.5	1.25	62.3	24.8	46.7	9.2
1.6	-32.6	1.6	63	30.4	47.4	14.8
2	-28.3	2	61.3	33	45.7	17.4
2.5	-24.1	2.5	60.1	36	44.5	20.4
3.15	-20	3.15	58	38	42.4	22.4
4	-16	4	56.4	40.4	40.8	24.8
5	-12	5	55.5	43.5	39.9	27.9
6.3	-8	6.3	53.1	45.1	37.5	29.5
8	-4	8	54	50	38.4	34.4
10	0	10	52	52	36.4	36.4
12.5	4	12.5	49.2	53.2	33.6	37.6
16	7.7	16	52.1	59.8	36.5	44.2
20	9	20	52.1	61.1	36.5	45.5
25	3.7	25	51.2	54.9	35.6	39.3
31.5	-4	31.5	50.1	46.1	34.5	30.5
40	-12	40	53.3	41.3	37.7	25.7
50	-20	50	55.5	35.5	39.9	19.9
63	-28	63	60.8	32.8	45.2	17.2
80	-36	80	54.5	18.5	38.9	2.9
100	-44					
			71.8	65.0	56.2	49.4 = logsums



G-weighting factors (from ISO 7196-1995, as appearing in http://www.acoustics.asn.au/conference_proceedings/AAS2004/ACOUSTIC/PDF/AUTHOR/AC040059.PDF)

Scenario/Location	Noise Emitter	Quantity	AUF	Lmax	Ref. feet	Rcvr. feet	Adj. Lmax	minutes	SPL	atten. SPL	Notes
Scenario #1A: perpendicular row, north of Seeley Ave. (near R1)	using a portable washer	1	20	81	9	83	61.7	15	49	47.2	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	183	54.8	30	45	41.1	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	283	51.0	15	38	33.7	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	83	50.6	15	39	37.1	FHWA 2006
		1	25	55	50	183	43.7	30	35	30.9	
		1	25	55	50	283	39.9	15	28	23.5	
									logsum Leq for hour	**48.7**	
Scenario #1B: perp. row, south of NSLU on Old Hwy. 80 (near R5)	using a portable washer	1	20	81	9	100	60.1	15	47	44.8	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	200	54.1	30	44	40.1	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	300	50.5	15	38	33.1	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	100	49.0	15	37	34.7	FHWA 2006
		1	25	55	50	200	43.0	30	34	30.0	
		1	25	55	50	300	39.4	15	27	23.0	
									logsum Leq for hour	**46.7**	
Scenario #2: parallel row, between Seeley and Holtville (near R2)	using a portable washer	1	20	81	9	100	60.1	15	47	44.8	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	366	48.8	30	39	34.2	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	633	44.1	15	31	25.9	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	100	49.0	15	37	34.7	FHWA 2006
		1	25	55	50	366	37.7	30	29	24.0	
		1	25	55	50	633	33.0	15	21	15.8	
									logsum Leq for hour	**45.6**	
Scenario #3: perpendicular row, south of Interstate 8	using a portable washer	1	20	81	9	50	66.1	5	48	48.3	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	167	55.6	10	41	37.2	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	283	51.0	5	33	28.9	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	50	55.0	5	38	38.1	FHWA 2006
		1	25	55	50	167	44.5	10	31	27.1	
		1	25	55	50	283	39.9	5	23	18.8	
									logsum Leq for hour	**49.1**	
Scenario #4: non-parallel (angled) row, adjoining C44-zoned property	using a portable washer	1	20	81	9	83	61.7	15	49	47.2	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	154	56.3	30	46	42.9	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	225	53.0	15	40	35.9	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	83	50.6	15	39	37.1	FHWA 2006
		1	25	55	50	154	45.2	30	36	32.7	
		1	25	55	50	225	41.9	15	30	25.8	
									logsum Leq for hour	**49.2**	
Scenario #1: perpendicular row, north of Seeley Ave.	Mazaka on a small excavator or tractor	1	50	86	16.2	450	57.1	15	48	43.3	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	450	57.1	30	51	46.3	
		1	50	86	16.2	450	57.1	15	48	43.3	
									logsum Leq for hour	**49.3**	
Scenario #2: parallel row, between Seeley and Holtville	Mazaka on a small excavator or tractor	1	50	86	16.2	450	57.1	15	48	43.3	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	450	57.1	30	51	46.3	
		1	50	86	16.2	450	57.1	15	48	43.3	
									logsum Leq for hour	**49.3**	
Scenario #3: perpendicular row, south of Interstate 8	Mazaka on a small excavator or tractor	1	50	86	16.2	450	57.1	15	48	43.3	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	450	57.1	30	51	46.3	
		1	50	86	16.2	450	57.1	15	48	43.3	
									logsum Leq for hour	**49.3**	
Scenario #4: non-parallel (angled) row, adjoining C44	Mazaka on a small excavator or tractor	1	50	86	16.2	250	62.2	15	53	49.0	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	250	62.2	30	56	52.0	
		1	50	86	16.2	250	62.2	15	53	49.0	
									logsum Leq for hour	**55.0**	

Scenario/Location	Noise Emitter	Quantity	AUF	Lmax	Ref. feet	Rcvr. feet	Adj. Lmax	minutes	SPL	atten. SPL	Notes
											5 daytime hours (nearest)
											7 daytime hours (remaining)
Scenario #1A: perpendicular row, north of Seeley Ave. (R1)	using a portable washer	1	20	81	9	83	61.7	15	49	47.2	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	183	54.8	30	45	41.1	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	283	51.0	15	38	33.7	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	83	50.6	15	39	37.1	FHWA 2006
		1	25	55	50	183	43.7	30	35	30.9	
		1	25	55	50	283	39.9	15	28	23.5	Value below is only for 5-hour wash noise near NSLU
									logsum Leq for hour	**48.7**	washing CNEL (dBA) 42
Scenario #1A + 300' (during 7 remaining hours)	using a portable washer	1	20	81	9	383	48.4	15	35	30.7	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	483	46.4	30	36	31.5	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	583	44.8	15	32	26.7	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	383	37.3	15	25	20.6	FHWA 2006
		1	25	55	50	483	35.3	30	26	21.4	
		1	25	55	50	583	33.7	15	22	16.6	Value below is only for 7-hours distant from NSLU
									logsum Leq for hour	**35.3**	washing CNEL (dBA) 30
Scenario #2: parallel row, between Seeley and Holtville (minimum 450-foot distance to property line)	Mazaka on a small excavator or tractor	1	50	86	16.2	450	57.1	15	48	43.3	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	450	57.1	30	51	46.3	
		1	50	86	16.2	450	57.1	15	48	43.3	Value below is only for 5-hour wash noise near NSLU
									logsum Leq for hour	**49.3**	washing CNEL (dBA) 42
Scenario #2: parallel row, between Seeley and Holtville (750-foot distance to property line)	Mazaka on a small excavator or tractor	1	50	86	16.2	750	52.7	15	44	38.3	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	750	52.7	30	47	41.4	
		1	50	86	16.2	750	52.7	15	44	38.3	Value below is only for 7-hours distant from NSLU
									logsum Leq for hour	**44.4**	washing CNEL (dBA) 39

predicted stationary operations noise level at **R1** (CNEL) 47.4

combined PV panel washing over 12-hour daytime period with stationary operations noise level at **R1** (CNEL) **49.9**

Scenario/Location	Noise Emitter	Quantity	AUF	Lmax	Ref. feet	Rcvr. feet	Adj. Lmax	minutes	SPL	atten. SPL	Notes
											5 daytime hours (nearest)
											7 daytime hours (remaining)
Scenario #2: parallel row, between Seeley and Holtville (R2)	using a portable washer	1	20	81	9	100	60.1	15	47	44.8	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	275	51.3	30	41	37.0	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	450	47.0	15	34	29.2	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	100	49.0	15	37	34.7	FHWA 2006
		1	25	55	50	275	40.2	30	31	26.8	
		1	25	55	50	450	35.9	15	24	19.0	Value below is only for 5-hour wash noise near NSLU
									logsum Leq for hour	**46.0**	washing CNEL (dBA) 39
Scenario #2 + 300' (during 7 remaining hours)	using a portable washer	1	20	81	9	400	48.0	15	35	30.3	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	575	44.9	30	35	29.8	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	750	42.6	15	30	24.3	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	400	36.9	15	25	20.2	FHWA 2006
		1	25	55	50	575	33.8	30	25	19.7	
		1	25	55	50	750	31.5	15	19	14.1	Value below is only for 7-hours distant from NSLU
									logsum Leq for hour	**34.0**	washing CNEL (dBA) 29
Scenario #2: parallel row, between Seeley and Holtville (R2) (minimum 450-foot distance to property line)	Mazaka on a small excavator or tractor	1	50	86	16.2	450	57.1	15	48	43.3	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	450	57.1	30	51	46.3	
		1	50	86	16.2	450	57.1	15	48	43.3	Value below is only for 5-hour wash noise near NSLU
									logsum Leq for hour	**49.3**	washing CNEL (dBA) 42
Scenario #2: parallel row, between Seeley and Holtville (R2) (750-foot distance to property line)	Mazaka on a small excavator or tractor	1	50	86	16.2	750	52.7	15	44	38.3	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	750	52.7	30	47	41.4	
		1	50	86	16.2	750	52.7	15	44	38.3	Value below is only for 7-hours distant from NSLU
									logsum Leq for hour	**44.4**	washing CNEL (dBA) 39

predicted stationary operations noise level at **R2** (CNEL) 48.8

combined PV panel washing over 12-hour daytime period with stationary operations noise level at **R2** (CNEL) **50.4**

Scenario/Location	Noise Emitter	Quantity	AUF	Lmax	Ref. feet	Rcvr. feet	Adj. Lmax	minutes	SPL	atten. SPL	Notes
											5 daytime hours (nearest)
											7 daytime hours (remaining)
Scenario #1B: perp. row, south of R5 NSLU on Old Hwy. 80	using a portable washer	1	20	81	9	100	60.1	15	47	44.8	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	200	54.1	30	44	40.1	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	300	50.5	15	38	33.1	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	100	49.0	15	37	34.7	FHWA 2006
		1	25	55	50	200	43.0	30	34	30.0	
		1	25	55	50	300	39.4	15	27	23.0	Value below is only for 5-hour wash noise near NSLU
									logsum Leq for hour	**46.7**	washing CNEL (dBA) 40
Scenario #1B + 300' (during 7 remaining hours)	using a portable washer	1	20	81	9	400	48.0	15	35	30.3	Soitec 2013 (EIR, Section 2.6 noise)
		1	20	81	9	500	46.1	30	36	31.2	IPC Eagle wash station, with equipment inside an "extra-large" metal Zombie Box (18 dBA reduction)
		1	20	81	9	600	44.5	15	32	26.4	20% AUF assumed for max. pressure and noise (otherwise, 80% lower pressure nozzle)
	pickup truck moving at low speeds	1	25	55	50	400	36.9	15	25	20.2	FHWA 2006
		1	25	55	50	500	35.0	30	26	21.0	
		1	25	55	50	600	33.4	15	21	16.3	Value below is only for 7-hours distant from NSLU
									logsum Leq for hour	**34.9**	washing CNEL (dBA) 30
Scenario #2: parallel row, east or west of the R5 NSLU (minimum 450-foot distance to property line)	Mazaka on a small excavator or tractor	1	50	86	16.2	450	57.1	15	48	43.3	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	450	57.1	30	51	46.3	
		1	50	86	16.2	450	57.1	15	48	43.3	Value below is only for 5-hour wash noise near NSLU
									logsum Leq for hour	**49.3**	washing CNEL (dBA) 42
Scenario #2: parallel row, east or west of the R5 NSLU (750-foot distance to property line)	Mazaka on a small excavator or tractor	1	50	86	16.2	750	52.7	15	44	38.3	Rigolett sound data, tractor rated for 63 kW (e.g., CASE 1594)
		1	50	86	16.2	750	52.7	30	47	41.4	
		1	50	86	16.2	750	52.7	15	44	38.3	Value below is only for 7-hours distant from NSLU
									logsum Leq for hour	**44.4**	washing CNEL (dBA) 39

predicted stationary operations noise level at **R5** (CNEL) 50

combined PV panel washing over 12-hour daytime period with stationary operations noise level at **R5** (CNEL) **51.3**

APPENDIX D

Excel-based Construction Noise Model (Emulating FWHA RCNM)

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

noise level limit for construction phase, per County = 75
allowable hours over which Leq is to be averaged (example: 8 for County of San Diego) = 8

Construction Phase (component activity)	Equipment Type (from Federal Highway Administration [FHWA] Roadway Construction Noise Model [RCNM] User's Guide Table 1)	Estimated 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.)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Perimeter Fence Installation	Flat bed truck	2	40	74	pick-up truck and flatbed truck	50	74.0	4	240	70
	front end loader	1	40	79	skid loader w/ auger attachment	50	79.0	4	240	72
									Total for Perimeter Fence Installation Phase:	**74.1**
Site Preparation (Clearing)	Flat bed truck	0	40	74		50	74.0	1	60	0
	grader	0	40	85		50	85.0	1	60	0
	dozer	0	40	82	bulldozer	50	82.0	1	60	0
	dump truck	1	40	76	water truck - 3 axles	50	76.0	4	240	69
	Scraper	0	40	84		50	84.0	1	60	0
	Roller	0	20	80	sheepsfoot roller	50	80.0	1	60	0
	Tractor	1	40	84	(with mower attachment)	50	84.0	1	60	71
									Total for Site Preparation (Clearing) Phase:	**73.1**
Site Preparation (Earth-moving)	Flat bed truck	0	40	74		50	74.0	1	60	0
	grader	0	40	85		50	85.0	1	60	0
	dozer	1	40	82	bulldozer	50	82.0	1	60	69
	dump truck	1	40	76	water truck - 3 axles	50	76.0	4	240	69
	Scraper	1	40	84		50	84.0	1	60	71
	Roller	0	20	80	sheepsfoot roller	50	80.0	1	60	0
	Tractor	0	40	84	(with mower attachment)	50	84.0	1	60	0
									Total for Site Preparation (Earth-moving) Phase:	**74.5**
Site Preparation (Grading)	Flat bed truck	1	40	74		50	74.0	1	60	61
	grader	1	40	85		50	85.0	1	60	72
	dozer	0	40	82	bulldozer	50	82.0	1	60	0
	dump truck	1	40	76	water truck - 3 axles	50	76.0	4	240	69
	Scraper	0	40	84		50	84.0	1	60	0
	Roller	1	20	80	sheepsfoot roller	50	80.0	1	60	64
	Tractor	0	40	84	(with mower attachment)	50	84.0	1	60	0
									Total for Site Preparation (Grading) Phase:	**74.3**
Underground work (Trenching)	excavator	1	40	81		50	81.0	1	60	68
	roller	1	20	80	sheepsfoot roller	50	80.0	1	60	64
	dump truck	1	40	76	water truck - 3 axles	50	76.0	4	240	69
	Generator (<25KVA, VMS signs)	1	50	70	5kW generator	50	70.0	4	240	64
	slurry trenching machine	0	50	80	Aussie padder (e.g., Ozzies)	50	80.0	1	60	0
	gradall	1	40	83	4x4 forklift	50	83.0	1	60	70
									Total for Underground work (Trenching) Phase:	**74.6**
Underground work (Back-filling)	excavator	0	40	81		50	81.0	1	60	0
	roller	1	20	80	sheepsfoot roller	50	80.0	1	60	64
	dump truck	1	40	76	water truck - 3 axles	50	76.0	4	240	69
	Generator (<25KVA, VMS signs)	1	50	70	5kW generator	50	70.0	4	240	64
	slurry trenching machine	1	50	80	Aussie padder (e.g., Ozzies)	50	80.0	1	60	68
	gradall	1	40	83	4x4 forklift	50	83.0	1	60	70
									Total for Underground work (Back-filling) Phase:	**74.6**
System Installation	gradall	1	40	83	4x4 forklift	83	78.6	6	360	73
	crane	1	16	81	small crane (80-ton)	83	76.6	6	360	67
	ATV	1	50	66	ATV (assume 96 dBA at 0.5 meters per CA regs)	83	61.6	6	360	57
	RGT Model RG21T vibratory pile driver	1	20	85	pile driver	83	80.6	4	240	71
	pickup truck	1	40	55	pickup truck	83	50.6	6	360	45
	Generator (<25KVA, VMS signs)	1	50	70	5kW generator	83	65.6	6	360	61
									Total for System Installation Phase:	**74.6**
Energy Storage Unit Installation	crane	1	16	81	small crane (80-ton)	300	65.4	8	480	57
	grader	1	40	85		300	69.4	8	480	65
	gradall	1	40	83	4x4 forklift	300	67.4	8	480	63
									Total for Energy Storage Unit Installation Phase:	**63.6**
Testing and Commissioning	pickup truck	1	40	55	pickup truck	50	55.0	8	480	51
									Total for Testing and Commissioning Phase:	**51.0**
Site Clean-up and Restoration	grader	1	40	85		50	85.0	1.5	90	74
	front end loader	1	40	79	skid loader	50	79.0	1.5	90	68
									Total for Site Clean-up and Restoration Phase:	**74.7**

Notes

1. Total noise levels per phase include attenuation due to atmospheric absorption, and ground acoustical absorption per ISO 9613-2 (eq. 10).

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

noise level limit for construction phase, per County = 75

allowable hours over which Leq is to be averaged (example: 8 for County of San Diego) = 8

Construction Phase (component activity)	Equipment Type (from Federal Highway Administration [FHWA] Roadway Construction Noise Model [RCNM] User's Guide Table 1)	Estimated 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.)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
General Construction	Flat bed truck	1	40	74		3500	37.1	8	480	33
	Pickup Truck	1	40	55		3500	18.1	8	480	14
									Total for General Construction Phase:	**24.9**
Site Preparation (access roads)	dozer	1	40	82	bulldozer	3500	45.1	8	480	41
	grader	1	40	85	road grader	3500	48.1	8	480	44
	scraper	1	40	84		3500	47.1	8	480	43
	compactor (ground)	1	20	80		3500	43.1	8	480	36
	front end loader	1	40	79		3500	42.1	8	480	38
	dump truck	1	40	76	water truck	3500	39.1	8	480	35
									Total for Site Preparation (access roads) Phase:	**40.4**
Site Preparation (pads)	dozer	2	40	82	bulldozer	3500	45.1	8	480	44
	grader	1	40	85	road grader	3500	48.1	8	480	44
	scraper	1	40	84		3500	47.1	8	480	43
	compactor (ground)	1	20	80		3500	43.1	8	480	36
	front end loader	2	40	79		3500	42.1	8	480	41
	dump truck	2	40	76	water truck	3500	39.1	8	480	38
									Total for Site Preparation (pads) Phase:	**41.6**
Foundations	backhoe	1	40	78		3500	41.1	8	480	37
	dump truck	4	40	76		3500	39.1	8	480	41
	drill rig truck	2	20	79		3500	42.1	8	480	38
	All Other Equipment > 5 HP	1	50	85	rock crusher	3500	48.1	8	480	45
	concrete pump truck	15	20	81	concrete truck	3500	44.1	8	480	49
	dump truck	1	40	76	water truck	3500	39.1	8	480	35
									Total for Foundations Phase:	**43.1**
Conduit and Grounding	slurry trenching machine	1	50	80	ditch witch	3500	43.1	8	480	40
	dump truck	2	40	76	water truck	3500	39.1	8	480	38
									Total for Conduit and Grounding Phase:	**34.0**
Paving (asphalt)	paver	1	50	77	asphalt emulsion truck	3500	40.1	8	480	37
	roller	3	20	80	vibratory roller	3500	43.1	8	480	41
									Total for Paving (asphalt) Phase:	**34.1**
Fence Installation	auger drill rig	1	20	84	drill rig w/ augers	3500	47.1	8	480	40
									Total for Fence Installation Phase:	**31.9**

Notes

1. Total noise levels per phase include attenuation due to atmospheric absorption, and ground acoustical absorption per ISO 9613-2 (eq. 10).

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

noise level limit for construction phase, per County = 75

allowable hours over which Leq is to be averaged (example: 8 for County of San Diego) = 8

Construction Phase (component activity)	Equipment Type (from Federal Highway Administration [FHWA] Roadway Construction Noise Model [RCNM] User's Guide Table 1)	Estimated 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.)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
General Construction	Flat bed truck	1	40	74		3500	37.1	8	480	33
	Pickup Truck	1	40	55		3500	18.1	8	480	14
								Total for General Construction Phase:		**24.9**
Site Preparation	dozer	1	40	82	bulldozer	3500	45.1	8	480	41
	grader	1	40	85	road grader	3500	48.1	8	480	44
	compactor (ground)	1	20	80		3500	43.1	8	480	36
	front end loader	1	40	79		3500	42.1	8	480	38
	dump truck	1	40	76	water truck	3500	39.1	8	480	35
								Total for Site Preparation Phase:		**39.0**
Pulling Wire	flat bed truck	1	40	74		3500	37.1	8	480	33
	All Other Equipment > 5 HP	1	50	85	puller and tensioner	3500	48.1	8	480	45
	flat bed truck	1	40	74	reel trailer	3500	37.1	8	480	33
	dump truck	1	40	76	semi tractor-trailer	3500	39.1	8	480	35
	flat bed truck	1	40	74	splice trailer	3500	37.1	8	480	33
	compressor (air)	1	40	78		3500	41.1	8	480	37
	helicopter	1	100	105	helicopter (per FAA AC-36H data)	3500	68.0	8	480	68
								Total for Pulling Wire Phase:		**59.7**
Steel Pole Framing and Erection	flat bed truck	4	40	74	2-ton flatbed truck, flat bed boom truck	3500	37.1	8	480	39
	drill rig truck	1	20	79	rigging truck	3500	42.1	8	480	35
	flat bed truck	1	40	74	mechanic truck	3500	37.1	8	480	33
	man lift	1	20	75	aerial lift trucks	3500	38.1	8	480	31
	crane	1	16	81	large mobile crane (75 tons)	3500	44.1	8	480	36
	pickup truck	1	40	55	shop vans	3500	18.1	8	480	14
								Total for Steel Pole Framing and Erection Phase:		**34.5**
Backfilling poles	compactor (ground)	1	20	80	air tampers	3500	43.1	8	480	36
	dump truck	1	40	76	dump truck	3500	39.1	8	480	35
								Total for Backfilling poles Phase:		**30.4**

Notes

1. Total noise levels per phase include attenuation due to atmospheric absorption, and ground acoustical absorption per ISO 9613-2 (eq. 10).