

ENVIRONMENTAL NOISE ASSESSMENT

**GRANITE CREEK PRECISE PLAN
MADERA, CALIFORNIA**

WJVA Report No. 24-65

PREPARED FOR

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1. INTRODUCTION

Project Description:

DR Horton (Applicant) requests an Annexation, General Plan Amendment, Pre-Zone, Tentative Parcel Map, and Tentative Subdivision Map for to develop the Granite Creek Precise Plan (Project, or Plan Area). The Project consists of the following:

Annexation to annex approximately 327-acres of property located on the north side of Avenue 14-½ between Road 23 and Road 24 into the City of Madera.

General Plan Amendment (GPA) to change the existing land use to a mix of uses, including residential, mixed use, commercial, open space, and public/semi-public uses as detailed in Figure 2-4. In 2009, the City of Madera adopted its current General Plan which designates the 204-acres of the Granite Creek Plan Area (Plan Area) as Village Reserve (VR). The GPA will also remove the Village E Specific Policy that requires a permanent agricultural buffer where the westerly edge of the Village abuts the Growth Boundary. While only 60-acres of the project is proposed for immediate development, a general plan amendment for 210-acres is proposed.

Pre-Zone to zone approximately 327-acres of property consistent with existing City of Madera zone districts. Proposed zoning includes approximately: 5.48 acres of P-D (1500), 35.35 acres of P-D (3000), 105.44 acres of P-D (4500), 18.27 acres of P-D (6000), 10.06 acres of C-1 (Light Commercial), 15.19 acres of C-N (Neighborhood Commercial), 22.34 acres of PF (Public Facilities), 23.70 acres of RCO (Resource Conservation and Open Space), and 91.61 acres of Unclassified zoning (Fresno River) as shown on Figure 2-5.

Tentative Subdivision Map to subdivide the approximately 60-acre parcel into 345 residential lots ranging in size from 4,500 square feet to 10,723 square feet (sf.). Approximately 60 acres of the 203-acre development are proposed for residential development. The 60-acre site is proposed to be developed with 345 residential lots at approximately 6.1 dwelling units per acre and with a 1.19-acre out lot for development as a park area along with streets, lighting, and outer landscape areas to accommodate sidewalk and trail areas. The 60-acre residential development is located entirely on APN 045-070-025 and will be built over three (3) phases of development beginning at the south end of the parcel closest to Road 14-1/2.

Project Assumptions

Although the only physical development proposed by the Project includes the 60-acre TSM as described previously, this environmental document analyzes the potential buildout of the Project site at a programmatic level, using reasonable assumptions so that future development described in the Precise Plan can tier from this EIR pursuant to CEQA Guidelines Section 15168(C)(1) and 15168(d) for evaluations of environmental issues associated with later activities/subsequent projects. Depending on the final design of future physical development, additional project specific CEQA review may be required as determined by the City through the entitlement review and approval process.

The proposed density, intensity, acreage, and realistic maximum development potential (housing units or square footage) of the proposed Project are summarized in Table 2-1. Build out of the Granite Creek Plan Area is limited to a maximum of 1,542 residential dwelling units and approximately 612,235 square feet over approximately 204 acres. Proposed development beyond these limitations may require additional environmental review. The number of residents at full build out is estimated at 5,119 based on an average household size of 3.32. Nearly 60% of the proposed Project area is planned for residential uses, followed by 40% planned for employment uses including commercial and mixed use, and the remaining for public institutional (K-8 School Site), open space, and roadways.

Table I: Project Buildout Assumptions

Land Use Designation	Zoning Designation	Total Acreage	Maximum Dwelling Units per Gross Acre or Maximum Non-Residential Floor Area Ratio	Maximum Development Potential
Residential Land Use Designations				
Low Density Residential	P-D (4500)	105.44	2.1 – 7.0 dwelling units	738 units
Medium Density Residential	P-D (3000)	35.35	7.1 – 15.0 dwelling units	530 units
High Density Residential	Residential	Low Density Residential	PD (6000), PD (4500) (City)	274 units
Employment Land Use Designations				
Village Mixed Use (VMU)	C-1 (Light Commercial)	10.06	0.5 Maximum Non-Residential FAR	219,106 square feet
Commercial (C)	C-N (Neighborhood Commercial)	15.19	0.3 Maximum Non-Residential FAR	198,503 square feet
Public and Semi-Public Land Use Designations				
Other Public and Semi-Public	PF (Public Facilities)	22.34	0.2 (Assumed Maximum FAR)	194,626 square feet
Open Space	RCO (Resource Conservation and Open Space)	9.74	0.2 (Assumed Maximum FAR)	84,854 square feet
TOTAL		203.60	--	1,542 units 612,235 square feet

Currently, there are no plans for the development of the remaining 123 acres of land proposed to be annexed. However, entitlements for this project will include a General Plan Amendment for approximately 210 acres and Pre-Zoning of all 327 acres. This includes the establishment of a 20-acre K-8 school site and an 8.8-acre dual use basin for water retention and recreational purposes.

Infrastructure

Water

The proposed Project will connect to the existing City water system. Per the City of Madera Water System Master Plan, the Project will install master planned water mains on Avenue 14 ½: a 12-inch between Road 23 ½ and Buena Posada Drive, and an 18-inch water main between Road 23 and Road 23 ½. An 18-inch water main will also be installed in the westerly boundary of the Project and will tie-in to the Villages at Almond Grove Development, located to the north.

The proposed Project will comply with the California Green Building Code standards, which requires residential and nonresidential water efficiency and conservation measures for new buildings and structures that will reduce the overall potable water use inside the building by 20 percent. The Project will be required to install ultra-low flow fixtures and appliances. All development within the Project area will be required to install water meters at all service connections. The City will assess service charges based on volumetric rates and/or tiered rates, which encourages reasonable water use.

Wastewater

The City of Madera Sanitary Sewer System Master Plan identified the need for an additional sewer trunk line running down Road 23 (Road 23 Trunk) to connect to the existing Wastewater Treatment Plant (WWTP). The Road 23 Trunk will be a 30-inch line that connects to a 48-inch line running parallel to an existing 48-inch pipe on Avenue 13. Both 48-inch pipelines will connect to the existing WWTP. The 30-inch line will be approximately 16,000 (about 8,000 at the Avenue 14 ½ tie-in) linear feet (lf) and the parallel 48-inch pipe will be approximately 8,000. It was determined that there is sufficient capacity to temporarily tie into the Westberry Boulevard Sewer Line (Westberry Trunk) until the Road 23 Sewer Trunk Line is installed. This is supported by a report from Akel Engineering, the City's consultant for their sewer master plan. The report dated December 21, 2023, and titled Sewer System Hydraulic Analysis for Granite Creek Subdivision, analyzed the possibility for the first 345 lots of the Granite Creek Development to be accommodated by the Westberry Trunk. The report indicated that the extra capacity is due in part to greater water use efficiency since the adoption of the 2014 Sewer System Master Plan.

A lift station will be needed to temporarily direct sewer flows to the Westberry Trunk. The lift station will be located along Avenue 14 ½, on the east side of the development area, near the entrance to the initial first 345 lots. Upon the installation of the Road 23 Trunk, Granite Creek would be required to reverse sewer flows to the Road 23 Trunk and remove the temporary lift station.

The entire project site is estimated to generate 187,000 gallons per day (gpd) of wastewater flows. Assuming seven percent inflow and infiltration, the total generated wastewater is expected to be about 200,000 gpd.

Storm Basin

The proposed basin will be a dual-use basin that will have a park area and a low flow area. The low flow area will have enough capacity so that a 2-year storm event can be retained without utilizing storage from the park area. The park area will only be used for storage during other major storm events. Approximately 54 acre-feet will be required to store the anticipated runoff generated from the project area during a 100-year major storm event, while 14 acre-feet will be needed to store the 2-year storm event flows.

A smaller temporary basin will be constructed for the initial 345 units at the same location and will be gradually expanded as development occurs. The ultimate basin design will be constructed at full buildout or when conditioned by the City.

Electric, Natural Gas and Telecommunication

Power will be provided to the Project area by Pacific Gas and Electric Company (PG&E). The location and alignment of future electrical lines will be determined by PG&E based on the required electrical loads and existing capacity of surrounding infrastructure. Natural gas will also be provided by PG&E through the extension of existing gas distribution lines. Telecommunications will be provided through existing telephone lines and wireless communication systems.

Environmental Noise Assessment:

This environmental noise assessment has been prepared to determine if significant noise impacts will be produced by the project and to describe mitigation measures for noise if significant impacts are determined. The environmental noise assessment, prepared by WJV Acoustics, Inc. (WJVA), is based upon the project Land Use Plan map dated 3/7/24 (Figure 1), traffic data provided by Provost & Pritchard Consulting Group, a project site visit on March 26 & 27, 2025. Revisions to the Land Use Map, project traffic information, or other project-related information available to WJVA at the time the analysis was prepared may require a reevaluation of the findings and/or recommendations of the report.

Appendix A provides definitions of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported in this analysis are A-weighted sound pressure levels in decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighted sound levels, as they correlate well with public reaction to noise. Appendix B provides examples of sound levels for reference.

2. THRESHOLDS OF SIGNIFICANCE

The CEQA Guidelines apply the following questions for the assessment of significant noise impacts for a project:

- a. Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
- b. Would the project result in generation of excessive groundborne vibration or groundborne noise levels?
- c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

a. Noise Level Standards

City of Madera

General Plan

The Noise Element of the City of Madera General Plan¹ (Noise Element) establishes noise level compatibility standards in terms of the Day-Night Average Level (L_{dn}) or Community Noise Equivalent Level (CNEL). Both the L_{dn} and CNEL represent the time-weighted energy average noise level for a 24-hour day, with a 10 dB penalty added to noise levels occurring during the nighttime hours (10:00 p.m.-7:00 a.m.). The CNEL includes an additional penalty of 5 dB (technically 4.77 dB) that is added to noise levels occurring during the evening hours between 7:00 p.m. and 10:00 p.m. Both the L_{dn} and CNEL represent cumulative exposure to noise over an extended period of time and are therefore calculated based upon *annual average* conditions. The L_{dn} and CNEL are considered to be equivalent descriptors of the community noise environment for the purposes of this study. Table I provides the City of Madera noise level standards for transportation noise sources.

For transportation noise sources, the Noise Element establishes an exterior noise exposure of less than 60 dBA L_{dn} as “completely compatible”, an exterior noise exposure of 60-70 dBA L_{dn} as “tentatively compatible”, an exterior noise exposure of 70-75 dBA L_{dn} as “normally incompatible” and an exterior noise exposure exceeding 75 dB L_{dn} as “completely incompatible”. Exterior noise level standards are typically applied to individual outdoor activity areas. Outdoor activity areas generally include backyards of single-family residences, individual patios or decks of multi-family developments and common outdoor recreation areas of multi-family developments. The intent of the exterior noise level requirement is to provide an acceptable noise environment for outdoor activities and recreation.

- “Completely Compatible” means that the specified land use is satisfactory and both the indoor and outdoor environments are pleasant.
- “Tentatively Compatible” means that noise exposure may be of concern, but common building construction practices will make the indoor living environment acceptable, even for sleeping quarters, and outdoor activities will not be unduly disturbed by noise.
- “Normally Incompatible” means that noise exposure warrants special attention, and new construction or development should generally be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features are included in the design. Careful site planning or exterior barriers may be needed to make the outdoor environment tolerable.
- “Completely Incompatible” means that the noise exposure is so severe that new construction or development should generally not be undertaken.

TABLE II: EXTERIOR NOISE COMPATIBILITY GUIDELINES FOR NOISE FROM ALL SOURCES, INCLUDING TRANSPORTATION NOISE (24-HOUR DAY-NIGHT AVERAGE [CNEL/Ldn])

Land Use Designations	Completely Compatible	Tentatively Compatible	Normally Incompatible	Completely Incompatible
All Residential (Single- and Multi-Family)	Less than 60 dBA	60-70 dBA	70-75 dBA	Greater than 75 dBA
All Commercial	Less than 70 dBA	70-75 dBA	Greater than 75 dBA	(1)
Public Parks (Lands designated as Open Space on which public parks are located or planned)	Less than 65 dBA	65-70 dBA	70-75 dBA	Greater than 75 dBA

(1) No “Completely Incompatible” category is shown for commercial uses because not all commercial uses are incompatible with noisy environments. The City may determine as part of the review of individual development proposals that some types of commercial uses are incompatible with noise environments in excess of 75 dBA CNEL.

Additionally, the Noise Element requires that interior noise levels attributable to exterior transportation noise sources not exceed 45 dB L_{dn}. The intent of the interior noise level standard is to provide an acceptable noise environment for indoor communication and sleep.

The following are the City’s standards for maximum exterior non-transportation noise levels to which land designated for residential land uses may be exposed for any 30-minute period on any day.

- Where existing ambient noise levels exceed these standards, the ambient noise level shall be highest allowable noise level as measured in dBA L_{eq} (30 minutes).
- The noise levels specified (below in Table II) shall be lowered by 5 dB for simple tonal noises (such as humming sounds), noises consisting primarily of speech or music, or for recurring impulsive noises (such as pile drivers, punch presses, and similar machinery). Example: The Single Family/Duplex standard from 10 p.m. to 7 a.m. for these types of noises is 45 dBA.

**TABLE III: EXTERIOR NOISE LEVEL STANDARDS
FOR NON-TRANSPORTATION NOISE, MEASURED AS dBA L_{eq} (30 MINUTES)**

Land Use Type	Time Period	Maximum Noise Level (dBA)
Single-Family Homes and Duplexes	10 p.m. to 7 a.m.	50
	7 a.m. to 10 p.m.	60
Multiple Residential 3 or More Units Per Building (Triplex +)	10 p.m. to 7 a.m.	55
	7 a.m. to 10 p.m.	60

b. Construction Noise and Vibration

Section 3-11.02(B) of the City of Madera Municipal Code² (Specific Noise Prohibitions) limits hours of noise-producing construction activities to between the hours of 6:00 a.m. and 8:00 p.m., daily.

There are no City of Madera Vibration level standards. Some guidance is provided by the Caltrans Transportation and Construction Vibration Guidance Manual³. The Manual provides guidance for determining annoyance potential criteria and damage potential threshold criteria. These criteria are provided below in Table IV and Table V, and are presented in terms of peak particle velocity (PPV) in inches per second (in/sec).

TABLE IV GUIDELINE VIBRATION ANNOYANCE POTENTIAL CRITERIA		
Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.1
Severe	2.0	0.4

Source: Caltrans

TABLE V		
GUIDELINE VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA		
Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile, historic buildings, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5
Source: Caltrans		

State of California

There are no state noise standards that are applicable to the project.

Federal Noise Standards

There are no federal noise standards that are applicable to the project.

3. SETTING

The Granite Creek Plan Area (Plan Area) is generally located east of Road 23 between Avenue 14-1/2 and the Fresno River in unincorporated Madera County. The Plan Area is bound by Avenue 14-1/2 to the south, Road 23 to the west, the Fresno River to the north, and Road 24 to the east. The Plan Area consists of two (2) properties that total approximately 204 acres that are generally bound to the north by the Fresno River, to the south by Avenue 14-1/2, to the west by Road 23, and to the east by the Vineyard West Phase II Subdivision. The Plan Area is directly west of the city limits of the City of Madera and lies within the Urban Growth Boundary (UGB) and the Sphere of Influence (SOI) for the City of Madera. The Plan Area consists of two (2) parcels including Madera County Assessor's Parcel Numbers (APNs) 045-070-025 and a portion of 045-070-026.

The proposed Plan Area lies within the UGB and SOI just west of the current city limit boundary. It is the policy of the City of Madera that any lands in the Planning Area outside of the City which are proposed to be converted from agricultural uses be annexed to the City before development. The City supports the annexation of property to its boundaries for the purpose of new development when sufficient public infrastructure, facilities, and services are available or will be provided in conjunction with the new development. A majority of the Granite Creek Planning Area is currently in agricultural production of grapes and various tree crops.

The Plan Area is surrounded primarily by agricultural uses to the north and west and single-family residential uses to the east. The south side of the Planning Area includes a combination of residential uses and agricultural uses.

A majority of the properties surrounding the Planning Area to the south and west are planned and zoned for agricultural uses. Properties to the north and east are planned and zoned for multiple uses including residential, commercial, industrial, office, public institutional, and open spaces.

a. Background Noise Level Measurements

Existing noise levels in the project vicinity are dominated by traffic noise along local roadways and noise associated with various agricultural land uses near and within the project site, as well as occasional aircraft overflights. Measurements of existing ambient noise levels in the project vicinity were conducted on March 26 & 27, 2025. Long-term (24-hour) ambient noise level measurements were conducted at three (3) locations (sites LT-1, LT-2, and LT-3). Ambient noise levels were measured for a period of 24 continuous hours at each of the three locations. Site LT-1 was located within the western portion of the project site, along Road 23. Site LT-2 was located within the southern portion of the project site, along Avenue 14 ½. Site LT-3 was located within the eastern portion project site, along Road 24. All three sites were exposed to noise associated with vehicle traffic on roadways as well as periodic agricultural activities and occasional aircraft overflights. Additionally, site LT-2 was exposed to noise associated with rural residential land uses and site LT-3 was exposed to noise associated with construction activities and residential land uses. The locations of the long-term ambient noise monitoring sites are provided on Figure 2.

Noise monitoring equipment consisted of Larson-Davis Laboratories Model LDL-820 sound level analyzers equipped with B&K Type 4176 1/2" microphones. The equipment complies with the specifications of the American National Standards Institute (ANSI) for Type I (Precision) sound level meters. The meters were calibrated with a B&K Type 4230 acoustic calibrator to ensure the accuracy of the measurements.

Measured hourly energy average noise levels (L_{eq}) at site LT-1 ranged from a low of 54.4 dB between 2:00 a.m. and 3:00 a.m. to a high of 69.1 dB between 5:00 p.m. and 6:00 p.m. Hourly maximum (L_{max}) noise levels at site LT-1 ranged from 77.9 to 93.4 dB. Residual noise levels at the monitoring site, as defined by the L_{90} , ranged from 28.5 to 51.3 dB. The L_{90} is a statistical descriptor that defines the noise level exceeded 90% of the time during each hour of the sample period. The L_{90} is generally considered to represent the residual (or background) noise level in the absence of identifiable single noise events from traffic, aircraft, and other local noise sources. The measured L_{dn} value at site LT-1 was 70.0 dB L_{dn} . Figure 3 graphically depicts hourly variations in ambient noise levels at site LT-1. Figure 4 provides a photograph of measurement site LT-1.

Measured hourly energy average noise levels (L_{eq}) at site LT-2 ranged from a low of 41.3 dB between 1:00 a.m. and 2:00 a.m. to a high of 62.4 dB between 9:00 a.m. and 10:00 a.m. Hourly maximum (L_{max}) noise levels at site LT-2 ranged from 73.8 to 85.4 dB. Residual noise levels at the monitoring site, as defined by the L_{90} , ranged from 27.2 to 44.6 dB. The measured L_{dn} value at site LT-2 was 61.0 dB L_{dn} . Figure 5 graphically depicts hourly variations in ambient noise levels at site LT-2. Figure 6 provides a photograph of measurement site LT-2.

Measured hourly energy average noise levels (L_{eq}) at site LT-3 ranged from a low of 33.4 dB between 2:00 a.m. and 3:00 a.m. to a high of 50.5 dB between 8:00 a.m. and 9:00 a.m. Hourly maximum (L_{max}) noise levels at site LT-3 ranged from 41.8 to 78.1 dB. Residual noise levels at the monitoring site, as defined by the L_{90} , ranged from 31.2 to 43.8 dB. The measured L_{dn} value at site LT-3 was 48.4 dB L_{dn} . Figure 7 graphically depicts hourly variations in ambient noise levels at site LT-3. Figure 8 provides a photograph of measurement site LT-3.

Additionally, short-term (15-minute) ambient noise level measurements were conducted at five (5) locations (Sites ST-1 through ST-5). Two (2) individual measurements were taken at each of the five short-term sites to quantify ambient noise levels in the morning and afternoon hours. The locations of the five short-term noise monitoring sites are provided on Figure 2.

Table VI summarizes short-term noise measurement results. The noise measurement data included energy average (L_{eq}) maximum (L_{max}) as well as five (5) individual statistical parameters. Observations were made of the dominant noise sources affecting the measurements. The statistical parameters describe the percent of time a noise level was exceeded during the measurement period. For instance, the L_{90} describes the noise level exceeded 90 percent of the time during the measurement period, and is generally considered to represent the residual (or background) noise level in the absence of identifiable single noise events from traffic, aircraft, and other local noise sources.

Short-term noise measurements were conducted for 15-minute periods at each of the five sites. Sites ST-1 and ST-2 were located northeast of the project site, in the vicinity of existing residential land uses. Site ST-3 was located southwest of the project site, along the east side of Road 23. Site ST-4 was located south of the project site, along the east side of Road 12 ½. Site ST-5 was located southeast of the project site, along the west side of Road 24. Sites ST-3 through ST-5 were located in the vicinity of existing rural residential land uses. The overall noise measurement data indicate that noise in the project vicinity is highly influenced by vehicular traffic along adjacent roadways.

TABLE VI
SUMMARY OF SHORT-TERM NOISE MEASUREMENT DATA
GRANITE CREEK PRECISE PLAN, MADERA
MARCH 26 & 27, 2025

Site	Time	A-Weighted Decibels, dBA							Sources
		L _{eq}	L _{max}	L ₂	L ₈	L ₂₅	L ₅₀	L ₉₀	
ST-1	8:15 a.m.	44.4	56.2	53.8	46.4	43.1	42.6	36.7	TR, AG, L
ST-1	4:05 p.m.	48.9	68.4	59.2	50.5	44.3	41.0	39.6	TR, AC
ST-2	8:40 a.m.	44.8	56.1	51.6	48.3	42.2	40.1	39.0	TR, B, D, C
ST-2	4:30 p.m.	45.5	60.8	50.0	47.4	45.5	43.8	41.6	TR, D
ST-3	9:00 a.m.	61.4	77.8	72.3	65.1	63.8	58.2	55.6	TR, AG
ST-3	4:50 p.m.	63.3	82.4	73.0	66.4	65.0	57.7	56.0	TR, AC
ST-4	9:20 a.m.	54.3	69.4	66.2	56.2	53.0	48.7	46.4	TR, B, D
ST-4	5:10 p.m.	56.1	71.4	65.8	60.1	52.2	49.6	48.5	TR, D, L
ST-5	9:40 a.m.	57.2	74.0	70.5	61.6	54.0	46.8	45.6	TR, AG
ST-5	5:30 p.m.	55.5	71.5	67.4	58.9	52.7	45.0	44.2	TR, AC

TR: Traffic AC: Aircraft AG: Agricultural Activities C: Construction Activities B: Birds D: Barking Dogs V:Voices L: Landscaping Activities
Source: WJV Acoustics, Inc.

4. NOISE IMPACTS TO OFF-SITE SENSITIVE RECEPTORS, AND MITIGATION MEASURES

a. Project Traffic Noise Impacts on Existing Noise-Sensitive Land Uses Outside Project Site

WJVA utilized the FHWA Traffic Noise Model⁴ to quantify expected project-related increases in traffic noise exposure along roadways in the project vicinity. The FHWA Model is a standard analytical method used by state and local agencies for roadway traffic noise prediction. The model is based upon reference energy emission levels for automobiles, medium trucks (2 axles) and heavy trucks (3 or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions, and is generally considered to be accurate within ± 1.5 dB. To predict L_{dn} values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Traffic volumes for the analyzed receptor locations were provided by the project traffic engineer, Provost & Pritchard. Truck percentages and the day/night distribution of traffic were estimated by WJVA, based upon previous studies conducted in the project vicinity since project-specific data were not available from government sources. The Noise modeling assumptions used to calculate project traffic noise are provided as Appendix C.

Traffic noise exposure levels for Existing, Existing Plus Project, 2045 Cumulative No Project and 2045 Cumulative Plus Project traffic scenarios were calculated based upon the FHWA Model and the above-described model inputs and assumptions. Project-related significant impacts would occur if an increase in traffic noise associated with the project would result in noise levels exceeding the City's applicable noise level standards at the location(s) of sensitive receptors. For the purpose of this analysis a significant impact was also assumed to occur if traffic noise levels were to increase by 3 dB at sensitive receptor locations where noise levels already exceed the City's applicable noise level standards (without the project), as 3 dB generally represents the threshold of perception in change for the human ear.

The City of Madera General Plan establishes an exterior noise level of up to 60 dB L_{dn} as "Completely Compatible" and an exterior noise level up to 70 dB L_{dn} as "Tentatively Compatible." "Completely Compatible" means that the specified land use is satisfactory and both the indoor and outdoor environments are pleasant. "Tentatively Compatible" means that noise exposure may be of concern, but common building construction practices will make the indoor living environment acceptable, even for sleeping quarters, and outdoor activities will not be unduly disturbed by noise.

Traffic noise was modeled at thirteen (13) receptor locations. The thirteen modeled receptors are located at roadway setback distances representative of the sensitive receptors (residences) along each analyzed roadway segment. The receptor locations are described below and provided graphically on Figure 9.

- R-1: Approximately 75 feet from the centerline of Cleveland Ave
- R-2: Approximately 75 feet from the centerline of Cleveland Ave
- R-3: Approximately 165 feet from the centerline of Avenue 14 ½
- R-4: Approximately 60 feet from the centerline of Sunset Ave
- R-5: Approximately 60 feet from the centerline of Sunset Ave
- R-6: Approximately 60 feet from the centerline of Sunset Ave
- R-7: Approximately 80 feet from the centerline of Sunset Ave
- R-8: Approximately 75 feet from the centerline of Sunset Ave
- R-9: Approximately 60 feet from the centerline of Avenue 14
- R-10: Approximately 280 feet from the centerline of Road 24
- R-11: Approximately 70 feet from the centerline of Westberry Blvd
- R-12: Approximately 75 feet from the centerline of Granada Dr
- R-13: Approximately 80 feet from the centerline of Schnoor Ave

Several of these roadway segments either have existing sound walls or the residences themselves provide acoustic shielding to the individual backyards. This acoustic shielding was accounted for in the noise model, with an estimated 5 dB of traffic noise attenuation provided.

Existing Conditions

Table VII provides existing traffic noise exposure levels at the thirteen analyzed representative receptor locations, and provides what the project contribution would be to existing traffic conditions.

TABLE VII PROJECT CONTRIBUTION TO FUTURE TRAFFIC NOISE, dB, L_{dn} GRANITE CREEK PRECISE PLAN, MADERA EXISTING TRAFFIC CONDITIONS				
Modeled Receptor	Existing Without Project Contribution	Existing Plus Project	Project Contribution	Significant Impact?
R-1	55	57	+2	No
R-2	59	60	+1	No
R-3	41	52	+11	No
R-4	52	58	+6	No
R-5	53	58	+5	No
R-6	56	58	+2	No
R-7	59	60	+1	No
R-8	59	60	+1	No
R-9	58	58	0	No
R-10	44	45	+1	No
R-11	53	53	0	No
R-12	60	61	+1	No
R-13	56	57	+1	No

Source: WJV Acoustics, Inc.
Provost & Pritchard

2045 Cumulative Conditions

Table VIII provides 2045 Cumulative traffic noise exposure levels at the thirteen analyzed representative receptor locations, and provides what the project contribution would be to 2045 Cumulative traffic conditions.

TABLE VIII PROJECT CONTRIBUTION TO FUTURE TRAFFIC NOISE, dB, L _{dn} GRANITE CREEK PRECISE PLAN, MADERA 2045 CUMULATIVE TRAFFIC CONDITIONS				
Modeled Receptor	2045 Conditions Without Project Contribution	2045 Conditions Plus Project	Project Contribution	Significant Impact?
R-1	57	58	+1	No
R-2	60	61	+1	No
R-3	43	52	+9	No
R-4	54	59	+5	No
R-5	55	59	+4	No
R-6	57	59	+2	No
R-7	60	61	+1	No
R-8	60	61	+1	No
R-9	59	59	0	No
R-10	46	47	+1	No
R-11	54	54	0	No
R-12	61	62	+1	No
R-13	57	58	+1	No

Source: WJV Acoustics, Inc.
Provost & Pritchard

Reference to Table VII and Table VIII indicate that the project's contribution could result in exterior noise levels to exceed 60 dB L_{dn} (Completely Compatible) but would not result in noise exposure levels at any sensitive receptor to exceed the 70 dB L_{dn} threshold (Tentatively Compatible). The highest anticipated noise exposure level would be approximately 62 dB L_{dn}. With such exterior noise levels, interior noise levels would not be expected to exceed the 45 dB L_{dn} interior noise level standard, and as such, would not be considered a significant impact and would remain compatible with the City of Madera noise compatibility standards.

b. Proposed Impacts From Operational On-Site Sources

The proposed Project would include two land use designations with the potential to result in noise impacts to existing noise-sensitive (residential) land uses. These land uses include Village Mixed Use (10.06 acres) and Commercial (15.19 acres).

- **Village Mixed Use:** This category provides for a mix of uses generally corresponding to the Medium Density Residential, High Density Residential, and Commercial land use categories. This designation is to be applied in the Village Centers and implemented through standard zoning districts, specific plans, planned development, or other methods.
- **Commercial:** This is the City's retail commercial land use category. A broad range of commercial uses is allowed, including professional offices. Various zoning designations shall be used to determine the specific character of commercial development, from regional shopping centers to neighborhood stores. The maximum floor area ratio (FAR) for the Commercial designation is 0.30.

The noise level standards applicable to these proposed land uses are provided above in Table III (Exterior Noise Level Standards for Non-Transportation Noise). The noise standards become 5-10 dB more restrictive during nighttime hours (10:00 p.m. to 7:00 a.m.)

A wide variety of noise sources can be associated with such commercial, retail, and mixed-use land uses. The noise levels produced by such sources can also be highly variable and could potentially impact existing off-site and proposed on-site sensitive receptors. Typical examples of stationary noise sources associated with such land uses include:

- HVAC/Mechanical equipment
- Truck movements
- Parking lot activities (closing of car doors and trunks, stereos, alarms etc.)
- Drive-Through operations
- Loading Dock Activities
- Car Wash Operations
- Refuse/Cardboard Compactor

The exact quantity, type and location of such noise-producing sources were not known at the time of this analysis. These potential noise sources are discussed in general terms below.

HVAC Mechanical Equipment

It is assumed that various components of the above-described land uses would include ground- or roof-mounted HVAC units for interior spaces. WJVA has conducted reference noise level measurements at numerous commercial and retail buildings with roof-mounted HVAC units, and associated noise levels typically range between approximately 45-50 dB at a distance of 50 feet from the building façade.

Truck Movements

Truck movements and deliveries would likely be associated with these land uses. Additionally, the Industrial Park land use designation could potentially include warehousing and/or distribution centers, which would involve associated truck movements.

WJVA has conducted measurements of the noise levels produced by slowly moving trucks for a number of studies. Such truck movements would be expected to produce noise levels in the range of 65 to 71 dBA at a distance of 100 feet. The range in measured truck noise levels is due to

differences in the size of trucks, their speed of movement and whether they have refrigeration units in operation during the pass-by.

Parking Lot Activities

Noise due to traffic in parking lots is typically limited by low speeds and is not usually considered to be significant. Human activity in parking lots that can produce noise includes voices, stereo systems and the opening and closing of car doors and trunk lids. Such activities can occur at any time. The noise levels associated with these activities cannot be precisely defined due to variables such as the number of parking movements, time of day and other factors. It is typical for a passing car in a parking lot to produce a maximum noise level of 60-65 dBA at a distance of 50 feet, which is comparable to the level of a raised voice.

Drive-Through Retail

The proposed project could include multiple retail areas that could include drive-through quick-service restaurant operations. In order to assess potential noise levels associated with drive-through operations, WJVA reviewed reference noise levels measured at a Wendy's drive-through restaurant located on South Mooney Boulevard in Visalia. Measurements were conducted during the early afternoon of July 11, 2011 between 12:45 p.m. and 1:45 p.m. using the previously-described noise monitoring equipment.

The microphone used by customers to order food and the loudspeaker used by employees to confirm orders are both integrated into a menu board that is located a few feet from the drive-through lane at the approximate height of a typical car window. Vehicles would enter the drive-through lane from the west and then turn to the north along the east side of the restaurant.

Reference noise measurements were obtained at a distance of approximately 40 feet from the menu board containing the microphone/loudspeaker system at an angle of about 45° toward the rear of the vehicle being served. This provided a worst-case exposure to sound from the loudspeaker system since the vehicle was not located directly between the loudspeaker and measurement location. Cars were lined up in the access lane during the noise measurement period indicating that the drive-through lane was operating at or near a peak level of activity.

Each ordering cycle was observed to take approximately 60 seconds including vehicle movements. A typical ordering cycle included 5-10 seconds of loudspeaker use with typical maximum noise levels in the range of 60-62 dBA at the 40 foot-reference location. Vehicles moving through the drive-through lane produced noise levels in the range of 55-60 dBA at the same distance. Vehicles parked at the ordering position (between the menu board and measurement site) were observed to provide significant acoustic shielding during the ordering sequence. The effects of such shielding are reflected by the noise measurement data. Noise levels were measured to approximately 60 dB L_{eq} at the measurement site, and included noise from all sources, including the loudspeaker, vehicle movements and HVAC equipment.

Loading Dock Activities

Noise sources typically associated with loading dock activities include truck engines, the operation of truck-mounted refrigeration units, fork lifts, the banging of hand carts and roll-up doors, noise from P.A. systems, and the voices of truck drivers and store employees. Truck engines and/or

refrigeration units are typically turned off while trucks are in loading dock areas to reduce noise and save energy. Based upon noise level measurements conducted by WJVA for other studies, loading dock noise levels would be expected to be in the range of approximately 60 to 75 dBA at a distance of 100 feet.

Compactor

Retail and commercial land uses often include exterior-located compactors. Based upon noise studies conducted by WJVA for other projects, the maximum noise level produced by a typical un-enclosed trash compactor (Hydra-Fab Model 1200) is approximately 74 dBA at a distance of 10 feet from the equipment.

Car Wash

Commercial/Retail land use designations could potentially include automated car wash operations. Noise levels associated with automated car wash operations vary widely, based upon car wash type, enclosure type, equipment type and orientation. WJVA has prepared numerous noise studies for various car wash projects. Noise levels associated with automated car wash operations are generally in the range of 83-87 dB at a distance of twenty feet from the source.

Potential Impact:

Noise levels from new stationary noise sources cannot be predicted with any certainty at this time since specific uses have not yet been proposed and the locations of stationary noise sources relative to the locations of new noise sensitive uses are not known. However, under some circumstances there is a potential for such uses exceed the City's noise standards for stationary noise sources at the locations of sensitive receptors.

Mitigation Measures:

Noise levels from new stationary noise sources may be effectively mitigated by incorporating noise mitigation measures into the project design that consider the geographical relationship between the noise sources of concern and potential receptors, the noise-producing characteristics of the sources and the path of transmission between noise sources and sensitive receptors. Options for noise mitigation include the use of building setbacks, the construction of sound walls and the use of noise source equipment enclosures.

When specific uses within the study area are proposed (and their locations are defined) that could result in a noise-related conflict between a commercial or other stationary noise source and project proposed sensitive receptors, an acoustical analysis should be required that quantifies project-related noise levels and recommends appropriate mitigation measures to achieve compliance with the City's noise standards. The acoustical analysis should be the responsibility of the project applicant.

c. Noise from Construction

Construction noise would occur at various locations within and near the project site through various phases. Existing sensitive receptors could be located as close as 100 feet from construction activities. Table IX provides typical construction-related noise levels at distances of 100 feet, 200 feet, and 300 feet.

Construction noise is not considered to be a significant impact if construction is limited to the allowed hours and construction equipment is adequately maintained and muffled. The City of Madera limits hours of construction to occur only between the hours of 6:00 a.m. to 8:00 p.m., daily. Any construction activities occurring outside of these hours would be subject to the City's stationary noise standards provided above in Table III. Construction noise impacts could result in annoyance or sleep disruption for nearby residents if nighttime operations were to occur or if equipment is not properly muffled or maintained.

TABLE IX
TYPICAL CONSTRUCTION EQUIPMENT
MAXIMUM NOISE LEVELS, dBA

Type of Equipment	100 Ft.	200 Ft.	300 Ft.
Concrete Saw	84	78	74
Crane	75	69	65
Excavator	75	69	65
Front End Loader	73	67	63
Jackhammer	83	77	73
Paver	71	65	61
Pneumatic Tools	79	73	69
Dozer	76	70	66
Rollers	74	68	64
Trucks	80	72	70
Pumps	74	68	64
Scrapers	81	75	71
Portable Generators	74	68	64
Backhoe	80	74	70
Grader	80	74	70

Source: FHWA

Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987

A noise impact could occur if construction activities do not incorporate appropriate best management practices in regards to construction-related noise. The following best management practices should be implemented to minimize the potential for noise impacts on existing sensitive receptors in the project area, during project construction.

Best Management Practices:

Noise levels associated with construction activities may be effectively mitigated by incorporating noise mitigation measures and appropriate best management practices. The following best management practices should be applied during periods of project construction.

- All construction equipment shall be properly maintained and muffled as to minimize noise generation at the source.
- Noise-producing equipment shall not be operating, running, or idling while not in immediate use by a construction contractor.
- All noise-producing construction equipment shall be located and operated, to the extent possible, at the greatest possible distance from any noise-sensitive land uses.
- Locate construction staging areas, to the extent possible, at the greatest possible distances from any noise-sensitive land uses.
- Signs shall be posted at the construction site and near adjacent sensitive receptors displaying hours of construction activities and providing the contact phone number of a designated noise disturbance coordinator.

d. Vibration Impacts

The dominant sources of man-made vibration are sonic booms, blasting, pile driving, pavement breaking, demolition, diesel locomotives, and rail-car coupling. Vibration from construction activities could be detected at the closest sensitive land uses, especially during movements by heavy equipment or loaded trucks and during some paving activities (if they were to occur). Typical vibration levels at distances of 100 feet and 300 feet are summarized by Table X. These levels would not be expected to exceed any significant threshold levels for annoyance or damage, as provided above in Table IV and Table V.

TABLE X		
TYPICAL VIBRATION LEVELS DURING CONSTRUCTION		
Equipment	PPV (in/sec)	
	@ 100'	@ 300'
Bulldozer (Large)	0.011	0.006
Bulldozer (Small)	0.0004	0.00019
Loaded Truck	0.01	0.005
Jackhammer	0.005	0.002
Vibratory Roller	.03	0.013
Caisson Drilling	.01	0.006
Source: Caltrans		

5. NOISE IMPACTS TO PROPOSED ON-SITE SENSITIVE RECEPTORS, AND MITIGATION MEASURES

a. Traffic Noise Impacts To Proposed On-Site Receptors

The City of Madera General Plan Noise Element establishes an exterior noise level standard of 60 dB L_{dn} for outdoor activity areas of residential uses. An exterior noise level up to 60 dB L_{dn} is considered “completely compatible” and an exterior noise level up to 70 dB L_{dn} is considered “tentatively compatible” for residential land uses. Outdoor activity areas generally include backyards of single-family residences and individual patios or decks and common outdoor activity areas of multi-family developments. The noise element also requires that interior noise levels attributable to exterior noise sources not exceed 45 dB L_{dn} .

The proposed project would include new sensitive receptors (residential land uses) that could be impacted by traffic noise exposure adjacent to or near arterial roadways. Such roadways include Road 23 and Avenue 14 ½. WJVA used the above-described FHWA traffic noise model and traffic noise modeling assumptions to determine the distances from the center of the roadways to the 60 dB L_{dn} and 70 dB L_{dn} noise exposure contours. Table XI provides the distances from the center of each roadway to these noise exposure contours. Table XI provides the contour distances for 2045 Cumulative conditions as they represent a worst-case assessment of noise exposure at proposed sensitive receptor locations.

TABLE XI DISTANCES TO TRAFFIC NOISE CONTOURS GRANITE CREEK PRECISE PLAN, MADERA CUMULATIVE 2045 CONDITIONS		
Roadway Segment (Description)	Distance (feet) From Roadway Centerline to Contour	
	60 dB L_{dn}	70 dB L_{dn}
Road 23	134	62
Avenue 14 ½	100	46

Source: WJV Acoustics, Inc.
Provost & Pritchard

It should be noted, contour distances provided in Table XI are based upon unattenuated traffic noise levels, and do not consider any localized acoustical shielding that may be provided by elevational/topographic changes between the receptor and the roadway, existing buildings, or walls. Therefore, these setback distances should be considered a worst-case assessment of traffic noise impacting the project site. Once site specific plans and details are developed, project site noise exposure may be re-evaluated based upon site-specific conditions.

Potential Impact:

A noise impact could occur if outdoor activity areas of new proposed sensitive receptors (residential land uses) are located within the cumulative 60dB L_{dn} traffic noise contours. Table XI provides the setback distances from the centerline of each of the site-adjacent arterial roadways to the 60 dB L_{dn} exterior noise level contour.

Mitigation:

Noise levels from transportation noise sources may be effectively mitigated by incorporating noise mitigation measures into the project design that consider the geographical relationship between the noise sources of concern and potential receptors, the noise-producing characteristics of the sources and the path of transmission between noise sources and sensitive receptors. Options for noise mitigation include the use of building setbacks and the construction of berms and sound walls.

b. Noise Impacts from Operational On-Site Sources

As described above, the proposed Project would include two land use designations with the potential to result in noise impacts to proposed (on-site) noise-sensitive (residential) land uses. These land uses include Village Mixed Use (10.06 acres) and Commercial (15.19 acres).

The noise level standards applicable to these proposed land uses are provided above in Table III (Municipal Code standards for non-transportation noise sources). The noise standards become 5-10 dB more restrictive during nighttime hours (10:00 p.m. to 7:00 a.m.)

A wide variety of noise sources can be associated with such commercial, retail, and mixed-use land uses. The noise levels produced by such sources can also be highly variable and could potentially impact existing off-site and proposed on-site sensitive receptors. Typical examples of stationary noise sources associated with such land uses include:

- HVAC/Mechanical equipment
- Truck movements
- Parking lot activities (closing of car doors and trunks, stereos, alarms etc.)
- Drive-Through operations
- Loading Dock Activities
- Car Wash Operations
- Refuse/Cardboard Compactor

The exact quantity, type and location of such noise-producing sources were not known at the time of this analysis. These potential noise sources were discussed in general terms above, in Section 4. These same noise sources could potentially result in noise impacts at proposed (on-site) residential land uses.

Potential Impact:

Noise levels from new stationary noise sources cannot be predicted with any certainty at this time since specific uses have not yet been proposed and the locations of stationary noise sources

relative to the locations of new noise sensitive uses are not known. However, under some circumstances there is a potential for such uses exceed the City's noise standards for stationary noise sources at the locations of sensitive receptors.

Mitigation Measures:

Noise levels from new stationary noise sources may be effectively mitigated by incorporating noise mitigation measures into the project design that consider the geographical relationship between the noise sources of concern and potential receptors, the noise-producing characteristics of the sources and the path of transmission between noise sources and sensitive receptors. Options for noise mitigation include the use of building setbacks, the construction of sound walls and the use of noise source equipment enclosures.

When specific uses within the study area are proposed (and their locations are defined) that could result in a noise-related conflict between a commercial or other stationary noise source and project proposed sensitive receptors, an acoustical analysis should be required that quantifies project-related noise levels and recommends appropriate mitigation measures to achieve compliance with the City's noise standards. The acoustical analysis should be the responsibility of the project applicant.

c. Noise Impacts from Nearby Airports or Airstrips

The project site is located approximately 1.25 miles south of Madera Municipal Airport. WJVA reviewed the Madera Countywide Airport Land Use Compatibility Plan⁵ (ALUCP) and determined that the project site lies within the D Zone (Other Airport Environs), and the noise impact is described as "low" within the ALUCP for D Zoned areas. The ALUCP also states *"Within Compatibility Zones C2 and D, the Density of new residential development is not limited."*

Section 3.3.1(a) of the ALUCP states *"The maximum CNEL considered normally acceptable for residential uses in the vicinity of the Airport is 60 dB."* The project site is located outside of the Madera Municipal Airport 60 dB CNEL contour. The 60 and 65 dB CNEL contours (and project site location) are provided as Figure 10.

6. IMPACT SUMMARY

This impact summary addresses only the noise impacts determined to be “potentially significant” and summarizes the appropriate measures that would be required to reduce noise levels to a “less than significant” level, if applicable.

- **Potential Impact:** Noise levels from new stationary noise sources associated with proposed Village Mixed Use and Commercial land uses within the project site could potentially impact existing and new sensitive receptors (residential land uses). Exact uses of these land use designations were not known at the time this analysis was prepared.

Mitigation: Noise levels from new stationary noise sources may be effectively mitigated by incorporating appropriate noise mitigation measures into the project design that consider the geographical relationship between the noise sources of concern and potential receptors, the noise-producing characteristics of the sources and the path of transmission between noise sources and sensitive receptors. If required, options for noise mitigation include the use of building setbacks, the construction of sound walls and the use of noise source equipment enclosures. When specific uses within the study area are proposed that could result in a noise-related conflict between a commercial or other stationary noise source and existing or proposed noise-sensitive receptor, an acoustical analysis may be required by the City that quantifies project-related noise levels and recommends appropriate mitigation measures to achieve compliance with the City’s noise standards.

- **Potential Impact:** A noise impact could occur if new proposed sensitive receptors (residential land uses) are located within the 2045 cumulative 60dB L_{dn} traffic noise contours. Table XI provides the setback distances from the centerline of the two site-adjacent arterial roadways to the 60 dB L_{dn} exterior noise level contour.

Mitigation: Noise levels from transportation noise sources may be effectively mitigated by incorporating noise mitigation measures into the project design that consider the geographical relationship between the noise sources of concern and potential receptors, the noise-producing characteristics of the sources and the path of transmission between noise sources and sensitive receptors. Options for noise mitigation include the use of building setbacks and the construction of berms and sound walls.

- **Potential Impact:** A noise impact could occur if construction activities occur outside of the City’s allowable hours of construction and/or do not incorporate appropriate best management practices in regards to construction-related noise. Implement best management practices to minimize the potential for noise impacts on existing sensitive receptors in the project area, during project construction. The following provides the City’s allowable hours of construction as well as generalized best management practices that should be applied during periods of project construction to ensure that noise impacts do not result from project construction:

- Per the City of Madera Municipal Code, construction activities should not occur outside the hours of 6:00 a.m. to 8:00 p.m., daily. Construction activities that occur outside these hours would be subject to the stationary noise standards provided above in Table III.
- All construction equipment shall be properly maintained and muffled as to minimize noise generation at the source.
- Noise-producing equipment shall not be operating, running, or idling while not in immediate use by a construction contractor.
- All noise-producing construction equipment shall be located and operated, to the extent possible, at the greatest possible distance from any noise-sensitive land uses.
- Locate construction staging areas, to the extent possible, at the greatest possible distances from any noise-sensitive land uses.
- Signs shall be posted at the construction site and near adjacent sensitive receptors displaying hours of construction activities and providing a contact phone number of a designated noise disturbance coordinator.

7. **SOURCES CONSULTED**

1. *City of Madera General Plan*, October 7, 2009.
2. City of Madera Municipal Code, updated June 5, 2024
3. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, April 2020.
4. Federal Highway Administration, *Traffic Noise Model, Version 2.5*, April 14, 2004
5. Mead & Hunt, *Madera Countywide Airport Land Use Compatibility Plan*, September 29, 2015

FIGURE 1: PROJECT LAND USE PLAN

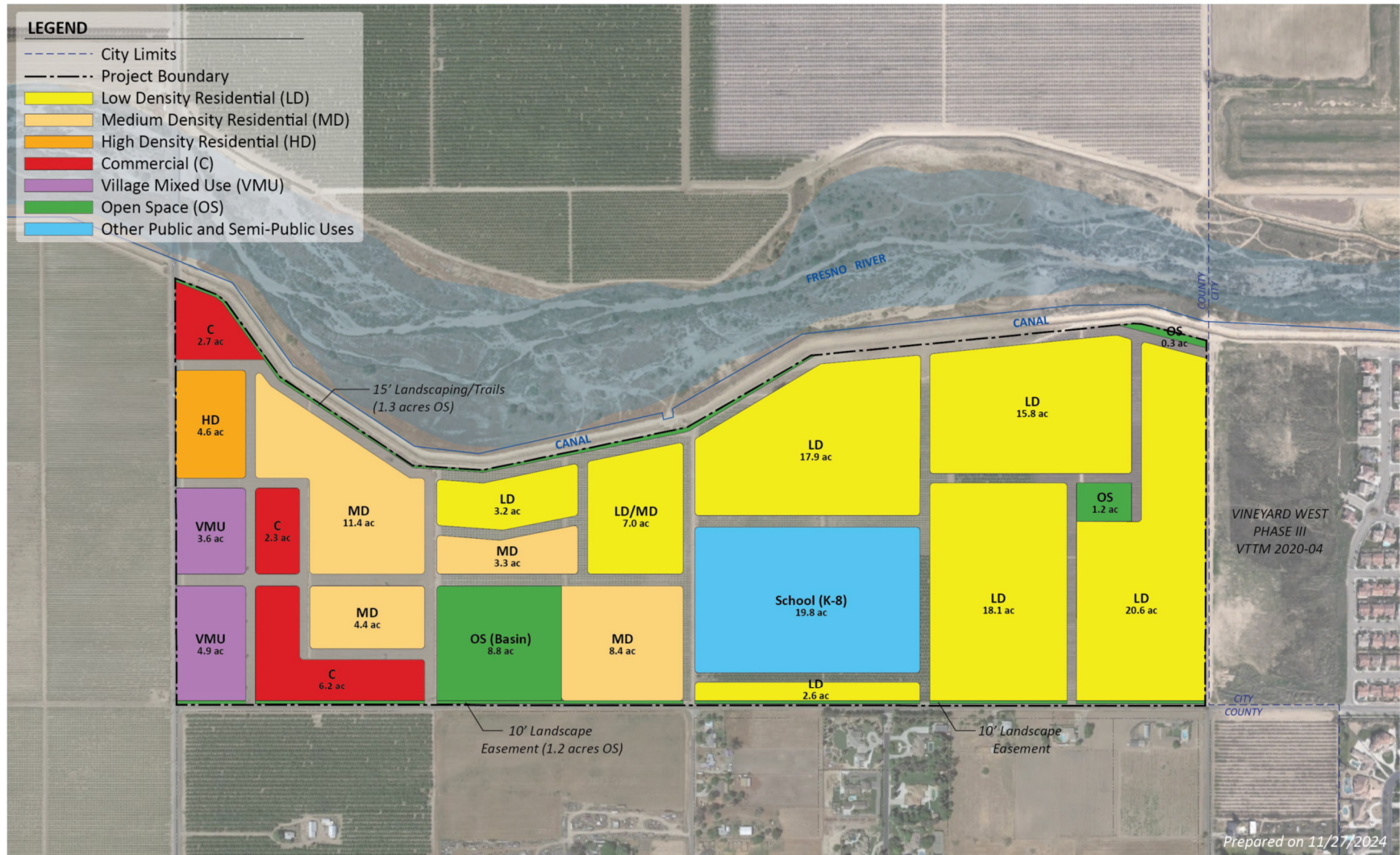




FIGURE 3: HOURLY NOISE LEVELS AT SITE LT-1

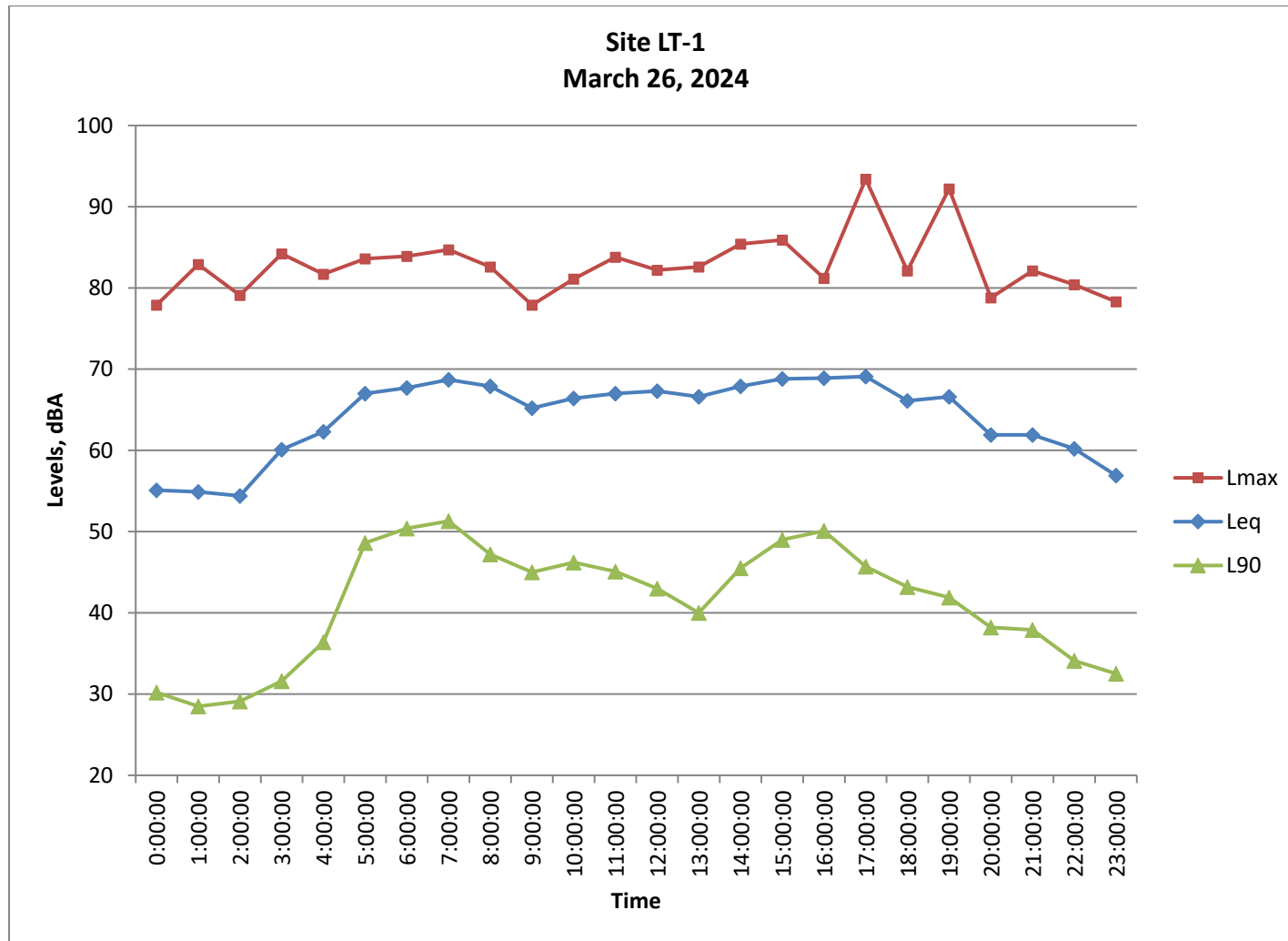


FIGURE 4: NOISE MEASUREMENT SITE LT-1



FIGURE 5: HOURLY NOISE LEVELS AT SITE LT-2

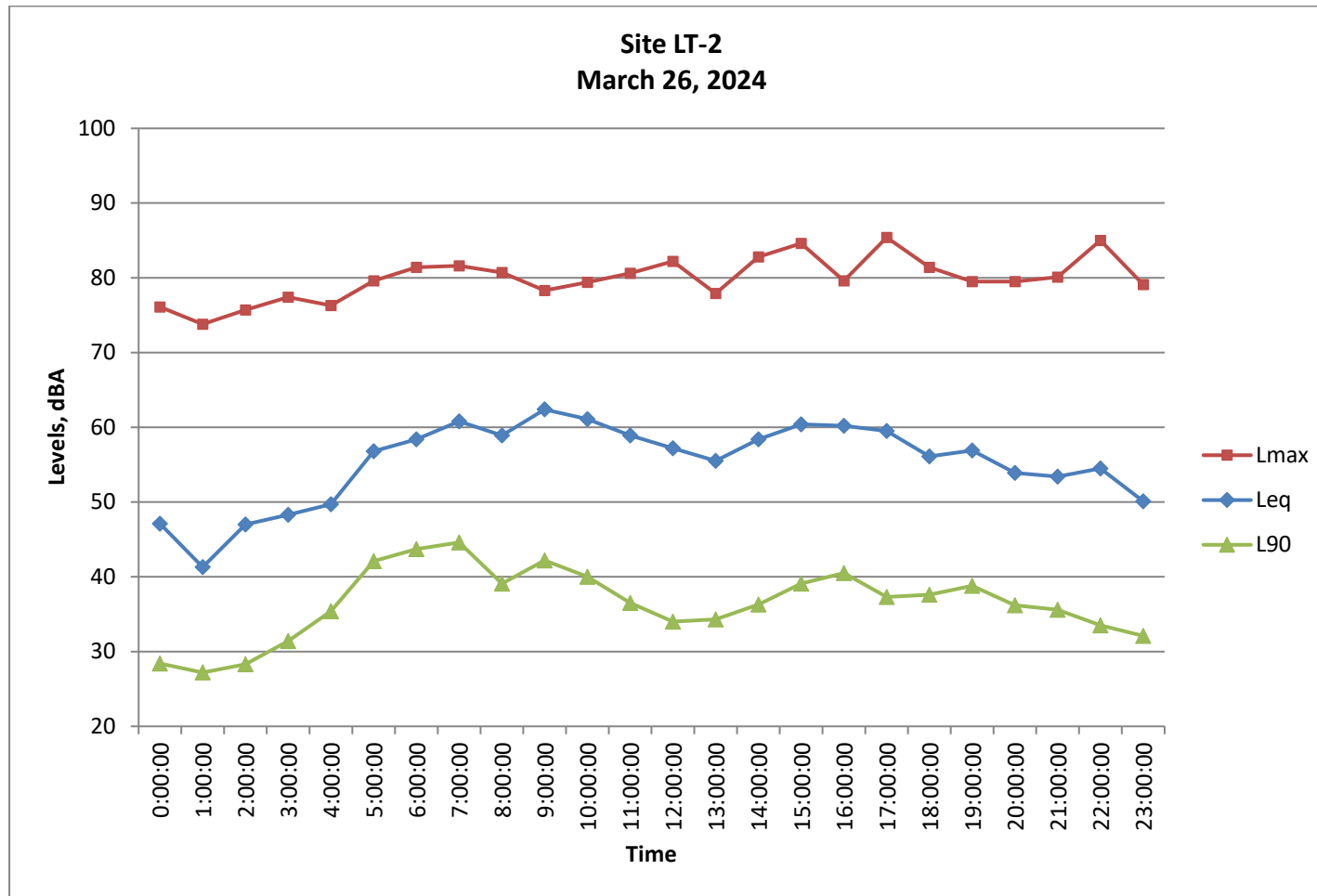


FIGURE 6: NOISE MEASUREMENT SITE LT-2



FIGURE 7: HOURLY NOISE LEVELS AT SITE LT-3

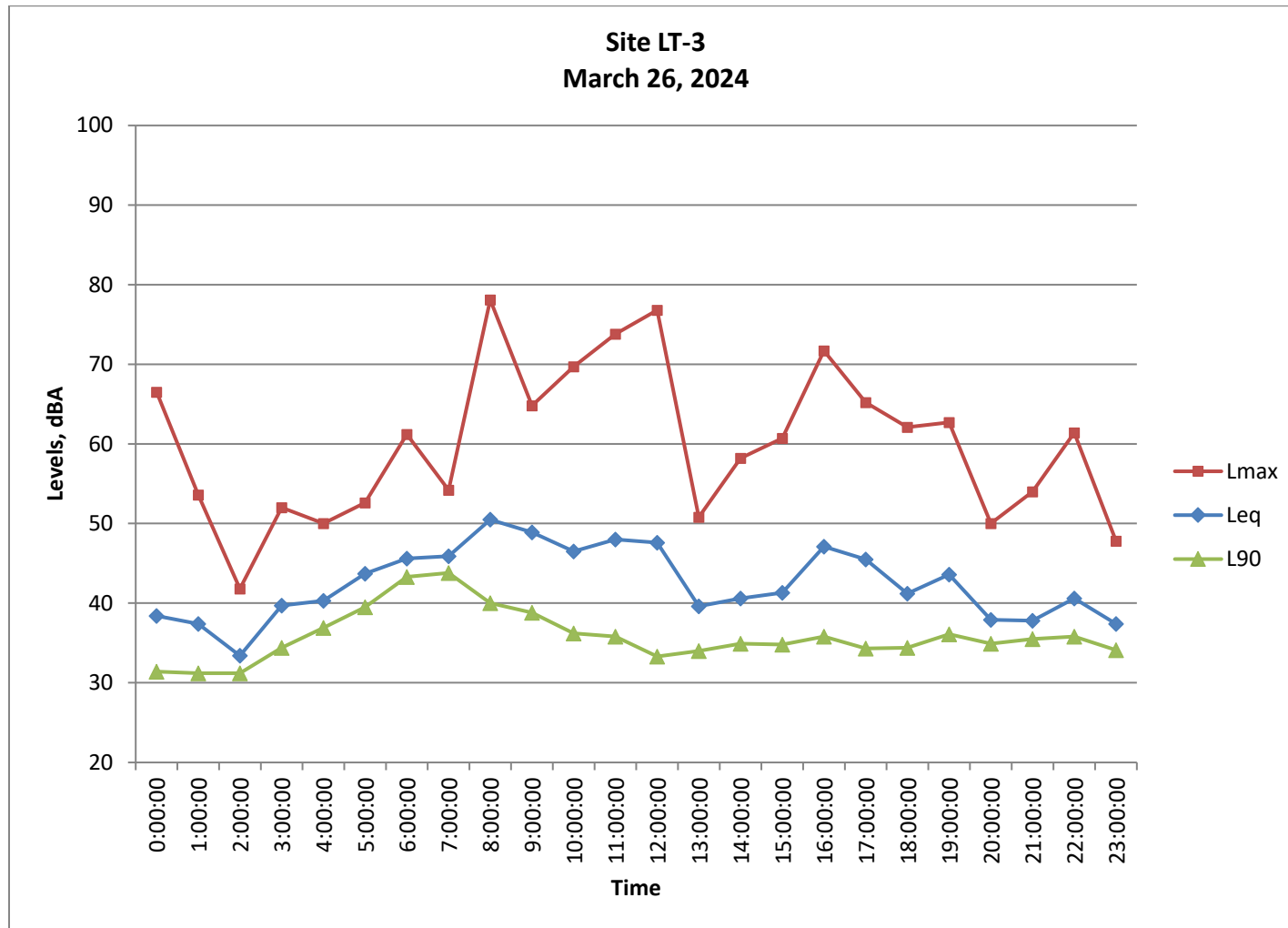


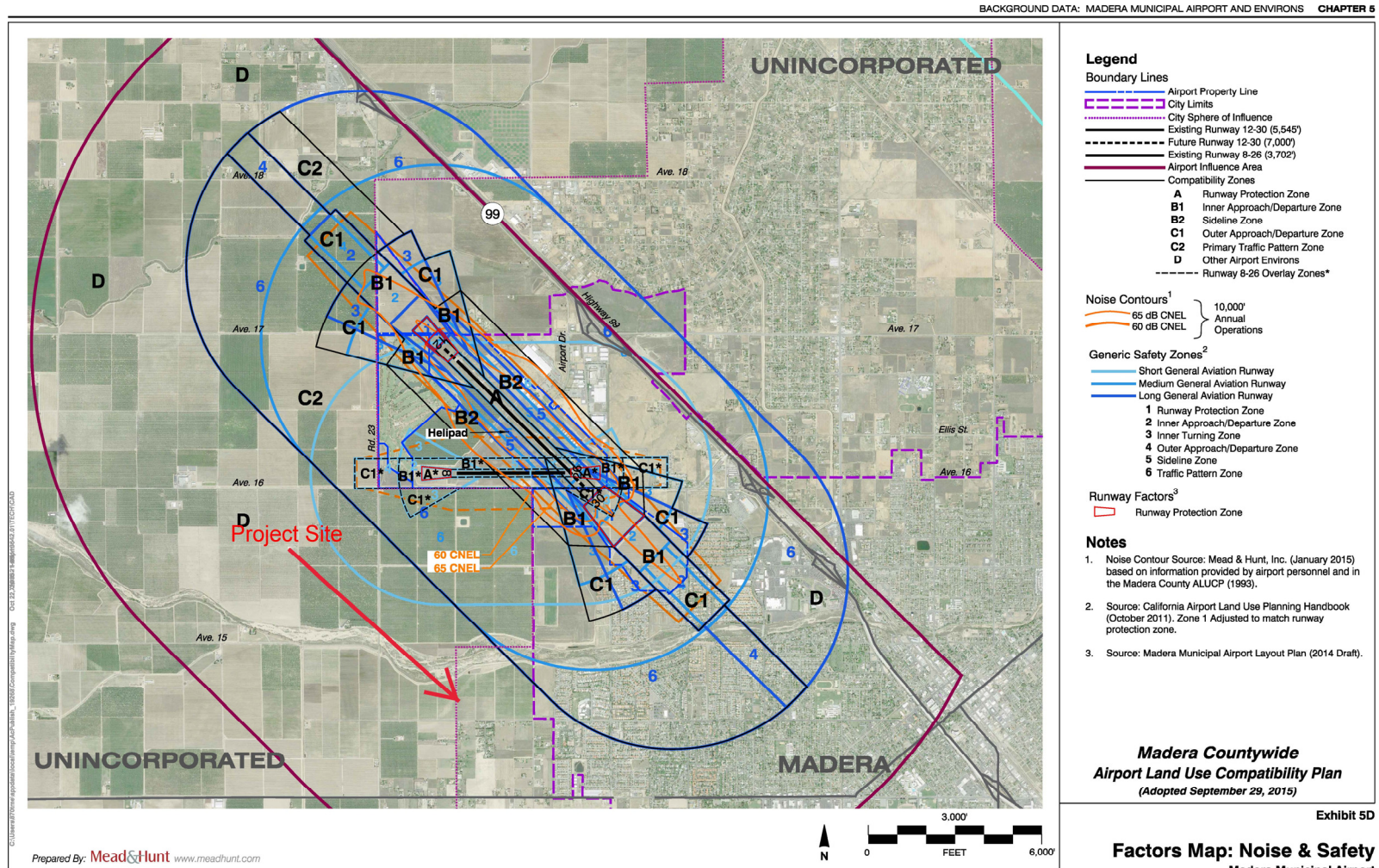
FIGURE 8: NOISE MEASUREMENT SITE LT-3



FIGURE 9: MODELED TRAFFIC NOISE RECEPTOR LOCATIONS



FIGURE 10: MADERA MUNICIPAL AIRPORT NOISE CONTOURS



APPENDIX A-1

ACOUSTICAL TERMINOLOGY

AMBIENT NOISE LEVEL:	The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.
CNEL:	Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.
DECIBEL, dB:	A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
DNL/L_{dn}:	Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.
L_{eq}:	Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L _{eq} is typically computed over 1, 8 and 24-hour sample periods.
NOTE:	The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L _{eq} represents the average noise exposure for a shorter time period, typically one hour.
L_{max}:	The maximum noise level recorded during a noise event.
L_n:	The sound level exceeded "n" percent of the time during a sample interval (L ₉₀ , L ₅₀ , L ₁₀ , etc.). For example, L ₁₀ equals the level exceeded 10 percent of the time.

ACOUSTICAL TERMINOLOGY

NOISE EXPOSURE CONTOURS:

Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

NOISE LEVEL REDUCTION (NLR):

The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of “noise level reduction” combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL:

Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

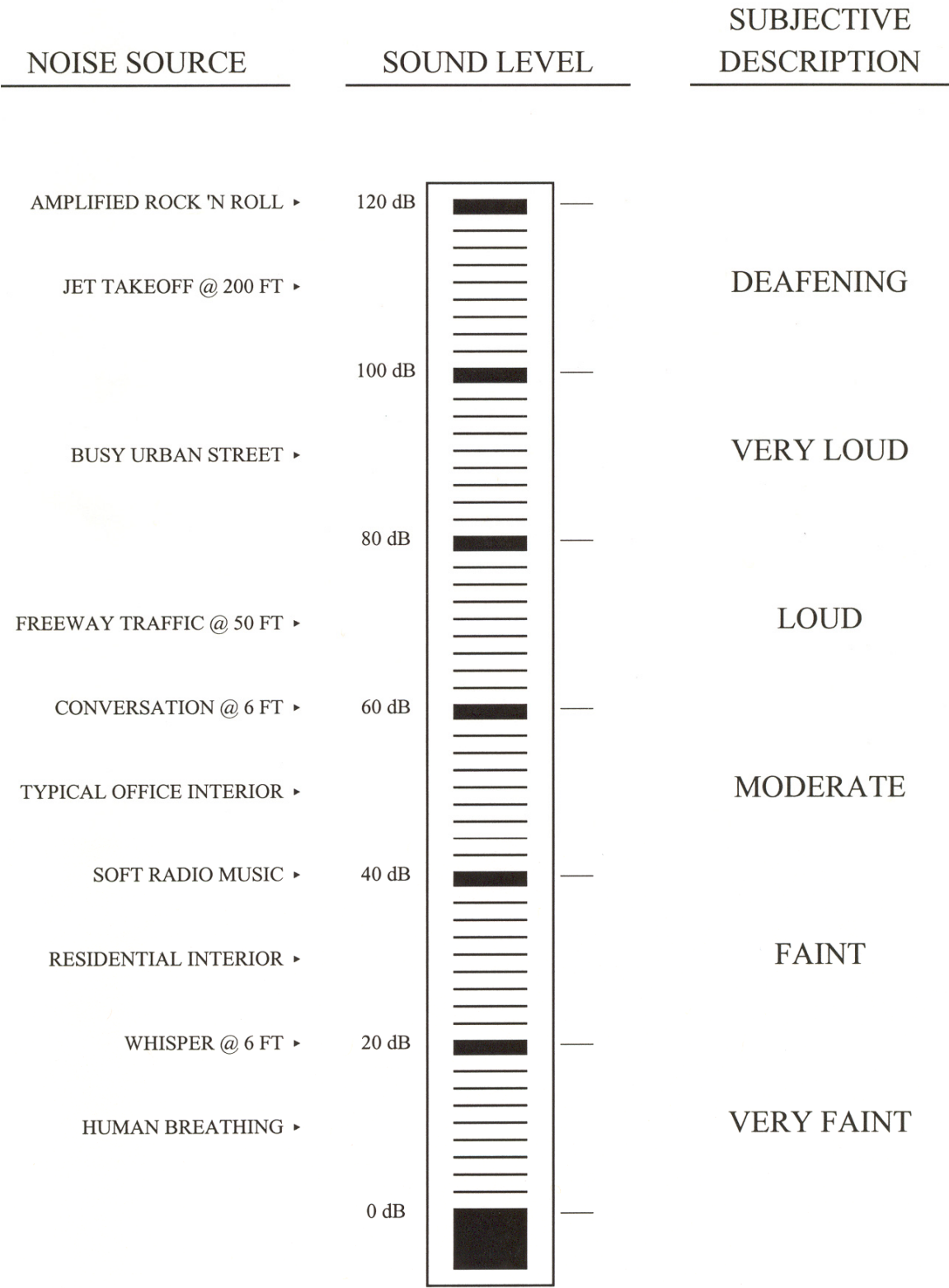
SOUND LEVEL:

The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

SOUND TRANSMISSION CLASS (STC):

The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

APPENDIX B EXAMPLES OF SOUND LEVELS



APPENDIX C

TRAFFIC NOISE MODELING CALCULATIONS

WJV Acoustics, Inc
 FHWA-RD-77-108
 Calculation Sheets
 August 26, 2025

Project #:	24-65
Description:	2026
Ldn/Cnel:	Ldn
Site Type:	Soft

Contour Levels (dB)	60	65	70	75					
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[illegible]

WJV Acoustics, Inc
 FHWA-RD-77-108
 Calculation Sheets
 August 26, 2025

Project #:	24-65
Description:	2045
Ldn/Cnel:	Ldn
Site Type:	Soft

Contour Levels (dB)	60	65	70	75				
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[illegible]

August 26, 2025

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Soft

[illegible]