TABLE OF CONTENTS

Section 6 Environmental Information 6.7-1

6.7 Noise 6.7-1
6.7.1 Affected Environment 6.7-1
6.7.2 Environmental Consequences 6.7-6
6.7.3 Operation 6.7-10
6.7.4 Cumulative Noise Impacts 6.7-13
6.7.5 Mitigation Measures 6.7-13
6.7.6 Laws, Ordinances, Regulations, and Standards 6.7-13
6.7.7 References 6.7-17

List of Tables

Table 6.7-1 Sound Levels of Typical Noise Sources and Noise Environments

Table 6.7-2 Short-Term Sound Level Measurements (dBA)

Table 6.7-3 Long-Term Noise Measurement Data Summary

Table 6.7-4 Calculated Sound Levels from Conventional Construction Activity

Table 6.7-5 Calculated Sound Levels from Special Construction Activity

Table 6.7-6 Noise Model Parameters

Table 6.7-7 Calculated Sound Levels from Operation

Table 6.7-8 Imperial County Land Use Compatibility Guidelines

Table 6.7-9 Imperial County Property Line Sound Level Limits

List of Figures

Figure 6.7-1 Noise Measurement Locations

Figure 6.7-2 Typical Construction Noise Generation Levels

Figure 6.7-3 Calculated Noise Contours at Property Lines

Figure 6.7-4 Calculated Noise Contours at Sensitive Receptors

TABLE OF CONTENTS

6.7 NOISE

This section describes the existing noise environment for the Project. Potential noise impacts associated with the Project are considered and noise-sensitive receptors are identified, as well as the LORS that regulate noise levels at those receptors. The following discussion describes the fundamentals of acoustics, the results of a detailed site reconnaissance, sound level measurements, and acoustical calculations.

6.7.1 Affected Environment

The Project Site is located northeast of the Town of Niland. The major noise-producing Project components will be located on a 22-acre site situated in the southwest portion of the Property, adjacent to the existing Niland Substation. The Project will be owned and operated by IID.

Some land uses are considered sensitive to noise. Noise-sensitive receptors are defined as land uses associated with indoor and outdoor activities that may be subject to stress or significant interference from noise. They include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities, and libraries.

Noise-sensitive receptors in the Project area consist of residential receptors to the east, southeast, northwest, and southwest. Three single-family residences and a concrete slab for parking recreational vehicles are located approximately 1,600 feet east of the acoustical center of the Project Site (the acoustical center is at the combustion turbine generators, CTG). Two single-family residences are located approximately 2,100 feet southeast of the Project Site. Two single-family residences are located approximately 2,600 feet northwest of the Project Site. Multiple single-family and multifamily residential, commercial, and industrial land uses are located to the southwest of the Project Site across the railroad tracks in the Town of Niland. The closest residence in the Town of Niland proper is approximately 3,500 feet from the Project Site.

6.7.1.1 Noise Background

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity, and that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound's pitch and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels. The minimum change in the sound level of individual events that an average

human ear can detect is about one to two dB. A three to five dB change is readily perceived. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Sound level is usually expressed by reference to a known standard. This report refers to two measurements: (1) sound pressure level, and (2) sound power level. In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 micropascals (µPa). In expressing sound power level, the standard reference sound power is 1 picowatt. These terms are different and should not be confused. Sound pressure level depends not only on the power of the source, but also on the distance from the source and on the acoustical characteristics of the space surrounding the source; while sound power level is a measure of the acoustic power radiated by the source.

Hertz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency but rather a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that reflects that human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) may be used to describe sound that is changing in level. L_{eq} is the energy-mean A-weighted sound level during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum L_{eq} (L_{max}) and minimum L_{eq} (L_{min}) indicators that represent the root-mean-square (RMS) maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} are commonly used. They are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of the measured time interval. Sound levels associated with the L_{10} typically describe transient or short-term events, half of the sounds during the measurement interval are softer than L_{50} and half are louder, while levels associated with the L_{90} describe the background noise conditions.

Finally, another sound measure known as the Community Noise Equivalent Level (CNEL) is defined as the A-weighted average sound level for a 24-hour day. It is calculated by adding a 5-decibel penalty to sound levels during the evening period (7:00 p.m. to 10:00 p.m.) and a 10-decibel penalty to sound levels during the night period (10:00 p.m. to 7:00 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours. The Day-Night Average Sound Level (L_{dn} or DNL) also represents the average sound level for a 24-hour day and is calculated by adding a 10-decibel penalty only to sound levels during the night period (10:00 p.m. to 7:00 a.m.). The CNEL and L_{dn} are used by the State of California and Imperial County (County) to define acceptable land use compatibility with respect to noise. Because of the time-of-day penalties associated with the CNEL and L_{dn} descriptors, the L_{eq} for a continuously operating sound source during a 24-hour period will be numerically less. Thus, for a power plant operating continuously for periods of 24 hours, the L_{eq} will be 6 dB lower than the L_{dn} value and 7 dB lower than the CNEL value. Sound levels of typical noise sources and environments are provided in Table 6.7-1, Sound Levels of Typical Noise Sources and Noise Environments, to provide a frame of reference.

TABLE 6.7-1
SOUND LEVELS OF TYPICAL NOISE SOURCES AND NOISE ENVIRONMENTS

Noise Source (at a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels*)
Military Jet Take-off with After-burner (50 ft)	140		
Civil Defense Siren (100 ft)	130	Aircraft Carrier Flight Deck	
Commercial Jet Take-off (200 ft)	120		Threshold of Pain *32 times as loud
Pile Driver (50 ft)	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Power Lawn Mower (3 ft)	100		Very Loud *8 times as loud
Motorcycle (25 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck, 40 mph (50 ft)	90	Boiler Room Printing Press Plant	*4 times as loud
Garbage Disposal (3 ft)	80	High Urban Ambient Sound	*2 times as loud
Passenger Car, 65 mph (25 ft) Vacuum Cleaner (10 ft)	70		Moderately Loud *70 decibels (Reference Loudness)
Normal Conversation (5 ft) Air Conditioning Unit (100 ft)	60	Data Processing Center Department Store	*1/2 as loud
Light Traffic (100 ft)	50	Private Business Office	*1/4 as loud

TABLE 6.7-1
SOUND LEVELS OF TYPICAL NOISE SOURCES AND NOISE ENVIRONMENTS

Noise Source (at a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels*)
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	Quiet *1/8 as loud
Soft Whisper (5 ft)	30	Quiet Bedroom	
	20	Recording Studio	Very Quiet
	10		
	0		Threshold of Hearing

6.7.1.2 Ambient Noise Survey

A series of sound level measurements were taken on December 19 and 20, 2005 at the closest residences and surrounding community to quantify the existing noise environment near the Project. Two types of sound level measurements were conducted: (1) short-term (1-hour duration), and (2) long-term (25-hour duration). The results of the short-term measurements are summarized in Table 6.7-2, Short-Term Sound Level Measurements, and the long-term measurement is summarized in Table 6.7-3, Long-Term Noise Measurement Data Summary. The measurement locations are shown in Figure 6.7-1, Noise Measurement Locations.

TABLE 6.7-2
SHORT-TERM SOUND LEVEL MEASUREMENTS (dBA)

Measurement Identification	Location Description	Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}
ST1	Center of Project Site	11:41-12:41	62	38	75	66	54	42
		22:10-23:10	60	52	76	59	54	53
ST2	Trailer park to southwest	12:56-13:56	59	42	76	60	47	42
		23:18-00:18	51	47	72	50	46	42
ST3	Residence to southeast	14:37-15:37	55	43	73	56	46	45
		21:00-22:00	52	48	70	54	52	50

Measurements taken on December 19 and 20, 2005.

TABLE 6.7-3
LONG-TERM NOISE MEASUREMENT DATA SUMMARY

Site ID	Measurement Location	Measurement Period			Measurement Results (dBA)				
		Start Date	Start Time	Duration (hh:mm)	25 hr L_{eq}	24 hr L_{dn}	24 hr CNEL	25 hr Average L_{50}	25 hr Average L_{90}
LT-1	8120 Cuff Road	12/19/05	10:40	25:00	49	57	58	38	32

The short-term data were gathered using a Larson Davis Model 720 American National Standards Institute (ANSI) Type 2 Integrating Sound Level Meter (Serial Number 0418). The sound level meters were set on slow-time response using the dBA scale for all the measurements and a windscreen was used. The meter was calibrated before and after each measurement period with a Larson Davis Model CAL150B acoustic calibrator (Serial Number 2233). The meter was mounted on a tripod 5 feet above the ground to simulate the average height of the human ear. All sound level measurements conducted by URS were in accordance with ISO (1996a,b,c).

The long-term data were gathered using a Larson Davis Model 820 ANSI Type 1 Integrating Sound Level Meter (Serial Number 1323). The meter was placed in a watertight container and the microphone was mounted securely on a tripod so that it was approximately 5 feet above ground level. The long-term measurement consisted of consecutive 10-minute averages.

Weather conditions during the survey period were warm with clear skies and no precipitation. The air temperature varied from 57°F to 75°F, with 37 percent to 47 percent relative humidity. Winds were moderate, ranging from 0 to 6 miles per hour, and directed toward the east for the daytime measurements and to the west for the nighttime measurements.

The following information details the measurement locations.

ST2 Two 1-hour measurements were conducted during the daytime and nighttime at the northeast property line of J and H Trailer Park at 150 Niland Avenue in Niland. The residence is approximately 2,600 feet southwest of the Project and is separated from the Project by railroad tracks. The daytime measurement was taken between 12:56 p.m. and 1:56 p.m. and the nighttime measurement was taken between 11:18 p.m. and 12:18 a.m. on December 19, 2005. The dominant daytime noise sources were vehicular traffic on Main Street and freight trains on the adjacent railroad. Other noise sources included birds vocalizing, dogs barking, infrequent use of a circular saw approximately 150 feet away, people talking, aircraft overflights. Nighttime noise sources consisted of a train idling in the background, infrequent (approximately four automobiles, vehicular traffic on Main Street, dogs barking, and a distant car alarm. The daytime one-hour L_{eq} was 63 dBA and the nighttime one-hour L_{eq} was 55 dBA. The calculated CNEL was 64 dBA and L_{dn} was 63 dBA.

ST3 Two 1-hour measurements were conducted during the daytime and nighttime on a berm adjacent to the front yard of a single-family residence. The residence is approximately 2,100 feet southeast of the acoustical center of the Project Site and is separated from the Project by undeveloped land and Beal Road. The daytime measurement was taken between 2:37 p.m. and 3:37 p.m. and the nighttime measurement was taken between 9:00 p.m. and 10:00 p.m. on December 19, 2005. Daytime noise sources consisted of vehicular traffic on Beal Road, aircraft overflights, rustling leaves, and two freight trains. Nighttime noise sources consisted of a compressor running for the first 5 minutes of the measurement, two freight trains, infrequent vehicular traffic on Beal Road, electrical hum from high voltage lines associated with the Niland Substation, and water trickling down the irrigation ditch running parallel to the berm. The daytime one-hour L_{eq} was 52 dBA and the nighttime one-hour L_{eq} was 56 dBA. The calculated CNEL was 62 dBA and the L_{dn} was 61 dBA.

LT1 A 25-hour measurement was conducted in the front yard of a single-family residence at 8130 Cuff Road. This residence is approximately 1,600 feet from the acoustical center of the Project Site (CTG) and is separated from the Project by Cuff Road. The measurement was taken between 10:40 a.m. on December 19, 2005 and 11:40 a.m. on December 20, 2005. Daytime noise sources consisted of horses chuff, birds vocalizing, dogs barking, aircraft overhead, vehicular traffic, and freight trains. Nighttime noise sources consisted of electrical hum from the Niland Substation, dogs barking, horses chuff, vehicular traffic, and freight trains. The 10-minute L_{eq} ranged from 27 to 64 dBA (average = 49 dBA) and the 10-minute L_{90} ranged from 24 to 42 dBA (average = 32 dBA). The average hourly L_{eq} during the nighttime hours was 42 dBA L_{eq}. The calculated CNEL was 58 dBA and the L_{dn} was 57 dBA.

A short-term sound level measurement (1 hour in duration) was also taken on December 19, 2005, at the Project Site to quantify the existing noise environment. The results of the short-term measurements are summarized in Table 6.7-2, Short-Term Sound Level Measurements. The following summarizes the measurements.

ST1 Two 1-hour measurements were conducted during the daytime and nighttime in the center of the Project Site. The daytime measurement was taken between 11:41 a.m. and 12:41 p.m. and the nighttime measurement was taken between 10:10 p.m. and 11:10 p.m. on December 19, 2005. Daytime noise sources consisted of the electrical hum from the existing Niland Substation, vehicular traffic on Beal Road, and aircraft overflights. Nighttime noise sources consisted of dogs barking to the southwest, the electrical hum from the existing Niland Substation, aircraft overflights, one automobile traveling down Beal Road, and three freight trains. The daytime 1-hour L_{eq} was 55 dBA and the nighttime 1-hour L_{eq} was 62 dBA.

6.7.2 Environmental Consequences

6.7.2.1 Thresholds of Significance

The Project is in the unincorporated portion of Imperial County. The noise elements and noise ordinances of the County have been reviewed and the portions relevant to this Project are summarized in Section 6.7.6, LORS Compliance. Based on the Noise Element of the General Plan, the Project's noise emission would be considered significant if:

- Noise from construction of the Project exceeds 75 dB L_{eq} when averaged over an 8 hour period at the nearest sensitive receptor.
- Noise from Project operations exceeds 75 dBA L_{eq} hourly sound levels at the property lines.
- Noise from Project operations exceeds 45 dBA L_{eq} hourly sound levels at the residential property line to the east (across Cuff Road).
- Noise from Project operations exceeds 60 dBA CNEL at sensitive receptors,.
- Noise from Project operations increases the existing noise level at sensitive receptors by 5 dBA CNEL.

- Based on CEC guidelines, if noise from the Project increases the existing noise level at the closest sensitive receptor by 5 dBA L_{eq} during the nighttime hours, an impact may result.

6.7.2.2 Construction Noise

The construction phase of the Project from site preparation and grading to commercial operation is scheduled to last 9 months. During that time many activities will be taking place, including construction of foundations, installation of piping and equipment, connection of major site interfaces, erecting major structures and commissioning. During these activities, a varying number of construction equipment and personnel will be in the area of the Project Site, resulting in varying levels of construction noise. The Project will utilize conventional construction techniques and equipment including excavators, bulldozers, heavy trucks (water truck, dump truck) and similar heavy construction equipment. A limited amount of specialized construction using pile-driving equipment will also be needed.

Conventional Construction Noise

Conventional construction activities at the Project Site would result in a short-term, temporary increase in the ambient noise level resulting from the operation of construction equipment. The increase in noise level would be primarily experienced close to the noise source. The magnitude of the noise effects would depend on the type of construction activity, noise level generated by various construction equipment, duration of the construction phase, and the distance between the noise source and receiver. Figure 6.7-2, Typical Construction Noise Generation Levels, shows maximum noise levels generated by typical construction equipment. Sound levels of typical construction equipment range from approximately 65 dBA to 95 dBA at 50 feet from the source, with an average level of 89 dBA at 50 feet during the noisiest activities (U.S. Environmental Protection Agency [USEPA] 1971). This analysis will use 89 dBA at 50 feet as the reference noise level for conventional construction noise.

Acoustical calculations were performed to estimate noise from conventional construction activities at the closest residences. Noise from the activity was assumed to have point source acoustical characteristics. Strictly speaking, a point source sound decays at a rate of 6 dB per doubling of distance from the source. This is a logarithmic relationship describing the acoustical spreading of a pure, undisturbed spherical wave in air. The rule applies to the propagation of sound waves with no ground interaction. The calculations are based on the formula below (Harris 1991):

$$SPL_2 = SPL_1 - 20\log\left(\frac{d_2}{d_1}\right), \text{ where:}$$

SPL_1 = known sound level,

SPL_2 = desired sound level,

d_1 = known distance, and

d_2 = desired distance.

Approximately one decibel per 1000 feet is also deducted for air absorption and anomalous excess attenuation. The closest offsite residential uses to the Project consist of single-family

residences approximately 1,600 feet east, residences 2,100 feet southeast, residences 2,600 southeast, and residences 3,500 feet to the northwest. Based on the distance from the Project components to be constructed, sound levels at the residences to the east will average 57 dBA, 55 dBA at residences to the southeast, 52 dBA at residences to the southwest, and 48 dBA at residences to the northwest, as summarized in Table 6.7-4, Calculated Sound Levels from Construction Activity. Because of the intermittent nature of construction work, the average sound level for an 8-hour work day would be expected to be substantially less than the calculation predicts.

The Imperial County Noise Element of the General Plan requires that construction noise shall not exceed 75 dB L_{eq} when averaged over an 8-hour period at the nearest sensitive receptor. The General Plan permits construction between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday, and 9:00 a.m. and 5:00 p.m. on Saturday. Some limited construction activities may need to be conducted outside of these hours as discussed in the Project Description, Section 2.0. This limited work shall satisfy the noise level standards as discussed in Section 6.7.6.3-3. No construction is permitted on holidays or Sundays.

Therefore, because conventional construction noise would not exceed 75 dBA L_{eq} when averaged over 8 hours, and construction activities would be in compliance with Table 6.7-4, Calculated Sound Levels from Conventional Construction Activity, there would be no impact at residences as a result of conventional Project construction activities.

TABLE 6.7-4
CALCULATED SOUND LEVELS FROM CONVENTIONAL CONSTRUCTION ACTIVITY

Receptor	Distance from Construction Area	Calculated Sound Level L_{eq} dBA)
Residences to east	1,600 feet	57
Residences to southeast	2,100 feet	55
Residences to southwest	2,600 feet	52
Residences to northwest	3,500 feet	48

Special Construction Noise

Portions of the Project's construction (e.g., the foundations under the CTG) may require driven piles. Noise from pile-driving activity is different in character from the typical, conventional "construction phase" noise and its potential noise impact is, therefore, analyzed separately. Also, because the primary source of noise from pile drivers is somewhat elevated, it does not typically benefit from attenuation due to intervening buildings and structures. The noise attenuation from other factors such as air absorption with distance still applies to noise from pile driving.

Maximum noise levels at 50 feet from a pile driver can range from 89 dBA to 114 dBA L_{max}, depending on many factors (e.g., driver power, driver type, pile size, soil characteristics) with a typical maximum level range of 101 to 105 dBA produced at 50 feet. The typical L_{eq} produced during pile driving ranges from 82 to 100 dBA at 50 feet. The higher typical noise level values of 100 dBA L_{eq} and 105 dBA L_{max} at 50 feet for the pile driver noise source were selected for calculation purposes.

Allowing for point-source divergence and excess attenuation, the maximum and average sound levels which might occur in noise-sensitive areas during pile driving activity were calculated. The resulting L_{eq} and L_{max} sound levels expected at the sensitive receptors are presented in Table 6.7-5, Calculated Sound Levels from Special Construction Activity.

TABLE 6.7-5
CALCULATED SOUND LEVELS FROM SPECIAL CONSTRUCTION ACTIVITY

Receptor	Distance from Construction Area	Calculated Sound Level L_{eq}, L_{max} (dBA)
Residences to east	1,600 feet	69, 74
Residences to southeast	2,100 feet	65, 70
Residences to southwest	2,600 feet	63, 68
Residences to northwest	3,500 feet	59, 64

The noise from pile driving, although clearly audible, would comply with the eight hour daytime construction noise decibel limits contained in the General Plan either as an individual source or in combination with other construction noise. Thus, no noise impacts from special construction activity will occur if this activity is conducted during hours of construction permitted by the General Plan Noise Element.

Cal/OSHA

Based upon construction noise data, noise levels on the construction site could exceed federal Occupational Safety and Health Administration (OSHA) and California OSHA (Cal/OSHA) guidelines for worker noise exposure. Compliance with Cal/OSHA regulations will ensure that construction personnel are adequately protected from potential noise hazards. The noise exposure level to protect hearing of workers is regulated at 90 dBA over an 8-hour work shift. The Project's construction contractors will comply with all Cal/OSHA regulations.

Off-site Laydown and Parking Areas

Designated Project areas will be used as off-load and staging areas. The use of the Project Site for equipment laydown and parking will not impact the surrounding area with respect to noise.

Construction Traffic

Access to the Project Site for construction activities will be via the southwest corner of the Property along from Beal Road north along the west Property boundary, then east into the Project Site. The construction workforce will typically arrive and depart by private vehicles. The number of daytime worker trips per day will average 40, with a peak of approximately 60 trips. Due to the existing high number of trucks that utilize the roadways, there would be no appreciable difference in the noise from construction vehicle traffic as a result of the Project.

Commissioning and Start-up

Most noise emission levels experienced during commissioning will be similar to those occurring during normal Project operations with the exception of short-term elevation of sound level due to limited equipment checks with sound enclosures open (or prior to their installation). Commissioning of the Project does not involve steam blows, air blows or other similar noise-producing processes with the exception of the gas line being blown clean during an operation limited to one shift (for safety reasons, often performed after normal hours or on a non-working day). Project commissioning will consist of frequent starting and stopping of all equipment including gas compressors, pumps, other motorized equipment, and work associated with a performance and emissions compliance testing program..

6.7.3 Operation

6.7.3.1 Noise Prediction Methods

The Cadna/A Noise Prediction Model (Version 3.5.115) was used to estimate the Project-generated sound level at the Property lines and noise-sensitive receptors. Cadna/A is a Windows® based software program that predicts and assesses noise levels near industrial noise sources based on ISO 9613-2 standards for noise propagation calculations. The model uses industry-accepted propagation algorithms and accepts sound power levels (in decibels re: 1 pico Watt) provided by the equipment manufacturer and other sources. The calculations account for classical sound wave divergence, plus attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding. Air absorption was determined using “standard day” conditions. The Property and surrounding areas were assumed to be flat; therefore, no intervening topographical barrier effects were considered. However, major buildings, tanks, and large equipment were included as barriers.

Calculations were performed using linear octave band sound power levels as inputs from each noise source. The model outputs are in terms of octave band and overall A-weighted sound pressure levels. General Electric supplied the sound power level values for the LM6000 CTG packages and ancillaries. For non-GE supplied equipment, assumed noise levels were used based on either vendor quotations or similar equipment from other projects. The sound power levels, type of source, and acoustic height of each component are provided in Table 6.7-6, Noise Model Parameters. The Project Site configuration was imported into Cadna/A from the project CAD files. The Project was assumed to operate 24 hours per day, so the average noise output (including variations due to start-ups and shut-downs) would be essentially constant regardless of time of day. This model uses the octave band sound power levels (PWL) of the major subcomponents to calculate the corresponding sound pressure levels (SPL) for the equipment. The formula used to derive the SPL (in dBA) is as follows:

$$SPL = PWL - 10 \log (2\pi r2) \text{ dBA, where r is in meters.}$$

TABLE 6.7-6
NOISE MODEL PARAMETERS

Project Component	Type of Source	Sound Power Level (PWL) at Octave Band Center Frequency (Hz)									A-Weighted	Acoustic Height
		31.5	63	125	250	500	1000	2000	4000	8000		
CTG exhaust stacks (2)	Area source	123	120	107	96	85	80	77	77	79	97.0	60 ft
SCR/CO catalysts (2)	Area source	118	111	104	101	91	77	73	71	60	95.2	30 ft
LM6000 generator packages (2)	Area source	120	112	113	107	100	95	92	94	91	104.1	30 ft
Air-cooled chiller (1)	Area source	--	111	112	110	104	96	92	90	89	105.7	30 ft
GSU transformers (2)	Point source	92	96	88	84	80	78	74	74	69	84	8 ft
Auxiliary transformers (4)	Point source	92	96	88	84	80	78	74	74	69	84	8 ft
Start-up skid (1)	Area source	87	90	95	108	110	107	104	108	87	113.4	8 ft
Gas compressor skid (1)	Area source	101	109	105	110	105	102	103	96	91	108.7	10 ft
Air compressor skid (1)	Area source	101	109	105	110	105	102	103	96	91	108.7	10 ft
92-kV substation	Area source	--	--	--	--	--	--	--	--	--	85	30 ft

Source: GE Aero Energy Products for LM6000 Main Unit Noise, Ancillaries, and SCR/CO Catalyst System Noise (2004).

6.7.3.2 Offsite Community Noise

The results of the calculations are depicted in Figure 6.7-3, Calculated Noise Contours at Property Lines, and Figure 6.7-4, Calculated Noise Contours at Sensitive Receptors, and summarized in Table 6.7-7, Calculated Sound Levels from Operation. Figure 6.7-4 depicts noise contours for the Project in 5-decibel increments at a receptor height of 5 feet with no topography at the Property lines. Figure 6.7-4 depicts noise contours for the Project in 5-decibel increments at a receptor height of 5 feet with no topography at the closest sensitive receptors. A review of the table shows that the calculated sound levels at the Property lines range from 44 to 61 dBA L_{eq}. The calculated sound levels at the receptors range from 36 to 45 dBA L_{eq} (43 to 52 dBA CNEL).

TABLE 6.7-7
CALCULATED SOUND LEVELS FROM OPERATION

Receptor	Calculated Level	
	Hourly L_{eq}	CNEL
North Property line	44	51
South Property line	61	68
East Property line	46	53

TABLE 6.7-7
CALCULATED SOUND LEVELS FROM OPERATION

Receptor	Calculated Level	
	Hourly L_{eq}	CNEL
West Property line	56	63
Residence to east (closest residence)	45	52

Based on the results of the calculations, the Project would be in compliance with the Noise Element of the General Plan at all Property lines (less than 75 dBA L_{eq}) and at sensitive receptors (less than 60 dBA CNEL and would not increase by 5 dBA CNEL). The existing noise environment at the closest receptor was 58 dBA CNEL. The Project would result in a sound level of 52 dBA CNEL at this receptor. The cumulative sound level would be 59 dBA CNEL (58 CNEL + 52 CNEL), which corresponds to a net CNEL increase of 1 dBA.

The calculated Project sound level at the closest receptor was 45 dBA L_{eq}, which is an increase of 3 dBA L_{eq} over the average hourly sound level of 42 dBA L_{eq} measured during the period between 10:00 p.m. and 7:00 a.m. Therefore, the Project complies with siting guidelines set forth by the CEC. The Project complies with all aspects of the Noise Element of the General Plan. In addition, the sound levels as a result of the Project would also comply with federal guidelines for assessing acceptable sound levels for residential uses. The EPA document, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," USEPA Report No. 550-9-74-04, recommends 55 dBA L_{dn}. The U.S. Department of Housing and Urban Development (HUD) Guidelines 24 CFR 51 subpart B has identified exterior sound levels up to 65 dBA L_{dn} acceptable for residential uses. The Project would result in a sound level of 52 dBA L_{dn} at the closest residential receptor. Typical noise reduction from residential buildings with windows partially open range from 10 to 15 dBA and with windows closed range from 25 to 30 (Imperial County General Plan 1997). Interior noise levels from the Project would be expected to be less than 42 dBA L_{dn}, which complies with the Noise Element and California Code of Regulations Title 24 requirement of 45 dBA L_{dn} in residential interior habitable spaces. Therefore, the Project would not result in a noise impact to residential receptors.

6.7.3.3 Onsite Occupational Noise

Based upon the noise level data, the noise levels inside and very near the Project would be similar in magnitude to comparably sized power plants and other large industrial projects. These high noise levels may require the use of hearing protection as specified by federal OSHA and Cal/OSHA guidelines for worker noise exposure. Compliance with Cal/OSHA regulations will ensure that personnel are adequately protected from potential noise hazards. The noise exposure level to protect hearing of workers is regulated at 90 dBA over an 8-hour work shift. Areas above 85 dBA will be posted as high noise level areas and hearing protection will be required. The Project owners will implement a hearing conservation program for applicable employees as outlined in Cal/OSHA regulations.

6.7.4 Cumulative Noise Impacts

CEC requirements specify that an analysis is required to determine the cumulative impacts of the Project and other projects within a 6-mile radius that have received construction permits but are not yet operational or that are in the permitting process or can be expected to do so in the near future. To our knowledge no such projects planned within 6 miles from the Project. Thus, there are no cumulative noise impacts.

6.7.5 Mitigation Measures

The design of the Project will not cause significant adverse construction noise impacts; thus, no mitigation of construction noise is required. However, to ensure that noise emission assumptions relied upon herein are valid and acoustical design goals are met by the Project during construction, the following Conditions of Certification are recommended:

6.7.5.1 Construction

NOISE 1:

- Construction noise emissions shall comply with the Noise Element of the General Plan regarding hours of construction activity and permitted noise levels affecting adjacent uses.
- All noise-producing project equipment, and vehicles using internal combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.
- All mobile or fixed noise-producing equipment used on the project, which is regulated for noise output by a local, state, or federal agency, shall comply with such regulation while in the course of project activity.
- The use of noise-producing signals, including horns, whistles, electronic alarms, and sirens and bells, will be for safety warning purposes only.
- No construction-related public address, loudspeaker, or music system shall be audible at any adjacent noise-sensitive land use.

NOISE-2: The construction contractor shall implement a noise complaint process and hotline number for the surrounding community. The applicant will have the responsibility and authority to receive and resolve noise complaints.

6.7.5.2 Operation

The design of the Project will not cause significant adverse noise impacts; thus, no mitigation of operational noise is required.

6.7.6 Laws, Ordinances, Regulations, and Standards

The following sections summarize LORS and compliance with respect to noise.

6.7.6.1 Federal

There are no federal laws, ordinances, or regulations that directly affect this Project with respect to noise. However, there are guidelines at the federal level that direct the consideration of a broad range of noise and vibration issues as listed below:

USEPA has not promulgated standards or regulations for environmental noise generated by power plants. However, USEPA has published a guideline that specifically addresses issues of community noise. This guideline, commonly referred to as the "levels document," contains goals for noise levels affecting residential land use of $L_{dn} \leq 55$ dBA for exterior levels and $L_{dn} \leq 45$ dBA for interior levels. Operation of the Project would result in exterior levels of <55 dBA L_{dn} and interior levels of <45 dBA L_{dn} at the closest receptor; therefore, the Project would comply with the USEPA guidelines.

6.7.6.2 State of California

CEC has been delegated the authority to act as the lead agency for purposes of compliance with CEQA (Public Resources Code Division 13, Environmental Protection, Section 21000 et. seq.).

The California Department of Industrial Relations, Cal/OSHA (8 CCR, General Industrial Safety Orders, Article 105, Control of Noise Exposure, §5095) requires that all in-plant noise levels be limited to 85 dBA at 3 feet from equipment sources to protect worker safety. If workers frequent areas of the plant that exceed 85 dBA, then all aspects of a hearing conservation program must be implemented by the employer. There are likely to be areas within the facility with noise levels above 85 dBA, but none of them can be considered a normal stationary 8-hour working station. Full-time operations and maintenance personnel will have only limited exposure to these high noise areas under most circumstances. In areas where 85 dBA is typically exceeded, signs will be posted requiring the use of hearing protection. If justified, a hearing conservation program will be implemented.

The state also requires local jurisdictions (Cal. Gov. Code Section 65302(f)) to prepare General Plans that include Land Use and Noise Elements.

6.7.6.3 Local Noise Regulations

Imperial County

The Project site and environs are unincorporated areas within and governed by Imperial County. Project noise at any noise-sensitive use must comply with General Plan and Noise Limits established for maintaining noise/land use compatibility between residential and industrial land uses.

General Plan

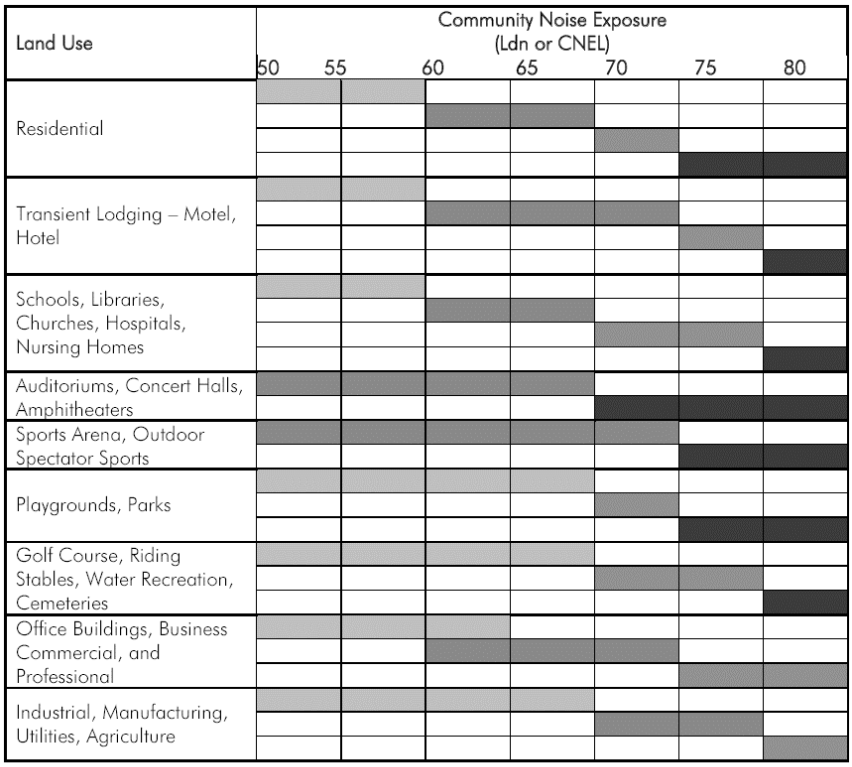
1. Land Use Compatibility

The Noise Element of the General Plan identifies a "Noise Impact Zone" as an area that may be exposed to noise greater than 60 dB CNEL or 75 dB L_{eq} (1 hour). This zone identifies areas and

properties where an acoustical analysis would be required to demonstrate Project compliance with land use compatibility requirements and other applicable environmental noise standards.

Land use compatibility defines the acceptability of a land use in a specified noise environment, as shown in Table 6.7-8, Imperial County Land Use Compatibility Guidelines.

TABLE 6.7-8
IMPERIAL COUNTY LAND USE COMPATIBILITY GUIDELINES



Source: Modified by CBA from 1998 State of California General Plan Guidelines.

ZONE A - Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved meet conventional Title 24 construction standards. No special noise insulation requirements.

ZONE B - Conditionally Acceptable: New construction or development shall be undertaken only after a detailed noise analysis is made and noise reduction measures are identified and included in the project design.

Zone C- Normally Unacceptable: New construction or development is discouraged. If new construction is proposed, a detailed analysis is required, noise reduction measures must be identified, and noise insulation features included in the design.

ZONE D- Clearly Unacceptable: New construction or development clearly should not be undertaken.

2. Property Line Standards

The Noise Element also identifies property line limits from noise generation from one property to an adjacent property based on the zoning of the properties. Table 6.7-9, Imperial County Property Line Sound Level Limits, summarizes the property line limits. The California Energy Commission bases its concern on actual use. Thus, for example, residential noise limits would apply to the immediate area around a residence that was an ancillary use to Agricultural designated or zoned parcels.

TABLE 6.7-9
IMPERIAL COUNTY PROPERTY LINE SOUND LEVEL LIMITS

Zone	Time	Applicable Limit One-hour Average Sound Levels (dB)
Residential zones	7:00 a.m. to 10:00 p.m.	50
	10:00 p.m. to 7:00 a.m.	45
Multi-residential zones	7:00 a.m. to 10:00 p.m.	55
	10:00 p.m. to 7:00 a.m.	50
Commercial zones	7:00 a.m. to 10:00 p.m.	60
	10:00 p.m. to 7:00 a.m.	55
Light Industrial/Industrial park zones	Any time	70
General industrial zones	Any time	75

Note:

When two adjacent properties have different uses, the more restrictive standard applies.

If the ambient sound level meets or exceeds the property line standard, the increase of the existing or proposed noise shall not exceed 3 dB L_{eq}.

3. Construction Noise Standards

During the work hours established in the General Plan, construction noise shall not exceed 75 dB L_{eq} averaged over an 8-hour period at the nearest sensitive receptor. Any construction activities that are required during the nighttime hours shall comply with the applicable 1-hour limit sound level as provided in Table 6.7-9 above. For example, 45 dBA $L_{eq(1\text{-}hr)}$ could not be exceeded at single family residential use. In order to satisfy this limit at the nearest residential area, the noise level limit on any nighttime Project construction activity would be 75 dBA $L_{eq(1\text{-}hr)}$ at a distance of 50 feet.

4. Significant Increase of Ambient Noise Levels

The Noise Element also takes into account existing noise levels. The following are considered significant impacts:

If the future noise level after the project is completed will be within the “normally acceptable” noise levels shown in Table 6.7-8, Imperial County Land Use Compatibility Guidelines, but will increase the existing ambient noise level of 5 dB CNEL or greater, it will be considered a potentially significant noise impact.

If the future noise levels after the project is completed will be greater than the "normally acceptable" noise levels shown in Table 6.7-8, Imperial County Land Use Compatibility Guidelines, a noise increase of 3 dB CNEL or greater shall be considered a potentially significant impact.

Noise Ordinance

Imperial County has adopted Property Line Sound Level Limits that serve as the functional equivalent to a noise ordinance and these have been provided in Table 6.7-9 above.

6.7.7 References

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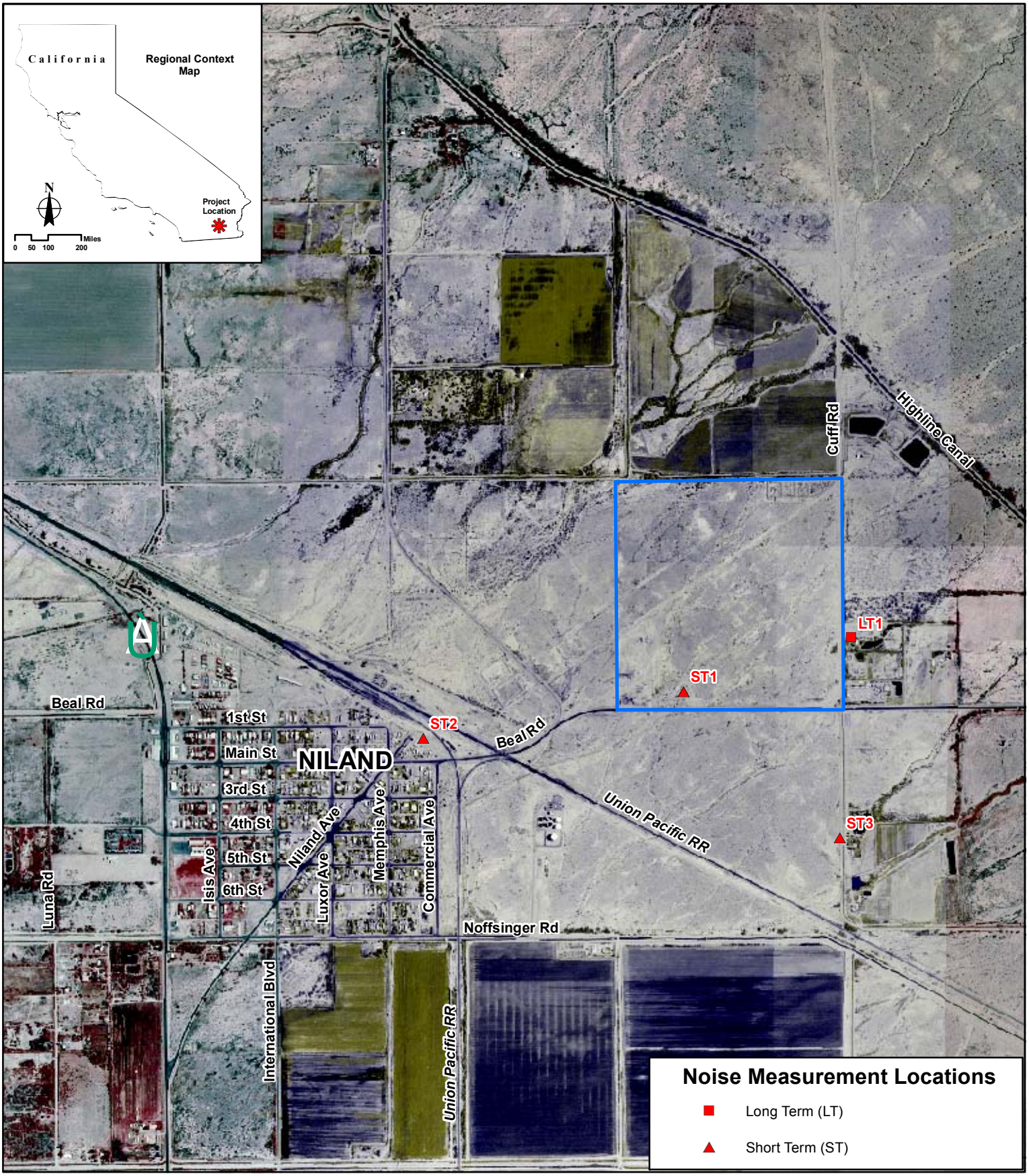

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0 400 800 1,600 Feet

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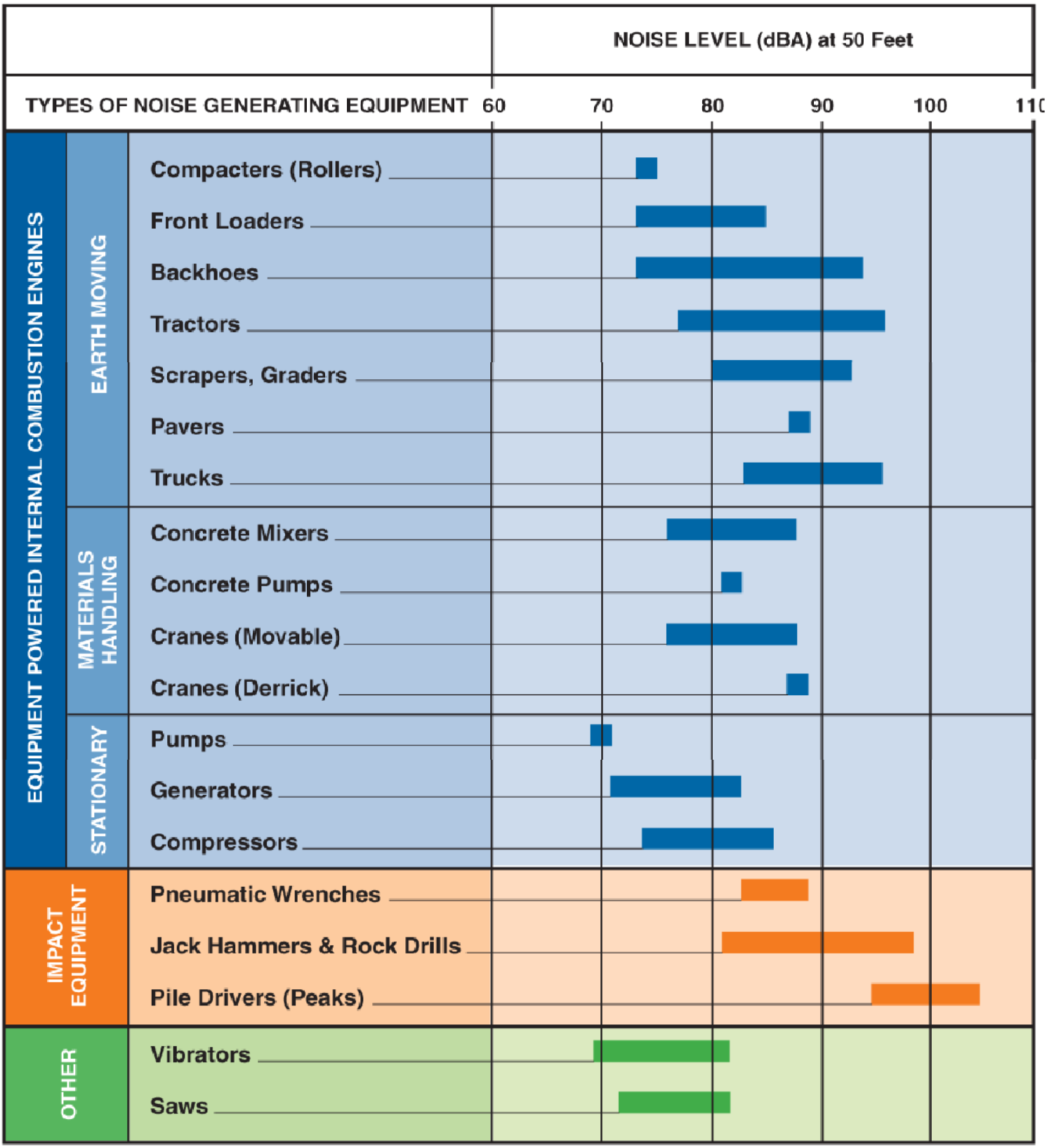
SOURCES:
USGS (aerial).

Noise Measurement Locations

Niland Gas Turbine Plant
Imperial Irrigation District

URS

FIGURE 6.7-1



Typical Construction Noise Generation Levels

Niland Gas Turbine Plant
Imperial Irrigation District

URS

FIGURE 6.7-2

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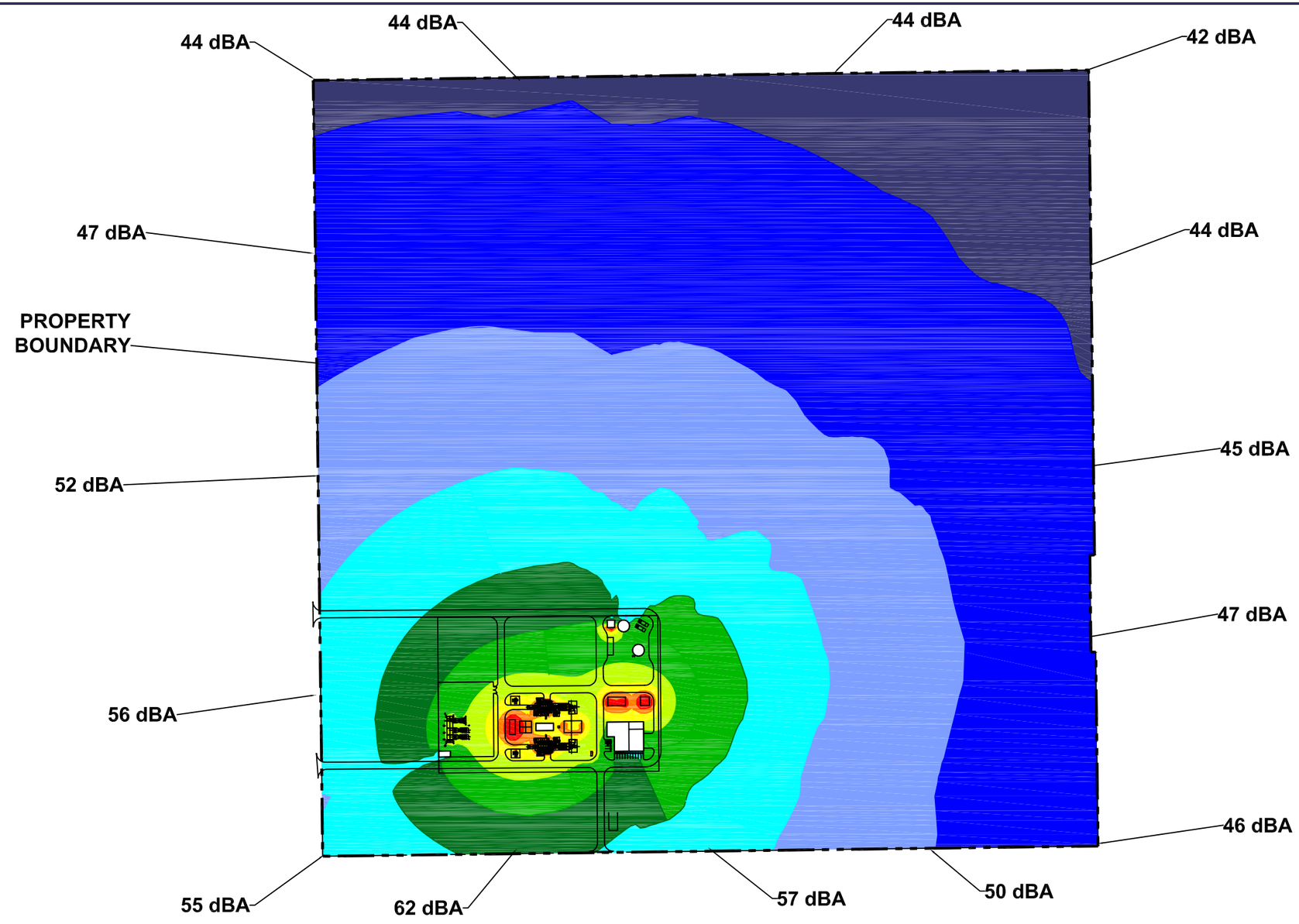

Noise Contours (in dBA)

- 35-40 dBA
- 40-45 dBA
- 45-50 dBA
- 50-55 dBA
- 55-60 dBA
- 60-65 dBA
- 65-70 dBA
- 70-75 dBA
- 75-80 dBA
- 80-85 dBA
- 85-90 dBA

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0 200 400 600 Feet

N

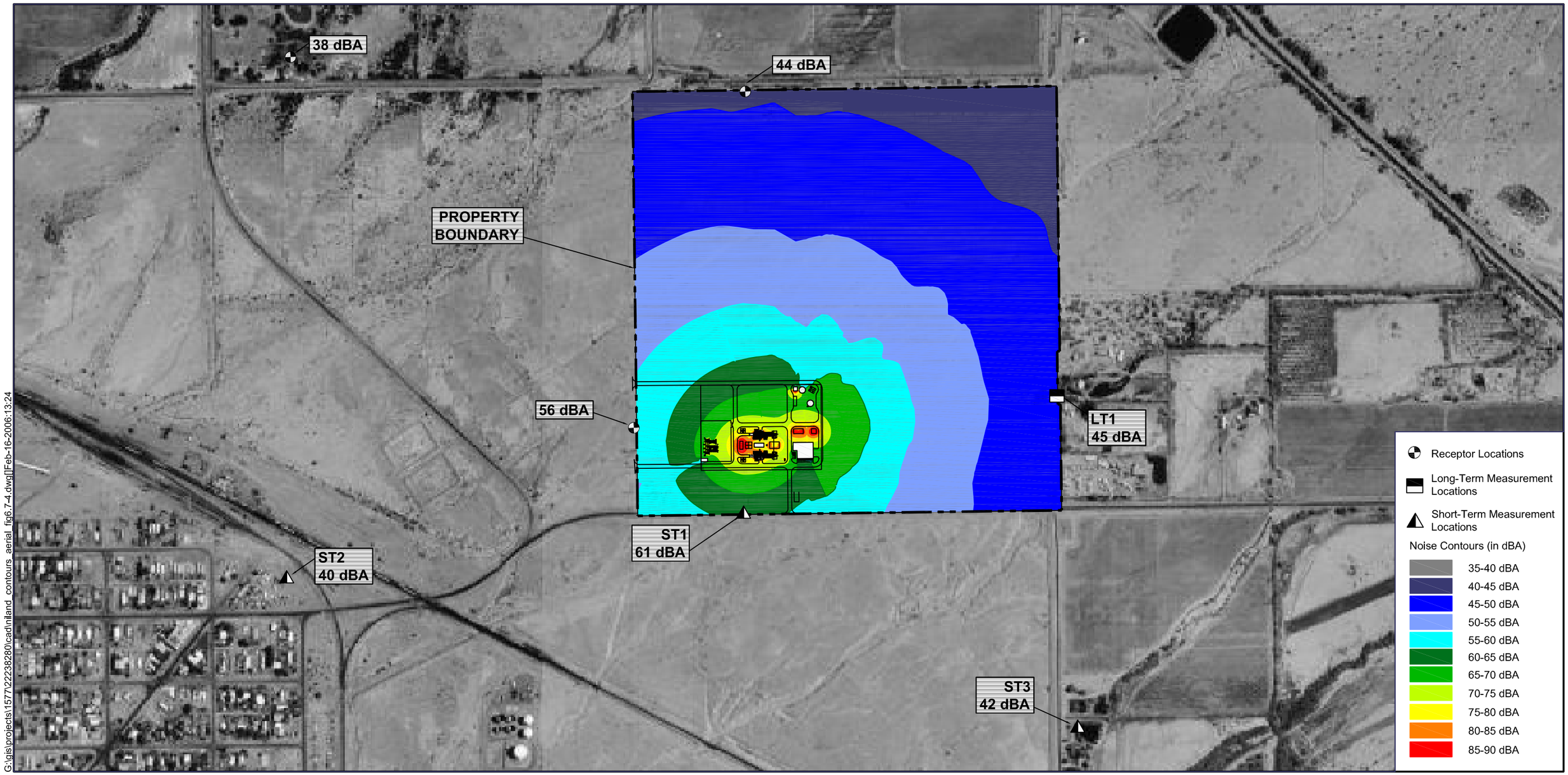
SOURCES: URS (Noise Contours);
Imperial Irrigation District (Site plan).

Calculated Noise Contours at Property Lines

Niland Gas Turbine Plant
Imperial Irrigation District

URS

FIGURE 6.7-3



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SOURCES: URS (Noise Contours);
Imperial Irrigation District (Site plan).

Calculated Noise Contours at Sensitive Receptors

Niland Gas Turbine Plant
Imperial Irrigation District

URS

FIGURE 6.7-4