# Noise Study Report

**Carlotta Gardens LLC**

Humboldt County APN 206-331-028-000

PLN-2022-17611

August 2022

Prepared By: Powell Consulting Date: August 16, 2022

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## Summary

Carlotta Gardens LLC plans to open and operate a Farm-Based Retail Stand (hereinafter referred to as "Project") on the site of their existing licensed outdoor and mixed-light cultivation located on Humboldt County APN 206-331-028-000 located in Carlotta, CA. The project is designed to sell only products grown from the existing licensed outdoor and mixed-light cultivation operated by Carlotta Gardens LLC on the above-mentioned APN..

- Project Location: APN 206-331-028-00

  6287 Highway 36

  Carlotta, CA 95528

- Project Purpose: To operate a Farm-Based Retail Stand

- Existing Noise Levels: The main source of noise in relation to this project comes from Eastbound and Westbound traffic on CA Highway 36

- Average Decibel Reading: 61.37 dB

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# Chapter 1. Introduction

## 1.1 Purpose of the Noise Study Report

The purpose of this Noise Study Report is to provide information and data to the Humboldt County Planning Department to assist with Carlotta Gardens LLC's application PLN-2022-17611 for a Farm-Based Retail Stand.

# Chapter 2. Fundamentals of Noise Levels

**Table 2-1. Typical A-Weighted Noise Levels**

| Common Outdoor Activities | Noise Level (dBA) | Common Indoor Activities |
|---|---|---|
| | — 110 — | Rock band |
| Jet fly-over at 1000 feet | | |
| | — 100 — | |
| Gas lawn mower at 3 feet | | |
| | — 90 — | |
| Diesel truck at 50 feet at 50 mph | | Food blender at 3 feet |
| | — 80 — | Garbage disposal at 3 feet |
| Noisy urban area, daytime | | |
| Gas lawn mower, 100 feet | — 70 — | Vacuum cleaner at 10 feet |
| Commercial area | | Normal speech at 3 feet |
| Heavy traffic at 300 feet | — 60 — | |
| | | Large business office |
| Quiet urban daytime | — 50 — | Dishwasher next room |
| Quiet urban nighttime | — 40 — | Theater, large conference room (background) |
| Quiet suburban nighttime | | |
| | — 30 — | Library |
| Quiet rural nighttime | | Bedroom at night, concert hall (background) |
| | — 20 — | |
| | | Broadcast/recording studio |
| | — 10 — | |
| Lowest threshold of human hearing | — 0 — | Lowest threshold of human hearing |

*Source:* Caltrans 2013.

## 2.1. Human Response to Changes in Noise Levels

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the midfrequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound, would generally be perceived as barely detectable.

## 2.2. Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

- **Equivalent Sound Level ($L_{eq}$):** $L_{eq}$ represents an average of the sound energy occurring over a specified period. In effect, $L_{eq}$ is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level ($L_{eq}[h]$) is the energy average of A-weighted sound levels occurring during a one-hour period, and is the basis for noise abatement criteria (NAC) used by Caltrans and FHWA.

- **Percentile-Exceeded Sound Level ($L_{xx}$):** $L_{xx}$ represents the sound level exceeded for a given percentage of a specified period (e.g., $L_{10}$ is the sound level exceeded 10% of the time, and $L_{90}$ is the sound level exceeded 90% of the time).

- **Maximum Sound Level ($L_{max}$):** $L_{max}$ is the highest instantaneous sound level measured during a specified period.

- **Day-Night Level ($L_{dn}$):** $L_{dn}$ is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.

- **Community Noise Equivalent Level (CNEL):** Similar to $L_{dn}$, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m., and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

## 2.3. Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

### 2.3.1. Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 decibels for each doubling of distance from a line source.

### 2.3.2. Ground Absorption

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water,), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 decibels per doubling of distance.

### 2.3.3. Atmospheric Effects

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

### 2.3.4. Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often

constructed between a source and a receptor specifically to reduce noise. A barrier that breaks the line of sight between a source and a receptor will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receptor is rarely effective in reducing noise because it does not create a solid barrier.

# **Chapter 3.** Methods and Procedures

On May 30th, 2022 a sound survey was conducted on multiple property lines on APN 206-331-028-00 over a continuous 24 hour period to measure maximum, minimum, and average decibel readings. Position CG-1W was on the Westernmost property line; Position CG-2E was on the Easternmost property line; and Position CG3-S was on the Southernmost property line close to CA Highway 36.

**Table 3-1. Summary of Short-Term Measurements**

| Position | Address | Area | Land Uses | Start Time | Duration (hours) | Maximum Measured dB | Minimum Measured dB | Average Measured dB | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CG-1W | 6287 Hwy36 Carlotta, CA 95528 | N/A | Agricultural | 5:22 p.m. | 24 | 68.5 | 43.4 | 55.95 | | |
| CG-2E | 6287 Hwy36 Carlotta, CA 95528 | N/A | Agricultural | 5:31 p.m. | 24 | 65.5 | 39.2 | 52.35 | | |
| CG-3S | 6287 Hwy36 Carlotta, CA 95528 | N/A | Agricultural | 5:38 p.m. | 24 | 79.5 | 72.1 | 75.8 | | |
| | | | | | | | | | | |

# Chapter 4. Conclusion

The noise levels taken over a 24 hour period as referenced in Table 3-1 seem to fall into expected decibel readings for an outdoor commercial agricultural operation with the loudest readings taken close to the property line adjacent to CA Highway 36 which functions as a busy arterial highway to the US-101.


**Permit Details**

**Permit: EPIMS-HUM-29879-R1C - Carlotta Gardens - 2022**

| | |
|---|---|
| **Status:** | Underway |
| **Region:** | Region 1 (Coastal) |
| **Permittee Organization:** | Carlotta Gardens |
| **CDFW Contact:** | Joshua Gruver |

## *Standard Agreement*

# *Signature Page*

This Standard Agreement is being issued to:

Val Levi

| | |
|---|---|
| **Final Standard Agreement:*** | EPIMS-HUM-29879-R1C_Final_Standard_Agreement.pdf<br>Open and print the attached PDF file. |

## *Exhibits*

## *Concurrence*

I am the applicant or I have the authority to sign for the applicant. By my signature, I accept and agree to comply with all the provisions contained herein.

| | |
|---|---|
| **Final Agreement Effective Date:** | 07/19/2022 |
| **Permittee Electronic Signature:** | Val Levi<br>First and Last Name |
| **Date Signed:** | 07/19/2022 |

Department of Fish and Wildlife

| | |
|---|---|
| **CDFW Electronic Signature:** | Angela Liebenberg |
| **CDFW Representative Title:** | Senior Environmental Scientist (Supervisor) |
| **Date Signed:** | 07/19/2022 |
| **Acting for:** | Yes |
| **Acting for the listed CDFW Representative:** | Rebecca Garwood<br>First and Last Name |