# Sound Level Assessment II
# Huasna Valley, CA

## Potential Sound Level Impacts
## of proposed Excelaron
## Huasna Oil Production Plan

**requested by**
**Huasna Valley Association**
**PO Box 1164**
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## 1.0 Description and Criteria

This is a report on the a study of potential noise impacts of the proposed Excelaron Huasna Oil Production Plan activities and operations. The proposed activities and operations are evaluated with reference to a recent baseline sound level survey and assessment of Huasna Valley, California. The results of the sound level survey are reported more fully in the Sound Level Assessment Report dated February 17, 2009. That report describes the overall sound levels from all existing sound sources during a relatively clear and wind-free period at the end of January 2009.

The sound level conditions are presented in metrics that may be evaluated against the San Luis Obispo County Exterior Noise Level Standards Ordinance. The County of San Luis Obispo Noise Ordinance uses the hourly equivalent sound level (Leq) as a standard of measurement. The noise ordinance stipulates that stationary noise sources shall not exceed 50 dB (Leq) during daytime hours, 7 a.m. to 10 p.m. and 45 dB (Leq) during nighttime hours 10 p.m. to 7 a.m. It also requires that at no time during the daytime hours shall the noise level exceed 70 dB. The text of the Noise Ordinance is reproduced in the Appendix of this report for reference. Also see the Appendix for definitions of acoustical terms and standards.

## 2.0 Proposed Project Activities

The Huasna Oil Production Plan of June 5, 2007, published by Excelaron, LLC, describes the development of an oil exploration and extraction project, using three existing wells and requiring the drilling of a fourth well, using hot water to enhance recovery. The project site is on a 160 acre parcel, with access over an improved road located on a private easement to Huasna Townsite Road. This road will be used for transporting oil offsite. A shipping and loading pad is located near the wells.

## 3.0 Evaluation of Noise Effects

CEQA Guidelines provide general principles for determining thresholds of significance Guidance for evaluating any substantial noise effects from a proposed project is found in the California Environmental Quality Act neither the CEQA statutory language, nor the CEQA Guidelines provide specific guidance as to when an environmental effect crosses the line into the realm of significance.

(CEQA) Guidelines, Appendix G, XI. Noise:
The following general questions are posed. Would the project:

a) Result in exposure of persons to or generation of noise levels in excess of standards

established in the local general plan or noise ordinance, or applicable standards of other agencies?

b) Result in exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?

c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Courts and commentators emphasize that the "the lead agency has discretion to formulate standards of significance for use in an EIR, which requires the agency to make a policy judgment about how to distinguish adverse impacts deemed significant from those deemed not significant."

The County may appropriately apply higher noise level threshold of significance based on specific evidence distinguishing noise impacts in different areas (i.e., rural vs. urbanized), rather than imposing a blanket application of statutory noise standards. This discretion reflects the reality that an ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting.

## 4.0 Regulatory Setting

Noise is regulated at the federal, state, and local levels through regulations, policies, and/or local ordinances. Local policies are commonly adaptations of federal and state guidelines, based on prevailing local conditions or special requirements.

### 4.1 FEDERAL POLICIES AND REGULATIONS

The Federal Noise Control Act of 1972 §2 [42 U.S.C. 4091] states the following:

(a) The Congress finds (1) that inadequately controlled noise presents a growing danger to the health and welfare of the Nation's population, particularly in urban areas; (2) that the major sources of noise include transportation vehicles and equipment, machinery, appliances, and other products of commerce; and (3) that, while primary responsibility for control of noise rests with State and local governments, Federal action is essential to deal with major noise sources in commerce control of which require national uniformity and treatment.

(b) The Congress declares that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare. To that end, it is the purpose of this Act to establish a means for effective coordination of Federal research and activities in noise control, to authorize the establishment of Federal noise emission standards for projects distributed in commerce, and to provide information to the public respecting the noise emission and noise reduction characteristics of such products.

## 4.2 STATE POLICIES AND REGULATIONS

### 1) California Government Code

The contents of County Noise Element and the methods used in their preparation have been determined by the requirements of §65302 (f) of the California Government Code and by the Guidelines for the Preparation and Content of the Noise Element of the General Plan prepared by the California Department of Health Services and included in the 1900 State of California General Plan Guidelines. The General Plan Guidelines require that major noise sources and areas containing noise-sensitive land uses be identified and quantified by preparing generalized noise exposure contours for current and projected conditions. Contours may be prepared in terms of either the Community Noise Equivalent Level (CNEL) or the Day-Night Average Level (Ldn), which are descriptors of total noise exposure at a given location for an annual average day. The CNEL and Ldn are generally considered to be equivalent descriptors of the community noise environment within plus or minus 1.0 dB.

## 4.3 LOCAL POLICIES AND REGULATIONS

### 1) County of San Luis Obispo Noise Element of the General Plan

The County Noise Element provides a policy framework for addressing potential and existing noise impacts during project review and long range planning. Its purpose is to minimize future and existing noise conflicts. Among the most significant polices found in the Noise Element are numerical noise standards that limit noise exposure within noise-sensitive land uses (i.e., residential, offices, outdoor recreation) resulting from stationary and transportation noise sources.

The Noise Element is divided into two separate documents and contains policies, performance goals, and procedures for addressing identified noise impacts. The County Noise Element Policy Document and Acoustic Design Manual sets noise exposure standards for noise sensitive land uses, and performance standards for new commercial and industrial uses. A companion document, the Technical Reference Document, contains background information on the methods used to develop noise exposure information and guidelines for those involved in land use choices and in project design and review. Together these documents comprise the County Noise Element, and provide methods for reducing noise exposure.

Noise standards are established in the San Luis Obispo County Noise Element for sensitive noise receptors. Noise standard applicability is usually limited to evaluating planned residential developments located along highways, arterial routes, frontage roads, railroad tracks, and stationary noise sources where planned or existing residential developments or noise sensitive land uses would be adversely affected by existing or increased project-related noise levels in the area.

The applicable policies of the County Noise Element include the following:

**New Development and Stationary Noise Sources.** New development of noise-sensitive land uses may be permitted only where location or design allow the development to meet

the standards for existing stationary noise sources.

**New or Modified Stationary Noise Sources.** Noise created by new stationary sources, or by existing stationary sources which undergo modifications that may increase noise levels, shall be mitigated to not exceed the noise level standards for lands designated for noise-sensitive uses.

**Land Use & Transportation Noise Sources.** Table V-27 shall be used to determine the appropriateness of designating land for noise sensitive uses, considering noise exposure from transportation sources. Table V-31 shows the ranges of noise exposure that are considered to be acceptable, conditionally acceptable, or unacceptable for various land uses.

In **acceptable** noise environments, development may be permitted without requiring specific noise studies or specific noise reducing features.

In **conditionally acceptable** noise environments, development should be permitted only after noise mitigation has been designed as part of the project, to reduce noise exposure to the levels specified by the following policies. In theses areas, further studies may be required to characterize the actual noise exposure and appropriate means to reduce it.

In **unacceptable** noise environments, development in compliance with the policies generally is not possible.

## 5.0 Potential Noise Impact

Potential noise impact from the proposed oil transport and drilling and extraction operation is an issue for the landowners and residents living in close proximity to the operation. In addition, the rural and remote land is a habitat to domestic and feral animals that may be potentially affected by both the daytime and nighttime noise generating operations. Potential noise from this operation comes from a number of sources: truck traffic, drilling and completion activities, well pumps and compressors, continuous electric power generation, hot water boilers and pumps. For some affected residential receptors, noise from the proposed operation will be clearly audible and of sufficient round-the-clock intensity that they may feel as if they are living in an industrial zone. For people accustomed to living in rural areas, the arrival of a new, industrial noise source can be perceived as greatly disturbing the natural environmental sounds they are accustomed to.

Potential specific noise sources can be identified from the project description in Table 1. Project Vehicle Traffic, ADT on page 19 and Table 2. Project Equipment List on page 19. These described noise sources were inserted on an acoustic model of the site and surrounding properties and an accurate sound level contour map for various conditions has been generated. The location of the study area is shown in Figure 1. Noise Contour Study Area, page 10

The results, comparing “No Project” and “Plus Project,” are shown in the following figures:

Figure 2. Baseline Sound Levels -- No Project, LDN, page 11

The noise level associated with each piece of equipment and with the proposed vehicular traffic varies with the power level, and sound attenuation varies with the distance from the equipment. Noise propagation to the surrounding territory and to sensitive receptors may change with shifts in wind direction and the pronounced effect of atmospheric "thermal inversion" which is common in coastal and inland valleys. The thermal inversion effect is particularly noticeable at nighttime, and residents of Huasna Valley can hear activities at Santa Maria Speedway, located 8 miles to the west over coastal hills. Therefore noise propagation prediction is accurate for non-windy conditions and normal atmospheric adiabatic lapse rate. Atmospheric effects are more fully described in the Sound Level Assessment report, dated February 17, 2009.

Evaluation of the noise impact must also take into account the time of occurrence, as certain operations are proposed to take place during the nighttime, i.e., between 10 p.m. and 7 a.m. during which hours the subjective noise impact is increased. The evaluation of impact during nighttime hours requires a ten dB "penalty" be added to nighttime noise, which is calculated in the LDN or CNEL metric.

Three potential sensitive receptors in the vicinity of the proposed operation were chosen to illustrate the potential impact:

Residence 1, located west of the proposed operation

Residence 2, located west of the operation, south of Residence 1

Residence 3, located along the transportation route, west of Huasna Townsite Road

The predicted noise impact on Residence 1 is an increase in sound level

**Table 1. Noise Impact on Three Residences**

| condition | Residence 1, dBA | Residence 2, dBA | Residence 3, dBA |
|---|---|---|---|
| LDN, no project | 40 | 39 | 42 |
| LDN, plus project | 48 | 46 | 44 |
| Day Leq no project | 36 | 35 | 38 |
| Day Leq plus project | 43 | 42 | 43 |
| Night Leq no project | 33 | 33 | 34 |
| Night Leq plus project | 41 | 35 | 35 |

Residence 1 will experience an LDN= 8 dBA increase if the project, as proposed, is constructed and operated. Residence 2 will experience an LDN = 7 dBA increase, Residence 3, which is typical of several residences located along the transportation route, will experience an LDN = 3 dBA increase.

At night, for Residence 1, the normally quiet, rural sound level of Leq 1 hour = 33 dBA will be increased by Leq = 8 dBA to Leq = 41 dBA. In summertime, this impact will be more pronounced, as windows are normall left open for ventilation.

For reference, the following sound level increases are perceived as indicated subjective response:

1 dBA increase in sound level is perceived as a barely audible increase by most people and is usually not judged to be significant.

3 dBA increase in sound level, is clearly perceived and is a clearly audible increase, considered to be a "significant" impact under some planning standards and threshold evaluations.

10 dBA increase in sound level, is perceived as a "doubling" of sound levels.

## 6.0 Recommended Mitigation Measures

An acceptable and feasible noise abatement solution is necessary to protect the affected area residents from unwanted noise pollution. Typically a sound barrier wall might be installed to eliminate industrial sound, along with stipulations of latest muffling, shrouding and shielding of motors, compressors and engines. This may not be a viable solution to oil drilling and hauling operations, however, due to the constant changing of locations. For most stationary equipment, enclosures and shrouds are available to reduce noise substantially at the source. Therefore, a condition should be stated that "state-of-the-art acoustic shielding shall be installed and maintained for all noise-generating equipment to minimize the noise created to the greatest extent possible." Urban, portable electric power generator sets are now available that have very low noise emission characteristics.

There are mobile absorptive sound wall units which are easy to assemble, disassemble and move. Since oil drilling is a temporary project, moving from one well to another, a portable sound wall can be used to reduce the unwanted noise during the drilling and the wall may be moved from one site to the next with little effort. With the inclusion of a mobile sound wall in oil drilling activities near residential areas, residents will be more able to enjoy their peaceful quite rural living throughout the completion and operation of the project.

Construction, transportation, and drilling are clearly limited to daytime hours, but the ongoing operations of water heaters, compressors, pumps and power generator appear to have no limits on hours of operation. If pumps or motors or generators will be running at night, it is crucial that noise be kept close to current ambient sound levels at residential property boundaries. In this rural area, night time ambient noise is as low as 33 dB. A pump or motor at 45dB will sound twice as loud as the background, and is sure to be an annoyance. A night time noise

standard of 35dB(A) is common in rural areas in some western states. A noise monitoring station or position at the boundary of the operation will provide a determination of noise standard compliance. Noise measurement equipment is not expensive and is feasible for technical personnel to operate. Alternatively, a noise consultant on the County approved list of consultants can provide occasional spot checks of noise levels at the boundary of operations. There should be a notification of local potentially affected residents, and an operational procedure or protocol for responding to noise complaints.

Low Frequency Noise: Most industrial noise regulations now also include special attention to low-frequency noise, which travels the farthest, and can propagate through the ground and into walls of houses. Some industrial installations produce low frequency noise at levels that cause disturbance. Simple averaged noise level measurements are not always effective at identifying possible low-frequency impacts. In some jurisdictions, measurements are taken using two different acoustic weighting standards, available on most sound level measurement instruments; db(A) and db(C) scale. The dB(A) scale more closely reflects the ways that humans hear sound (i.e., it accentuates the frequencies that we hear most easily and discounts the frequencies we do not perceive as well;

The dB(C) scale is weighted more toward low-frequency sounds. A common approach to evaluating low frequency component of noise pollution, is that when dB(C) exceeds dB(A) by 20dB or more, then added attention and mitigation is directed toward low-frequency noise emissions. Noise mitigation should allow for special treatment of low-frequency noise when dB(C) exceeds 60dB or when dB(C) exceeds dB(A) by 20dB or more.

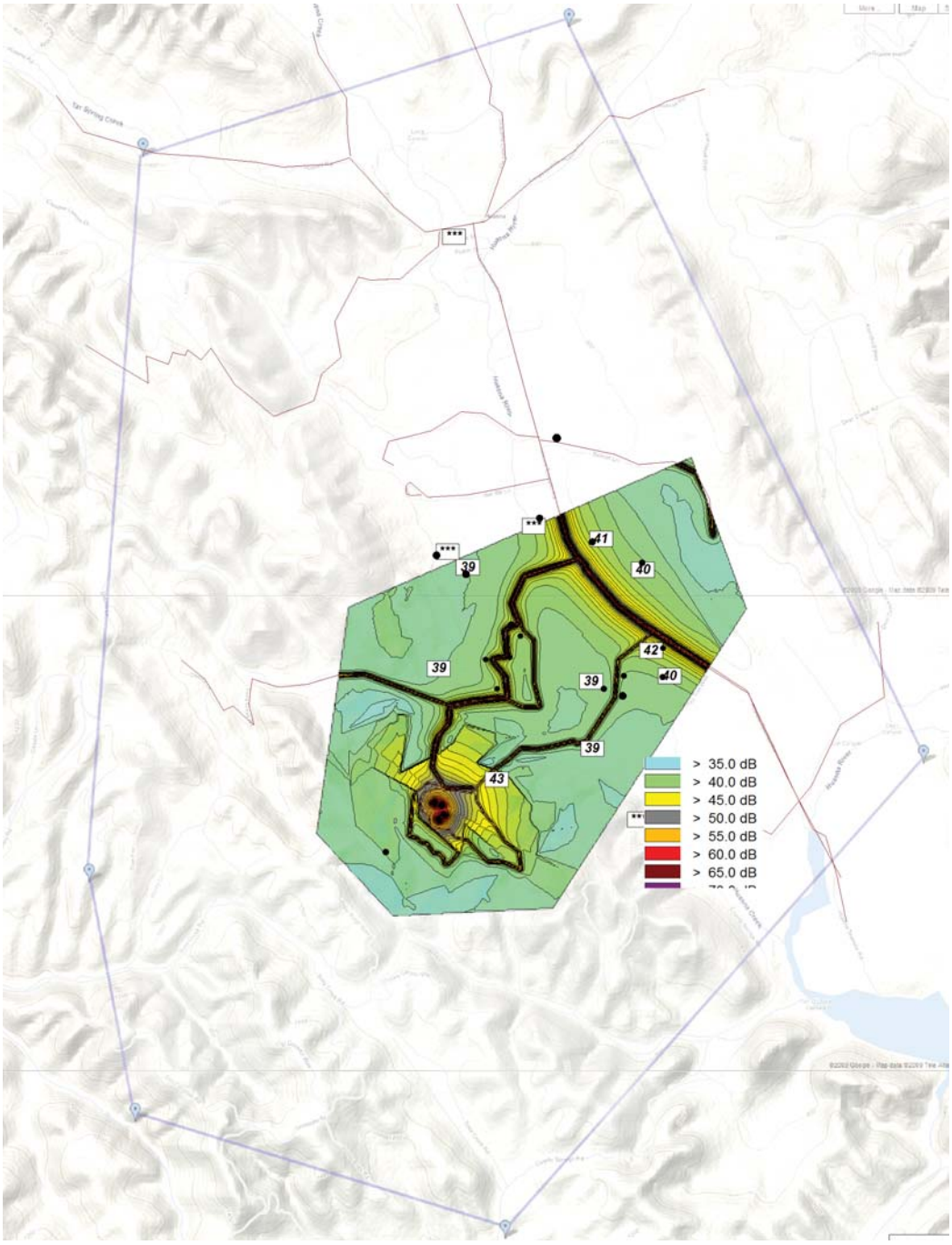
Permits granted to allow oil exploration and extraction in the vicinity of residential uses should be contingent on the installation and maintenance of the most effective noise abatement technologies and procedures.

For 45dB.com

March 19, 2009

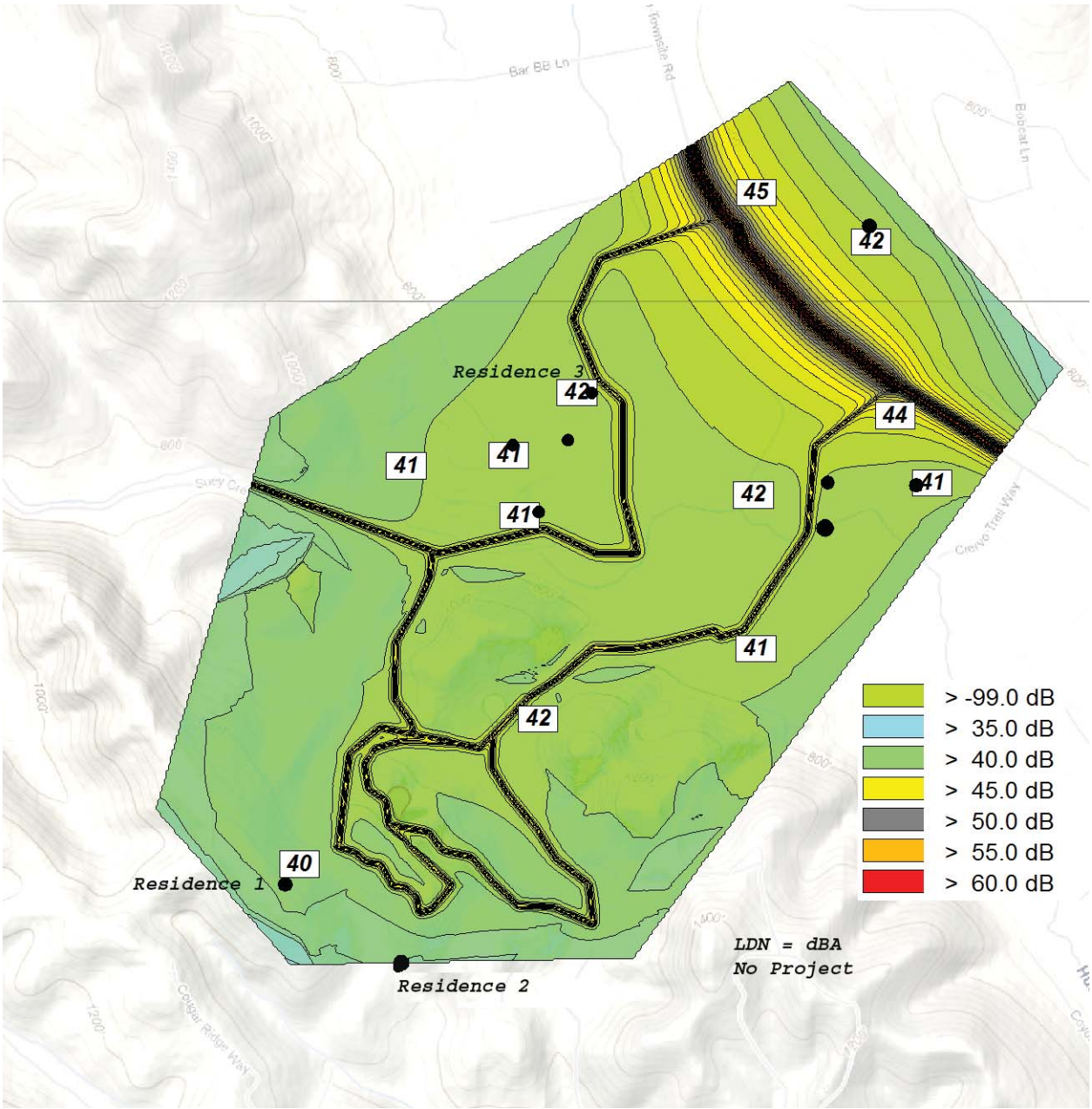
## Figure 1. Noise Contour Study Area

Inset area (in color) indicates area studied for noise impact in this report.



## Figure 2. Baseline Sound Levels -- No Project, LDN

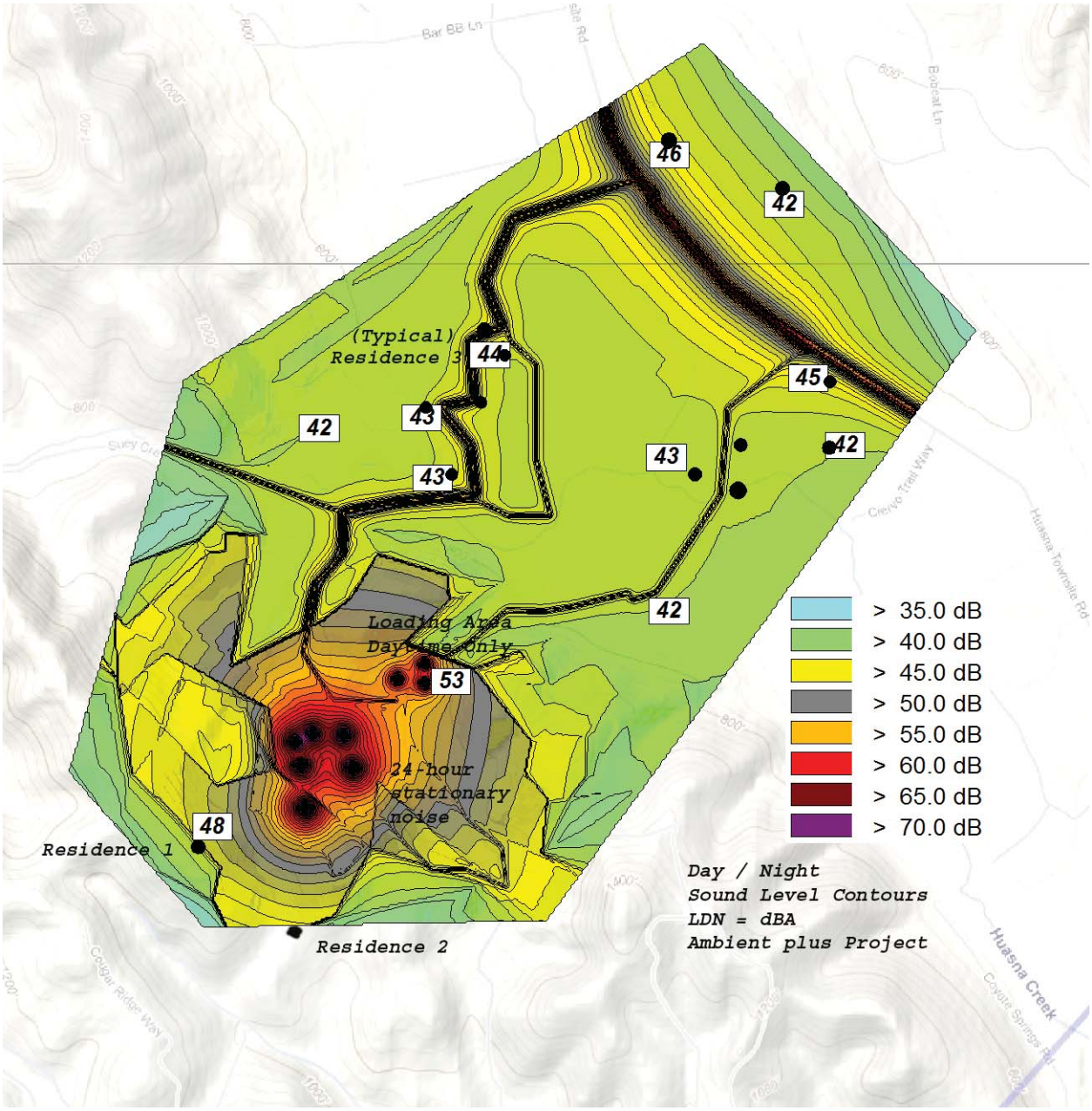
Sound Level Contours are shown in units of LDN = dBA



## Figure 3. Baseline Sound Levels, Plus Project, LDN

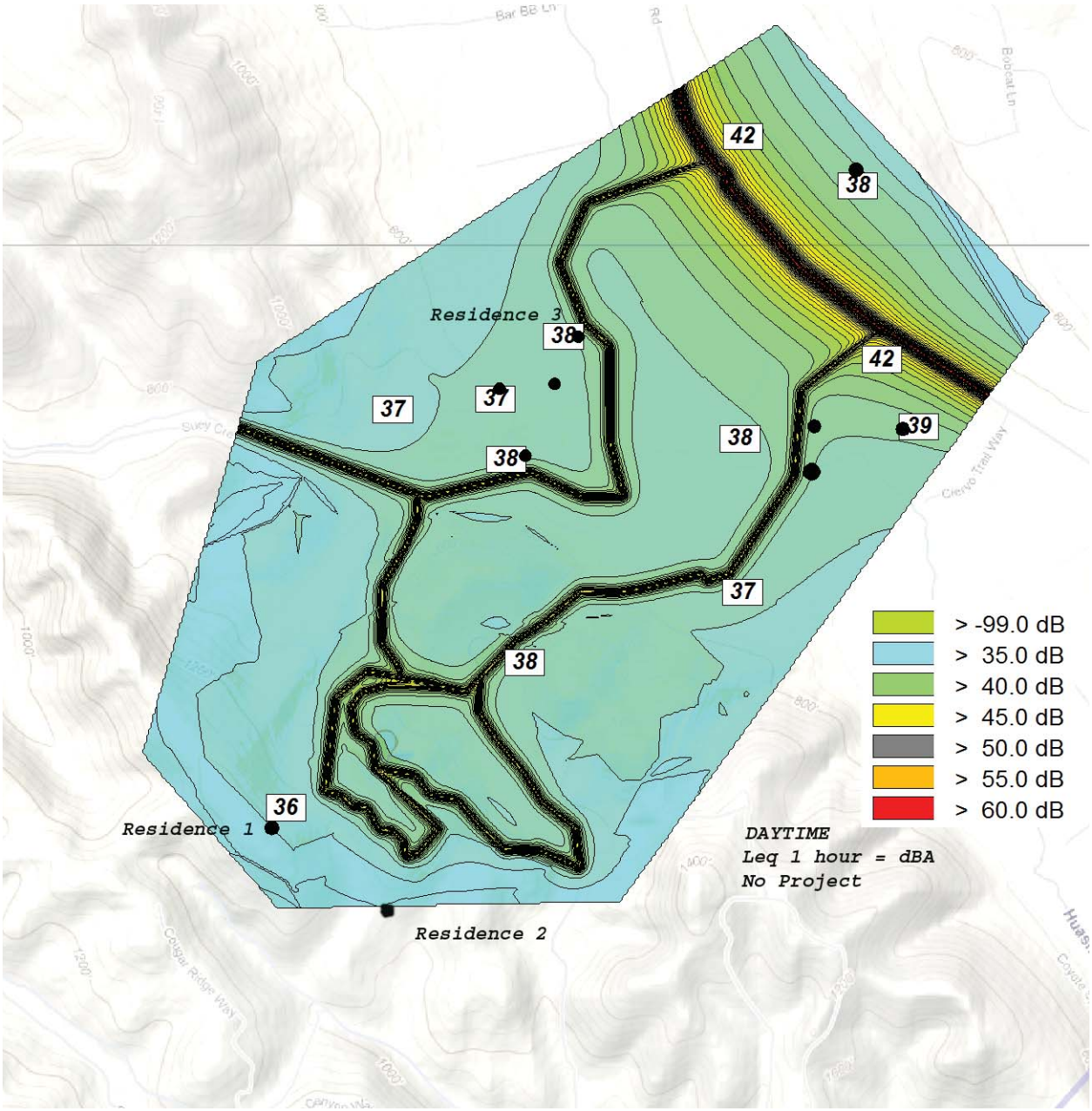
Sound Level Contours are shown in units of LDN = dBA.

Residence 3 is typical of several residences located along transportation route. Loading area shown is active only in daytime. 24 hour stationary noise is based on equipment listed and comparable operation. Sound level received at Residence 1 is increased by LDN = 8 dBA over a "no project" condition.



## Figure 4. Baseline Sound Levels - No Project, Daytime Leq

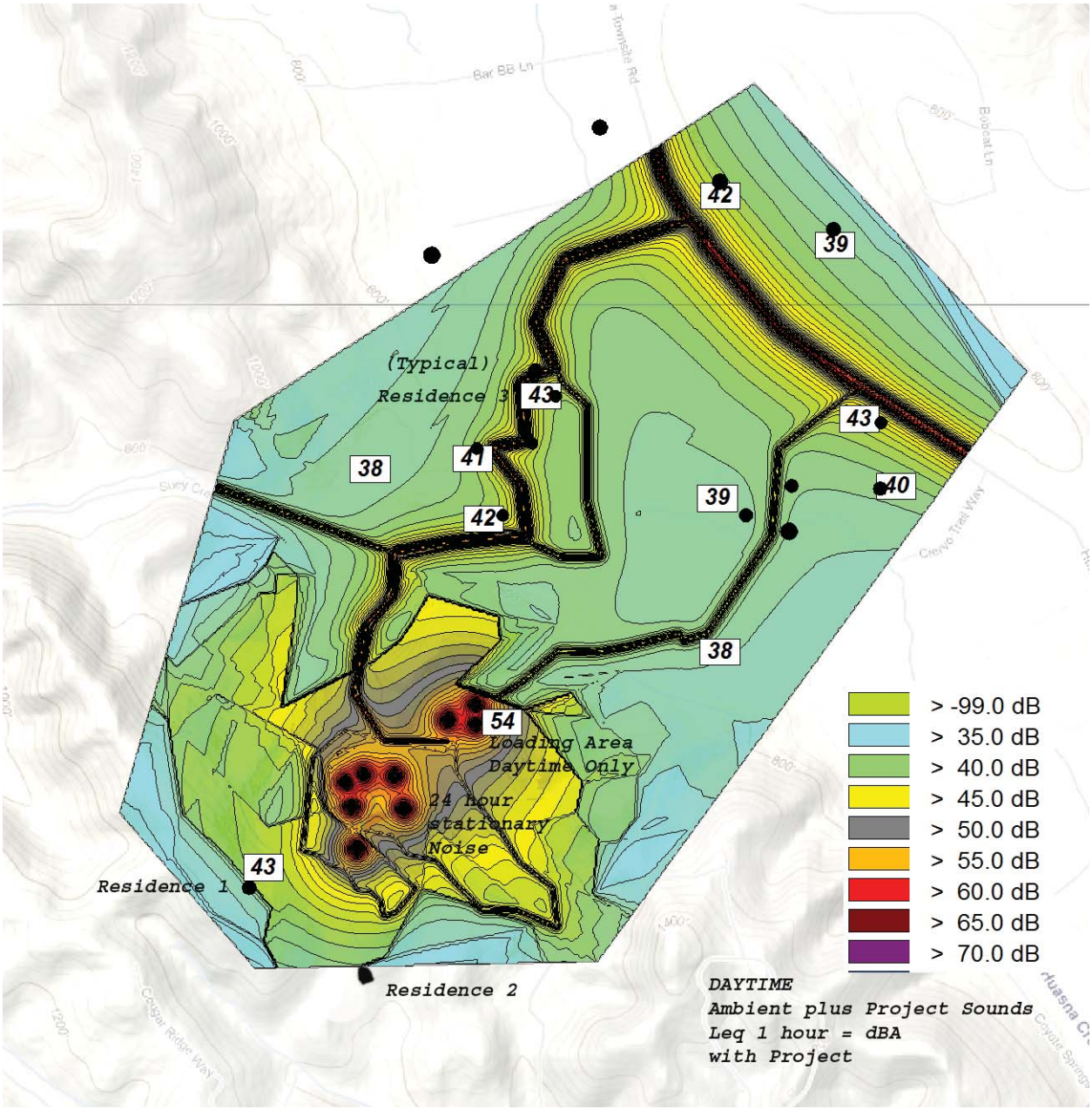
Sound Level Contours are shown in units of Daytime Leq 1 hour = dBA



## Figure 5. Baseline Sound Levels - Plus Project, Daytime Leq

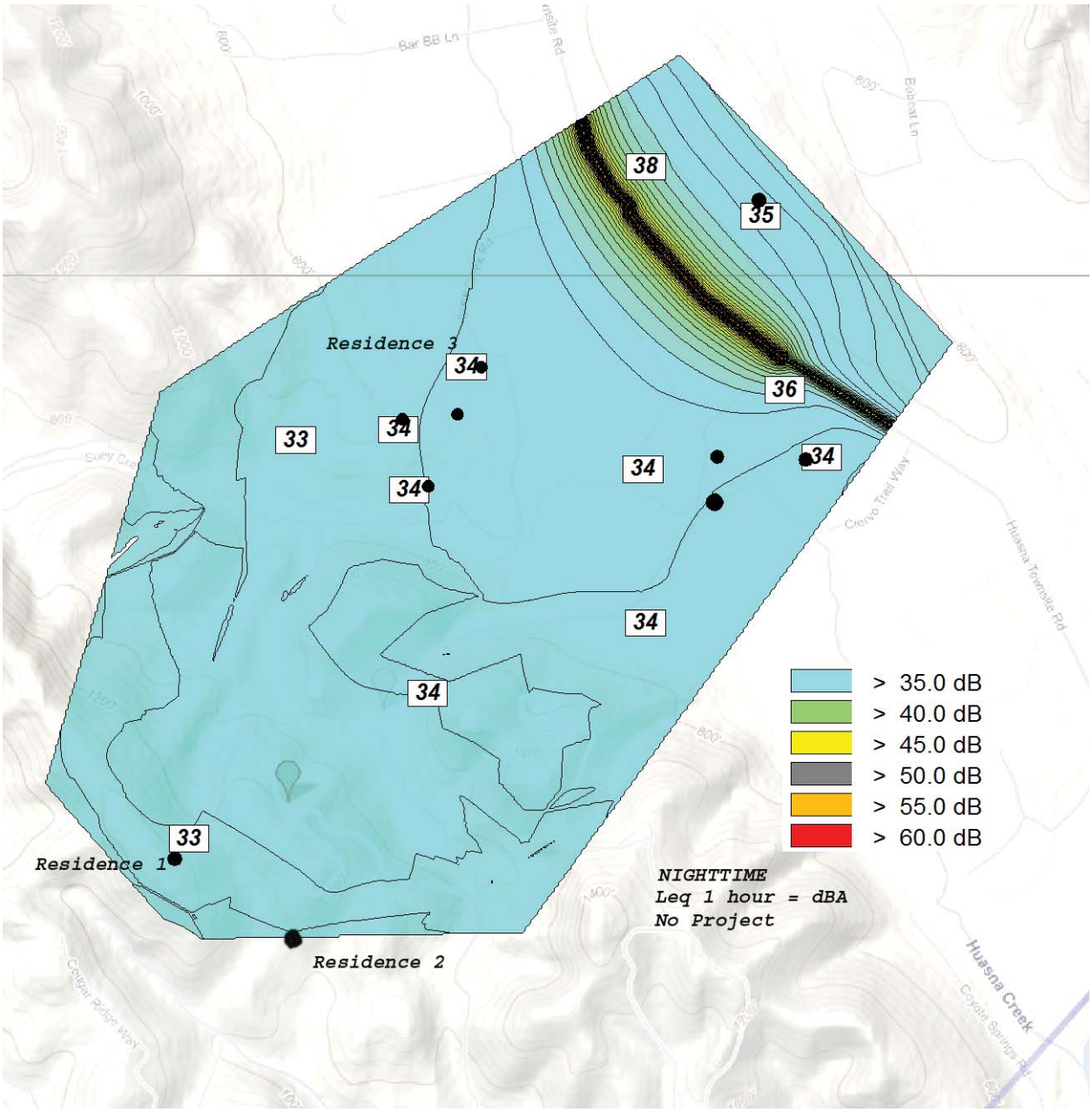
Sound Level Contours are shown in units of Daytime Leq 1 hour = dBA

Residence 3 is typical of several residences located alongside transportation routes. Loading Area is active during daytime only. 24-hour stationary noise is based on equipment listed and comparable operations. Daytime sound level at Residence 1 is increased by Leq 1 hr. = 7 dBA.



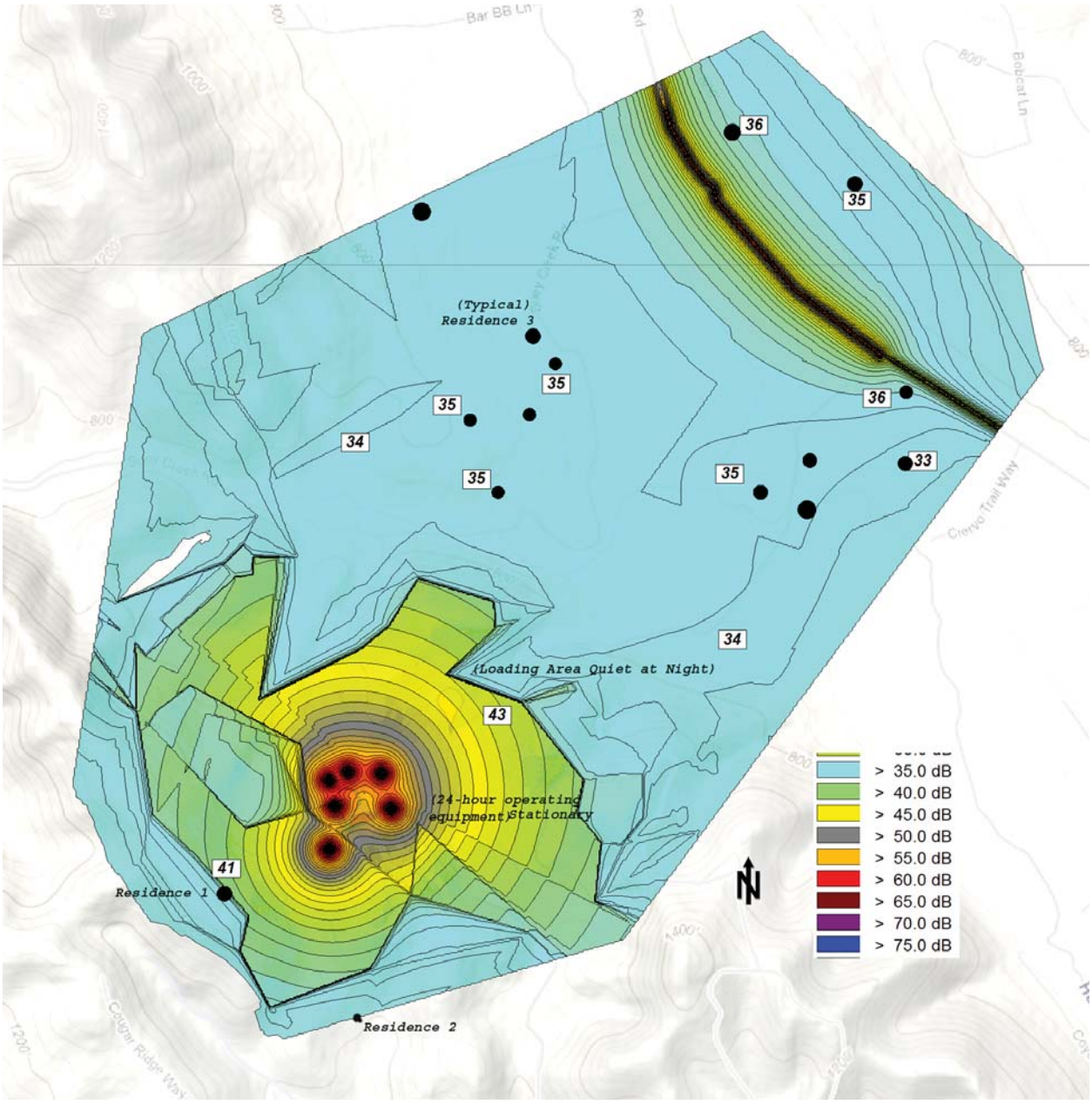
## Figure 6. Baseline Sound Levels - No Project, Nighttime Leq

Sound Level Contours are shown in units of Nighttime Leq 1 hour = dBA



## Figure 7. Baseline Sound Levels - Plus Project, Nighttime Leq

Sound Level Contours are shown in units of Nighttime Leq 1 hour = dBA. The Loading Area does not contribute sound power at night; the 24-hour stationary noise contributes to an increase in sound level at Residence 1 of Leq 1 hr. = 8 dBA.



## 7.0 Appendix I: Exterior Noise Level Standards, County of San Luis Obispo

### 23.06.044 - Exterior Noise Level Standards:

The exterior noise level standards of this section are applicable when a land use affected by noise is one of the following noise-sensitive uses which are defined in the Land Use Element and Local Coastal Plan: residential uses listed in Table O, Framework for Planning, except for residential accessory uses and temporary dwellings; health care services (hospitals and similar establishments only); hotels and motels; bed and breakfast facilities; schools (pre-school to secondary, college and university, specialized education and training); churches; libraries and museums; public assembly and entertainment; offices, and outdoor sports and recreation.

(a) No person shall create any noise or allow the creation of any noise at any location within the unincorporated areas of the county on property owned, leased, occupied or otherwise controlled by such person which causes the exterior noise level when measured at any of the preceding noise-sensitive land uses situated in either the incorporated or unincorporated areas to exceed the noise level standards in the following table. When the receiving noise-sensitive land use is outdoor sports and recreation, the following noise level standards shall be increased by 10 dB.

| EXTERIOR NOISE LEVEL STANDARDS | | |
|---|---|---|
| | Daytime<br>7a.m. to 10 p.m. | Nighttime<br>10 p.m. to 7 a.m. |
| Hourly Equivalent Sound Level (Leq, dB) | 50 | 45 |
| Maximum level, dB | 70 | 65 |

(b) In the event the measured ambient noise level exceeds the applicable exterior noise level standard in subsection (a), the applicable standard shall be adjusted so as to equal the ambient noise level plus one dB.

(c) Each of the exterior noise level standards specified in subsection (a) shall be reduced by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

(d) If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level can be measured, the noise level measured while the source is in operation shall be compared directly to the exterior noise level standards.

[Amended 1992, Ord 2556]

## 8.0 Appendix II: Notes, Definitions

| TERM | DEFINITION |
|---|---|
| Ambient Noise Level | The composite of noise from all sources near and far. The normal or existing level of environmental noise or sound at a given location. The ambient level is typically defined by the LEQ level. |
| Background Noise Level | The underlying, ever-present lower level noise that remains in the absence of intrusive or intermittent sounds. Distant sources, such as traffic, typically make up the background. The background level is generally defined by the L90 percentile noise level. |
| Sound Level, dB | Sound Level. Ten times the common logarithm of the ratio of the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micropascals, SLOW time response, in accordance with ANSI S1.4-1971 (R1976) Unit: decibels(dB). |
| dBA or dB(A): | A-weighted sound level. The ear does not respond equally to all frequencies, but is less sensitive at low and high frequencies than it is at medium or speech range frequencies. Thus, to obtain a single number representing the sound level of a noise containing a wide range of frequencies in a manner representative of the ear's response, it is necessary to reduce the effects of the low and high frequencies with respect to the medium frequencies. The resultant sound level is said to be A-weighted, and the units are dBA. The A-weighted sound level is also called the noise level. |
| Equivalent Sound Level LEQ | Because sound levels can vary markedly in intensity over a short period of time, some method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, one describes ambient sounds in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called LEQ. In this report, both a 15 minute and an hourly period is used. |
| Percentile Sound Level (Ln) | The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (e.g., L90) |
| Subjective Loudness Changes. | In addition to precision measurement of sound level changes, there is a subjective characteristic which describes how most people respond to sound:<br>•A change in sound level of 3 dBA is *barely perceptible* by most listeners.<br>•A change in level of 6 dBA is *clearly perceptible*.<br>•A change of 10 dBA is perceived by most people as being *twice* (or *half*) as loud. |
| Time weighting | Different, internationally recognized, meter damping characteristics are available on sound level measuring instruments: Slow (S), Fast (F) and Impulse (I). In this community sound level measurement, the Fast (F) response time is used. |

**Table 2. Project Vehicle Traffic, ADT**

| No. of Vehicles | Size of Vehicle | Activity | Weekly ADT |
|---|---|---|---|
| 12 (daily) | 3-axle truck | hauling oil | 168 |
| 3 (daily) | pickup | crew | 42 |
| 1 (weekly) | propane truck | propane delivery | 2 |
| | | | |
| | | **Total Ave. / Day = 30** | |

**Table 3. Project Equipment List**

| Item | Quantity | Size/Description |
|---|---|---|
| Wash Tank | 1 | 750 bbl, 16 ft dia x 24 ft, oil/water separation |
| Stock Tank | 1 | 1000 bbl, 21.5 ft dia x 16 ft, storage/dehydration tank |
| Water Tank | 1 | 1000 bbl, 21.5 ft dia x 16 ft, water heating tank for well injection |
| Diluent Tank | 1 | 200 bbl, 9.5 ft dia x 16 ft, add to production to increase separation |
| Well Pumping Unit | 4 | 40 hp |
| Heater | 1 | < 2 mmbtu/hr, for heating injection water to wells |
| Heater | 1 | < 2 mmbtu/hr, for oil processing/dehydration |
| Vapor Recovery Compressor | 1 | 7.5 hp motor |
| Injection Pump | 2 | 600-700 psid, 20 gpm, 15 hp motors, water injection to wells |
| Generator | 1 | 150 kW, propane-fueled, will be equipped with a three way catalytic converter |
| Propane Tank | 1 | 10,000 gal |
| Fire Water Tank | 2 | *Size to be determined by fire marshall, assume 200 bbl, 9.5 ft dia x 16 ft |
| Fire Hydrant | 2 | |
| Injection Manifold | 1 | Route water for injection from water tank to wells |
| Production Manifold | 1 | Route production from wells to wash tank |
| Injection Piping | ft | NPS 3 in, w/ 1 in thick calcium silicate insulation |
| Production Piping | ft | NPS 4 in, w/ 1 in thick calcium silicate insulation |
| Fire Water Piping (alt. plan) | ft | NPS 2 in |

## 9.0 Qualifications of Preparer

### David Lord, Ph.D., Principal Consultant

For more than 20 years, David Lord has worked with architects, engineers, building contractors and public agencies to assess and solve problems in acoustics, noise and vibration. Dr. Lord is recognized as an acoustical consultant by several municipal and county planning departments and has provided acoustical consulting services for projects located in the following counties in California: San Luis Obispo, Santa Barbara, Orange, San Bernardino, Ventura and Los Angeles. David Lord is approved by the Department of Defense as an acoustical consultant at Vandenberg Air Force Base and at the Naval Facilities Engineering Command, Port Hueneme.

### Community Noise Assessment

Projects have ranged in scale and complexity from residential to commercial and institutional developments. All noise assessments rigorously follow Caltrans and ASTM standard procedures, while adhering to local planning standards and noise ordinances and the Uniform Building Code. Recent projects include: Environmental Impact Report noise chapter for a Metrolink station in Orange County; noise assessment for an automobile service center, a retail food market, a community theater, a water treatment plant, various wineries, a boutique hotel, a remote, 600 acre religious retreat site, an annual rodeo and tractor pull event, a metal salvage yard, etc. Residential neighbor-noise assessments range from animal noise to motorcycle noise, to stationary mechanical noise issues.

### Room Acoustics

Consulting projects undertaken in room acoustics range in scale from 50- to 400-seat spaces, such as church sanctuaries and restaurants. Consultation begins preferably with the architect early in design and continues through construction and occupancy. Music sources are evaluated and matched to the shape, the volume and the absorptivity of the space, using energy/time/frequency analysis tools. Recent projects include the Katsuya Restaurant at Hollywood and Vine; the Vina Robles Winery Refectory, and the United Methodist Church, San Luis Obispo.

### Instrumentation

Sound and vibration measurements are made with multiple, state-of-the-art, data-logging, integrating, Type I instruments and a real time analyzer. Long-term total sound monitoring is conducted with high-resolution digital sound recorders. Sound transmission and reverberation studies are made with a real-time analyzer following ASTM procedures. Each instrument is factory calibrated annually to meet U.S. National Institute of Standards and Technology requirements and has a current Certificate of Calibration and Conformance.

**Recent Projects in California.** Partial list; References provided on request.

1. Bradley Square, Santa Maria, California; Housing Development 120 units. Transportation noise assessment, mitigation recommendations, noise-resistant construction design.

2. Por La Mar Nursery commercial horticulture development, worker housing, Santa Barbara / Goleta, California. Transportation noise assessment, noise resistant housing design.

3. Fess Parker Wine Center, Lompoc California, with Pults & Associates, Architects. CEQA Environmental Impact Assessment for Noise, City of Lompoc.

4. San Ysidro Ranch, Montecito, with Mechanical Engineering Consultants, Santa Barbara. Total sound level monitoring, recording, assessment and mitigation design.

5. Santa Maria Country Club, Santa Maria, California; room acoustics solutions for conference, dining and meeting rooms.

6. State Street, City of Santa Barbara, consultant to several entertainment establishments for entertainment noise mitigation and conflict resolution.

7. Expert testimony for Allen Hutkin, Attorney at Law, San Luis Obispo, noise nuisance cases.

8. Environmental Impact Report, Noise Impact Assessment for Enos Ranchos and Mahoney Ranch General Plan Amendment/Zone Change/Specific Plan Amendment/Annexation, Santa Maria, CA, with Science Applications International Corporation (SAIC)

9. Environmental Impact Report, Noise Impact Assessment, including rail noise issues, for Westgate Metrolink Station, Placentia, CA, with Crawford, Multari and Clark Associates.

10. Expert testimony for William S. Walter, Attorney, eminent domain compensation case, San Luis Obispo, CA.

11. QAD Inc., Summerland, CA. Chiller installation noise assessment and mitigation design evaluation to meet County of Santa Barbara noise standards.

**Academic Qualifications**

David Lord is a Professor Emeritus of Architecture at California Polytechnic State University, San Luis Obispo, where he developed the curriculum and taught courses in community noise and acoustical engineering.

David Lord holds the Master of Architecture degree from the University of California, Berkeley, with a specialization in architectural acoustics. David Lord earned the Ph.D. degree from the University of London, Bartlett School of Architecture.

**Memberships**

David Lord is a member of the American Society of Heating, Refrigerating and Air Conditioning Engineers, the Acoustical Society of America, the American Institute of Physics, the Institute of Noise Control Engineering, and the Audio Engineering Society.