5.8 Noise

This section addresses the potential noise impacts associated with construction and operation of the PHPP. It covers both the power generating facilities and linear facilities and includes an evaluation of potential effects on noise-sensitive receptors in the PHPP plant site vicinity, as well as on PHPP personnel. As required by CEC guidelines, a 25-hour noise survey was conducted to establish background noise levels in the Project area.

5.8.1 LORS Compliance

The construction and operation of the PHPP will be performed in accordance with the applicable LORS. The applicable Federal, State, and local noise LORS are summarized in Table 5.8.1 and are discussed in the text that follows the table.

Table 5.8-1 LORS Applicable to Noise

LORS	Applicability	Where Discussed in AFC
Federal:		
Federal Noise Control Act of 1972 (40 CFR 204)	Regulates noise emissions from operation of construction equipment and facilities; establishes noise emission standards for construction equipment and other categories of equipment; and provides standards for the testing, inspection, and monitoring of such equipment. Gives states and municipalities primary responsibility for noise control.	Section 5.8.3
Occupational Health and Safety Act of 1970 (OSHA) (29 Code of Federal Regulations [CFR] 1910.95)	Regulates the worker noise exposure to 90 dBA over an 8-hour work shift. Areas above 85 dBA need to be posted as high noise level areas and hearing protection will be required.	Section 5.8.3
State:		
California Noise Control Act of 1973 (Health and Safety Code, Division 28)	Declares that excessive noise is a serious hazard to public health and welfare; establishes the Office of Noise Control with responsibility to set standards for noise exposure in cooperation with local governments or the State Legislature.	Section 5.8.3
California Government Code 65300	Establishes guidelines for the development of noise elements to City and County General Plans.	Section 5.8.3
Cal-OSHA, 8 CCR Article 105, Sections 095 et seq.	Exposure of workers over 8-hour shift is limited to 90 dBA. See Federal OSHA.	Section 5.8.3
California Vehicle Code,	Regulates vehicle noise limits on California highways.	Section 5.8.3

LORS	Applicability	Where Discussed in AFC
Sections 23130 and 23130.5		
Local:		
City of Palmdale General Plan Noise Element	The General Plan establishes goals and policies to ensure that City residents are protected from excessive noise.	Sections 5.8.2 and 5.8.3
City of Lancaster General Plan Noise Element	Establishes goals and policies to ensure that residents are protected from excessive noise.	Sections 5.8.2 and 5.8.3

5.8.1.1 Federal LORS

In terms of LORS compliance, the Federal regulations that are applicable to the PHPP have been incorporated into local and state regulatory requirements. The EPA noise guidelines have been considered in developing local requirements.

Under the Occupational Safety and Health Act of 1970, the Occupational Safety and Health Administration (OSHA) has adopted regulations that are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which a worker is exposed. OSHA regulations also dictate hearing conservation program requirements and workspace noise monitoring requirements. OSHA requirements limit worker noise exposure to 90 decibels absolute (dBA) over an eight-hour work shift. Furthermore, if eight-hour worker noise exposure exceeds 85 dBA, the area must be posted as a noise hazard zone and a hearing conservation program is required.

5.8.1.2 State LORS

The occupational noise regulations promulgated under OSHA are administered by the California Occupational Safety and Health Administration (Cal-OSHA). The noise exposure level of workers is regulated at 90 dBA over an 8-hour shift to protect hearing (29 CFR 1910.95). Onsite noise levels will generally be in the 70 dBA to 85 dBA range. Onsite Project areas above 85dBA will be posted as high noise level areas and hearing protection will be required. The Project will implement a hearing protection program for applicable employees and maintain 8-hour exposure levels below 90 dBA.

Noise limits for highway vehicles are regulated under the California Vehicle Code, Sections 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol and the County Sheriff's Office. Delivery trucks and other Project-related vehicles will meet applicable Code requirements.

5.8.1.3 Local LORS

The applicable State noise guidelines are adopted in the local general plans and ordinances. The PHPP plant site is within the boundaries of the City of Palmdale, but the site is adjacent (across E Ave M) to the City of Lancaster. Thus, the General Plan Noise Element and the Noise Ordinance Code of both jurisdictions would represent the local LORS.

The Ordinance Code of Palmdale contains specific regulations regarding construction and operation noise in Chapter 8.28 which specifies that construction is prohibited between the hours of 8:00 p.m. and 6:30 a.m. the following day and all day on Sunday if the construction is within 500 feet of a residential zone.

The Palmdale City General Plan requires acoustical analysis reports to include acoustical design for residential development adjacent to freeways or major arterials to achieve the appropriate interior and exterior noise levels through sound insulation. The City of Palmdale noise limits are shown in Table 5.8-2

Table 5.8-2 City of Palmdale Maximum Acceptable Levels

Land Use	Exterior	Interior	Scale
Residential			
Single Family Residence	65	45	dBA CNEL
Multi Family Residence	65	45	dBA CNEL
Mobile Home Park	65	45	dBA CNEL
Commercial including, but not limited to:	A noise level which does not jeopardize health, safety, and welfare of visitors.		
Retail		55	Leq(h)
Services		55	Leq(h)
Office		55	Leq(h)
Institutional including, but not limited to:	A noise level which does not jeopardize health, safety, and welfare of visitors.		
Schools		45	Leq(h)
Hospitals		45	Leq(h)
Nursing Homes		45	Leq(h)
Industrial including, but not limited to:			
Industrial Park Business Park	A noise level which does not interfere with normal business activity.	65 65	Leq(h) Leq(h)
Quarry	Maximum 65 Leq(h) at the interface with residentially designated land.	N/A	

Leq(h) The A-weighted equivalent sound level averaged over a period of "h" hours. An example would be Leq(12) where the equivalent sound level is the average over a specified 12-hour period (such as 7 a.m. to 7 p.m.). Typically, time period "h" is defined to match the hours of operation of a given type of use.

Source: City of Palmdale General Plan Noise Element, Table N-3

The Ordinance Code of Lancaster contains specific regulations regarding construction and operation noise in Chapter 8.24 which specifies that construction is prohibited between the hours of 8:00 p.m. and sunrise the following day and all day on Sunday if the construction is within 500 feet of an occupied dwelling, apartment, hotel, mobile home or other place of residence.

The Lancaster City General Plan established maximum exterior and interior noise level objectives for land uses in the City, as shown in Table 5.8-3.

Table 5.8-3 City of Lancaster Noise Compatible Land Use Objectives

Land Use	Maximum Exterior CNEL	Maximum Interior CNEL
Rural, Single-, and Multiple-Family Residential Dwellings	65 dBA	45 dBA
Schools: Classrooms Playgrounds	 65 dBA 70 dBA	 45 dBA –
Libraries	–	50 dBA
Hospitals and Convalescent Facilities Living Areas Sleeping Areas	 – –	 50 dBA 40 dBA
Commercial and Industrial Office Areas	70 dBA –	– 50 dBA
CNEL = community noise equivalent level. Source: City of Lancaster General Plan EIR, Noise Compatible Land Use Objectives.		

5.8.1.4 Involved Agencies

No permits are required for the PHPP that are specific to noise issues. However, the Project will need to comply with the applicable requirements of the City of Palmdale and City of Lancaster General Plan Noise Elements. The contact information for these agencies is provided in Table 5.8-4.

Table 5.8-4 Agencies and Agency Contacts

Agency Contact	Phone/E-mail	Permit/Issue
Asoka Herath City of Palmdale Planning Department 38250 Sierra Highway Palmdale, CA 93550	661/267-5200 Planning_Department@ cityofpalmdale.org	Compliance with Palmdale General Plan Noise Element
Brian S. Ludicke City of Lancaster Planning Department 44933 Fern Avenue Lancaster, CA 93534	(661) 723-6100 jreyes@cityoflancasterca.org	Compliance with Lancaster General Plan Noise Element

5.8.1.5 Required Permits and Permit Schedule

The Project does not require permits that are specific to noise issues, and thus, there is no permit schedule.

5.8.2 Affected Environment

The following sections provide background information on noise characteristics and describe the existing noise environment in the Project vicinity.

5.8.2.1 General Noise Characteristics

The unit of sound measurement is the decibel (dB). The dB scale is a logarithmic measure used to quantify sound power or sound pressure. A sound power level describes the acoustical energy of a sound and is independent of the medium in which the sound is traveling. As such, sound power levels are not measurable with a sound level meter, which only measures sound pressure levels. A sound pressure level is a physical measure of the pressure field a sound wave produces, and is presented in dB as the ratio of a measured pressure to a reference pressure; 20 micropascals (µPa) in air.

Noise Effects on Humans

The human ear is not uniformly sensitive to all noise frequencies. Therefore, the "A" weighting scale was devised to correspond with the ear's sensitivity. The A-weighting scale uses specific weighting of sound pressure levels from about 31.5 Hz to 8 kilohertz (kHz) for the purpose of determining the human response to sound. The resulting unit of measure is the A-weighted decibel (dBA).

Because noise levels can vary over a given time period, they are quantified further using the Equivalent Sound Level (Leq) and Day-Night Sound Level (Ldn) or Community Noise Equivalent Level (CNEL). The Leq is an average of the time-varying sound energy for a specified time period. The Ldn is an average of the time-varying sound energy for one 24-hour period, with a 10 decibel (dB) addition to the sound energy for the time period of 22:00 to 07:00 hours (10 PM to 7 AM). The CNEL is an average of the time-varying sound energy for one 24-hour period, with a 10 decibel (dB) addition to the sound energy for the time period of 22:00 to 07:00 hours (10 PM to 7 AM) and a 5 decibel (dB) addition to the sound energy for the time period of 19:00 to 22:00 (7 PM to 10 PM). Additional technical noise terms and their definitions are provided in Table 5.8-5.

The effects of noise on people can be listed in three general categories: 1) subjective effects of annoyance, nuisance, and dissatisfaction; 2) interference with activities such as speech, sleep, and learning; and 3) physiological effects such as startling and hearing loss. In most cases, environmental noise may produce effects in the first two categories only. However, workers in industrial plants may experience noise effects in the last category. No completely satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a common standard is primarily due to the wide variation in individually thresholds of annoyance and habituation to noise. Thus, an important way of determining a person's subjective reaction to a new noise is by comparing it to the existing or "ambient" noise environment to which that person has adapted. In general, the more the level or tonal variations of a noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 65 dBA range, and high above 65 dBA. Typical CNEL values might be 35 dBA for a desert wilderness area,

50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown, and 80 to 85 dBA near a freeway or airport.

Noise Propagation

In air, sound from a point source radiates according to inverse square laws either spherically or hemispherically from the source, depending on whether the noise source is near a reflecting surface such as the ground. Consequently, sound will decrease at a rate of 6 dB per doubling of distance from a point source. Additional decreases will occur due to sound absorption in the air, interaction with the ground, and shielding by intervening obstacles.

Table 5.8-5 Definition of Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
L(10), L(50), & L(90)	The A-weighted noise levels that are exceeded 10 percent, 50 percent, and 90 percent of the time, respectively, during the measurements period. L(90) is generally used to indicate the quietness of the measurement location.
Equivalent Noise Level, Leq	The energy average A-weighted noise level during a noise level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to the sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, Ldn	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite noise from all sources, near and far. The normal or existing level of environmental noise at a given location
Intrusive Noise	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.
Source: General Plan Guidelines, Governor's Office of Planning and Research, 2003.	

5.8.2.2 Existing Noise Environment

The PHPP plant site is located in the northernmost portion of Palmdale; the Project site is just south of E Ave M and the area north of Ave M across from the northwestern part of the plant site is within the City of Lancaster. The terrain is relatively flat and open. To the north of the site between Avenue M and Avenue L, the land is zoned Heavy Industrial by the City of Lancaster and Industrial by the City of Palmdale in their respective jurisdictions. Areas within approximately one mile of the Project plant site boundary and to the edges of the ROW of the Project's transmission line route options were evaluated. To the west of the site, the land use is zoned Light Industry, Office, Business Park and Commercial. Air Force Plant 42 is located to the south and east of the site. The nearest residential land use zone is in the City of Lancaster, one mile north of E Ave M (north of E Ave L) and east of 15th Street. The nearest existing residential area is approximately 600 feet north of Avenue L and east of 10th Street, over 1.5 miles from the center of the PHPP plant site. Ten residential structures (R1 to R10 on Figure 5.8-2) are identified as being located in the industrial zone north of the site (some appear to be abandoned houses or used as commercial/office buildings). The nearest of these is located approximately three-quarters of a mile northwest of the center of the plant power block and approximately a quarter-mile north of the plant site. Other noise sensitive receptors within one mile of the PHPP plant site boundaries include hotels on the west side of Sierra Highway, north of E Ave M. The Lancaster Adult Day Care Center (R11) is located on the northeast corner of E Ave M and 4th St E approximately one mile from the center of the plant power block and approximately one-third mile from the northwest corner of the power plant site boundary.

Existing identifiable noise sources in the study area are vehicle noise on Sierra Highway and Avenue M, aircraft activity at Air Force Plant 42, trains on the Union Pacific Railroad line (UP) that lies between the site's western boundary and Sierra Highway, and noise from industrial and commercial properties on the west and north side of the Project site.

As shown on Figure 5.8-1, the plant site is in close proximity to Air Force Plant 42; it is within the CNEL 60 dBA noise contour for the airport and the south side of the site borders the CNEL 70 dBA contour. Other influences on the noise environment include traffic on adjacent streets and the UP. According to the City of Lancaster 2030 General Plan, the 65 CNEL and 60 CNEL from local traffic on E Ave L east of 15th Street extends from the roadway centerline approximately 291 feet and 920 feet, respectively. According to the Noise Element of the Palmdale General Plan, the 65 dBA CNEL extends out from the center line to 327 feet from E Ave M, 315 feet from Sierra Highway and 690 feet from the rail line east of Sierra Highway.

The adult day care center (R11) is located within the CNEL 65 contour due to traffic on E Ave M and is just outside the CNEL 70 dBA contour due to aircraft activity from Plant 42. Noise measurements were taken in the plant site vicinity at four locations (see discussion below).

Background Sound Level Measurements

The noise measurement sites were chosen to characterize the acoustical environment near the Project site. No noise-sensitive receptors, considered to be a location such as a residence, church, school, or open recreational area, where activities exist that would be subject to interference or annoyance from external noise sources, were identified from land use maps and site visit. Four measurement locations were selected as described in Table 5.8-6 and shown on Figure 5.8-2.

Table 5.8-6 Ambient Noise Measurement Locations

Measurement Location	Description
1	42104 6th St East. 628 feet North of E Ave M curb; 50 feet east of the center of 6th St
2	West of site. 85 feet east of rail line and 7 feet north of south property line.
3	SE corner of site. 15 feet west of east property line; 38 feet north of south property line.
4	East side of site. 2,440 feet south of Ave M; 32 feet west of property line.

Methodology. A-weighted sound levels were measured in accordance with ANSI S1.13 at approximately five feet above grade using two ANSI S1.4 Type 1 portable real-time sound level meters. In order to minimize extraneous weather-related noise, the sound level meter microphones were equipped with a windscreen.

To assure accuracy of the measurements, field calibration checks of the sound level meter were conducted using a certified sound calibrator before the start and at the end of each measurement period. Additionally, the sound level meter and filter set was factory calibrated within 12 months preceding the measurements.

Atmospheric conditions during the background noise measurements conducted at/near the Project site on May 29, 2007 through May 30, 2007 are summarized as follows:

- The temperature for the period ranged between 60 °F and the maximum high temperature was 113 °F.
- The measured relative humidity ranged between 12 percent and 30 percent.
- The wind speeds during the measurement period ranged between 6 mph to 23 mph.

Monitoring Results. The results of the noise monitoring are presented in Table 5.8-7. The average levels measured during the quietest four hours of the night between midnight and 4 am are presented in Table 5.8-8. The average levels measured during the planned hours of construction (6 am to 6 pm) are presented in Table 5.8-9.

Table 5.8-7 Ambient Noise Measurements – May 29, 2007 to May 30, 2007

	Location 1				Location 2				Location 3				Location 4				Wind Speed
Hour	**Leq**	**L(10)**	**L(50)**	**L(90)**	**Leq**	**L(10)**	**L(50)**	**L(90)**	**Leq**	**L(10)**	**L(50)**	**L(90)**	**Leq**	**L(10)**	**L(50)**	**L(90)**	**mph**
12:00	–	–	–	–	58.0	58.8	54.0	49.6	56.8	48.9	40.3	35.1	53.1	55.6	40.5	36.8	8
13:00	56.8	69.0	52.4	48.4	62.6	60.2	56.3	52.2	56.0	49.9	43.5	38.5	55.6	57.1	43.8	38.7	12
14:00	57.5	68.6	54.3	50.2	61.4	62.5	58.4	54.5	49.3	51.2	46.3	41.9	52.2	56.6	46.3	42.1	17
15:00	60.0	67.5	58.4	53.9	59.7	62.3	58.6	53.9	52.3	54.6	49.5	44.3	53.5	58.8	49.9	45.0	17
16:00	61.9	70.0	60.2	56.8	63.9	63.5	59.6	55.6	57.1	58.9	54.2	49.7	60.3	60.1	52.8	49.1	22
17:00	59.8	65.8	58.8	55.1	61.0	63.0	59.4	55.1	64.3	57.3	52.1	47.4	52.0	56.0	50.4	46.4	22
18:00	65.1	79.8	60.1	56	65.2	63.8	59.3	54.9	71.3	58.5	52.3	47.2	73.0	60.4	53.6	49.3	20
19:00	59.5	67.5	56.6	51.8	64.7	61.7	57.3	51.9	44.6	48.0	42.6	38.9	45.1	50.9	41.8	39.0	23
20:00	53.3	63.1	49.6	44.8	72.7	63.8	54.0	49.2	45.5	49.4	39.7	37.4	46.0	53.5	39.3	37.2	20
21:00	49.3	55.6	47.2	42.5	53.2	56.0	51.3	46.8	39.1	40.5	38.3	36.7	40.9	43.5	38.3	36.5	10
22:00	54.3	64.7	51.7	46	69.8	69.9	55.2	49.7	47.7	51.9	41.1	37.1	47.3	53.2	42.4	39.0	7
23:00	52.0	61.9	48	42.4	64.8	55.5	49.5	42.3	41.2	41.9	36.9	35.4	40.9	46.9	37.2	35.4	9
00:00	47.7	57.4	44.2	37.8	49.0	52.2	46.0	39.9	36.8	37.6	35.4	33.6	37.0	39.4	35.6	34.0	10
01:00	51.8	63.9	45	38.7	67.5	52.4	45.5	38.1	44.8	49.3	35.9	33.9	45.5	54.5	36.5	34.4	9
02:00	50.9	61.6	42.1	37.8	67.7	58.1	43.1	38.1	41.3	42.6	36.4	34.5	41.3	48.4	35.8	33.9	12
03:00	49.0	56.4	46.5	41.4	50.3	53.4	47.1	41.0	40.5	43.3	38.0	36.2	39.9	43.0	38.2	36.3	13
04:00	54.9	61.8	52.6	46.7	52.9	55.0	50.2	45.1	43.0	42.3	39.8	37.6	53.4	50.8	41.3	38.2	8
05:00	58.8	66.3	57.1	51.9	66.7	61.5	55.6	50.9	47.1	47.4	43.4	41.0	52.9	58.9	44.8	41.8	6
06:00	59.1	67.3	57.2	51.7	58.1	59.1	55.3	51.9	48.9	46.7	43.5	41.6	53.6	61.1	46.9	43.9	7
07:00	52.0	63.8	48.4	45.1	54.9	56.3	51.6	47.5	47.9	45.1	40.9	37.6	48.8	54.0	43.5	41.7	6
08:00	53.0	66.0	45.3	41.7	58.0	55.8	50.7	46.2	58.7	41.8	35.9	31.5	51.1	54.0	39.2	34.7	10
09:00	53.9	68.1	45.8	41	68.0	58.6	51.4	45.8	60.4	51.9	37.6	32.7	56.1	61.1	40.6	35.2	7
10:00	54.2	67.4	46.7	42.8	68.1	57.4	51.4	46.6	61.5	47.4	38.5	33.2	55.3	56.5	38.6	33.7	8
11:00	53.4	65.5	47.8	43.1	70.1	62.5	52.8	48.0	45.0	48.1	42.9	36.3	48.1	52.6	41.9	36.9	10
12:00	58.5	68.7	55.7	51.2	70.2	63.1	54.9	49.7	60.3	53.6	47.9	42.0	56.2	57.1	45.8	41.7	16
13:00	59.0	72.2	55.2	50.9	65.6	59.5	55.0	50.1	62.6	54.5	49.5	43.5	58.6	57.0	48.7	44.3	19
14:00	–	–	–	–	56.7	59.7	55.4	50.0	51.8	53.0	46.9	42.2	–	–	–	–	21
CNEL	**62.6**				**73.5**				**61.6**				**62.0**				

Table 5.8-8 Average Ambient Noise Levels Measured During Four Quietest Nighttime Hours

Measurement Location	Leq	L(10)	L(50)	L(90)
M1	49.9	59.8	44.5	38.9
M2	52.8	54.0	45.4	39.3
M3	40.9	43.2	36.4	34.6
M4	40.9	46.3	36.5	34.7

Table 5.8-9 Average Ambient Noise Levels Measured During Normal Daytime Working Hours

Measurement Location	Leq	L(10)	L(50)	L(90)
M1	57.3	68.6	53.1	49.1
M2	60.9	60.6	55.1	50.6
M3	55.7	51.7	44.7	39.8
M4	55.5	57.1	45.1	40.9

5.8.3 Environmental Impacts

The following section describes the noise impacts of the Project during construction and operation.

5.8.3.1 Significance Criteria

Noise impacts would be considered significant if the combined noise level of ambient plus Project-generated noise at the nearest sensitive receptors would exceed the 65 dBA CNEL exterior noise level threshold for residential uses established by both the City of Palmdale and City of Lancaster General Plan Noise Elements.

Alternatively, if the 65 dB CNEL threshold is not exceeded, a significant noise impact would result if ambient plus Project-generated noise levels at a sensitive receptor constitute a substantial increase above ambient alone levels. An increase above ambient noise levels up to 5 dBA in a residential setting is generally considered insignificant; an increase between 5 and 10 dBA could be considered significant or insignificant by the CEC depending on the particular circumstances; and an increase of 10 dBA is subjectively heard as a doubling in loudness and would almost always be considered significant by the CEC. Factors to be considered in determining the significance of an adverse effect include the resulting combined noise level of ambient plus Project-generated noise; the duration and frequency of the noise; the number of people affected; and the land use designation of the affected receptor sites.

5.8.3.2 Construction

Plant Site

Construction will occur over a period of approximately 27 months with construction activities typically occurring between 6 am and 6 pm Monday through Friday. Table 5.8-10 provides a list of equipment expected to be used during Project construction, together with associated noise levels and estimated load factors. Pile driving is not anticipated as part of PHPP construction.

Table 5.8-10 Construction Equipment Noise Emissions

Equipment	Load Factor (%)	Lmax @ 50 ft
Air Compressor, Ingersoll-Rand	50	80
Asphalt Paver, Cat A-8008	60	80
Backhoe, Cat, 420E	50	80
Compactor, Cat CS-563	60	83
Crane, 300-Ton, 2250 Manitowoc	20	85
Crane, 250-Ton, Manitowoc 999	20	85
Crane, 60-Ton, RT-760	20	84
Crane, 70-Ton, RT-870	20	85
Crane, 250-Ton, Manitowoc, 4100W	20	86
Crane, 40-Ton, 630 Liebherr Tower	20	84
D6 Dozer	40	84
D8 Dozer	40	85
Forklift	40	80
Generators	50	82
Light Towers	50	80
Loader, Cat, 938F	55	80
Man Lift	20	80
Motor Grader, Cat 140H	60	85
Trencher, Cat 140G	70	80
Truck, Concrete Pump, International	65	82
Welder, Multiquip, BLW-300SS	45	74
Welder, Multiquip, GA 3800	50	73
On-Site Welding Truck	40	80
On-Site Fuel/Lube Truck	40	80
On-Site Flatbed Truck	40	80
On-Site Watering Truck	40	84
On-Site Dump Truck	40	84
Scraper 637	40	85
Pneumatic Tools	50	85

Noise levels from construction of the PHPP facilities will vary with the level of activity, numbers of pieces of equipment operating, and the location of the construction activity. The period when construction activities are expected to be at their peak was modeled. Table 5.8-11 shows the number, types of construction equipment, and the associated maximum sound pressure levels (Lmax) for each piece of equipment assumed in the modeling of the noisiest Project construction period.

Table 5.8-11 PHPP Construction Equipment

Equipment	Lmax @ 50 ft	Total Equipment Hours
Air compressor	80	8
Backhoe, Cat, 420E	80	3
Crane, 250-ton	85	2
Crane, 300-ton	85	1
Crane, 40-ton	84	2
Crane, 60-ton	84	3
Crane, 70-ton	85	1
Forklift	80	4
Generators	82	2
Light Towers	80	6
Concrete Pump Truck	82	7
Man Lift	80	10
Motor Grader, Cat 140H	85	1
Trencher, Cat 140G	80	1
BLW-300SS Welder	74	20
GA 3800 Welder	73	15
Pipelayer, Cat 561N	82	2
Onsite welding truck	80	3
Onsite fuel lube truck	80	2
Onsite flatbed truck	80	7
Onsite dump truck	84	2
Onsite Watering Truck	84	5
Onsite ¾ Ton pickup (75 dB)	75	5
Pneumatic Tools	85	12

The CadnaA noise model software was used to generate construction noise level contours. The acoustical model is based on the estimated number of equipment items, maximum noise level with a load factor applied to each, hours of operation, standard hemispherical free-field propagation algorithms, and considers attenuation for barriers and obstacles, reflections from major surfaces and standard air and ground attenuation. The results of the construction noise modeling show that Project construction equipment noise emissions would produce noise levels that are less than 60 dBA CNEL at any locations outside the boundaries of the PHPP plant site locations around the Project site. Noise levels on the north side of E Ave M would not exceed 50 dBA and noise levels in any residential locations would be within the CNEL 65 dBA

noise threshold for residential uses that are included in the Palmdale and Lancaster General Plan Noise Elements.

The construction noise levels (Leq) calculated for receptors R1 through R11 are presented in Table 5.8-12. There are no residential structures that would experience more than a 5 dBA increase over existing daytime L(90) (based on measurement results at M1 presented in Table 5.8-9). Adjacent airport and industrial areas may experience a 10 dB increase in noise levels. However, no noise-sensitive land uses will experience an increase in ambient noise during construction hours as shown in Table 5.8-9. The PHPP construction noise will not jeopardize health, safety, and welfare of visitors to adjacent commercial, business and industrial land uses. Due to the temporary nature of construction noise and the predicted low construction noise levels at the nearest residential structures, PHPP construction noise impacts would be less than significant.

Table 5.8-12 Construction Noise Levels for Residential Structures

Receiver #	Address	Leq(1)	CNEL
R1	42057 5th St E, Lancaster, CA 93535	41.6	38.5
R2	42104 6th St E, Lancaster, CA 93535 - Measurement Location 1	45.1	42.1
R3	42056 7th St E, Lancaster, CA 93535	47.2	44.2
R4	42155 8th St E, Lancaster, CA 93535	45.8	42.8
R5	42206 8th St E, Lancaster, CA 93535	43.5	40.5
R6	42021 4th St E, Lancaster, CA 93535	39.2	36.2
R7	42324 8th St E, Lancaster, CA 93535	41.4	38.3
R8	42257 8th St E, Lancaster, CA 93535	40.4	37.4
R9	42307 7th St E, Lancaster, CA 93535	39.0	36.0
R10	42306 7th St E, Lancaster, CA 93535	39.5	36.5
R11	Lancaster Adult Day Health Care Center	41.2	38.1

Construction worker noise exposure may exceed OSHA noise limits of 85 dBA within 15 to 20 yards of the heavy construction equipment operating on the site, which will require implementation of a hearing protection program for those work areas.

During startup of the steam turbine it is anticipated that there will be a series of short steam blows, lasting two or three minutes each over a period of two to three weeks in order to flush out debris from the steam piping. A silencer will be installed on the end of the steam blow piping, reducing the sound power level to less than 124 dBA (which corresponds to 92 dBA measured at 50 feet from the silencer and at a height of five feet above grade). The noise level resulting at the nearest residential structure (receptor R3) would be less than 55 dBA and less than a 10 dBA increase over existing daytime L(90) (based upon measurement results at M1 presented in Table 5.8-9). Due to the temporary nature of steam blow noise and the predicted increase in noise levels at the nearest residential structures, PHPP steam blow noise impacts would be less than significant.

Linear Facilities

New offsite Project linear facilities include a number of pipelines of different lengths ranging from 1.0 mile to 8.7 miles, as well as a 35.6-mile 230 kV transmission line route between the plant site and SCE's Vincent Substation. Construction of the Project's linear facilities will use construction equipment that produce similar noise levels to the equipment used on the plant site. Inherent in the construction of linear facilities is that the construction site moves constantly so that no particular area is exposed to noise for more than a relatively short time during daytime hours. For these reasons, potential noise impacts from the construction of Project linear facilities would be less than significant.

Vibration

Vibration attenuates rapidly; it is unlikely that vibration would be perceptible at any appreciable distance from the Project site during construction.

5.8.3.3 Operation

Plant Site

For most of the time when the PHPP is in operation, Project equipment is expected to operate essentially continuously and produce a steady sound level. Periodic short-term noise level increases can occur during plant startup or shutdown, during load transitions, or during opening of steam relief valves to vent pressure.

Project operational phase noise levels for the PHPP were calculated using the CadnaA noise model, based on the equipment noise emissions data in Table 5.8-13 and the planned layout of facilities on the Project site. The acoustical model is based on standard hemispherical free-field propagation algorithms and assumes absorptive ground attenuation.

Onsite noise levels at locations in close proximity to the combustion turbines are anticipated to be above 85 dBA. The proposed Project will be required to implement administrative procedures and hearing protection measures to ensure compliance with OSHA requirements for workplace hearing protection. With the required hearing protection program, onsite Project operations noise impacts would be less than significant.

Offsite noise level contours for the operational phase of the Project were developed using the CadnaA noise model. As shown in Figure 5.8-3, the projected operational Leq(1) noise level is less than 65 dBA before reaching the Project plant site boundaries. Areas within the 45 dBA Leq(1) noise contour may experience a 10 decibel increase in ambient noise during the quietest nighttime hours. These areas fall within industrial or airport land uses and would not be considered significantly impacted for this reason. At the nearest residential area, one mile north of E Ave M, the projected operational Leq(1) is 35 dBA..

As shown in Figure 5.8-4, the projected operational CNEL noise level is less than 65 dBA before reaching the Project plant site boundaries. At the nearest residential area, one mile north of E Ave M, the projected operational CNEL is less than 45 dBA. This is below the existing CNEL (based upon and below the local noise criteria for residential areas. Thus, the projected noise contours would diminish to the point of being indistinguishable from ambient levels before reaching any of the offsite noise sensitive or residential receptors. Project operations noise impacts would be less than significant.

The operation phase noise levels calculated for R1 through R11 are presented in Table 5.8-14. There are no residential structures that would experience more than a 5 dBA increase over existing nighttime L(90) (based on measurement results at location M1 presented in Table 5.8-8).

Table 5.8-13 PHPP Equipment Noise Emissions

Equipment Description	Sound Power Level									
	Octave Band Center Frequency, Hz									dBA
	32.5	63	125	250	500	1000	2000	4000	8000	
Inlet Ducting	100	99	93	91	80	73	80	53	27	87
Inlet Filter Face	107	110	103	99	95	93	91	84	75	99
Accessory	104	107	101	98	97	97	99	93	87	103
Inlet Plenum	89	92	89	91	90	91	100	90	79	102
Turbine Compartment	111	113	107	106	103	101	106	102	97	110
Exhaust Diffuser with barrier	113	112	106	100	95	88	86	82	77	98
Load Compartment	106	108	108	103	98	96	99	96	89	105
Generator	105	105	104	101	103	102	101	96	87	107
Turbine compartment vent fans	102	102	110	101	98	95	94	98	95	104
Steam Turbine	112	112	108	107	106	101	96	94	93	107
Steam Generator	106	106	105	102	104	103	102	97	88	108
HRSG Inlet	111	116	114	107	93	91	84	67	50	102
HRSG Body	106	111	109	101	87	85	76	59	42	97
Stack Breakout	102	109	105	97	81	73	52	40	35	92
Stack Exit	105	95	85	75	66.2	59	54.8	52	46.1	74
Transformers	105	108	108	105	102	98	95	92	84	104
Cooling Tower Sides	102	105	105	102	103	102	102	100	94	95
Cooling Tower Ends	92	95	95	91	91	90	89	85	78	108
Cooling Tower Top	105	108	108	104	104	104	104	100	94	110
Boiler Feed Pumps	92	97	99	99	101	94	91	93	88	102
Condensate Pumps	88	93	95	96	97	90	87	89	84	98
Gas Metering	30	30	50	65	85	85	85	80	70	90

Table 5.8-14 PHPP Operation Phase Noise Levels at Nearest Residential Structures

Receiver #	Address	Leq(1)	CNEL
R1	42057 5th St E, Lancaster, CA 93535	38.4	45.0
R2	42104 6th St E, Lancaster, CA 93535 - Measurement Location 1	40.2	46.8
R3	42056 7th St E, Lancaster, CA 93535	41.7	48.3
R4	42155 8th St E, Lancaster, CA 93535	40.7	47.3
R5	42206 8th St E, Lancaster, CA 93535	40.6	47.3
R6	42021 4th St E, Lancaster, CA 93535	36.6	43.3
R7	42324 8th St E, Lancaster, CA 93535	39.6	46.2
R8	42257 8th St E, Lancaster, CA 93535	38.6	45.2
R9	42307 7th St E, Lancaster, CA 93535	36.7	43.3
R10	42306 7th St E, Lancaster, CA 93535	37.2	43.8
R11	Lancaster Adult Day Health Care Center	38.1	44.7

Switchyards

The onsite switchyard for the PHPP is located on the eastern end of the plant. The noise from the transformers in the switchyard were included in the plant noise model and the noise contours and modeling results discussed above include the noise contribution from the noise sources in the switchyard. Projected switchyard noise would be less than significant.

Linear Facilities

Operation of Project gas or water pipelines will produce no audible noise. Audible noise from electrical transmission lines are related to corona effects; (corona is the ionization of the air at the surface of the energized electrical conductor and suspension hardware stemming from the high electrical field strength at the conductor surface). Corona-generated audible noise from transmission lines is generally characterized as a crackling or hissing noise.

Although conductors are designed to minimize corona discharges, surface irregularities caused by damage, insects, raindrops or airborne contaminants may locally enhance the electric field strength sufficiently high for corona discharges to occur. The noise level generated by corona from overhead power lines is affected by various parameters such as:

- Atmospheric conditions,
- Line length,
- Height above ground,
- Size of conductors and their configuration,
- Type of connection,
- Bundle conductor composition,

- Voltage gradient, and
- Ground resistance.

Modern transmission lines are designed, constructed, and maintained so that during dry conditions they will operate below the corona inception voltage, meaning that the line will generate a minimum of corona-related noise. The corona hum typically would produce noise levels ranging up to 30 dBA, measured at the edge of the transmission line ROW during dry conditions. A noise level of 30 dBA would be practically unnoticeable and easily masked by other ambient noises. Corona levels (and audible noise levels) are highest during heavy rain when the conductors are wet, but the noise generated by the rain likely would be greater than the noise generated by the corona, and thus the increased corona-related noise would not be noticeable. Thus, no significant noise impacts would be expected from Project linear facilities during operation.

5.8.3.4 Cumulative Impacts

There are four cumulative projects that have been identified within three miles of the PHPP which include a mix of residential, commercial, medical and industrial uses, as described in Section 5.1. The closest of these, the Fairway Business Park, is approximately 1.3 miles from the PHPP and is being developed to attract large-scale industrial users. Given the distances between the other projects and the PHPP site, as well as the fact that the cumulative projects will be subject to local noise ordinances, no significant cumulative noise impacts would be expected.

5.8.4 Mitigation Measures

5.8.4.1 Construction

The following mitigation measures will be implemented to reduce noise emissions and ensure that Project construction and operation noise impacts are less than significant.

NOISE-1 Warning signs will be posted in high noise areas and a hearing protection program will be implemented for work areas where noise levels exceed 85 dBA.

NOISE-2 Heavy construction equipment operation and other noisy construction work will be restricted to 6:00 a.m. to 6:00 p.m. Relatively quieter activities would be permitted during evening and nighttime periods. This restriction would not apply to periods where a continuous pour may be required. In this event the local authorities will be contacted and a special permit obtained for that period.

NOISE-3 High pressure steam blows will utilize a temporary silencer that will quiet the steam blows to no more than 92 dBA measured 50 ft from the silencer at a height of five ft.

5.8.4.2 Operation

NOISE-4 During Project operations, all noise control equipment will be maintained in good working order in accordance with manufacturers' specifications.

NOISE-5 Warning signs will be posted in high noise areas and a hearing protection program will be implemented for work areas where noise levels exceed 85 dBA.

NOISE-6 Incorporate into the final design/procurement of Project facilities and equipment noise attenuation measures that ensure compliance with the noise emission values shown in Table 5.8-13.

5.8.5 References

CadnaA Noise Model, 2005. Datakustik GmbH. Grifenberg, Germany.

State of California, 2003 General Plan Guidelines, Governor's Office of Planning and Research, October.

City of Palmdale, 1993. City of Palmdale General Plan. Noise Element. Adopted January 25.

Occupational Safety & Health Administration, 2007. 29 Code of Federal Regulations, Subpart H, Section 1910.95, Occupational Noise Exposure.

Los Angeles County Airport Land Use Commission, 2003. Airport Influence Area, http://planning.co.la.ca.us/doc/aluc/ALUC_Palmdale.pdf. May 13

City of Lancaster, 2007. City of Lancaster 2030 General Plan. Noise Element. Public Review Draft April 30.

Map Location

Legend

- Plant Site
- Power Block
- Noise Contour Line

1 inch equals 1.5 mile

0 0.75 1.5 3 Miles

Source: AICUZ Study 2002

Palmdale Hybrid Power Project

Figure 5.8-1

CNEL Noise Contours
Air Force Plant 42

PALMDALE
a place to call home

Inland Energy, Inc.

ENSR | AECOM

Project: 10855-002
Date: July 2008

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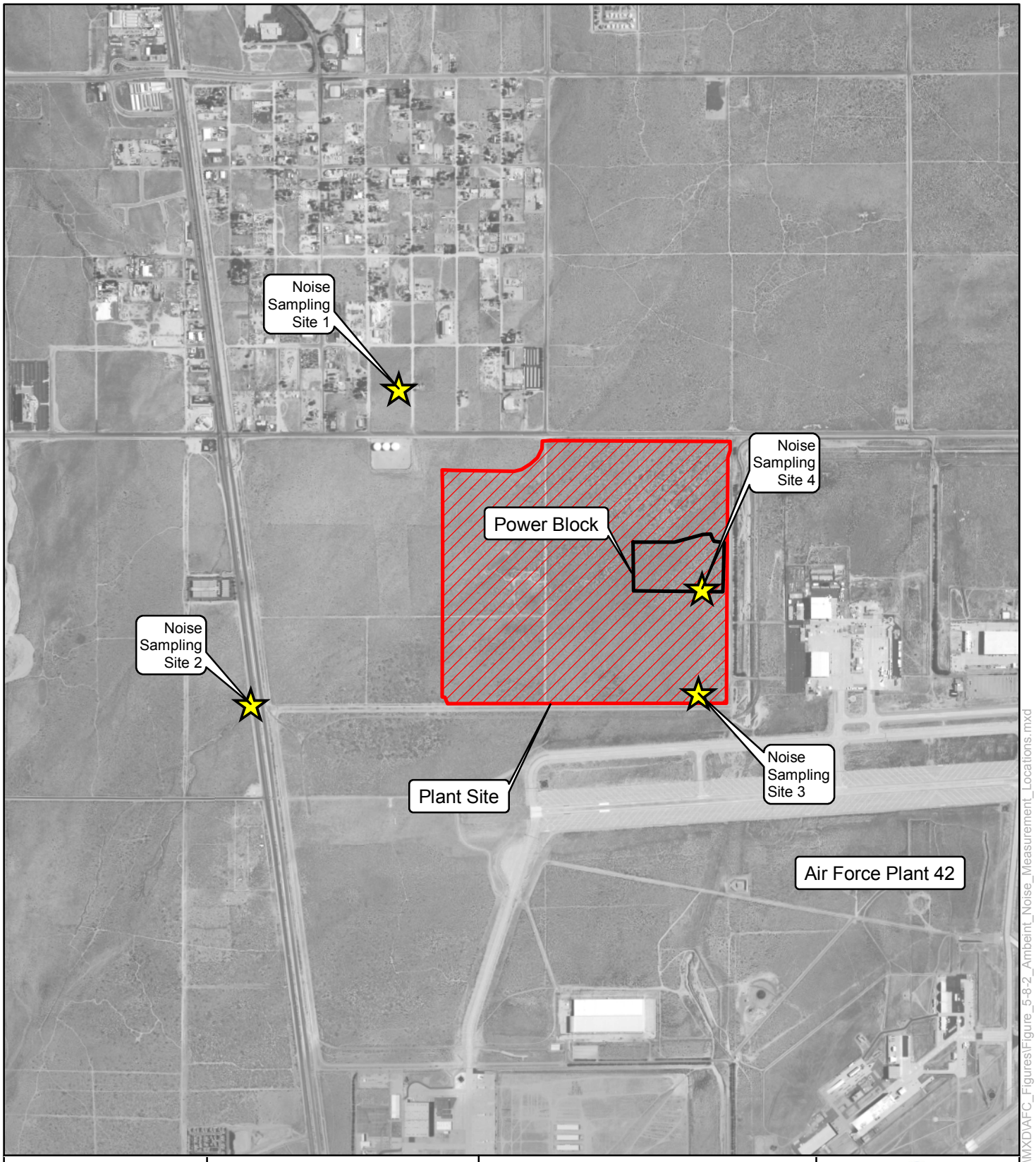

Map Location

Legend

- Plant Site
- Power Block
- Noise Sampling Sites

N W E S

Source: Acentech Inc.

Palmdale Hybrid Power Project

Figure 5.8-2

Ambient Noise Measurement Locations

1:24,000

1 inch equals 2,000 feet

0 1,000 2,000 4,000 Feet

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Inland Energy, Inc.

ENSR | AECOM

Project: 10855-002
Date: July 2008

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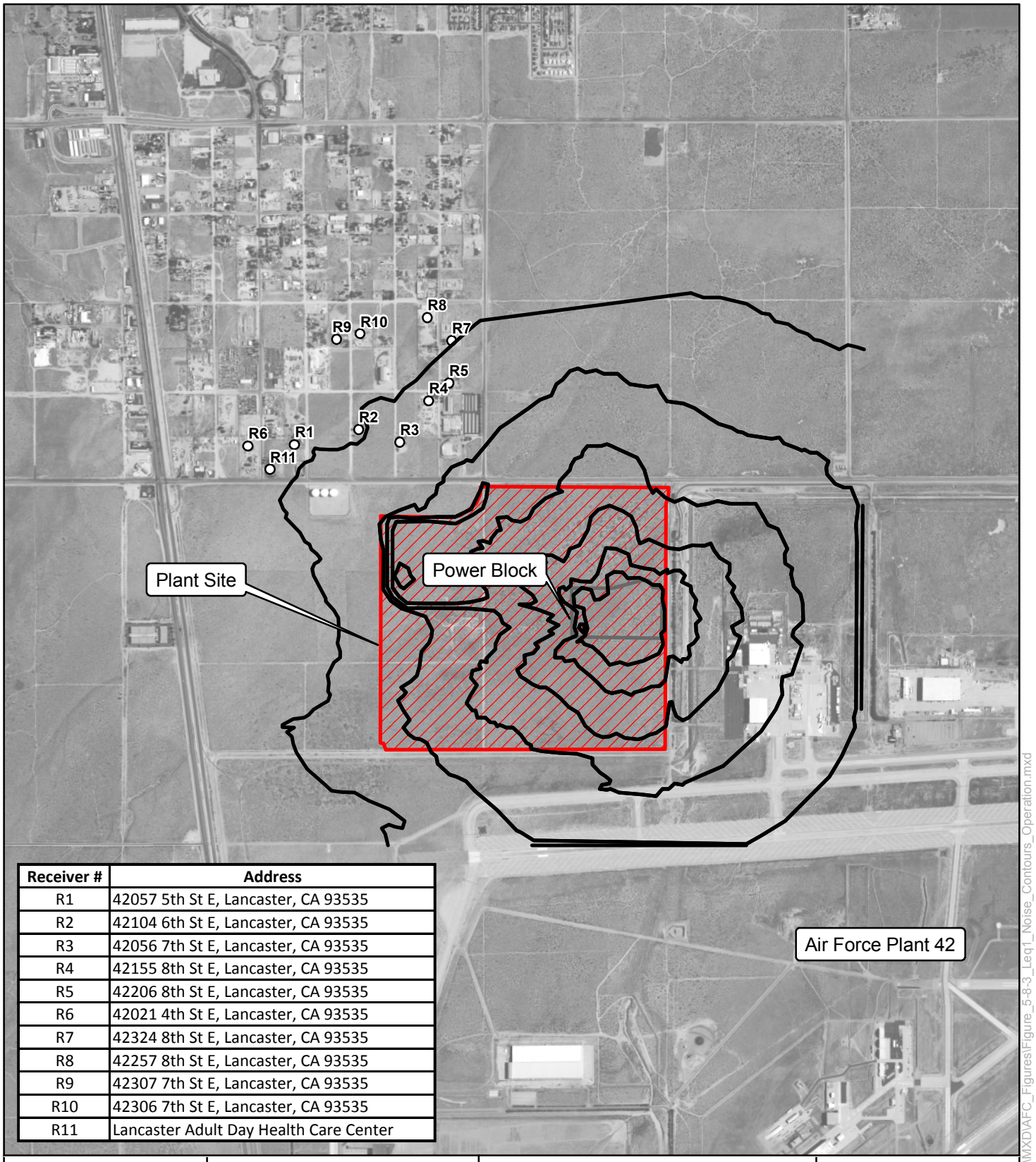

Receiver #	Address
R1	42057 5th St E, Lancaster, CA 93535
R2	42104 6th St E, Lancaster, CA 93535
R3	42056 7th St E, Lancaster, CA 93535
R4	42155 8th St E, Lancaster, CA 93535
R5	42206 8th St E, Lancaster, CA 93535
R6	42021 4th St E, Lancaster, CA 93535
R7	42324 8th St E, Lancaster, CA 93535
R8	42257 8th St E, Lancaster, CA 93535
R9	42307 7th St E, Lancaster, CA 93535
R10	42306 7th St E, Lancaster, CA 93535
R11	Lancaster Adult Day Health Care Center

Map Location

Legend

- Plant Site
- Power Block
- Noise Receiver
- Noise Contour

N W E S

Source: Acentech Inc.

Palmdale Hybrid Power Project

Figure 5.8-3

Leq(1) Noise Contours - PHPP Operation

1:24,000

1 inch equals 2,000 feet

0 1,000 2,000 4,000 Feet

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Project: 10855-002
Date: July 2008

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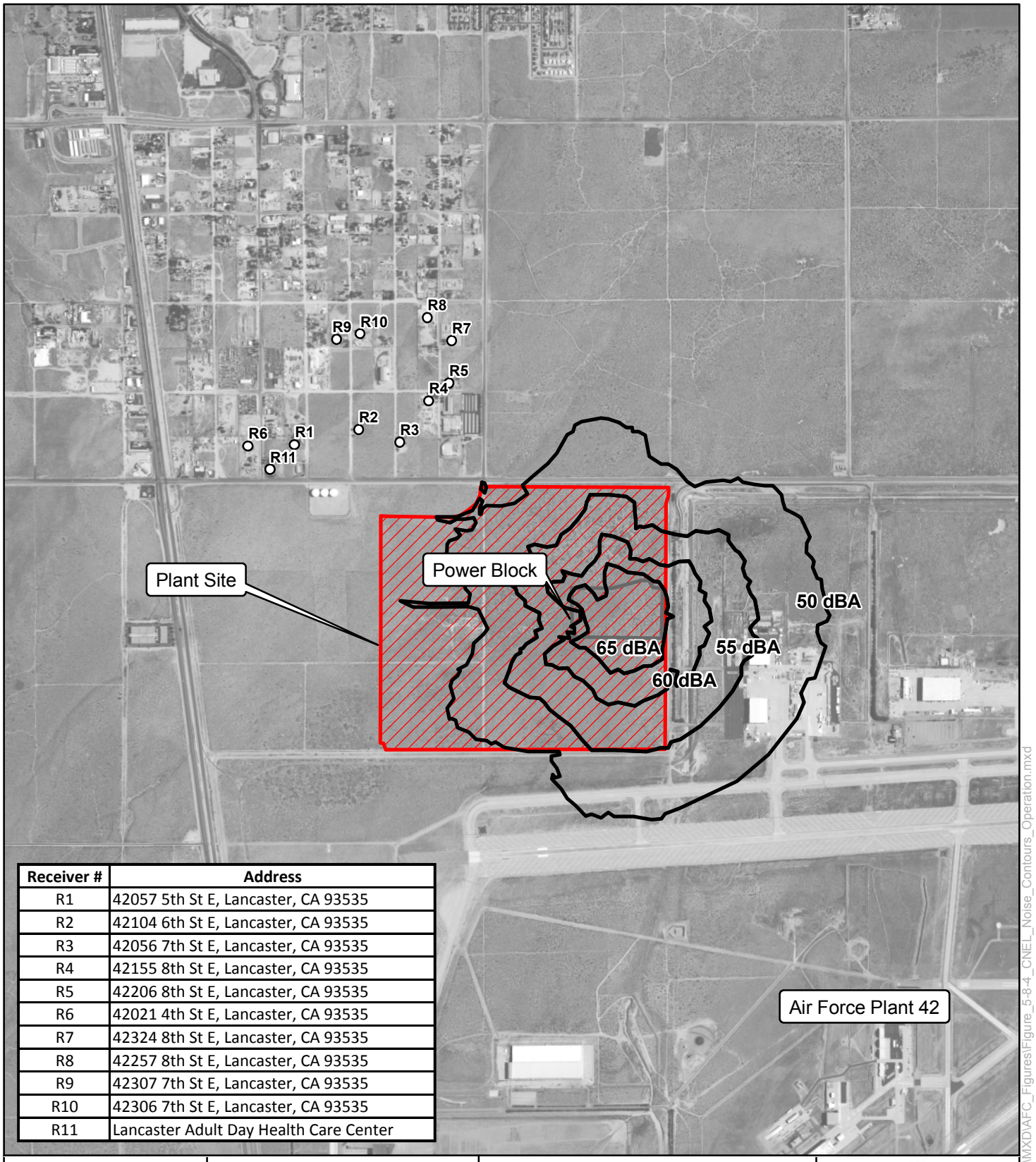

Receiver #	Address
R1	42057 5th St E, Lancaster, CA 93535
R2	42104 6th St E, Lancaster, CA 93535
R3	42056 7th St E, Lancaster, CA 93535
R4	42155 8th St E, Lancaster, CA 93535
R5	42206 8th St E, Lancaster, CA 93535
R6	42021 4th St E, Lancaster, CA 93535
R7	42324 8th St E, Lancaster, CA 93535
R8	42257 8th St E, Lancaster, CA 93535
R9	42307 7th St E, Lancaster, CA 93535
R10	42306 7th St E, Lancaster, CA 93535
R11	Lancaster Adult Day Health Care Center

Map Location

Legend

- Plant Site
- Power Block
- Noise Receiver
- Noise Contour

N W E S

Source: Acentech Inc.

Palmdale Hybrid Power Project

Figure 5.8-4

CNEL Noise Contours - PHPP Operation

1:24,000

1 inch equals 2,000 feet

0 1,000 2,000 4,000 Feet

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Project: 10855-002
Date: July 2008

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