SECTION 4.8

NOISE

4.8 NOISE

This section defines technical terminology used in the analysis of noise; identifies federal, state and local regulations applicable to noise; and describes the environmental setting with regard to existing ambient noise levels. This section also analyzes potential noise impacts associated with construction, operation and reclamation of the proposed Project. The information in this section is based on the *Noise and Groundborne Vibration Impact Assessment for the Proposed Seville Solar Farm Complex, County of Imperial, CA* prepared by AMBIENT Air Quality & Noise Consulting (AMBIENT 2013) and the "Seville Solar Farm Complex – Supplemental Construction Traffic Analysis" memo (Chen Ryan 2014). The Noise and Groundborne Vibration Impact Assessment is provided in **Appendix F** of this EIR; the Supplemental Construction Traffic Analysis memo is provided in **Appendix B** of this EIR. Both appendices are included on the attached CD.

DEFINITIONS AND TERMINOLOGY

To facilitate understanding of this section, the following glossary of terms is provided as an introduction to the environmental setting for noise. While some of the terms are technical in nature, these acronyms and abbreviations are essential to describe and characterize noise.

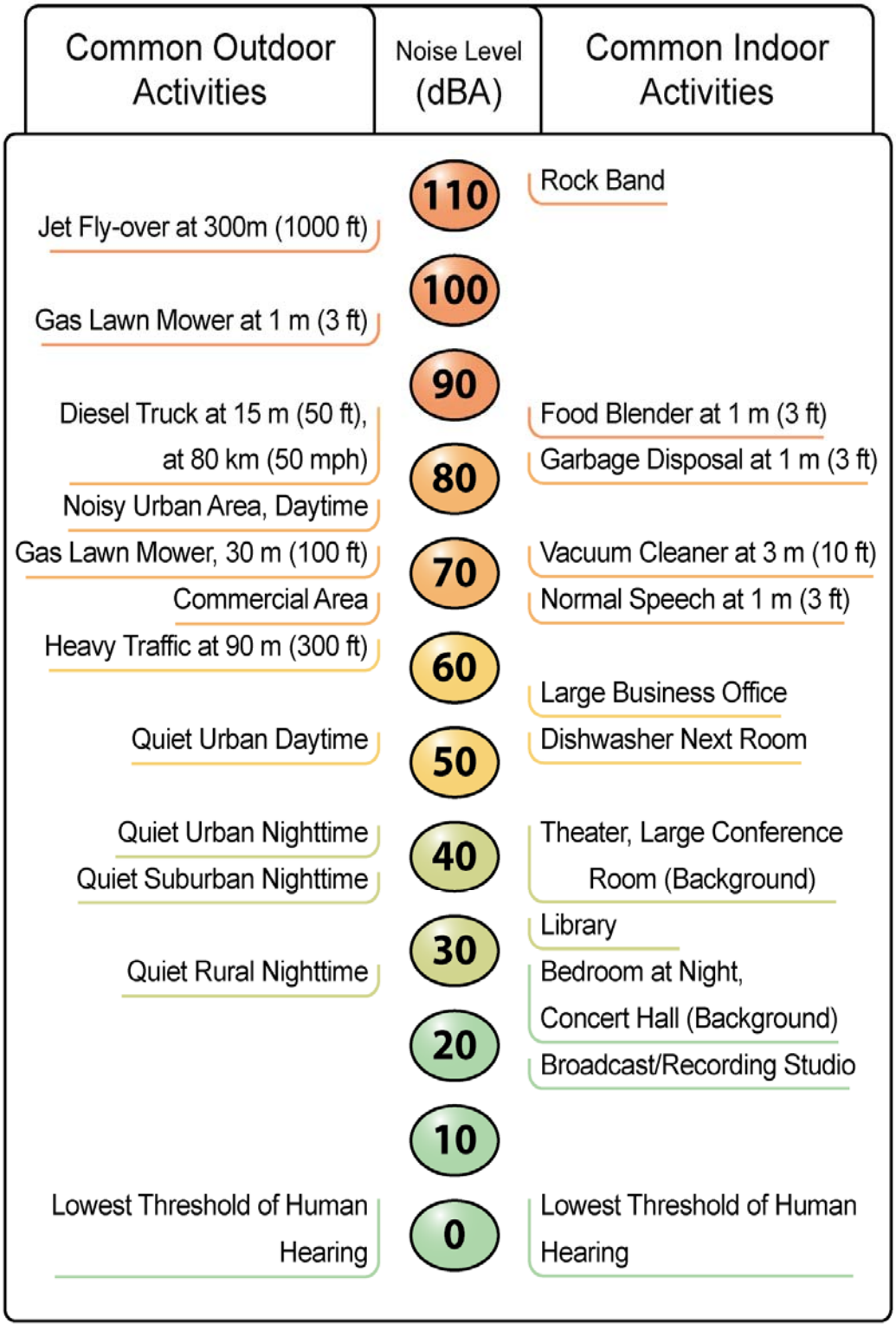
ACOUSTIC FUNDAMENTALS

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency. Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second (defined in Hertz). The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA. Common community noise sources and associated noise levels, in dBA, are depicted in **Figure 4.8-1**.

Noise can be generated by a number of sources, including mobile sources, such as automobiles, trucks and airplanes, and stationary sources, such as construction sites, machinery, and industrial operations. Noise generated by mobile sources typically attenuates at a rate between 3.0 to 4.5 dBA per doubling of distance. The rate depends on the ground surface and the number or type of objects between the noise source and the receiver. For mobile transportation sources, such as highways, hard and flat surfaces, such as concrete or asphalt, have an attenuation rate of 3.0 dBA per doubling of distance. Soft surfaces, such as uneven or vegetated terrain, have an attenuation rate of about 4.5 dBA per doubling of distance from the source. Noise generated by stationary sources typically attenuates at a rate of approximately 6.0 to 7.5 dBA per doubling of distance from the source.

Sound levels can be reduced by placing barriers between the noise source and the receiver. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between



Source: AMBIENT 2013.

FIGURE 4.8-1
COMMON NOISE LEVELS

the source and the receiver. Buildings, concrete walls, and berms can all act as effective noise barriers. Wooden fences or broad areas of dense foliage can also reduce noise, but are less effective than solid barriers.

A. NOISE DESCRIPTORS

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are used. **Table 4.8-1** identifies and summarizes the most commonly used noise descriptors.

TABLE 4.8-1
COMMON ACOUSTICAL DESCRIPTORS

Descriptor	Definition
Energy Equivalent Noise Level (L_{eq})	The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Minimum Noise Level (L_{min})	The minimum instantaneous noise level during a specific period of time.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The 24-hour L_{eq} with a 10 dBA "penalty" for noise events that occur during the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Level (CNEL)	The CNEL is similar to the Ldn described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.
Single Event Level (SEL)	The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.

Source: AMBIENT 2013, Table 3.

B. ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

For additional details regarding sound propagation and attenuation; human response to noise; and effects of noise on human activities, refer to the *Noise and Groundborne Vibration Impact Assessment for the Proposed Seville Solar Farm Complex* included in **Appendix F** of this EIR.

4.8.1 REGULATORY FRAMEWORK

A. FEDERAL

The Noise Control Act of 1972 (P.L. 92-574)

The Noise Control Act and several other federal laws require the federal government to set and enforce uniform noise standards for aircraft and airports, interstate motor carriers and railroads, workplace activities, medium and heavy-duty trucks. Most federal noise standards focus on preventing hearing loss by limiting exposure to sounds of 90 dBA and higher. However, some are stricter and focus on limiting exposure to quieter levels that are annoying to most individuals and can diminish one's quality of life.

Occupational Safety and Health Act of 1970

The Federal Occupational Safety and Health Administration (OSHA) regulates on-site noise levels and protects workers from occupational noise exposure. To protect hearing, worker noise exposure is limited to 90 decibels with A-weighting (dBA) over an 8-hour work shift (29 Code of Regulations [CFR] 1910.95). Employers are required to develop a hearing conservation program when employees are exposed to noise levels exceeding 85 dBA. These programs include provision of hearing protection devices and testing employees for hearing loss on a periodic basis.

B. STATE

State of California General Plan Guidelines

The State of California regulates vehicular and freeway noise affecting classrooms, sets standards for sound transmission and occupational noise control, and identifies noise insulation standards and airport noise/land-use compatibility criteria. The *State of California General Plan Guidelines* (State of California 2003), published by the Governor's Office of Planning and Research (OPR), also provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

C. LOCAL

County of Imperial General Plan

The Noise Element of the Imperial County General Plan identifies and defines existing and future environmental noise levels from sources of noise within or adjacent to the County; establishes goals, objectives, and policies to address these impacts; and provides Implementation Programs to achieve the goals and objectives. **Table 4.8-2** summarizes the Project's consistency with the applicable goal, objective, programs and policies of the Noise Element. While this EIR analyzes the Project's consistency with the General Plan pursuant to State CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

TABLE 4.8-2
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Goals, Objectives, Policies and/or Programs	Consistent with General Plan?	Analysis
NOISE ELEMENT		
Project/Land Use Planning		
Goal 2: Review proposed Projects for noise impacts and require design which will provide acceptable indoor and outdoor noise environments.	Yes	A Noise and Groundborne Vibration Impact Assessment (AMBIENT 2013) was prepared for the Proposed Seville Solar Farm Complex which examined the effects of construction and operational noise generated by the proposed Project. Long-term operational noise associated with on-site substations and power conversion stations would not exceed County thresholds. Therefore, the proposed Project is consistent with this goal.
Objective 2.2 Provide acoustical analysis guidelines which minimize the burden on project proponents and project reviewers.	Yes	The County of Imperial Noise Element includes noise standards by which projects are assessed. The proposed Project was analyzed using these standards and found to be below established noise thresholds with regard to short-term construction and long-term traffic noise and long-term operational noise. Therefore, the proposed Project is consistent with this objective.
Programs and Policies		
1) Acoustical Analysis of Proposed Projects The County shall require the analysis of proposed discretionary projects which may generate excessive noise or which may be impacted by existing excessive noise levels, including but not limited to the following: • An analysis shall be required for any project which would be located, all or in part, in a Noise Impact Zone as specified above. • An analysis shall be required for any project which has the potential to generate noise in excess of the Property Line Noise Limits stated in Table 9. • An analysis shall be required for any project which, although not located in a	Yes	A Noise and Groundborne Vibration Impact Assessment was prepared for the proposed Seville Solar Farm Complex (AMBIENT 2013). As a discretionary large-scale solar project that would involve heavy equipment and require post driving, an acoustical analysis was warranted. The Assessment described the existing noise environment and included an analysis of noise impacts to nearby rural residential uses (i.e. sensitive receptors) relative to County property line noise standards. Short-term construction noise levels (both on site and from construction vehicle traffic along SR 78) were found to be within County standards. Likewise, long-term operational noise impacts were found to be below County property line noise

TABLE 4.8-2
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Goals, Objectives, Policies and/or Programs	Consistent with General Plan?	Analysis
Noise Impact Zone, has the potential to result in a significant increase in noise levels to sensitive receptors in the community. • An acoustical analysis and report shall be prepared by a person deemed qualified by the Director of Planning. The report shall describe the existing noise environment, the proposed Project, the projected noise impact and, if required, the proposed mitigation to ensure conformance with applicable standards.		standards. Therefore the proposed Project is consistent with Program and Policy 1.
2) Noise/Land Use Compatibility. Where acoustical analysis of a proposed Project is required, the County shall identify and evaluate potential noise/land use conflicts that could result from the implementation of the project. Projects which result in noise levels that exceed the "Normally Acceptable" criteria of the Noise/Land Use Compatibility Guidelines, Table 7, shall include mitigation measures to eliminate or reduce to an acceptable level the adverse noise impacts.	Yes	Long-term operational noise impacts of the solar farm complex were found to be below County property line noise standards. Therefore, the proposed Project is consistent with Program and Policy 2.
5) New Noise Generating Projects. The County shall identify and evaluate projects which have the potential to generate noise in excess of the Property Line Noise Limits specified in Table 9. An acoustical analysis must be submitted which demonstrates the project's compliance with the Property Line Noise Limits, and/or required mitigation measures to reduce noise to acceptable levels. Mitigation may include a greater property line setback than required by the Zoning Ordinance, use of solid building walls without openings, noise attenuation walls and/or landscaped earth berms, alternative construction	Yes	Refer to analysis of Program and Policy 1. The proposed Project has been analyzed with respect to County Property Line Noise Limits. The proposed Project is consistent with Program and Policy 5.

TABLE 4.8-2
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Goals, Objectives, Policies and/or Programs	Consistent with General Plan?	Analysis
materials or design, alternative traffic patterns, or other noise reduction techniques.		
6) Project Which Generate Off-site Traffic Noise. The acoustical analysis shall identify and evaluate projects which will generate traffic and increase noise levels on off-site roadways. If the project has the potential to cause a significant noise impact to sensitive receptors along those roadways, the acoustical analysis report shall consider noise reduction measures to reduce the impact to a level less than significant, including reduction of the intensity of the proposed Project, construction of noise attenuation walls and/or landscaped earth berms, or other changes in project design or its proposed access. For non-residential projects, reduced hours of operation may also be required.	Yes	The Noise and Groundborne Vibration Impact Assessment prepared for the Project analyzed impacts of increased long-term traffic noise (refer to Impact 4.8.2). Impacts were determined to be less than significant and no mitigation is required. Therefore the proposed Project is consistent with Program and Policy 6.

County of Imperial General Plan

Land Use Compatibility Noise Criteria

The Noise Element of the County's General Plan identifies goals, objectives, and policies and programs to reduce noise-related impacts and land use compatibility conflicts. For determination of land use compatibility, the Noise Element identifies noise criteria for various land-use designations based on the average-daily noise descriptor (i.e., CNEL). **Table 4.8-3** summarizes the County of Imperial's land use compatibility noise standards.

TABLE 4.8-3
COUNTY OF IMPERIAL LAND USE COMPATIBILITY NOISE CRITERIA

Land Use Category	Average-Daily Noise Level (dBA CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	<60	60-70	70-75	>75
Transient Lodging-Motels, Hotels	<60	60-75	70-80	>80
Schools, Libraries, Churches, Hospitals, Nursing Homes	<60	60-70	70-80	>80
Auditoriums, Concert Halls, Amphitheaters	--	<70	--	>70
Sports Arena, Outdoor Spectator Sports	--	<70	70-75	>75
Playgrounds, Neighborhood Parks	<70	--	70-75	>75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	<70	--	70-80	>80
Office Buildings, Business Commercial and Professional	<65	65-75	75-80	>80
Industrial, Manufacturing, Utilities, Agriculture	<70	70-75	75-80	>80

***Normally Acceptable**: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.*
***Conditionally Acceptable**: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.*
***Normally Unacceptable**: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.*
***Clearly Unacceptable**: New construction or development clearly should not be undertaken.*

Source: Imperial County 1997.

Property Line Noise Standards

The Imperial County General Plan also establishes maximum allowable average-hourly noise limits for various land use designations (refer to **Table 4.8-4**). These noise standards are to be applied at the property line of the noise-generating land use. In instances where the adjoining land use designations differ from that of the noise-generating land use, the more restrictive noise standard shall apply. Where the ambient noise level is equal to or exceeds the property line noise standard, the increase of the existing or proposed noise shall not exceed 3 dBA L_{eq}. It is important to note that these standards imply the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. These standards do not apply to construction noise.

TABLE 4.8-4
COUNTY OF IMPERIAL PROPERTY LINE NOISE STANDARDS

Land Use Zone	Time Period	Average-Hourly Noise Level (dBA L_{eq})
Residential	7 a.m. - 10 p.m. 10 p.m. - 7 a.m.	50 45
Multi-residential	7 a.m. - 10 p.m. 10 p.m. - 7 a.m.	55 50
Commercial	7 a.m. -10 p.m. 10 p.m. - 7 a.m.	60 55

TABLE 4.8-4
COUNTY OF IMPERIAL PROPERTY LINE NOISE STANDARDS

Land Use Zone	Time Period	Average-Hourly Noise Level (dBA L_{eq})
Light Industrial/Industrial Park	Any time	70
General Industrial	Any time	75

Source: Imperial County 1997.
Notes: When the noise-generating property and the receiving property have different uses, the more restrictive standard shall apply. When the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dBA Leq.

Construction Noise Standards

The Imperial County General Plan Noise Element also establishes noise limitations pertaining to construction-related activities. **Table 4.8-5** summarizes the County's noise limitations for construction activities. These standards are applied at the nearest noise-sensitive receptor. To minimize potential nuisance impacts to nearby receptors, the General Plan also establishes hourly restrictions for noise-generating construction activities.

TABLE 4.8-5
COUNTY OF IMPERIAL CONSTRUCTION NOISE LIMITATIONS

Duration	Noise Level (dBA Leq)	Averaging Period	Hourly Restrictions
Short-term (days or weeks)	75	8 hours	7:00 a.m. – 7:00 p.m., Monday – Friday 9:00 a.m. – 5:00 p.m., Saturdays No commercial construction allowed on Sundays or holidays
Extended Duration	75	1 hour	

Source: Imperial County 1997.

Significant Increase of Ambient Noise Levels

The Imperial County General Plan Noise Element also establishes guidelines for the evaluation of project-generated increases in ambient noise levels. Projects resulting in increases in ambient noise levels, as identified below, would typically be considered to have a potentially significant noise impact (Imperial County 1997):

a. If the future noise level after the project is completed will be within the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, but will result in an increase of 5 dB CNEL or greater, the project will have a potentially significant noise impact and mitigation measures must be considered.

b. If the future noise level after the project is completed will be greater than the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, a noise increase of 3 dB CNEL or greater shall be considered a potentially significant noise impact and mitigation measures must be considered.

County of Imperial Noise Abatement and Control Ordinance

The County of Imperial Noise Abatement and Control Ordinance (Title 9, Division 7) identifies property line noise limitations that are consistent with those identified in the Imperial County General Plan Noise Element (refer to **Table 4.8-4**). As noted above, the noise limits are applied at the property line of the noise-generating land use. In instances where the adjoining land use designations differ from that of the noise-generating land use, the more restrictive noise standard shall apply (Imperial County 1998).

Groundborne Vibration

There are no federal, state, or local regulatory standards for ground-borne vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on potential structural damage risks and human annoyance.

At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely result in structural damage. For most structures, a peak particle velocity (ppv) threshold of 0.5 inches per second (in/sec) is sufficient to avoid structure damage, with the exception of fragile historic structures or ruins. For the protection of fragile, historic, and residential structures, Caltrans recommends a more conservative threshold of 0.2 inches per second ppv. This same threshold would represent the level at which vibrations would be potentially annoying to people in buildings (AMBIENT 2013, p. 13).

4.8.2 ENVIRONMENTAL SETTING

The noise analysis in this section is summarized from the *Noise and Groundborne Vibration Impact Assessment for the Proposed Seville Solar Farm Complex, County of Imperial, CA* (AMBIENT 2013) as well as knowledge of the area from site visits performed by EGI staff on August 15, 2013. The Noise and Groundborne Vibration Impact Assessment is provided as **Appendix F** on the CD of Technical Appendices attached to this EIR.

A. SOLAR FARM COMPLEX

Nearby noise-sensitive land uses consist predominantly of rural residential land uses, generally located west of the solar farm complex site. The nearest residential land uses are located adjacent to the northwestern boundary of proposed Lot 6 and approximately 5,200 feet northwest of Lot 1. The Blu-In RV Park is located approximately 1.85 miles west of the northwestern boundary of the solar farm complex site. Nearby land uses are depicted in **Figure 4.8-2**.

Ambient Noise Environment

The noise environment in the proposed Project area is defined primarily by vehicular traffic on SR 78. To a lesser extent, occasional aircraft overflights also contribute on to ambient noise levels in the Project area. In addition, the Ocotillo Wells State Vehicular Recreation Area (OWSVRA) is located north of SR 78. No off-highway vehicles were in operation during the noise monitoring survey period. However, off-highway vehicle operations within the OWSVRA also contribute, on an occasional and intermittent basis, to the ambient noise environment.

The Project is not located within two miles of a public airport or private airstrip. The nearest airport is the Ocotillo Airport, which is located approximately 5.7 miles northwest of the solar farm complex site. As a result, the solar farm complex site is not subject to high levels of aircraft noise. No major commercial or industrial noise sources were identified within the Project area.

To document existing ambient noise levels at the solar farm complex site, short-term ambient noise measurements were conducted on September 18 and 19, 2013. A long-term (24-hour) noise measurement survey was also conducted to document vehicle traffic noise on SR 78. Noise measurements were conducted using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter positioned at a height of approximately 5 feet above ground level. **Figure 4.8-2** depicts the noise locations where noise measurements were taken. Average-daily noise levels are depicted in **Figure 4.8-3**. **Table 4.8-6** summarizes measured ambient noise levels.

TABLE 4.8-6
SUMMARY OF MEASURED AMBIENT NOISE LEVELS

Location	Monitoring Period		Noise Levels (dBA)		
	Start Date & Time	Duration	L_{eq}	L_{max}	CNEL
M1: Blu In Café, Approximately 50 feet from SR 78 Centerline	09/18/13, 13:30 p.m.	15 minutes	62.3	80.9	--
	09/19/13, 10:07 a.m.	18 minutes	62.7	81.6	--
M2: SR 78, Approximately 95 feet from Road Centerline	09/18/13, 15:30 p.m.	30 minutes	55.3	74.0	--
	09/19/13, 8:00 a.m.	60 minutes	59.1	78.1	--
	09/19/13, 9:00 a.m.	60 minutes	58.2	77.4	--
M3: SR 78, Approximately 85 feet from Road Centerline	09/19/13, 6:30 a.m.	15 minutes	59.2	77.8	--
	09/19/13, 10:40 a.m.	15 minutes	58.4	78.5	--
	09/18/13-09/19/13	24 hours	--	--	61

Source: AMBIENT 2013.

Table 4.8-7 summarizes calculated existing traffic noise levels and distances to existing average-daily noise contours (in CNEL/L_{dn}) for SR 78. **Figure 4.8-2** depicts the existing noise contours.

TABLE 4.8-7
EXISTING TRAFFIC NOISE LEVELS

Roadway	CNEL/L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]	Predicted Distance From Road Centerline to CNEL Contour (feet)				
		60	55	50	45	40
SR 78	64	107	231	497	1,060	2,300

Source: AMBIENT 2013. Traffic noise levels were calculated using the Federal Highway Administration's roadway noise prediction model. Refer to Appendix A of the Noise and Groundborne Vibration Impact Assessment (included in Appendix F of this EIR) for noise modeling assumptions and results.

Based on the measurements conducted, average-daily traffic noise levels were determined to be roughly equivalent (within approximately 2 dB) of the peak-hour traffic noise levels. Existing traffic noise levels at the nearest residences to the solar farm complex site (refer to **Figure 4.8-2**) can range from approximately 50 dBA at locations nearest SR 78 to less than 40 dBA at residences located furthest from SR 78.

B. TRANSMISSION LINE

The Noise and Groundborne Vibration Impact Assessment focused on noise generated on the solar farm complex site as well as the 92 kV transmission line. Construction and operational noise associated with modifications to the Anza Substation are discussed on a qualitative basis considering the new equipment to be installed in the context of the existing facility. Noise level increases generated by the substation

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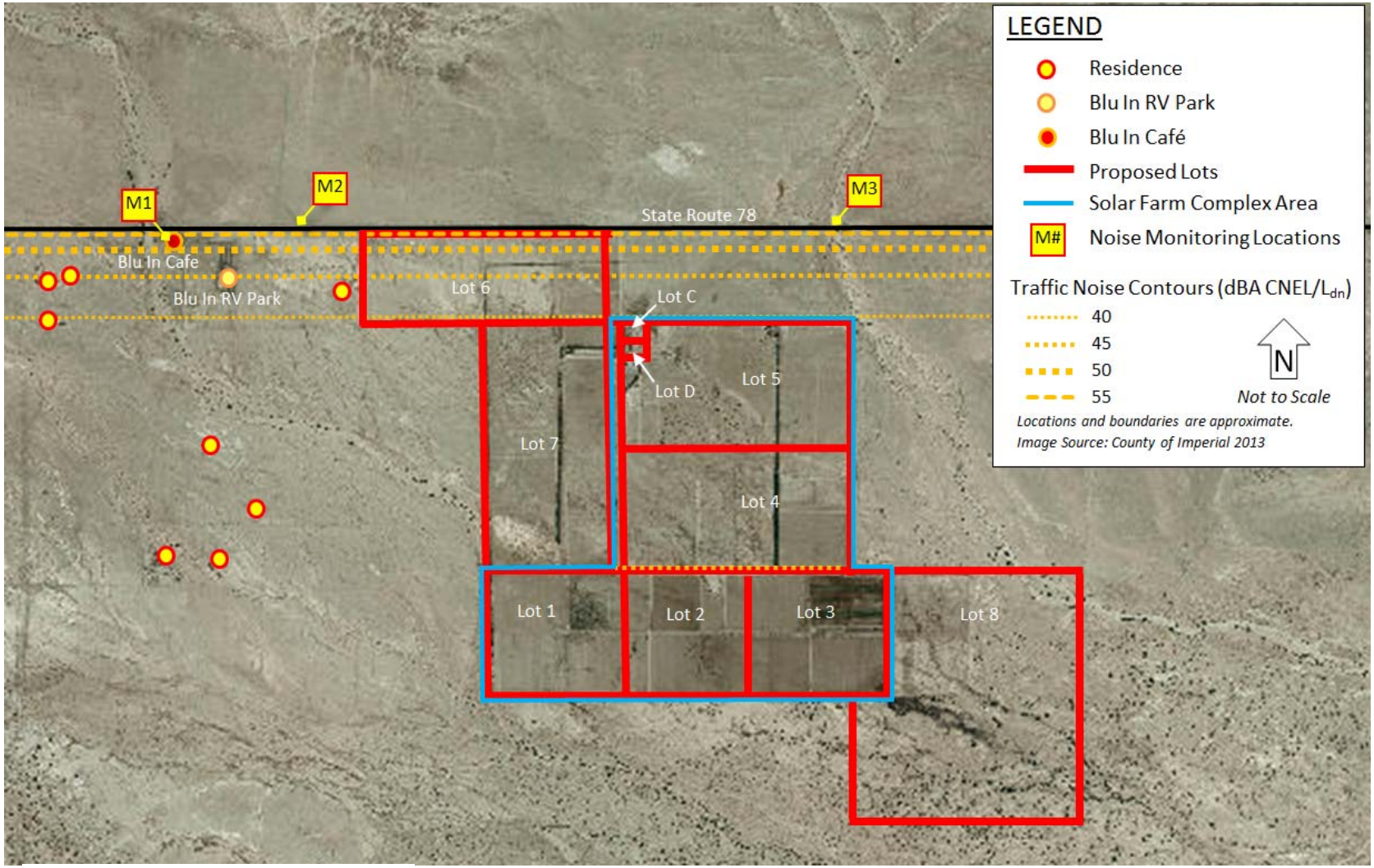
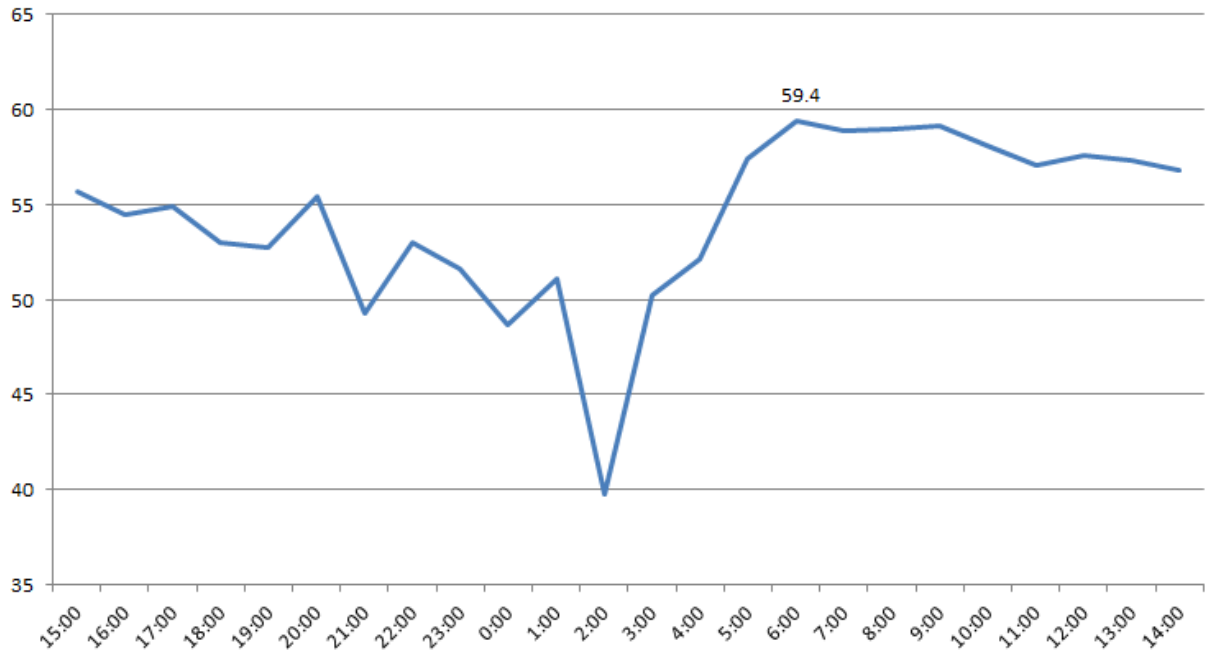


Source: AMBIENT 2013.

FIGURE 4.8-2
SOLAR FARM COMPLEX SITE, NEARBY LAND USES, AND NOISE MONITORING LOCATIONS



Average daily noise levels based on measurements conducted at monitoring site M3. Refer to **Table 4.8-6** and **Figure 4.8-2**.

Source: AMBIENT 2013.

FIGURE 4.8-3
AVERAGE-DAILY NOISE LEVELS

modifications would be limited to short-term construction noise. Long-term operational noise associated with the addition of the new 92 kV switch and breaker bank is not anticipated to increase more than 3 dB over existing levels. As no sensitive receptors are located in the vicinity of the Anza Substation, and existing transformer noise would overshadow noise associated with the addition of the new 92 kV switch and breaker bank, no modeling of noise level increases associated with the modifications was warranted.

One of the phenomena associated with high-voltage transmission lines, is Corona discharge. Corona is the electrical breakdown of the air into charged particles, which may result in audible noise. During corona activity, transmission lines can generate a small amount of sound energy. This audible noise can increase during high humidity weather conditions, when water drops may collect on the surface of the conductors and increase Corona activity. Audible noise generated by Corona discharge is typically described as a crackling or humming sound. Corona discharge is typically associated with transmission lines rated at 230 kV and above. For lines rated less than 230 kV, (such as the 92 kV transmission line proposed as part of the Project) the conductor size is typically of sufficient diameter so that little or no Corona activity would exist under most operating conditions. For example, audible Corona noise levels for a typical 230 kV line is about 25 dBA at locations directly below or near the power line corridor. It follows that the Corona noise level for the 92 kV line would be less than 25 kV and is not likely to be audible as there are no sensitive receptors in the immediate vicinity of the transmission line.

4.8.3 IMPACTS AND MITIGATION MEASURES

A. STANDARDS OF SIGNIFICANCE

SIGNIFICANCE CRITERIA

Criteria for determining the significance of noise impacts were developed based on information contained in the CEQA Guidelines Appendix G. According to the guidelines, a project may have a significant effect on the environment if it would result in the following conditions:

a) Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or of applicable standards of other agencies.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the Project area to excessive noise levels.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the Project area to excessive noise levels.

For purposes of this analysis and where applicable, the County of Imperial noise standards were used for evaluation of project-related noise impacts. Thresholds of significance used in this analysis are discussed below:

Short-term Construction Noise

Short-term construction noise impacts would be considered significant if the proposed Project would exceed applicable County noise standards (refer to **Table 4.8-5**, above). Construction activities would also be considered to have a significant impact if construction would result in substantial increases in ambient noise levels at the nearest noise-sensitive receptors during the more noise-sensitive evening and nighttime hours (i.e., 7 a.m. to 7 p.m.).

As noted in the discussion of "Acoustic Fundamentals" earlier in this section, a 3 dB increase in noise levels is generally considered to be the minimum increase audible to the human ear. For purposes of this analysis, a substantial increase in short-term construction noise is defined as an increase of 3 dBA or greater. This threshold is also consistent with the County's defined increase in property line noise levels for non-transportation noise sources (refer to "Property Line Noise Standards and **Table 4.8-4**, above).

Long-term Operational Traffic Noise

Long-term operational noise impacts would be considered significant if the proposed Project would result in a substantial increase in ambient noise levels that would exceed the County noise standards for land use compatibility (refer to **Table 4.8-3**). For assessment of transportation impacts, a substantial increase in noise levels is typically defined as an increase of 5.0 dB or greater where the noise levels without project implementation are less than the applicable noise standard. Where the noise level without project implementation equals or exceeds applicable noise standards, an increase of 3.0 dBA, or greater, would be considered a substantial increase. As noted in **Figure 4.8-2**, exterior noise levels at nearby existing residential land uses are not projected to exceed the County's "normally acceptable" noise standard of 55 dBA CNEL. As a result, a substantial increase in noise levels at these locations would typically be defined as an increase of 5.0 dB or greater.

Long-term Operational Non-Transportation Noise

Long-term operational noise impacts would be considered significant if the proposed Project would result in non-transportation noise levels that would exceed applicable County noise standards at nearby noise-sensitive land uses. **Table 4.8-4**, above, summarizes the County of Imperial noise limitations for stationary sources. When the ambient noise level is equal to or exceeds the Property Line noise standard, the applicable noise standard is the ambient noise level (in dBA Leq) plus 3 dB. In instances where the

adjoining land use designations differs from that of the noise-generating land use, the more restrictive noise standard shall apply (Imperial County 1998).

The solar farm complex site is currently zoned Agriculture (A-2). Based on the nature of the Project, the "General Industrial" land use designation, as identified in **Table 4.8-3** above, is considered most closely representative of the proposed land use (i.e. a solar farm). As a result, project-generated noise levels that would exceed 75 dBA Leq at the property line of the solar farm complex site would be considered to have a potentially significant impact. To ensure a conservative analysis, irrespective of existing zoning designation, operational noise levels that would exceed the County's applicable daytime and nighttime noise standards at the nearest residential land use (i.e., 50 and 45 dBA Leq) would also be considered to have a potentially significant impact. This more conservative noise standard is used to ensure that occupants of these existing dwelling units are adequately protected from Project-generated operational noise levels.

Exposure to Groundborne Vibration

Groundborne vibration levels would be considered significant if predicted short-term construction or long-term operational groundborne vibration levels attributable to the proposed Project would exceed 0.2 inches per second ppv at the nearest offsite existing structure.

B. Issues Scoped Out as Part of the Initial Study

CEQA significance criteria b, e and f were scoped out as part of the Initial Study. However, because potential increases in groundborne vibration levels may occur in association with short-term construction-related activities (i.e. post driving), criterion b was subsequently determined to be relevant to the analysis of construction noise impacts and is discussed in this section of the EIR.

Criteria e and f dealing with airports were scoped out on the basis that the Project is not located within two miles of a public airport or a private airstrip. The nearest airport is the Ocotillo Airport located approximately 5.7 miles northwest of the Project. As a result, the Project is not subject to high levels of aircraft noise. Implementation of the proposed Project would not affect airport operations nor result in increased exposure of noise-sensitive receptors to aircraft noise. For these reasons, exposure to aircraft noise levels would be considered less than significant and is not discussed further in this EIR.

C. Methodology

A combination of existing literature, noise level measurements, and accepted noise prediction and sound propagation algorithms were used to: 1) predict short-term construction noise levels; 2) predict long-term non-transportation noise levels; 3) predict long-term transportation source noise levels; and 4) evaluate groundborne vibration impacts.

Short-Term Construction Noise

Predicted noise levels at nearby noise-sensitive land uses were calculated utilizing typical noise levels and usage rates associated with construction equipment derived from the U.S. Department of Transportation, Federal Highway Administration's (FHWA's) *Roadway Construction Noise Model* (version 1.1) and representative data obtained from construction of similar projects. Construction noise levels were predicted assuming an average noise attenuation rate of 6 dB per doubling of distance from the source and an excess noise-attenuation rate of 1.5 dB per 1,000 feet. Modeling assumptions and calculations are provided in Appendix A of the Noise and Groundborne Vibration Impact Assessment which is included as **Appendix F** of this EIR.

Long-term Operational Stationary-Source Noise

Predicted noise levels associated with on-site stationary noise sources and activities were calculated based on representative data obtained from existing literature and noise assessments prepared for similar

projects. Operational noise levels were predicted assuming an average noise attenuation rate of 6 dB per doubling of distance from the source and an excess noise attenuation rate of 1.5 dB per 1,000 feet. Operational noise levels were calculated at the solar farm complex site property lines and nearby land uses for comparison to the County noise standards. Modeling assumptions and calculations are provided in Appendix A of the Noise and Groundborne Vibration Impact Assessment which is included as **Appendix F** of this EIR.

Long-term Traffic Noise

Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise emission factors and traffic data obtained from the "Seville Solar Farm Project – Revised Transportation Analysis" memo (Chen Ryan 2013). Additional input data included vehicle speeds, ground attenuation factors, and roadway widths. Predicted noise levels were calculated at a distance of 50 feet from the near-travel-lane centerline as well as distances to the predicted noise contours. Increases in traffic noise levels attributable to the proposed Project were determined based on a comparison of predicted noise levels with and without project implementation. Modeling assumptions and calculations are provided in Appendix A of the Noise and Groundborne Vibration Impact Assessment which is included as **Appendix F** of this EIR.

Groundborne Vibration

No major existing sources of groundborne vibration have been identified in the proposed Project area. Groundborne vibration levels associated with construction-related activities were evaluated utilizing typical groundborne vibration levels rates associated with construction equipment, obtained from the U.S. Department of Transportation, Federal Transit Administration's *Transit Noise and Vibration Impact Assessment Guidelines* (FTA 2006). Groundborne vibration impacts related to structural damage and human annoyance were evaluated taking into account the distance from construction activities to nearby land uses and the criteria typically applied for structural damage and human annoyance.

D. Project Impacts and Mitigation Measures

Noise Levels in Excess of Standards/Substantial Temporary Noise Increase

Impact 4.8.1 Activities associated with construction would increase short-term noise levels on the solar farm complex site and in the vicinity of the Project area. However, no County noise standards would be exceeded during construction. Therefore, a **less than significant impact** would occur in association with temporary noise increases.

Construction

Construction noise associated with the proposed Project would be temporary and would vary depending on the nature of the activities being performed. Noise generated would primarily be associated with the operation of off-road equipment for on-site construction activities as well as construction vehicle traffic on area roadways. Short-term construction-generated noise levels associated with on-site activities and off-site vehicle traffic are discussed in more detail below.

On-site Construction Activities

The proposed Project includes development of 5 lots (Lots 1 thru 5) as individual solar energy projects. Lots 6 through 8 are not proposed for development. Development of Lots 1 thru 5 would largely involve site preparation, grading, and solar panel installation. In addition, an operations and maintenance (O&M) building would be constructed within each of the proposed solar energy project lots. Lots A, C and D would be developed specifically for the benefit of all five solar energy projects (refer to **Figure 4.8-4** for lot locations). Lot A includes the solar development transmission lines to the solar energy project substations;

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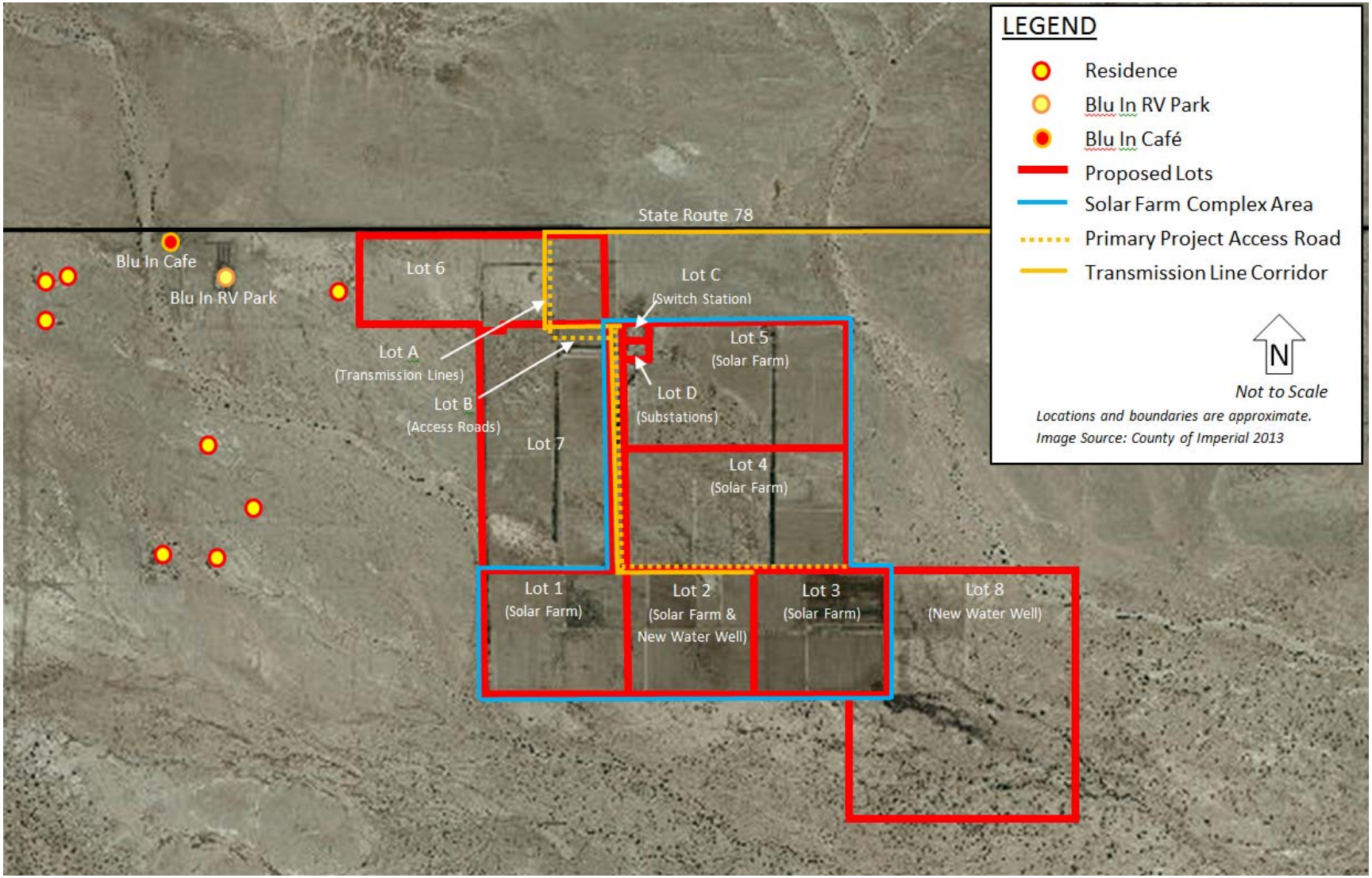

Source: AMBIENT 2013.

FIGURE 4.8-4
PROPOSED PROJECT LOTS & AREAS OF MAJOR PROJECT CONSTRUCTION

Lot C would house the IID electrical switch station; and Lot D would include the five solar energy project substations. Lot B would consist of the internal property road system. Demolition of existing structures would also be required. Two new water wells would be constructed, including one on Lot 2 and one on Lot 8. Construction periods for the individual solar energy projects are not expected to overlap. However, there is the potential for some construction activities to overlap.

TABLE 4.8-8
ESTIMATED CONSTRUCTION EQUIPMENT INVENTORY & NOISE LEVELS

Construction Phase/Type of Equipment	Estimated Quantity	Individual Equipment Noise Levels (dBA) @ 50 Feet [1]	
		L_{max}	L_{eq}
Water Well Drilling			
Drilling Rig	1	85	81
Off-Highway Truck	1	84	80
Tractor/Loader/Backhoe	1	80	76
New Access Road Construction			
Grader	2	85	81
Off-Highway Truck	1	84	80
Roller	2	85	78
Crawler Tractor/Dozer	1	82	78
Scraper	1	85	81
Switch Station Construction			
Aerial Lift	2		
Crane	1	85	77
Grader	1	85	81
Tractor/Loader/Backhoe	1	80	76
Transmission Line Construction			
Aerial Lift	3		
Crawler Tractor/Dozer	2	82	78
Internal Road Construction			
Grader	1	85	81
Off-Highway Truck	1	84	80
Roller	2	85	78
Tractor/Loader/Backhoe	1	80	76
Demolition of Onsite Structures			
Tractor/Loader/Backhoe	2	80	76
Solar Panel Installation			
Generator Set	5	81	78
Off-Highway Truck	1	84	80

TABLE 4.8-8
ESTIMATED CONSTRUCTION EQUIPMENT INVENTORY & NOISE LEVELS

Construction Phase/Type of Equipment	Estimated Quantity	Individual Equipment Noise Levels (dBA) @ 50 Feet [1]	
		L_{max}	L_{eq}
Solar Panel Installation (continued)			
Trencher	2	85	82
Track-Mounted Post Drivers[2]	2	88	81
Building Construction			
Aerial Lift	2	75	68
Concrete Pump	1	81	78
Crane	1	85	77
Roller	1	80	73
Tractor/Loader/Backhoe	1	80	76
Substation Construction			
Aerial Lift	2	75	68
Crane	1	85	77
Tractor/Loader/Backhoe	1	80	76
Gen-Tie Line			
Aerial Lift	3	75	68
Crawler Tractor/Dozer	2	82	78

Sources: EMA 2013c; AMBIENT 2013, Table 8.

[1] Based on estimated major noise-generating construction equipment requirements derived from the air quality analysis prepared for this project. Not all equipment may be represented.

[2] Based on measurements conducted at Topaz Solar Farm 2012.

*Refer to Appendix A the Noise and Groundborne Vibration Impact Assessment (included as **Appendix F** of this EIR) for noise modeling assumptions and results.*

Table 4.8-9 summarizes the estimated construction-generated noise levels at the nearest residential land uses for major on-site construction activities. To be consistent with County of Imperial noise standards, construction-generated noise levels were calculated for both the highest hour and eight-hour averages (in dBA L_{eq}). As indicated in **Table 4.8-9**, noise levels generated by on-site construction activities would range from approximately 12 to 38 dBA L_{eq} over a 1-hour period and from approximately 12 to 37 dBA L_{eq} averaged over an 8-hour period. The highest noise levels would be associated with post-driving activities.

Based on the preliminary construction schedule, some construction activities could potentially occur concurrently (EMA 2013c). **Table 4.8-9** also summarizes calculated noise levels associated with concurrent construction activities. Assuming that multiple construction activities could potentially occur simultaneously, construction-generated noise levels at the nearest residences could reach levels of approximately 43 dBA L_{eq} over a 1-hour period and 42 dBA L_{eq} over an 8-hour period. It is important to note that the noise levels presented in **Table 4.8-9** are based on distances from the nearest existing residences to the nearest areas of on-site construction activities, including the proposed solar energy project within Lot 1. Because noise levels decrease with increased distance, construction-generated noise levels associated with subsequent solar energy projects (i.e., Lots 2 thru 5) would be less as perceived at the nearest existing residences.

TABLE 4.8-9
PREDICTED CONSTRUCTION NOISE LEVELS AT THE NEAREST NOISE-SENSITIVE RECEPTOR

Construction Activity	Average Energy-Equivalent Noise Level (dBA Leq) [1]	
	1-Hour	8-Hour
Water Well Drilling	12	12
New Access Road Construction	41	41
Internal Road Construction	35	35
Demolition of Onsite Structures	34	34
Site Preparation	32	27
Grading	36	32
Combined Noise Levels for Above Activities at Nearest Receptor [2]:	43	42
Switch Station Construction	34	33
Transmission Line Construction	34	34
Solar Panel Installation without Post Driving	35	34
Post Driving	38	37
O&M Building Construction	29	29
Substation Construction	27	27
Gen Tie Line	30	30
Combined Noise Levels for Above Activities at Nearest Receptor [2]:	41	40
County of Imperial Noise Standards [3]:	75	75
Exceeds Noise Standards?	No	No

Source: AMBIENT 2013, Table 9.

*[1] Based on estimated distance to construction activity source center and equipment noise levels identified in **Table 4.8-9**.*

[2] Based on activities that could potentially occur concurrently derived from the preliminary construction schedule identified in the air quality analysis prepared for this project (EMA 2013).

[3] For short-term activities, construction equipment noise levels are limited to 75 dB L_{eq}, averaged over an eight (8) hour period. In instances where construction activities would occur for an extended duration (more than a few weeks) a more restrictive noise standard of 75 dB L_{eq} averaged over a one (1) hour period, is applied.

*Refer to Appendix A the Noise and Groundborne Vibration Impact Assessment (included as **Appendix F** of this EIR) for noise modeling assumptions and results.*

As noted above, predicted noise levels associated with the various on-site construction activities would not exceed the County of Imperial noise standards. As identified in **Table 4.8-5**, the Imperial County General Plan Noise Element establishes noise limitations pertaining to construction-related activities. Any deviation from the construction hours identified in the Noise Element would require County authorization. Any deviation from the construction hours identified in the Noise Element would require County authorization. For these reasons, impacts associated with noise from on-site construction activities are considered **less than significant**.

Construction Vehicle Traffic

Construction generated vehicle traffic would include a mix of light-duty automobiles and trucks, medium-duty trucks, and heavy-duty trucks. According to the "Seville Solar Farm Project – Revised Transportation Analysis" memo prepared for the Project (Chen Ryan 2013), approximately 14 vendor trucks and 14 haul trucks would arrive at, and depart from, the solar farm complex site at staggered times throughout the

day. Project construction would require a maximum of 150 workers on-site at any given time. Assuming that construction employees drive their own vehicles, construction worker trips to the solar farm complex site would total a maximum of approximately 300 trips per day (Chen Ryan 2013).

Table 4.8-10 summarizes predicted traffic noise levels for area roadways with and without the contribution of construction-generated vehicle traffic associated with the solar farm complex site and 92 kV transmission line. [Note: The "Seville Solar Farm Complex – Supplemental Construction Traffic Analysis" memo (Chen Ryan 2014) examined traffic associated with construction of the Anza Substation modifications. The increase in traffic volumes were negligible and are not reflected in Table 4.8-10]. As indicated, construction activities would not result in a substantial increase in average-daily vehicle traffic noise levels along area roadways. The proposed Project would be required to comply with the County's restrictions for construction-related activities (refer to **Table 4.8-5**). As noted above, any deviation from the construction hours identified in the Noise Element would require County authorization. For these reasons, impacts associated with noise from construction vehicle traffic are considered **less than significant**.

TABLE 4.8-10
PREDICTED SHORT-TERM INCREASES IN TRAFFIC NOISE LEVELS

Roadway	CNEL/L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]		Predicted Increase	Substantial Increase?[2]
	Without Project	With Project		
SR 78	64.26	65.50	1.24	No

Source: AMBIENT 2013.

1. *Traffic noise levels were calculated using the FHWA roadway noise prediction model based on data obtained from the traffic analysis prepared for this project (Chen Ryan 2013).*
2. *For purposes of this analysis, a substantial increase in noise levels is defined as an increase of 5.0, or greater, where the noise levels, without project implementation, are less than the County's "normally acceptable" noise standard. Where the noise level, without project implementation, equals or exceeds applicable noise standards, an increase of 3.0 dBA, or greater, would be considered a substantial increase. These criteria are intended to apply to long-term project operation, but are used in this analysis in the absence of applicable criteria for short-term activities.*

Operation

Once the Project is operational, no construction activities or construction vehicle traffic are anticipated to be generated. The amount of activity and vehicle trips associated with maintenance would be substantially less than occurs during construction. Operational noise is discussed as part of Impact 4.8-2, below.

Reclamation

Activities associated with reclamation include concrete removal; removal and dismantling of underground utilities; excavation and removal of soil; and final site contour. All equipment and facilities on the solar farm complex site would be removed basically in reverse order of the manner in which installation occurred. However, the IID-owned facilities (IID switchyard and 92 kV transmission line on the Property; 92 kV transmission line with underbuilt 12.5 kV distribution line; 12.5 kV distribution line system constructed on the Property; and the IID Anza Substation modifications) would not be decommissioned until IID determined that these improvements were no longer needed and could be retired and removed. Likewise, the roads constructed on Lot B to access each of the parcels created under the major subdivision and all of the water wells would not be decommissioned or reclaimed. Reclamation activities would likely generate noise levels similar to those occurring during construction and are likewise considered **less than significant**. After the solar farm complex site is cleared and contoured, it would be reclaimed to its end state of approximate existing idle farmland and is not anticipated to include any noise generating activities that would exceed county standards.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

Long-Term Exposure to Increased Traffic Noise

Impact 4.8.2 Long-term operation of the proposed Project would not result in a substantial increase in traffic noise levels. This impact would be considered **less than significant.**

Construction

Construction activities would occur for a limited duration prior to Project operation. Once the Project begins operation, no construction activities or construction vehicle traffic are anticipated to be generated. Construction noise is discussed as part of Impact 4.8-1, above.

Operation

Implementation of the proposed Project would result in increased traffic volumes along SR 78. The increase in traffic volumes resulting from implementation of the proposed Project would, therefore, contribute to predicted increases in traffic noise levels. The FHWA Highway Traffic Noise Prediction Model (FHWA RD77-108), utilizing California vehicle noise emission factors, was used to predict traffic noise levels along primarily affected roadway segments (i.e. SR 78 north of the Project), with and without implementation of the proposed Project. The Project's contribution to traffic noise levels along these roadways was determined by comparing the predicted noise levels with and without Project-generated operational traffic.

Table 4.8-11 summarizes the predicted traffic noise levels, with and without development of the proposed Project. In comparison to existing conditions, the proposed Project would result in predicted increases in traffic noise levels along SR 78 of approximately 0.09 dBA CNEL/L_{dn}. The Project's contribution to SR 78 traffic noise levels in future years are projected to decline to approximately 0.08 dBA by year 2015 and 0.02 dBA by year 2020. Therefore, operation of the proposed Project would not contribute to a substantial increase in traffic noise levels. As a result, impacts associated with long-term exposure to increased traffic noise would be considered **less than significant**.

TABLE 4.8-11
PREDICTED INCREASES IN SR-78 TRAFFIC NOISE LEVELS LONG-TERM OPERATIONAL CONDITIONS

Year	CNEL/L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]		Predicted Noise Level Increase	Substantial Noise Level Increase?[2]
	Without Project	With Project		
Existing Conditions	64.26	64.35	0.09	No
Near-Term Year 2015	64.47	64.55	0.08	No
Long-Term Year 2025	73.34	73.36	0.02	No

Source: AMBIENT 2013.

1. *Traffic noise levels were calculated using the FHWA roadway noise prediction model based on data obtained from the traffic analysis prepared for this project (Chen Ryan Associates 2013).*
2. *For purposes of this analysis, a substantial increase in noise levels is defined as an increase of 5.0, or greater, where the noise levels, without project implementation, are less than the County's "normally acceptable" noise standard. Where the noise level, without project implementation, equals or exceeds applicable noise standards, an increase of 3.0 dBA, or greater, would be considered a substantial increase.*

Reclamation

After the solar farm complex site is cleared and contoured, it would be reclaimed to its end state of approximate existing idle farmland. No long-term exposure to increased traffic noise would be generated in association with reclaiming the solar farm complex site to idle farmland. As a result, **less than significant impacts** with regard to long-term exposure to increased traffic noise during reclamation.

Mitigation Measures

None required.

Significance After Mitigation

Not Applicable.

Long-Term Exposure to Increased Stationary-Source Noise

Impact 4.8.3 Long-term operation of the proposed Project is not anticipated to exceed applicable noise standards at the solar farm complex site's property line. Therefore, long-term exposure to increased stationary-source noise is considered a **less than significant impact.**

Construction

Construction activities would occur for a limited duration prior to Project operation. Once the Project begins operation, no construction activities or construction vehicle traffic are anticipated to be generated. Construction noise is discussed as part of Impact 4.8-1, above.

Operation

The proposed Project would operate continuously, seven days per week. Noise generated by Project operations would be associated with the on-site transformers, inverters, substations, and power conversion stations (PCSs). Each solar energy project may also be equipped with horizontal single-axis tracker (HSAT) systems or dual-axis tracker (DAT) systems, to orient the solar panels toward the sun. Operation of the electrical motors used to power the HSATs and/or DATs would generate intermittent noise. In addition, given the low background noise levels, Corona discharge may be somewhat detectable in the immediate vicinity of the proposed solar development transmission lines (i.e. gen-tie lines) and the 92 kV transmission line, particularly during high humidity conditions. Other operational noise sources would include on-site vehicle operations and intermittent maintenance activities.

Representative noise levels for on-site stationary noise sources were obtained from noise studies and measurement data obtained from similar solar farm projects and related equipment. **Table 4.8-12** summarizes representative operational noise levels for on-site noise sources.

TABLE 4.8-12
SUMMARY OF ON-SITE STATIONARY EQUIPMENT NOISE LEVELS

Source	Distance (feet)	Noise Level (dBA L_{eq})
Substation Transformer Noise Levels [1]	3	70
Power Conversion Stations (PCS) [2]	10	70
Transmission Line Corona Discharge [3]	25	25
Horizontal Single-Axis Tracker (HSAT) & Dual-Axis Tracker (DAT) Systems [4]	400	37
Onsite Maintenance [5]	50	70

Source: AMBIENT 2013.

Notes to Table 4.8-12

1. *Substation transformers noise based on data obtained from the Panoche Valley Solar Farm Project Draft Environmental Impact Report (San Benito County 2010)*
2. *PCS noise levels are based on full-load (daytime) conditions, including noise generated by two inverters located within an enclosed structure, one transformer mounted at the exterior of the structure, exterior mounted HVAC system and an exhaust fan. Based on data obtained from the Topaz Solar Farm Project Draft Environmental Impact Report (San Luis Obispo County 2011).*
3. *Transmission Line Corona Discharge is conservatively based on a 230 kV line. Corona discharge noise generated by lower-rated lines would be less.*
4. *HSAT & DAT noise levels based on T20 Tracker System. Includes the simultaneous operation of 6 tracker motors (ICF 2010).*
5. *Assumes 70 dBA L_{eq} at 50 feet based on typical operational noise levels for portable equipment (e.g., portable generators and compressors)(FTA 2006).*

The predominant generators of on-site noise during project operations would be the substation and PCSs. Transformers are proposed to be located a distance of no less than 450 feet from the solar farm complex site property line; PCSs would be at least 25 feet from solar farm complex site property line. Noise generated by other on-site sources, including the HSAT and DAT systems, gen-tie lines, and vehicles would not be projected to exceed applicable noise standards. Likewise, these sources would not result in a detectable increase in ambient noise levels at the nearest existing noise-sensitive receptors. However, if maintenance activities were to occur during the nighttime hours, detectable increases in ambient noise levels at the nearest residential land uses could potentially occur if heavy-duty noise generating equipment were used. The Applicant has indicated that maintenance activities are not anticipated to be performed during noise sensitive hours, but if necessary to do so, no heavy-duty noise generating equipment would be used (Carey 2014b). Noise generated by each component of the solar farm complex and transmission line is described below. As previously mentioned, modifications to the Anza Substation would not generate perceptible increases in existing noise levels.

Substation Transformers

Transformer noise is typically described as a "humming" or "buzzing" noise which is caused by mechanical movement of the laminations located within the transformer core. Expansion of the core laminations occurs when the transformer is under load. When the transformer is not under load the core laminations return to their original state. Because movement of the core laminations occurs during both load and non-load conditions, transformers typically generate audible noise under both load and non-load conditions. During non-load conditions, the highest audible noise levels are typically approximately 2 dB less than noise generated while under load.

As noted in **Table 4.8-12**, operational noise levels associated with the proposed substation transformers would be approximately 70 dBA at a distance of 3 feet, while under load. Based on this noise level, predicted noise levels at the nearest the existing residential land use, located west of proposed Lot 6, would be less than 3 dBA and would not result in a detectable increase in ambient noise levels. Likewise operational noise levels would not exceed the County's exterior daytime or nighttime noise standards of 50 and 45 dBA L_{eq}, respectively. Furthermore, the PCSs within each of the proposed solar energy project lots would be located at a distance no less than 450 feet from the property line (Carey 2014c). Based on this distance and the operational noise levels noted above, operational noise levels at the property line would be approximately 27 dBA L_{eq}, which would not exceed the County's property line noise standard of 75 dBA L_{eq}. Thus, noise from substation transformers would be considered to have **a less than significant impact.**

Power Conversion Stations

PCSs would be constructed within each of the proposed solar energy projects (i.e., Lots 1 thru 5). Each PCS would include two inverters and one transformer. The inverters would be housed within an enclosed structure which would help to reduce operational noise from the inverters. The transformer would be located at the exterior of the PCS enclosures. In addition, each of the PCSs would be anticipated to include

an exhaust fan and a heating, ventilation, and air conditioning (HVAC) system. The HVAC is typically mounted to the exterior of the enclosure.

Each of the proposed PCSs would operate only during the daytime hours along with the inverters (which would be located within an enclosed structure), the transformer, exhaust fans, and HVAC systems. As noted in **Table 4.8-12**, combined operational noise levels associated with each PCS would be approximately 70 dBA L_{eq} at a distance of 10 feet. During the nighttime hours, operational noise levels would be limited to non-load noise generated by the transformers, which typically average approximately 55 dBA L_{eq} at 10 feet or less. Based on these noise levels the highest predicted noise levels at the nearest residential dwellings would be approximately 6 dBA L_{eq}, or less, under full-load daytime conditions with all equipment operating. Although actual noise levels may vary somewhat depending on final design, operation of the proposed PCSs would not result in a detectable increase in ambient noise levels at the nearest residential land use. Likewise, would predicted operational noise levels would not exceed the County's exterior daytime or nighttime noise standards of 50 and 45 dBA L_{eq}, respectively. Furthermore, the PCSs within each of the proposed solar energy project lots would be located at a distance no less than 450 feet from the property line (Carey 2014c). Based on this distance, operational noise levels at the property line would be approximately 37 dBA L_{eq} (refer to **Table 4.8-12** and would not exceed the County's property line noise standard of 75 dBA L_{eq} . Thus, operational noise from PCSs would be considered to have a **less than significant impact.**

Electrical Transmission Line

One of the phenomena associated with high-voltage transmission lines, is Corona discharge. Corona is the electrical breakdown of the air into charged particles, which may result in audible noise. During Corona activity, transmission lines can generate a small amount of sound energy. This audible noise can increase during high humidity weather conditions when water drops may collect on the surface of the conductors and increase Corona activity. Audible noise generated by Corona discharge is typically described as a crackling or humming sound. Corona discharge is typically associated with transmission lines rated at 230 kV and above. For lines rated less than 230 kV, the conductor size is typically of sufficient diameter so that little or no Corona activity would exist under most operating conditions. For example, audible Corona noise levels for a typical 230 kV line are approximately 25 dBA at locations within approximately 25 feet of the power line corridor.

The proposed Project would include construction of approximately three miles of new IID 92 kV transmission line for the interconnection of the new IID switch station to the existing Anza Substation located east of the solar farm complex site on the south side of SR-78. Approximately 0.75 miles of new 92 kV transmission line would be constructed on the solar farm complex site. Given the low power rating of the proposed transmission line, audible noise associated with Corona discharge along the transmission line corridor would be minimal (i.e., less than 25 dBA L_{eq}). As such, Corona discharge would not exceed applicable County noise standards or result in a detectable increase in ambient noise levels at the nearest existing residences. Thus, noise from operation of the proposed 92 kv transmission line is considered a **less than significant impact**.

Horizontal Single-Axis & Dual-Axis Tracker Systems

Noise associated with the HSAT and DAT systems would be generated by small electrically-powered motors used to orient the solar panels to the sun's position. The tracking system motors would operate intermittently throughout the daytime hours. Noise levels generated by the tracking systems average approximately 48 dBA at a distance of 50 feet. Based on this noise level and assuming up to 6 motors operating simultaneously, the resultant combined noise level would be 37 dBA at a distance of approximately 400 feet (AMBIENT 2013). Based on these same assumptions, predicted operational noise levels at the nearest residential land use would be approximately 7 dBA Leq, or less, and would not result

in a detectable increase in ambient noise levels. Predicted operational noise levels at the solar farm complex site property line would be approximately 65 dBA L_{eq}, or less, and would not exceed applicable County noise standards. Thus, operational noise generated by HSAT and DAT systems is considered **a less than significant impact**.

Onsite Maintenance & Security Activities

On-site maintenance activities would also generate periodic noise levels. Such activities may include occasional washing/cleaning of solar panels, solar panel repairs and security patrols. The highest noise levels would be associated with the cleaning and repair of the solar panels which may involve the intermittent use of portable equipment, such as power washers, compressors and portable generators. Small portable equipment typically generates noise levels of approximately 70 dBA or less at a distance of 50 feet (FTA 2006). Based on this noise level (i.e. 70 dBA or less), predicted noise levels at the nearest residential dwellings would be approximately 22 dBA L_{eq} and would not result in a significant increase in ambient noise levels that would exceed the County's exterior daytime or nighttime noise standards of 50 and 45 dBA L_{eq}, respectively.

The operation of motor vehicles on site for maintenance and security purposes would also generate intermittent noise. On-site vehicles used for routine maintenance and security patrols would generate intermittent noise levels of approximately 65 dBA L_{max} at a distance of 50 feet. However, vehicle traffic in any one location would be of short duration and would be transient. The highest noise levels associated with on-site vehicle use would be anticipated to occur along the solar farm complex site main access road. Based on the traffic analysis prepared for the Project, operational vehicle traffic would total approximately 20 vehicles per day (refer to Table 4.3-6 in Section 4.3, Transportation and Circulation). Based on this estimate, the on-site vehicle traffic would generate noise levels of approximately 32 dBA CNEL/L_{dn} at a distance 50 feet. Predicted on-site vehicle traffic noise levels at the nearest residence would be less than 5 dBA CNEL/L_{dn} and would not result in a detectable increase in ambient noise levels. However, if maintenance activities were to occur during the nighttime hours, the Applicant has indicated that no heavy duty-noise generating equipment would be used thereby avoiding detectable increases in ambient noise levels at the nearest residential land uses. Thus, noise from on-site maintenance and security activities is considered a **less than significant impact**.

Other Potential Noise Sources

Other potential noise sources at the solar farm complex site, including wind noise, would be minor. Wind noise generally occurs due to vibrations generated as air moves around and/or over objects, low pressure areas, and small openings between materials. The vibrations generated, particularly during high wind conditions, may result in noise levels that are detectable to the human ear.

A literature search regarding wind noise was conducted by AMBIENT Air Quality & Noise Consulting (AMBIENT). Documents reviewed as part of the literature search are identified in Appendix B of the Noise and Groundborne Vibration Impact Assessment which is included in **Appendix F** of this EIR. No reported instances or potential noise-related impacts attributable to wind-generated noise from photovoltaic systems or solar farms were identified.

In addition to the literature search, noise surveys were also conducted by AMBIENT at the California Valley Solar Ranch located in San Luis Obispo County. This facility employs similar solar technology involving the use of single-axis tracking technology. The surveys were conducted under a range of meteorological and wind conditions taking into account varying wind directions and solar panel orientations. Based on the surveys conducted, no detectable wind noise was identified associated with the solar facility. [Note: The results of the noise surveys are provided in Appendix C of the Noise and Groundborne Vibration Impact

Assessment which is included in **Appendix F** of this EIR.] Therefore, impacts associated with other potential noise sources during operation, including wind, are considered **less than significant**.

Reclamation

After the solar farm complex site is cleared and contoured, it would be reclaimed to its end state of approximate existing idle farmland No long-term exposure to increased stationary-source noise would occur in association with reclaiming the solar farm complex site to idle farmland. As a result, a **less than significant impact** is anticipated in association with long-term exposure to increased stationary-source noise during reclamation.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

Exposure to Groundborne Vibration

Impact 4.8.4 Ground-borne vibration levels associated with short-term Project construction and long-term operational activities would not exceed applicable groundborne vibration criterion at nearby land uses. This impact would be considered **less than significant.**

Construction

Increases in groundborne vibration levels attributable to the proposed Project would be primarily associated with short-term construction-related activities. Construction activities associated with the proposed Project would not be anticipated to require the use of equipment or processes that would generate substantial ground vibration. Given the distance to the nearest land uses (i.e., approximately 4,500 feet or greater), onsite construction activities would not result in excessive groundborne vibration levels that would adversely affect nearby land uses. As a result, groundborne vibration impacts would be considered **less than significant** during Project construction.

Operation

Long-term operational activities associated with the proposed Project would not involve the use of any equipment or processes that would result in potentially significant levels of ground vibration. Thus, groundborne vibration impacts would be considered **less than significant** during operation of the proposed Project.

Reclamation

As is the case with construction, increases in groundborne vibration levels attributable to reclamation activities would be short term and would not be anticipated to require the use of equipment or processes that would generate substantial ground vibration. Given the distance to the nearest land uses (i.e., approximately 4,500 feet or greater), on-site reclamation activities are not anticipated to result in excessive groundborne vibration levels that would adversely affect nearby land uses. As a result, groundborne vibration impacts would be considered **less than significant** during reclamation. Upon reclamation to approximate existing idle farmland, the solar farm complex site would not generate any groundbourne vibration.

Mitigation Measures

None required.

Significance After Mitigation

Not Applicable.

4.8.4 CUMULATIVE SETTING, IMPACTS AND MITIGATION MEASURES

A. CUMULATIVE SETTING

The geographic extent of the cumulative setting for noise consists of the Project area and the surrounding areas within the County within approximately one mile of the Project. All of the cumulative projects identified in Table 3.0-1 in Chapter 3.0, Introduction to the Environmental Analysis and Assumptions Used, are located more than one mile away and no other major stationary sources of noise have been identified in the Project area. The primary factor for cumulative noise impact analysis is, therefore, the consideration of future traffic noise levels along SR 78.

B. CUMULATIVE IMPACTS AND MITIGATION MEASURES

Contribution to Cumulative Noise Levels

Impact 4.8.5 Long-term operation of the proposed Project would not result in a substantial contribution to cumulative noise levels. Therefore, cumulative noise impacts would be considered **less than cumulatively considerable.**

Construction

Impacts associated with noise from on-site construction activities as well as construction vehicle traffic were considered less than significant. The Project area is rural with few sensitive receptors and construction noise would occur for a limited duration. No other cumulative projects (per Table 3.0-1) are located within one mile of the proposed Project. Therefore, the Project's contribution to cumulative noise levels is considered **less than cumulatively considerable** during construction.

Operation

The Project's operational contribution to the cumulative traffic noise levels along SR 78 was determined by comparing projected traffic noise conditions for future cumulative year 2025, with and without the contribution of Project-generated vehicle traffic. **Table 4.8-13** summarizes predicted increases in future cumulative traffic noise levels along primarily affected roadways.

TABLE 4.8-13
PREDICTED INCREASES IN TRAFFIC NOISE LEVELS - CUMULATIVE YEAR 2025 CONDITIONS

Roadway	CNEL/L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]		Predicted Increase	Substantial Increase?[2]
	Without Proposed Project	With Proposed Project		
SR-78	73.34	73.36	0.02	No

Source: AMBIENT 2013.

1. *Traffic noise levels were calculated using the FHWA roadway noise prediction model for year 2025 conditions, based on data obtained from the traffic analysis prepared for this project (CRA 2013).*
2. *For purposes of this analysis, a substantial increase in noise levels is defined as an increase of 5.0 dB, or greater, where the noise levels, without project implementation, are less than the County's "normally acceptable" noise standard. Where the noise level, without project implementation, equals or exceeds applicable noise standards, an increase of 3.0 dBA, or greater, would be considered a substantial increase.*

As depicted in **Table 4.8-13**, the contribution of Project-generated vehicle traffic noise would result in a less than cumulatively considerable contribution to traffic noise levels along SR 78. Likewise, the proposed Project would result in a **less than cumulatively considerable impact** to cumulative noise levels.

Reclamation

Noise levels generated by reclamation activities are assumed to be similar to construction noise levels. Accordingly, the noise contribution of the Project during reclamation is expected to be **less than cumulatively considerable.** As the solar farm complex site will be reclaimed to approximate existing idle farmland, noise levels are anticipated to be less than significant upon reclamation of the site to its end state.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

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