## 5.12 NOISE

In accordance with California Energy Commission (CEC) regulations, this section describes the existing noise environment in the vicinity of the Bullard Energy Center (BEC), and assesses potential noise impacts associated with the project. Specifically, the assessment consisted of: (1) identifying all sensitive receptors that may be affected by noise, as well as all applicable laws, ordinances, regulations, and standards (LORS) that regulate noise emissions at those receptors; (2) monitoring existing noise levels at sensitive noise receptors potentially affected by noise; (3) predicting facility noise levels at these receptors using three-dimensional computer modeling techniques; (4) comparing projected facility emissions to local and state performance standards for the control of noise and (5) incorporating noise controls into the design of the facility in order to meet all state and local requirements.

In summary, results of the evaluation showed that noise produced during operation of the facility, given the proposed acoustical design of the project, would wholly conform to limits established by the City of Fresno 2025 General Plan (GP), the City of Fresno 2025 Noise Element, the City of Fresno Noise Ordinance and with siting standards promulgated by the CEC.

### 5.12.1 Affected Environment

#### *5.12.1.1 Fundamentals of Acoustics*

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that interferes with or disrupts normal activities. Most environments can generally be characterized by a relatively constant level of noise that is discernable when all temporary or varying noises such as bird songs, car pass-bys, or aircraft flyovers, cease. This level is referred to as the ambient or background noise level. 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, sensitivity of the individual, perceived importance of the noise and its appropriateness in the setting, time of day and type of activity during which the noise occurs.

Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound's pitch and is measured in cycles per second, or Hertz (Hz), whereas intensity describes the sound's loudness and is measured in decibels (dB). The minimum change detectable by human hearing is about 3 dB and the average person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness.

#### *Sound Level Meters*

Noise is measured using a standardized instrument called the "sound level meter." All sound level meters are equipped with small microphones that detect minute changes in atmospheric pressure caused by the mechanical vibration of air molecules. Healthy human hearing can detect pressures as low as 0.00002 Pascals (threshold of hearing) to as high as 20 Pascals (threshold of

pain).[1] Since this represents an enormous dynamic range (one million to one) sound pressures are instead reported using a logarithmic scale, which compresses the numbers to keep them more manageable. Once converted, they are referred to as sound pressure levels, followed by "decibels" (abbreviated as dB) as the unit of measure. On a logarithmic scale, the threshold of hearing and threshold of pain become 0 dB and 120 dB, respectively. Because of the logarithmic nature of the dB unit, sound levels cannot be arithmetically added or subtracted and are somewhat cumbersome to handle mathematically. However, a simple-to-use "rule-of-thumb" for handling logarithmic addition has been provided in Appendix M, Noise Measurements (see Logarithmic Operations).

### *A-Weighted Levels*

Noise can be measured using various "apparent" scales, similar to reporting temperature in terms of either wind chill or heat index, or reporting humidity in terms of dewpoint. The latter are better indicators of perceived cold, warmth or dampness, respectively. Similarly, sound level measurements are often reported using the "A-weighting" scale of a sound level meter. A-weighting slightly boosts high frequency sound, while reducing low frequency levels (similar to the way stereo bass and treble controls work) providing a better indicator of perceived loudness at relatively modest volumes. These sound level measurements are called A-weighted levels and are reported in units of decibels, "A" scale (dBA). Figure 5.12-1, Typical Sound Pressure Levels, illustrates ranges of A-weighted levels for common noise sources.

### *Frequency Analysis*

To further approximate the response of human hearing, sound level meters are often equipped with octave band filters. As shown in Table 5.12-1, Octave Band Filter Frequency Ranges, octave band filters divide our audible range of sound into nine separate "frequency-bins" much like a prism separates white-light into bands of different color or wavelengths. Imagining a piano with only nine keys to represent the full range of sound is a good analogy. Sound levels are sometimes measured using one-third octave band filters. As the name implies, one-third octave band filters divide octaves into three additional "bins" for greater resolution. This analogous piano would have 27 "keys" representing the full musical scale.

[1] As pounds are a measure of weight, Pascals are a measure of pressure, equivalent to about 0.02 pounds per square foot (lbs/ft$^2$). A single Pascal of pressure will produce a *sound pressure level* of 94 dB.

**TABLE 5.12-1**
**OCTAVE BAND FILTER FREQUENCY RANGES**

| Octave Band Center Frequency | Frequency Range |
|---|---|
| 31.5 Hz | 22 Hz – 44 Hz |
| 63 Hz | 44 Hz – 88 Hz |
| 125 Hz | 88 Hz – 177 Hz |
| 250 Hz | 177 Hz – 355 Hz |
| 500 Hz | 355 Hz – 710 Hz |
| 1,000 Hz | 710 Hz – 1420 Hz |
| 2,000 Hz | 1420 Hz – 2840 Hz |
| 4,000 Hz | 2840 Hz – 5680 Hz |
| 8,000 Hz | 5680 Hz – 11360 Hz |

Notes:
Hz = hertz

### *Percentile Levels ($L_N$)*

Because community noise levels constantly fluctuate over time, percentile or "exceedance" measurements are used to quantify them. These measures help describe the average noise level as well as the range of highs to lows. Equally important, they allow us to separate loud, short-duration noises from quiet, constant-level background sounds. As shown in Figure 5.12-2, Percentile Sound Level Analysis:

$L_{10}$ ("L-Ten") is the level exceeded 10 percent of the time, that is, levels are higher than this value only 10 percent of the measurement time. The $L_{10}$ typically represents the loudest and shortest duration noise events occurring in the environment, such as car and truck pass-bys.

$L_{50}$ ("L-Fifty") is the sound level exceeded 50 percent of the time. Levels will be above and below this value exactly one-half of the measurement time, and therefore the $L_{50}$ is sometimes referred to as the "median" sound level.

$L_{90}$ ("L-Ninety") is the sound level exceeded 90 percent of the time and is often called the "background" sound level. Ninety percent of the time, measured levels are higher than this value, and therefore the $L_{90}$ represents the environment at its quietest periods.

### *Equivalent Energy Level ($L_{EQ}$)*

Noise levels may also be reported in terms of "equivalent energy levels" ($L_{EQ}$). An $L_{EQ}$ is a hypothetical number that is "equivalent" in energy to the actual fluctuating noise for any given measurement period. As shown in Figure 5.12-2, Percentile Sound Level Analysis, a noise level of 50 dBA ($L_{EQ}$) for a period of 1-minute is equivalent in energy to the fluctuating noise level for the same period, produced by the car and truck passes, which range in level from less than 30 dBA to more than 60 dBA. The $L_{EQ}$ typically falls between the $L_{10}$ and $L_{50}$ and is the "base"

metric used to establish other measures of environmental noise, such as the Day-Night Level ($L_{DN}$) or the Community Noise Equivalent Level (CNEL).

### *Day-Night Level ($L_{DN}$)*

Another metric used to assess community noise is the $L_{DN}$. The $L_{DN}$ represents a 24-hour measurement of sound within a community, and is calculated by adding a 10-dB "penalty" to noises that occur between 10:00 p.m. and 7:00 a.m. This approach considers the potential for increased annoyance when people are resting, relaxing and sleeping. The $L_{DN}$ is the preferred metric of federal bureaus such as the Department of Housing and Urban Development and the U.S. Environmental Protection Agency (USEPA), as well as of City of Fresno land use planning agencies (through their Noise Element of the General Plan).

### *Community Noise Equivalent Level (CNEL)*

Similar to $L_{DN}$, the CNEL is an adjusted average A-weighted sound level for a 24-hour day. It is calculated by adding a 5-dB adjustment to sound levels during evening hours (7:00 p.m. to 10:00 p.m.) and a 10-dB adjustment to sound levels during nighttime hours (10:00 p.m. to 7:00 a.m.). These adjustments compensate for the increased sensitivity to noise during the typically quieter evening and nighttime hours.

### *Sound Power Levels and Sound Pressure Levels*

Sound power level (PWL) is a single number that describes the amount of sound energy radiated by a piece of equipment, independent of the surroundings or environment. Sound PWL allows one piece of equipment to be directly compared with another, and then source-ranked to determine which should be attenuated first.

Sound PWL is analogous to the wattage of a light bulb, whereas sound level is analogous to brightness. Sound power is independent of the environment; sound pressure is dependent on the environment. When a 75-watt light bulb is placed in a room painted white or black, it still radiates the same amount of energy. However, the apparent brightness of the light bulb does not remain the same; it changes as the environment changes. In the room painted white, many reflections are causing the apparent brightness of the bulb to increase, and in the room painted black, much of the light is being absorbed, so the apparent brightness decreases.

For sound, a room painted white is analogous to a contemporary home with sparse furnishings and hardwood floors, i.e., little absorbing material and many reflections. A room painted black is analogous to a colonial home with overstuffed chairs, carpets and paintings on the wall, i.e., many absorbing materials and fewer reflections. A blender or vacuum cleaner would tend to have a higher sound pressure level in the contemporary home versus the colonial one. Similar to light bulb wattage however, the sound power level of the appliance source has not changed.

For the most part, no meter "directly" measures sound power. Instead, it is calculated from sound level measurements corrected for reflections, distance to the source, directivity, etc. Sound intensity meters can be used to determine the in-situ sound intensity level of a source (power/unit area). Since these meters measure sound level and the direction that the sound comes from, they inherently account for reflections and other environmental factors. An adjustment for distance or area is then applied to the levels, to derive the sound PWL of the equipment.

### 5.12.1.2 Existing Conditions

#### Site Description

The site is located between Highway 99 and North Golden State Boulevard, approximately 1-mile southeast of West Herndon Avenue in northwest Fresno, California as shown in Figures 5.12-3, Site Area Map – USGS, and 5.12-4, Site Area Map – Aerial Photo. Surrounding land uses include industrial operations abutting the property to the north and south, and roadways to the east and west, with residential neighborhoods beyond that. There are three large neighborhoods and one single residence within approximately 0.5 mile from the center of the site, with the nearest neighborhood (Carnegie Avenue) being within about 1,200 feet east of site center, and situated across Highway 99. Many of the more recently developed residential neighborhoods adjacent to either North Golden State Boulevard or Highway 99 are shielded from traffic noise by 12-foot high masonry walls running along the perimeter of the neighborhoods.

#### Ambient Noise Level Survey

An ambient noise level survey was conducted on August 9 to 11, 2006, to characterize the acoustic environment at sensitive receptors. Specifically, noise level measurements were collected to establish baseline or background levels prior to construction and operation of the facility and to characterize Noise Sensitive Areas (NSAs) that may be potentially exposed to sound level increases as a result of the project. NSAs are land uses associated with indoor and/or outdoor activities that may be subject to stress and/or significant interference from noise. NSAs often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities, houses of worship and libraries. Industrial, commercial, and agricultural land uses are generally not considered sensitive to noise. Table 5.12-2, Nearest Noise Sensitive Properties, provides a list of the six nearest noise sensitive receptors to the site. (All distances are referenced to the center of the BEC).

**TABLE 5.12-2**
**NEAREST NOISE SENSITIVE PROPERTIES**

| Receiver | Property | Description |
|---|---|---|
| 1 | Bullard Avenue Neighborhood | First row of houses off Mesa Avenue, approximately 1,600 feet east of site center. North Golden State Boulevard, at grade railroad tracks, and open field lie between site and receiver. |
| 2 | Carnegie Avenue Neighborhood | First home located on the corner of Carnegie and Morris avenues, approximately 1,200 feet east of site center. North Golden State Boulevard and at grade railroad tracks lie between site and receiver. |
| 3 | Brentwood Ranch Neighborhood | First row of homes off Ensenada Avenue, approximately 1,500 feet west of site center. Highway 99 and 12-foot tall masonry wall lie between site and receivers. |
| 4 | Market Street Neighborhood and Victory Life Church | Victory Life Church parking lot, approximately 4,700 feet south of site center. Various commercial buildings lie between site and receiver. |
| 5 | 6330 North Golden State Boulevard Residence | Isolated home at 6330 North Golden State Boulevard, approximately 3,200 feet north of site center. Various commercial buildings and open field lie between site and receiver. |
| 6 | Hampton Renaissance Neighborhood | First row of homes where Bryan Avenue dead-ends, approximately 3,700 feet northeast of site center. North Golden State Boulevard, at-grade railroad tracks, and agricultural lands lie between site and receiver. |

### *Ambient Survey Procedures*

A reconnaissance of the site was performed to identify noise-sensitive receivers such as residences, schools, churches, hospitals, and other locations potentially impacted by noise from the BEC. As described in Table 5.12-3, Noise Monitoring Locations, and shown in Figure 5.12-5, Noise Monitoring Locations, primarily residences were found, with one church within a residential area to the south and two schools beyond the residential area to the northeast.

**TABLE 5.12-3**
**NOISE MONITORING LOCATIONS**

| Location | Type of Noise Measurement | Site Description |
|---|---|---|
| S1/L1 | Short-term and Long-term | 1,600 feet east of site center, along Bullard Avenue with direct line-of-sight to BEC. |
| S2/L2 | Short-term and Long-term | 1,200 feet east of site center, along Carnegie Avenue with direct line-of-site to BEC. |
| S3/L3 | Short-term and Long-term | 1,500 feet west of site center, within partially developed Brentwood Ranch area, approximately 180 feet west of and behind 12-foot tall masonry wall. |
| S4 | Short-term | 4,700 feet south of site center, in parking lot of Victory Life Church at 5303 Market Street. Line-of-sight blocked by Church and various commercial buildings. |
| S5 | Short-term | Representative of 6330 North Golden State Boulevard Residence. Actual measurement location was 1,500 feet south of residence, but distance to primary noise source was similar. Partial line-of-sight to BEC. |
| S6 | Short-term | At dead end of Bryan Avenue near main entrance to Hampton Renaissance neighborhood. A 6-foot tall masonry wall surrounds this area. Line-of-sight broken only by agricultural plantings. |

A total of six sites were selected for noise monitoring. Of these, three had long-term monitors set up for approximately 50 continuous hours,[2] while all six were also monitored manually for short-term measurements (15-minute intervals). The short-term sites were monitored twice during daylight hours and twice during early morning hours. As shown in Figure 5.12-5, Noise Monitoring Locations, noise-monitoring locations provided adequate spatial representation of nearby NSAs.

The noise measurement set-ups were identical in that the microphone was located on a tripod, 5 feet above the ground, and the sound level meter and batteries were located directly below the tripod within a weatherproof enclosure. The tripod was connected to the enclosure for stability and each long-term set-up was chained and locked for security. The following describes the specific placement of each sound level meter. Any distance references are from the center of the BEC.

**S1/L1:** This measurement location was about 5 feet from the backyard privacy fence of the homes located off Mesa Avenue and was located within a landscaped area. The BEC was in direct line-of-sight from this location. This site was directly accessed from Bullard Avenue.

**S2/L2:** This measurement location was about 50 feet south of the Carnegie and Morris Avenue intersection. The sound level meter was located within a landscaped area, 5 feet in front of the masonry wall protecting this neighborhood. This location had a direct line-of-sight to the BEC.

[2] The CEC typically requires at least 25-hours of baseline monitoring for NSA(s). As a conservative measure, and to allow for changes in weather patterns and improved statistical certainty, 50-hours of monitoring data was collected at L1, L2 and L3.

**S3/L3:** This measurement location was adjacent to the backyard of a home off Ensenada Avenue, within the Brentwood Ranch residential development. This home (still under construction at the time of the measurement) is situated within the front row of homes to Highway 99. The specific location of the microphone was about three feet west of Ensenada Avenue and about 180 feet south of a 12-foot tall masonry noise wall next to a light pole. This location did not have a direct line-of-sight to the BEC due to the noise wall.

**S4:** This measurement location was in the parking lot of the Victory Life Church at 5303 Market Street. The sound level meter was approximately 100 feet northwest of Market Street and out in the open. There was no direct line-of-sight to the BEC due to the church and other intervening buildings.

**S5:** This measurement location was 20 feet off Bullard Avenue; about 1,300 feet southwest of North Golden State Boulevard and 1,700 feet northwest of the BEC. This location was selected to represent background levels for the home at 6330 North Golden State Boulevard (1,500 feet to the northwest of this measurement location) in that it was situated at a similar distance to the primary noise source for the area, which was Highway 99. This location, as well as the residence it represents, would both have direct line-of-sight to the BEC.

**S6:** This measurement location was approximately 50 feet further south of where Bryan Avenue dead-ends near the entrance to the Hampton Renaissance neighborhood. This measurement site was out in the open, but did not have direct line-of-sight to the BEC due to agricultural foliage.

### *Instrumentation*

All long-term sound level measurements were collected with Larson Davis Model 820 Sound Level Meters. These meters comply with Type 2 tolerance requirements of the American National Standards Institute (ANSI). All short-term sound level measurements were collected with a Larson Davis Model 824 Sound Level Meter. This meter complies with Type 1 tolerance requirements of ANSI. All meters were set to the “slow” time response and logged A-weighted $L_{EQ}$ and $L_N$ (percentile) sound levels. Microphones were placed 5 feet above the ground and mounted with windscreens. All meters were field calibrated before and after each measurement set with a Larson Davis Model CAL200 Acoustic Calibrator. A calibration laboratory qualified the equipment within a 12-month period using references traceable to the National Institute of Standards and Technology. Complete instrument specifications and calibration certificates are provided in Appendix M, Noise Measurements.

### *Monitoring Results*

Average wind conditions were below 3 miles per hour for a majority of the survey, with occasional gusts over 10 miles per hour. Daytime temperatures ranged from about 64 degrees Fahrenheit (ºF) to 100ºF, with an average relative humidity of 15 percent. Nighttime temperatures ranged from about 63ºF to 83ºF, with an average relative humidity of 50 percent. No precipitation occurred during the survey.

The primary noise source for all sites was traffic, with Highway 99 being the most dominant. Other sources included noise from the active Southern Pacific Railroad and at-grade railroad crossings. Also, existing industrial activity around the site was apparent with most emissions generated by diesel trucks. Table 5.12-4, Description of Ambient Noise at Each Measurement

Location, provides a description of the ambient noise sources observed at each measurement position.

**TABLE 5.12-4**
**DESCRIPTION OF AMBIENT NOISE AT EACH MEASUREMENT LOCATION**

| Location | Ambient Noise Description |
|---|---|
| S1/L1<br>S2/L2 | This neighborhood is very active during the daytime hours, and remains somewhat active in the early morning as well. Audible noises during the day include traffic and residential rooftop air conditioners, nearby trains, train horns, and railroad crossing warning signals. Some commercial noise was audible during both day and night. |
| S3/L3 | As this neighborhood remains under construction, daytime noises included nearby construction activities, but traffic on the other side of the wall along Highway 99 was distinctly audible. Nighttime noises were dominated by traffic along Highway 99. |
| S4 | The daytime ambient noise in this neighborhood was mostly from traffic along Highway 99 and North Golden State Boulevard, but also included some noise from adjacent industrial operations. Nighttime levels were dominated by traffic noise along Highway 99. |
| S5 | This site was dominated by traffic noise along Highway 99, with some industrial operational noise during the daytime. |
| S6 | Audible noise included Highway 99, North Golden State Boulevard as well as residential traffic during the daytime. At night, traffic noise from Highway 99 was dominant. |

Background ($L_{90}$) noise levels ranged from approximately 45 to 58 dBA, and were primarily controlled by traffic noise from Highway 99. At four of six measurement positions, background ($L_{90}$) levels were slightly higher during nighttime hours than during daytime hours. This was likely due to increased truck traffic volumes as well as to normal temperature inversions (see Footnote 6).

Table 5.12-5, L1: 25-hour Noise Measurement Results, Table 5.12-6, L2: 25-hour Noise Measurement Results, and Table 5.12-7, L3: 25-hour Noise Measurement Results, provide the long-term noise measurement results for L1, L2 and L3, respectively, for the 25-hour period exhibiting the quietest four consecutive $L_{90}$ hours of data.[3] Table 5.12-8, S1 to S6: 15-minute Noise Measurement Results, provides the short-term noise measurement results for S1 to S6. A complete set of survey measurement and weather data can be found in Appendix M, Noise Measurements.

[3] Based upon a review or more than 50 hours of data from each site. The logarithmic average of the quietest four consecutive $L_{90}$ hours is typically used by the CEC in establishing noise limits for a facility.

**TABLE 5.12-5**
**L1: 25-HOUR NOISE MEASUREMENT RESULTS (dBA)**

| Date | Start Time | Stop Time | $L_{eq}$ | $L_{min}$ | $L_{max}$ | $L_{(10)}$ | $L_{(50)}$ | $L_{(90)}$ |
|---|---|---|---|---|---|---|---|---|
| 8/10/2006 | 4:00 p.m. | 5:00 p.m. | 51 | 47.2 | 60.7 | 52.7 | 50.5 | 49 |
| 8/10/2006 | 5:00 p.m. | 6:00 p.m. | 58.2 | 48.5 | 82.1 | 58.8 | 51.7 | 50.1 |
| 8/10/2006 | 6:00 p.m. | 7:00 p.m. | 54.5 | 48.4 | 73.5 | 54.3 | 51.5 | 50 |
| 8/10/2006 | 7:00 p.m. | 8:00 p.m. | 54.1 | 48.4 | 63.9 | 56.2 | 53.6 | 51.3 |
| 8/10/2006 | 8:00 p.m. | 9:00 p.m. | 57.3 | 50.5 | 78.3 | 57.6 | 55.5 | 53.3 |
| 8/10/2006 | 9:00 p.m. | 10:00 p.m. | 55.6 | 48.9 | 68.5 | 57.2 | 55.3 | 53.2 |
| 8/10/2006 | 10:00 p.m. | 11:00 p.m. | 54.7 | 49.6 | 64.7 | 56.3 | 54.5 | 52.3 |
| 8/10/2006 | 11:00 p.m. | 12:00 a.m. | 59 | 47.1 | 83.3 | 57.3 | 54.6 | 51.7 |
| 8/11/2006 | 12:00 a.m. | 1:00 a.m. | 61.5 | 46.9 | 86.7 | 61.6 | 52.7 | 50.1 |
| 8/11/2006 | 1:00 a.m. | 2:00 a.m. | 50.7 | 44.2 | 58 | 52.4 | 50.4 | 48.4 |
| 8/11/2006 | 2:00 a.m. | 3:00 a.m. | 56.5 | 45.4 | 78.3 | 55.9 | 52.7 | 50 |
| 8/11/2006 | 3:00 a.m. | 4:00 a.m. | 60 | 47.4 | 86.4 | 57.4 | 54.2 | 51.4 |
| 8/11/2006 | 4:00 a.m. | 5:00 a.m. | 57.2 | 49.9 | 73.2 | 59 | 55.4 | 52.8 |
| 8/11/2006 | 5:00 a.m. | 6:00 a.m. | 61.2 | 52.2 | 85.7 | 58.9 | 56.8 | 55.1 |
| 8/11/2006 | 6:00 a.m. | 7:00 a.m. | 58.2 | 52.8 | 78.5 | 59 | 57.1 | 55.3 |
| 8/11/2006 | 7:00 a.m. | 8:00 a.m. | 60.2 | 50 | 83.6 | 59.8 | 56.5 | 53.9 |
| 8/11/2006 | 8:00 a.m. | 9:00 a.m. | 54.9 | 46.9 | 77.8 | 54.6 | 51.2 | 48.5 |
| **8/11/2006** | **9:00 a.m.** | **10:00 a.m.** | 51 | 42.7 | 75.9 | 51.9 | 47.3 | **44.7** |
| **8/11/2006** | **10:00 a.m.** | **11:00 a.m.** | 54.2 | 44.4 | 77.3 | 52 | 47.9 | **45.9** |
| **8/11/2006** | **11:00 a.m.** | **12:00 p.m.** | 49.9 | 42.4 | 73.9 | 50.9 | 46.2 | **44.2** |
| **8/11/2006** | **12:00 p.m.** | **1:00 p.m.** | 54.9 | 42.9 | 82.5 | 53.2 | 48.3 | **45.8** |
| 8/11/2006 | 1:00 p.m. | 2:00 p.m. | 50.5 | 44.9 | 72.7 | 51.3 | 48.6 | 46.7 |
| 8/11/2006 | 2:00 p.m. | 3:00 p.m. | 56.3 | 45.9 | 74.3 | 59.1 | 50.6 | 48.2 |
| 8/11/2006 | 3:00 p.m. | 4:00 p.m. | 51.6 | 47.4 | 70.1 | 53 | 50.9 | 49.3 |
| 8/11/2006 | 4:00 p.m. | 5:00 p.m. | 60.7 | 48.8 | 88.4 | 54.8 | 52.4 | 50.7 |

| | |
|---|---|
| **45.2** | = Quietest $L_{90}$ (average of four consecutive hours) |
| **64.7** | = $L_{DN}$ |
| **64.9** | = CNEL |

Notes:

CNEL = Community Noise Equivalent Level
dBA = decibels, "A" scale
$L_{(10)}$ = sound level exceeded 10 percent of time
$L_{(50)}$ = sound level exceeded 50 percent of time
$L_{(90)}$ = sound level exceeded 90 percent of time
$L_{DN}$ = Day-Night Level
$L_{EQ}$ = equivalent energy levels
$L_{max}$ = maximum sound level
$L_{min}$ = minimum sound level

**TABLE 5.12-6**
**L2: 25-HOUR NOISE MEASUREMENT RESULTS (dBA)**

| Date | Start Time | Stop Time | $L_{eq}$ | $L_{min}$ | $L_{max}$ | $L_{(10)}$ | $L_{(50)}$ | $L_{(90)}$ |
|---|---|---|---|---|---|---|---|---|
| 8/9/2006 | 7:00 p.m. | 8:00 p.m. | 66.6 | 49 | 92.1 | 69 | 59.5 | 53.4 |
| 8/9/2006 | 8:00 p.m. | 9:00 p.m. | 65.8 | 50.5 | 84.9 | 69.2 | 61.2 | 56.8 |
| 8/9/2006 | 9:00 p.m. | 10:00 p.m. | 64.7 | 50.9 | 82.1 | 68.3 | 60.3 | 56.3 |
| 8/9/2006 | 10:00 p.m. | 11:00 p.m. | 70.3 | 50.8 | 99.9 | 68.5 | 58.5 | 55 |
| 8/9/2006 | 11:00 p.m. | 12:00 a.m. | 61.4 | 47.9 | 81.6 | 65 | 56.4 | 52.3 |
| 8/10/2006 | 12:00 a.m. | 1:00 a.m. | 66.8 | 45.1 | 93 | 63.3 | 54.5 | 50.4 |
| 8/10/2006 | 1:00 a.m. | 2:00 a.m. | 58.4 | 45.9 | 75.7 | 60.3 | 54.3 | 50.7 |
| 8/10/2006 | 2:00 a.m. | 3:00 a.m. | 56.5 | 45.1 | 76.8 | 58.7 | 53.2 | 49.2 |
| 8/10/2006 | 3:00 a.m. | 4:00 a.m. | 60.5 | 45 | 81.7 | 61.3 | 51.6 | 48 |
| 8/10/2006 | 4:00 a.m. | 5:00 a.m. | 71 | 44 | 100.8 | 61.7 | 52.6 | 48.6 |
| 8/10/2006 | 5:00 a.m. | 6:00 a.m. | 67.4 | 49.6 | 91.3 | 70.8 | 58.7 | 52 |
| 8/10/2006 | 6:00 a.m. | 7:00 a.m. | 73.1 | 49.7 | 97.1 | 68.9 | 62.5 | 55.3 |
| 8/10/2006 | 7:00 a.m. | 8:00 a.m. | 68.2 | 49.4 | 90.5 | 70.7 | 61.9 | 55.8 |
| **8/10/2006** | **8:00 a.m.** | **9:00 a.m.** | 69.2 | 42.8 | 97.3 | 69.7 | 59.9 | **48.4** |
| **8/10/2006** | **9:00 a.m.** | **10:00 a.m.** | 62.8 | 42.2 | 82.5 | 66.7 | 56.7 | **45.2** |
| **8/10/2006** | **10:00 a.m.** | **11:00 a.m.** | 74 | 41 | 101.3 | 69.3 | 56.7 | **45.3** |
| **8/10/2006** | **11:00 a.m.** | **12:00 p.m.** | 75.5 | 43 | 101.3 | 70.1 | 58.5 | **48.5** |
| 8/10/2006 | 12:00 p.m. | 1:00 p.m. | 65.4 | 46.3 | 87.5 | 69.5 | 58.8 | 50 |
| 8/10/2006 | 1:00 p.m. | 2:00 p.m. | 64.4 | 45.5 | 89.3 | 68.2 | 57 | 48.9 |
| 8/10/2006 | 2:00 p.m. | 3:00 p.m. | 65.2 | 46.3 | 83.6 | 69.3 | 60.1 | 51.3 |
| 8/10/2006 | 3:00 p.m. | 4:00 p.m. | 70.2 | 48.1 | 95.6 | 71.1 | 63.1 | 53.5 |
| 8/10/2006 | 4:00 p.m. | 5:00 p.m. | 68.8 | 49.7 | 93.5 | 71.3 | 63.6 | 54.4 |
| 8/10/2006 | 5:00 p.m. | 6:00 p.m. | 71.9 | 50.2 | 97.3 | 71.9 | 67.3 | 57.8 |
| 8/10/2006 | 6:00 p.m. | 7:00 p.m. | 67.6 | 49.3 | 87 | 71.4 | 63 | 54.3 |
| 8/10/2006 | 7:00 p.m. | 8:00 p.m. | 66.5 | 49.6 | 89.9 | 69 | 59.9 | 54 |

| | |
|---|---|
| **47.1** | = Quietest $L_{90}$ (average of four consecutive hours) |
| **74.2** | = $L_{DN}$ |
| **74.4** | = CNEL |

Notes:

CNEL = Community Noise Equivalent Level
dBA = decibels, "A" scale
$L_{(10)}$ = sound level exceeded 10 percent of time
$L_{(50)}$ = sound level exceeded 50 percent of time
$L_{(90)}$ = sound level exceeded 90 percent of time
$L_{DN}$ = Day-Night Level
$L_{EQ}$ = equivalent energy levels
$L_{max}$ = maximum sound level
$L_{min}$ = minimum sound level

**TABLE 5.12-7**
**L3: 25-HOUR NOISE MEASUREMENT RESULTS (dBA)**

| Date | Start Time | Stop Time | $L_{eq}$ | $L_{min}$ | $L_{max}$ | $L_{(10)}$ | $L_{(50)}$ | $L_{(90)}$ |
|---|---|---|---|---|---|---|---|---|
| 8/10/2006 | 12:00 p.m. | 1:00 p.m. | 51.4 | 42.5 | 67.3 | 53.7 | 49.4 | 46.4 |
| 8/10/2006 | 1:00 p.m. | 2:00 p.m. | 57.6 | 42.8 | 66.3 | 61.4 | 53.5 | 47.6 |
| 8/10/2006 | 2:00 p.m. | 3:00 p.m. | 62.8 | 50 | 69 | 65.6 | 62.9 | 53.5 |
| 8/10/2006 | 3:00 p.m. | 4:00 p.m. | 58.1 | 44.9 | 72.9 | 63.3 | 53.8 | 49.2 |
| 8/10/2006 | 4:00 p.m. | 5:00 p.m. | 53.6 | 49.5 | 63 | 55.5 | 53.1 | 51.3 |
| 8/10/2006 | 5:00 p.m. | 6:00 p.m. | 54.8 | 45.5 | 74.5 | 56.1 | 53.3 | 50.3 |
| 8/10/2006 | 6:00 p.m. | 7:00 p.m. | 53.2 | 45.8 | 62.8 | 55.4 | 52.5 | 49.7 |
| 8/10/2006 | 7:00 p.m. | 8:00 p.m. | 52.2 | 44.9 | 60.7 | 54.2 | 51.7 | 49.1 |
| 8/10/2006 | 8:00 p.m. | 9:00 p.m. | 53.9 | 46 | 78.1 | 55.2 | 52.4 | 49.4 |
| 8/10/2006 | 9:00 p.m. | 10:00 p.m. | 53.8 | 45.5 | 62.7 | 56 | 53.3 | 50.5 |
| 8/10/2006 | 10:00 p.m. | 11:00 p.m. | 53.7 | 45.9 | 61.2 | 56 | 53.3 | 50.1 |
| 8/10/2006 | 11:00 p.m. | 12:00 a.m. | 55.9 | 46.1 | 72.2 | 58.6 | 54.9 | 51.1 |
| **8/11/2006** | **12:00 a.m.** | **1:00 a.m.** | 53.6 | 43.2 | 69.6 | 56.4 | 52.5 | **48.5** |
| **8/11/2006** | **1:00 a.m.** | **2:00 a.m.** | 51.5 | 41.7 | 60.4 | 54.7 | 50.5 | **45.6** |
| **8/11/2006** | **2:00 a.m.** | **3:00 a.m.** | 51.3 | 41.1 | 59.9 | 54 | 50.4 | **46.5** |
| **8/11/2006** | **3:00 a.m.** | **4:00 a.m.** | 54.6 | 42.6 | 69.6 | 57.5 | 53.5 | **49** |
| 8/11/2006 | 4:00 a.m. | 5:00 a.m. | 54.3 | 45.2 | 64.1 | 57.1 | 53.2 | 49.9 |
| 8/11/2006 | 5:00 a.m. | 6:00 a.m. | 56 | 46.9 | 63.7 | 58.2 | 55.6 | 53.1 |
| 8/11/2006 | 6:00 a.m. | 7:00 a.m. | 57.2 | 51.8 | 67.7 | 59.2 | 56.6 | 54.6 |
| 8/11/2006 | 7:00 a.m. | 8:00 a.m. | 61.2 | 51.3 | 87.3 | 60.4 | 57.2 | 54.9 |
| 8/11/2006 | 8:00 a.m. | 9:00 a.m. | 66.1 | 49.6 | 82.5 | 69.9 | 60.1 | 53.6 |
| 8/11/2006 | 9:00 a.m. | 10:00 a.m. | 61.8 | 48.9 | 79.7 | 60.9 | 56.6 | 53.8 |
| 8/11/2006 | 10:00 a.m. | 11:00 a.m. | 68.3 | 47.4 | 86.3 | 71.5 | 58.6 | 53.8 |
| 8/11/2006 | 11:00 a.m. | 12:00 p.m. | 76 | 45.9 | 95.7 | 79.9 | 70.5 | 52.5 |
| 8/11/2006 | 12:00 p.m. | 1:00 p.m. | 62.1 | 42.9 | 83.4 | 62.9 | 51.9 | 48.1 |

| | |
|---|---|
| **47.6** | = Quietest $L_{90}$ (average of four consecutive hours) |
| **65.6** | = $L_{DN}$ |
| **65.7** | = CNEL |

Notes:

CNEL = Community Noise Equivalent Level
dBA = decibels, "A" scale
$L_{(10)}$ = sound level exceeded 10 percent of time
$L_{(50)}$ = sound level exceeded 50 percent of time
$L_{(90)}$ = sound level exceeded 90 percent of time
$L_{DN}$ = Day-Night Level
$L_{EQ}$ = equivalent energy levels
$L_{max}$ = maximum sound level
$L_{min}$ = minimum sound level

**TABLE 5.12-8**
**S1 TO S6: 15-MINUTE NOISE MEASUREMENT RESULTS (dBA)**

| Location | Day/Night | Date | Time | $L_{eq}$ | $L_{min}$ | $L_{max}$ | $L_{(10)}$ | $L_{(50)}$ | $L_{(90)}$ |
|---|---|---|---|---|---|---|---|---|---|
| S1 | Night | 8/10/2006 | 3:38 a.m. | 54.1 | 48.5 | 68.4 | 55.4 | 52.1 | 50.1 |
| S1 | Night | 8/11/2006 | 2:39 a.m. | 52.2 | 46.2 | 60 | 54.0 | 51.8 | 49.4 |
| S1 | Day | 8/10/2006 | 3:26 p.m. | 50.1 | 46.3 | 67.4 | 51.0 | 48.9 | 47.3 |
| S1 | Day | 8/11/2006 | 2:05 p.m. | 50.7 | 46 | 66.3 | 51.6 | 48.8 | 47.1 |
| S2 | Night | 8/10/2006 | 3:18 a.m. | 55.7 | 47.9 | 74.6 | 55.7 | 51.0 | 49.2 |
| S2 | Night | 8/11/2006 | 2:20 a.m. | 67.4 | 50.6 | 88.8 | 72.0 | 55.7 | 52.5 |
| S2 | Day | 8/10/2006 | 3:08 p.m. | 73.9 | 49.3 | 96.5 | 72.0 | 64.4 | 54.3 |
| S2 | Day | 8/11/2006 | 1:45 p.m. | 64 | 49.3 | 77.9 | 68.6 | 57.1 | 50.9 |
| S3 | Night | 8/10/2006 | 2:06 a.m. | 53.3 | 45.9 | 58.7 | 55.5 | 53.1 | 49.6 |
| S3 | Night | 8/11/2006 | 1:10 a.m. | 52.9 | 45.4 | 60.3 | 55.8 | 52.0 | 47.4 |
| S3 | Day | 8/10/2006 | 1:51 p.m. | 55.1 | 47.8 | 64.4 | 57.0 | 54.7 | 51.2 |
| S3 | Day | 8/11/2006 | 12:35 p.m. | 64 | 47.4 | 83 | 65.4 | 52.6 | 48.9 |
| S4 | Night | 8/10/2006 | 1:37 a.m. | 55.2 | 49.7 | 59.4 | 57.3 | 54.9 | 52.4 |
| S4 | Night | 8/11/2006 | 12:47 a.m. | 54.6 | 47.5 | 66.6 | 57.9 | 52.6 | 50.3 |
| S4 | Day | 8/10/2006 | 1:14 p.m. | 49 | 46.1 | 55.3 | 50.5 | 48.8 | 47.2 |
| S4 | Day | 8/11/2006 | 12:10 p.m. | 53 | 49 | 63.7 | 54.8 | 52.0 | 50.2 |
| S5 | Night | 8/10/2006 | 2:58 a.m. | 58.3 | 51.1 | 65.1 | 61.4 | 57.2 | 53.4 |
| S5 | Night | 8/11/2006 | 2:01 a.m. | 59.5 | 51.5 | 64.7 | 62.0 | 59.0 | 55.0 |
| S5 | Day | 8/10/2006 | 2:47 p.m. | 56.9 | 53.1 | 61.4 | 58.7 | 56.7 | 54.7 |
| S5 | Day | 8/11/2006 | 1:25 p.m. | 61.5 | 55.8 | 76.7 | 63.0 | 60.3 | 57.5 |
| S6 | Night | 8/10/2006 | 2:35 a.m. | 52.9 | 48.5 | 56.8 | 54.7 | 52.7 | 50.6 |
| S6 | Night | 8/11/2006 | 1:37 a.m. | 49.5 | 46.3 | 54.3 | 51.1 | 49.2 | 47.5 |
| S6 | Day | 8/10/2006 | 2:22 p.m. | 47.5 | 44.6 | 61.2 | 49.0 | 46.7 | 45.4 |
| S6 | Day | 8/11/2006 | 1:02 p.m. | 51.7 | 46.7 | 63.2 | 53.6 | 49.8 | 47.6 |

Notes:
dBA = decibels, "A" scale
$L_{(10)}$ = sound level exceeded 10 percent of time
$L_{(50)}$ = sound level exceeded 50 percent of time
$L_{(90)}$ = sound level exceeded 90 percent of time
$L_{EQ}$ = equivalent energy levels
$L_{max}$ = maximum sound level
$L_{min}$ = minimum sound level

### *5.12.1.3 Local Land Use and Noise Sources*

Surrounding land uses include industrial operations abutting the property to the north and south, and roadways to the east and west with residential neighborhoods beyond that. Noise sources include roadway traffic, with Highway 99 being the most dominant source. Other sources include noise from the active Southern Pacific Railroad and at-grade railroad crossings. Also, existing industrial activity around the site is apparent, with most noise produced by diesel trucks.

### *5.12.1.4 Noise Level Design Goals*

Following the California Environmental Quality Act (CEQA) guidelines (California Code of Regulations [CCR], Title 14, Appendix G, Section XI), the project would cause a significant impact if operations resulted in:

- Exposure of people to noise levels in excess of standards established in the local General Plan or noise ordinance.
- Exposure of people to excessive ground-borne noise levels or vibration.
- Substantial permanent increase in ambient noise levels in the project vicinity.
- Substantial temporary or periodic increase in ambient noise levels in the project vicinity.

In accordance with CEQA guidelines, the noise level design goal for the BEC was established such that noise produced during operation of the plant would comply with the most stringent LORS applicable to the project (see Section 5.2.4, Mitigation Measures – Emissions Offsets). Specifically, the 2025 City of Fresno General Plan; the 2025 City of Fresno General Plan Noise Element; the City of Fresno Noise Ordinance, and CEC siting standards were each reviewed in order to establish noise level design goals for the BEC. The level of allowable BEC noise for each standard is calculated and presented in the following section. Note that for the latter three performance standards, the amount of noise permitted during BEC operations is based upon the level of existing noise present in the community.

### *2025 City of Fresno General Plan*

The General Plan provides a blueprint of how the city anticipates directing and managing growth while minimizing potential impacts for existing and future generations. As discussed in the GP, an exterior noise level of up to 60 dBA CNEL is compatible with residential land uses. Similarly, an exterior noise level of up to 75 dBA CNEL is compatible with industrial land uses. Because of the weighting and averaging nature of the CNEL, a noise source that operates 24 hours/day, such as the BEC may, produces a CNEL approximately 8 dBA higher than its hourly $L_{EQ}$ (i.e., the preferred metric for stating BEC noise emissions). As such, facility emissions resulting in exterior noise levels up to 52 dBA, (60 dBA – 8 dBA) at residential land uses and up to 67 dBA, (75 dBA – 8 dBA) at industrial land uses, as summarized in Table 5.12-9, Fresno 2025 General Plan – Allowable Facility Noise Emissions, are considered acceptable.

**TABLE 5.12-9**
**FRESNO 2025 GENERAL PLAN - ALLOWABLE FACILITY NOISE EMISSIONS**

| Location | Land Use | Normally Acceptable Exterior CNEL for Compatible Land Use | Normally Acceptable Exterior $L_{EQ}$ for Compatible Land Use (CNEL minus 8) |
|---|---|---|---|
| L1 | Residential | 60 | 52 |
| L2 | Residential | 60 | 52 |
| L3 | Residential | 60 | 52 |
| L4 | Residential | 60 | 52 |
| L5 | Residential | 60 | 52 |
| L6 | Residential | 60 | 52 |
| Industrial Property Line | Industrial | 75 | 67 |

CNEL = community noise level equivalent

### *2025 City of Fresno General Plan Noise Element*

As discussed in Policy H-1-b of the Noise Element from the General Plan:

For purposes of city analyses of noise impacts, and for determining appropriate noise mitigation, a significant increase in ambient noise levels is assumed if the project causes ambient noise levels to exceed the following:

- The ambient noise level is less than 60 dB $L_{DN}$ and the project increases noise levels by 5 dB or more.
- The ambient noise level is 60-65 dB $L_{DN}$ and the project increases noise levels by 3 dB or more.
- The ambient noise level is greater than 65 dB $L_{DN}$ and the project increases noise levels by 1.5 dB or more.

Table 5.12-10, Fresno 2025 Noise Element – Policy H-1-b Allowable Facility Noise Emissions, presents the allowable level of facility noise permitted under Policy H-1-b, based upon ambient noise level measurements collected at each of the sensitive areas. Complete $L_{DN}$ calculations can be found in Appendix M, Noise Measurements. As shown, the allowable facility-only noise level ($L_{EQ}$) varies from 53 to 64 dBA.

**TABLE 5.12-10**
**FRESNO 2025 NOISE ELEMENT - POLICY H-1-b**
**ALLOWABLE FACILITY NOISE EMISSIONS**

| Location | Lowest Ambient Sound Level ($L_{DN}$) (A) | Policy H-1-b Allowable Ambient Increase ($L_{DN}$) (B) | Allowable Future Ambient During Facility Operation ($L_{DN}$) (C = A + B) | Allowable Facility-Only $L_{DN}$ Level ($L_{DN}$) (D = C – A) Log Subtraction | Allowable Facility-Only $L_{EQ}$ Level ($L_{EQ}$) (E = D - 7) |
|---|---|---|---|---|---|
| L1 | 65 | 3 | 68 | 65 | **58** |
| L2 | 75 | 1.5 | 76.5 | 71 | **64** |
| L3 | 63 | 3 | 66 | 63 | **56** |
| L4 | 61 | 3 | 64 | 61 | **54** |
| L5 | 64 | 3 | 67 | 64 | **57** |
| L6 | 56 | 5 | 61 | 60 | **53** |

Notes:
Ambient sound level = lowest measured $L_{DN}$ for L1, L2 and L3, based on more than 50-hours of monitoring data.
For L4, L5 and L6, where only periodic, rather than continuous monitoring was conducted, the lowest daytime $L_{EQ}$ and lowest nighttime $L_{EQ}$ were used to calculate an $L_{DN}$ for evaluation purposes.
$L_{DN}$ = day-night level
$L_{EQ}$ = equivalent energy levels

Policy H-1-l of the Noise Element further states:

> *"Noise created by new proposed stationary noise sources or existing stationary noise sources which undergo modifications that may increase noise levels shall be mitigated so as not to exceed the noise level standards of 50 dBA (hourly $L_{EQ}$) during daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA (hourly $L_{EQ}$) during nighttime hours (10:00 p.m. to 7:00 a.m.) at noise sensitive land uses. When ambient noise levels exceed or equal the levels in the table, mitigation shall only be required to limit source noise levels to ambient plus 5 dB."*

Table 5.12-11, Fresno 2025 Noise Element – Policy H-1-1 Allowable Facility Noise Emissions, presents the allowable level of facility-only noise emissions permitted under Policy H-1-l, based upon ambient noise level measurements collected at sensitive areas. Complete calculations can be found in Appendix M, Noise Measurements. As shown, the allowable facility-only noise level ($L_{EQ}$) varies from 50 to 62 dBA.

**TABLE 5.12-11**
**FRESNO 2025 NOISE ELEMENT – POLICY H-1-l**
**ALLOWABLE FACILITY NOISE EMISSIONS ($L_{EQ}$)**

| Location | Lowest Daytime Ambient Sound Level ($L_{EQ}$) | Daytime Allowable Facility-Only Noise Level ($L_{EQ}$) | Lowest Nighttime Ambient Sound Level ($L_{EQ}$) | Nighttime Allowable Facility-Only Noise Level ($L_{EQ}$) | Most Restrictive Limit ($L_{EQ}$) |
|---|---|---|---|---|---|
| L1 | 49 | **50** | 51 | **56** | **50** |
| L2 | 43 | **50** | 57 | **62** | **50** |
| L3 | 51 | **56** | 51 | **56** | **56** |
| L4 | 49 | **50** | 55 | **61** | **50** |
| L5 | 57 | **62** | 58 | **63** | **62** |
| L6 | 48 | **53** | 50 | **55** | **53** |

Notes:
Ambient sound level = lowest measured daytime (7:00 a.m. to 10:00 p.m.) or lowest measured nighttime (10:00 p.m. to 7:00 a.m.) $L_{EQ}$ noise level.
$L_{EQ}$ = equivalent energy levels

Also, see Section 5.9, Land Use, for additional discussion on compliance with this policy.

### *City of Fresno Noise Ordinance*

The City of Fresno Noise Ordinance limits facility emissions such that increases to existing ambient levels at receiver property lines do not exceed 5 dB or more. If measured ambient noise levels are lower than the levels given in Table 5.12-12, City of Fresno Noise Ordinance Minimum Ambient Noise Levels, for a corresponding time period and receiver land use, then the sound level provided in the ordinance is deemed to be the ambient noise level at that location for the given time period. Table 5.12-13, City of Fresno Noise Ordinance Allowable Facility Noise Emissions, presents the allowable level of facility-only noise emissions permitted under the noise ordinance, based upon ambient noise level measurements collected.

**TABLE 5.12-12**
**CITY OF FRESNO NOISE ORDINANCE MINIMUM AMBIENT NOISE LEVELS**

| District | Time | Minimum Ambient Noise Level (dBA) |
|---|---|---|
| Residential | 10:00 p.m. to 7:00 a.m. | 50 |
| Residential | 7:00 p.m. to 10:00 p.m. | 55 |
| Residential | 7:00 a.m. to 7:00 p.m. | 60 |
| Commercial | 10:00 p.m. to 7:00 a.m. | 60 |
| Commercial | 7:00 a.m. to 10:00 p.m. | 65 |
| Industrial | Anytime | 70 |

Source: City of Fresno. 1972. Municipal Code and Charter; Section 8-302(b).
Notes:
dBA = decibels, “A” scale

**TABLE 5.12-13**
**CITY OF FRESNO NOISE ORDINANCE ALLOWABLE FACILITY NOISE EMISSIONS**

| Location | Ambient Sound Level | Minimum Ambient Condition | Allowable Facility Level (Ambient + 5) |
|---|---|---|---|
| L1 | 40 | 50 | **55** |
| L2 | 33 | 50 | **55** |
| L3 | 41 | 50 | **55** |
| L4 | 46 | 50 | **55** |
| L5 | 51 | 50 | **56** |
| L6 | 51 | 50 | **55** |
| Industrial Property Lines | 49 | 70 | **75** |

Notes:
Ambient sound level = the minimum ($L_{MIN}$) or lowest ambient level recorded in a single hour. This is typically the quietest 1-second period during the measurement. (The industrial receiver property line ambient was estimated from data collected at L1 and L3).

In addition, construction activities causing "discomfort or annoyance to any reasonable person of normal sensitiveness" would be restricted between the hours of 10:00 p.m. and 7:00 a.m., and on Sundays.

### *California Energy Commission*

Under CEC siting requirements, new-source noise impacts at residential receptors are evaluated by comparing projected facility noise emissions to pre-existing background noise levels as well as to specific local performance standards. The CEC defines an area as negligibly impacted where operations potentially increase noise levels by 5 dBA or less over existing ambient background noise levels. The CEC typically defines the ambient background noise level as the lowest four-consecutive hour logarithmic-average $L_{90}$ at a 25-hour measurement site, and the lowest $L_{90}$ at a short-term measurement site. Table 5.12-14, CEC Allowable Facility Noise Emissions, presents the allowable facility-only noise emissions based upon ambient increases of not more than 5 dBA. As shown, facility noise limits range from 49 to 57 dBA.

**TABLE 5.12-14**
**CEC ALLOWABLE FACILITY NOISE EMISSIONS ($L_{EQ}$)**

| Location | Ambient Noise Level | Allowable Facility-Only Noise Level | Allowable Future Ambient Noise Level During Facility Operation | Increase to Ambient Noise Level |
|---|---|---|---|---|
| L1 | 45 | **49** | 50 | 5 |
| L2 | 47 | **51** | 52 | 5 |
| L3 | 48 | **51** | 53 | 5 |
| L4 | 50 | **54** | 55 | 5 |

**TABLE 5.12-14**
**CEC ALLOWABLE FACILITY NOISE EMISSIONS ($L_{EQ}$)**

| Location | Ambient Noise Level | Allowable Facility-Only Noise Level | Allowable Future Ambient Noise Level During Facility Operation | Increase to Ambient Noise Level |
|---|---|---|---|---|
| L5 | 53 | **57** | 58 | 5 |
| L6 | 45 | **49** | 50 | 5 |

Notes:
Ambient noise level = lowest measured four-consecutive hour logarithmic average $L_{90}$ (See Tables 5.12-5, L1: 25-hour Noise Measurement Results, 5.12-6, L2: 25-hour Noise Measurement Results, and 5.12-7, L3: 25-hour Noise Measurement Results). Since long-term monitoring was not conducted at locations L4, L5 and L6, the lowest measured $L_{90}$ ambient level was used for evaluation purposes. Future Ambient = Ambient + Facility-Only Noise.
CEC = California Energy Commission
LEQ = equivalent energy levels

The CEC also considers construction noise as typically insignificant if:

- The construction activity is temporary.
- Use of heavy equipment and noisy activities is limited to daytime hours.
- All feasible noise abatement measures are implemented for noise-producing equipment.

### *Performance Standards Summary*

Table 5.12-15, Summary of Facility Noise Emission Limits, compares facility noise limits for all applicable standards. The design basis for noise control is the minimum, or most stringent limit established by any of the applicable LORS. As shown, the most restrictive limits for noise sensitive receptors range from 49 to 52 dBA $L_{EQ}$, and are driven by either CEC or GP performance standards. Moreover, the most restrictive noise limit for property lines that abut industrial land uses is 67 dBA LEQ, driven by the City of Fresno General Plan. These limits serve as the noise control design goals for the facility, and insure that no significant impact results from operation of the project.

**TABLE 5.12-15**
**SUMMARY OF FACILITY NOISE EMISSION LIMITS ($L_{EQ}$)**

| Location | Applicable LORS (All values are $L_{EQ}$ Equivalents) | | | | | |
|---|---|---|---|---|---|---|
| | Fresno 2025 General Plan Table 5.12-9 | Fresno 2025 Noise Element Policy H-1-b Table 5.12-10 | Fresno 2025 Noise Element Policy H-1-l Table 5.12-11 | Fresno Local Ordinance Table 5.12-13 | CEC Regulations Table 5.12-14 | Most Restrictive Limit - Noise Control Design Goal |
| L1 | 52 | 58 | 50 | 55 | 49 | **49/CEC** |
| L2 | 52 | 64 | 50 | 55 | 51 | **51/CEC** |
| L3 | 52 | 56 | 56 | 55 | 51 | **51/CEC** |
| L4 | 52 | 54 | 50 | 55 | 54 | **52/GP** |
| L5 | 52 | 57 | 62 | 56 | 57 | **52/GP** |

**TABLE 5.12-15**
**SUMMARY OF FACILITY NOISE EMISSION LIMITS ($L_{EQ}$)**

| Location | Applicable LORS (All values are $L_{EQ}$ Equivalents) | | | | | |
|---|---|---|---|---|---|---|
| | Fresno 2025 General Plan Table 5.12-9 | Fresno 2025 Noise Element Policy H-1-b Table 5.12-10 | Fresno 2025 Noise Element Policy H-1-l Table 5.12-11 | Fresno Local Ordinance Table 5.12-13 | CEC Regulations Table 5.12-14 | Most Restrictive Limit - Noise Control Design Goal |
| L6 | 52 | 53 | 53 | 55 | 49 | **49/CEC** |
| Industrial Property Line | 67 | N/A | N/A | 75 | N/A | **67/GP** |

Notes:
CEC = California Energy Commission
GP = General Plan
$L_{EQ}$ = equivalent energy levels
LORS = laws, ordinances, regulations, and standards
N/A = not applicable

### *5.12.1.5 Acoustical Modeling of Operational Noise*

In order to evaluate the expected noise emissions of the facility and identify the need for sound attenuation measures, a three-dimensional, computer-generated acoustical model was developed using SoundPlan® 6.3, based on site plan and general arrangement drawings provided by Bibb and Associates, Inc. (see Figure 5.12-6, Conceptual General Arrangements). A-weighted emissions of all major noise sources were considered, and the BEC was conservatively assumed to operate 24-hours/day.

Sound PWLs presented in Table 5.12-16, Equipment Sound Power Levels, for all major pieces of equipment were estimated using octave band data from manufacturers, in-house data, and data from industry-standard prediction algorithms.[4] (Sound PWLs provide a convenient means to describe the total amount of noise radiated by a piece of equipment).

**TABLE 5.12-16**
**EQUIPMENT SOUND POWER LEVELS**

| Noise Source | Sound Power Level (dB) at Octave Band Center Frequency (Hz) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | A-Wt |
| Air Compressor Skid | 96 | 103 | 101 | 101 | 98 | 97 | 96 | 95 | 91 | 103 |
| Ammonia Forwarding Pumps | 91 | 102 | 96 | 96 | 93 | 92 | 91 | 90 | 86 | 98 |
| Ammonia Injection Skid | 91 | 102 | 96 | 96 | 93 | 92 | 91 | 90 | 86 | 98 |
| Ammonia Vaporizer | 91 | 102 | 96 | 96 | 93 | 92 | 91 | 90 | 86 | 98 |
| Auxiliary Transformer | 86 | 92 | 94 | 89 | 89 | 83 | 78 | 73 | 66 | 89 |
| Circulating Water Pumps | 96 | 103 | 101 | 101 | 98 | 97 | 96 | 95 | 91 | 103 |
| Cooling Tower (per cell) | 108 | 109 | 108 | 106 | 103 | 101 | 96 | 96 | 95 | 106 |

[4] *Electric Power Plant Environmental Noise Guide*, Edison Electric Institute, N.Y., N.Y.

**TABLE 5.12-16**
**EQUIPMENT SOUND POWER LEVELS**

| | Sound Power Level (dB) at Octave Band Center Frequency (Hz) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Noise Source** | **31.5** | **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | **8000** | **A-Wt** |
| Auxiliary Skid | 96 | 103 | 101 | 101 | 98 | 97 | 96 | 95 | 91 | 103 |
| Cooling/Purge Air Fans | 48 | 87 | 101 | 93 | 93 | 92 | 82 | 77 | 79 | 95 |
| Air Inlet Filter House | 108 | 106 | 101 | 91 | 71 | 66 | 77 | 90 | 90 | 94 |
| Generator Enclosure Walls | 107 | 106 | 106 | 94 | 89 | 90 | 86 | 77 | 77 | 95 |
| Generator Exhaust Silencer, Damper & Exit | 111 | 103 | 108 | 96 | 81 | 78 | 77 | 75 | 76 | 94 |
| Generator Vent Fan Motor & Shell Surfaces | 102 | 102 | 102 | 91 | 78 | 73 | 71 | 68 | 65 | 88 |
| Turbine Enclosure Walls | 111 | 108 | 104 | 98 | 94 | 87 | 88 | 90 | 86 | 98 |
| Turbine Vent Fan Discharge | 103 | 105 | 98 | 96 | 84 | 85 | 86 | 83 | 76 | 93 |
| Turbine Vent Fan Shell, Motor & Silencer Shell | 101 | 98 | 99 | 99 | 91 | 89 | 84 | 85 | 80 | 96 |
| Step-Up Transformer | 96 | 102 | 104 | 99 | 99 | 93 | 88 | 82 | 76 | 99 |
| Demineralized Water Pumps | 91 | 102 | 96 | 96 | 93 | 92 | 91 | 90 | 86 | 98 |
| Fire Water Pump Building | 102 | 105 | 99 | 93 | 79 | 70 | 63 | 57 | 56 | 88 |
| Fuel Gas Compressor Enclosure | 105 | 108 | 102 | 96 | 82 | 73 | 66 | 60 | 59 | 91 |
| Fuel Gas Compressor After Cooler | 100 | 100 | 99 | 96 | 91 | 89 | 83 | 77 | 71 | 94 |
| Fuel Gas Regulator Skid | - | - | - | 78 | 80 | 85 | 95 | 93 | 85 | 99 |
| Raw Water Pumps | 91 | 102 | 96 | 96 | 93 | 92 | 91 | 90 | 86 | 98 |
| Rooftop Ventilation Fans | 95 | 95 | 91 | 87 | 84 | 82 | 80 | 76 | 76 | 88 |
| Selective Catalytic Reduction Unit | 116 | 104 | 103 | 104 | 99 | 90 | 87 | 84 | 65 | 100 |
| Wastewater Forwarding Pumps | 91 | 102 | 96 | 96 | 93 | 92 | 91 | 90 | 86 | 98 |
| Turbine Exhaust Duct Casing | 114 | 113 | 105 | 99 | 94 | 89 | 84 | 80 | 75 | 97 |
| Turbine Exhaust Stack (Mitigated)[5] | 127 | 122 | 119 | 114 | 108 | 102 | 104 | 112 | 106 | 116 |

Notes:
dB = decibel(s)
Hz = hertz
wt = weighted

Equipment PWLs were adjusted for the reduction of sound by distance (geometrical spreading); the molecular absorption of sound by air (air absorption); and the absorption and reflection of sound by the ground (ground effect). Sound PWLs were further modified by the effects of shielding, (i.e., tanks, buildings, equipment, etc.) and by changes in source levels with direction (directivity) to estimate on-site and off-site noise levels.

[5] Mitigated levels necessary to achieve noise level design goals for the Facility.

### *Modeling Parameters*

Acoustical modeling is based on International Standardization Organization (ISO) 9613-2, "Attenuation of Sound during Propagation Outdoors" adopted by the ISO in 1996. This standard provides a widely accepted engineering method for the calculation of outdoor environmental noise levels from sources of known sound emission. The following sections briefly describe the conditions under which the predictions are considered valid.

#### Meteorology

The absorption (attenuation) of sound by air is strongly dependent on frequency, temperature and relative humidity, but only weakly on atmospheric pressure. In general, low temperatures and low humidity increase high-frequency sound absorption, thereby reducing far-field noise levels. For this analysis, mean annual atmospheric conditions near the project site for the period of record from 1961 through 1990 were obtained from the National Climatic Data Center (NCDC). Specifically, mean annual temperature, relative humidity and barometric pressure values used in the analysis were 63°F, 70 percent relative humidity, and 1,017 millibars (mbars), respectively.

ISO 9613 is designed to estimate far-field noise levels under favorable sound-propagation conditions, (that is, when wind is blowing from the facility towards receivers, at a speed roughly between 2 and 11 miles per hour, when measured at a height of 10 to 36 feet above the ground) or under well-developed temperature inversions, which commonly occur on clear, calm nights.[6] For other weather conditions, such as during crosswind or upwind situations, or for ground based temperature lapses (see Footnote 6), observed noise levels would generally be less than predicted.

#### Ground Effect

Noise level predictions are largely dependent on both the type and extent of "ground" condition assumed for site and receiver areas. Areas of ground at the project site were modeled as "hard" or completely reflective, which is typical of paving, concrete, tamped ground, water, and other ground surfaces commonly found at industrial sites. Ground areas near receivers were assumed to be 50 percent absorptive, which is characterized as semi-porous.

#### Reflections

For complex installations with a large number of buildings and obstacles, reflected energy components can be considerable. Therefore, the number of reflections for the model was conservatively set at two. This means that two reflections from buildings and obstacles were allowed for individual acoustic rays.

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[6] Temperature inversions typically develop during calm, cloudless nights, when the sun is no longer heating the ground. As a result, air near the ground begins to cool, forming a thicker and thicker "blanket" as the evening progresses. In practical terms, this means that temperature is ***increasing*** with elevation (i.e., the air is actually warmer at higher elevations, as compared to near the ground), and hence the term "temperature inversion." The effect of temperature inversion on sound propagation is to "bend" sound waves back towards the ground, producing near worse-case noise levels at a receiver. In contrast, "temperature lapse" commonly develops during calm, cloudless ***daytime*** periods, when the sun is heating the ground, which in turn produces a warm layer of air next to the ground, as opposed to at higher elevations. This means that temperature ***decreases*** with elevation, causing sound waves to bend upwards and reducing noise levels observed at a far-field observer.

### Acoustical Modeling of Construction Noise

Construction of the BEC is expected to be typical of other power plants in terms of schedule and equipment used. The noise level will vary during the construction period, depending upon the construction phase. Construction of power plants can generally be divided into five phases that use different types of construction equipment. The five phases are: (1) site preparation and excavation, (2) concrete pouring, (3) steel erection, (4) mechanical equipment installation, and (5) clean-up (Miller et al. 1978).

Both the USEPA Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have extensively studied noise from individual pieces of construction equipment as well as from power plant construction sites (USEPA 1971; Barnes et al. 1976). Since specific information on types, quantities, and operating schedules of construction equipment is not available at this point in project development, information from these documents for similarly sized industrial projects was used. Use of this data, which is between 21 and 26 years old, is considered conservative since the evolution of construction equipment has been toward quieter designs to protect operators from exposure to high noise levels.

An acoustical model of construction operations and equipment was developed using SoundPLAN® Version 6.3 and industry standard algorithms to predict noise levels at NSAs.[7] Noise levels of typical equipment that may be employed during the construction process are given in Table 5.12-17, Typical Noise Emission Levels for Construction Equipment (BBN 1977). Equivalent energy levels ($L_{EQ}$) were estimated for each of five major construction phases, including: (1) grading and excavation, (2) concrete pouring, (3) steel erection, (4) equipment installation, and (5) finishing and clean-up. Adjustments for hemispherical divergence, atmospheric absorption and ground effect were included. A similar model was created for estimating the cumulative effects of multiple construction projects (see Section 5.12.2.3, Cumulative Impacts, for further details).

**TABLE 5.12-17**
**TYPICAL NOISE EMISSION LEVELS FOR CONSTRUCTION EQUIPMENT**

| Equipment Item | Noise Level at 50 feet (dBA) | Equipment Item | Noise Level at 50 feet (dBA) |
|---|---|---|---|
| Air Compressors | 76 – 89 | Generators (Portable) | 71 – 87 |
| Backhoes | 81 – 90 | Jackhammers | 69 – 85 |
| Concrete Pumps | 74 – 84 | Pile Drivers | 81 – 107 |
| Concrete Vibrators | 68 – 81 | Pumps | 68 – 80 |
| Cranes (Derrick) | 79 – 86 | Steel Rollers | 75 – 82 |
| Cranes (Mobile) | 80 – 85 | Shovels | 77 – 90 |
| Dozers | 77 – 90 | Trucks | 81 – 87 |

[7] Power Plant Construction Noise Guide, Bolt Beranek and Newman, Inc., May 1977.

**TABLE 5.12-17**
**TYPICAL NOISE EMISSION LEVELS FOR CONSTRUCTION EQUIPMENT**

| Equipment Item | Noise Level at 50 feet (dBA) | Equipment Item | Noise Level at 50 feet (dBA) |
|---|---|---|---|
| Front-End Loaders | 77 – 90 | Vibratory Conveyors | 70 – 80 |
| Graders | 79 – 89 | Welders | 66 – 75 |

Source: Power Plant Construction Noise Guide, Bolt Beranek and Newman, Inc., May 1997.
Notes:
dBA = decibel(s), "A" scale

## 5.12.2 Environmental Consequences

Noise would be produced during construction of the project as well as during operation of the combustion turbines and auxiliary support equipment. Potential noise impacts from both activities are assessed in this section. To determine the significance of project-generated increases in noise levels, significance criteria were used. Impacts were considered significant if:

- Project operation would conflict with the City of Fresno Noise Ordinance.
- Project operation would conflict with the 2025 City of Fresno General Plan.
- Project operation would conflict with the 2025 City of Fresno Noise Element.
- Project operation would result in an increase of more than 5 dBA at Noise Sensitive Areas, (as per CEC performance standards).
- Project construction was not temporary.
- Use of heavy construction equipment and noisy activities was not limited to daytime hours.
- Use of all feasible construction noise abatement measures were not implemented.

### *5.12.2.1 Plant Site Noise*

#### *Construction Noise*

Like most major projects, construction of the BEC will result in temporary increases to ambient noise levels. The magnitude of the increases will depend on the type of construction activity; the noise levels generated by various pieces of construction equipment; the duration of the construction phase; and the distance between the noise sources and receiver.

Construction will occur over the course of daytime shifts, although it is possible that extensions of the basic workday, or moderate amounts of evening or weekend work will be required. However, construction activities associated with higher increases in ambient noise levels will typically take place only during weekday daytime hours.

Noise levels may vary widely, depending on the phase of construction and specific tasks being performed. For example, during site preparation, heavy equipment for grading, excavation and pad construction would be required, including backhoes, front-end loaders, dump trucks and concrete trucks. Alternately, on-site fabrication during the equipment installation phase would require portable generators, air compressors, welding machines, etc.

As shown in Table 5.12-18, Projected Construction Noise Levels, $L_{EQ}$ levels are predicted to range from 42 dBA to 63 dBA at nearby residential receivers. Note that noise emissions presented are those expected outdoors and that a building or home would provide significant attenuation of these levels. Specifically, noise levels within homes and dwellings would be up to 27 dBA lower (windows closed). Even in homes with open windows, indoor noise levels would be up to 17 dBA (USEPA 1974) lower than outdoor levels.

**TABLE 5.12-18**
**PROJECTED CONSTRUCTION NOISE LEVELS (dBA)**

| Location | Construction Phase | | | | |
|---|---|---|---|---|---|
| | Grading and Excavation | Concrete Pouring | Steel Erection | Equipment Installation | Finishing |
| S1/L1 | 60 | 56 | 60 | 55 | 50 |
| S2/L2 | 61 | 57 | 61 | 56 | 51 |
| S3/L3 | 63 | 59 | 63 | 58 | 53 |
| S4 | 47 | 43 | 47 | 42 | 37 |
| S5 | 59 | 55 | 59 | 54 | 49 |
| S6 | 52 | 48 | 52 | 47 | 42 |

Notes:
dBA = decibel(s), "A" scale

These projected levels would be temporary and only occur during daytime hours. Moreover, all feasible construction noise abatement measures would be implemented. Therefore, no significant impact resulting from construction noise is expected.

### *Operational Noise at Noise Sensitive Areas*

Operation of the facility involves introduction of noise-generating equipment. Overall noise levels generally depend upon the physical layout of the plant; noise emission characteristics of the equipment; numbers of individual equipment units; and noise control measures incorporated into the facility design. The following results are based upon equipment listed in Table 5.12-16, Equipment Sound Power Levels, and noise control measures consisting of combustion turbine air intake silencers, combustion turbine exhaust stack silencers, acoustical enclosures for the gas turbines and fuel gas compressors and property line acoustical barriers.

More specifically, silencers are provided within the air intake ductwork of the combustion turbines, as standard manufacturer's equipment, to reduce high-frequency compressor and turbine blade noise emissions. Similarly, an acoustical enclosure is supplied as standard equipment, to reduce casing radiated noise emissions from the combustion turbine, generator, gearing and other auxiliary support equipment. Exhaust noise will be reduced by approximately 17 dBA via the selective catalytic converter (SCR) as well as by a parallel baffle absorptive silencer placed into either the ductwork leading to the stack, or hung within the stack itself. Fuel gas compressor noise will be reduced by more than 20 dBA by housing the equipment within a metal building to reduce compressor head and casing noise emissions. Finally, as shown in Figure 5.12-7, Predicted Noise Level Contours – Off Site, three acoustical barriers providing approximately 8 dB of reduction were incorporated into the model to limit property boundary

noise emissions, including a 12-foot high by 175-foot long barrier on the western elevation of the cooling tower; a 10-foot high by 650-foot long barrier along the northern property boundary; and an 8-foot high by 130-foot long barrier around the fuel gas regulating area.

As shown in Table 5.12-19, Noise Level Compliance Assessments, given the proposed acoustical design of the BEC, predicted noise emissions at nearby sensitive areas are expected to range from 38 to 51 dBA and therefore conform to the most restrictive standards discussed in Section 5.12.1.4, Noise Level Design Goals, and Section 5.12.2, Environmental Consequences. As presented in Table 5.12-20, NSA Ambient Increases During Facility Operations, these levels would result in ambient increases of not more than 5 dBA, which is considered an insignificant impact. Predicted BEC noise levels are also presented as a series of contours in Figure 5.12-8, Predicted Noise Level Contours – On Site, and detailed modeling results can be found in Appendix M, Noise Measurements.

**TABLE 5.12-19**
**NOISE LEVEL COMPLIANCE ASSESSMENTS**

| Location | Predicted BEC Noise Level with Sound Attenuation Measures | Most Restrictive Limit Table 5.12-14, CEC Allowable Facility Noise Emissions | Complies with Most Restrictive Standard? |
|---|---|---|---|
| L1 | 46 dBA | 49 | Yes |
| L2 | 49 dBA | 51 | Yes |
| L3 | 51 dBA | 51 | Yes |
| L4 | 38 dBA | 52 | Yes |
| L5 | 47 dBA | 52 | Yes |
| L6 | 40 dBA | 49 | Yes |

Notes:
BEC = Bullard Energy Center
dBA = decibels, "A" scale

**TABLE 5.12-20**
**NSA AMBIENT INCREASES DURING FACILITY OPERATIONS**

| Location | Ambient Noise Level | Predicted BEC Noise Level with Sound Attenuation Measures | Future Predicted Ambient Noise Level | Ambient Noise Level Increase |
|---|---|---|---|---|
| L1 | 45 | 46 | 49 | **4 dBA** |
| L2 | 47 | 49 | 51 | **4 dBA** |
| L3 | 48 | 51 | 53 | **5 dBA** |
| L4 | 50 | 38 | 50 | **< 1 dBA** |
| L5 | 53 | 47 | 54 | **1 dBA** |
| L6 | 45 | 40 | 46 | **1 dBA** |

Notes:
Ambient noise level = lowest measured four-consecutive-hour logarithmic-average $L_{90}$. Since long-term monitoring was not conducted at locations L4, L5 and L6, the lowest measured ambient level was used for evaluation purposes.
Cumulative = ambient + Facility.
< = less than
BEC = Bullard Energy Center
dBA = decibels, "A" scale
NSA = noise sensitive area

### *Ground-Borne Noise Levels*

Operation of similar facilities has not resulted in ground-borne vibration impacts. The equipment that would be used in the project is well balanced and designed to produce very low vibration levels throughout the life of the project. An imbalance could contribute to ground vibration levels in the vicinity of the equipment. However, vibration-monitoring systems installed in the equipment are designed to ensure that the equipment remains balanced. Should an imbalance occur, the event would be detected and the equipment automatically shutdown.

### *Operational Noise at Adjacent Industrial Land Uses*

Figure 5.12-7, Predicted Noise Level Contours – Off Site, presents the predicted on-site noise level contours during operation of the BEC. As shown, noise levels are 67 dBA or less along the entire site boundary and therefore significantly lower than the City of Fresno's maximum allowable noise level of 75 dBA at industrial receiver land uses.[8] Moreover, levels conform to land use noise compatibility standards established in the Fresno GP (i.e., 75 dBA CNEL or 67 dBA $L_{EQ}$ for a noise source operating 24 hours/day).

### *Worker Exposure to Noise*

Occupational noise exposure of employees within the plant cannot be evaluated until the project has been constructed and employee jobs and routines determined. The project Owner will conduct an occupational noise survey to identify noise hazardous areas within the BEC. The survey will be conducted when the BEC is in full operation and by an individual qualified in accordance with Title 8, CCR, Section 5095-5100 (Article 105) and Title 29, Code of Federal Regulations (CFR), Part 1910. Signage will be posted in high-noise areas, where hearing protection will be required.

## *5.12.2.2 Non-Site Noise*

### *Pipeline Construction*

Potential noise impacts associated with gas, water or sewer transmission line routes would occur during construction activities. For the primary gas transmission line corridor, the nearest noise-sensitive receptors are approximately 50 feet from the proposed transmission line corridor, on the south side of West Bullard Avenue, one-quarter mile west of Highway 99. For water and sewer transmission lines, the nearest NSAs are approximately 780 feet from the corridor(s) and parallel to North Golden State Boulevard.

Noise levels for pipeline construction typically range from 70 to 90 dBA at 50 feet from the work area. Based on this range, levels would be approximately 70 to 90 dBA at the nearest NSAs during gas pipeline construction and approximately 45 to 65 dBA during water and sewer line construction. Sound levels may be 10 to 20 dBA less when averaged over 8 hours because of the intermittent nature of the type of activity.

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[8] As discussed in Section 12.1.4.3, of the City's Noise Ordinance a 5-dB increase to ambient levels during operation of the BEC is allowable. The Noise Ordinance also establishes a minimum ambient noise level for industrial land uses of 70 dBA. Therefore, the allowable BEC noise level is 75 dBA.

These projected levels are temporary and transitory in nature and will be mitigated to the extent feasible by sound reduction devices; limiting construction to daytime hours in accordance with local noise control laws and ordinances; and providing notice to nearby residences and businesses. Moreover, it is anticipated that only a short length of pipeline construction, (i.e., approximately 1-city block, or 500 feet out of a total of 9,500 feet) is located within 50-feet of NSAs. Although noise from pipeline construction is potentially objectionable at these close distances, operations and activities will advance on average, by 50 feet/day and therefore, levels for any single receiver will be significantly reduced within a very short duration. As such, no significant impact resulting from pipeline construction is expected.

### *5.12.2.3 Cumulative Impacts*

The project has confirmed that no industrial or commercial developments are currently planned that would significantly impact ambient levels at noise sensitive receivers in the vicinity of the site (see Cumulative Impacts Table in Appendix M, Noise Measurements).

However, the project has identified three proposed residential developments within a 1-mile radius of the BEC, whose construction activities could overlap with construction of the BEC. Specifically, a 118-unit condominium development located in the southeast corner of the intersection of North Polk and West Dante; an 80-unit multiple family residential development located in the northeast corner of the intersection of North Polk and West Palo Alto; and a 65-dwelling planned unit development located on the north side of West Bullard between North Grantland and North Bryan. As shown in Table 5.12-21, Cumulative Construction Noise Impacts, the cumulative ambient increase if all projects were constructed simultaneously, versus only constructing the BEC, is 4 dBA or less for any nearby NSA. Given that construction is temporary, noisy activities will be limited to daytime hours (BEC), and all feasible construction noise abatement measures will be implemented (BEC), no significant noise impacts resulting from simultaneous construction of projects are expected.

**TABLE 5.12-21**
**CUMULATIVE CONSTRUCTION NOISE IMPACTS (dBA)**

| Location | Construction Project | | | | | | |
|---|---|---|---|---|---|---|---|
| | BEC Worse Case | 118-Unit Condo | 80-Unit Multi-Family | 65-Unit Development | Total Noise Level for Non-BEC Projects | Total Noise Level for All Projects | Increase over BEC Project |
| S1/L1 | 60 | 53 | 48 | 46 | 55 | 61 | 1 dBA |
| S2/L2 | 61 | 51 | 46 | 45 | 53 | 62 | 1 dBA |
| S3/L3 | 63 | 45 | 42 | 50 | 52 | 63 | < 1 dBA |
| S4 | 47 | 43 | 40 | 39 | 46 | 50 | 3 dBA |
| S5 | 59 | 46 | 44 | 54 | 55 | 60 | 1 dBA |
| S6 | 52 | 49 | 47 | 50 | 53 | 56 | 4 dBA |

Notes:
< = les than
BEC = Bullard Energy Center
dBA = decibels, “A” scale

### 5.12.3 Mitigation Measures

No mitigation measures for the BEC are required, since noise levels comply with all state and local performance standards, given the acoustical design of the BEC, which includes combustion turbine generator (CTG) air intake and exhaust stack silencers; CTG acoustical enclosures; fuel gas compressor enclosures; and property line acoustical barriers.

### 5.12.4 Laws, Ordinances, Regulations, and Standards

This section describes LORS for the control of noise, as also summarized in Table 5.12-22, Noise Laws, Ordinances, Regulations, and Standards.

**TABLE 5.12-22**
**NOISE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS**

| LORS | Applicability | Section |
|---|---|---|
| **Federal** | | |
| USEPA 1974 Noise Guidelines | Guidelines for state and local governments. | Section 5.12.4.1 |
| Noise Control Act (1972) as amended by the Quiet Communities Act (1978); (42 USC 4901-4918) | Separate noise-sensitive areas are encouraged. | |
| **State** | | |
| CEC | This agency has established guidelines for noise generated during operation and construction of the project. It identifies criteria for the determination of significant impact on residential areas. | Section 5.12.4.2.1 |
| Cal/OSHA Occupational Noise Exposure Regulations (8 CCR, General Industrial Safety Orders, Article 105, Control of Noise Exposure, § 5095, et seq.) | Sets employee noise exposure limits. Equivalent to Federal OSHA standards. | Section 5.12.4.2.2 |
| California Vehicle Code | Regulates vehicle noise limits on California highways. | Section 5.12.4.2.3 |
| **Local** | | |
| County of Fresno | N/A | Section 5.12.4.3.1 |
| 2025 City of Fresno General Plan | This requirement is applicable to noise generated during operation and sets limits on the maximum level of facility noise at residential, commercial and industrial land uses. | Section 5.12.4.3.2 |
| 2025 City of Fresno Noise Element | This requirement is applicable to noise generated during operation and sets limits for increasing the ambient sound level at noise-sensitive land uses. | Section 5.12.4.3.3 |
| City of Fresno Ordinance Code, Article 3, Section 8-306 | This requirement is applicable to noise generated during operation and sets limits for increasing the ambient sound level at residential, commercial and industrial land uses. | Section 5.12.4.3.4 |

**TABLE 5.12-22**
**NOISE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS**

| LORS | Applicability | Section |
|---|---|---|
| City of Fresno Ordinance Code, Article 3, Section 8-309. | This requirement is applicable to noise generated during construction and restricts the hours of the day construction is permitted. | Section 5.12.4.3.4 |

Notes:
Cal/OSHA = California Occupational Safety and Health Administration
CEC = California Energy Commission
LORS = laws, ordinances, regulations, and standards
N/A = not applicable
USC = U.S. Code
USEPA = U.S. Environmental Protection Agency

### *5.12.4.1 Federal*

There are no noise-related federal LORS that affect this project. However, there are guidelines at the federal level that direct the consideration of a broad range of noise issues as listed below:

- National Environmental Policy Act (42 U.S. Code [USC] 4321, et seq.) (Public Law [PL]-91-190)
- Noise Control Act of 1972 (42 USC 4910)

The USEPA has not promulgated standards or regulations for environmental noise generated by power plants. However, the USEPA has published a guideline (EPA Levels Document, Report No. 556/9-74-664) containing recommendations for noise levels affecting residential land use. The agency is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues, and therefore should not be construed as standards or regulations.

### *5.12.4.2 State of California*

#### *California Energy Commission*

Under CEC siting requirements, new-source noise impacts at residential receptors are evaluated with respect to the pre-existing background noise level or specific local performance standards. The CEC typically defines an area as negligibly impacted by a project where operation potentially increases existing ambient noise levels by 5 dBA or less. The CEC defines the ambient background noise level as the lowest four-consecutive-hour logarithmic-average $L_{90}$ at a 25-hour measurement site, and the lowest $L_{90}$ at a short-term measurement site.

The CEC also considers construction noise as typically insignificant if all of the following are true:

- The construction activity is temporary.
- Use of heavy equipment and noisy activities is limited to daytime hours.
- All feasible noise abatement measures are implemented for noise-producing equipment.

### *Cal/OSHA*

Occupational exposure to noise is regulated by California Occupational Safety and Health Administration (Cal/OSHA) in Title 8, Group 15, Article 105, Sections 5095 to 5100. This standard stipulates that protection against the effects of noise exposure shall be provided when sound levels exceed 90 dBA over an 8-hour exposure period. Protection shall consist of feasible administrative or engineering controls. If such controls fail to reduce sound levels to within acceptable levels, personal protective equipment shall be provided and used to reduce exposure to the employee. Additionally, a Hearing Conservation Program must be instituted by the employers whenever employee noise exposure equals or exceeds the Action Level of an 8-hour time-weighted average (TWA) sound level of 85 dBA. The Hearing Conservation Program requirements consist of periodic area and personal noise monitoring, performance and evaluation of audiograms, provision of hearing protection, annual employee training, and record keeping.

### *California Vehicle Code*

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.

## *5.12.4.3 Local*

### *County of Fresno*

The project lies within the limits of the City of Fresno. The City has permitting and approval authority by law and is not subject to County regulations, which generally cover only unincorporated areas.

### *2025 City of Fresno General Plan*

The California State Planning Law (California Government Code Section 65302) requires all cities, counties, and entities (such as multi-city port authorities) to prepare and adopt a GP to guide community change. The GP provides a blueprint of how agencies anticipate directing and managing growth while minimizing potential impacts for existing and future generations.

As discussed in the GP, an exterior noise level of up to 60 dBA CNEL is compatible with residential land uses. Similarly, an exterior noise level of up to 75 dBA CNEL is compatible with industrial land uses. Because of the weighting and averaging nature of the CNEL, a constant noise source (i.e., one operating 24 hours/day, such as the BEC may) produces a CNEL approximately 8 dBA higher than its hourly $L_{EQ}$ (i.e., the preferred metric for stating facility noise emissions). As such, BEC emissions resulting in exterior noise levels up to 52 dBA, (60 dBA – 8 dBA) at residential land uses and up to 67 dBA, (75 dBA – 8 dBA) at industrial land uses are considered acceptable.

### *2025 City of Fresno General Plan Noise Element*

The objective of the GP is to "protect the citizens of the city from the harmful and annoying effects of exposure to excessive noise." These objectives are codified in the following Noise Element policies (see Appendix M, Noise Measurements for full text):

#### H-1-a Policy

New noise sensitive land uses impacted by existing or projected future transportation noise sources shall include mitigation measures so that resulting noise levels do not exceed the standards shown in Table 8 [of the Policy].

**TABLE 8**
**[from H-1-a Policy]**
**MAXIMUM ALLOWABLE NOISE EXPOSURE TRANSPORTATION NOISE SOURCES**

| Land Use[4] | Outdoor Activity Areas[1] $L_{DN}$ dB | Interior Spaces | |
|---|---|---|---|
| | | $L_{DN}$ dB | $L_{EQ}$ dB[2] |
| Residential | 60[3] | 45 | --- |
| Transient Lodging | 60[3] | 45 | --- |
| Hospitals, Nursing Homes | 60[3] | 45 | --- |
| Theaters, Auditoriums, Music Halls | --- | --- | 35 |
| Churches, Meeting Halls | 60[3] | --- | 45 |
| Office Buildings | --- | --- | 45 |
| Schools, Libraries, Museums | --- | --- | 45 |

[1]Where the location of outdoor activity areas is unknown or is not applicable, the exterior noise level standard shall be applied to the property line of the receiving land use.

[2]As determined for a typical worst-case hour during periods of use.

[3]Noise levels up to 65 dB $L_{DN}$ adjacent to the Burlington Northern Santa Fe and Union Pacific mainline tracks may be allowed by the project approving authority when it is determined that it is not possible to achieve 60 dB $L_{DN}$ in outdoor activity areas using a practical application of the best-available noise reduction technology, and when all feasible exterior noise reduction measures have been proposed.

[4]The Planning and Development Director, on a case-by-case basis, may designate land uses other than those shown in this table to be noise-sensitive, and may require appropriate noise mitigation measures.

#### H-1-b Policy

For purposes of City analyses of noise impacts, and for determining appropriate noise mitigation, a significant increase in ambient noise levels is assumed if the project causes ambient noise levels to exceed the following:

- The ambient noise level is less than 60 dB $L_{DN}$ and the project increases noise levels by 5 dB or more.
- The ambient noise level is 60-65 dB $L_{DN}$ and the project increases noise levels by 3 dB or more.
- The ambient noise level is greater than 65 dB $L_{DN}$ and the project increases noise levels by 1.5 dB or more.

### H-1-c Policy

The City shall review new public and private development proposals to determine conformance with the policies of this noise element.

### H-1-d Policy

The City shall require an acoustical analysis in those cases where a project potentially threatens to expose existing or proposed noise-sensitive land uses to excessive noise levels. The presumption of potentially excessive noise levels shall be based on the location of new noise-sensitive uses to known noise sources or staff's professional judgment that a potential for adverse noise impact exists. Acoustical analyses shall be required early in the review process so that noise mitigation may be included in the project design. For development not subject to environmental review, the requirements for an acoustical analysis shall be implemented prior to the issuance of building permits. The requirements for the content of an acoustical analysis are established by the Planning and Development Department in conjunction with environmental health agencies.

### H-1-e Policy

The City shall develop and employ procedures to ensure that noise mitigation measures required pursuant to an acoustical analysis are implemented in the development review and building permit processes.

### H-1-f Policy

The City shall develop and employ procedures to monitor compliance with the policies of the Noise Element after completion of projects where noise mitigation measures have been required.

### H-1-g Policy

The City shall enforce the State Noise Insulation Standards (CCR, Title 24) and Chapter 35 of the Uniform Building Code (UBC) concerning interior noise exposure for multi-family housing, hotels and motels.

### H-1-h Policy

The City shall request the California Highway patrol, the Sheriff's and Police Department to actively enforce the California Vehicle Code sections relating to adequate vehicle mufflers and modified exhaust systems, and sound systems in vehicles.

### H-1-i Policy

The City shall review and update the Noise Element and the Noise Ordinance to ensure that noise exposure information and specific polices and ordinances are consistent with changing conditions within the City and with noise control regulations or policies enacted after the adoption of this element.

### H-1-j Policy

Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated so that resulting noise levels do not exceed the adopted standards at noise-sensitive land uses.

### H-1-k Policy

New noise-sensitive land uses impacted by stationary noise sources shall include mitigation measures so that resulting noise levels do not exceed the standards show[n] in Table 9 [of the Policy].

**TABLE 9**
**[from Policy H-1-k]**
**MAXIMUM ALLOWABLE NOISE EXPOSURE – STATIONARY NOISE SOURCES[1]**

| | Daytime (7:00 a.m. to 10:00 p.m.) | Nighttime (10:00 p.m. to 7:00 a.m.) |
|---|---|---|
| Hourly Equivalent Sound Level ($L_{eq}$), dB | 50 | 45 |
| Maximum Sound Level ($L_{max}$), dB | 70 | 65 |

[1]As determined at outdoor activity areas. Where the location of outdoor activity areas is unknown or not applicable, the noise exposure standard shall be applied at the property line of the receiving land use. When ambient noise levels exceed or equal the levels in this table, mitigation shall only be required to limit noise to the ambient plus 5 dB.

### H-1-l Policy

Noise created by new proposed stationary noise sources or existing stationary noise sources which undergo modifications that may increase noise levels shall be mitigated so as not to exceed the noise level standards of 50 dBA (hourly $L_{EQ}$) during daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA (hourly $L_{EQ}$) during nighttime hours (10:00 p.m. to 7:00 a.m.) at noise sensitive land uses. When ambient noise levels exceed or equal the levels in the table, mitigation shall only be required to limit source noise levels to ambient plus 5 dB.

### H-1-m Policy

As a guideline, noise barriers (walls, earth berms, or berm/wall combinations) shall not exceed 15 feet in height as measured from the elevation of the nearest building pad. The Planning and Development Director, on a case-by-case basis, may allow noise barrier heights differing from this guideline. However, resulting noise levels must satisfy the maximum allowable noise exposure standards.

## *City of Fresno Noise Ordinance*

The City of Fresno Noise Ordinance limits facility emissions such that increases to existing ambient noise levels at receiver property lines do not exceed 5 dB or more. If measured ambient noise levels are lower than levels given in Table 5.12-23, City of Fresno Minimum Ambient Noise Levels, for a corresponding time period and receiver land use, then the sound level provided in the ordinance is deemed to be the ambient noise level at that location for the given time period.

**TABLE 5.12-23**
**CITY OF FRESNO MINIMUM AMBIENT NOISE LEVELS**

| District | Time | Minimum Ambient Noise Level (dBA) |
|---|---|---|
| Residential | 10:00 p.m. to 7:00 a.m. | 50 |
| Residential | 7:00 p.m. to 10:00 p.m. | 55 |
| Residential | 7:00 a.m. to 7:00 p.m. | 60 |
| Commercial | 10:00 p.m. to 7:00 a.m. | 60 |

**TABLE 5.12-23**
**CITY OF FRESNO MINIMUM AMBIENT NOISE LEVELS**

| District | Time | Minimum Ambient Noise Level (dBA) |
|---|---|---|
| Commercial | 7:00 a.m. to 10:00 p.m. | 65 |
| Industrial | Anytime | 70 |

Source: City of Fresno. 1972. Municipal Code and Charter; Section 8-302(b).
Notes:
dBA = decibels, "A" scale

In addition, construction activities causing "discomfort or annoyance to any reasonable person of normal sensitiveness" would be restricted between the hours of 10:00 p.m. and 7:00 a.m., and on Sundays.

## 5.12.5 Involved Agencies and Agency Contacts

### *5.12.5.1 Federal*

Federal Transit Administration - Region 9
201 Mission Road, Room 2210
San Francisco, CA 94105-1835
415-744-1333
Regional Administrator
Leslie Rogers

### *5.12.5.2 State*

Cal/OSHA
7575 Metropolitan Drive, Suite 207
San Diego, CA 92108
619-767-2280
Area Manager
Wende Carlson

### *5.12.5.3 County*

Fresno County Department of Public Works and Planning
2220 Tulare Street, Suite A, Fresno, CA 93721-2104
559-262-4321
Lew Pond

#### *5.12.5.4 City*

Fresno City Hall
Planning Division
2600 Fresno Street, Room 3043
Third Floor, South End
Fresno, CA 93721-3604
559-621-8277

### 5.12.6 Permits Required and Permit Schedule

No permit is required from the City of Fresno as long as construction occurs between the hours of 7:00 a.m. to 10:00 p.m., Monday through Saturday. Since there are no plans for construction outside these hours, no permits or permit schedule are required.

### 5.12.7 References

American National Standards Institute (ANSI), ANSI B133.8, Gas Turbine Installation Sound Emissions, 1989.

Bolt Beranek and Newman, Inc., Power Plant Construction Noise Guide, May 1997.

California Code of Regulations, Title 8, Section 5095-5100 (Article 105).

California Energy Commission. 1997. Rules of Practice and Procedure, Power Plant Site Certification Regulations.

City of Fresno. 1972. Municipal Code and Charter; Chapter 8: Morals and Conduct; Article 3: Noise Regulations.

Edison Electric Institute, *Electric Power Plant Environmental Noise Guide.* 2nd Edition, Revised, New York, NY, 1983.

ISO (International Organization Standardization), ISO 6190, Measurement of Sound Pressure Levels of Gas Turbine Installations for Evaluating Environmental Noise, 1988.

_____. 1996. ISO 9613-2, Attenuation of Sound during Propagation Outdoors.

_____. 1996a. Description and Measurement of Environmental Noise, Basic Quantities and Procedures Part 1, ISO 1996/1.

_____. 1996b. Description and Measurement of Environmental Noise, Basic Quantities and Procedures, Acquisition of Data Pertinent to Land Use, Part 2, ISO 1996/2.

_____. 1996c. Description and Measurement of Environmental Noise, Basic Quantities and Procedures, Application to Noise Limits, Part 3, ISO 1996/3.

U.S. Environmental Protection Agency (USEPA). 1971. *Noise from Construction Equipment and Operations, Building Equipment and Home Appliances.* (Prepared under contract by Bolt et al., Bolt, Beranek & Newman, Boston, MA). Washington, DC.

_____. 1974. March. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA Report 55019-74-004. Washington, DC.

Adequacy Issue: Adequate ____ Inadequate ____

# DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Noise** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

| SITING REGULATIONS | INFORMATION | AFC PAGE NUMBER AND SECTION NUMBER | ADEQUATE YES OR NO | INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS |
|---|---|---|---|---|
| Appendix B (g) (1) | ...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation. | S. 12.1.2<br>S. 12.1.2.4<br>S. 12.1.3<br>S. 12.2<br>S. 12.3 | | |
| Appendix B (g) (4) (A) | A land use map which identifies residences, hospitals, libraries, schools, places of worship, or other facilities where quiet is an important attribute of the environment within the area impacted by the proposed project. The area impacted by the proposed project is that area where there is a potential increase of 5 dB(A) or more, during either construction or operation, over existing background levels. | Figure 5.12-5 | | |
| Appendix B (g) (4) (B) | A description of the ambient noise levels at those sites identified under subsection (g)(4)(A) which the applicant believes provide a representative characterization of the ambient noise levels in the project vicinity, and a discussion of the general atmospheric conditions, including temperature, humidity, and the presence of wind and rain at the time of the measurements. The existing noise levels shall be determined by taking noise measurements for a minimum of 25 consecutive hours at a minimum of one site. Other sites may be monitored for duration at the applicant's discretion during the same 25-hour period. The results of the noise level measurements shall be reported in $L_{eq}$ (equivalent sound or noise level), $L_{dn}$ (day-night sound or noise level) or CNEL (Community Noise Equivalent Level) in units of dB(A). The $L_{10}$, $L_{50}$, and $L_{90}$ values (noise levels exceeded 10 percent, 50 percent, and 90 percent of the time, respectively) shall also be reported. | S. 5.12.1.2.4<br><br>Tables: 5.12-5<br>5.12-6<br>5.12-7<br>5.12-8<br><br>Appendix:<br>Meteorological Data | | |
| Appendix B (g) (4) (C) | A description of the major noise sources of the project, including the range of noise levels and the tonal and frequency characteristics of the noise emitted. | Table 5.12-10<br><br>Appendix: Acoustical Modeling Results | | |

Adequacy Issue: Adequate ____ Inadequate ____

# DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Noise** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

| SITING REGULATIONS | INFORMATION | AFC PAGE NUMBER AND SECTION NUMBER | ADEQUATE YES OR NO | INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS |
|---|---|---|---|---|
| Appendix B (g) (4) (D) | An estimate of the project noise levels, during both construction and operation, at residences, hospitals, libraries, schools, places of worship or other facilities where quiet is an important attribute of the environment, within the area impacted by the proposed project. | S. 12.2.1.1.1<br>S. 12.2.1.2<br><br>Figure 5.12-7<br><br>Tables: 5.12-12<br>5.12-13 | | |
| Appendix B (g) (4) (E) | An estimate of the project noise levels within the project site boundary during both construction and operation and the impact to the workers at the site due to the estimated noise levels. | S. 5.12.2.1.3 | | |
| Appendix B (g) (4) (F) | The audible noise from existing switchyards and overhead transmission lines that would be affected by the project and estimates of the future audible noise levels that would result from existing and proposed switchyards and transmission lines. Noise levels shall be calculated at the property boundary for switchyards and at the edge of the rights-of-way for transmission lines. | N/A | | |
| Appendix B (h) (1) (A) | Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, and permits applicable to the proposed project, and a discussion of the applicability of each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; | Table 5.12-14 | | |
| Appendix B (h) (1) (B) | Tables which identify each agency with jurisdiction to issue applicable permits and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities. | Table 5.12-14 | | |

Adequacy Issue: Adequate ____ Inadequate ____

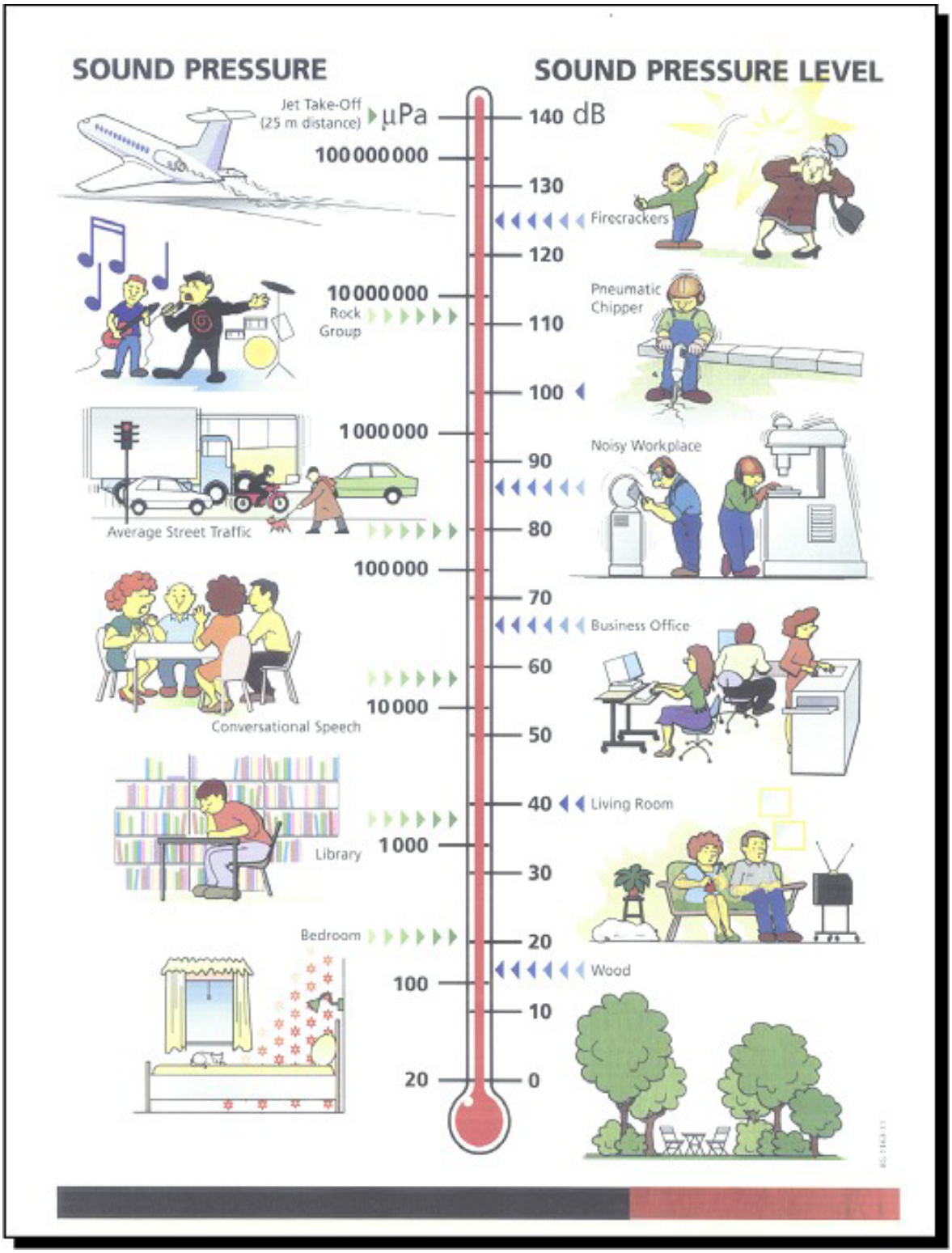
# DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Noise** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

| SITING REGULATIONS | INFORMATION | AFC PAGE NUMBER AND SECTION NUMBER | ADEQUATE YES OR NO | INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS |
|---|---|---|---|---|
| Appendix B (h) (2) | A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A). | S. 12.1.1.1<br>S. 5.12.2.1.2<br>S. 5.12.2.2 | | |
| Appendix B (h) (3) | The name, title, phone number, and address, if known, of an official within each agency who will serve as a contact person for the agency. | S. 5.12.5 | | |
| Appendix B (h) (4) | A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits. | S. 5.12.6 | | |




**SOURCE: BRÜEL & KJÆR, DENMARK**

**Levels Shown are Equivalent to A-Weighted Levels At 1,000 Hertz**

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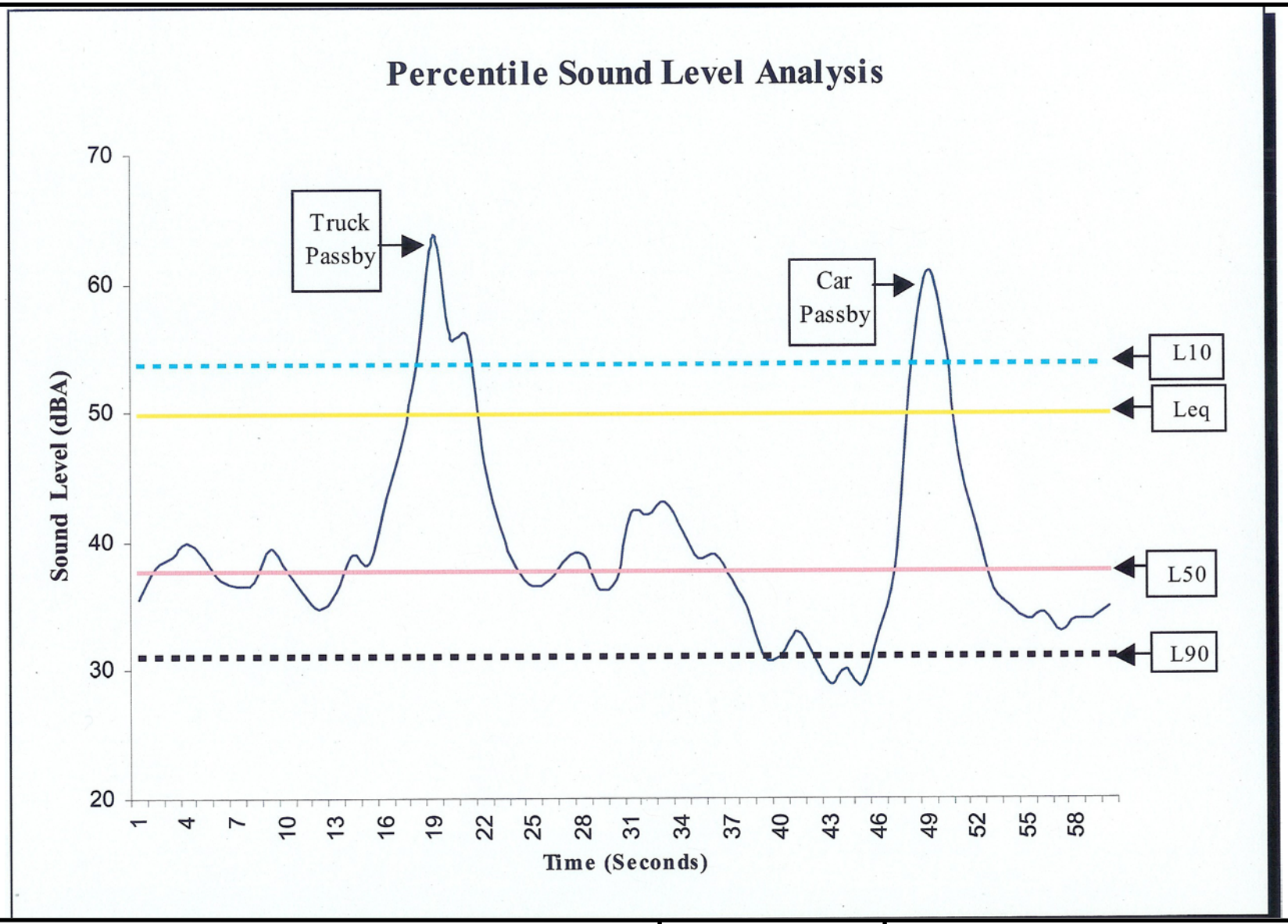
**TYPICAL SOUND PRESSURE LEVELS**

**BULLARD ENERGY CENTER**
**FRESNO, CALIFORNIA**

**FIGURE 5.12-1** | **PROJ. NO. 1757**

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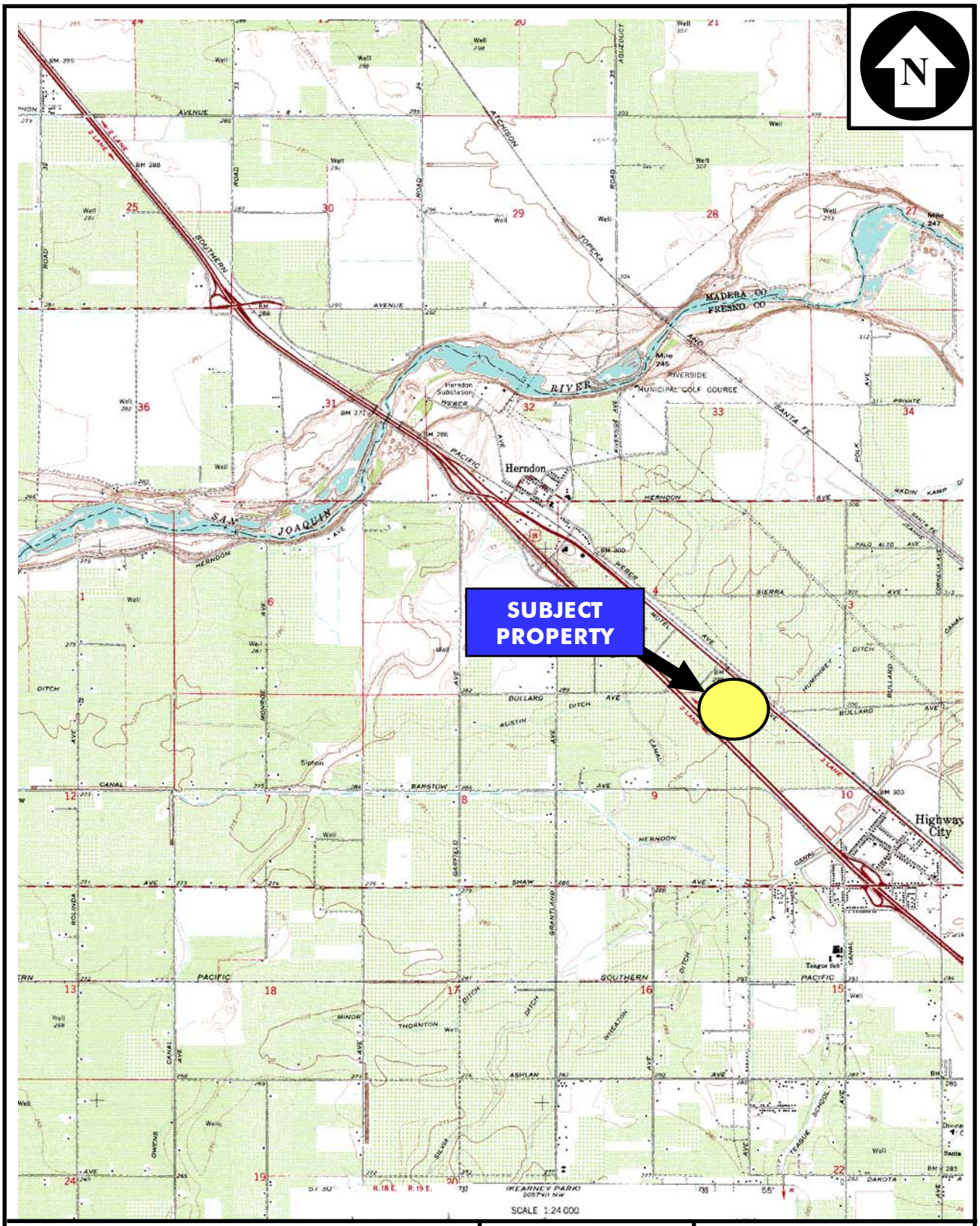
**PERCENTILE SOUND LEVEL ANALYSIS**

**BULLARD ENERGY CENTER**
**FRESNO, CALIFORNIA**

**FIGURE 5.12-2** | **PROJ. NO. 1757**




0 3000 6000 9000

Scale in Feet

QUADRANGLE LOCATION

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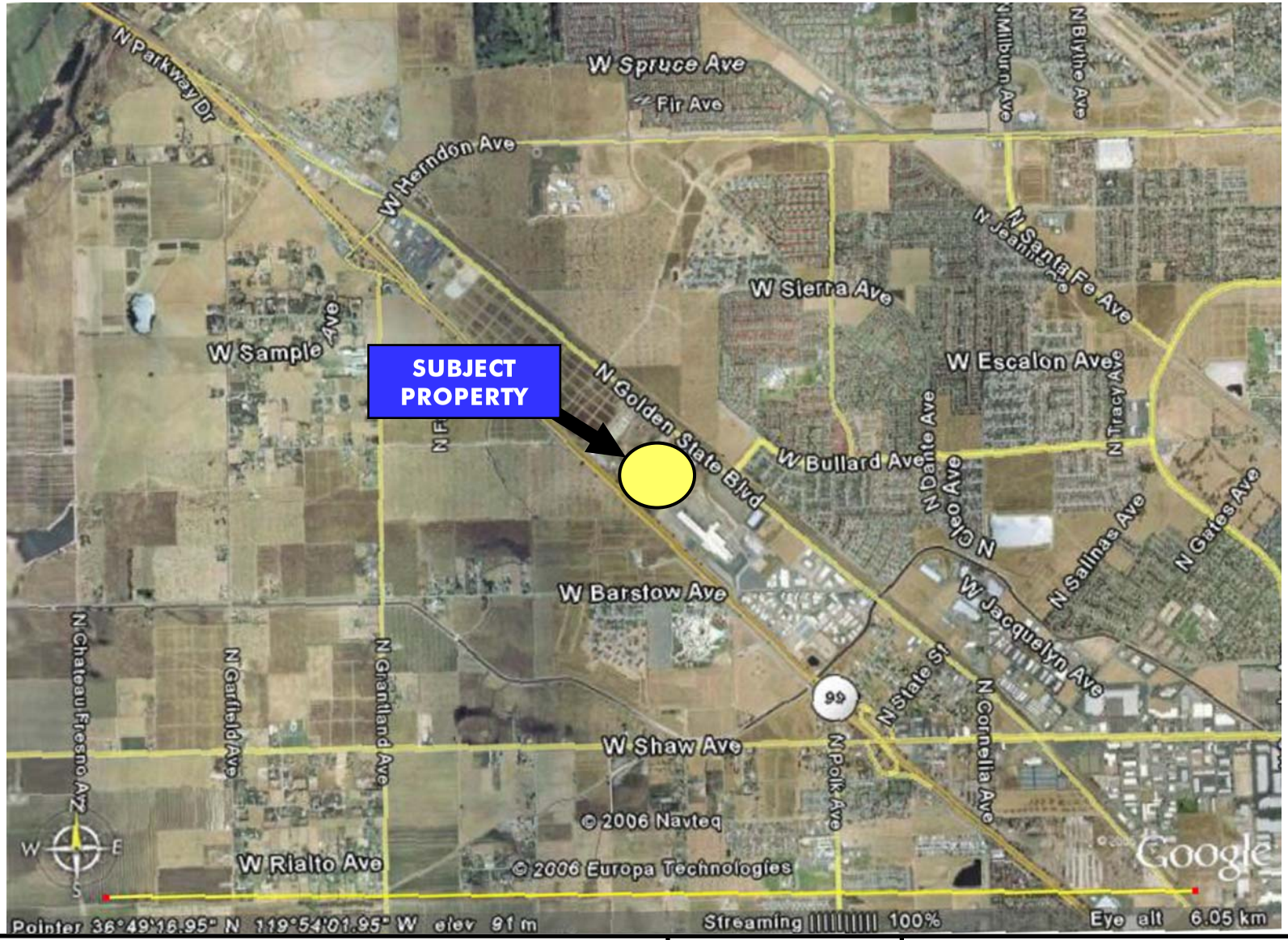
**SITE AREA MAP - USGS**

**BULLARD ENERGY CENTER**
**FRESNO, CALIFORNIA**

**FIGURE 5.12-3** | **PROJ. NO. 1757**




0 2000 4000 6000

Scale in Feet

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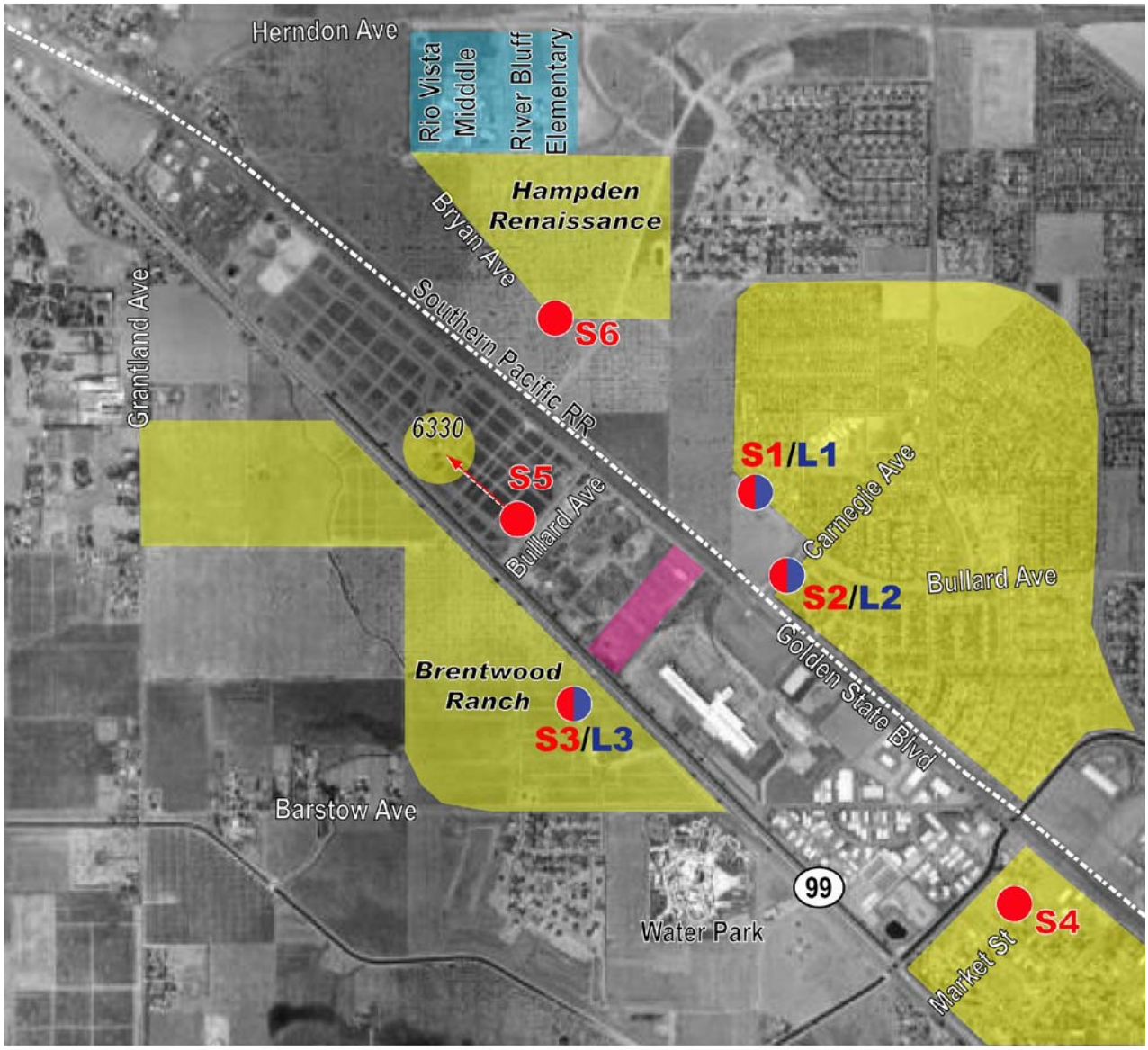
**SITE AREA MAP – AERIAL PHOTO**

**BULLARD ENERGY CENTER**
**FRESNO, CALIFORNIA**

**FIGURE 5.12-4** | **PROJ. NO. 1757**




NORTH

- Bullard Site
- Residential Area
- School Area
- Long and Short Duration Noise Measurement Location
- Short Duration Noise Measurement Location

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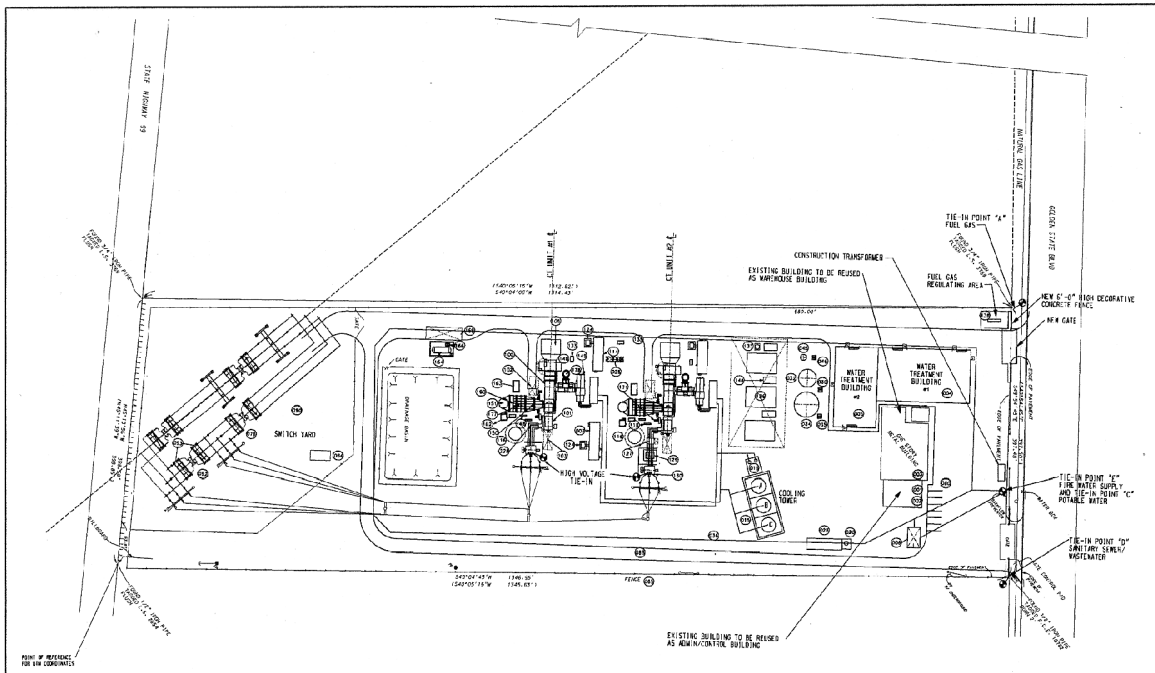
**NOISE MONITORING LOCATIONS**

**BULLARD ENERGY CENTER**
**FRESNO, CALIFORNIA**

**FIGURE 5.12-5** | **PROJ. NO. 1757**




LEGEND

(001) ADMINISTRATION BUILDING
(002) CONTROL BUILDING
(003) WAREHOUSE BUILDING
(004) WATER TREATMENT BUILDING #1
(005) WATER TREATMENT BUILDING #2
(006) FIRE WATER PUMP BUILDING
(007) ELECTRICAL BUILDING
(013) COOLING TOWER
(014) CIRCULATING WATER PUMPS
(016) COOLING TOWER XFMR'S
(017) COOLING TOWER ACC AND CHEMICAL FEED BUILDING
(025) OIL/WATER SEPERATOR
(029) DEMINERALIZED WATER PUMPS
(032) DEMINERALIZED WATER STORAGE TANK (120,000 GAL)
(034) RAW WATER / FIREWATER STORAGE TANK (300,000 GAL)
(035) RAW WATER PUMPS
(036) FIREWATER LOOP
(045) WASTEWATER COLLECTOR TANK (20,000 GAL.)
(046) WASTEWATER FORWARDING PUMPS
(077) EQUIPMENT FIREWALL
(078) DEADEND STRUCTURE (BY OWNER)
(088) PARKING AREA
(089) ROADWAY, 12' WIDTH
(098) SITE FENCE
(099) PLANT SWITCHYARD (BY OWNER)
(099) SF6 BREAKER (BY OWNER)
(099) SWITCHYARD DISCONNECT (BY OWNER)
(099) 18' x 36' SWITCHYARD CONTROL MODULE (BY OWNER)
(100) COMBUSTION TURBINE (BY OWNER)
(101) COMBUSTION TURBINE GENERATOR (BY OWNER)
(102) TURBINE ROTOR REMOVAL AREA
(103) GENERATOR REMOVAL AREA
(105) AIR INLET FILTER (BY OWNER)
(110) PACKAGED ELECTRICAL ELECTRONIC CONTROL CENTER (PEECC) (BY OWNER)
(117) FUEL GAS FILTER/SEPERATOR
(118) ELECTRIC DEW POINT HEATER
(124) PAD MOUNTED TRANSFORMER
(127) 13.8KV GENERATOR BREAKER
(128) AUXILIARY TRANSFORMER
(129) CTG STEP-UP TRANSFORMER
(133) WASTE WATER DRAINS TANK
(136) FUEL GAS COMPR. WITH ACCOUSTICAL ENCLOSURE
(137) NATURAL GAS SURGE TANK
(138) FUEL GAS REGULATING TANK
(139) AIR COMPRESSOR SKID
(144) FUEL GAS COMPR. - RECYCLE GAS FIN FAN COOLER
(148) CTG AUXILIARY SKID (BY OWNER)
(149) INTERCOOLER SKID (BY OWNER)
(150) CTG EXHAUST DUCT (BY OWNER)
(151) STACK (BY OWNER)
(160) SCR (BY OWNER)
(162) CONTINUOS EMISSIONS MONITORING SYS. EQUIP.
(163) AMMONIA VAPORIZER
(164) AMMONIA STORAGE TANK
(166) AMMONIA FORWARDING PUMPS
(168) AMMONIA INJECTION SKID
(169) AMMONIA UNLOADING CONTAINMENT AREA
(171) COOLING/PURGE AIR FANS (BY OWNER)
(172) CO CATALYST (BY OWNER)
(176) COMBUSTION TURBINE VBV SILENCER STACK
(228) 150-PHASE BUS DUCT

| EMMISION LOCATION POINT | NORTHING (METERS) | EASTING (METERS) |
|---|---|---|
| UNIT-1 STACK | N. 4,078,898.396 | E. 241,359.558 |
| UNIT-2 STACK | N. 4,078,938.845 | E. 241,396.514 |
| COOLING TOWER-A | N. 4,079,108.546 | E. 241,106.508 |
| COOLING TOWER-B | N. 4,079,034.986 | E. 241,233.298 |
| COOLING TOWER-C | N. 4,079,081.416 | E. 241,160.628 |
| FIREWATER DIESEL PUMP | N. 4,079,000.748 | E. 2415,533.011 |

| LEGEND No. | NAME AND DESCRIPTION | STRUCTURE PLAN DIMENSION (FEET) | STRUCTURE HEIGHT DIMENSION (FEET) |
|---|---|---|---|
| 001 002 | ADMIN & CONTROL BLDG. INSULATED STD. SEAM METAL ROOF w/ SLOPE 1/2" PER FT | 80' X 56' | 15' MAX |
| 003 | WAINTENANCE/WAREHOUSE BLDG. INSULATED STD. SEAM METAL ROOF w/ SLOPE 1/2" PER FT | 105' X 70' | 24' MAX |
| 135 | FUEL GAS COMPRESSOR ENCLOSURE INSULATED STD. SEAM METAL ROOF w/ SLOPE 1/2" PER FT | 27' X 17' | 15' |
| 004 | WATER TREATMENT BLDG. #1 | 140' X 80' | 14' |
| 005 | WATER TREATMENT BLDG. #2 | 124' X 65' | 14' |
| 006 | FIREWATER PUMP BLDG. | 20' X 10' | 13' @ EAVE |
| 134 | PEECC BLDG. INSULATED STD. SEAM METAL ROOF w/ SLOPE 1/2" PER FT | 35' X 15' | 20' |
| 023 | COOLING TOWER CHEMICAL BLDG. INSULATED STD. SEAM METAL ROOF w/ SLOPE 1/2" PER FT | 16' X 60' | 10' |
| 100 | COMBUSTION TURBINE INLET AIR FILTER, HIGHEST PART OF CT | 13' X 135' NOTE AIR INLET SECT. IS 30' WIDE | 40' |
| 150 | EXHAUST DUCT (UP TO STACK) | 24'W X 70'L ON TOP THEN TAPERS DOWN TOWARD THE CTG EXHAUST | 38'-45' |
| 151 | EXHAUST STACK | 13'-6"ID 14'-2" - 14'-6"OD | 90' |

| LEGEND No. | NAME AND DESCRIPTION | STRUCTURE PLAN DIMENSION (FEET) | STRUCTURE HEIGHT DIMENSION (FEET) |
|---|---|---|---|
| 118 | COMBUSTION TURBINE VBV SILENCER STACK | 11'-0 1/2"ID 12'OD | 53'-0 5/8 |
| 015 | COOLING TOWER | 37'8 X 51'1 NOTE LENGTH BASED ON 3 CELLS | 42' TO TOP OF STACK 30' TO FAN DECK |
| 032 | DM WATER STORAGE TANK 120,000 GALLON CAPACITY | 27' DIAMETER | 30' STRAIGHT SIDE HEIGHT OF CONE ROOF |
| 034 | RAW WATER / FIREWATER STORAGE TANK 300,000 GALLON CAPACITY | 37' DIAMETER | 37' STRAIGHT SIDE HEIGHT OF CONE ROOF |
| 007 | ELECTRICAL BLDG. INSULATED STD. SEAM METAL ROOF w/ SLOPE 1/2" PER FT | 56' X 15' | 20' |

60 0 60 120
SCALE IN FEET
SCALE: 1" = 60'-0"

PLANT NORTH
TRUE NORTH

- PRELIMINARY -
NOT FOR CONSTRUCTION

| REV | DESCRIPTION | DRN | CHK | APP | DATE |
|---|---|---|---|---|---|
| D | REVISED COOLING TOWER ORIENTATION | DAD | MJS | SMG | 07-3-1 |
| C | REVISED UTM COORDINATES | DHL | MJS | SMG | 07-3-1 |
| B | UPDATED WITH UTM COORDINATES | TCF | MJS | SMG | 7-21-0 |
| A | ISSUED FOR AIR QUALITY MODELING | MND | MJS | SMG | 7-1-0 |

KIEWIT INDUSTRIAL CO.
A Kiewit Company

BULLARD ENERGY CENTER LLC

Bibb and associates
8400 Lenexa Drive
Lenexa, Kansas 66214

FIGURE AQ-1
SITE ARRANGEMENT FOR AIR QUALITY MODEL

| | by | date |
|---|---|---|
| DESIGNED | MJS | 07-14-05 |
| DRAWN | MND | 07-14-05 |
| CHECKED | SMG | 07-14-05 |

DRAWING NUMBER
2006 026-PP-001AQ

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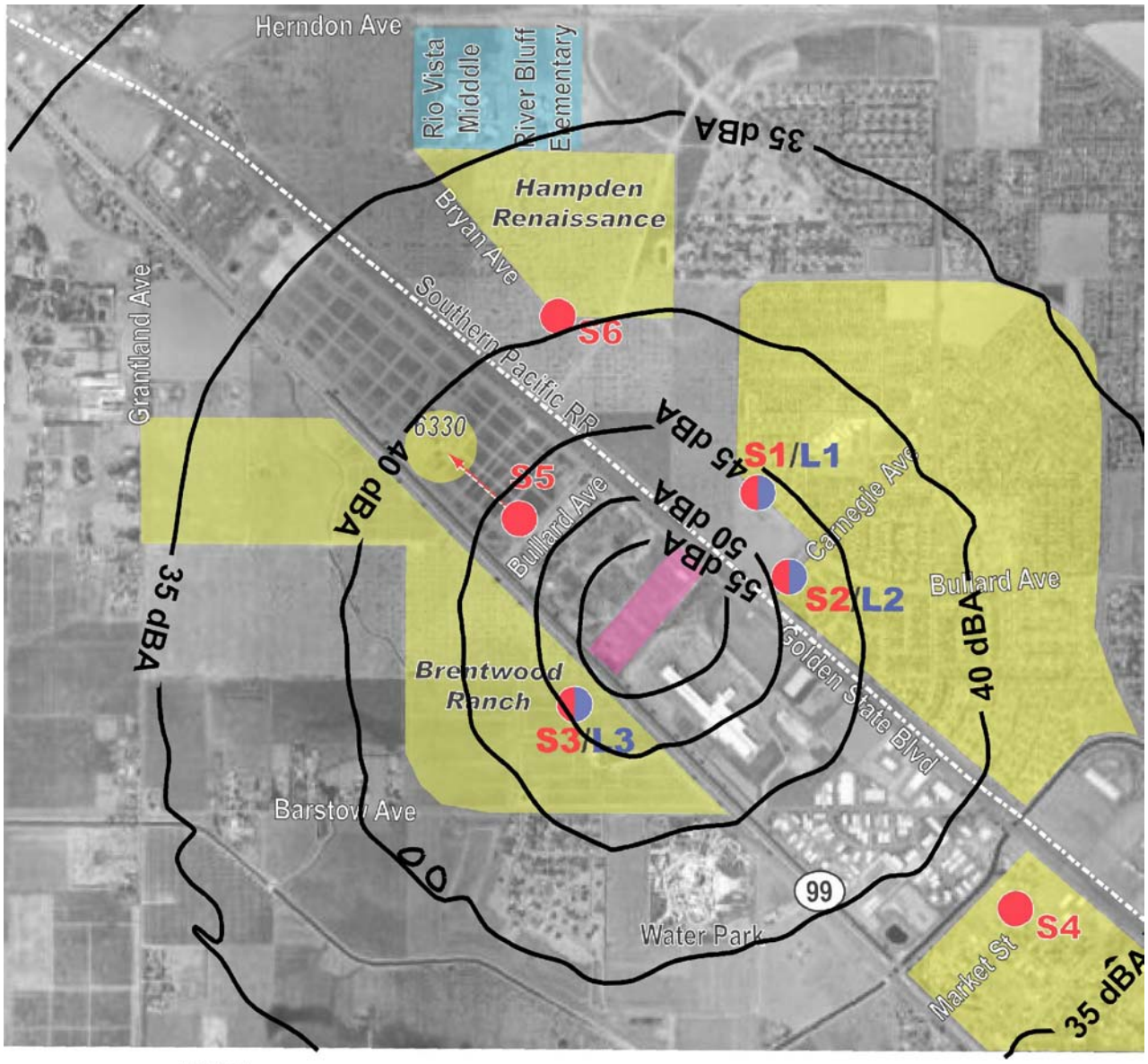
**CONCEPTUAL GENERAL ARRANGEMENT**

**BULLARD ENERGY CENTER**
**FRESNO, CALIFORNIA**

**FIGURE 5.12-6** | **PROJ. NO. 1757**




NORTH

- Bullard Site
- Residential Area
- School Area
- Long and Short Duration Noise Measurement Location
- Short Duration Noise Measurement Location

0 1000 2000 3000

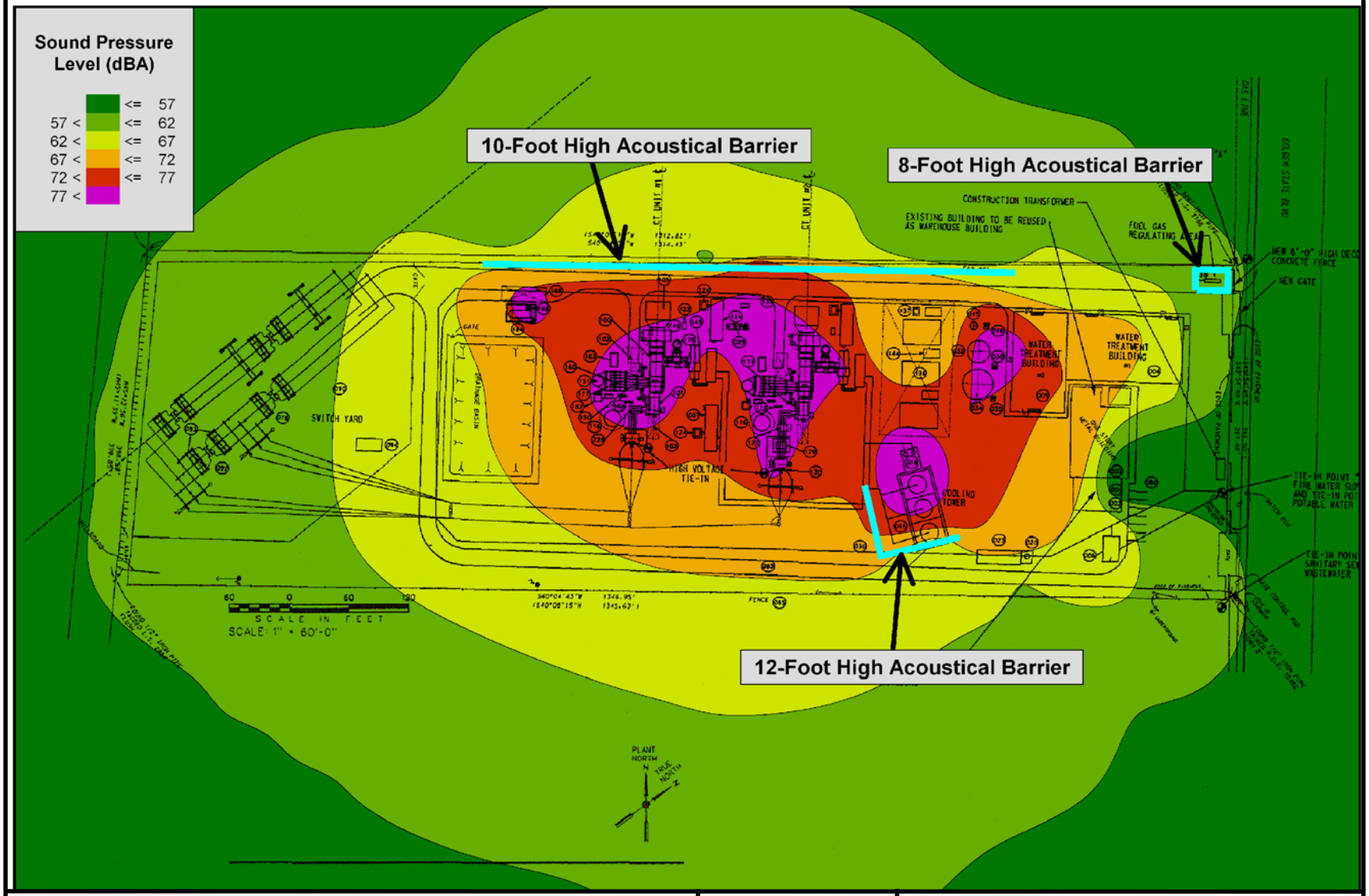
Scale in Feet

Michael Theriault ACOUSTICS INC
NOISE CONTROL CONSULTING SERVICES

**PREDICTED NOISE LEVEL CONTOURS - OFFSITE**

**BULLARD ENERGY CENTER**
**FRESNO, CALIFORNIA**

**FIGURE 5.12-7** | **PROJ. NO. 1757**

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**PREDICTED NOISE LEVEL CONTOURS - ONSITE**

**BULLARD ENERGY CENTER**
**FRESNO, CALIFORNIA**

| FIGURE 5.12-8 | PROJ. NO. 1757 |
|---|---|