APPENDIX F

CITY OF GILROY 2040 GENERAL PLAN
DRAFT NOISE AND VIBRATION ASSESSMENT

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Gilroy, California

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A. INTRODUCTION

Illingworth & Rodkin, Inc. (I&R) has been retained by the City of Gilroy to assist the City with the Gilroy 2040 General Plan. The current General Plan policies are being updated to be consistent with the "Guidelines for the Preparation and Content of the Noise Element of the General Plan." The Noise Element requirements are set forth in State of California Government Code Section 65302(f) which provides the following overall guidance:

A Noise Element shall identify and appraise noise problems in a community. The Noise Element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:

(1) Highways and freeways.
(2) Primary arterials and major local streets.
(3) Passenger and freight online railroad operations and ground rapid transit systems.
(4) Commercial or general aviation, heliport, helistop, and military airport operations, aircraft overflights, jet engine test cells, and all other ground facilities and maintenance functions related to airport operation.
(5) Local industrial plants, including but not limited to railroad classification yards.
(6) Other ground stationery sources identified by local agencies as contributing to the community noise environment.

Noise contours shall be shown for all of these sources and stated in terms of Community Noise Equivalent Level (CNEL) or day/night average noise level (L_{dn}). The noise contour shall be prepared on the basis of noise monitoring or following generally accepted noise modeling techniques for various hours identified in paragraphs (1) to (6), inclusive.

The SoundPLAN model has been used to develop noise contour information for the primary traffic noise sources, and a table has been prepared identifying noise exposure levels along transportation routes in the City based on the gathered noise data and noise modeling. The noise contours are used as a guide for establishing a pattern of land uses in the Land Use Element that minimizes the exposure of community residents to excessive noise.

The Noise Element includes implementation measures and possible solutions that address existing and foreseeable noise problems, if any. The adopted Noise Element is to serve as a guideline for compliance with the State's Noise Insulation Standards.

Noise ordinances are specifically designed to deal with land use to land use noise issues. Typical problems in communities include noise from heating, ventilating, and air conditioning equipment, swimming pool pumps, loud parties, barking dogs, entertainment venues, etc. The City of Gilroy's noise-related provisions are contained in the Zoning Ordinance. The current ordinance addresses noise-related issues in the community through a combination of quantitative noise limits, prohibition acts, and exemptions. Quantitative noise limits are presented in the proposed ordinance to regulate intermittent and continuous sources of noise resulting from residential and commercial mechanical equipment and activities.

This summary report is divided into six sections. The first five sections provide the background information concerning the methods and noise and vibration data utilized to assess the noise and vibration impacts resulting from the Gilroy 2040 General Plan, including: A) an introduction, B) a brief summary of noise and vibration concepts, C) a summary of the applicable regulatory criteria, D) a description of the existing noise and vibration sources in the City, and E) the presentation of Existing and Buildout Noise Contour Maps. The Impacts and Mitigation Measures Section (F) describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project with respect to adjacent noise and vibration sources and noise-sensitive land uses.

B. NOISE AND VIBRATION CONCEPTS

1. Terminology

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (*frequency*) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA)*. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise* descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the *sound level meter*. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various

computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level (CNEL)* is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level (L_{dn} or DNL)* is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

2. Effects of Noise

a. Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event, such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard, which is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA, averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

b. Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA L_{dn} with open windows and 65 to 70 dBA L_{dn} if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70 dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major

roadways and freeways typically need special glass windows with Sound Transmission Class ratings greater than 30 STC.

c. Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. Therefore, there is an increase in annoyance due to ground vehicle noise of about 1 percent per dBA between a L_{dn} of 60 to 70 dBA. Between a L_{dn} of 70 to 80 dBA, each decibel increase increases the percentage of the population highly annoyed by about 2 percent. People appear to respond more adversely to aircraft noise. When the L_{dn} due to aircraft noise is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase in aircraft noise results in about a 3 percent increase in the percentage of the population highly annoyed.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which 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, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

3. Ground Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the Peak Particle Velocity (PPV), and another is the Root Mean Square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction-generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous vibration levels produce. The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying.

Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where ground-borne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise, causing induced vibration in exterior doors and windows.

Typical background vibration levels in residential areas are usually 50 VdB or lower, well below the threshold of perception for most humans (60 to 70 VdB). Perceptible vibration levels inside residences are attributed to the operation of heating and air conditioning systems, door slams and foot traffic. Table 3 illustrates some common sources of vibration and the association to human perception or the potential for structural damage. Construction activities, train operations, and heavy truck and bus traffic are some of the most common external sources of vibration that can be perceptible inside residences.

TABLE 3 Typical Levels of Ground-borne Vibration

Human/Structural Response	Velocity Level, VdB	Typical Events (50-foot setback)
Threshold, minor cosmetic damage	100	Blasting, pile driving, vibratory compaction equipment Heavy tracked vehicles (Bulldozers, cranes, drill rigs)
Difficulty with tasks such as reading a video or computer screen	90	
Residential annoyance, infrequent events	80	Commuter rail, upper range Rapid transit, upper range
Residential annoyance, occasional events		Commuter rail, typical Bus or truck over bump or on rough roads
Residential annoyance, frequent events	70	Rapid transit, typical
Approximate human threshold of perception to vibration		Buses, trucks and heavy street traffic
	60	Background vibration in residential settings in the absence of activity
Lower limit for equipment ultra-sensitive to vibration	50	

Source: Transit Noise and Vibration Impact Assessment, US Department of Transportation Federal Transit Administration, May 2006.

a. Construction Vibration

Construction activities can cause vibration that varies in intensity, depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction-related ground-borne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess ground-borne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher, and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

Table 4 displays continuous vibration impacts on human annoyance and on buildings. As discussed previously, annoyance is a subjective measure, and vibrations may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying.

TABLE 4 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to new residential and modern commercial/industrial structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

b. Rail Vibration

Railroad operations are potential sources of substantial ground vibration, depending on distance, the type and the speed of trains, and the type of railroad track. People's response to ground vibration has been correlated best with the RMS velocity level of the ground. The velocity of the ground is expressed on the decibel scale. The reference velocity is 1×10^{-6} in/sec RMS, which equals 0 VdB, and 1 in/sec equals 120 VdB. Although not a universally accepted notation, the abbreviation "VdB" is used in this document for vibration levels in decibels to reduce the potential for confusion with airborne sound levels in decibels.

One of the problems with developing suitable criteria for ground-borne vibration is the limited research into human response to vibration and more importantly human annoyance inside buildings. The U.S. Department of Transportation (U.S. DOT) Federal Transit Administration

(FTA) has developed rational vibration limits that can be used to evaluate human annoyance to ground-borne vibration. These limits are summarized in Table 5. These criteria are primarily based on experience with passenger train operations, such as rapid transit and commuter rail systems. The main difference between passenger and freight operations is the time duration of individual events; a passenger train lasts a few seconds, whereas a long freight train may last several minutes, depending on speed and length.

TABLE 5 FTA Ground-borne Vibration Impact Criteria

Land Use Category	Impact Levels (VdB re 1 micro-inch /sec)		
	Frequent Events[1]	**Occasional Events[2]**	**Infrequent Events[3]**
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Source: US Department of Transportation Federal Transit Administration 2006

Notes:

1. "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
2. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
3. "Infrequent Events" is defined as fewer than 30 vibration events per day. This category includes most commuter rail systems.
4. This limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

c. Vibration from Heavy Trucks and Buses

Ground-borne vibration levels from heavy trucks and buses are not normally perceptible, especially if roadway surfaces are smooth. Buses and trucks typically generate ground-borne vibration levels to about 63 VdB at a distance of 25 feet when traveling at a speed of 30 mph. Higher vibration levels can occur when buses or trucks travel at higher rates of speed or when the pavement is in poor condition. Vibration levels below 65 VdB are below the threshold of human perception.

C. REGULATORY FRAMEWORK

The federal government, State of California, and the City of Gilroy establish regulatory criteria in the form of guidelines, regulations, and policies that are designed to limit noise exposure at noise-sensitive land uses. Federal and State Agencies, Appendix G of the State California Environmental Quality Act (CEQA) Guidelines, the City of Gilroy General Plan, and the City of Gilroy Municipal Code present the following:

1. Federal

a. Department of Housing and Urban Development (HUD)

HUD environmental criteria and standards are presented in 24 CFR Part 51. New residential construction qualifying for HUD financing proposed in high noise areas (exceeding 65 dBA L_{dn}) must incorporate noise attenuation features to maintain acceptable interior noise levels. A goal of 45 dBA L_{dn} is set forth for interior noise levels and attenuation requirements are geared toward achieving that goal. It is assumed that with standard construction any building will provide sufficient attenuation to achieve an interior level of 45 dBA L_{dn} or less if the exterior level is 65 dBA L_{dn} or less. Approvals in a "normally unacceptable noise zone" (exceeding 65 dBA but not exceeding 75 dBA) require a minimum of 5 dBA additional noise attenuation for buildings if the day-night average is greater than 65 dBA but does not exceed 70 dBA, or minimum of 10 dBA of additional noise attenuation if the day-night average is greater than 70 dBA but does not exceed 75 dBA.

b. Federal Highway Administration (FHWA)

Proposed federal or federal-aid highway construction projects at a new location, or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes requires an assessment of noise and consideration of noise abatement per Title 23 of the Code of Federal Regulations, Part 772 (23 CFR Part 772), "Procedures for Abatement of Highway Traffic Noise and Construction Noise." FHWA has adopted noise abatement criteria (NAC) for sensitive receptors, such as picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals, when "worst-hour" noise levels approach or exceed 67 dBA L_{eq}. The California Department of Transportation (Caltrans) has further defined approaching the NAC to be 1 dBA below the NAC for noise-sensitive receptors identified as Category B activity areas (e.g., 66 dBA L_{eq} is considered approaching the NAC).[1]

c. Federal Transit Administration (FTA) – Train Vibration

The FTA has identified vibration impact criteria for sensitive buildings, residences, and institutional land uses near rail transit and railroads. The thresholds for residences and buildings where people normally sleep (e.g., nearby residences) are 72 VdB for frequent events (more than 70 events of the same source per day), 75 VdB for occasional events (30 to 70 vibration events of the same source per day), and 80 VdB for infrequent events (less than 30 vibration events of the same source per day).

[1] Traffic Noise Analysis Protocol, Caltrans Division of Environmental Analysis, May, 2011.

2. State of California

a. California Administrative Code Section 65302(f)

California Government Code Section 65302(f) requires that all General Plans include a Noise Element to address noise problems in the community. The Noise Element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:

- Highways and freeways.
- Primary arterials and major local streets.
- Passenger and freight on-line railroad operations and ground rapid transit systems.
- Commercial, general aviation, heliport, military airport operations, aircraft flyovers, jet engine tests stands, and all other ground facilities and maintenance functions related to airport operation.
- Local industrial plants, including, but not limited to, railroad classification yards.
- Other stationary ground noise sources identified by local agencies as contributing to the community noise environment.

Noise contours shall be shown for all of these sources and stated in terms of CNEL or L_{dn}. The noise contours shall be prepared on the basis of noise monitoring or following generally accepted noise modeling techniques for the various sources identified above.

The noise contours shall be used as a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise. The noise element shall include implementation measures and possible solutions that address existing and foreseeable noise problems, if any. The adopted noise element shall serve as a guideline for compliance with the state's noise insulation standards.

b. California Noise Insulation Standards

In 1974, the State of California established minimum noise insulation performance standards for hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings in Title 25 of the California Administrative Code. These standards were ultimately implemented through Title 24 and the various versions of the California Building Code (most recently Chapter 12, Appendix Section 1207.11 of the 2010 Code). The noise limit was a maximum interior noise level of 45 dBA L_{dn}/CNEL. Where exterior noise levels exceed 60 dBA L_{dn}/CNEL, a report must be submitted with the building plans describing the noise control measures that have been incorporated into the design of the project to meet the noise

limit. The State Office of Planning and Research (OPR) Guidelines require the General Plan to facilitate the implementation of the Building Code noise insulation standards.

c. Division of Aeronautic Noise Standards

Title 21 of the California Code of Regulations[2] sets forth the State's airport noise standards. In the findings described in Section 5006, the standard states the following: "A level of noise acceptable to a reasonable person residing in the vicinity of an airport is established as a CNEL value of 65 dB for purposes of these regulations. This criterion level has been chosen for reasonable persons residing in urban residential areas where houses are of typical California construction and may have windows partially open. It has been selected with reference to speech, sleep, and community reaction." Based on this finding, the airport noise standard as defined in Section 5012 is set at a CNEL of 65 dBA.

d. California Department of Transportation (Caltrans) – Construction Vibration

Caltrans identifies 0.5 in/sec PPV as the threshold for which there is a risk of damage to new residential and modern commercial/industrial structures, 0.3 in/sec PPV as the threshold for older residential structures, and 0.25 in/sec PPV as the threshold for damage to historic and some old buildings. All of these limits have been used successfully, and compliance to these limits has not been known to result in appreciable structural damage. All vibration limits referred to herein apply on the ground level and take into account the response of structural elements (i.e. walls and floors) to ground-borne excitation.

3. City of Gilroy

a. City of Gilroy 2002 General Plan

The City of Gilroy General Plan contains policies to protect residents from exposure to excessive noise and its effects through appropriate mitigation measures and responsive land use planning, especially in regard to noise-sensitive land uses, such as schools, hospitals, and housing for seniors.

The following policies are set forth in the General Plan to facilitate this goal:

***26.01* – Noise and Land Use.** Establish a physical development pattern that is compatible with the noise environment of Gilroy, ensuring that residential neighborhoods and park areas are the quietest areas in the community.

***26.02* – Maximum Permissible Noise Levels.** Ensure that outdoor and indoor noise levels are within the maximum permitted levels shown in Table 6. Prohibit further development in areas where noise levels currently exceed these standards or where such development will cause levels to exceed the permitted maximum.

[2] California Code of Regulations Airport Noise Standards, Title 21, Public Works Division 2.5, Division of Aeronautics (Department of Transportation), Chapter 6 Noise Standards, Article 1.General.

TABLE 6 Permissible Maximum Outdoor and Indoor Noise Levels

Land Use Category	Max. Outdoor L_{DN} (dBA)	Max. Indoor L_{DN} (dBA)
Residential	60 [1]	45
Commercial	65	61
Industrial	76	See note 2

[1] The outdoor sound levels for residential properties shall be held to 60-dBA, or a maximum of 70-dBA if ALL of the following FINDINGS can be made:

- That potential noise levels, exceeding the 60 dBA standard, are generally limited to less than 10% of the entire project site;
- That reasonably accepted sound attenuation measures have been incorporated into the project design;
- That potential noise levels are part of the developer's disclosure to future residents;
- That interior noise limits established by the General Plan are strictly maintained; and
- Potential noise levels will not jeopardize the health, safety, and general welfare of the public.

Nevertheless, a 60-dBA outdoor noise threshold shall be maintained for active living/recreation areas FOR ALL DWELLINGS, rather than all yards surrounding an entire dwelling. All residential dwellings should be afforded a private outdoor living/recreation area [i.e.; rear yard space, courtyard, patio, terrace, deck, extended porch, veranda, etc.].

[2] The indoor standards for industrial land uses have been set by the Occupational Safety and Health Administration. The maximum level to be exceeded no more than 10 percent of the time (L10) is 65 dBA while the maximum level to be exceeded no more than 50 percent of the time (L50) is 60 dBA.

Source: Figure 8-3 Permissible Maximum Outdoor and Indoor Noise Levels from Gilroy General Plan Noise Element.

Resolution No. 2007 – (adopted by the City Council in October 2007) amended the Permissible Maximum Outdoor and Indoor Noise Levels as follows:

> *"For Downtown Specific Plan area only:*
> *Accept a conditionally acceptable outdoor noise level of L_{dn} 65 dB or less at common spaces and recreation areas in multi-family residential units near the railroad corridor where the L_{dn} 60dB goal cannot reasonably be met. This outdoor noise goal would not normally be applied to small decks and balconies where noise levels could be higher."*

***26.03* – Buffering Standards.** Enforce stringent buffering standards to protect residents from freeway, expressway, highway, and industrial noise. Use open land as a buffer between residential areas and highways or industrial areas wherever possible.

***26.04* – Acoustical Design.** Consider the acoustical design of projects in the development review process to reduce noise to an acceptable level. Ensure that noise mitigation features are designed and implemented in an aesthetically pleasing and consistent manner.

***26.05* – Earth Berms.** Require landscaped earth berms as an alternative to soundwalls where feasible to buffer noise along major thoroughfares adjacent to residential areas. Where an earth berm is not feasible, an alternative design approach [that may include a masonry wall screened with drought tolerant, low maintenance landscaping should be explored that is sensitive to the natural and man-made environment.

***26.06* – Interagency Coordination.** Coordinate with other agencies in the region in noise abatement measures.

***26.07* – Public Input.** Provide opportunities for public input on noise issues and publicize the existence of avenues by which citizen noise problems can be measured and mitigated.

b. City of Gilroy Zoning Ordinance

The City's zoning ordinance (Chapter 30, Section 41.31) contains quantitative noise limits for noise sources within the City of Gilroy based on the land use of the property receiving the noise. The noise ordinance establishes acceptable exterior noise levels and exemptions from the ordinance for special activities, such as emergency work and refuse and recycling collection. Special noise limits are also established for certain noise-generating activities. The City's zoning ordinance (Chapter 30, Section 41.31) reads as follows:

Section 41.31 Specific Provisions – Noise
It shall be unlawful to generate noise within the City limits that exceeds the limits established in this section of the Zoning Ordinance

(a) Definitions:

(1) Decibel (dBA): A unit measuring the amplitude of sound or noise, weighted to the range of human hearing (A-weighting scale on a sound level meter).
(2) Noise Level: Measurement of sound in decibels (dBA) obtained by using a sound level meter at slow response.
(3) Sound Level Meter: An instrument comprised of a microphone, an amplifier, an output meter, and frequency weighing networks, used for measuring sound levels in decibel (dBA) units.
(4) L_{10}: During a noise measurement interval, the noise being measured may not exceed the limit more than ten percent (10%) of the time.

(b) Maximum outdoor noise levels:

Residential noise impacting residential property

Fixed source – outdoor mechanical equipment (i.e. pool, spa, air conditioning equipment, etc…) - Max. 70 dBA [L10] measured at the property line (mechanical equipment installed after 7/1/07).

The outside use of power tools, and yard & landscaping equipment, etc… (including home garage vehicle repairs) - Limited to the hours of 7:00 a.m. to 10:00 p.m. Prohibited use between the hours of 10:00 p.m. & 7:00 a.m.

ALSO SEE:
Municipal Code Section 16.31 also applies:
"…any loud boisterous, irritating, penetrating, or unusual noise… which disrupts another in any residence...between the hours of 10:00 p.m. and 7:00 a.m. of any day." is prohibited.

(1) Permitted noise levels in outdoor spaces if ALL of the following findings can be made:

a. *That potential noise levels exceeding the General Plan standard are generally limited to less than ten percent of the entire site;*
b. *That reasonably accepted sound attenuation measures have been incorporated into the project design;*
c. *That potential noise levels are part of the developer's disclosure to future residents;*
d. *That interior noise limits established by the General Plan are strictly maintained; and*
e. *Potential noise levels will not jeopardize the health, safety, and general welfare of the public.*

Commercial & Industrial noise impacting residential property

Fixed source mechanical equipment - Maximum of 70 dBA [L_{10}] measured at the residential property line.

Power tools & yard equipment (outside use) - Limited to the hours of 7:00 a.m. to 10:00 p.m. (same as the residential standard, with maximum of 70 dBA [L10] measured at the residential property line. Prohibited between the hours of 10:00 p.m. & 7:00 a.m.

Power tools & equipment (indoor use) - Maximum of 70 dBA [L10] (measured at the residential property line.

ALSO SEE:
Municipal Code Section 16.31 also applies:
"…any loud boisterous, irritating, penetrating, or unusual noise… which disrupts another in any residence...between the hours of 10:00 p.m. and 7:00 a.m. of any day." is prohibited.

(c) Exceptions to the exterior noise limits listed in subsection (b) above:

(1) *Persons, equipment, vehicles, alarms, or sirens utilized in essential activities necessary to preserve, protect, or save lives or property from danger, loss, or harm;*
(2) *Refuse & recycling collection vehicles when operating between the hours of 5:00 a.m. and 6:00 p.m.;*
(3) *Special events operating in compliance with an approved Special Events Permit; and*
(4) *City approved activities on public properties.*

D. NOISE AND VIBRATION IN GILROY

1. Gilroy 2040 General Plan Noise Measurement Survey

A noise measurement survey was completed to establish existing noise levels in the City of Gilroy. Long-term measurements were made over a period of 24 hours or more to provide information on how noise levels vary throughout the day and night and may vary from day to day. A series of attended short-term (10-minute) measurements were also made. During attended measurements, the observer identifies and documents noise sources occurring during each measurement and notes the level of noise associated with each identifiable event. This assists in quantitatively and qualitatively characterizing the noise environment along the major roadways and also in the quieter areas of the City.

The State Office of Planning and Research Guidelines related to the preparation of the Noise Element of the General Plan mandate that noise exposure levels be prepared in terms of the day/night average sound level (L_{dn}) or the community noise equivalent level (CNEL). Both of these descriptors were described previously and represent the 24-hour average noise level with weighting periods for the daytime (L_{dn}) or the daytime and evening (CNEL). L_{dn} is currently the preferred metric and is used in this report to characterize the 24-hour average noise exposure level. It is also important to know how noise levels vary within each hour of the day and night. For this purpose, standard acoustical descriptors were measured and reported. These standard statistical descriptors are the L_{max}, the L_1, the L_{10}, the L_{50}, and the L_{90}. The L_{max} noise level is the highest noise levels during the interval and the L_1, L_{10}, L_{50}, and L_{90} represent sound levels exceeding 1 percent, 10 percent, 50 percent (the median level), and 90 percent of the time interval (representing the background noise levels). The hourly equivalent sound level (L_{eq}), the basis for the day/night average noise levels, was measured and reported for each hour as well.

The most prominent ambient noise source in Gilroy is vehicles traveling along major roadways. U.S. Highway 101 (US 101) runs through the easternmost portion of the city. Major local roadways include Monterey Road, Santa Teresa Boulevard, State Route (S.R.) 152 (10th Street), Wren Avenue, Welburn Avenue, Leavesley Road, 1st Street/Hecker Pass Highway, and Miller Avenue. Vehicular traffic on smaller local roads also contributes to the noise environment at receptors along these roadways. The Union Pacific Railroad roughly parallels Monterey Road and generates noise when commuter or freight trains pass through the City. The highest noise levels occur when trains sound their warning whistles near at-grade crossings. General aviation and occasional high altitude jet aircraft overflights are also audible throughout the community but do not make a substantial contribution to community noise levels.

A noise monitoring survey was performed from Tuesday, December 3, 2013 to Friday, December 6, 2013, and (at one location) from Friday, November 1, 2013 to Tuesday, November 5, 2013. Noise measurement locations are shown on Figure 1, and Appendix A summarizes the data collected at the long-term measurement sites. During the noise survey, weather conditions were moderate in terms of temperature and wind. The noise survey was conducted with Larson Davis Laboratories Type 820 precision sound level meters. Instrumentation was calibrated at the beginning of the noise survey and post-calibrated at the end of the survey. No calibration corrections were necessary. During the survey, the microphones were fitted with windscreens.

Measurement LT-1 was located 30 feet north of the center of Leavesley Road, east of US 101. The land use at this location is primarily agricultural, with commercial uses located to the west. Vehicular traffic on Leavesley Road was the dominant noise source affecting the noise measurement. Activities from nearby farming, such as equipment, may be considered significant intermittent noise sources but did not affect the overall 24-hour average noise level. The measured day/night average noise level at this location was 78 dBA L_{dn}. Daytime noise levels at this location were typically in the range of 73 to 76 dBA L_{eq}, with nighttime noise levels as low as 62 dBA L_{eq}.

Measurement LT-2 was on Silacci Way, 180 feet from the center of SR 152. This measurement location was selected to characterize noise levels along SR 152. The measurement was located at the approximate setback of nearby commercial uses, adjacent to a vacant field, and across SR 152 from agricultural land use. The measured noise level at this location was 72 dBA L_{dn}. Daytime noise levels at this location were in the range of 66 to 68 dBA L_{eq}, with nighttime noise levels as low as 61 dBA L_{eq}.

Noise measurement LT-3 was made about 100 feet west from the center of Monterey Road, north of 7th Street. The primary noise sources at this location are vehicular traffic along Monterey Road and trains along the rail line, located about 350 feet east of the measurement site. Train crossings are located at rail line intersections with both 6th Street and 7th Street, resulting in high maximum noise levels generated by train horn soundings. Additionally, a Caltrain station is located to the southwest of the measurement site. Commercial land uses surround this location, with nearest residential land uses approximately 550 feet to the west. The day/night average noise level was measured to be 67 dBA L_{dn}. Monterey Road is calculated to generate an L_{dn} of 64 dBA at this location. During hours containing train pass-by events and/or horn soundings, hourly average noise levels typically ranged from 62 to 70 dBA L_{eq}, with trains generating maximum noise levels in the range of 89 to 99 dBA L_{max}.

Measurement Location LT-4 was made on Hanna Street, north of West 10th Street, in a neighborhood of single-family residences. The measurement position was about 85 feet from the centerline of West 10th Street. Vehicular traffic along West 10th Street was the major source of noise at this location. The day/night average noise level at this site was measured to be 66 dBA L_{dn}. Daytime noise levels at this location were in the range of 62 to 66 dBA L_{eq}, with nighttime noise levels as low as 50 dBA L_{eq}.

Noise measurement LT-5 was made 140 feet east of the center of Santa Teresa Boulevard, south of Club Drive. The measurement was located at the setback of existing residential land uses located across the roadway. Vehicular traffic along Santa Teresa Boulevard was the major source of noise at this location. The day/night average noise level was measured to range from 61 to 63 dBA L_{dn}. Daytime noise levels at this location were in the range of 59 to 64 dBA L_{eq}, with nighttime noise levels as low as 39 dBA L_{eq}.

Measurement Location LT-6 was 50 feet east of the center of Wren Avenue in El Roble Park. Vehicular traffic along Wren Avenue was the major noise source at this location. The day/night average noise level at this site ranged from 63 to 64 dBA L_{dn}. Noise levels at this location were as low as 46 dBA L_{eq} at night during periods with little local traffic. Daytime noise levels at this location were in the range of 60 to 65 dBA L_{eq}, with nighttime noise levels as low as 46 dBA L_{eq}.

Measurement LT-7 was on Hanna Street, 100 feet from the center of 1st Street. This measurement location was selected to characterize traffic noise levels along 1st Street, which was the dominant noise source at this location. The measured noise level at this location was 68 dBA L_{dn}. Daytime noise levels at this location were in the range of 64 to 69 dBA L_{eq}, with nighttime noise levels as low as 53 dBA L_{eq}.

Measurement Location LT-8 was adjacent to I.O.O.F. Avenue, 75 feet from the center of railroad tracks running east of Monterey Road. This measurement location was selected to characterize noise levels along the railroad. The dominant sources of noise at LT-8 were train pass-by events and local vehicular traffic. The measured noise levels at this location varied depending on whether or not a train pass-by occurred in a given hour and how frequent passbys occurred over a given day. Noise levels were as low as 51 dBA L_{eq} during nighttime hours with low traffic volumes and no train passbys. During hours containing train pass-by events, hourly average noise levels typically ranged from 70 to 80 dBA L_{eq}, with trains typically generating maximum noise levels in the range of 90 to 110 dBA L_{max}. The day-night average noise level at LT-8 ranged from 74 to 78 dBA L_{dn}.

Short-term noise measurements were conducted during the day on December 5 and December 6, 2013. The measured data are summarized in Table 7. Location ST-1 was on Arroyo Circle; traffic from the roadway was the significant contributor to measured noise levels. At Location ST-2, local traffic on Luchessa Avenue was the dominant source of noise. At Location ST-3, vehicular traffic on Thomas Road was the dominant source of noise. Location ST-4 was in Gilroy Park, where traffic along Miller Avenue was the significant contributor to measured noise levels. At Location ST-5, vehicular traffic along 1st Street was the dominant source of noise. ST-6 was located at the intersection of Wren Avenue and Welburn Avenue, and traffic on both roadways was the significant contributor to measured noise levels. Traffic on Mantelli Drive was the dominant noise source at ST-7, with Wren Avenue traffic as a secondary contributor. ST-8 was located on Longmeadow Drive near Santa Teresa Boulevard, with traffic on the latter roadway being the dominant noise source. Traffic on Santa Teresa Boulevard was also the dominant noise source at ST-9, which was north of Day Road. ST-10 was also north of Day Road, east of Monterey Road. Traffic on Monterey Road was the significant contributor to measured noise levels. Traffic on Hecker Pass Highway was the dominant noise source at measurement ST-11, and measured noise levels at ST-12 were a result of traffic on Santa Teresa Boulevard.

Data from noise measurements made (in November 2013 by Illingworth & Rodkin, Inc.) for other projects were utilized in this analysis. A noise measurement (M-1) located 65 feet from the center of Union Pacific Railroad (UPRR) tracks was made at a site near East 10th Street. Train events were the dominant source of noise, resulting in day-night average noise levels as high as 78 dBA L_{dn}, which is consistent with the railway measurement LT-8 detailed above. Noise measurement M-2 was located 50 feet from the center of East 10th Street, which was the dominant source of noise during the measurement. Day-night average noise levels reached 73 dBA L_{dn}. Data from these measurements are shown in Appendix A.

FIGURE 1 Noise Measurement Locations in Gilroy

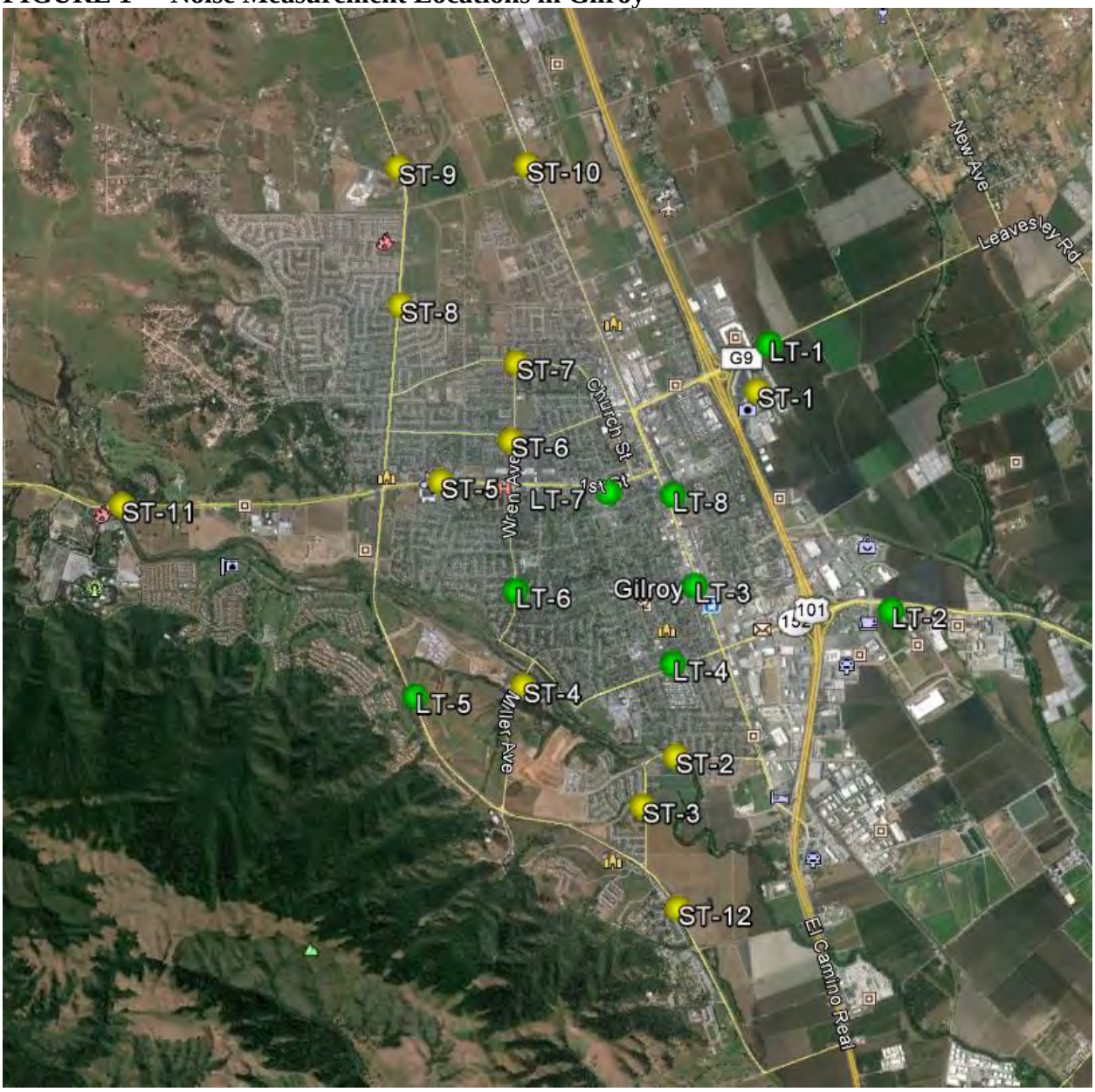

TABLE 7 Summary of Short-Term Noise Measurement Data

Noise Measurement Location (Date, Time)	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: ~75 feet east of the centerline of Arroyo Circle (12/6/2013, 10:00-10:10 a.m.)	68	67	63	59	54	60
ST-2: ~75 feet west of the centerline of Luchessa Avenue (12/5/2013, 4:00-4:10 p.m.)	75	70	64	60	57	62
ST-3: ~55 feet from the centerline of Thomas Road (12/5/2013, 4:30-4:40 p.m.)	78	76	71	62	48	66
ST-4: Gilroy Park; ~110 feet from the centerline of Miller Avenue (12/5/2013, 2:00-2:10 p.m.)	68	64	58	46	39	53
ST-5: ~65 feet from the centerline of 1st Street (12/5/2013, 2:30-2:40 p.m.)	78	77	74	68	59	71
ST-6: Corner of Wren Avenue & Welburn Avenue; ~75 feet from the centerline of each road (12/5/2013, 1:30-1:40 p.m.)	77	74	68	61	57	64
ST-7: ~65 feet from the centerline of Mantelli Drive; ~120 feet from the centerline of Wren Avenue (12/5/2013, 11:30-11:40 p.m.)	80	75	67	60	54	64
ST-8: ~100 feet from the centerline of Santa Teresa Boulevard (12/5/2013, 12:00-12:10 p.m.)	74	72	67	60	53	63
ST-9: ~90 feet west of the centerline of Santa Teresa Boulevard, near Day Road (12/5/2013, 12:30-12:40 p.m.)	78	72	67	57	40	63
ST-10: ~90 feet west of the centerline of Monterey Road (12/5/2013, 1:00-1:10 p.m.)	77	75	72	67	57	68
ST-11: ~75 feet south of the centerline of Hecker Pass Road (12/5/2013, 3:00-3:10 p.m.)	77	72	68	56	43	63
ST-12: ~75 feet from the centerline of Santa Teresa Boulevard, near Mesa Road (12/5/2013, 3:30-3:40 p.m.)	69	67	64	54	39	59

2. Major Findings

a. Stationary Noise Sources

Industrial operations are the primary stationary noise sources that make a significant local contribution to community noise levels in Gilroy. In general, these stationary noise sources (e.g. fabrication, large mechanical equipment, and loading areas) are often located in primarily commercial and industrial areas and are isolated from noise-sensitive land uses. However, the possibility of sensitive development encroaching on some of these stationary noise sources remains, which could result in some land use conflicts. Noise sources that affect sensitive receptors within the community would also include commercial land uses or those normally associated with and/or secondary to residential development. These include entertainment venues, nightclubs, outdoor dining areas, gas stations, car washes, fire stations, drive-thrus, air

conditioning units, swimming pool pumps, school playgrounds, athletic and music events, and public parks.

The majority of stationary noise sources in Gilroy are from rooftop and loading dock equipment at commercial uses located on Monterey Road, West 10th Street, and 1st Street. There are also several industrial facilities within the community that contain large mechanical equipment along Highway 152, east of Cameron Boulevard.

b. Temporary Noise Sources

Construction is a temporary source of noise for residences and businesses located near construction sites. Construction noise can be significant for short periods of time at any particular location as a result of public improvement projects, private development projects, remodeling, etc. The highest construction noise levels are normally generated during grading and excavation, with lower noise levels occurring during building construction. Large pieces of earth-moving equipment, such as graders, scrapers, and bulldozers, generate maximum noise levels of 85 to 90 dBA L_{max} at a distance of 50 feet. Typical hourly average construction-generated noise levels are about 80 to 85 dBA L_{eq}, measured at a distance of 50 feet from the site during busy construction periods. Some construction techniques, such as impact pile driving, can generate very high levels of noise (105 dBA L_{max} at 50 feet) that are difficult to control. Construction activities can elevate noise levels at adjacent businesses and residences by 15 to 20 dBA or more.

c. Traffic

Major vehicular transportation routes include U.S. Highway 101 and S.R. 152. Major local roads include Monterey Road, Santa Teresa Boulevard, and East 10th Street.

U.S. Highway 101 is the major north-south transportation corridor transecting the City and is the predominant source of noise throughout most of the community. S.R. 152 is the major west-east corridor that provides access to Watsonville to the west and Interstate 5 to the east over Pacheco Pass.

d. Rail

Railroad lines are another significant source of transportation-related noise in Gilroy. The UPRR main-line, running north-south adjacent to Monterey Road, transects the City and carries both Caltrain and freight train traffic. According to the Caltrain weekday timetable, approximately 6 commuter trains per day run to Gilroy, the southernmost end of the passenger train service. Two Amtrak trains along the Coast Starlight route pass through Gilroy each day. No freight trains were observed during field measurements, but based on noise measurements conducted adjacent to the rail line, it is estimated that approximately 4 to 8 freight trains pass through Gilroy per day.

e. Vibration

(1) Transportation-Related Vibration Sources

There is one passenger and freight rail line (discussed above) that runs through Gilroy that is a significant source of transportation-related vibration.

Approximately 12 to 16 trains pass through Gilroy on a daily basis. Many of these trains pass during evening and nighttime hours when people are normally at rest. Rail traffic along the line is anticipated to increase to up to 30 trains per day, and future train activity would be considered "occasional" with respect to the FTA vibration impact criteria. The 75 VdB limit is used to characterize the vibration compatibility.

Charles M. Salter Associates, Inc. measured ground-borne vibration levels ranging from 79 to 80 VdB at a distance of 50 feet from the center of the main railroad track, 73 to 74 VdB at a distance of 100 feet from the center of main railroad track, and 68 VdB at a distance of 200 feet from the center of main railroad track in 2006 during freight and passenger train pass-by events.

Transportation-related ground vibration could also occur from heavy truck passbys on U.S. Highway 101 and occasionally on major local roadways, although the resulting vibration levels at the nearest receptors are normally below the threshold of perception.

(2) Temporary Vibration Sources

Construction activities, such as demolition, site preparation work, excavation, and foundation work, can generate ground-borne vibration at land uses adjoining construction sites. Impact pile driving has the potential of generating the highest ground vibration levels and is of primary concern to structural damage. Other project construction activities, such as caisson drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.), can generate substantial vibration levels in the immediate vicinity.

E. NOISE EXPOSURE MAPS

SoundPLAN Version V8.1, a three-dimensional ray-tracing computer program, was used to calculate traffic noise levels along major roadways throughout Gilroy. Calculations took into account the traffic volumes, speeds, vehicle mix information, and the topography of the area. The geometric data used to create the model were based on GIS information provided by the City. Existing and year 2040 Plus Project Buildout peak hour traffic data and travel speeds were also input into the model. For U.S. Highway 101, traffic volumes and truck mix data input into the model were based on information published by Caltrans. The predicted noise levels were then compared to measured noise levels for calibration purposes, and adjustments were made as necessary to create an accurate model. The noise map prepared based on existing conditions is shown on Figure 2, and the noise map prepared based on year 2040 conditions is shown on Figure 3. Table 8 presents existing and year 2040 Plus Project L_{dn} noise levels calculated at a reference distance of 75 feet from the center of the near travel lane for roadways in Gilroy.

FIGURE 2 Existing Traffic Noise Contours in Gilroy

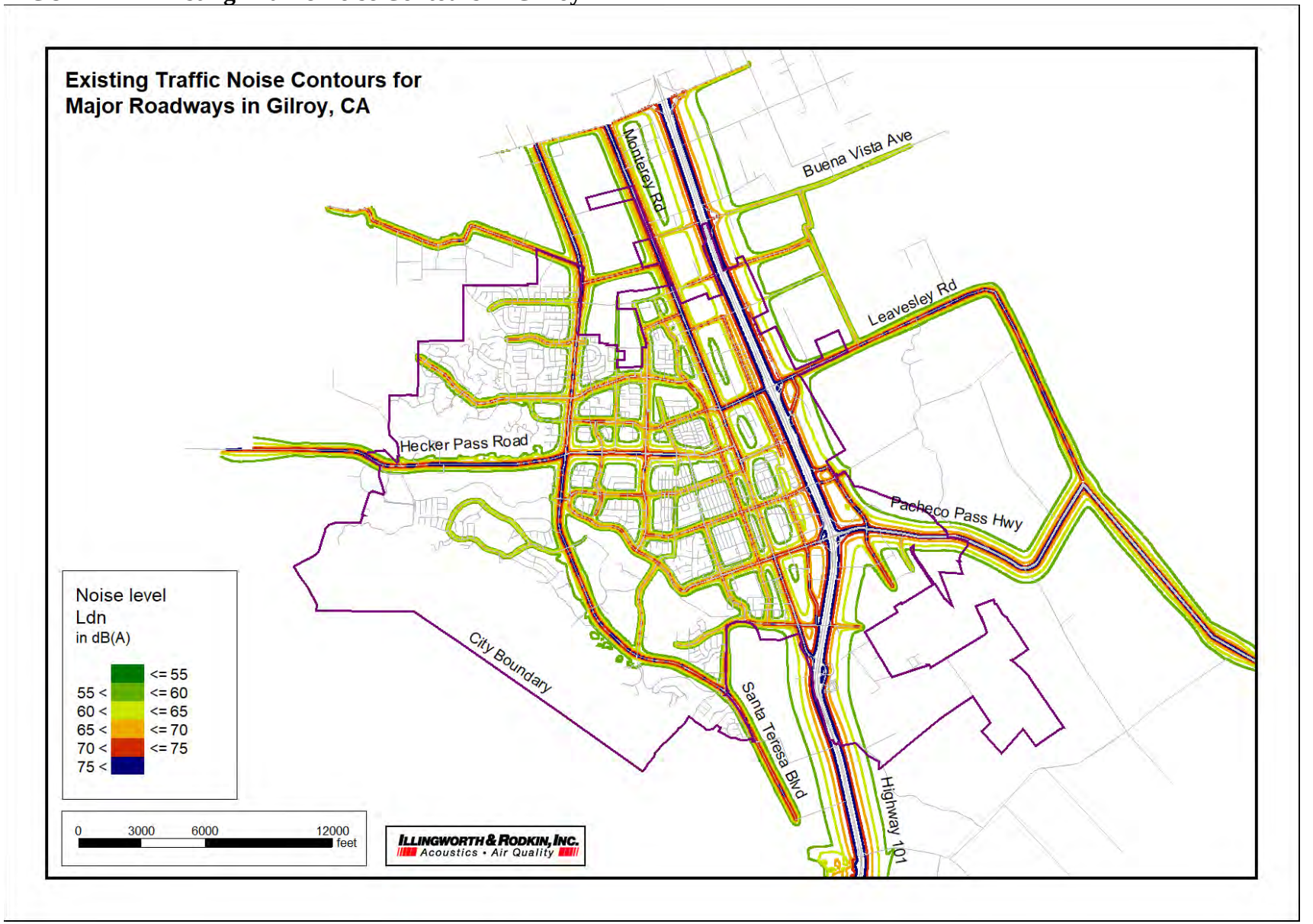

FIGURE 3 2040 General Plan Buildout Traffic Noise Contours in Gilroy

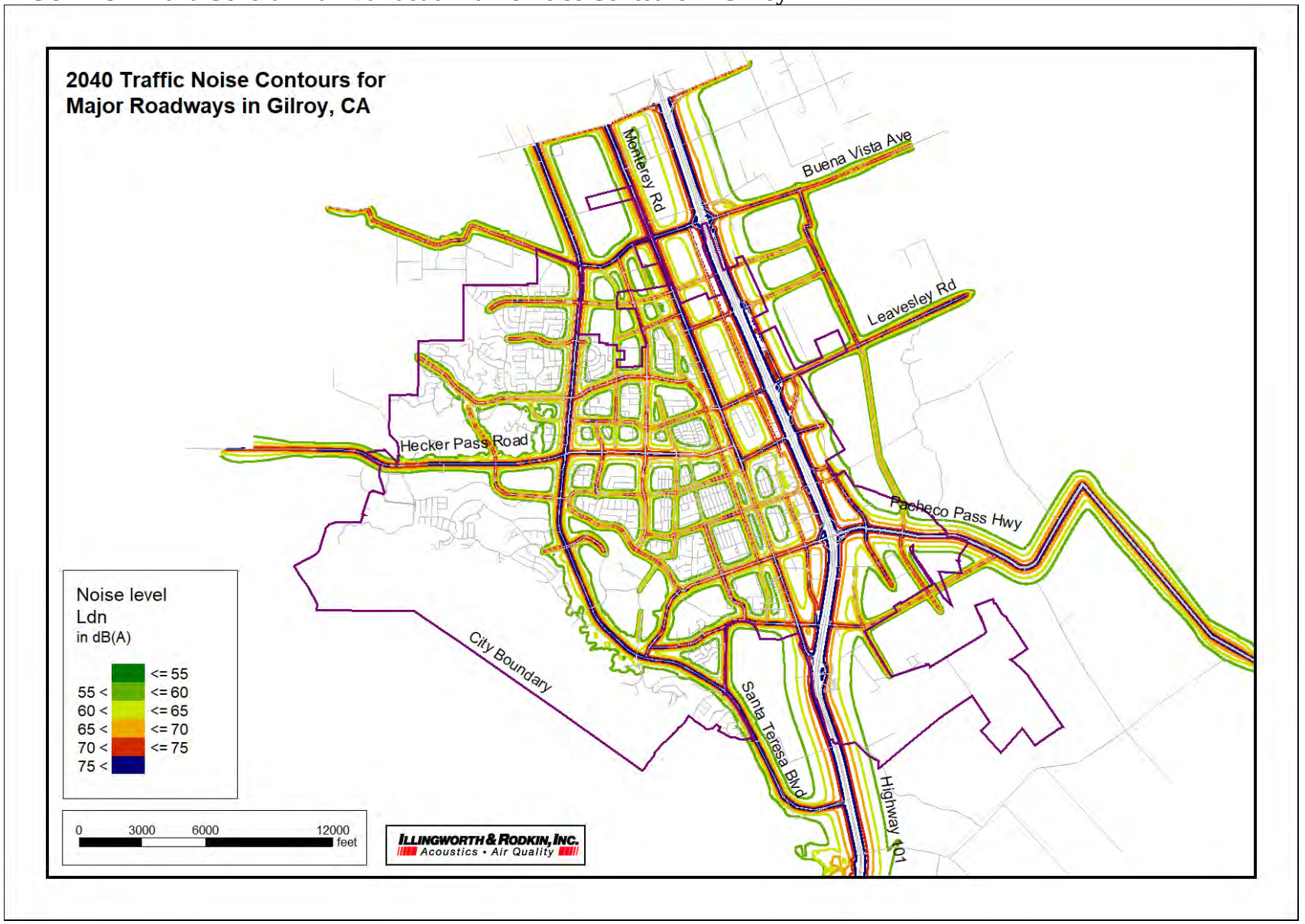

TABLE 8 Existing and 2040 Plus Project Modeled Noise Levels Along Gilroy Roadways

Roadway	Segment	L_{dn} at 75 feet, dBA		Change Over Existing
		Existing	Buildout	
Highway 101	North City Limits to South City Limits	81	82	1[3]
1st Street	Santa Teresa Blvd. to Westwood Dr.	66	67	1
	Kern Ave. to Wren Ave.	68	68	0
	Wren Ave. to Monterey Rd.	64	66	2
10th Street	Uvas Park Dr. to Church St.	64	66	2
Arroyo Circle	Leavesley Ave. to Pacheco Pass Hwy.	67	66	-1[2]
Buena Vista Avenue	No Name Rd. to Marcella Ave.	58	66	8
	Church St. to Wren Ave.	--[4]	70	--
Cameron Boulevard	Leavesley Ave. to Pacheco Pass Hwy.	55	60	5
	Pacheco Pass Hwy. to Luchessa Ave.	--[4]	64	--
	Luchessa Ave. to Southside Dr.	--[4]	62	--
Camino Arroyo	Gilman Rd. to Pacheco Pass Hwy.	67	68	1
	Pacheco Pass Hwy. to Venture Way	65	66	1
Chestnut Street	Luchessa Avenue to 10th St.	65	66	1
	10th St. to 6th St.	63	64	1
Church Street	Mantelli Dr. to Welburn Ave.	64	64	0
	Welburn Ave. to 6th St.	63	63	0
	6th St. to 10th St.	62	63	1
Cohansey Avenue	Wren Ave. to Kern Ave.	--[4]	61	--
Day Road	Santa Teresa Blvd. to Monterey Rd.	64	56	-8[2]

TABLE 8 Existing and 2040 Plus Project Modeled Noise Levels Along Gilroy Roadways

Roadway	Segment	L_{dn} at 75 feet, dBA		Change Over Existing
		Existing	Buildout	
	West of Santa Teresa Blvd.	64	65	1
Hecker Pass Road	West of Santa Teresa Blvd.	69	70	1
I.O.O.F. Avenue	Monterey Rd. to Murray Ave.	62	68	6
Leavesley Avenue	Arroyo Cir. to Marcella Ave.	67	64	-3[2]
Luchessa Avenue	Thomas Rd. to Church St.	64	68	4
Mantelli Drive	Kern Ave. to Wren Ave.	64	66	2
	Welburn Ave. to Santa Teresa Blvd.	62	64	2
Marcella Avenue	Buena Vista Ave. to Leavesley Ave.	58	67	9[5]
Monterey Road	3rd St. to 6th St.	61	64	3
	10th St. to Luchessa Ave.	67	69	2
	Farrell Ave. to Las Animas Ave.	71	74	3
	Buena Vista Ave. to Cohansey Ave.	71	72	1
	Masten Ave. to Buena Vista Ave.	73	74	1
Pacheco Pass Highway	Camino Arroyo to Cameron Blvd.	72	73	1
Santa Teresa Boulevard	Fitzgerald Ave. to Day Rd.	69	71	2
	Longmeadow Dr. to Mantelli Dr.	66	71	5
	Mantelli Dr. to Hecker Pass Rd.	66	72	6
	3rd St. to Club Dr.	69	71	2
	Club Dr. to Miller Ave.	68	72	4

TABLE 8 Existing and 2040 Plus Project Modeled Noise Levels Along Gilroy Roadways

Roadway	Segment	L_{dn} at 75 feet, dBA		Change Over Existing
		Existing	Buildout	
	Miller Ave. to Thomas Rd.	67	70	3
	Thomas Rd. to Castro Valley Rd.	66	71	5
Thomas Road	Luchessa Ave. to Santa Teresa Blvd.	66	67	1
Uvas Park Drive	Wren Ave. to Miller Ave.	62	63	1
Welburn Avenue	Santa Teresa Blvd. to Kern Ave.	58	59	1
	Wayland Ln. to Church St.	63	63	0
Wren Avenue	3rd St. to 6th St.	64	65	1
	Mantelli Dr. to 1st St.	63	64	1

[1] Barriers along Highway 101 were not entered into the model and were not taken into account.
[2] Due to future roadway extensions and rerouting of traffic, traffic noise levels along certain segments under year 2040 Buildout conditions would decrease from existing conditions.
[3] Existing traffic along Highway 101 was based on information published by Caltrans. Year 2040 traffic was estimated based on engineering judgement and traffic volumes provided on other City roadways.
[4] These segments are planned for the future 2040 buildout but do not currently exist.
[5] The Cameron Boulevard extension would potentially result in noise increases of 8 to 10 dB along certain segments of Buena Vista Avenue and Marcella Avenue.

F. NOISE IMPACTS AND MITIGATION MEASURES

1. Significance Criteria

The Gilroy 2040 General Plan project consists of the development of General Plan goals and policies; the development of land use designations and identification of specific job and housing growth capacity to guide future growth; identification of targeted areas to develop or redevelop to accommodate this future economic and population growth; and setting policy for the provision of City services for new and existing development of all types for the City of Gilroy through the year 2040. For modeling purposes, buildout conditions with a horizon of 2040 were used; however, it is unlikely that full buildout actually will occur by then.

Standards of Significance

The City of Gilroy CEQA thresholds of significance state that a project may have a significant effect on the environment if it would:

a) Result in exposure of persons to or generation of noise levels in excess of standards established in the general plan.
    - Exceed permissible maximum outdoor and indoor noise levels adopted in GP Policy 26.02, Figure 8-3.

b) Result in exposure of persons to or generation of excessive ground-borne vibration or ground borne noise levels.
    - For projects that are likely to result in vibration, significance of exposure of persons to or generation of excessive ground-borne vibration or ground borne noise levels would be based on a special study to determine the impact and recommend mitigation measures.

c) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
    - All construction projects have the potential to result in substantial temporary increases in noise levels, which is mitigated by including 2020 General Plan EIR Mitigation Measure 4.7-B (time restrictions, muffler requirements, temporary noise barriers) as a condition of approval on all construction projects.

a) Noise and Land Use Compatibility Impact Discussion

Noise and Land Use Compatibility Impact Discussion for New Noise-Sensitive Land Uses

The Gilroy 2040 General Plan project would allow for future development of noise-sensitive land uses in areas located in varying noise environments. New noise-sensitive development would be allowed along major transportation corridors and in the vicinity of stationary noise sources. A significant noise impact would be identified where noise-sensitive land uses are proposed in areas where existing or future noise levels would exceed the noise and land use compatibility standards established by the City of Gilroy.

Impact a1: Existing and future noise levels at the locations of potential residences and other noise-sensitive developments allowed for under the General Plan could exceed the City's noise thresholds.

The primary noise sources in the City of Gilroy include ground transportation noise sources, such as roadway traffic and trains, and local stationary noise sources, such as equipment used for industrial operations. Residential developments, schools, libraries, hospitals, convalescent homes, and places of worship are considered to be the land uses that are the most noise-sensitive because of the quiet nature of the use.

<u>Traffic Noise Exposure</u>
The future noise exposure levels were calculated using the existing measured noise levels adjusted upward to account for increased traffic on the roadways due to cumulative development including the build out of the City of Gilroy 2040 General Plan, and by modeling noise levels along new roadway segments using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) algorithms. The distances to the 60, 65, and 70 dBA L_{dn} future traffic noise contours for

the major roadways located in Gilroy are summarized in Table 9. The results shown in Table 9 are depicted graphically in Figures 2 and 3.

TABLE 9 2040 General Plan Buildout Traffic Noise Contours

Roadway	Segment	Distance from Centerline to Traffic Noise Contours[1], feet		
		70 dBA L_{dn}	65 dBA L_{dn}	60 dBA L_{dn}
Highway 101	North City Limits to South City Limits	470	1020	2200
1st Street	Santa Teresa Blvd. to Westwood Dr.	<50	100	220
	Kern Ave. to Wren Ave.	60	120	260
	Wren Ave. to Monterey Rd.	<50	90	190
10th Street	Uvas Park Dr. to Church St.	<50	90	190
Arroyo Circle	Leavesley Ave. to Pacheco Pass Hwy.	<50	90	190
Buena Vista Avenue	No Name Rd. to Marcella Ave.	<50	90	190
Cameron Boulevard	Leavesley Ave. to Pacheco Pass Hwy.	<50	<50	80
	Pacheco Pass Hwy. to Luchessa Ave.	<50	60	140
	Luchessa Ave. to Southside Dr.	<50	50	100
Camino Arroyo	Gilman Rd. to Pacheco Pass Hwy.	60	120	260
	Pacheco Pass Hwy. to Venture Way	<50	90	190
Chestnut Street	Luchessa Avenue to 10th St.	<50	90	190
	10th St. to 6th St.	<50	60	140
Church Street	Mantelli Dr. to Welburn Ave.	<50	60	140
	Welburn Ave. to 6th St.	<50	60	120
	6th St. to 10th St.	<50	60	120
Cohansey Avenue	Wren Ave. to Kern Ave.	<50	<50	90
Day Road	West of Santa Teresa Blvd.	<50	80	160

TABLE 9 2040 General Plan Buildout Traffic Noise Contours

Roadway	Segment	Distance from Centerline to Traffic Noise Contours[1], feet		
		70 dBA L_{dn}	65 dBA L_{dn}	60 dBA L_{dn}
Hecker Pass Road	West of Santa Teresa Blvd.	80	160	350
I.O.O.F. Avenue	Monterey Rd. to Murray Ave.	60	120	260
Leavesley Avenue	Arroyo Cir. to Marcella Ave.	<50	60	140
Luchessa Avenue	Thomas Rd. to Church St.	60	120	260
Mantelli Drive	Kern Ave. to Wren Ave.	<50	90	190
	Welburn Ave. to Santa Teresa Blvd.	<50	60	140
Monterey Road	3rd St. to 6th St.	<50	60	140
	10th St. to Luchessa Ave.	60	140	300
	Farrell Ave. to Las Animas Ave.	140	300	340
	Buena Vista Ave. to Cohansey Ave.	100	200	470
	Masten Ave. to Buena Vista Ave.	140	300	340
Pacheco Pass Highway	Camino Arroyo to Cameron Blvd.	120	260	550
Santa Teresa Boulevard	Fitzgerald Ave. to Day Rd.	90	190	410
	Longmeadow Dr. to Mantelli Dr.	90	190	410
	Mantelli Dr. to Hecker Pass Rd.	100	200	470
	3rd St. to Club Dr.	90	190	410
	Club Dr. to Miller Ave.	100	220	470
	Miller Ave. to Thomas Rd.	80	160	350
	Thomas Rd. to Castro Valley Rd.	90	190	410

TABLE 9 2040 General Plan Buildout Traffic Noise Contours

Roadway	Segment	Distance from Centerline to Traffic Noise Contours[1], feet		
		70 dBA L_{dn}	65 dBA L_{dn}	60 dBA L_{dn}
Thomas Road	Luchessa Ave. to Santa Teresa Blvd.	50	100	220
Uvas Park Drive	Wren Ave. to Miller Ave.	<50	60	120
Welburn Avenue	Santa Teresa Blvd. to Kern Ave.	<50	<50	60
	Wayland Ln. to Church St.	<50	60	120
Wren Avenue	3rd St. to 6th St.	<50	80	160
	Mantelli Dr. to 1st St.	<50	60	140

[1] Noise levels do not take shielding from terrain, structures, or noise barriers into account.
[2] Noise levels at distances greater than 300 feet from roadway centerlines are likely to change with varying atmospheric conditions.

As indicated in Tables 8 and 9, existing and future noise levels along many roadways in the City of Gilroy currently exceed those considered compatible for noise-sensitive land uses. As such, noise levels at the locations of residential and other noise-sensitive land uses allowed for under the 2040 General Plan would exceed the City's noise thresholds of acceptability.

Where exterior noise levels would exceed 60 dBA L_{dn} in new residential development, interior levels may exceed 45 dBA L_{dn} assuming that windows and doors are open for ventilation. Interior noise levels within residential units are 20 to 25 decibels lower than exterior noise levels with the windows closed, assuming typical California Building Code construction methods. Where exterior noise levels are 60 to 70 dBA L_{dn}, interior noise levels can typically be maintained below 45 dBA L_{dn} with the incorporation of an adequate forced-air mechanical ventilation system in the residential units to allow residents the option of controlling noise by keeping the windows closed. In areas exceeding 70 dBA L_{dn}, the inclusion of windows and doors with high Sound Transmission Class (STC) ratings, and the incorporation of forced-air mechanical ventilation systems, may be necessary to meet 45 dBA L_{dn}.

The implementation of Proposed General Plan Policies PH 6.1 through 6.7 would reduce potential impacts associated with new noise-sensitive land use exposure to traffic noise sources to a less-than-significant level.

PH 6.1 Noise and Land Use
Establish a physical development pattern that is compatible with the noise environment of Gilroy, ensuring that residential neighborhoods and park areas are the quietest areas in the community. [Existing GP, 26.01]

PH 6.2 Noise Standard Consistency

Review development proposals to assure consistency with noise standards, using the Future Noise Contours map to determine if additional noise studies are needed for proposed development. [Existing GP, 26.C]

PH 6.3 Maximum Permissible Noise Levels

Ensure that outdoor and indoor noise levels are within the maximum permitted levels. Prohibit further development of sensitive uses in areas where the current or projected future noise levels exceed these standards and feasible mitigation is not available to reduce the noise level to meet the standards identified in Table 9-1. [Existing GP, 26.02, modified]

PH 6.4 Noise Study and Mitigation

Require proposed development projects in areas where future residents or visitors may be exposed to major noise sources (e.g. roadways, rail lines, industrial activities) to conduct an environmental noise analysis. The noise analysis shall determine noise exposure and noise standard compatibility with respect to the noise standards identified in Table 9-1 and shall incorporate noise mitigation when located in noise environments that are not compatible with the proposed uses of the project. [New Policy]

TABLE 9-1

City of Gilroy Maximum Permitted Outdoor and Indoor Noise Levels

Land Use Category	Maximum Outdoor L_{DN} (dBA)	Maximum Indoor L_{DN} (dBA)
Residential	60[1]	45[1]
Commercial	65	61
Industrial	76	see note 2

Source: City of Gilroy, *Gilroy General Plan 2002,* as amended through Resolution No. 2004-42.

[1]The Outdoor sound levels for residential properties shall be held to 60-dBA Ldn, or a maximum of 70-dBA if ALL of the following FINDINGS can be made:

- That potential noise levels, exceeding the 60 dBA standard, are generally limited to less than 10% of the entire project site
- That feasible sound attenuation measures have been incorporated in the project design;
- That potential noise levels are part of the developer's disclosure to future residents;
- That interior noise limits established by the General Plan are strictly maintained; and
- Potential noise levels will not jeopardize the health, safety, and general welfare of the public.

[2] The indoor standards for industrial land uses have been set by the Occupational Safety and Health Administration. The maximum level to be exceeded no more than 10 percent of the time (L10) is 65 dBA, while the maximum level to be exceeded no more than 50 percent of the time (L50) is 60 dBA.

PH 6.5 Acoustical Design

Consider the acoustical design of projects in the development review process to reduce noise to an acceptable level. Ensure that noise mitigation features are designed and implemented in an aesthetically pleasing and consistent manner. [Existing GP, 26.04]

PH 6.6 Setbacks and Earth Berms

Require landscaped setbacks and earth berms as an alternative to soundwalls where feasible to buffer noise along major thoroughfares and rail lines adjacent to residential areas. Where an adequate setback and earth berm is not feasible, a masonry wall screened with drought tolerant, low maintenance landscaping will be required. [Existing GP, 26.05, modified]

PH 6.7 Residential Noise Standards

Require the design of new residential development to comply with the noise standards found in Table 9-1. Maximum outdoor sound levels for residential properties shall be 60 dBA L_{dn}, in areas where outdoor use is a major consideration (e.g., backyards in single family housing and common recreational areas in multi-family developments). In the Downtown Specific Plan Area, the maximum outdoor noise level in common recreation areas of multi-family residential uses shall be 65 dBA L_{dn}. In outdoor use areas where the City determines that maintaining the outdoor noise levels mentioned above cannot be achieved after the application of reasonable and feasible mitigation, a level of up to 70 dBA L_{dn} may be permitted, if the following findings are made:

- That feasible sound attenuation measures have been incorporated in the project design;
- That potential noise levels are part of the developer's disclosure to future residents;
- That interior noise limits established by the General Plan are strictly maintained; and
- Potential noise levels will not jeopardize the health, safety, and general welfare of the public. [Existing GP, 26.03, modified]

<u>Rail Noise Exposure</u>

Train operations include the existing UPRR rail line, which includes both freight and passenger trains, and the California High Speed Train (HST), which has been proposed to pass through Gilroy and would include a station in Downtown Gilroy.

Railroad train noise from operations on the UPRR tracks was assumed to be similar to existing conditions, generating a noise level of about 74 dBA L_{dn} at a distance of 75 feet from the center of the main line. Railroad train noise levels would generally exceed 60 dBA L_{dn} within about 350 feet of active railroad corridors (10 to 15 trains per day). Where residential development is located adjacent to at-grade rail crossings, these sensitive uses would be subject to maximum instantaneous noise levels (L_{max}) from train warning whistles that range from approximately 90 to 110 dBA L_{max}.

The California High Speed Train (HST) San Jose to Merced Section is proposed to pass through the City of Gilroy. Multiple alternative alignments and design options were under consideration for the Section. The California High Speed Rail Authority has selected Alternative 4 as the state's preferred alternative. Alternative 4 is a blended alternative in which high speed rail will be placed at grade throughout Gilroy on an alignment parallel to the existing UPRR tracks. The maximum operational speed through Gilroy is expected to be 110 mph. This would effectively become another source of noise and vibration within the Monterey Road/UPRR corridor. Residential and

commercial uses currently border portions of this alignment. Additionally, neighborhood residential and mixed-use areas are proposed along this corridor. The Downtown Specific Plan is currently being revised to include the development of the HST line and station.

Representative noise and vibration data for the proposed California High Speed Rail Project was obtained from various sources, including data from published environmental documents that have studied the project and data provided by the California High Speed Rail Authority, most of which appears to have been based upon the U.S. DOT High Speed Ground Transportation Noise and Vibration Impact Assessment. Noise and vibration studies and environmental impact reports (EIRs) that were utilized in this assessment were programmatic, as specific development plans for the HST have not been finalized.

For the purpose of this analysis, credible worst-case assumptions were made regarding the speed, frequency, location of right-of-way, and other factors. This analysis assumes that trains will travel at-grade at maximum speeds of 110 mph. During peak periods and full build-out of the high-speed rail system, approximately 10 to 12 trains are expected to travel past the site per hour in each direction. During off-peak periods, 6 to 8 trains are expected per hour in each direction. Trains would not travel between the hours of midnight and 5:00 a.m.

Using data from the California HST Program EIR/EIS, day-night average noise levels are anticipated to range from 65 to 70 dBA L_{dn} at a distance of 200 feet, and maximum noise levels generated by a passing HST are anticipated to reach approximately 75 to 80 dBA L_{max}. The HST would make an incremental contribution to the total noise level of less than 1 dBA L_{dn}, and maximum noise levels from trains passing by would be below the noise levels generated by trains and trucks utilizing the existing corridor.

The implementation of Proposed General Plan Policies PH 6.1, and PH 6.3 through 6.7 would reduce potential impacts associated with new noise-sensitive land uses exposure to rail noise levels, but not to a less-than-significant level.

PH 6.1 Noise and Land Use
Establish a physical development pattern that is compatible with the noise environment of Gilroy, ensuring that residential neighborhoods and park areas are the quietest areas in the community. [Existing GP, 26.01]

PH 6.3 Maximum Permissible Noise Levels
Ensure that outdoor and indoor noise levels are within the maximum permitted levels. Prohibit further development of sensitive uses in areas where the current or projected future noise levels exceed these standards and feasible mitigation is not available to reduce the noise level to meet the standards identified in Table 9-1. [Existing GP, 26.02, modified]

PH 6.4 Noise Study and Mitigation
Require proposed development projects in areas where future residents or visitors may be exposed to major noise sources (e.g. roadways, rail lines, industrial activities) to conduct an environmental noise analysis. The noise analysis shall determine noise exposure and noise standard compatibility with respect to the noise standards identified in Table 9-1 and shall incorporate noise mitigation

when located in noise environments that are not compatible with the proposed uses of the project. [New Policy]

TABLE 9-1

City of Gilroy Maximum Permitted Outdoor and Indoor Noise Levels

Land Use Category	Maximum Outdoor L_{DN} (dBA)	Maximum Indoor L_{DN} (dBA)
Residential	60[1]	45[1]
Commercial	65	61
Industrial	76	see note 2

Source: City of Gilroy, *Gilroy General Plan 2002*, as amended through Resolution No. 2004-42.

[1]The Outdoor sound levels for residential properties shall be held to 60-dBA Ldn, or a maximum of 70-dBA if ALL of the following FINDINGS can be made:

- That potential noise levels, exceeding the 60 dBA standard, are generally limited to less than 10% of the entire project site
- That feasible sound attenuation measures have been incorporated in the project design;
- That potential noise levels are part of the developer's disclosure to future residents;
- That interior noise limits established by the General Plan are strictly maintained; and
- Potential noise levels will not jeopardize the health, safety, and general welfare of the public.

[2] The indoor standards for industrial land uses have been set by the Occupational Safety and Health Administration. The maximum level to be exceeded no more than 10 percent of the time (L10) is 65 dBA, while the maximum level to be exceeded no more than 50 percent of the time (L50) is 60 dBA.

PH 6.5 Acoustical Design

Consider the acoustical design of projects in the development review process to reduce noise to an acceptable level. Ensure that noise mitigation features are designed and implemented in an aesthetically pleasing and consistent manner. [Existing GP, 26.04]

PH 6.6 Setbacks and Earth Berms

Require landscaped setbacks and earth berms as an alternative to soundwalls where feasible to buffer noise along major thoroughfares and rail lines adjacent to residential areas. Where an adequate setback and earth berm is not feasible, a masonry wall screened with drought tolerant, low maintenance landscaping will be required. [Existing GP, 26.05, modified]

PH 6.7 Residential Noise Standards

Require the design of new residential development to comply with the noise standards found in Table 9-1. Maximum outdoor sound levels for residential properties shall be 60 dBA L_{dn}, in areas where outdoor use is a major consideration (e.g., backyards in single family housing and common recreational areas in multi-family developments). In the Downtown Specific Plan Area, the maximum outdoor noise level in common recreation areas of multi-family residential uses shall be 65 dBA L_{dn}. In outdoor use areas where the City determines that maintaining the outdoor noise

levels mentioned above cannot be achieved after the application of reasonable and feasible mitigation, a level of up to 70 dBA L_{dn} may be permitted, if the following findings are made:

- That feasible sound attenuation measures have been incorporated in the project design;
- That potential noise levels are part of the developer's disclosure to future residents;
- That interior noise limits established by the General Plan are strictly maintained; and
- Potential noise levels will not jeopardize the health, safety, and general welfare of the public. [Existing GP, 26.03, modified]

Proposed General Plan Policies PH 6.1 through PH 6.7, in conjunction with the proposed Indoor and Outdoor Noise Standards shown in General Plan Table 9-1, would require that the compatibility standards be used to determine where noise levels in the community are acceptable or unacceptable, and require noise attenuation measures to achieve the acceptable noise level standards. Noise studies of new development proposals are required when existing or future noise levels from transportation or non-transportation noise sources exceed the acceptable levels for that use in order to determine the controls necessary to maintain consistency with the interior and exterior noise standards. Policy PH 6.6 identifies noise-reducing measures, such as the requirement that setbacks or noise barriers, are included in the design of roadway, freeway, and rail improvement projects to reduce noise levels. The proposed goals and policies of the Potential Hazards Element reduce potential impacts associated with noise and land use compatibility. However, due to the uncertainty of the final HST alignment and possible mitigation measures that might be incorporated into the future HST Project, these policies would not reduce the impact of future HST noise to a less-than-significant level.

Mitigation Measure N-a1:

<u>The following additional policy is recommended to be added to the Potential Hazards Element of the City of Gilroy's 2040 General Plan.</u>

Proposed Additional Policy PH 6.14 High Speed Rail. The City of Gilroy should continue to coordinate with the California High Speed Rail Authority to ensure that HST incorporates appropriate mitigation measures.

The implementation of the Proposed General Plan Policies PH 6.1, and PH 6.3 through 6.7 and Proposed Additional Policy PH 6.13 could feasibly reduce the significant noise impact to a less-than-significant level; however, mitigation measures that might be incorporated into the future HST Project are unknown and beyond the control of the City, resulting in a **significant and unavoidable** impact.

<u>Stationary and Local Noise Sources</u>

Mixed-use development projects often include residential uses located above or in proximity to commercial uses, and in areas served by bus transit along major roadways. Under the Gilroy 2040 General Plan, mixed-use residential land use designations are proposed for sections west of Monterey Road in the northern and southern parts the City (Neighborhood Districts High and Low) and along 1st Street. The Downtown Specific Plan would also include mixed-use development.

Noise sources associated with commercial uses could include mechanical equipment operations, public address systems, parking lot noise (e.g., opening and closing of vehicle doors, people talking, car alarms), delivery activities (e.g., use of forklifts, hydraulic lifts), trash compactors, and air compressors. These elevated noise levels, which have the potential to be generated by commercial uses within mixed-use developments, would expose nearby noise-sensitive land uses to noise levels that exceed the City's noise standards.

Placement of residential uses within close proximity to industrial uses would also have the potential to expose residents to increased noise levels in exceedance of City noise standards. Conversely, the industrial uses could be subject to new noise standards to ensure noise level compatibility with nearby residential and mixed-use neighborhoods. Industrial uses could be subject to new limitations for noise intensive activities to keep noise levels at nearby residential and mixed-use neighborhoods within City noise level standards.

The implementation of Proposed General Plan Policies PH 6.1, PH 6.3 through 6.5, and PH 6.7 through 6.8 would reduce potential impacts associated with new noise-sensitive land use exposure to stationary noise sources to a less-than-significant level.

PH 6.1 Noise and Land Use
Establish a physical development pattern that is compatible with the noise environment of Gilroy, ensuring that residential neighborhoods and park areas are the quietest areas in the community. [Existing GP, 26.01]

PH 6.3 Maximum Permissible Noise Levels
Ensure that outdoor and indoor noise levels are within the maximum permitted levels. Prohibit further development of sensitive uses in areas where the current or projected future noise levels exceed these standards and feasible mitigation is not available to reduce the noise level to meet the standards identified in Table 9-1. [Existing GP, 26.02, modified]

PH 6.4 Noise Study and Mitigation
Require proposed development projects in areas where future residents or visitors may be exposed to major noise sources (e.g. roadways, rail lines, industrial activities) to conduct an environmental noise analysis. The noise analysis shall determine noise exposure and noise standard compatibility with respect to the noise standards identified in Table 9-1 and shall incorporate noise mitigation when located in noise environments that are not compatible with the proposed uses of the project. [New Policy]

TABLE 9-1 City of Gilroy Maximum Permitted Outdoor and Indoor Noise Levels		
Land Use Category	**Maximum Outdoor L_{DN} (dBA)**	**Maximum Indoor L_{DN} (dBA)**
Residential	60[1]	45[1]
Commercial	65	61
Industrial	76	see note 2

Source: City of Gilroy, *Gilroy General Plan 2002*, as amended through Resolution No. 2004-42.
[1]The Outdoor sound levels for residential properties shall be held to 60-dBA Ldn, or a maximum of 70-dBA if ALL of the following FINDINGS can be made:

- That potential noise levels, exceeding the 60 dBA standard, are generally limited to less than 10% of the entire project site
- That feasible sound attenuation measures have been incorporated in the project design;
- That potential noise levels are part of the developer's disclosure to future residents;
- That interior noise limits established by the General Plan are strictly maintained; and
- Potential noise levels will not jeopardize the health, safety, and general welfare of the public.

[2] The indoor standards for industrial land uses have been set by the Occupational Safety and Health Administration. The maximum level to be exceeded no more than 10 percent of the time (L10) is 65 dBA, while the maximum level to be exceeded no more than 50 percent of the time (L50) is 60 dBA.

PH 6.5 Acoustical Design

Consider the acoustical design of projects in the development review process to reduce noise to an acceptable level. Ensure that noise mitigation features are designed and implemented in an aesthetically pleasing and consistent manner. [Existing GP, 26.04]

PH 6.7 Residential Noise Standards

Require the design of new residential development to comply with the noise standards found in Table 9-1. Maximum outdoor sound levels for residential properties shall be 60 dBA L_{dn}, in areas where outdoor use is a major consideration (e.g., backyards in single family housing and common recreational areas in multi-family developments). In the Downtown Specific Plan Area, the maximum outdoor noise level in common recreation areas of multi-family residential uses shall be 65 dBA L_{dn}. In outdoor use areas where the City determines that maintaining the outdoor noise levels mentioned above cannot be achieved after the application of reasonable and feasible mitigation, a level of up to 70 dBA L_{dn} may be permitted, if the following findings are made:

- That feasible sound attenuation measures have been incorporated in the project design;
- That potential noise levels are part of the developer's disclosure to future residents;
- That interior noise limits established by the General Plan are strictly maintained; and
- Potential noise levels will not jeopardize the health, safety, and general welfare of the public. [Existing GP, 26.03, modified]

PH 6.8 Incremental Noise Impacts of Commercial and Industrial Development
Review of proposed new or expanding commercial and industrial development shall consider potential noise impacts on nearby residential uses and, as necessary, shall require noise mitigation measures as a condition of project approval. [New Policy]

Noise and Land Use Compatibility Impact Discussion for New Noise-Generating Land Uses

Implementation of the Gilroy 2040 General Plan would facilitate the development of new noise-generating land uses. These new land uses could result in operational noise levels that exceed General Plan noise standards, as well as noise level standards contained in the Zoning Ordinance. A significant noise impact would be identified where the operation of noise-generating land uses would create noise levels that exceed the noise and land use compatibility standards or Zoning Ordinance noise limits as established by the City of Gilroy.

Impact a2: New noise-generating land uses could produce noise levels that would exceed the City's noise thresholds of acceptability or Zoning Ordinance noise limits at sensitive receptors in the vicinity.

Mixed-Use development projects often include residential uses located above or in proximity to commercial uses and are located in areas served by rail and bus transit along major roadways and the railroad corridor. Office, commercial, retail, or other noise-generating uses developed under the General Plan could substantially increase noise levels at noise-sensitive land uses or could expose receptors to noise levels that exceed the City's Municipal Code noise limits.

Future operations at existing and proposed noise-producing land uses are dependent on many variables, and information is unavailable to allow meaningful projections of noise. Noise conflicts may be caused by noise sources, such as outdoor dining areas or bars, mechanical equipment, outdoor maintenance areas, truck loading docks and delivery activities, public address systems, and parking lots (e.g., opening and closing of vehicle doors, people talking, and car alarms). Development under the proposed General Plan would introduce new noise-generating sources adjacent to existing noise-sensitive areas and new noise-sensitive uses adjacent to existing noise sources.

Compliance with the following Proposed General Plan Policies would reduce potential impacts associated with new noise-producing land uses to a less-than-significant level:

PH 6.1 Noise and Land Use
Establish a physical development pattern that is compatible with the noise environment of Gilroy, ensuring that residential neighborhoods and park areas are the quietest areas in the community. [Existing GP, 26.01]

PH 6.2 Noise Standard Consistency
Review development proposals to assure consistency with noise standards, using the Future Noise Contours map to determine if additional noise studies are needed for proposed development. [Existing GP, 26.C]

PH 6.3 Maximum Permissible Noise Levels
Ensure that outdoor and indoor noise levels are within the maximum permitted levels. Prohibit further development of sensitive uses in areas where the current or projected future noise levels exceed these standards and feasible mitigation is not available to reduce the noise level to meet the standards identified in Table 9-1. [Existing GP, 26.02, modified]

PH 6.4 Noise Study and Mitigation
Require proposed development projects in areas where future residents or visitors may be exposed to major noise sources (e.g. roadways, rail lines, industrial activities) to conduct an environmental noise analysis. The noise analysis shall determine noise exposure and noise standard compatibility with respect to the noise standards identified in Table 9-1 and shall incorporate noise mitigation when located in noise environments that are not compatible with the proposed uses of the project. [New Policy]

PH 6.5 Acoustical Design
Consider the acoustical design of projects in the development review process to reduce noise to an acceptable level. Ensure that noise mitigation features are designed and implemented in an aesthetically pleasing and consistent manner. [Existing GP, 26.04]

PH 6.6 Setbacks and Earth Berms
Require landscaped setbacks and earth berms as an alternative to soundwalls, where feasible, to buffer noise along major thoroughfares and rail lines adjacent to residential areas. Where an adequate setback and earth berm is not feasible, a masonry wall screened with drought tolerant, low maintenance landscaping will be required. [Existing GP, 26.05, modified]

PH 6.8 Incremental Noise Impacts of Commercial and Industrial Development
Review of proposed new or expanding commercial and industrial development shall consider potential noise impacts on nearby residential uses and, as necessary, shall require noise mitigation measures as a condition of project approval. [New Policy]

EJ 3.2 Noise Reduction Retrofit Program
Explore the feasibility of a program to provide residents the resources to retrofit their homes with noise reduction features. [New Policy]

New noise-generating projects implemented by the General Plan would be subject to the quantitative noise limits established in the General Plan policies and the City's Municipal Code noise standards, ensuring that existing or proposed residences and other noise-sensitive land uses would not be exposed to excessive noise. Compliance with these quantitative limits would result in a less-than-significant impact.

b) Land Use Compatibility Impact Discussion for New Vibration Sensitive Land Uses Near Railroad

Development facilitated by the General Plan could expose persons to excessive ground-borne vibration levels attributable to existing UPRR and proposed future HST trains. The proposed

locations of buildings and their specific sensitivity to vibration are not known at this time; however, such uses located in proximity to the UPRR or HST tracks could be exposed to ground vibration levels exceeding FTA guidelines.

Impact b1: Ground vibration levels resulting from railroad train operations could exceed appropriate vibration thresholds and could expose people to excessive ground-borne vibration.

Railroad trains are a source of ground-borne vibration when receptors are located close to the tracks. Many factors influence levels of ground-borne vibration from trains experienced in buildings, including operational factors, geology, building construction, train speed, and track type. The U.S. DOT FTA has developed vibration impact assessment criteria for evaluation vibration impacts associated with rapid transit projects.[3]

There is one existing rail line in Gilroy, a UPRR main-line, running north-south adjacent to Monterey Road. This line transects the City and carries both Caltrain and freight train traffic. Approximately 12 to 16 trains pass through Gilroy on this rail line daily, including about 6 Caltrain passenger trains, 2 Amtrak passenger trains, and 4 to 8 freight trains. Rail traffic along the line is anticipated to increase to up to 30 trains per day, and future train activity would be considered "occasional" with respect to the FTA vibration impact criteria. Since many of these trains pass during evening and nighttime hours when people are normally at rest, the 75 VdB limit is used to characterize the vibration compatibility. Ground-borne vibration levels from train passbys along this rail line range from 79 to 80 VdB at a distance of 50 feet from the center of the main railroad track, 73 to 74 VdB at a distance of 100 feet from the center of main railroad track, and 68 VdB at a distance of 200 feet from the center of main railroad track during freight and passenger train pass-by events. Residences proposed within 45 feet of the center of the main rail line could be exposed to vibration levels exceeding 80 VdB.

In addition to the existing rail line, the California High Speed Train (HST) San Jose to Merced Section is proposed to pass through the City of Gilroy, as described in Impact a1. For the purposes of this analysis, assumptions were made regarding these factors to predict vibration levels from HST at the nearest receptors. Steel-wheel technology is regarded as the type of train system that will be implemented, with wheels in proper working condition (e.g., no worn wheels or wheels with flats). The analysis again assumes that the maximum speed would be between up to 110 mph and the design option would be at-grade. During peak periods and full build-out of the high-speed rail system, approximately 10 to 12 trains are expected to travel past the site per hour in each direction. During off-peak periods, 6 to 8 trains are expected per hour in each direction. Trains would not travel between the hours of midnight and 5:00 a.m. As a result, the 72 VdB vibration limit would apply.

Using data from the California HST Program EIR/EIS, the vibration level at a distance of 200 feet from the tracks, resulting from a train traveling at-grade at 110 mph, would be about 69 VdB. The impact threshold is 72 VdB, so the threshold would not be exceeded as trains pass through Gilroy.

[3] U.S. Department of Transportation, Federal Transit Administration, Transit Noise and Vibration Impact Assessment, FTA-VA-90-1003-06, May 2006.

As development proceeds and by utilizing appropriate adjustment factors, vibration levels can be adjusted up or down based on known conditions.

The implementation of Proposed General Plan Policy PH 6.13 and Proposed Additional Policy PH 6.14, above, would reduce potential impacts associated with vibration from railroad train operations.

PH 6.13 Transportation Vibration
Require proposed residential and commercial projects located within 200 feet of existing major freeways and railroad lines (e.g. freight, Amtrak, and Caltrain) to conduct a ground vibration and vibration noise evaluation consistent with City-approved methodologies (e.g. Caltrans, Federal Transportation Authority). [New Policy]

The implementation of Proposed General Plan Policy PH 6.13 and Additional Policy PH 6.14 could feasibly reduce the significant noise impact to a less-than-significant level; however, as with Mitigation a1, mitigation incorporated as a result of the HST Project are unknown and beyond the control of the City, resulting in a **significant and unavoidable** impact.

c) Permanent Noise Increase Impact Discussion Resulting from Increased Traffic

Development facilitated by the 2040 General Plan would result in increased traffic volumes along roadways throughout Gilroy. A significant noise impact would be identified where existing noise-sensitive land uses would be subject to future noise levels in excess of the City's noise thresholds.

Impact c1: Increased vehicular traffic and transportation and infrastructure improvements in the plan area would result in existing noise sensitive land uses being exposed to noise levels in excess of the City's noise thresholds.

The increased development allowed under the General Plan would result in an increase in vehicular traffic as development occurs and population increases. These projected increases in traffic would occur over time and would increase noise levels throughout the City of Gilroy and its vicinity. Traffic volumes provided by Hexagon Transportation Consultants, Inc. were reviewed to calculate the change in traffic noise levels attributable to the cumulative growth planned in the Gilroy General Plan. Traffic volumes under the 2020 Existing and 2040 General Plan traffic scenarios were compared to calculate the relative increase in traffic noise attributable to the buildout of the General Plan. Table 8 shows the calculated traffic noise increases along all major roadways in Gilroy. Table 9 shows the calculated distances to the 60, 65, and 70 dBA L_{dn} traffic noise level contours under 2040 Buildout Conditions for the major roadways in the City. Traffic noise level contours under Existing and 2040 Buildout Conditions are shown graphically in Figures 2 and 3.

The City of Gilroy assesses noise with respect to their maximum permissible noise levels shown in Table 6. The City does not establish a significance threshold for assessing permanent increases in noise.

As indicated in Table 8, perceptible noise increases (3 dBA L_{dn} or greater) would occur along segments of Buena Vista Avenue, Cameron Boulevard, I.O.O.F. Avenue, Luchessa Avenue, Marcella Avenue, Monterey Road, and Santa Teresa Boulevard as a result of 2040 General Plan

Buildout conditions. Existing residential land uses are located within the projected 60 dBA L_{dn} noise contours under 2040 General Plan Buildout conditions along portions of all of these roadways, with the exception of Cameron Boulevard. In addition to projected traffic noise increases along existing roadway segments, traffic noise levels would increase in areas adjacent to proposed future roadways and roadway extensions (see Table 9). This is a **potentially significant cumulative** impact.

The implementation of Proposed General Plan Policies EJ 3.2, EJ 3.3, and PH 6.9 would reduce potential impacts associated with traffic noise increases, but not to a less-than-significant level.

EJ 3.2 Noise Reduction Retrofit Program
Explore the feasibility of a program to provide residents the resources to retrofit their homes with noise reduction features. [New Policy]

EJ 3.3 Noise Attenuation for Existing Developments
Explore the feasibility of constructing sound walls between Highway 101 and residential neighborhoods adjacent to Highway 101. [New Policy]

PH 6.9 Transportation Noise
Consider potential noise impacts when evaluating proposals for transportation projects, including road, freeway, and transit projects, and incorporate mitigation measures to meet General Plan standards. [New Policy]

Mitigation Measure N-c1:

The following revised language of Proposed General Plan Policy PH 6.9 is recommended to reduce potential impacts associated with traffic noise increases to a *less-than-significant* level.

PH 6.9 Transportation Noise
Consider potential noise impacts when evaluating proposals for transportation projects, including road, freeway, and transit projects, and incorporate mitigation measures to meet General Plan standards. Methods available to mitigate cumulative traffic noise level increases would need to be studied on a case-by-case basis at receptors that would be considered noise impacted. Noise reduction methods could include the following:

- New or larger noise barriers or other noise reduction techniques could be constructed to protect sensitive outdoor use areas at existing residential land uses, where reasonable and feasible. Final design of such barriers should be completed during project-level review on a parcel-by-parcel basis.

- Alternative noise reduction techniques could be implemented, such as re-paving streets with "quieter" pavement types such as Open-Grade or Rubberized Asphalt Concrete. The use of "quiet" pavement can reduce noise levels by 2 to 5 dBA depending on the existing pavement type, traffic speed, traffic volumes, and other factors.

d) Impact Discussion Resulting from Temporary Construction Noise and Vibration

The proposed Gilroy 2040 General Plan project would facilitate the construction of new projects throughout the City. Residences and businesses located adjacent to development sites would be affected at times by construction noise and vibration.

Impact Discussion Resulting from Construction Noise

Temporary construction-related noise would be considered significant if noise levels would exceed 60 dBA L_{eq} (the maximum permissible outdoor noise level for residential land uses) at residential land uses or 70 dBA L_{eq} at sensitive industrial, office, or commercial land uses for a period of more than one construction season.

Impact d1: Construction noise would cause a temporary or periodic increase in noise exposure above ambient noise levels.

Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive receptors. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (early morning, evening, or nighttime hours), when construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction durations last over extended periods of time.

Major noise-generating construction activities associated with new projects would include removal of existing pavement and structures, site grading and excavation, installation of utilities, the construction of building foundations, cores, and shells, paving, and landscaping. The highest noise levels are typically generated during the demolition of existing structures when impact tools are used (e.g., jackhammers, hoe rams) and during the construction of building foundations when impact pile driving is required to support the structure. Site grading and excavation activities would also generate high noise levels as these phases often require the simultaneous use of multiple pieces of heavy equipment, such as dozers, excavators, scrapers, and loaders. Lower noise levels result from building construction activities when these activities move indoors and less heavy equipment is required to complete the tasks.

Construction equipment would typically include, but would not be limited to, earth-moving equipment and trucks, pile driving rigs, mobile cranes, compressors, pumps, generators, paving equipment, and pneumatic, hydraulic, and electric tools. Construction noise levels would vary by phase and vary within phases based on the amount of equipment in operation and location where the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 12 and 13. Table 12 shows the average noise level range by construction phase, and Table 13 shows the maximum noise level range for different construction equipment. Table 12 levels are consistent with construction noise levels calculated for the project in the Federal Highway Administration Roadway Construction Noise Model, including the anticipated equipment that would be used for each phase of the project. Typical hourly average construction-generated noise levels are about 77 to 89 dBA L_{eq} measured at a distance of 50 feet from the site during busy construction periods. Large pieces of earth-moving equipment, such as graders, scrapers, and dozers, generate maximum noise levels of 85 to 90 dBA L_{max} at a distance of 50 feet. During each

stage of construction, there would be a different mix of equipment operating, and noise levels would vary based on the amount of equipment on site and the location of the activity. Construction noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and receptor. Intervening structures or terrain would result in lower noise levels at distant receptors.

TABLE 12 Typical Ranges of Noise Levels at 50 Feet from Construction Sites (dBA L_{eq})

	Domestic Housing		**Office Building, Hotel, Hospital, School, Public Works**		**Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station**		**Public Works Roads & Highways, Sewers, and Trenches**	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.
Source: United States Environmental Protection Agency, 1973, Legal Compilation on Noise, Vol. 1, p. 2-104.

TABLE 13 Construction Equipment 50-foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:

1 Measured at 50 feet from the construction equipment, with a “slow” (1 sec.) time constant.

2 Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

3 Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

The City of Gilroy limits construction to between the hours of 7:00 a.m. and 10:00 p.m. Gilroy does not establish quantitative noise limits for demolition or construction activities occurring in the City.

The City does not establish quantitative noise limits for noise due to demolition or construction activities occurring in the City. Noise generated by small infill projects facilitated by the Gilroy 2040 General Plan would likely have relatively short overall construction durations, with the noisiest phases of construction (e.g., demolition, foundations, project infrastructure, building core, and shell) limited to a timeframe of one year or less. These phases of construction are not anticipated to generate noise levels in excess of 60 dBA L_{eq} (the maximum permissible outdoor noise level for residential land uses) at sensitive land uses in the area over extended periods of time (beyond one construction season). Interior construction, landscaping, and finishing activities would not be expected to result in noise levels in excess of 60 dBA L_{eq} at off-site locations. Large construction projects associated with future development facilitated by the Gilroy 2040 General Plan, such as construction associated with the adopted specific plans, may result in a substantial temporary noise increase at adjacent noise-sensitive land uses. As a result, noise levels from these projects could exceed 60 dBA L_{eq} and last over one year in duration.

The implementation of Proposed 2040 General Plan Policies PH 6.10 and PH 6.11 would reduce potential impacts associated with temporary noise increases due to construction, but not to a less-than-significant level.

PH 6.10 Construction Noise Study
Require proposed development projects subject to discretionary approval to assess potential construction noise impacts on nearby sensitive uses and to minimize impacts on those uses, to the extent feasible. [New Policy]

PH 6.11 Construction and Maintenance Noise Limits
Limit the hours of construction and maintenance activities to the less sensitive hours of the day (7:00am to 7:00pm Monday through Friday and 9:00am to 7:00 pm on Saturdays). Construction hours that vary from these timeframes may be approved by the Building Official, in conformance with Article XVI. Hours of Construction of the Gilroy City Code. [New Policy]

Mitigation Measure N-d1, which recommends common best construction noise control practices, would be required to ensure that construction noise impacts are reduced to a less-than-significant level.

Mitigation Measure N-d1:

The following standard construction noise controls shall be implemented at a project site, as required as standard conditions of project approval within the City of Gilroy:

- Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area;

- Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment;

- Prohibit all unnecessary idling of internal combustion engines;

- Utilize “quiet” models of air compressors and other stationary noise sources where technology exists;

- Designate a "disturbance coordinator" who would be responsible for responding to any complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., bad muffler, etc.) and will require that reasonable measures be implemented to correct the problem.

- If impact pile driving is proposed, multiple-pile drivers shall be considered to expedite construction. Although noise levels generated by multiple pile drivers would be higher than the noise generated by a single pile driver, the total duration of pile driving activities would be reduced;

- If impact pile driving is proposed, temporary noise control blanket barriers shall shroud pile drivers or be erected in a manner to shield the adjacent land uses. Such noise control blanket barriers can be rented and quickly erected; and

- If impact pile driving is proposed, foundation pile holes shall be pre-drilled to minimize the number of impacts required to seat the pile Pre-drilling foundation pile holes is a standard construction noise control technique. Pre-drilling reduces the number of blows required to seat the pile. Notify all adjacent land uses of the construction schedule in writing.

The potential short-term noise impacts associated with construction of future development facilitated by the Gilroy 2040 General Plan project would be mitigated to a **less-than-significant** level with the adoption and implementation of the above standard controls that require reasonable noise reduction measures be incorporated into the construction plan and implemented during all phases of construction activity to minimize the exposure of neighboring properties.

Impact Discussion Resulting from Construction Vibration

Project-specific demolition and construction activities required for future development associated with the Gilroy 2040 General Plan project may generate perceptible vibration levels when heavy equipment or impact tools (e.g. jackhammers, pile drivers, hoe rams) are used in the vicinity of nearby sensitive land uses.

Impact d2: Demolition and construction activities facilitated by the Plan may expose persons to excessive vibration levels.

The City of Gilroy does not establish quantitative noise limits for vibration due to demolition or construction activities occurring in the City. Table 14 presents typical vibration source levels for

construction equipment. Heavy tracked vehicles (e.g., bulldozers or excavators) can generate distinctly perceptible ground-borne vibration levels when this equipment operates within approximately 25 feet of sensitive land uses. Impact pile drivers can generate distinctly perceptible ground-borne vibration levels at distances up to about 100 feet, and may exceed building damage thresholds within 25 feet of any building, and within 50 to 100 feet of a historical building, or building in poor condition.

TABLE 14 Vibration Source Levels for Construction Equipment

Equipment		**PPV at 25 ft. (in/sec)**	**Approximate L_v at 25 ft. (VdB)**
Pile Driver (Impact)	upper range	1.158	112
	typical	0.644	104
Pile Driver (Sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop		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: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, October 2018.

The implementation of Proposed General Plan Policy PH 6.12 would reduce the potential vibration impacts associated with demolition and construction activities to a **less-than-significant** level by establishing safe limits to protect structures from potential damage and would minimize vibration impacts on people and businesses.

PH 6.12 Vibration Impact Assessment

Require a vibration impact assessment for proposed development projects in which heavy-duty construction equipment would be used (e.g. pile driving, bulldozing) within 200 feet of an existing structure or sensitive receptor. If applicable, require all feasible mitigation measures to be implemented to ensure that no damage or disturbance to structures or sensitive receptors would occur. [New Policy]