4.13 NOISE

This section describes existing noise and vibration conditions, sets forth criteria for determining the significance of noise and vibration impacts and estimates the likely noise and vibration impacts that would result from construction and operation of the proposed Specific Plan. Mitigation measures are identified, as necessary, to address significant environmental impacts.

4.13.1 Environmental Setting

This section describes the fundamentals of noise and vibration, summarizes the regulatory framework, and describes the existing noise environment of the Specific Plan Area.

4.13.1.1 Characteristics of Sound

Noise is generally defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, or sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is the number of complete vibrations or cycles per second of a wave that results in the range of tone from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment, and it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effects on adjacent sensitive land uses.

Measurement of Sound. Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. Table 4.13.A contains a list of typical acoustical terms and definitions. Figure 4.13-1 shows representative outdoor and indoor noise levels in units of dBA.

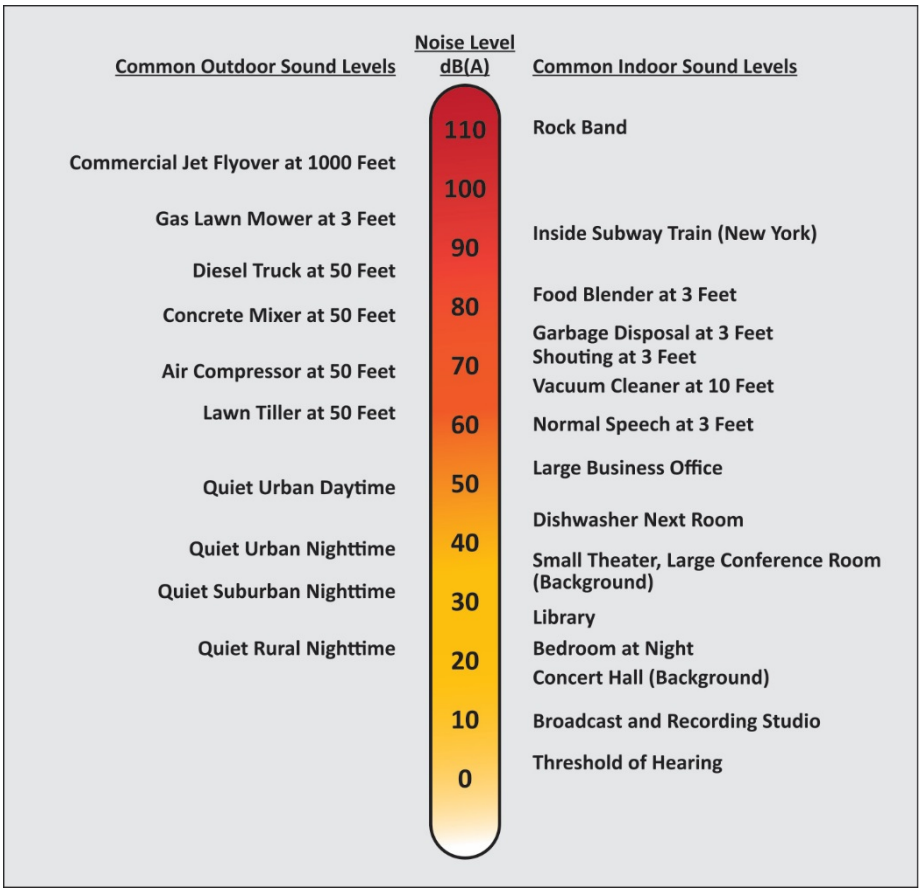
A decibel (dB) is a unit of measurement that indicates the relative intensity of a sound. Changes of three dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of three dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense. Each 10 dB increase in sound level is perceived as approximately a doubling of loudness.

Table 4.13.A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of level that denotes the ratio between two quantities proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels equaled or exceeded by a fluctuating sound level for 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of five decibels to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris, Cyril 1998).

Figure 4.13-1: Typical A-Weighted Sound Levels



Source: Compiled by LSA (2016).

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a six dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise sensitive receptor of concern.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of time varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq}, the community noise equivalent level (CNEL), and the day-night average level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening relaxation hours. CNEL and L_{dn} are within one dBA of each other and are normally

exchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours. Typical A-weighted sound levels from various sources are described in Figure 4.13-1.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest exponential time averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions, and addresses the annoying aspects of intermittent noise.

Noise standards in terms of percentile exceedance levels, L_n, are often used together with the L_{max} for noise enforcement purposes. When specified, the percentile exceedance levels are not to be exceeded by an offending sound over a stated time period. For example, the L_{10} noise level represents the level exceeded ten percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the lowest noise level experienced during a monitoring period. It is normally referred to as the background noise level. For a relatively steady noise, the measured L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3.0 dBA or greater, since, as described earlier, this level of noise change has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dBA. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level of less than 1.0 dBA that are inaudible to the human ear. A change in noise level of at least 5 dBA would be required before any noticeable change in human response would be expected and a 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise. The effects of noise on people can also be described in three categories: annoyance, interference with activities such as speech or sleep, and physiological effects such as hearing loss. Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the ear, and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling.

Unwanted community effects of noise occur at levels much lower than those that cause hearing loss and other health effects. Noise annoyance occurs when it interferes with sleeping, conversation, and noise-sensitive work, including learning or listening to the radio, television, or music. According to World Health Organization (WHO) noise studies, few people are seriously annoyed by daytime

activities with noise levels below 55 dBA, or are only moderately annoyed with noise levels below 50 dBA.[1]

4.13.1.2 Characteristics of Groundborne Vibration

Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings. As the vibration propagates from the foundation throughout the remainder of the building, the vibration of floors and walls may cause perceptible vibration from the rattling of windows or a rumbling noise. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. When assessing annoyance from ground-borne noise, vibration is typically expressed as root mean square (rms) velocity in units of decibels of 1 micro-inch per second. To distinguish vibration levels from noise levels, the unit is written as "VdB." Human perception to vibration starts at levels as low as 67 VdB and sometimes lower. Annoyance due to vibration in residential settings starts at approximately 70 VdB. Groundborne vibration is almost never annoying to people who are outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of the building, the motion does not provoke the same adverse human reaction.

In extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Vibration impacts on building structures are generally assessed in terms of peak particle velocity (PPV). Common sources of groundborne vibration include trains and construction activities such as blasting, pile driving and operating heavy earthmoving equipment. Typical vibration source levels from construction equipment are shown in Table 4.13.B.

Table 4.13.B: Typical Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 feet (in/sec)	Approximate VdB at 25 feet
Pile Driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Vibratory roller		0.210	94
Hoe ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Federal Transit Administration. *Transit Noise and Vibration Impact Assessment Manual.* (September 2018).

[1] World Health Organization. 1999. *Guidelines for Community Noise*.

4.13.1.3 Project Area

The ambient noise environment in the City of Madera is affected by a variety of noise sources, including mobile source noise and stationary noise. As indicated in the City's General Plan Noise Element, the most significant mobile sources of noise in Madera are the Madera Municipal Airport (noise created by aircraft takeoffs and landings), the two railroad lines that pass through the Planning Area, and State Route 99 and other major roadways. Stationary noise sources in Madera include outdoor machinery, the Madera Raceway, the high school football stadium, and the industrial areas near the Madera Municipal Airport and in the southwest portion of the City. Noise generated at construction sites is also a source of noise in Madera. The following section describes the existing noise environment and identifies the primary noise sources in the vicinity of the project site.

Existing Traffic Noise. Motor vehicles with their distinctive noise characteristics are a major source of noise in Madera. The amount of noise varies according to many factors, such as volume of traffic, vehicle mix (percentage of cars and trucks), average traffic speed, and distance from the observer.

Existing roadway traffic noise levels in the Specific Plan Area were assessed using the Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77-108). Traffic volumes were obtained from the proposed Specific Plan's Traffic Impact Analysis (TIA).[2] This model uses a typical vehicle mix for urban/suburban areas in California and requires parameters, including traffic volumes, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resultant noise levels are weighted and summed over 24-hour periods to determine the day-night average noise level (L_{dn}) values. Existing traffic noise contours along modeled roadway segments are shown in Table 4.13.C.

Existing Aircraft Noise. The Madera Municipal Airport is located directly north and east of the Specific Plan Area. Based on Exhibit 5D of the Madera Countywide Airport Land Use Compatibility Plan, the northernmost portions of the Specific Plan Area, including near the intersections of Avenue 17 and Road 23 and Avenue 16 and Road 24, lie within the 65 dBA CNEL noise contours for this airport. The rest of the Specific Plan Area lies beyond the 65 dBA CNEL noise contour.

Existing Sensitive Land Uses. Sensitive receptors include residences, schools, hospitals, churches, and similar uses that are sensitive to noise. Construction and operation associated with the proposed Specific Plan could adversely affect nearby noise-sensitive land uses. The closest sensitive receptors to the Specific Plan Area include the single-family residence located along Avenue 15, approximately 370 feet south of the Specific Plan Area boundary, the single-family residences located alone Catlan Drive, located approximately 1,240 feet southeast of the Specific Plan Area boundary, and the single-family residences located along Camino Lane, approximately 2,180 feet east of the Specific Plan Area boundary.

[2] LSA. 2020. *Traffic Impact Analysis, Village D Specific Plan*. February.

Table 4.13.C: Existing Traffic Noise Levels

Roadway Segment	Average Daily Trips	Centerline to 70 dBA CNEL (feet)	Centerline to 65 dBA CNEL (feet)	Centerline to 60 dBA CNEL (feet)	CNEL (dBA) 50 Feet From Outermost Lane
Road 23 between Avenue 17 and Project Driveway 3	4,458	< 50	61	131	65.6
Road 23 between Project Driveway 3 and Avenue 16	4,458	< 50	61	131	65.6
Road 23 between Avenue 16 and Cleveland Avenue	4,658	< 50	63	135	65.8
Road 23 between Cleveland Avenue and Project Driveway 4	5,575	< 50	71	152	66.5
Road 23 between Project Driveway 4 and Project Driveway 5	5,575	< 50	71	152	66.5
Road 23 between Project Driveway 5 and Avenue 14 ½	5,575	< 50	71	152	66.5
Road 23 between Avenue 14 ½ and Avenue 14	5,052	< 50	66	143	66.1
Westberry Boulevard between Sunset Avenue and Avenue 14/Howard Road	3,888	< 50	< 50	58	59.5
Granada Drive between Cleveland Avenue and Fresno River	10,439	< 50	77	165	67.1
Granada Drive between Sunset Avenue and Avenue 14/Howard Road	7,707	< 50	63	135	65.8
Avenue 17 between Road 22 and Project Driveway 1	802	< 50	< 50	< 50	58.1
Avenue 17 between Project Driveway 1 and Road 23	802	< 50	< 50	< 50	58.1
Avenue 17 between Road 23 and Golden State Boulevard	2,233	< 50	< 50	83	62.6
Avenue 17 between Golden State Boulevard and State Route 99 Southbound Off-Ramp	9,626	< 50	102	219	68.9
Avenue 16 between Road 22 and Project Driveway 2/Road 22 ½	453	< 50	< 50	< 50	55.6
Avenue 16 between Project Driveway 2/Road 22 ½ and Road 23	453	< 50	< 50	< 50	55.6
Cleveland Avenue between Road 22 ½ and Road 23	36	< 50	< 50	< 50	44.6
Cleveland Avenue between Road 23 and Project Driveway 6	2,349	< 50	< 50	86	62.8
Cleveland Avenue between Project Driveway 6 and Westberry Boulevard	2,349	< 50	< 50	86	62.8
Cleveland Avenue between Westberry Boulevard and Granada Drive	3,879	< 50	< 50	86	62.2
Cleveland Avenue between Granada Drive and Schnoor Street	9,473	< 50	75	156	65.1
Cleveland Avenue between Schnoor Street and Fairgrounds	15,080	< 50	84	175	65.9
Cleveland Avenue between Fairgrounds and State Route 99 Southbound Ramps	15,080	< 50	84	175	65.9
Sunset Avenue between Granada Drive and Schnoor Street	6,123	< 50	< 50	77	61.5
Howard Road between Granada Drive and Schnoor Street	10,751	< 50	57	114	63.0
Howard Road between Schnoor Street and Pine Street	16,597	< 50	73	150	64.9
Olive Avenue between Yosemite Avenue and I Street	11,314	< 50	58	117	63.2
Olive Avenue between I Street and State Route 99 Southbound Off-Ramp	11,314	< 50	58	117	63.2
Olive Avenue between State Route 99 Southbound Off-Ramp and Madera Avenue	11,314	< 50	54	115	64.7

Source: Compiled by LSA (December 2020).
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels

4.13.1.4 Regulatory Context

The following section provides brief discussions of the federal, State, and local regulatory framework related to noise.

Federal Regulations. In 1972 Congress enacted the Noise Control Act. This act authorized the U.S. Environmental Protection Agency (USEPA) to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels), as shown in Table 4.13.D. The USEPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels.

Table 4.13.D: Summary of USEPA Noise Levels

Effect	Level	Area
Hearing loss	$L_{eq}(24) \leq 70$ dB	All areas.
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq}(24) \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, play-grounds, etc.
Indoor activity interference and annoyance	$L_{eq} \leq 45$ dB	Indoor residential areas.
	$L_{eq}(24) \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

Source: U.S. Environmental Protection Agency. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (March 1974).

For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an $L_{eq}(24)$ of 70 dBA. The "(24)" signifies an L_{eq} duration of 24 hours. The USEPA activity and interference guidelines are designed to ensure reliable speech communication at about five feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels are below 55 dBA and 45 dBA, respectively.

The noise effects associated with an outdoor L_{dn} of 55 dBA are summarized in Table 4.13.E. At 55 dBA L_{dn}, 95 percent sentence clarity (intelligibility) may be expected at 11 feet, and no substantial community reaction. However, 1 percent of the population may complain about noise at this level and 17 percent may indicate annoyance.

Table 4.13.E: Summary of Human Effects in Areas Exposed to 55 dBA L_{dn}

Type of Effect	Magnitude of Effect
Speech – Indoors	100 percent sentence intelligibility (average) with a 5 dB margin of safety.
Speech – Outdoors	100 percent sentence intelligibility (average) at 0.35 meter. 99 percent sentence intelligibility (average) at 1.0 meter. 95 percent sentence intelligibility (average) at 3.5 meters.
Average Community Reaction	None evident; 7 dB below level of significant complaints and threats of legal action and at least 16 dB below "vigorous action."
Complaints	1 percent dependent on attitude and other non-level related factors.
Annoyance	17 percent dependent on attitude and other non-level related factors.
Attitude Towards Area	Noise essentially the least important of various factors.

Source: U.S. Environmental Protection Agency. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (March 1974).

State of California. The State of California has established regulations that help prevent adverse impacts to occupants of buildings located near noise sources. The "State Noise Insulation Standard" requires noise-sensitive land uses to meet performance standards through design and/or building materials that would offset any noise source in the vicinity of the building. State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are found in the California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor ceiling assemblies must block or absorb sound. For limiting noise from exterior noise sources, the noise insulation standards set an interior standard of 45 dBA CNEL in any habitable room with all doors and windows closed. In addition, the standards require preparation of an acoustical analysis demonstrating the manner in which dwelling units have been designed to meet this interior standard, where such units are proposed in an area with exterior noise levels greater than 60 dBA CNEL.

The State has also established land use compatibility guidelines for determining acceptable noise levels for specified land uses.

City of Madera General Plan. The City of Madera addresses noise in the Noise Element of the General Plan.[3] The Noise Element provides goals, policies, and action items that work to protect residents from the harmful effects of exposure to excessive noise, and to protect the economic base of the City by preventing the encroachment of incompatible land uses near roadways, industries, railroads, and other sources of noise. Table 4.13.F includes policies and action items from the Noise Element that would be applicable to the proposed project. Tables 4.13.G through 4.13.I include additional City standards.

City of Madera Municipal Code. The City of Madera's Noise Ordinance (Title III: Public Safety, Chapter 11: Noise Control) includes various nuisance provisions intended to protect community residents from prolonged unnatural or unusual noise levels that could cause increased levels of annoyance, discomfort, or injury. Section 3-11.01 stipulates that no person shall make, or cause or permit to be made or caused, upon any premises owned, occupied, possessed, or controlled by them or upon any public street, alley, or thoroughfare any unnecessary noise or sound which is physically annoying to persons of ordinary and normal sensitivity or which is so harsh or so prolonged unnatural or unusual in its use, time, and place as to cause physical discomfort, or which is injurious to the lives health, peace, and comfort of the inhabitants of the City.

[3] Madera, City of. 2009. *City of Madera General Plan. Noise Element*. October 7.

Table 4.13.F: General Plan Policies Related to Noise

Policy/Action Item Number	Policy
Policy N-1	The City will protect residential areas and other noise-sensitive uses from excessive noise by doing the following: 1. Requiring that land uses, roadways, and other sources do not create incompatible noise levels on adjacent parcels. 2. Allowing homes or noise-sensitive uses to be developed only in places where existing and projected noise levels will meet the exterior noise guidelines and standards shown in Policies N-5 and N-6. 3. Requiring that City decisions which would cause or allow an increase in noise created by stationary or mobile sources (such as development of noise-generating land uses or the construction of new or wider roadways) be informed by a noise analysis and accompanied by noise reduction measures to keep noise at acceptable levels. The analysis may be accomplished by reviewing available noise data, by requiring additional information on potential noise that would be created, or by a noise analysis prepared as part of the project's environmental analysis. Roadway projects which are consistent with the Circulation Map in this General Plan will generally not require the preparation of a noise analysis.
Action Item N-2.1	Apply the State Noise Insulation Standards, zoning and building controls, buffers, sound barriers, traffic controls, and other effective measures to reduce exposure to noise that exceeds the standards contained in this General Plan.
Action Item N-2.2	Action Item N-2.2: Require acoustical studies for: 1. Significant new noise generators, or 2. New uses which are proposed to be developed in areas which do not meet the "completely compatible" exterior noise guidelines contained in Policy N-5 or Policy N-6. If information on the noise environment at a project site is not available, a measurement of the noise environment by a qualified acoustical engineer may be needed to make a determination whether a proposed project complies with the guidelines and standards in Policy N-5 or N-6.
Policy N-4	The following compatibility standards shall be used to determine whether a proposed use is appropriate for its location, given the projected ambient noise level. • "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.
Policy N-5	The following are the maximum 24-hour exterior noise levels for land designated by this General Plan for residential, commercial/retail, and public parks: • See Policy N-4 for the definitions of these levels of compatibility. • These guidelines apply to land designated by this General Plan for these uses. Residential, retail, or public parks which have been developed on land designated for other uses shall be subject to the exterior noise guidelines for the land on which they are located. • Non-residential uses located on residentially designated land shall be subject to the exterior noise guidelines for residential lands. • All uses on commercial lands, including non-commercial uses, shall be subject to the standards for commercial land. • Land use designations not listed above do not have exterior noise compatibility standards. Land use designations with no exterior noise compatibility standard include office and industrial. Standards for public schools are set and enforced by the State of California and are not regulated by the City of Madera. Therefore, no standards for public schools are shown in Table 4.13.G.

Table 4.13.F: General Plan Policies Related to Noise

Policy/Action Item Number	Policy
Policy N-6	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 Leq (30 minutes). • The noise levels specified above 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 10:00 p.m. to 7:00 a.m. for these types of noises is 45 dBA. • The City may impose exterior noise standards which are less restrictive than those specified above, provided that: 1. The noise impact on the residential or other noise-sensitive use is addressed in an environmental analysis, 2. A finding is made by the approving body stating the reasons for accepting a higher exterior noise standard, and 3. Interior noise standards will comply with those identified in Policy N-7.
Policy N-7	The following are the City's standards for acceptable indoor noise levels for various types of land uses. These standards should receive special attention when projects are considered in "Tentatively Compatible" or "Normally Incompatible" areas. • Noise created inside a use listed above shall not count toward the acceptable noise levels to be maintained in accordance with this policy.
Policy N-8	Multi-Family residential uses constructed in a mixed-use setting with commercial or office uses may be exempted from exterior noise standards at the City's discretion but must meet interior noise standards as defined in Policy N-7.
Policy N-9	The City's preferences for providing noise mitigation are, in order (#1 is the most preferred, #5 the least): 1. Reduce noise at the source. 2. If #1 is not practical, seek to designate land uses which are compatible with projected noise levels. 3. If #1 or #2 are not practical, use distance from the source to reduce noise to acceptable levels. 4. If #1, #2, or #3 are not practical, use buildings, berms, or landscaping or a combination of these to reduce exterior noise to acceptable levels. Use construction techniques (sound-reducing windows, etc.) to reduce interior noise to acceptable levels. 5. The last measure which should be considered is the use of a sound wall to reduce noise to acceptable levels.
Policy N-10	Where they are constructed, sound walls should be: 1. Considered only if proven effective by accompanying noise studies. 2. Be visually attractive, complement the surroundings, and require a minimum of maintenance. (See Community Design Element references to sound wall designs). 3. As small/low as possible consistent with the need to reduce noise to acceptable levels.
Policy N-11	The City shall generally not require the installation of sound walls in front yard areas to reduce noise to acceptable levels in residential areas which were originally constructed without sound walls. The City shall emphasize other methods to reduce noise levels in these situations, and may accept exterior noise levels higher than those shown in Policy N-5 in order to minimize the construction of sound walls. Examples of "other methods" include: • Installation of double- or triple-paned windows; • Installation of weather stripping or seals to keep noise out; • Replacing wooden fencing with walls or other materials with better sound reducing properties; • Use of rubberized asphalt to reduce roadway noise.

Table 4.13.F: General Plan Policies Related to Noise

Policy/Action Item Number	Policy
Policy N-12	All acoustical analysis prepared pursuant to this Noise Element shall: 1. Be the financial responsibility of the applicant. 2. Be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics. 3. Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions and the predominant noise sources. 4. Estimate existing and projected cumulative (20 years) noise levels in terms of Ldn or CNEL and/or the standards in this Noise Element, and compare those levels to the policies in this Noise Element. 5. Recommend appropriate mitigation to achieve compliance with the adopted policies and standards of this Noise Element, giving preference to proper site planning and design over mitigation measures which require the construction of noise barriers or structural modifications to buildings which contain noise-sensitive land uses. 6. In cases where a sound wall is proposed, the potential impacts associated with noise reflecting off the wall and toward other properties or sensitive uses shall be evaluated. 7. Estimate noise exposure after the prescribed mitigation measures have been implemented. 8. Describe a post-project assessment program which could be used to evaluate the effectiveness of the proposed mitigation measures.
Policy N-13	For the purposes of CEQA analysis, a 5 db increase in CNEL or L_{dn} noise levels shall be normally considered to be a significant increase in noise.

Source: City of Madera General Plan (October 2009).

Table 4.13.G: Exterior Noise Compatibility Guidelines for Noise from all Sources, Including Transportation Noise (24-Hour Day/Night Average [CNEL/L_{dn}])

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

Source: City of Madera (October 2009).

[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.

Table 4.13.H: 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	10:00 p.m. to 7:00 a.m.	50
	7:00 a.m. to 10:00 p.m.	60
Multiple Residential 3 or More Units Per Building (Triplex +)	10:00 p.m. to 7:00 a.m.	55
	7:00 a.m. to 10:00 p.m.	60

Source: City of Madera (October 2009).

Table 4.13.I: Maximum Acceptable Interior Noise Levels Created by Exterior Noise Sources

Land Use Type	Acceptable Noise Level (dBA L_{dn} or CNEL)
Residential Living and Sleeping Areas	45
Residential Living and Sleeping Areas where the dwelling unit is subject to noise from railroad tracks, aircraft overflights, or similar sources which produce clearly identifiable, discrete noise events (such as the passing of a train as opposed to relatively steady or constant noise sources such as roadways)	40
Private & Semi Private School Classrooms[1]	55
All Places of Work Other than School Classrooms	Conform with applicable state and federal workplace safety standards

Source: City of Madera (October 2009).
[1] Standards for public schools are set and enforced by the State of California and are not regulated by the City of Madera.

In addition, the Noise Ordinance prohibits noise sources associated with operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, remodeling, paving, or grading of any real property or demolition work between the hours of 8:00 p.m. and 6:00 a.m. However, the Community Development Director or their designated representative may exempt certain construction work from the provisions of this chapter for a limited time. In such circumstance, the contractor or owner shall be allowed to work after 8:00 p.m. and to operate machinery and equipment. The Noise Ordinance also prohibits the operation of any mechanically powered saw, drill, grinder, lawn or garden tool, or similar tool between the hours of 8:00 p.m. and 6:00 a.m.

4.13.2 Impacts and Mitigation Measures

The following section presents a discussion of the impacts related to noise that could result from implementation of the proposed Specific Plan. The section begins with the criteria of significance, which establish the thresholds to determine if an impact is significant. The latter part of this section presents the impacts associated with implementation of the proposed Specific Plan and the recommended mitigation measures, if required. Mitigation measures are recommended, as appropriate, for significant impacts to eliminate or reduce them to a less-than-significant level. Cumulative impacts are also addressed.

4.13.2.1 Significance Criteria

The thresholds for impacts related to noise used in this analysis are consistent with Appendix G of the State CEQA Guidelines. Development of the proposed Specific Plan would result in a significant impact related to noise if it would:

Threshold 4.13.1 **Generate 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;**

Threshold 4.13.1 **Generate excessive groundborne vibration or groundborne noise levels;**

Threshold 4.13.1 **For a project located within the vicinity of a private airstrip an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.**

Policy N-13 of the City's General Plan states that for the purposes of CEQA analysis, a 5 db increase in CNEL or L_{dn} noise levels shall be normally considered to be a significant increase in noise. Therefore, the significance criteria define a significant impact to occur if the Specific Plan would result in a substantial (5 dBA or greater) permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

4.13.2.2 Project Impacts

The following discussion describes the potential impacts related to noise that could result from implementation of the proposed Specific Plan.

Threshold 4.13.1 **Would the project generate a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?**

The following section describes the short-term construction and long-term operational noise impacts associated with implementation of the proposed Specific Plan.

Short-Term Construction-Related Noise Impacts. Construction associated with implementation of the proposed Specific Plan would occur over a period of approximately 30 years. Construction activities associated with development allowed under the proposed Specific Plan could result in substantial temporary or periodic increases in ambient noise levels at development sites throughout the Specific Plan Area.

Construction would result in short-term noise impacts on the nearby sensitive receptors. Maximum construction noise would be short-term, generally intermittent depending on the construction phase, and variable depending on receiver distance from the active construction zone. The duration of noise impacts generally would be from one day to several days depending on the phase of construction. The level and types of noise impacts that would occur during construction are described below.

Short-term noise impacts would occur during grading and site preparation activities. Table 4.13.J lists typical construction equipment noise levels (L_{max}) recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor, obtained from the FHWA Roadway Construction Noise Model. Construction-related short-term noise levels would be higher than existing ambient noise levels currently in the project area but would no longer occur once construction of the project is completed.

Table 4.13.J: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%)	Maximum Noise Level (L_{max}) at 50 Feet[1]
Backhoes	40	80
Compactor (ground)	20	80
Compressor	40	80
Cranes	16	85
Dozers	40	85
Dump Trucks	40	84
Excavators	40	85
Flat Bed Trucks	40	84
Forklift	20	85
Front-end Loaders	40	80
Graders	40	85
Impact Pile Drivers	20	95
Jackhammers	20	85
Pick-up Truck	40	55
Pneumatic Tools	50	85
Pumps	50	77
Rock Drills	20	85
Rollers	20	85
Scrapers	40	85
Tractors	40	84
Welder	40	73

Source: Roadway Construction Noise Model (FHWA 2006).
Note: Noise levels reported in this table are rounded to the nearest whole number.
[1] Maximum noise levels were developed based on Spec 721.560 from the Central Artery/Tunnel (CA/T) program to be consistent with the City of Boston's Noise Code for the "Big Dig" project.
L_{max} = maximum instantaneous sound level

Two types of short-term noise impacts could occur during construction of projects associated with the proposed Specific Plan. The first type involves construction crew commutes and the transport of construction equipment and materials to sites, which would incrementally increase noise levels on roads leading to the site. As shown in Table 4.13.J, there would be a relatively high single-event noise exposure potential at a maximum level of 84 dBA L_{max} with trucks passing at 50 feet.

The second type of short-term noise impact is related to noise generated during grading and construction on project sites. Construction is performed in discrete steps, or phases, each with its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on site. Therefore, the noise levels vary as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase.

Table 4.13.J lists maximum noise levels recommended for noise impact assessments for typical construction equipment, based on a distance of 50 feet between the equipment and a noise receptor. Typical maximum noise levels range up to 87 dBA L_{max} at 50 feet during the noisiest construction phases. The site preparation phase, including excavation and grading of the site, tends to generate the highest noise levels because earthmoving machinery is the noisiest construction

equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by 3 or 4 minutes at lower power settings.

Construction allowed under the Specific Plan is expected to require the use of earthmoving equipment, dozers, and water and pickup trucks. The maximum noise level generated by each scraper on future project sites would be approximately 84 dBA L_{max} at 50 feet from the scraper. Each dozer would generate approximately 82 dBA L_{max} at 50 feet. The maximum noise level generated by water and pickup trucks would be approximately 75 dBA L_{max} at 50 feet from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case combined noise level during this phase of future construction would be 86 dBA L_{max} at a distance of 50 feet from the active construction area. In addition, some construction projects could require pile driving, which would have a maximum noise level of approximately 95 dBA L_{max} at 50 feet.

Noise-sensitive receptors include residences, schools, hospitals, churches, and similar uses that are sensitive to noise. Construction and operation of development allowed under the proposed Specific Plan could adversely affect nearby noise-sensitive land uses. Construction noise is permitted by the City of Madera when activities occur between the hours of 6:00 a.m. and 8:00 p.m. While construction noise impacts are exempt from specific noise levels limits under the City's Municipal Code, projects that have unusual or extremely loud construction activities (i.e., pile driving, nighttime construction work) would require additional impact considerations. The specific equipment mix for construction associated with implementation of the Specific Plan is unknown at this time as specific development plans have not been prepared. Therefore, Mitigation Measure NOI-1.1 would be required to limit noise from construction activities in order to reduce potential construction period noise impacts for nearby sensitive receptors to less-than-significant levels.

Implementation of Mitigation Measure NOI-1.1 would limit construction hours and require the construction contractor to implement noise-reducing measures during construction, which would reduce short-term construction noise impacts to a less-than-significant level.

Long-Term Operational Noise Impacts. Implementation of the Specific Plan would result in a mix of residential, commercial/office, business park industrial uses, public facilities and park/open space uses in the Specific Plan Area. The development described in the Specific Plan would occur as individual, site-specific applications are brought forth by property owners. Such plans are not developed at this time and therefore project-specific noise analysis cannot be prepared. Future discretionary projects will be reviewed for noise impacts at the time they are submitted. However, noise-generating uses associated with development under the Specific Plan would typically include vehicle traffic and operational noise, such as heating, ventilation, and air conditioning (HVAC) equipment and typical motor vehicle/parking area activities.

Traffic Noise Impacts. Traffic noise levels under the existing conditions and by phase were assessed using the FHWA Highway Traffic Noise Prediction Model (FHWA RD 77-108). Traffic volumes were obtained from the proposed Specific Plan's TIA.[4] Existing, Phase I Project Completion Year (2029), Phase II Project Completion Year (2039), and Phase III Project Completion Year (2049) Without and With Project traffic noise levels at 50 feet from the centerline of the outermost travel lane for each roadway segment in the Specific Plan Area are shown in Table 4.13.K. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn. Appendix J provides the specific assumptions used in developing these noise levels and model printouts.

Off-Site Traffic Noise Impacts. As shown in Table 4.13.K, future noise levels without the proposed Specific Plan along existing roadways are projected to increase by approximately up to 10.9 dBA at roadway segments outside of the Specific Plan Area. The largest off-site noise level increase in traffic-related noise as a result of development under the Specific Plan would be on Avenue 17 between Road 23 and Golden State Boulevard, with up to a 10.9 dBA increase under Existing With Project conditions and up to 9.3 dBA increase under Phase III Project Completion Year (2049) With Project conditions. This noise level increase would exceed the significance criteria for noise-level increases of 5 dBA. In addition, Road 23 between Avenue 14 ½ and Avenue 14 and Cleveland Avenue between Westberry Boulevard and Granada Drive would result in noise level increases that exceed the 5 dBA significance criteria.

To reduce traffic noise at outdoor living areas, typical noise mitigation would include the construction of a stand-alone sound wall, which reduces noise levels by approximately 5 to 10 dBA. However, building a sound wall to mitigate noise levels may not be feasible because a sound wall could limit access to properties or could be infeasible for other reasons such as lack of right-of-way. Therefore, because project specific plans are not yet developed, additional noise mitigation measures cannot be designed or incorporated to ensure a reduction of exterior noise levels. Therefore, noise impacts along Road 23 between Avenue 14 ½ and Avenue 14, Avenue 17 between Road 23 and Golden State Boulevard, and Cleveland Avenue between Westberry Boulevard and Granada Drive would be considered significant and unavoidable.

[4] LSA, 2020, op. cit.

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Table 4.13.K: Traffic Noise Levels Without and With Specific Plan

Roadway Segment	Existing Traffic Volumes					Phase I Project Completion Year (2029) Traffic Volumes					Phase II Completion Year (2039) Traffic Volumes					Phase III Completion Year (2049) Traffic Volumes				
	Without Project		With Project			Without Project		With Project			Without Project		With Project			Without Project		With Project		
	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions
Road 23 between Avenue 17 and Project Driveway 3	4,458	65.6	40,636	75.2	9.6	4,524	65.6	12,096	69.9	4.3	4,590	63.5	26,359	71.1	7.6	4,657	63.5	40,835	73.0	9.5
Road 23 between Project Driveway 3 and Avenue 16	4,458	65.6	33,971	74.4	8.8	4,572	65.7	12,144	69.9	4.2	4,686	63.6	18,126	69.4	5.8	4,799	63.7	34,312	72.2	8.5
Road 23 between Avenue 16 and Cleveland Avenue	4,658	65.8	34,926	74.5	8.7	5,586	66.6	12,324	70.0	3.4	6,515	65.0	18,459	69.5	4.5	7,443	65.6	37,711	72.6	7.0
Road 23 between Cleveland Avenue and Project Driveway 4	5,575	66.5	36,640	74.7	8.2	6,226	67.0	14,726	70.8	3.8	6,877	65.2	19,935	69.9	4.7	7,528	65.6	38,592	72.7	7.1
Road 23 between Project Driveway 4 and Project Driveway 5	5,575	66.5	33,303	74.3	7.8	5,955	66.8	15,995	71.1	4.3	6,334	64.9	19,062	69.7	4.8	6,714	65.1	34,442	72.2	7.1
Road 23 between Project Driveway 5 and Avenue 14 ½	5,575	66.5	33,665	74.4	7.9	5,660	66.6	15,700	71.0	4.4	5,744	64.5	18,474	69.5	5.0	5,829	64.5	33,919	72.2	7.7
Road 23 between Avenue 14 ½ and Avenue 14	5,052	66.1	26,622	73.3	7.2	5,215	66.3	13,077	70.3	4.0	5,378	64.9	15,162	69.4	4.5	5,541	65.0	27,111	71.9	6.9
Westberry Boulevard between Sunset Avenue and Avenue 14/Howard Road	3,888	59.5	5,060	60.7	1.2	4,846	60.5	5,614	61.1	0.6	5,803	60.3	6,571	60.9	0.6	6,760	61.0	7,932	61.7	0.7
Granada Drive between Cleveland Avenue and Fresno River	10,439	67.1	10,795	67.2	0.1	11,674	67.6	11,930	67.7	0.1	12,910	66.5	13,266	66.6	0.1	14,145	66.9	14,501	67.0	0.1
Granada Drive between Sunset Avenue and Avenue 14/Howard Road	7,707	65.8	7,707	65.8	0.0	8,086	66.0	8,086	66.0	0.0	8,464	64.7	8,464	64.7	0.0	8,843	64.8	8,843	64.8	0.0
Avenue 17 between Road 22 and Project Driveway 1	802	58.1	2,300	62.7	4.6	894	58.6	1,358	60.4	1.8	987	56.8	2,391	60.6	3.8	1,080	57.2	2,577	61.0	3.8
Avenue 17 between Project Driveway 1 and Road 23	802	58.1	11,439	69.7	11.6	902	58.6	1,366	60.4	1.8	1,003	56.9	11,409	67.4	10.5	1,103	57.3	11,740	67.6	10.3
Avenue 17 between Road 23 and Golden State Boulevard	2,233	62.6	27,891	73.5	10.9	3,262	64.2	5,338	66.4	2.2	3,351	62.1	22,463	70.4	8.3	3,440	62.2	29,098	71.5	9.3
Avenue 17 between Golden State Boulevard and State Route 99 Southbound Off-Ramp	9,626	68.9	29,982	73.9	5.0	14,168	70.6	15,884	71.1	0.5	17,771	69.4	33,915	72.2	2.8	21,374	70.2	41,730	73.1	2.9
Avenue 16 between Road 22 and Project Driveway 2/Road 22 ½	453	55.6	691	57.5	1.9	459	55.7	459	55.7	0.0	465	55.8	465	55.8	0.0	470	55.8	708	57.6	1.8
Avenue 16 between Project Driveway 2/Road 22 ½ and Road 23	453	55.6	10,456	69.3	13.7	1,187	59.8	1,187	59.8	0.0	1,920	61.9	5,203	66.2	4.3	2,654	63.3	12,657	70.1	6.8
Cleveland Avenue between Road 23 and Project Driveway 6	2,349	62.8	28,339	73.6	10.8	2,425	62.9	14,959	70.8	7.9	2,501	63.1	15,868	71.1	8.0	2,576	63.2	28,566	73.6	10.4
Cleveland Avenue between Project Driveway 6 and Westberry Boulevard	2,349	62.8	31,877	74.1	11.3	2,967	63.8	21,105	72.3	8.5	3,586	64.6	22,277	72.6	8.0	4,204	65.3	33,732	74.4	9.1
Cleveland Avenue between Westberry Boulevard and Granada Drive	3,879	62.2	22,801	69.9	7.7	4,942	63.2	17,008	68.6	5.4	6,005	64.7	18,071	69.5	4.8	7,068	65.4	25,990	71.0	5.6
Cleveland Avenue between Granada Drive and Schnoor Street	9,473	65.1	26,807	69.7	4.6	10,997	65.8	22,233	68.9	3.1	12,520	66.4	23,756	69.1	2.7	14,044	66.9	31,378	70.3	3.4

Table 4.13.K: Traffic Noise Levels Without and With Specific Plan

Roadway Segment	Existing Traffic Volumes					Phase I Project Completion Year (2029) Traffic Volumes					Phase II Completion Year (2039) Traffic Volumes					Phase III Completion Year (2049) Traffic Volumes				
	Without Project		With Project			Without Project		With Project			Without Project		With Project			Without Project		With Project		
	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions
Cleveland Avenue between Schnoor Street and Fairgrounds	15,080	65.9	29,794	68.9	3.0	16,508	66.3	26,120	68.3	2.0	17,936	65.9	27,548	67.8	1.9	19,364	66.3	34,078	68.7	2.4
Cleveland Avenue between Fairgrounds and State Route 99 Southbound Ramps	15,080	65.9	30,178	68.9	3.0	17,328	66.5	26,940	68.4	1.9	19,577	66.3	29,725	68.1	1.8	21,825	66.8	36,923	69.1	2.3
Sunset Avenue between Granada Drive and Schnoor Street	6,123	61.5	7,555	62.4	0.9	6,225	61.6	6,709	61.9	0.3	6,327	60.7	6,811	61.0	0.3	6,429	60.8	7,861	61.6	0.8
Howard Road between Granada Drive and Schnoor Street	10,751	63.0	19,675	65.6	2.6	11,299	63.2	14,443	64.3	1.1	11,847	63.4	15,223	64.5	1.1	12,395	63.6	21,319	66.0	2.4
Howard Road between Schnoor Street and Pine Street	16,597	64.9	25,521	66.8	1.9	16,913	65.0	20,057	65.7	0.7	17,229	64.3	20,605	65.1	0.8	17,544	64.4	26,468	66.2	1.8
Olive Avenue between Yosemite Avenue and I Street	11,314	63.2	17,868	65.2	2.0	12,501	63.7	14,441	64.3	0.6	13,688	64.1	15,628	64.6	0.5	14,875	64.4	21,429	66.0	1.6
Olive Avenue between I Street and State Route 99 Southbound Off-Ramp	11,314	63.2	16,316	64.8	1.6	12,501	63.7	13,835	64.1	0.4	13,688	64.1	15,022	64.5	0.4	14,875	64.4	19,877	65.7	1.3
Olive Avenue between State Route 99 Southbound Off-Ramp and Madera Avenue	11,314	64.7	18,050	66.8	2.1	14,470	65.8	16,437	66.4	0.6	17,626	65.2	20,492	65.8	0.6	20,783	65.9	27,519	67.1	1.2
Road 22 between Avenue 17 and Avenue 16	-	-	490	56.0	-	-	-	10	39.1	-	-	-	10	39.1	-	-	-	490	56.0	-
Road 22 between Avenue 16 and Cleveland Avenue	-	-	280	53.6	-	-	-	10	39.1	-	-	-	10	39.1	-	-	-	280	53.6	-
Road 22 south of Cleveland Avenue	-	-	40	45.1	-	-	-	0	29.1	-	-	-	0	29.1	-	-	-	40	45.1	-
Cleveland Avenue between Road 22 and Project Driveway 2/Road 22 1/2	-	-	230	42.8	-	-	-	0	19.2	-	-	-	0	19.2	-	-	-	230	42.8	-
Cleveland Avenue between Project Driveway 2/Road 22 1/2 and Road 23	-	-	18,950	62.0	-	-	-	770	48.1	-	-	-	770	48.1	-	-	-	18,950	62.0	-
Project Driveway 2/Road 22 1/2 between Avenue 16 and Cleveland Avenue	-	-	8,540	60.0	-	-	-	10	30.7	-	-	-	390	46.6	-	-	-	8,540	60.0	-
Project Driveway 2/Road 22 1/2 between Avenue 17 and Avenue 16	-	-	7,210	59.3	-	-	-	20	33.7	-	-	-	7,980	59.7	-	-	-	7,990	59.8	-
Avenue 16 between Road 22 and Westberry Road	-	-	6,460	60.8	-	-	-	4,330	59.1	-	-	-	7,480	61.4	-	-	-	6,460	60.8	-
Project Driveway 5 west of Project Driveway 2/Road 22 1/2	-	-	1,030	49.4	-	-	-	0	19.2	-	-	-	0	19.2	-	-	-	1,030	49.4	-
Project Driveway 5 east of Project Driveway 2/Road 22 1/2	-	-	1,550	51.1	-	-	-	0	19.2	-	-	-	0	19.2	-	-	-	1,550	51.1	-

Table 4.13.K: Traffic Noise Levels Without and With Specific Plan

Roadway Segment	Existing Traffic Volumes					Phase I Project Completion Year (2029) Traffic Volumes					Phase II Completion Year (2039) Traffic Volumes					Phase III Completion Year (2049) Traffic Volumes				
	Without Project		With Project			Without Project		With Project			Without Project		With Project			Without Project		With Project		
	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	ADT	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from Baseline Conditions
Project Driveway 2/Road 22 1/2 north of Project Driveway 5	-	-	780	49.6	-	-	-	0	20.7	-	-	-	0	20.7	-	-	-	780	49.6	-
Project Driveway 4 east of Road 23	-	-	25,780	63.3	-	-	-	11,460	59.8	-	-	-	22,680	62.8	-	-	-	25,780	63.3	-
Project Driveway 5 west of Road 23	-	-	3,080	54.1	-	-	-	430	45.6	-	-	-	800	48.3	-	-	-	4,230	55.5	-
Project Driveway 6 south of Cleveland Avenue	-	-	8,110	59.8	-	-	-	8,110	59.8	-	-	-	7,920	59.7	-	-	-	7,850	59.7	-
Project Driveway 2/Road 22 1/2 between Road 23 and Project Driveway 3	-	-	10,020	60.7	-	-	-	0	20.7	-	-	-	10,060	60.8	-	-	-	10,020	60.7	-
Project Driveway 4 between Project Driveway 2/Road 22 1/2 and Road 23	-	-	16,850	61.5	-	-	-	3,230	54.3	-	-	-	20,480	62.3	-	-	-	16,720	61.5	-

Source: Compiled by LSA (December 2020).
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
Shaded cells indicate roadways within the Specific Plan Area.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
- = Future roadway segment that would be constructed as part of the proposed project.

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On-Site Traffic Noise Impacts. As shown in Table 4.13.L, future noise levels along roadway segments within the Specific Plan Area (represented by the shaded cells in the table) would be up to 75.2 dBA CNEL. Based on the City's Exterior Noise Compatibility Guidelines for Noise, this noise level would be within the City's *Normally Incompatible* exterior noise level for residential and public parks land uses and within the City's *Tentatively Compatible* exterior noise level for all commercial land uses. Therefore, proposed land uses may be permitted only after detailed analysis of the noise reduction features proposed to be incorporated in the project design. Table 4.13.L identifies noise contours for roadway segments within the Specific Plan Area based on distance attenuation. Figure 4.13-2 identifies the future traffic noise contours for these roadway segments.

Table 4.13.L: Traffic Noise Contours Along Roadway Segments Within the Specific Plan Area

Roadway Segment	dB CNEL at 50 feet from Roadway Centerline	Feet from Roadway Centerline (Distance to Noise Contours)		
		60 dBA	65 dBA	70 dBA
Road 23 between Avenue 17 and Project Driveway 3	75.2	572	265	123
Road 23 between Project Driveway 3 and Avenue 16	74.4	507	236	109
Road 23 between Avenue 16 and Cleveland Avenue	74.5	517	240	112
Road 23 between Cleveland Avenue and Project Driveway 4	74.7	533	248	115
Road 23 between Project Driveway 4 and Project Driveway 5	74.3	501	232	108
Road 23 between Project Driveway 5 and Avenue 14 ½	74.4	504	234	109
Avenue 17 between Road 22 and Project Driveway 1	62.7	84	< 50	< 50
Avenue 17 between Project Driveway 1 and Road 23	69.7	246	114	53
Avenue 16 between Road 22 and Project Driveway 2/Road 22 ½	57.6	< 50	< 50	< 50
Avenue 16 between Project Driveway 2/Road 22 ½ and Road 23	70.1	263	122	57
Cleveland Avenue between Road 23 and Project Driveway 6	73.6	449	209	97
Cleveland Avenue between Project Driveway 6 and Westberry Boulevard	74.4	452	210	98
Road 22 between Avenue 17 and Avenue 16	56.0	< 50	< 50	< 50
Road 22 between Avenue 16 and Cleveland Avenue	53.6	< 50	< 50	< 50
Road 22 south of Cleveland Avenue	45.1	< 50	< 50	< 50
Cleveland Avenue between Road 22 and Project Driveway 2/Road 22 1/2	42.8	< 50	< 50	< 50
Cleveland Avenue between Project Driveway 2/Road 22 1/2 and Road 23	62.0	98	< 50	< 50
Project Driveway 2/Road 22 1/2 between Avenue 16 and Cleveland Avenue	60.0	56	< 50	< 50
Project Driveway 2/Road 22 1/2 between Avenue 17 and Avenue 16	59.8	54	< 50	< 50
Avenue 16 between Road 22 and Westberry Road	61.4	90	< 50	< 50
Project Driveway 5 west of Project Driveway 2/Road 22 1/2	49.4	< 50	< 50	< 50
Project Driveway 5 east of Project Driveway 2/Road 22 1/2	51.1	< 50	< 50	< 50
Project Driveway 2/Road 22 1/2 north of Project Driveway 5	49.6	< 50	< 50	< 50
Project Driveway 4 east of Road 23	63.3	119	59	< 50
Project Driveway 6 south of Cleveland Avenue	59.8	54	< 50	< 50
Project Driveway 2/Road 22 1/2 between Road 23 and Project Driveway 3	60.8	63	< 50	< 50
Project Driveway 4 between Project Driveway 2/Road 22 1/2 and Road 23	62.3	103	< 50	< 50

Source: Compiled by LSA (December 2020).

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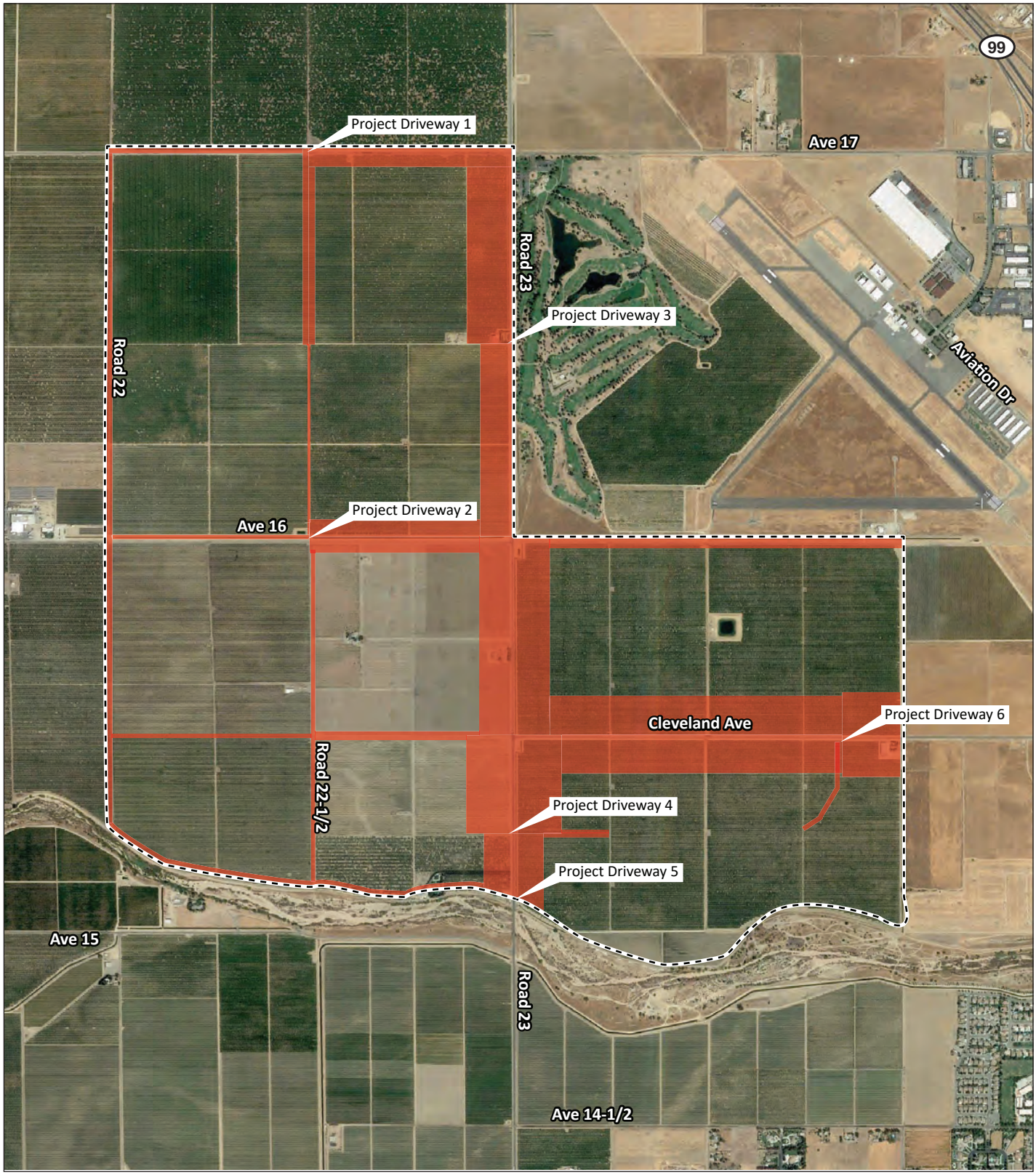

LSA

FIGURE 4.13-2

N

0 1000 2000
FEET

Project Area

Traffic noise contours with noise levels greater than 60 dBA CNEL

The Villages at Almond Grove Specific Plan EIR

Future Traffic Noise Contours

SOURCES: Google Earth, 8/23/2018; LSA, 2020

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In addition, due to the high traffic volumes and ambient noise levels along roadways in the Specific Plan Area, future residences may be exposed to increased interior noise levels that exceed the City's acceptable interior noise level standard of 45 dBA CNEL. As shown in Table 4.13.K and Table 4.13.L, buildout of the proposed Specific Plan would generate noise levels up to 75.2 dBA CNEL. Exterior-to-interior noise level reduction with windows open would be approximately 15 dBA. Therefore, sensitive receptors near roadways in the Specific Plan Area could be exposed to interior noise levels that exceed the City's acceptable interior noise level standard of 45 dBA CNEL. Therefore, Mitigation Measure NOI-1.2, as discussed below, would be required to reduce interior noise impacts to meet the City's acceptable interior noise level at residences exposed to traffic noise exceeding 60 dBA CNEL.

Implementation of Mitigation Measure NOI-1.2 would reduce interior noise levels by more than 25 dBA with windows closed, which would reduce interior noise impacts at the residences to noise levels below the City's interior residential noise standard. However, implementation of the proposed Specific Plan would result in a substantial permanent increase in ambient noise levels that would result in outdoor living areas to exceed standards for exterior noise limits. Additionally, because developments that would be considered under the proposed Specific Plan have not been designed or proposed at this time, additional noise reduction measures would be identified at the time such projects are proposed. Therefore, the exposure of noise-sensitive land uses to noise levels in excess of standards established by the City, or to substantial noise increases as a result of future growth associated with implementation of the proposed Specific Plan, would result in a significant unavoidable permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

Stationary Source Noise. Development allowed under the proposed Specific Plan may include the installation or creation of new stationary sources of noise, or could include the development of new sensitive land uses in the vicinity of existing noise sources. For commercial uses, these noise sources could include loading/unloading operations, generators, and outdoor speakers; for residential uses, stationary noise sources may include air conditioners or pool pumps. These stationary sources of noise would have the potential to disturb adjacent sensitive receptors. However, noise generation would continue to be limited by the City of Madera's Noise Ordinance (Title III: Public Safety, Chapter 11: Noise Control).

Development allowed by the proposed Specific Plan may include the development of new sensitive land uses in the vicinity of existing noise sources and could potentially subject sensitive land uses to long-term noise impacts. However, to ensure that new development will meet the interior noise standards identified by the State, all new developments in areas with noise levels greater than 60 dBA CNEL would be required to prepare an acoustical analysis and would require new residential land uses to be designed to maintain a standard of 45 dBA CNEL or less in building interiors, as required by Mitigation Measure NOI-1.2. In addition, any new noise-generating sources would be subject to compliance with the City's General Plan and Noise Ordinance (Title III: Public Safety, Chapter 11: Noise Control), which sets exterior noise standards for the various land uses within the City. Therefore, with implementation of Mitigation Measure NOI-1.3, implementation of the proposed Specific Plan would not expose

persons to stationary source noise levels in excess of the City's General Plan and Municipal Code.

Level of Significance Without Mitigation**:** Potentially significant.

Impact NOI-1: The proposed project would generate 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 in other applicable local, State, or federal standards.

Mitigation Measure NOI-1.1: The project contractor shall implement the following measures during construction of the proposed project:

- Equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- Place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the active project site.
- Locate equipment staging in areas that would create the greatest possible distance between construction-related noise sources and noise-sensitive receptors nearest the active project site during all construction activities.
- Ensure that all general construction related activities are restricted to between the hours of 6:00 a.m. and 8:00 p.m., consistent with the City's Noise Ordinance.
- Designate a "disturbance coordinator" at the City, at the expense of the project contractor, who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler) and would determine and implement reasonable measures warranted to correct the problem.

Mitigation Measure NOI-1.2: In order to comply with the City's noise compatibility guidelines, prior to the issuance of grading permits, new development proposed under the Specific Plan shall require an acoustic study for approval by the Community Development Director or designee for all noise-sensitive projects located within the following traffic noise contours with noise levels greater than 60 dBA CNEL:

- Within 572 feet of Road 23 between Avenue 17 and Project Driveway 3;

- Within 507 feet of Road 23 between Project Driveway 3 and Avenue 16;
- Within 517 feet of Road 23 between Avenue 16 and Cleveland Avenue;
- Within 533 feet of Road 23 between Cleveland Avenue and Project Driveway 4;
- Within 501 feet of Road 23 between Project Driveway 4 and Project Driveway 5;
- Within 504 feet of Road 23 between Project Driveway 5 and Avenue 14 ½;
- Within 84 feet of Avenue 17 between Road 22 and Project Driveway 1;
- Within 246 feet of Avenue 17 between Project Driveway 1 and Road 23;
- Within 50 feet of Avenue 16 between Road 22 and Project Driveway 2/Road 22 ½;
- Within 263 feet of Avenue 16 between Project Driveway 2/Road 22 ½ and Road 23;
- Within 449 feet of Cleveland Avenue between Road 23 and Project Driveway 6;
- Within 452 feet of Cleveland Avenue between Project Driveway 6 and Westberry Boulevard;
- Within 50 feet of Road 22 between Avenue 17 and Avenue 16;
- Within 50 feet of Road 22 between Avenue 16 and Cleveland Avenue;
- Within 50 feet of Road 22 south of Cleveland Avenue;
- Within 50 feet of Cleveland Avenue between Road 22 and between Project Driveway 2/Road 22 ½;
- Within 98 feet of Cleveland Avenue between Project Driveway 2/Road 22 ½ and Road 23;

- Within 56 feet of Project Driveway 2/Road 22 ½ between Avenue 16 and Cleveland Avenue; Within 54 feet of Project Driveway 2/Road 22 ½ between Avenue 17 and Avenue 16;
- Within 90 feet of Avenue 16 between Road 22 and Westberry Road;
- Within 50 feet of Project Driveway 5 west of Project Driveway 2/Road 22 ½;
- Within 50 feet of Project Driveway 5 east of Project Driveway 2/Road 22½;
- Within 50 feet of Project Driveway 2/Road 22 ½ north of Project Driveway 5;
- Within 119 feet of Project Driveway 4 east of Road 23;
- Within 54 feet of Project Driveway 6 south of Cleveland Avenue;
- Within 63 feet of Project Driveway 2/Road 22 ½ between Road 23 and Project Driveway 3; and
- Within 103 feet of Project Driveway 4 between Project Driveway 2/ Road 22 ½ and Road 23.

The acoustic study shall demonstrate that that interior noise levels in habitable rooms shall not exceed 45 dBA CNEL. Acoustical design features shall be incorporated into the proposed project design, which may include a combination of exterior features to reduce noise, such as berms/walls and/or architectural features such as Sound Transmission Class (STC) rated windows and doors. All STC ratings shall be shown on the building plans and incorporated into the construction of the proposed project. Once final architectural plans with the exterior-wall details and window types are available, a Final Acoustic Report shall be prepared by a qualified consultant to confirm that the interior living spaces of residential dwelling units will meet the City's interior noise standard of 45 dBA CNEL (A weighted decibel Community Noise Equivalent Level) with windows and doors closed. If interior noise levels are still exceeded after the Final Acoustic Report is completed, additional design features shall be incorporated to meet the interior noise.

Mitigation Measure NOI-1.3: In order to comply with the City's General Plan non-transportation related noise standards and Municipal Code standards, prior to the issuance of grading permits, an acoustical study shall be prepared

for any stationary sources of noise proposed under the Specific Plan. The stationary source noise study shall demonstrate that noise levels would be consistent with the Noise Ordinance standards outlined in Title III: Public Safety, Chapter 11: Noise Control and shall be approved by the City of Madera Community Development Director or designee.

Level of Significance With Mitigation: Significant and unavoidable.

Threshold 4.13.2 Would the project generate excessive groundborne vibration or groundborne noise levels?

Vibration refers to groundborne noise and perceptible motion. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors. Vibration energy propagates from a source, through intervening soil and rock layers, to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by the occupants as the motion of building surfaces, rattling of items on shelves or hanging on walls, or as a low-frequency rumbling noise. The rumbling noise is caused by the vibrating walls, floors, and ceilings radiating sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of groundborne vibration are construction activities (e.g., pavement breaking and operating heavy-duty earthmoving equipment), and occasional traffic on rough roads. In general, groundborne vibration from standard construction practices is only a potential issue when it occurs within 25 feet of sensitive uses. Groundborne vibration levels from construction activities very rarely reach levels that can damage structures; however, these levels are perceptible near the active construction site. With the exception of old buildings built prior to the 1950s or buildings of historic significance, potential structural damage from heavy construction activities rarely occurs. When roadways are smooth, vibration from traffic (even heavy trucks) is rarely perceptible.

The streets surrounding the Specific Plan Area would be paved, smooth, and unlikely to cause significant groundborne vibration. In addition, the rubber tires and suspension systems of fire engines and other on-road vehicles make it unusual for on-road vehicles to cause groundborne noise or vibration problems. It is, therefore, assumed that no such vehicular vibration impacts would occur and, therefore, no vibration impact analysis of on-road vehicles is necessary. Additionally, once constructed, the proposed project would not contain uses that would generate groundborne vibration.

Construction Vibration. Construction of the projects allowed under the Specific Plan could result in the generation of groundborne vibration. This construction vibration impact analysis discusses the level of human annoyance using vibration levels in VdB and will assess the potential for building damages using vibration levels in peak particle velocity (PPV inches per second [(in/sec]) because vibration levels calculated in RMS are best for characterizing human response to building vibration, while vibration level in PPV is best used to characterize potential for damage. The FTA Transit Noise and Vibration Impact Assessment guidelines indicate that a vibration level up to 102 VdB (an

equivalent to 0.5 in/sec in PPV) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For a non-engineered timber and masonry building, the construction vibration damage criterion is 94 VdB (0.2 in/sec in PPV).

Table 4.13.M shows the PPV and VdB values at 25 feet from a construction vibration source. As shown in Table 4.13.M, bulldozers and other heavy-tracked construction equipment (except for pile drivers and vibratory rollers) generate approximately 87 VdB of groundborne vibration when measured at 25 feet, based on the Transit Noise and Vibration Impact Assessment. At this level, groundborne vibration would result in potential annoyance to residents and workers, but would not cause any damage to the buildings.

Table 4.13.M: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 feet	
	PPV (in/sec)	L_V (VdB)[a]
Pile Driver (Impact), Typical3	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Sources: *Transit Noise and Vibration Impact Assessment* (FTA 2018).
[a] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
µin/sec = micro-inches per second
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Construction vibration, similar to vibration from other sources, would not have any significant effects on outdoor activities (e.g., those outside of residential buildings in the project vicinity). Outdoor site preparation for the proposed project is expected to include the use of bulldozers and loaded trucks. The greatest levels of vibration are anticipated to occur during the site preparation phase. All other phases are expected to result in lower vibration levels. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary) because vibration impacts occur normally within the buildings. The formula for vibration transmission is provided below.

$$L_vdB\ (D) = L_vdB\ (25\ feet) - 30\ Log\ (D/25)$$
$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

Based on distance attenuation, groundborne vibration levels associated with heavy construction equipment would exceed the FTA threshold of 94 VdB (0.2 in/sec PPV) for building damage when heavy construction equipment is used within 15 feet of existing structures. Implementation of the

proposed Specific Plan would allow for high density, mixed-use development in more densely developed areas where offsite structures would be more prevalent. Even during these occurrences, the buffers set forth by the City of Madera Municipal Code (e.g., setbacks, easements, right-of-ways) would ensure that in most cases onsite and offsite structures would be separated by at least 15 feet, and thus construction activities would be buffered by at least 15 feet from adjacent structures.

If construction activities would occur within 15 feet of adjacent structures, short-term construction impacts associated with groundborne vibration would be potentially significant. Therefore, implementation of Mitigation Measure NOI-2.1 would be required to increase the distance between heavy construction equipment and the surrounding structures to a minimum of 15 feet. Implementation of Mitigation Measure NOI-2.1 would ensure that construction vibration level would be below the threshold of 0.2 in/sec PPV for building damage and would reduce impacts to a less-than-significant level.

Level of Significance Without Mitigation: Potentially significant.

Impact NOI-2: The proposed project would generate excessive groundborne vibration or groundborne noise levels.

Mitigation Measure NOI-2.1 Prior to the approval of any construction or building permits for new development proposed under the Specific Plan, the City of Madera Community Development Director or designee shall ensure that construction plans include specifications that prohibit the use of heavy construction equipment within 15 feet of existing structures.

Level of Significance With Mitigation: Less than significant.

Threshold 4.13.3 For a project located within the vicinity of a private airstrip an airport land use plan or, where such a plan has not been adopted, within 2 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?

As required by the Caltrans Division of Aeronautics, the Madera County ALUC must prepare an ALUCP for public and public use airport within its jurisdiction. An ALUCP guides local jurisdictions in determining appropriate compatible land uses with detailed findings and policies. The Madera County ALUC adopted the Madera Countywide Airport Land Use Plan, which covers the Madera Municipal Airport and the Chowchilla Municipal Airport. The proposed Specific Plan, other City land use plans, and all City land use decisions must be compatible with the adopted ALUCP. The ALUCP includes CNEL noise contours based on projected airport and aircraft operations. The purpose of these noise contours are to minimize the effect of airport and aircraft noise on the adjacent community by determining land use compatibility and locations for noise mitigation measures during the planning, design, and development process.

The Madera Countywide ALUCP establishes land uses that are either acceptable or unacceptable within each CNEL noise contour based on the noise sensitivity of the particular use. Noise-sensitive

land uses such as residential uses are typically only acceptable in areas outside the 65 dBA CNEL and greater noise contours. It is within these areas that the Madera County ALUC has determined that residential uses can occur while still minimizing the effects of adjacent and overhead aircraft noise on noise-sensitive receptors. Any land use decision made within the jurisdictional boundary of the ALUCP, and based upon policies set forth by the General Plan, must be consistent with the ALUCP, including the land use compatibility policies based on CNEL noise contours, as required by law.

The Madera Municipal Airport is located directly north and east of the Specific Plan Area. Based on Exhibit 5D of the Madera Countywide ALUCP, the northernmost portions of the Specific Plan Area, including near the intersections of Avenue 17 and Road 23 and Avenue 16 and Road 24, lie within the 65 dBA CNEL noise contours for this airport. The rest of the Specific Plan Area lies beyond the 65 dBA CNEL noise contours. Based on Figure 3-5 of the Project Description, the proposed land use near the intersection of Avenue 17 and Road 23 within the 65 dBA CNEL noise contours does not include noise sensitive uses and the proposed land use near the intersection of Avenue 16 and Road 24 is a retention basin. As such, the proposed project would not include new residential uses or similar noise-sensitive land use proposed for areas susceptible to aircraft noise levels exceeding those levels that are typically considered acceptable. Additionally, future development proposals within the Specific Plan Area would be required to be consistent with the ALUCP for Madera Municipal Airport.

There are no private airstrips operating within the Specific Plan Area. As a result, any noise associated with private airstrips would not result in a substantial noise levels within the Specific Plan Area. Therefore, implementation the proposed project would not result in impacts from adjacent and overhead aircraft noise on noise-sensitive land uses. Therefore, impacts associated with noise produced by public, public use, or private airports in the Specific Plan Area would be less than significant.

Level of Significance Without Mitigation: Less than significant. No mitigation is required.

4.13.2.3 Cumulative Impacts

The proposed project would have a significant effect on the environment if it – in combination with other projects – would contribute to a significant cumulative impact related to noise.

Short-Term Construction Impacts. Buildout of the proposed Specific Plan would introduce construction activities to the Specific Plan Area that could potentially result in temporary or periodic increases in ambient noise levels. Construction activities would typically occur intermittently and vary depending upon the nature or phase of construction, although noise ranges are usually similar across all construction phases. Depending on the equipment required and duration of use, the worst-case combined noise level during this phase of future construction would be 86 dBA L_{max} at a distance of 50 feet from the active construction area. In addition, some construction projects could require pile driving, which would have a maximum noise level of approximately 95 dBA L_{max} at 50 feet.

Hypothetically, if several different projects were constructed simultaneously within the same immediate vicinity, there would be potential for cumulative temporary noise effects, since

construction noise from individual projects could compound. However, this scenario is highly unlikely. A more reasonable assumption is that future construction activities would occur at different locations throughout the Specific Plan Area, and each would be subject to Mitigation Measure NOI-1.1. Although scheduling of some of construction activities would likely overlap, projects would not be constructed simultaneously, but instead would occur over a number of years. This distribution of individual projects would reduce the potential for compounding of construction noise.

As previously addressed, construction noise is permitted by the City of Madera when activities occur between the hours of 6:00 a.m. and 8:00 p.m. While construction noise impacts are currently exempt from specific noise levels limits, projects that have unusual or extremely loud construction activities (such as pile driving, nighttime construction work, unusually long construction duration, etc.) would be evaluated on a case-by-case basis. In addition, Mitigation Measure NOI-1.1 would be required to limit construction activities to daytime hours and implement best practices during construction and would reduce potential construction period noise impacts for nearby sensitive receptors to less-than-significant levels. Therefore, the proposed project contributions to cumulative construction noise would be less than cumulatively considerable and thus would result in a less than significant cumulative impact.

Long-Term Operational Impacts. Buildout of the Specific Plan would result in increased traffic volumes along existing roadways, thus incrementally increasing noise levels. Future noise levels are projected to increase by up to 10.9 dBA at roadway segments outside of the Specific Plan Area, as shown in Table 4.13.K. The largest off-site noise level increase in traffic-related noise as a result of the Specific Plan would be on Avenue 17 between Road 23 and Golden State Boulevard, with up to a 10.9 dBA increase under Existing With Project conditions and up to 9.3 dBA increase under Phase III Project Completion Year (2049) With Project conditions. This noise level increase would exceed the significance criteria for noise-level increases of 5 dBA.

As identified above, to reduce traffic noise at outdoor living areas, typical noise mitigation would include the construction of a stand-alone sound wall, which reduces noise levels by approximately 5 to 10 dBA. However, building a sound wall to mitigate noise levels may not be feasible because a sound wall could limit access to properties. Therefore, additional noise mitigation measures are not available to reduce exterior noise levels. Additionally, because specific development projects that would be considered under the proposed Specific Plan have not been designed or proposed at this time, additional noise reduction measures would be identified at the time such projects are proposed; therefore, the substantial noise increases as a result of future growth according to the proposed Specific Plan would be considered a potentially significant impact. Therefore, the proposed project contributions to cumulative traffic noise would be cumulatively considerable and would result in a significant cumulative impact.

In addition, buildout of the Specific Plan may include the installation or creation of new stationary sources of noise, or could include the development of new sensitive land uses in the vicinity of existing noise sources. For commercial uses, these noise sources could include loading/unloading operations, generators, and outdoor speakers; for residential uses, stationary noise sources may include air conditioners or pool pumps. These stationary sources of noise would have the potential

to disturb adjacent sensitive receptors. However, noise generation would continue to be limited by the City of Madera's Noise Ordinance (Title III: Public Safety, Chapter 11: Noise Control).

Development allowed by the proposed Specific Plan may include the development of new sensitive land uses in the vicinity of existing noise sources and could potentially subject sensitive land uses to long-term noise impacts. However, to ensure that new development will meet the interior noise standards identified by the State, all new developments in areas with noise levels greater than 60 dBA CNEL would be required to prepare an acoustical analysis and would require new residential land uses to be designed to maintain a standard of 45 dBA CNEL or less in building interiors, as required by Mitigation Measure NOI-1.2. In addition, any new noise-generating sources would be subject to compliance with the City's General Plan and Noise Ordinance (Title III: Public Safety, Chapter 11: Noise Control), which sets exterior noise standards for the various land uses within the City. Therefore, with implementation of Mitigation Measure NOI-1.3, which outlines measures to address stationary noise sources, implementation of the proposed Specific Plan would not expose persons to stationary source noise levels in excess of the City's General Plan and Municipal Code.

Construction Vibration Impacts. Buildout of the Specific Plan, along with construction of related projects in the Specific Plan Area, would use construction equipment such as tractors, trucks, and jackhammers. Hypothetically, if several different projects were constructed simultaneously upon the same construction site within 15 feet of an existing structure, there would be potential for cumulative ground vibration effects. However, this scenario is highly unlikely. A more reasonable assumption is that future construction activities would occur at different locations throughout the Specific Plan Area, and each would be subject to Mitigation Measure NOI-1.1. Although scheduling of some of these construction activities would likely overlap, projects would not be constructed simultaneously, but instead would occur over a number of years. In addition, implementation of Mitigation Measure NOI-2.1 would be required to increase the distance between heavy construction equipment and the surrounding structures to a minimum of 15 feet to ensure that construction vibration level would be below the threshold of 0.2 in/sec PPV for building damage and would reduce impacts to a less-than-significant level. As a result, with implementation of Mitigation Measure NOI-2.1, no cumulative impacts associated with ground vibration would occur in the Specific Plan Area, and therefore, the implementation of the proposed Specific Plan is not deemed cumulatively considerable.

Airport Impacts. Buildout of the proposed Specific Plan would introduce noise-sensitive land uses such as residential uses to areas potentially affected by public airport and aircraft noise. However, all development occurring within the proposed Specific Plan would be subject to the land use compatibility polices of the applicable ALUCP. The ALUCP includes CNEL noise contours based on projected airport and aircraft operations. The purpose of these noise contours are to minimize the effect of airport and aircraft noise on the adjacent community by determining land use compatibility and locations for noise mitigation measures during the planning, design, and development process. Any land use decision made within the jurisdictional boundary of an applicable ALUCP (regardless of whether within or outside the Planning Area) and based upon policies set forth by the General Plan must be consistent with the ALUCP, including the land use compatibility policies based on CNEL noise contours, as required by law.

As discussed above, based on Exhibit 5D of the Madera Countywide ALUCP, the northernmost portions of the Specific Plan Area, including near the intersections of Avenue 17 and Road 23 and Avenue 16 and Road 24, lie within the 65 dBA CNEL noise contours for this airport. The rest of the Specific Plan Area lies beyond the 65 dBA CNEL noise contours. The proposed land use near the intersection of Avenue 17 and Road 23 within the 65 dBA CNEL noise contours does not include noise sensitive uses and the proposed land use near the intersection of Avenue 16 and Road 24 is a retention basin. As such, the proposed project would not include new residential uses or similar noise-sensitive land use proposed for areas susceptible to aircraft noise levels exceeding those levels that are typically considered acceptable. Additionally, future development proposals within the Specific Plan Area would be required to be consistent with the Airport Land Use Compatibility Plan for Madera Municipal Airport.

In addition, there are no private airstrips operating within the Specific Plan Area. As a result, any noise associated with private airstrips would not result in a substantial noise levels within the Specific Plan Area. Therefore, implementation the proposed project would not result in impacts from adjacent and overhead aircraft noise on noise-sensitive land uses, and impacts associated with noise produced by public, public use, or private airports in the Specific Plan Area would be less than significant. As a result, no cumulative impacts associated with airport and aircraft noise would occur in the Specific Plan Area, and therefore, the implementation of the proposed Specific Plan is not deemed cumulatively considerable.

Level of Significance Without Mitigation: Less than significant. No mitigation is required.

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