4.11 NOISE

This chapter describes the regulatory framework and existing conditions of the City of San Mateo Environmental Impact Report (EIR) Study Area and evaluates the potential noise impacts from adopting and implementing the proposed General Plan 2040 and proposed Climate Action Plan (CAP) update, and from future development and activities that could occur under the proposed project. A summary of the relevant regulatory framework and existing conditions is followed by a discussion of potential impacts and cumulative impacts related to implementation of the proposed General Plan. Noise monitoring and modeling data are included as Appendix D, *Noise Data*, of this Draft EIR.

4.11.1 ENVIRONMENTAL SETTING

4.11.1.1 NOISE AND VIBRATION FUNDAMENTALS

Noise can be generally defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude. When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. Therefore, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements.

Noise Exposure and Community Noise

Noise exposure is a measure of noise over a period of time. Noise level is a measure of noise at a given instant in time. Community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual receptor. These successive additions of sound to the community noise environment vary the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors.

Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise include the average hourly noise level (in L_{eq}) and the average daily noise levels/community noise equivalent level (in L_{dn}/CNEL). The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL are measures of community noise. Each is applicable to this analysis and defined as follows:

- **Equivalent Noise Level (L_{eq})** is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
- **L_{max}** is the instantaneous maximum noise level for a specified period of time.
- **L_{min}** is the minimum, instantaneous noise level experienced during a given period of time.
- **Day-Night Average (L_{dn})** is a 24-hour average L_{eq} with a 10-dBA "weighting" added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
- **Community Noise Equivalent Level (CNEL)** is a 24-hour average L_{eq} with a 5-dBA weighting during the hours of 7:00 pm to 10:00 pm and a 10-dBA weighting added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the evening and nighttime, respectively.

Table 4.11-1, *Common Noise Descriptors,* provides a list of other common acoustical descriptors.

TABLE 4.11-1 COMMON NOISE DESCRIPTORS

Descriptor	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.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons 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 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.

TABLE 4.11-1 COMMON NOISE DESCRIPTORS

Descriptor	Definition
Frequency, Hertz (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 sounds 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 acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
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	A 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level, CNEL	A 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
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 on its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.

Source: ECORP, 2023.

Sound Measurement

As previously described, sound pressure is measured through the A-weighted measure to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies.

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. On a logarithmic scale, an increase of 10 dBA is 10 times more intense than 1 dBA, 20 dBA is 100 times more intense, and 30 dBA is 1,000 times more intense. A sound as soft as human breathing is about 10 times greater than 0 dBA. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud). When the standard logarithmic dB is A-weighted (dBA), an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be three dB higher than one source under the same conditions.[1] For example, a 65-dBA source of sound, such as a truck, when joined by another 65 dBA source results in a sound amplitude of 68 dBA, not 130 dBA (i.e., doubling the source strength increases the sound pressure by three dBA). Under the decibel scale, three sources of equal loudness together would produce an increase of five dBA.

Typical noise levels associated with common noise sources are depicted in Figure 4.11-1, *Common Noise Levels*.

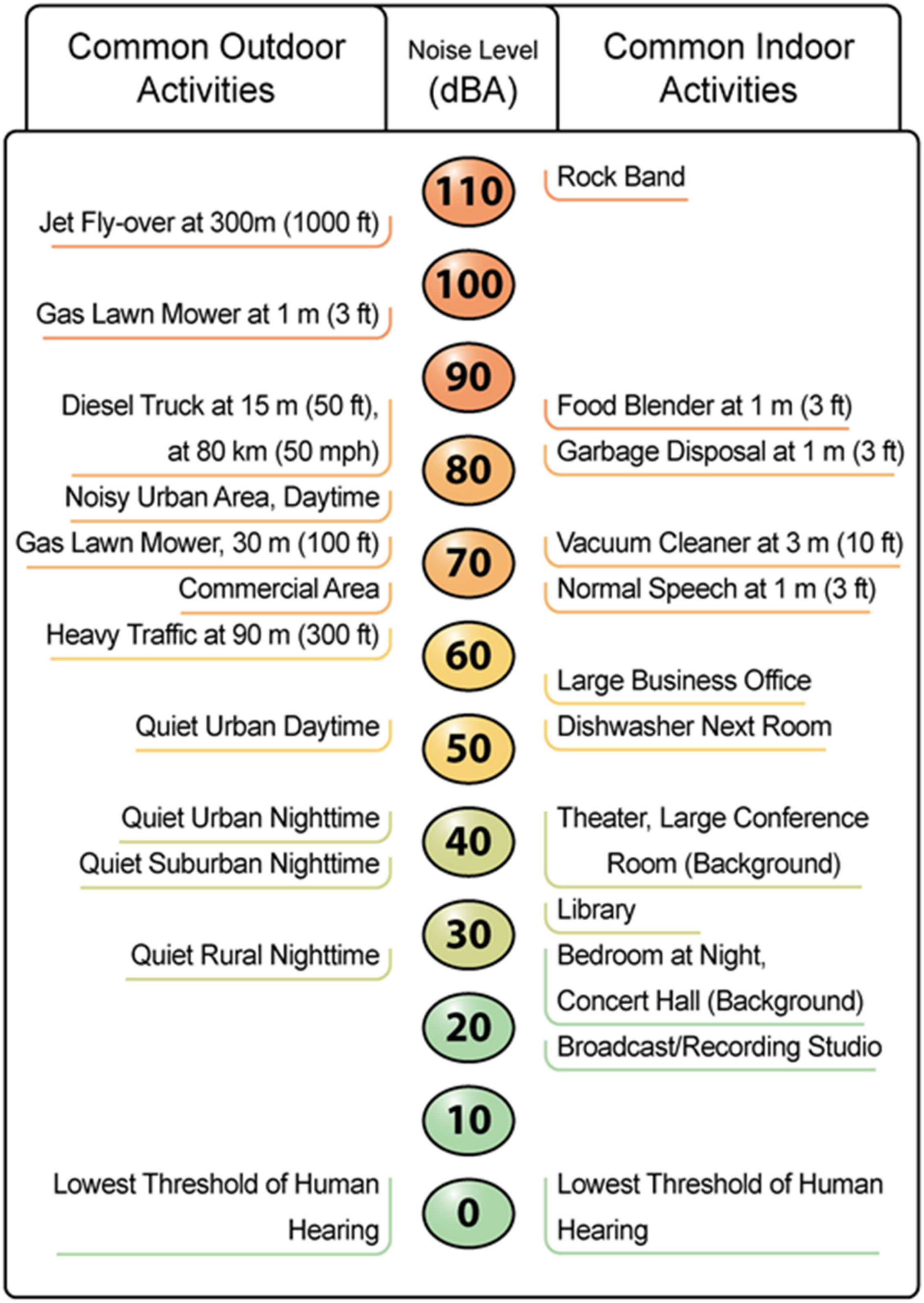
Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time it is less than this level. This level also represents the level exceeded 30 minutes in an hour. Similarly, the L_2, L_8 and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time, or 1, 5, and 15 minutes per hour. These "L_n" values are typically used to demonstrate compliance for stationary noise sources with a city's noise ordinance, as discussed below. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law requires that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). As described above, the CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 p.m. to 10:00 p.m. and 10 dBA for the hours from 10:00 p.m. to 7:00 a.m. The L_{dn} descriptor uses the same methodology but only adds a 10 dBA increment between 10:00 p.m. and 7:00 a.m. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher).

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

[1] Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment*, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 5, 2023.



Source: California Department of Transportation (Caltrans) 2020a.

Figure 4.11-1
Common Noise Levels

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL or L_{dn} is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in A-weighted noise levels (dBA), the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response is expected. An increase of 5 dBA is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

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 that 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.

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 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.

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA could result in permanent hearing damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain.

Noise Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks, and airplanes, as well as stationary sources such as construction sites, machinery, and industrial operations. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6.0 dB (dBA) for each doubling of distance from a stationary or point source.[2] Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3.0 dBA for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. [3] No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3.0 dB per doubling of distance is assumed.[4]

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about 5 dBA,[5] while a solid wall or berm generally reduces noise levels by 10 to 20 dBA.[6] However, noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction of 35 dBA or greater.[7] To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the “line of sight” between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend lengthwise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver.

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[2] Federal Highway Administration, June 2017, *Construction Noise Handbook,* https://www.fhwa.dot.gov/Environment/noise/construction_noise/handbook/handbook02.cfm, accessed April 5, 2023.

[3] Federal Highway Administration, June 2017, *Construction Noise Handbook,* https://www.fhwa.dot.gov/Environment/noise/construction_noise/handbook/handbook02.cfm, accessed April 5, 2023.

[4] Federal Highway Administration, February 2017, *Effective Noise Control During Nighttime Construction*, http://ops.fhwa.dot.gov/wz/workshops/accessible/schexnayder_paper.htm., accessed April 5, 2023.

[5] Federal Highway Administration, 2006, Roadway Construction Noise Model.

[6] Federal Highway Administration, February 2017, *Effective Noise Control During Nighttime Construction*, http://ops.fhwa.dot.gov/wz/workshops/accessible/schexnayder_paper.htm., accessed April 5, 2023.

[7] Western Electro-Acoustic Laboratory, Inc. 2000, *Sound Transmission Sound Test Laboratory Report No. TL 96-186*.

The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows.[8] The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.[9] Generally, in exterior noise environments ranging from 60 dBA CNEL to 65 dBA CNEL, interior noise levels can typically be maintained below 45 dBA, a typical residential interior noise standard, with the incorporation of an adequate forced air mechanical ventilation system in each residential building, and standard thermal-pane residential windows/doors with a minimum rating of Sound Transmission Class (STC) 28.[10] In exterior noise environments of 65 dBA CNEL or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods is often required to meet the interior noise level limit. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA CNEL with proper wall construction techniques following California Building Code (CBC) methods, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

Vibration Fundamentals

Vibration is an oscillating motion in the earth. Like noise, vibration is transmitted in waves, but through the earth or solid objects. Unlike noise, vibration is typically of a frequency that is felt rather than heard. Sources of earthborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or humanmade causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions).

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. As with noise, vibration can be described by both its amplitude and frequency. Amplitude can be characterized in three ways—displacement, velocity, and acceleration. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); 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.

PPV is generally accepted as the most appropriate descriptor for evaluating the potential for building damage. For human response, however, an average vibration amplitude is more appropriate because it takes time for the human body to respond to the excitation (the human body responds to an average vibration amplitude, not a peak amplitude). Because the average particle velocity over time is zero, the RMS amplitude is typically used to assess human response. The RMS value is the average of the amplitude squared over time, typically a 1-second period.[11]

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[8] California Department of Transportation, 2002, *California Airport Land Use Planning Handbook.*

[9] Harris Miller, Miller & Hanson Inc., 2006, *Transit Noise and Vibration Impact Assessment, Final Report.*

[10] STC is an integer rating of how well a building partition attenuates airborne sound. In the U.S., it is widely used to rate interior partitions, ceilings, floors, doors, windows, and exterior wall configurations.

[11] Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment*, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 5, 2023.

Table 4.11-2, *Human Reaction and Damage to Buildings from Typical Vibration Levels,* displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, 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 groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

TABLE 4.11-2 HUMAN REACTION AND DAMAGE TO BUILDINGS FROM TYPICAL VIBRATION LEVELS

Vibration Level Peak Particle Velocity (in/sec)	Vibration Level Vibration Velocity Level (VdB)	Human Reaction	Effect on Buildings
0.006–0.019	64-74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Threshold at which there is a risk of architectural damage to extremely fragile historic buildings, ruins, ancient monuments
0.10	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Threshold at which there is a risk of architectural damage to fragile buildings. Virtually no risk of architectural damage to normal buildings
0.25	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to historic and some old buildings
0.3	96	Vibrations may begin to feel severe to people in buildings	Threshold at which there is a risk of architectural damage to older residential structures
0.5	103	Vibrations considered unpleasant by people subjected to continuous vibrations	Threshold at which there is a risk of architectural damage to new residential structures and Modern industrial/commercial buildings

Source: California Department of Transportation, April 2020, *Transportation and Construction Vibration Guidance Manual*, https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf, accessed April 5, 2023. Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment*, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 5, 2023.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. For instance, heavy-duty trucks generally generate groundborne vibration velocity levels of 0.006 PPV at 50 feet under typical circumstances, which as identified in Table 4.11-2 is considered very unlikely to cause damage to buildings of any type. Common sources for groundborne vibration are planes, trains, and construction activities such as earth moving that requires the use of heavy-duty equipment.

The way in which vibration is transmitted through the earth is called propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

4.11.1.2 REGULATORY FRAMEWORK

Federal Regulations

Federal Highway Administration

Proposed federal or federal-aided highway construction projects at a new location, or the physical alteration of an existing highway that significantly changes the horizontal or vertical alignment or increases the number of through-traffic lanes, require an assessment of noise and consideration of noise abatement per 23 Code of Federal Regulations Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." The Federal Highway Administration (FHWA) has adopted noise abatement criteria for sensitive receivers—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}.[12]

US Environmental Protection Agency

In addition to FHWA standards, the United States Environmental Protection Agency (USEPA) has identified the relationship between noise levels and human response. The USEPA has determined that over a 24-hour period, an L_{eq} of 70 dBA will result in some hearing loss. Interference with activity and annoyance will not occur if exterior levels are maintained at an L_{eq} of 55 dBA and interior levels at or below 45 dBA. These levels are relevant to planning and design and useful for informational purposes, but they are not land use planning criteria because they do not consider economic cost, technical feasibility, or the needs of the community; therefore, they are not mandated.

The USEPA also set 55 dBA L_{dn} as the basic goal for exterior residential noise intrusion. However, other federal agencies, in consideration of their own program requirements and goals, as well as the difficulty of actually achieving a goal of 55 dBA L_{dn}, have settled on the 65 dBA L_{dn} level as their standard. At 65 dBA L_{dn}, activity interference is kept to a minimum, and annoyance levels are still low. It is also a level that can realistically be achieved.

[12] California Department of Transportation, April 2020, *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects*, https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/traffic-noise-protocol-april-2020-a11y.pdf, accessed October 4, 2022.

United States Department of Housing and Urban Development

The United States Department of Housing and Urban Development (HUD) has set the goal of 65 dBA L_{dn} as a desirable maximum exterior standard for residential units developed under HUD funding. (This level is also generally accepted within the State of California.) Although HUD does not specify acceptable interior noise levels, standard construction of residential dwellings typically provides 20 dBA or more of attenuation with the windows closed. Based on this premise, the interior L_{dn} should not exceed 45 dBA.

Federal Interagency Committee on Noise

The Federal Interagency Committee on Noise (FICON) thresholds of significance assist in the evaluation of increased traffic noise. The 2000 FICON findings provide guidance as to the significance of changes in ambient noise levels due to transportation noise sources. FICON recommendations are based on studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. FICON's measure of substantial increase for transportation noise exposure is as follows:

- If the existing ambient noise levels at existing and future noise-sensitive land uses (e.g., residential, etc.) are less than 60 dBA CNEL and the project creates a readily perceptible 5 dBA CNEL or greater noise level increase and the resulting noise level would exceed acceptable exterior noise standards; or
- If the existing noise levels range from 60 to 65 dBA CNEL and the project creates a barely perceptible 3 dBA CNEL or greater noise level increase and the resulting noise level would exceed acceptable exterior noise standards; or
- If the existing noise levels already exceed 65 dBA CNEL, and the project creates a community noise level increase of greater than 1.5 dBA CNEL.

National Institute of Occupational Safety and Health

A division of the US Department of Health and Human Services, the National Institute for Occupational Safety and Health (NIOSH) has established a construction-related noise level threshold as identified in the Criteria for a Recommended Standard: Occupational Noise Exposure prepared in 1998. NIOSH identifies a noise level threshold based on the duration of exposure to the source. The NIOSH construction-related noise level threshold starts at 85 dBA for more than 8 hours per day; for every 3-dBA increase, the exposure time is cut in half. This reduction results in noise level thresholds of 88 dBA for more than 4 hours per day, 92 dBA for more than 1 hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. The intention of these thresholds is to protect people from hearing losses resulting from occupational noise exposure.

Aircraft Noise Standards

The Federal Aviation Administration (FAA) Advisory Circular Number 150 5020 2, entitled "Noise Assessment Guidelines for New Helicopters" recommends the use of a cumulative noise measure, the 24-hour equivalent sound level [L_{eq}(24)], so that the relative contributions of the heliport and other sound sources within the community may be compared. The L_{eq}(24) is similar to the L_{dn} used in assessing the impacts of fixed wing aircraft. The helicopter $L_{eq}(24)$ values are obtained by logarithmically adding the single-event level (SEL) values over a 24-hour period.

Public Law 96 193 also directs the FAA to identify land uses which are "normally compatible" with various levels of noise from aircraft operations. Because of the size and complexity of many major hub airports and their operations, Federal Aviation Regulation Part 150 identifies a large number of land uses and their attendant noise levels. These recommended noise levels are included in Table 4.11-3, *Federal Aviation Administration Normally Compatible Community Sound Levels*.

TABLE 4.11-3 FEDERAL AVIATION ADMINISTRATION NORMALLY COMPATIBLE COMMUNITY SOUND LEVELS

Type of Area	L_{eq} (24)
Residential	
Suburban	57
Urban	67
City	72
Commercial	72
Industrial	77

Notes: The L_{eq} is the Equivalent Continuous Noise Level, which describes sound levels that vary over time, resulting in a single decibel value that takes into account the total sound energy over the period of time of interest.
Source: Federal Aviation Administration (FAA) Advisory Circular Number 150 5020 2, 1983.

State Regulations

General Plan Guidelines

The State of California, through its General Plan Guidelines, discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels, expressed in CNEL. A conditionally acceptable designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates that standard construction can occur with no special noise reduction requirements. The General Plan Guidelines provide cities with recommended community noise and land use compatibility standards that can be adopted or modified at the local level based on conditions and types of land uses specific to that jurisdiction.

California Building Code

The State of California provides a minimum standard for building design through Title 24, Part 2, of the California Code of Regulations (CCR), commonly referred to as the "California Building Code" (CBC). The CBC is updated every three years. It is generally adopted on a jurisdiction-by-jurisdiction basis, subject to further modification based on local conditions. The City of San Mateo regularly adopts each new CBC update under the San Mateo Municipal Code (SMMC) Chapter 23.08, *Building Code*. CBC Part 2, Volume 1, Chapter 12, Section 1206.4, *Allowable Interior Noise Levels*, requires that interior noise levels attributable to exterior sources not exceed 45 dBA in any habitable room. The noise metric is evaluated as either the day-night average sound level (L_{dn}) or the community noise equivalent level (CNEL), whichever is consistent with the noise element of the local general plan.

The State of California's noise insulation standards for non-residential uses are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 11, California Green Building Standards Code (CALGreen). CALGreen noise standards are applied to new or renovation construction projects in California to control interior noise levels resulting from exterior noise sources. Proposed projects may use either the prescriptive method (Section 5.507.4.1) or the performance method (5.507.4.2) to show compliance. Under the prescriptive method, a project must demonstrate transmission loss ratings for the wall and roof-ceiling assemblies and exterior windows when located within a noise environment of 65 dBA CNEL or higher. Under the performance method, a project must demonstrate that interior noise levels do not exceed 50 dBA $L_{eq(1hr)}$.

Airport Noise Standards

California Code of Regulations Title 21, Section 5012, establishes 65 dBA CNEL as the acceptable level of aircraft noise for persons living in the vicinity of airports. Noise-sensitive land uses are generally incompatible in locations where the aircraft exterior noise level exceeds 65 dBA CNEL, unless an aviation easement for aircraft noise has been acquired by the airport proprietor. Assembly Bill (AB) 2776 requires any person who intends to sell or lease residential properties in an airport influence area to disclose that fact to the person buying the property.

Regional Regulations

The Airport Land Use Compatibility Plan (ALUCP) covering all three public airports in San Mateo County was approved by the City/County Association of Governments of San Mateo County (C/CAG) in December 1996. The C/CAG is the Airport Land Use Commission (ALUC) responsible for promoting land use compatibility around the County's airports in order to minimize public exposure to excessive noise and safety hazards. The C/CAG has since adopted updated ALUCPs for San Francisco International Airport (November 2012), Half Moon Bay Airport (September 2014), and San Carlos Airport (October 2015).[13] The updated ALUCPs describe a series of land use safety and compatibility zones and associated guidelines for development around each airport that are intended to prevent development that is incompatible with airport operations. These regulations include height restrictions based on proximity to the airport and flight patterns. The ALCUPs delineate two Airport Influence Areas (AIA), Area A and Area B, within proximity to each airport. As a requirement for development located in Area A, the presence of existing airports within two miles of the property must be disclosed in the notice of intention to offer the property for sale. For development located within Area B of the AIA, the C/CAG Board shall exercise its statutory duty to review proposed land development proposals, among other plans, ordinances, amendments, and actions.

[13] City/County Association of Governments of San Mateo County, 2022, Airport Land Use, https://ccag.ca.gov/plansreportslibrary-2/airport-land-use/, accessed October 4, 2022.

Local Regulations

San Mateo General Plan 2030

The City of San Mateo General Plan 2030 goals, policies, and actions that are relevant to noise are primarily in the Noise Element. As part of the proposed project, some existing General Plan goals, policies, and actions would be amended, substantially changed, or new policies would be added. Applicable goals, policies, and actions are identified and assessed for their effectiveness and potential to result in an adverse physical impact later in this chapter under Section 4.11.3, *Impact Discussion*.

City of San Mateo Municipal Code

The SMMC includes various directives pertaining to noise and vibration. The SMMC is organized by title, chapter, and section, and in some cases, articles. Provisions related to noise and vibration impacts are included in Title 7, *Health, Sanitation, and Public Nuisance*, and Title 27, *Zoning.*

Chapter 7.30, *Noise Regulations*, establishes regulations to protect the inhabitants of the city against all forms of nuisances. Section 7.30.030, *Designated Noise Zones*, assigns the following noise zones:

- Noise Zone 1 includes property in any single-family residential zone, including adjacent parks and open space
- Noise Zone 2 includes all property in any commercial/mixed residential, multi-family residential, specific plan district or Planned Unit Development
- Noise Zone 3 includes all property in any commercial or central business district
- Noise Zone 4 includes all property in any manufacturing or industrial zone.

Section 7.30.040, *Maximum Permissible Sound Levels*, establishes noise level standards, which are shown in Table 4.11-4, *City of San Mateo Municipal Code Noise Level Standards*.

TABLE 4.11-4 CITY OF SAN MUNICIPAL CODE MATEO NOISE LEVEL STANDARDS

Noise Zone	Time Period	Noise Level (dB)
Noise Zone 1	10 p.m. – 7 a.m.	50
	7 a.m. – 10 p.m.	60
Noise Zone 2	10 p.m. – 7 a.m.	55
	7 a.m. – 10 p.m.	60
Noise Zone 3	10 p.m. – 7 a.m.	60
	7 a.m. – 10 p.m.	65
Noise Zone 4	Anytime	70

Source: City of San Mateo Municipal Code, 2023.

Section 27.56.090, *Noise*, prohibits sounds pressure level of an individual operation or plant (other than the operation of motor vehicles and other transportation facilities) exceed the decibel levels at the designated octave bands shown in Table 4.11-5, *City of San Mateo Municipal Code Sound Level Limits*.

TABLE 4.11-5 CITY OF SAN MATEO MUNICIPAL CODE SOUNDS LEVEL LIMITS

	Sound Level	
Octave Band Cycles/Second	Residence Sound Level [a]	Commercial Sound Level [b]
0 to 75	67	73
75 to 150	62	68
150 to 300	58	64
300 to 600	54	60
600 to 1200	49	55
1200 to 2400	45	51
2400 to 4800	41	47
Above 4800	37	43

Notes:
a. Maximum permitted sound level in decibels along residence district boundaries or 125 feet from plant or operation property line.
b. Maximum permitted sound level in decibels along commercial district boundaries or 125 feet from plant or operation property line.
Source: City of San Mateo Municipal Code, 2023.

4.11.1.3 EXISTING CONDITIONS

Noise-Sensitive Land Uses

Some land uses are considered more sensitive to noise levels than others due to the duration and nature of time people spend at these uses. In general, residences are considered most sensitive to noise as people spend extended periods of time in them, including the nighttime hours. Therefore, noise impacts affecting rest and relaxation, sleep, and communication are highest at residential uses. Schools, hotels, hospitals, nursing homes, and recreational uses are also considered to be more sensitive to noise, as activities at these land uses involve rest, recovery, relaxation, and concentration, and increased noise levels tend to disrupt such activities. Places such as churches, libraries, and cemeteries, where people tend to pray, study, and/or contemplate, are also sensitive to noise but, due to the limited time people spend at these uses, impacts are usually tolerable. Commercial and industrial uses are considered the least noise sensitive.

Existing Noise Environment

Noise sources are typically categorized as mobile or stationary. Most mobile sources are transportation related from vehicles operating on roadways, fixed railways, and aircraft and airport operations. Off-road construction equipment is also considered a mobile source. Stationary noise sources typically include machinery; fabrication; heating, ventilation, and air conditioning systems; compressors and generators; and landscape maintenance equipment. Stationary noise sources generated by light industrial and commercial activities can result in noise-related land use conflicts when these operations (e.g., loading docks or equipment operations) are adjacent to residential land uses (collocation). The dominant noise sources within San Mateo includes community noise from automobile traffic, most potently from US Highway 101, State Route 92 (SR-92), Interstate 280 (I-280), El Camino Real, Hillsdale Boulevard, and 3rd Street, and the Caltrain/Union Pacific (UPRR) rail line.

Existing Community Noise

Existing community noise conditions in San Mateo were documented during a noise monitoring survey completed in late May and early June 2012. The EIR preparers resurveyed a sampling of several individual noise monitoring locations in November 2022. These noise measurements are representative of typical existing noise exposure during the daytime. Existing noise measurements were taken at 10 locations throughout the city. All measurements were conducted during regular school hours. The sound level meters used (Larson Davis LxT) for noise monitoring satisfy the American National Standards Institute (ANSI) standard for Type 1 instrumentation.[14] The short-term sound level meter was set to “slow” response and “A” weighting (dBA). The meter was calibrated prior to and after the monitoring period. All measurements were at least 5 feet above the ground and away from reflective surfaces. Measurement locations, described below, are shown in Figure 4.11-2, *Existing Noise Measurement Locations*, and the results are reported in Table 4.11-6, *Existing (Baseline) Noise Measurements*.

- **Location 1 (L-1)** was next to 792 E. Poplar Street (San Mateo High School). The measurement location was located approximately 20 feet south of the nearest travel centerline. A 15-minute noise measurement began at 3:16 PM on Thursday, November 17, 2022. The noise environment is characterized primarily by cars traveling. Noise levels generally ranged from 61 dBA to 68 dBA.
- **Location 2 (L-2)** was next to 100 W. Poplar Street (residence). The measurement location was approximately 15 feet east of the nearest southbound travel lane centerline. A 15-minute noise measurement began at 3:50 PM on Thursday, November 17, 2022. The noise environment is characterized primarily by cars traveling. Traffic noise levels generally ranged from 50 dBA to 59 dBA.
- **Location 3 (L-3)** was next to 725 Patricia Avenue (residence). The measurement location was approximately 15 feet east of the nearest northbound travel lane centerline. A 15-minute noise measurement began at 4:18 PM on Thursday, November 17, 2022. The noise environment is characterized primarily by cars passing by as well as highway and train noise. Traffic noise levels generally ranged from 47 dBA to 54 dBA.
- **Location 4 (L-4)** was next to 1405 South Delaware Street (residence). The measurement location was approximately 15 feet east of the nearest southbound travel lane centerline. A 15-minute noise measurement began at 7:39 AM on Friday, November 18, 2022. The noise environment is characterized primarily by cars passing by as well as highway and train noise. Traffic noise levels generally ranged from 63 dBA to 71 dBA.
- **Location 5 (L-5)** was next to 1501 South Norfolk Street (residence). The measurement location was approximately 15 feet east of the nearest northbound travel lane centerline. A 15-minute noise measurement began at 4:47 PM on Thursday, November 17, 2022. The noise environment is characterized primarily by cars passing by as well as highway and train noise. Traffic noise levels generally ranged from 63 dBA to 70 dBA.
- **Location 6 (L-6)** was next to Mariners Island and Armada Way (residence). The measurement location was approximately 15 feet east of the nearest southbound travel lane centerline. A 15-minute noise measurement began at 5:15 PM on Thursday, November 17, 2022. The noise

[14] Monitoring of ambient noise was performed using Larson-Davis model LxT sound level meters.

environment is characterized primarily by cars passing by. Traffic noise levels generally ranged from 57 dBA to 71 dBA.

- **Location 7 (L-7)** was next to 512 19th Avenue (residence). The measurement location was approximately 15 feet east of the nearest southbound travel lane centerline. A 15-minute noise measurement began at 8:08 AM on Friday, November 18, 2022. The noise environment is characterized primarily by cars passing by and highway noise. Traffic noise levels generally ranged from 66 dBA to 70 dBA.
- **Location 8 (L-8)** was next to Franklin Parkway (residence). The measurement location was approximately 15 feet east of the nearest southbound travel lane centerline. A 15-minute noise measurement began at 8:41 AM on Friday, November 18, 2022. The noise environment is characterized primarily by cars traveling. Traffic noise levels generally ranged from 57 dBA to 70 dBA.
- **Location 9 (L-9)** was next to 506 Alameda de las Pulgas (residence). The measurement location was approximately 15 feet east of the nearest northbound travel lane centerline. A 15-minute noise measurement began at 9:08 AM on Friday, November 18, 2022. The noise environment is characterized primarily by cars traveling. Traffic noise levels generally ranged from 59 dBA to 68 dBA.
- **Location 10 (L-10)** was next to 931 Hillsdale Boulevard (residence). The measurement location was approximately 15 feet east of the nearest westbound travel lane centerline. A 15-minute noise measurement began at 9:53 AM on Friday, November 18, 2022. The noise environment is characterized primarily by cars passing by as well as highway and train noise. Traffic noise levels generally ranged from 57 dBA to 69 dBA.

As shown in Table 4.11-6, the ambient recorded noise levels range from 54.4 dBA to 67.3 dBA L_{eq} over the course of the 10 short-term noise measurements taken throughout San Mateo from November 17, 2022 to November 18, 2022. As described, the noise environment throughout the city is characterized primarily by automobile noise. Train noise from the rail corridor is another major source of noise in San Mateo.

Source: Esri, 2023. ECORP Consulting, Inc., 2023.

Figure 4.11-2
Existing Noise Measurement Locations

TABLE 4.11-6 EXISTING (BASELINE) NOISE MEASUREMENTS

Location Number	Location Description	L_{eq} dBA	L_{min} dBA	L_{max} dBA	Time
1	792 E. Poplar Avenue, across from San Mateo High School	**64.0**	47.2	74.0	3:16 pm – 3:31 pm (11/17/2022)
2	100 W. Poplar Avenue, approximately 540 feet west of El Camino Real	**59.1**	39.7	73.6	3:50 pm – 4:05 pm (11/17/2022)
3	725 Patricia Avenue, approximately 200 feet southeast of Dakota Avenue	**54.4**	44.3	75.4	4:18 pm – 4:34 pm (11/17/2022)
4	1405 S. Delaware Street	**67.0**	49.0	78.4	7:39 am – 7:54 am (11/18/2022)
5	1501 S. Norfolk Street	**66.1**	48.7	77.4	4:47 pm – 5:02 pm (11/17/2022)
6	Mariners Island Boulevard / Armada Way Intersection	**65.2**	46.4	77.5	5:15 pm – 5:30 pm (11/17/2022)
7	512 19th Avenue, approximately 200 feet south of State Route 92	**67.3**	63.3	76.3	8:08 am – 8:23 am (11/18/2022)
8	Franklin Parkway, south of Franklin Templeton Campus	**64.8**	43.5	82.6	8:41 am – 8:56 am (11/18/2022)
9	Alameda de las Pulgas / Virginia Avenue Intersection	**63.5**	47.0	72.6	9:08 am – 9:23 am (11/18/2022)
10	931 W. Hillsdale Boulevard, approximately 175 feet north of Verdun Avenue	**61.6**	37.5	76.0	9:53 am – 10:08 am (11/18/2022)

Notes: L_{eq} is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. L_{min} is the minimum noise level during the measurement period and L_{max} is the maximum noise level during the measurement period.
Source: Measurements were taken by PlaceWorks with a Larson Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator. See Appendix D1 of this Draft EIR for noise measurement outputs.

Existing Traffic Noise

Traffic noise levels depend primarily on the speed of the traffic and the volume of trucks. The primary source of noise from automobiles is high-frequency tire noise, which increases with speed. Trucks and older automobiles produce engine and exhaust noise, and trucks can also generate wind noise. Tire noise from cars is produced at ground level (i.e., where the tire contacts the road), whereas truck noise can be generated at a height of 10 to 15 feet above the road, depending on the height of the exhaust pipe(s) and engine. As a result, sound walls are not as effective at reducing truck noise unless they are very tall.

The dominant noise source within San Mateo is vehicle traffic on its roadways, primarily US Highway 101, SR-92, I-280, El Camino Real, Hillsdale Boulevard, and 3rd Street. Existing roadway noise levels were calculated for roadway segments throughout San Mateo. This task was accomplished using the FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108) (see Appendix D2 of this Draft EIR) and traffic volumes from Kittleson Transportation Consultants. The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data shows that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average daily noise levels along these roadway segments are presented in Table 4.11-7, *Existing Roadway Noise Levels*.

TABLE 4.11-7 EXISTING ROADWAY NOISE LEVELS

Roadway Segment	Volume (Average Daily Trips)	L_{dn} at 50 Feet	Distance to L_{dn} Contour (feet)			
			70 dBA	65 dBA	60 dBA	55 dBA
US Highway 101*						
All of San Mateo	217,846	**80.3**	533 ft	1,686 ft	5,332 ft	16,861 ft
Interstate 280**						
All of San Mateo	93,000	**84.7**	1,470 ft	4,648 ft	14,699 ft	46,481 ft
State Route 92						
Between City Limits & Mariner's Island Boulevard	106,668	**80.4**	549 ft	1,737 ft	5,493 ft	17,372 ft
Between Mariner's Island Boulevard & US Highway 101 Junction	156,688	**84.7**	1,462 ft	4,623 ft	14,619 ft	46,230 ft
Between US Highway 101 & El Camino Real	112,404	**81.1**	648 ft	2,050 ft	6,482 ft	20,497 ft
Between El Camino Real & Alameda de las Pulgas	95,627	**79.2**	418 ft	1,321 ft	4,179 ft	13,214 ft
Between Alameda de las Pulgas & Hillsdale Boulevard	79,482	**78.4**	347 ft	1,098 ft	3,473 ft	10,983 ft
Between Hillsdale Boulevard & City Limits	69,948	**77.9**	306 ft	967 ft	3,047 ft	9,666 ft
1st Avenue						
East of B Street	2,815	**57.2**	-	-	-	82 ft
West of B Street	1,890	**55.4**	-	-	-	55 ft
2nd Avenue						
East of B Street	3,525	**58.1**	-	-	33 ft	103 ft
Between B Street & Ellsworth Avenue	4,138	**58.3**	-	-	33 ft	106 ft
Between Ellsworth Avenue & San Mateo Drive	4,923	**59.6**	-	-	45 ft	144 ft
Between San Mateo Drive & El Camino Real	7,698	**61.5**	-	-	71 ft	225 ft
3rd Avenue						
East of Humboldt Street	18,685	**65.4**	-	55 ft	172 ft	545 ft
Between Humboldt Street & Delaware Street	8,978	**62.2**	-	-	83 ft	262 ft
Between Delaware Street & B Street	5,970	**60.4**	-	-	55 ft	174 ft
Between B Street & Ellsworth Avenue	4,650	**59.3**	-	-	43 ft	136 ft
Between Ellsworth Avenue & San Mateo Drive	4,895	**59.6**	-	-	45 ft	143 ft
Between San Mateo Drive & El Camino Real	5,353	**59.9**	-	-	49 ft	156 ft
4th Avenue						
East of Humboldt Street	20,565	**65.8**	-	60 ft	190 ft	600 ft

TABLE 4.11-7 EXISTING ROADWAY NOISE LEVELS

Roadway Segment	Volume (Average Daily Trips)	L_{dn} at 50 Feet	Distance to L_{dn} Contour (feet)			
			70 dBA	65 dBA	60 dBA	55 dBA
Between Humboldt Street & Delaware Street	12,408	**63.6**	-	36 ft	115 ft	362 ft
Between Delaware Street & B Street	7,348	**61.3**	-	-	68 ft	214 ft
Between B Street & San Mateo Drive	6,458	**60.8**	-	-	60 ft	188 ft
Between San Mateo Drive & El Camino Real	5,948	**60.4**	-	-	55 ft	174 ft
5th Avenue						
East of Delaware Street	4,195	**58.9**	-	-	39 ft	122 ft
Between Delaware Street & B Street	6,380	**60.7**	-	-	59 ft	186 ft
Between B Street & San Mateo Drive	7,018	**61.1**	-	-	65 ft	205 ft
Between San Mateo Drive & El Camino Real	7,115	**61.2**	-	-	66 ft	208 ft
9th Avenue						
East of Delaware Street	4,665	**59.4**	-	-	43 ft	136 ft
Between Delaware Street & B Street	7,923	**61.7**	-	-	73 ft	231 ft
Between B Street and El Camino Real	5,860	**60.3**	-	-	79 ft	251 ft
31st Avenue						
Between Delaware Street & El Camino Real	5,698	**59.2**	-	-	42 ft	133 ft
West of El Camino Real	8,600	**62.0**	-	-	79 ft	251 ft
42nd Avenue						
West of El Camino Real	4,750	**59.4**	-	-	44 ft	139 ft
Alameda de las Pulgas						
Between Crystal Springs Road & 20th Avenue	19,180	**67.2**	-	83 ft	262 ft	828 ft
Between 20th Avenue & Hillsdale Boulevard	11,735	**65.1**	-	51 ft	160 ft	506 ft
Concar Drive						
East of Grant Street	6,390	**62.0**	-	-	80 ft	252 ft
Between Grant Street & Delaware Street	10,175	**64.3**	-	-	135 ft	427 ft
Between Delaware Street & State Route 92 Ramps	14,735	**65.9**	-	62 ft	196 ft	619 ft
West of State Route 92 Ramps	2,115	**57.2**	-	-	-	83 ft
Crystal Springs Road						
West of El Camino Real	5,920	**60.4**	-	-	55 ft	173 ft
B Street						
North of 1st Avenue	4,285	**59.0**	-	-	40 ft	125 ft
Between 1st Avenue & 2nd Avenue	4,123	**58.8**	-	-	38 ft	120 ft

NOISE

TABLE 4.11-7 EXISTING ROADWAY NOISE LEVELS

Roadway Segment	Volume (Average Daily Trips)	L_{dn} at 50 Feet	Distance to L_{dn} Contour (feet)			
			70 dBA	65 dBA	60 dBA	55 dBA
Between 2nd Avenue & 3rd Avenue	4,070	**58.8**	-	-	38 ft	119 ft
Between 3rd Avenue & 4th Avenue	3,948	**58.6**	-	-	36 ft	115 ft
Between 4th Avenue & 5th Avenue	3,275	**57.8**	-	-	-	96 ft
Between 5th Avenue & 9th Avenue	4,228	**58.9**			39 ft	123 ft
South of 9th Avenue	5,100	**59.7**			47 ft	149 ft
Baldwin Avenue						
East of El Camino Real	5,070	**59.7**	-	-	47 ft	148 ft
West of El Camino Real	3,730	**58.4**	-	-	34 ft	109 ft
Delaware Street						
Between Peninsula Avenue & Poplar Avenue	8,048	**61.7**	-	-	74 ft	235 ft
Between Poplar Avenue & 3rd Avenue	8,663	**62.0**	-	-	80 ft	253 ft
Between 3rd Avenue & 4th Avenue	11,430	**63.2**	-	33 ft	106 ft	334 ft
Between 4th Avenue & 5th Avenue	9,210	**62.3**	-	-	85 ft	269 ft
Between 5th Avenue & 9th Avenue	7,535	**61.4**	-	-	70 ft	220 ft
Between 9th Avenue & 16th Avenue	7,935	**61.7**	-	-	73 ft	232 ft
Between 16th Avenue & Concar Drive	15,040	**65.7**	-	59 ft	188 ft	593 ft
Between Concar Drive & 19th Avenue	15,903	**66.3**	-	67 ft	211 ft	668 ft
Between 19th Avenue & Saratoga Drive	15,398	**66.1**	-	65 ft	204 ft	646 ft
Between Saratoga Drive & 25th Avenue	12,693	**63.7**	-	37 ft	117 ft	370 ft
Between 25th Avenue & 28th Avenue	5,950	**62.0**	-	-	79 ft	250 ft
Between 28th Avenue & 31st Avenue	5,188	**59.8**	-	-	48 ft	151 ft
South of 31st Avenue	7,160	**61.2**	-	-	66 ft	209 ft
El Camino Real						
Between Peninsula Avenue & Poplar Avenue	23,985	**69.2**	-	133 ft	419 ft	1,327 ft
Between Poplar Avenue & Tilton Avenue	27,448	**69.8**	48 ft	152 ft	480 ft	1,518 ft
Between Tilton Avenue & Crystal Springs Road	28,750	**70.0**	50 ft	159 ft	503 ft	1,590 ft
Between Crystal Springs Road & 2nd Avenue	26,540	**69.7**	46 ft	147 ft	464 ft	1,468 ft

TABLE 4.11-7 EXISTING ROADWAY NOISE LEVELS

Roadway Segment	Volume (Average Daily Trips)	L_{dn} at 50 Feet	Distance to L_{dn} Contour (feet)			
			70 dBA	65 dBA	60 dBA	55 dBA
Between 2nd Avenue & 3rd Avenue	31,933	**71.4**	69 ft	219 ft	694 ft	2,194 ft
Between 3rd Avenue & 4th Avenue	32,695	**71.5**	71 ft	225 ft	710 ft	2,246 ft
Between 4th Avenue & Barneson Avenue	33,883	**71.7**	74 ft	233 ft	736 ft	2,328 ft
Between Barneson Avenue & 17th Avenue	34,083	**71.7**	74 ft	234 ft	741 ft	2,342 ft
Between 17th Avenue & 20th Avenue	39,148	**72.3**	85 ft	269 ft	851 ft	2,690 ft
Between 20th Avenue & 25th Avenue	30,245	**71.2**	66 ft	208 ft	657 ft	2,078 ft
Between 25th Avenue & 28th Avenue	31,423	**71.4**	68 ft	216 ft	683 ft	2,159 ft
Between 28th Avenue & 31st Avenue	31,030	**71.4**	69 ft	218 ft	691 ft	2,185 ft
Between 31st Avenue & Hillsdale Boulevard Ramps	15,570	**68.5**	-	113 ft	356 ft	1,125 ft
Between Hillsdale Boulevard Ramps & 41st Avenue	16,180	**68.2**	-	104 ft	330 ft	1,044 ft
Between 41st Avenue & 42nd Avenue	26,178	**70.3**	-	168 ft	534 ft	1,689 ft
Ellsworth Avenue						
North of 2nd Avenue	5,055	**59.7**	-	-	47 ft	148 ft
Between 2nd Avenue & 3rd Avenue	3,783	**58.4**	-	-	35 ft	110 ft
South of 3rd Avenue	3,025	**57.5**	-	-	-	88 ft
Fashion Island Boulevard/Bridgepointe Parkway						
Between Chess Drive & Baker Way	11,320	**62.6**	-	-	91 ft	289 ft
Between Baker Way & Mariner's Island Boulevard	14,590	**65.5**	-	-	178 ft	563 ft
Between Mariner's Island Boulevard & Norfolk Street	16,203	**65.1**	-	52 ft	164 ft	517 ft
Between Norfolk Street & US Highway 101 Ramps	18,260	**65.3**	-	54 ft	170 ft	538 ft
Franklin Parkway						
Between Saratoga Drive & Delaware Street	5,508	**60.5**	-	-	-	143 ft
Hillsdale Boulevard						
East of Norfolk Street	35,120	**71.8**	76 ft	241 ft	763 ft	2,413
Between Norfolk Street & US Highway 101 Ramps	41,595	**69.8**	-	151 ft	477 ft	1,507 ft
Between US Highway 101 Ramps & Saratoga Drive	26,695	**70.6**	-	183 ft	580 ft	1,834 ft
Between Saratoga Drive & El Camino Real	19,630	**68.4**	-	109 ft	343 ft	1,086 ft

TABLE 4.11-7 EXISTING ROADWAY NOISE LEVELS

Roadway Segment	Volume (Average Daily Trips)	L_{dn} at 50 Feet	Distance to L_{dn} Contour (feet)			
			70 dBA	65 dBA	60 dBA	55 dBA
Between El Camino Real & Alameda de las Pulgas	9,988	**64.2**	-	-	133 ft	419 ft
Between Alameda de las Pulgas & Campus Drive	10,978	**62.1**	-	-	81 ft	256 ft
Humboldt Street						
Between Peninsula Avenue & Poplar Avenue	8,378	**61.9**	-	-	77 ft	245 ft
Between Poplar Avenue & 3rd Avenue	8,138	**61.8**	-	-	75 ft	238 ft
Between 3rd Avenue & 4th Avenue	6,698	**60.9**	-	-	62 ft	196 ft
South of 4th Avenue	5,465	**60.0**	-	-	50 ft	160 ft
Mariner's Island Boulevard						
Between 3rd Avenue & Fashion Island Boulevard	8,885	**62.6**	-	-	91 ft	287 ft
South of Fashion Island Boulevard	18,335	**65.7**	-	59 ft	187 ft	592 ft
Norfolk Street						
North of 3rd Avenue	7,640	**61.5**	-	-	71 ft	223 ft
Between 3rd Avenue & Kehoe Avenue	10,615	**62.9**	-	-	98 ft	310 ft
Between Kehoe Avenue & Fashion Island Boulevard	10,250	**62.8**	-	-	95 ft	299 ft
Between Fashion Island Boulevard & El Camino Real	9,773	**62.8**	-	-	96 ft	304 ft
Peninsula Avenue						
Between Bayshore Boulevard & Humboldt Street	21,120	**67.5**	-	89 ft	280 ft	887 ft
Between Humboldt Street & Delaware Street	15,928	**64.8**	-	48 ft	150 ft	475 ft
Between Delaware Street & San Mateo Drive	13,915	**64.2**	-	42 ft	131 ft	415 ft
Between San Mateo Drive & El Camino Real	5,720	**60.3**	-	-	54 ft	171 ft
Poplar Avenue						
Between US Highway 101 & Humboldt Street	10,135	**61.7**	-	-	75 ft	236 ft
Between Humboldt Street & Delaware Street	7,823	**60.6**	-	-	58 ft	182 ft
Between Delaware Street & San Mateo Drive	5,978	**59.5**	-	-	44 ft	139 ft
Between San Mateo Drive & El Camino Real	6,865	**60.1**	-	-	51 ft	160 ft
San Mateo Drive						
Between Peninsula Avenue & Poplar Avenue	12,250	**64.9**	-	49 ft	156 ft	494 ft

TABLE 4.11-7 EXISTING ROADWAY NOISE LEVELS

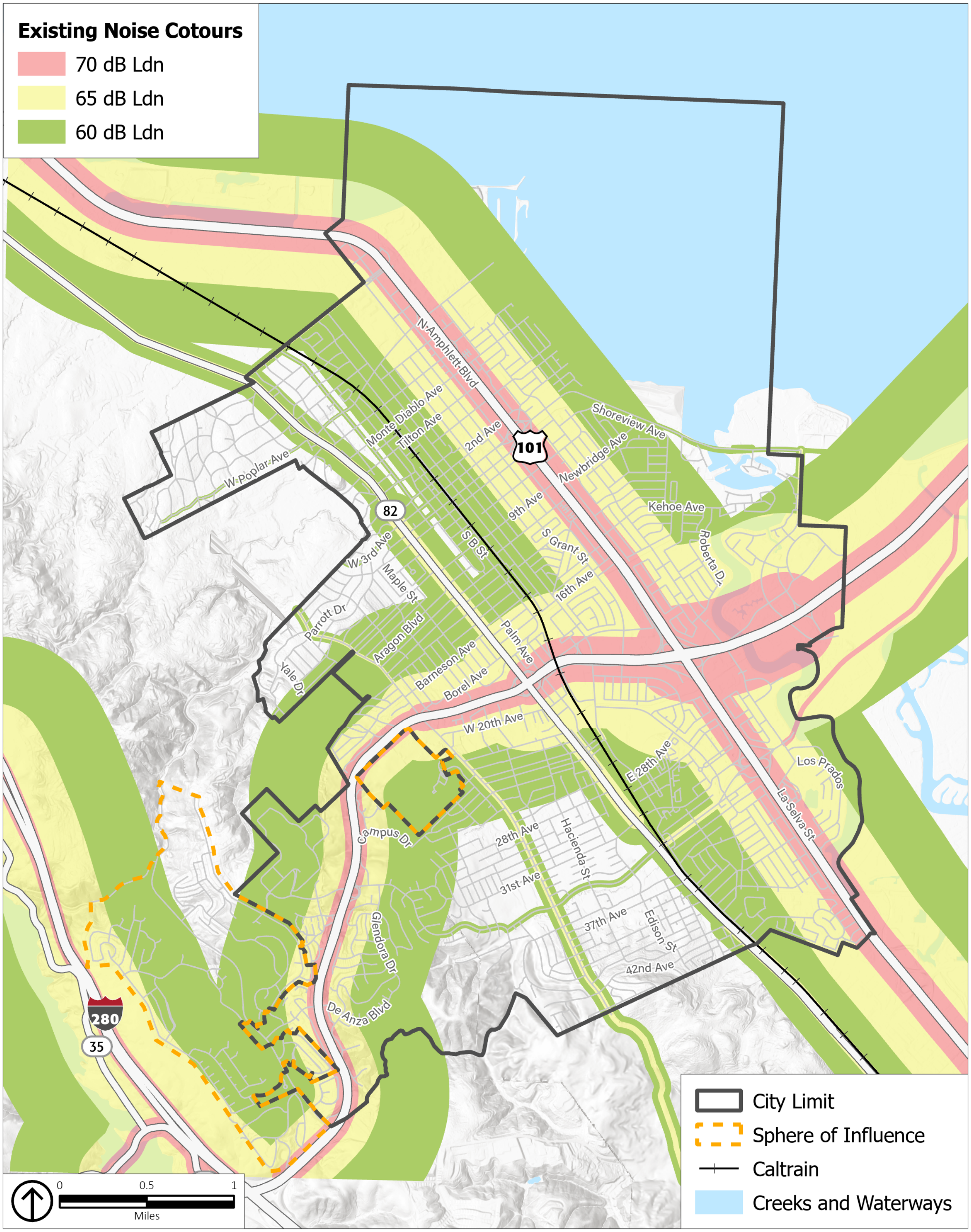
Roadway Segment	Volume (Average Daily Trips)	L_{dn} at 50 Feet	Distance to L_{dn} Contour (feet)			
			70 dBA	65 dBA	60 dBA	55 dBA
Between Poplar Avenue & 2nd Avenue	10,583	**62.9**	-	-	98 ft	309 ft
Between 2nd Avenue & 3rd Avenue	5,273	**59.9**	-	-	49 ft	154 ft
Between 3rd Avenue 4th Avenue	4,700	**59.4**	-	-	43 ft	137 ft
Between 4th Avenue & 5th Avenue	3,693	**58.3**	-	-	34 ft	108 ft
Saratoga Drive						
Between Delaware Street & Franklin Parkway	9,315	**64.1**	-	-	127 ft	402 ft
Between Franklin Parkway & Hillsdale Boulevard	12,065	**63.9**	-	-	123 ft	389 ft
Between Hillsdale Boulevard & Santa Clara Way	7,140	**60.6**	-	-	58 ft	182 ft
Tilton Avenue						
East of El Camino Real	4,650	**59.3**	-	-	43 ft	136 ft

Notes:
* Modeled noise calculations adjusted to account for ten feet high sound walls adjacent to US Highway 101 as it traverses San Mateo.
** The nearest segment of Interstate 280 to San Mateo traverses approximately 2,150 feet distant.
Source: Traffic noise levels on all San Mateo roadways were calculated using the FHWA roadway noise prediction model in conjunction with the trip generation rate identified by Kittelson and Associates. US Highway 101, Interstate 280, and State Route 92 trip generation rates are identified by the California Department of Transportation Traffic Census Program (2023). Refer to Appendix D2 for traffic noise modeling assumptions and results.

Existing noise contours for the freeways and major arterials within the city are presented in Figure 4.11-3, *Existing Traffic Noise Contours*. The noise contours shown in Figure 4.11-3 represent the predicted noise level based on roadway volumes, the percent of trucks, speed, and other factors.

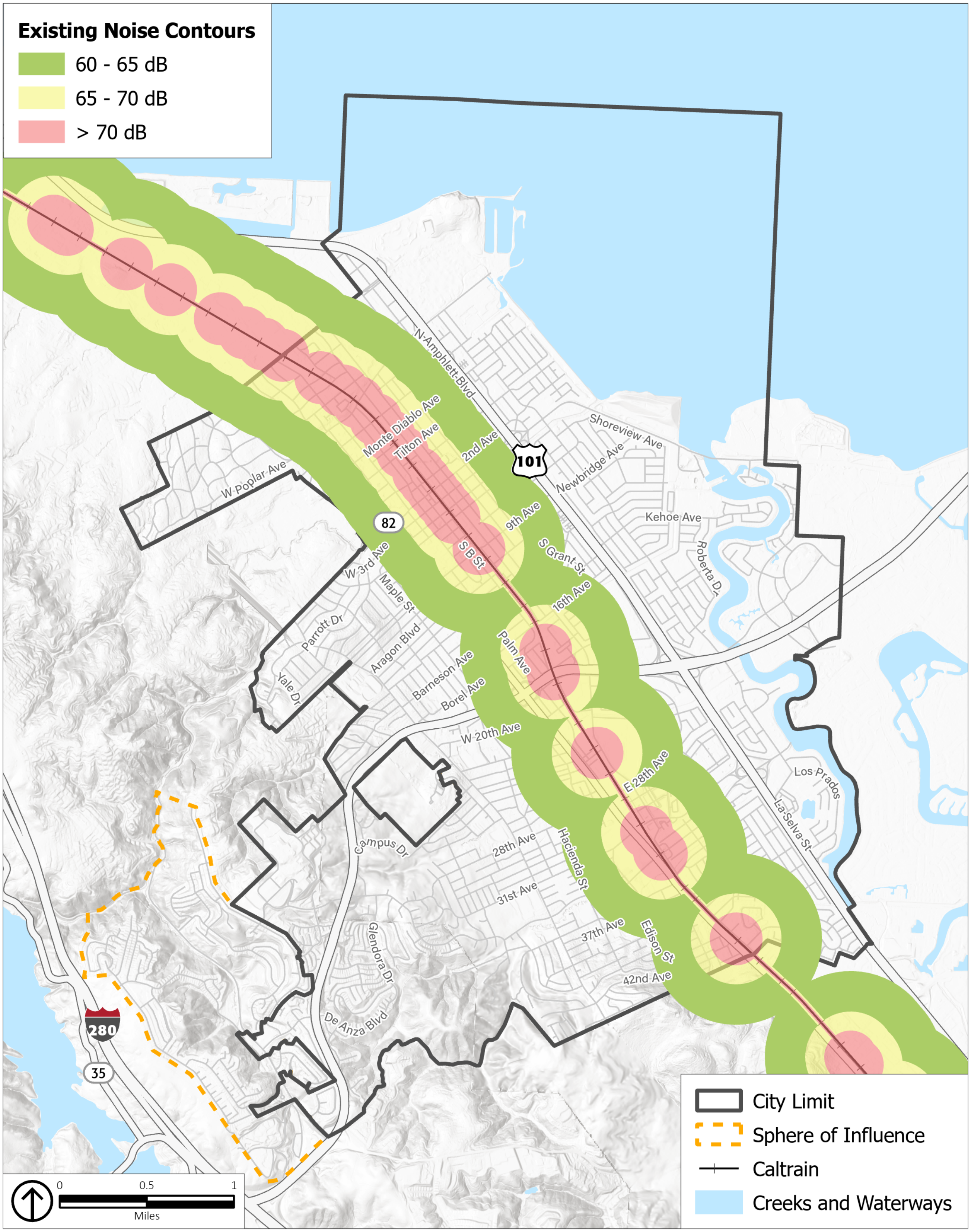
Existing Rail Noise

Railway noise is also a major mobile noise source throughout the city. The Caltrain/UPRR rail line (rail corridor) runs adjacent to El Camino Real in the southern portion of the city and jogs east slightly at Hillsdale Boulevard and runs along the western border of Bay Meadows. North of Bay Meadows, the tracks run adjacent to Railroad Avenue until the northern portion of the city, where they traverse between North San Mateo Drive and North Claremont Street. Currently, there are 104 Caltrain commuter trains that pass through San Mateo each weekday, and 32 on weekend days. While freight train traffic is limited, there are typically up to three freight trains per day traversing the city. Noise levels for the rail line were calculated using the methodology contained in the Federal Transit Administration's Transit Noise and Vibration Impact Assessment manual. It was assumed that the train's warning horn was blown within ¼ mile of all grade crossings and stations. Due to the numerous grade crossings and stations in San Mateo, the train horn dominates the existing train noise contours shown in Figure 4.11-4, *Existing Railway Noise Contours*.



Source: ECORP, 2023; PlaceWorks, 2023.

Figure 4.11-3
Existing Traffic Noise Contours



Source: ECORP, 2023; PlaceWorks, 2023.

Figure 4.11-4
Existing Railway Noise Contours

Existing Aircraft Noise

The northeastern part of the city is somewhat affected by aircraft activity due to nearby San Francisco International Airport. Typically, aircraft are on approach (i.e., landing) over San Francisco Bay just to the east of San Mateo. The city is located outside of the Airport's 65 dBA CNEL noise contour.

4.11.2 STANDARDS OF SIGNIFICANCE

The proposed project would result in a significant noise impact if it would:

1. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
2. Generate excessive groundborne vibration or groundborne noise levels.
3. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.
4. In combination with past, present, and reasonably foreseeable projects, result in cumulative noise impacts in the area.

A project might have a significant effect on the environment if it would substantially increase the ambient noise levels in the area or expose people to severe noise levels. As previously described, a change in level of at least 5 dBA is required before any noticeable change in community response is expected. Based on this fact and the proposed Noise Element policies, a significant increase in traffic noise is considered to be an increase in the existing ambient noise environment of at least 5 dBA L_{dn}. Based on SMMC Chapter 7.30, an individual project would also be considered to have a significant impact if its on-site noise sources generate noise levels above the stationary-source standards identified in Table 4.11-4.

Noise-sensitive receivers include residences, multifamily common open-space areas, schools, hotels, hospitals, nursing homes, and recreational uses.

4.11.3 IMPACT DISCUSSION

This is a program-level EIR that considers the potential impacts from adoption of the proposed project by assessing proposed policies contained in the proposed project and development and activities that may occur under the proposed project. Impacts relative to noise and vibration are evaluated using the criteria listed above and based on information included in the proposed General Plan, including the proposed land use map, and existing and future traffic volumes provided by Kittleson Transportation Consultants. The proposed project does not propose specific development projects but, for the purposes of environmental review, establishes the potential buildout of the proposed project. This represents the maximum feasible development that the City has projected can reasonably be expected to occur through the proposed General Plan horizon of 2040. To capture the potential impact of future development under the proposed project, this Draft EIR utilizes the baseline existing conditions described above and analyzes the impacts of urban development through the projection period ending in 2040. Roadside noise levels were calculated for the same roadways analyzed for the transportation analysis in Chapter 4.15, *Transportation*, of this Draft EIR. The street segments selected for analysis are those forecast to experience the greatest percentage increase in traffic generated by future development under the proposed project and are therefore expected to be most directly impacted. Transportation-source noise levels have been calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with traffic counts provided by Kittleson Transportation Consultants. The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data shows that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels.

NOISE-1 The proposed project would result in the generation of a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Noise/Land Use Compatibility

The Noise (N) Element of the proposed General Plan provides policy direction for minimizing noise impacts on the community and establishes noise control measures for construction and operation of land use projects. By identifying noise-sensitive land uses and establishing compatibility guidelines for land use and noises (Table N-1 of the proposed General Plan Noise Element), noise considerations would influence the general distribution, location, and intensity of future land uses. The result is that effective land use planning and project design can alleviate the majority of noise problems. However, future infill development in San Mateo under the proposed project will be focused primarily in ten General Plan Land Use Study Areas, which are concentrated around existing transit and services, including near major noise sources such as US Highway 101, SR 92, El Camino Real and the Caltrain tracks.

The most basic planning strategy to minimize adverse impacts on new land uses due to noise is to avoid designating certain land uses at locations in the city that would negatively affect noise-sensitive land uses. Uses such as schools, hotels, hospitals, nursing homes, recreational uses, churches, libraries, cemeteries, and all types of residential uses must be located outside of any area anticipated to exceed acceptable noise levels as defined by the Noise-Sensitive Land Use Compatibility Guidelines or must be protected from noise through sound attenuation measures such as site and architectural design and sound walls. The proposed guidelines are used as a basis for planning decisions and these guidelines are shown in Table N-1 of the proposed General Plan 2040 Noise Element, which is reproduced as Table 4.11-8, *Proposed General Plan Noise-Sensitive Land Use Compatibility Guidelines*.

TABLE 4.11-8 PROPOSED GENERAL PLAN NOISE-SENSITIVE LAND USE COMPATIBILITY GUIDELINES

	Land Use Category of Proposed New Use	Day-Night Average Exterior Noise Level, L_{dn} (dBA)				
		0 - 59	60 - 65	66 - 70	71 - 80	over 81
Noise Sensitive Land Uses	Residential (all densities) *	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Normally Unacceptable
Noise Sensitive Land Uses	Multi-family Common Open Space for Residents	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Normally Unacceptable
Noise Sensitive Land Uses	Hotels, Motels, and Other Lodging	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Normally Unacceptable
Noise Sensitive Land Uses	Schools, Libraries, Hospitals, Churches, Long-Term Care Facilities	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Normally Unacceptable
Noise Sensitive Land Uses	Parks, Playgrounds, Privately Owned Publicly Accessible Open Space	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Normally Unacceptable
Office and Commercial		Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable
Research and Development, Industrial		Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable

- **Normally Acceptable.** Specified land use is satisfactory based on the assumption that any buildings involved are of normal, conventional construction, without any special noise mitigation requirements.
- **Conditionally Acceptable.** New construction or development should be undertaken only after a detailed analysis of the noise-reduction requirements is made and needed noise mitigation features have been included in the design.
- **Normally Unacceptable.** New construction or development should not be undertaken.

* See residential land use designations in the Land Use Element of this General Plan.

Source: City of San Mateo, Proposed Strive General Plan 2040, Table N-1.

Table N-1 of the proposed General Plan would be used to determine whether the existing exterior noise levels that would surround a proposed new use are acceptable or unacceptable and to identify where a proposed project may need to incorporate noise mitigation features. In a case where the noise levels identified at a future project site fall within levels considered normally acceptable, the project would be considered compatible with the existing noise environment. All future projects under the proposed project subject to discretionary review would be evaluated for noise/land use compatibility.

The Noise (N) Element of the proposed General Plan provides guidance to protect the community from excessive noise exposure. The following General Plan 2040 goals, policies, and actions would integrate noise considerations into land use planning decisions and require design strategies for minimize noise effects:

- **Goal N-1:** Protect noise-sensitive land uses from excessive noise levels.
  - **Policy N 1.1: Noise and Land Use Planning.** Integrate noise considerations into land use planning decisions to minimize noise impacts to or from new development.
  - **Policy N 1.2: Interior Noise Level Standard.** Require submittal of an acoustical analysis and interior noise insulation for all noise-sensitive land uses listed in Table N-1 [of the proposed General Plan] that have an exterior noise level of 60 dBA (Ldn) or above, as shown on Figure N-2 [of the proposed General Plan]. The maximum interior noise level shall not exceed 45 dBA (Ldn) in any habitable rooms, as established by the California Building Code.
  - **Policy N 1.3: Exterior Noise Level Standard for Residential Uses.** Require an acoustical analysis for new multifamily common open space for residents that have an exterior noise level of 60 dBA (Ldn) or above, as shown on Figure N-2 [of the proposed General Plan]. Incorporate necessary mitigation measures into residential project design to minimize common open space noise levels. Maximum exterior noise should not exceed 65 dBA (Ldn) for residential uses and should not exceed 65 dBA (Ldn) for public park uses.
- **Goal N-2:** Minimize unnecessary, annoying, or unhealthful noise.
  - **Policy N 2.2: Minimize Noise Impacts.** Incorporate necessary mitigation measures into new development design to minimize short-term noise impacts. Determine whether new development has the potential to result in a significant noise impact on existing development based on the following standards. Impacts will be analyzed based on long-term operational noise increases at the sensitive receptor property line, or new uses that generate noise levels at the sensitive receptor property line, as follows:

L_{dn} Category of Existing Development Per Figures N-1, N-2, and/or N-3 [of the proposed General Plan]	Noise Increase Considered “Significant” over Existing Noise Levels
Normally Acceptable	An increase of more than 5 dBA and the total Ldn exceeds the “normally acceptable” category
Conditionally Acceptable	An increase of more than 5 dBA
Unacceptable	An increase of more than 5 dBA

  - **Policy N 2.3: Minimize Commercial Noise.** Protect land uses other than those listed as “noise sensitive” in Table N-1 [of the proposed General Plan] from adverse impacts caused by the on-site noise generated by new developments. Incorporate necessary mitigation measures into development design to minimize short-term and long-term noise impacts. Prohibit new uses that generate noise levels of 65 dBA (Ldn) or above at the property line, excluding existing ambient noise levels.

Proposed General Plan Policy N 1.1 would require the integration of noise considerations into land use planning decisions to minimize new noise impacts to or from new development. Proposed Policy N 1.2 would require the submittal of an acoustical analysis and interior noise insulation for all “noise sensitive” land uses that are determined to likely have an exterior noise level of 60 dBA L_{dn} or above, as shown on

Figure N-2 of the General Plan (see Figure 4.11-5, *Future Traffic Noise Contours*). Additionally, Table 4.11-11, *Future (General Plan Buildout) Roadway Noise Levels*, shows roadway noise contours in tabular format. Similarly, proposed Policy N 1.3 would require the submittal of an acoustical analysis for all new multifamily common open space that have an exterior noise level of 60 dBA L_{dn} or above, as shown on Figure N-2 of the General Plan (Figure 4.11-5 of this chapter).

The acoustical analyses potentially triggered by these proposed policies at the project level would include refined evaluation of noise/land use compatibility in order to more precisely identify the existing ambient noise environment affecting the subject site, typically achieved through conducting baseline noise measurements with a sound level meter, though this can also be achieved in many areas of the city by referring to Figure N-2 of the General Plan (Figure 4.11-5 of this chapter) and/or Table 4.11-11 of this chapter. The location-specific baseline noise measurements presented in the acoustical analyses either demonstrate the noise/land use compatibility between a proposed land use and location or assist with the characterization of the ambient noise environment in a manner that allows for implementation of the appropriate noise attenuation measures necessary to protect the new noise-sensitive land use. Examples of noise attenuation measures include adding buffers and/or landscaped earth berms between the receptor and the source of noise, orienting windows and outdoor living areas away from unacceptable noise exposure, architectural design, and/or incorporating state-of-the-art structural sound attenuation and setbacks. The need for noise attenuation measures in building construction and project design from any noise source and for all land uses will be determined on a project-by-project basis at the time development is proposed.

Further, proposed General Plan Policy N 2.2 would require that projects generating a noise increase of 5 dBA, the minimum increase that is perceptible, incorporate mitigation measures into new development design to minimize short-term noise impacts. Proposed Policy N 2.3, which seeks to protect land uses generally not considered to be noise-sensitive, prohibits new uses that generate noise levels of 65 dBA L_{dn} or above at the property lines of commercial land uses.

For these reasons, noise/land use compatibility under the General Plan would represent a *less than significant* impact.

Temporary Construction Noise

Under the proposed project, the primary source of temporary noise within the city would be demolition and construction activities associated with development projects and activities. Construction activities would involve both off-road construction equipment (e.g., excavators, dozers, cranes, etc.) and transport of workers and equipment to and from construction sites. Table 4.11-9, *Reference Construction Equipment Noise Levels (50 Feet from Source),* shows typical noise levels produced by the types of off-road equipment that would likely be used during future construction within San Mateo. It is noted that future development under the proposed project could potentially require installation of pile foundations that may utilize impact pile drivers or similar equipment that may be expected to generate high noise levels.

Construction noise is currently a major source of temporary noise within San Mateo and would continue to be so regardless of whether the proposed project is adopted. Noise levels near individual construction sites associated with development and activities under the proposed project would not be substantially different from what they would be under the existing City of San Mateo 2030 General Plan and current CAP. Since specific future projects within the city are unknown at this time, it is conservatively assumed that the construction areas associated with these future projects could be located within 50 feet of sensitive land uses. As depicted in Table 4.11-9, noise levels generated by individual pieces of construction equipment typically range from approximately 74 dBA to 101.3 dBA L_{max} at 50 feet and 67.7 dBA to 94.3 dBA L_{eq} at 50 feet. Average hourly noise levels associated with construction projects can vary, depending on the activities performed. Short-term increases in vehicle traffic, including worker commute trips and haul truck trips, may also result in temporary increases in ambient noise levels at nearby receptors. During each stage of construction, a different mix of equipment would operate, 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 the receptor. Intervening structures or terrain would result in lower noise levels at distant receivers.

TABLE 4.11-9 REFERENCE CONSTRUCTION EQUIPMENT NOISE LEVELS (50 FEET FROM SOURCE)

Equipment	Typical Noise Level (dBA) at 50 Feet from Source	
	L_{max}	L_{eq}
Aerial Lift	74.7	67.7
Air Compressor	77.7	73.7
Backhoe	77.6	73.6
Blasting	94.0	73.0
Boring Jack (Power Unit)	83.0	80.0
Boring Jack (Horizontal)	82.0	76.0
Chain Saw	83.7	76.7
Compactor (Ground)	83.2	76.2
Concrete Mixer Truck	78.8	74.8
Concrete Mixer (Vibratory)	80.0	73.0
Concrete Pump Truck	81.4	79.4
Concrete Saw	89.9	82.6
Crane	80.6	72.6
Dozer	81.7	77.7
Drill Rig	84.4	77.4
Drill Rig Truck	79.1	72.2
Drum Mixer	80.0	77.0
Dump Truck	76.5	72.5
Excavator	80.7	76.7
Front End Loader	79.1	75.1
Generator	80.6	77.6
Gradall	83.4	79.4
Grader	85.0	81.0
Hydraulic Break Ram	90.0	80.0
Impact Hammer/Hoe Ram (Mounted)	90.3	83.3

TABLE 4.11-9 REFERENCE CONSTRUCTION EQUIPMENT NOISE LEVELS (50 FEET FROM SOURCE)

Equipment	Typical Noise Level (dBA) at 50 Feet from Source	
	L_{max}	L_{eq}
Jackhammer	88.9	81.9
Other Equipment	85.0	82.0
Pavement Scarifier	89.5	82.5
Paver	77.2	74.2
Pile Driver (Impact)	101.3	94.3
Pile Driver (Vibratory)	100.8	93.8
Pneumatic Tools	85.2	82.2
Pumps	80.9	77.9
Rock Drill	81.0	74.0
Roller	80.0	73.0
Scraper	83.6	79.6
Tractor	84.0	80.0
Truck (Flat Bed)	74.3	70.3
Truck (Pick Up)	75.0	71.0
Vacuum Street Sweeper	81.6	71.6
Welder	74.0	70.0

Source: Federal Highway Administration, 2006, Roadway Construction Noise Model.

SMMC Section 7.30.060 exempts construction noise from noise standards so long as construction activities are restricted to weekdays between the hours of 7:00 a.m. and 7:00 p.m., on Saturdays between the hours of 9:00 a.m. and 5:00 p.m., and on Sundays and holidays between the hours of noon and 4:00 p.m.; and that the construction noise level at any point outside of the construction site does not exceed 90 dBA. It is common for cities to regulate construction noise in this manner because construction noise is temporary, short term, and intermittent in nature, and ceases upon completion of construction. Furthermore, the Noise (N) Element of the proposed General Plan addresses construction noise as follows:

- **Goal N-2:** Minimize unnecessary, annoying, or unhealthful noise
  - **Policy N 2.7: Construction Noise and Vibration Monitoring.** Require construction noise limits and vibration monitoring around sensitive receptors, including through limiting construction hours and individual and cumulative noise from construction equipment. For larger development projects that demand intensive construction periods and/or use equipment that could create vibration impacts, require a vibration impact analysis, as well as monitoring and reporting of noise/vibration levels throughout construction, consistent with industry standards.

Through implementation of proposed General Plan Policy N 2.7, the City would require construction noise limits around sensitive receptors, including through limiting construction hours, consistent with the SMMC, and individual and cumulative noise from construction equipment. For larger development projects that demand intensive construction periods and/or use equipment that could create vibration impacts, proposed Policy N 2.7 requires a vibration impact analysis, as well as monitoring and reporting of noise/vibration levels throughout construction.

SMMC Section 7.30.060 and the proposed General Plan goal and policy identified above would ensure that noise attenuation is provided to minimize temporary noise impact associated with construction. Construction noise under the proposed project would therefore be *less than significant*.

Stationary Source Noise

The development of residential, automotive, industrial, or other uses and activities under the proposed project could generate substantial stationary noise. Such sources could generate noise from heating, ventilation, and air conditioning (HVAC) mechanical equipment, back-up diesel generators in some cases, parking lot activity, backup beepers from internal truck and equipment maneuvering, and other sources. Table 4.11-10, *Reference Stationary Source Noise Levels (At the Source),* identifies noise levels generally associated with common stationary noise sources.[15]

TABLE 4.11-10 REFERENCE STATIONARY SOURCE NOISE LEVELS (AT THE SOURCE)

Stationary Noise Source	L_{eq}
Commercial Car Wash [a]	79.1 dBA
Drive Thru Activity (speaker) [b]	89.1 dBA
Gasoline Dispensing Station [c]	64.7 dBA
Generators [d]	75.0 dBA
HVAC Mechanical Equipment [e]	56.8 dBA
Parking Garage [f]	52.6 dBA
Regional Shopping Center Parking Lot [g]	61.1 dBA
Small Parking Lot [h]	53.2 dBA
Tire and Lube Service Station [i]	62.3 dBA
Truck Backup Beeper [j]	79.0 dBA
Truck Yard/Warehouse [k]	62.4 dBA

Notes: a. The average of two noise measurements conducted at commercial carwashes in 2019 and 2022.
b. The average of six noise measurements conducted within fast food restaurant drive thru while drive thru speaker in use.
c. The average of five noise measurements conducted within the fuel canopy of gasoline dispensing stations in 2019 and 2021.
d. Generac Mobile Diesel Generator Set Specification Sheet 2020.
e. One noise measurement conducted at an operating HVAC unit in 2017.
f. One noise measurement conducted within a parking garage in 2019.
g. One noise measurement conducted within a Safeway parking lot in 2019.
h. The average of three noise measurements conducted within a strip mall parking lot in 2022, hotel parking lot in 2021, and medical facility parking lot in 2020.
i. The average of two noise measurements conducted at a Big O Tires in 2019 and a Jiffy Lube in 2022.
j. City of San Jose 2014 Midpoint at 237 Loading Dock Noise Study.
k. The average of five noise measurements conducted at four truck yards and one distribution center in 2021.

[15] Many of the sources were measured for their sound power output with a Larson Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator.

Stationary source noise is currently a major source of temporary noise within the EIR Study Area and would continue to be so regardless of whether the proposed project is adopted. Noise levels near individual sources under the proposed project would not be substantially different from what they would be under the existing City of San Mateo General Plan 2030 and current CAP. As previously described, SMMC Chapter 7.30 establishes regulations to protect the inhabitants of the city against all forms of nuisances, including stationary source noise, as shown in Table 4.11-4. Future development under the proposed project, and associated on-site stationary source noise, would be subject to the noise standards identified in Table 4.11-4. Stationary sources of noise that are identified as exceeding the noise standards established by SMMC Chapter 7.30 would be required to implement noise-reduction measures in order to reduce their noise to acceptable levels. Additionally, the Noise (N) Element of the proposed General Plan addresses stationary noise as follows:

- **Goal N-1:** Protect noise-sensitive land uses from excessive noise levels.
  - **Policy N 1.5: Inclusive Outreach.** Notify the community when new land uses that would result in excessive noise levels are being considered and inform community members about how they can engage in the process. Use outreach and engagement methods that encourage broad representation and are culturally sensitive, particularly for equity priority communities.
- **Goal N-2:** Minimize unnecessary, annoying, or unhealthful noise.
  - **Policy N 2.3: Minimize Commercial Noise.** Protect land uses other than those listed as "noise sensitive" in Table N-1 [of the proposed General Plan] from adverse impacts caused by the on-site noise generated by new developments. Incorporate necessary mitigation measures into development design to minimize short-term and long-term noise impacts. Prohibit new uses that generate noise levels of 65 dBA (Ldn) or above at the property line, excluding existing ambient noise levels.

With adherence to SMMC Chapter 7.30 and the proposed General Plan goals and policies identified above, future development and activities under the proposed project would result in a *less-than-significant* impact related to stationary noise sources.

Rail Noise

As previously described, railway noise is a major mobile noise source in the EIR Study Area (see Figure 4.11-4). The Caltrain/UPRR rail line runs adjacent to El Camino Real in the southern portion of the city and jogs east slightly at Hillsdale Boulevard and runs along the western border of Bay Meadows. North of Bay Meadows, the tracks run adjacent to Railroad Avenue until the northern portion of the city, where they traverse between North San Mateo Drive and North Claremont Street. Currently, there are 104 Caltrain commuter trains that pass through San Mateo each weekday, and 32 on weekend days. While freight train traffic is limited, there are typically up to three freight trains per day traversing San Mateo.

Noise levels along the existing railroad and light rail corridors under the proposed General Plan would remain the same as existing conditions; any changes to the frequency of trains or to train equipment would be initiated and implemented by the respective rail authority, rather than the City of San Mateo, and are not part of the proposed project. However, implementation of the proposed project has the potential to locate new development along the rail line.

The Noise (N) Element of the proposed General Plan addresses rail noise as follows:

- **Goal N-2:** Minimize unnecessary, annoying, or unhealthful noise.
  - **Policy N 2.5: Railroad Noise.** Support the installation of noise barriers and other mitigations along the railroad corridor where noise-sensitive land uses are adversely impacted by excessive noise levels (60 dBA [Ldn] or greater), as shown in Figure N-3. [of the proposed Genera Plan].
  - **Action N 2.9: Railroad Noise Reductions.** Implement projects necessary to achieve Quiet Zones in the city, such as elimination of at-grade rail crossings or other mitigation measures to decrease horn and other operational noise levels, with a focus on achieving Quiet Zones as part of any substantial expansions of the rail service.
  - **Action N 2.10: Railroad Noise Barriers.** Work with the Peninsula Corridor Joint Powers Board to promote and encourage adequate noise mitigations and barriers to be incorporated into any rail service expansion or track realignment.

Additionally, as previously described, the most basic planning strategy to minimize adverse impacts on new land uses due to noise is to avoid designating certain land uses at locations in the city that would negatively affect noise-sensitive land uses. Uses such as schools, hotels, hospitals, nursing homes, recreational uses, churches, libraries, cemeteries, and all types of residential uses must be located outside of any area anticipated to exceed acceptable noise levels as defined by the Noise-Sensitive Land Use Compatibility Guidelines (see Table 4.11-8) or must be protected from noise through sound attenuation measures such as site and architectural design and sound walls. All future development projects subject to discretionary review under the proposed project would be evaluated for noise/land use compatibility, including railway noise/land use compatibility. Proposed General Plan Policies N 1.1 and N 1.2 would require the integration of noise considerations into land use planning decisions to minimize new noise impacts to or from new development. Proposed Policies N 1.1 and N 1.2 provide a strong policy framework for minimizing noise impacts, including railway-related noise impacts, in new development.

No aspect of the proposed project would increase railway noise levels along the existing railroad and light rail corridors. Adherence to proposed General Plan goal, policies, and actions identified above would ensure that the noise environment in San Mateo does not increase in a manner that worsens existing land use compatibility or exposes noise-sensitive land uses to "unacceptable" noise levels. Therefore, this impact is *less than significant*.

Traffic Noise

Future development and activities under the proposed project are expected to affect the community noise environment mainly by generating additional traffic. Transportation-source noise levels were calculated for this EIR using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with traffic counts provided by Kittleson Transportation Consultants. The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data shows that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. As previously described, a 5-dBA change is required before any noticeable change in community response is expected. Based on this fact, a significant increase in traffic noise is considered to be an increase in the existing ambient noise environment of at least 5 dBA L_{dn}.

Future traffic noise contours are mapped in Figure 4.11-5, *Future Traffic Noise Contours*. Table 4.11-11, *Future (General Plan Buildout) Roadway Noise Levels*, shows the calculated off-site roadway noise levels under existing traffic levels compared to future buildout under the proposed project.

As shown in Table 4.11-11, the only roadway segment that would experience an increase of more than 5.0 dBA L_{dn} over existing conditions includes the segment of 1st Avenue west of B Street. As previously described, a 5-dBA change is required before any noticeable change in community response is expected. Based on this fact, a significant increase in traffic noise is considered to be an increase in the existing ambient noise environment of at least 5 dBA L_{dn}. As reflected in Table 4.11-11, this analysis included a large sample of local roadways segments, but did not include all roadways within San Mateo. These segments were selected for analysis purposes to illustrate potential changes in roadway noise throughout the EIR Study Area. Therefore, additional roadways segments in the EIR Study Area may experience increased traffic noise.

TABLE 4.11-11 FUTURE (GENERAL PLAN BUILDOUT) ROADWAY NOISE LEVELS

Roadway Segment	L_{dn} at 50 Feet		Difference	Significant Increase?	Distance to L_{dn} Contour – General Plan Buildout (feet)			
	Existing	Existing Plus Project			70 dBA	65 dBA	60 dBA	55 dBA
US Highway 101 [a]								
All of San Mateo	80.3	80.9	**0.6**	No	619 ft	1,959 ft	6,194 ft	19,588 ft
Interstate 280								
All of San Mateo	84.7	84.7	**N/A [b]**	No	1,470 ft	4,648 ft	14,699 ft	46,481 ft
State Route 92								
Between City Limits & Mariner's Island Boulevard	80.4	81.6	**1.2**	No	724 ft	2,289 ft	7,238 ft	22,888 ft
Between Mariner's Island Boulevard & US Highway 101 Junction	84.7	85.4	**0.7**	No	1,740 ft	5,503 ft	17,403 ft	55,034 ft
Between US Highway 101 & El Camino Real	81.1	81.8	**0.7**	No	759 ft	2,401 ft	7,593 ft	24,011 ft
Between El Camino Real & Alameda de las Pulgas	79.2	80.8	**1.6**	No	532 ft	1,681 ft	5,317 ft	16,815 ft
Between Alameda de las Pulgas & Hillsdale Boulevard	78.4	79.7	**1.3**	No	466 ft	1,473 ft	4,657 ft	14,725 ft
Between Hillsdale Boulevard & City Limits	77.9	79.2	**1.3**	No	415 ft	1,312 ft	4,150 ft	13,125 ft
1st Avenue								
East of B Street	57.2	61.2	**4.0**	No	-	-	66 ft	207 ft
West of B Street	55.4	61.2	**5.8**	**Yes**	-	-	66 ft	208 ft

TABLE 4.11-11 FUTURE (GENERAL PLAN BUILDOUT) ROADWAY NOISE LEVELS

Roadway Segment	L_{dn} at 50 Feet		Difference	Significant Increase?	Distance to L_{dn} Contour – General Plan Buildout (feet)			
	Existing	Existing Plus Project			70 dBA	65 dBA	60 dBA	55 dBA
2nd Avenue								
East of B Street	58.1	61.2	**3.1**	No	-	-	66 ft	209 ft
Between B Street & Ellsworth Avenue	58.3	60.0	**1.7**	No	-	-	50 ft	157 ft
Between Ellsworth Avenue & San Mateo Drive	59.6	60.6	**1.0**	No	-	-	57 ft	180 ft
Between San Mateo Drive & El Camino Real	61.5	62.1	**0.6**	No	-	-	81 ft	256 ft
3rd Avenue								
East of Humboldt Street	65.4	65.8	**0.4**	No	-	60 ft	191 ft	603 ft
Between Humboldt Street & Delaware Street	62.2	62.8	**0.6**	No	-	-	95 ft	300 ft
Between Delaware Street & B Street	60.4	62.9	**2.5**	No	-	-	98 ft	309 ft
Between B Street & Ellsworth Avenue	59.3	61.7	**2.4**	No	-	-	74 ft	235 ft
Between Ellsworth Avenue & San Mateo Drive	59.6	62.0	**2.4**	No	-	-	79 ft	249 ft
Between San Mateo Drive & El Camino Real	59.9	62.0	**2.1**	No	-	-	80 ft	252 ft
4th Avenue								
East of Humboldt Street	65.8	66.1	**0.3**	No	-	64 ft	203 ft	641 ft
Between Humboldt Street & Delaware Street	63.6	63.7	**0.1**	No	-	37 ft	117 ft	369 ft
Between Delaware Street & B Street	61.3	63.3	**2.0**	No	-	34 ft	107 ft	337 ft
Between B Street & San Mateo Drive	60.8	63.7	**2.9**	No	-	37 ft	116 ft	367 ft
Between San Mateo Drive & El Camino Real	60.4	64.1	**3.7**	No	-	41 ft	128 ft	406 ft
5th Avenue								
East of Delaware Street	58.9	62.8	**3.9**	No	-	-	94 ft	298 ft
Between Delaware Street & B Street	60.7	62.5	**1.8**	No	-	-	89 ft	282 ft
Between B Street & San Mateo Drive	61.1	63.1	**2.0**	No	-	32 ft	102 ft	322 ft
Between San Mateo Drive & El Camino Real	61.2	62.1	**0.9**	No	-	-	81 ft	256 ft
9th Avenue								
East of Delaware Street	59.4	62.3	**2.9**	No	-	-	85 ft	270 ft
Between Delaware Street & B Street	61.7	62.7	**1.0**	No	-	-	94 ft	296 ft
Between B Street and El Camino Real	60.3	61.8	**1.5**	No	-	-	76 ft	239 ft

TABLE 4.11-11 FUTURE (GENERAL PLAN BUILDOUT) ROADWAY NOISE LEVELS

Roadway Segment	L_{dn} at 50 Feet		Difference	Significant Increase?	Distance to L_{dn} Contour – General Plan Buildout (feet)			
	Existing	Existing Plus Project			70 dBA	65 dBA	60 dBA	55 dBA
31st Avenue								
Between Delaware Street & El Camino Real	59.2	61.8	**2.6**	No	-	-	76 ft	239 ft
West of El Camino Real	62.0	62.8	**0.8**	No	-	-	95 ft	299 ft
42nd Avenue								
West of El Camino Real	59.4	61.5	**2.1**	No	-	-	71 ft	226 ft
Alameda de las Pulgas								
Between Crystal Springs Road & 20th Avenue	67.2	68.0	**0.8**	No	-	100 ft	316 ft	1,000 ft
Between 20th Avenue & Hillsdale Boulevard	65.1	66.5	**1.4**	No	-	71 ft	225 ft	712 ft
Concar Drive								
East of Grant Street	62.0	64.0	**2.0**	No	-	40 ft	127 ft	402 ft
Between Grant Street & Delaware Street	64.3	65.3	**1.0**	No	-	54 ft	171 ft	540 ft
Between Delaware Street & State Route 92 Ramps	65.9	66.1	**0.2**	No	-	64 ft	201 ft	637 ft
West of State Route 92 Ramps	57.2	61.0	**3.8**	No	-	-	63 ft	199 ft
Crystal Springs Road								
West of El Camino Real	60.4	63.4	**3.0**	No	-	34 ft	108 ft	343 ft
B Street								
North of 1st Avenue	59.0	61.7	**2.7**	No	-	-	74 ft	234 ft
Between 1st Avenue & 2nd Avenue	58.8	62.1	**3.3**	No	-	-	82 ft	258 ft
Between 2nd Avenue & 3rd Avenue	58.8	61.5	**2.7**	No	-	-	70 ft	223 ft
Between 3rd Avenue & 4th Avenue	58.6	61.0	**2.4**	No	-	-	63 ft	200 ft
Between 4th Avenue & 5th Avenue	57.8	60.6	**2.8**	No	-	-	58 ft	182 ft
Between 5th Avenue & 9th Avenue	58.9	62.2	**3.3**	No			83 ft	261 ft
South of 9th Avenue	59.7	62.9	**3.2**	No			97 ft	305 ft
Baldwin Avenue								
East of El Camino Real	59.7	63.0	**3.3**	No	-	-	99 ft	313 ft
West of El Camino Real	58.4	58.6	**0.2**	No	-	-	36 ft	114 ft
Delaware Street								
Between Peninsula Avenue & Poplar Avenue	61.7	63.2	**1.5**	No	-	33 ft	103 ft	327 ft
Between Poplar Avenue & 3rd Avenue	62.0	62.7	**0.7**	No	-	-	94 ft	296 ft

TABLE 4.11-11 FUTURE (GENERAL PLAN BUILDOUT) ROADWAY NOISE LEVELS

Roadway Segment	L_{dn} at 50 Feet		Difference	Significant Increase?	Distance to L_{dn} Contour – General Plan Buildout (feet)			
	Existing	Existing Plus Project			70 dBA	65 dBA	60 dBA	55 dBA
Between 3rd Avenue & 4th Avenue	63.2	63.5	**0.3**	No	-	35 ft	111 ft	352 ft
Between 4th Avenue & 5th Avenue	62.3	62.9	**0.6**	No	-	-	97 ft	308 ft
Between 5th Avenue & 9th Avenue	61.4	61.9	**0.5**	No	-	-	77 ft	242 ft
Between 9th Avenue & 16th Avenue	61.7	62.0	**0.3**	No	-	-	79 ft	249 ft
Between 16th Avenue & Concar Drive	65.7	66.4	**0.7**	No	-	70 ft	220 ft	697 ft
Between Concar Drive & 19th Avenue	66.3	67.0	**0.7**	No	-	79 ft	249 ft	787 ft
Between 19th Avenue & Saratoga Drive	66.1	66.7	**0.6**	No	-	74 ft	234 ft	739 ft
Between Saratoga Drive & 25th Avenue	63.7	64.9	**1.2**	No	-	49 ft	155 ft	491 ft
Between 25th Avenue & 28th Avenue	62.0	63.4	**1.4**	No	-	-	110 ft	346 ft
Between 28th Avenue & 31st Avenue	59.8	62.6	**2.8**	No	-	-	91 ft	288 ft
South of 31st Avenue	61.2	62.2	**1.0**	No	-	-	84 ft	265 ft
El Camino Real								
Between Peninsula Avenue & Poplar Avenue	69.2	70.7	**1.5**	No	58 ft	184 ft	582 ft	1,839 ft
Between Poplar Avenue & Tilton Avenue	69.8	70.5	**0.7**	No	57 ft	179 ft	566 ft	1,790 ft
Between Tilton Avenue & Crystal Springs Road	70.0	70.7	**0.7**	No	59 ft	186 ft	587 ft	1,858 ft
Between Crystal Springs Road & 2nd Avenue	69.7	70.1	**0.4**	No	51 ft	161 ft	510 ft	1,613 ft
Between 2nd Avenue & 3rd Avenue	71.4	71.8	**0.4**	No	75 ft	237 ft	751 ft	2,374 ft
Between 3rd Avenue & 4th Avenue	71.5	71.9	**0.4**	No	78 ft	246 ft	779 ft	2,463 ft
Between 4th Avenue & Barneson Avenue	71.7	72.0	**0.3**	No	79 ft	251 ft	792 ft	2,506 ft
Between Barneson Avenue & 17th Avenue	71.7	72.4	**0.7**	No	87 ft	276 ft	871 ft	2,756 ft
Between 17th Avenue & 20th Avenue	72.3	73.4	**1.1**	No	110 ft	349 ft	1,104 ft	3,492 ft
Between 20th Avenue & 25th Avenue	71.2	72.9	**1.7**	No	97 ft	305 ft	965 ft	3,052 ft
Between 25th Avenue & 28th Avenue	71.4	72.9	**1.5**	No	98 ft	309 ft	978 ft	3,093 ft

TABLE 4.11-11 FUTURE (GENERAL PLAN BUILDOUT) ROADWAY NOISE LEVELS

Roadway Segment	L_{dn} at 50 Feet		Difference	Significant Increase?	Distance to L_{dn} Contour – General Plan Buildout (feet)			
	Existing	Existing Plus Project			70 dBA	65 dBA	60 dBA	55 dBA
Between 28th Avenue & 31st Avenue	71.4	72.8	**1.4**	No	95 ft	299 ft	946 ft	2,990 ft
Between 31st Avenue & Hillsdale Boulevard Ramps	68.5	69.4	**0.9**	No	-	138 ft	435 ft	1,377 ft
Between Hillsdale Boulevard Ramps & 41st Avenue	68.2	68.9	**0.7**	No	-	122 ft	385 ft	1,218 ft
Between 41st Avenue & 42nd Avenue	70.3	70.9	**0.6**	No	62 ft	196 ft	621 ft	1,963 ft
Ellsworth Avenue								
North of 2nd Avenue	59.7	62.8	**3.1**	No	-	-	95 ft	300 ft
Between 2nd Avenue & 3rd Avenue	58.4	61.9	**3.5**	No	-	-	77 ft	244 ft
South of 3rd Avenue	57.5	61.1	**3.6**	No	-	-	64 ft	204 ft
Fashion Island Boulevard/Bridgepointe Parkway								
Between Chess Drive & Baker Way	62.6	63.6	**1.0**	No	-	-	114 ft	361 ft
Between Baker Way & Mariner's Island Boulevard	65.5	67.3	**1.8**	No	-	85 ft	269 ft	850 ft
Between Mariner's Island Boulevard & Norfolk Street	65.1	66.7	**1.6**	No	-	74 ft	236 ft	745 ft
Between Norfolk Street & US Highway 101 Ramps	65.3	65.9	**0.6**	No	-	62 ft	197 ft	622 ft
Franklin Parkway								
Between Saratoga Drive & Delaware Street	60.5	64.7	**4.2**	No	-	-	148 ft	468 ft
Hillsdale Boulevard								
East of Norfolk Street	71.8	72.7	**0.9**	No	93 ft	295 ft	932 ft	2,949 ft
Between Norfolk Street & US Highway 101 Ramps	69.8	70.3	**0.5**	No	-	170 ft	538 ft	1,703 ft
Between US Highway 101 Ramps & Saratoga Drive	70.6	71.3	**0.7**	No	67 ft	211 ft	668 ft	2,111
Between Saratoga Drive & El Camino Real	68.4	68.6	**0.2**	No	-	114 ft	359 ft	1,137 ft
Between El Camino Real & Alameda de las Pulgas	64.2	65.0	**0.8**	No	-	50 ft	157 ft	498 ft
Between Alameda de las Pulgas & Campus Drive	62.1	63.5	**1.4**	No	-	35 ft	112 ft	354 ft
Humboldt Street								
Between Peninsula Avenue & Poplar Avenue	61.9	63.1	**1.2**	No	-	33 ft	103 ft	326 ft
Between Poplar Avenue & 3rd Avenue	61.8	63.2	**1.4**	No	-	33 ft	103 ft	327 ft

TABLE 4.11-11 FUTURE (GENERAL PLAN BUILDOUT) ROADWAY NOISE LEVELS

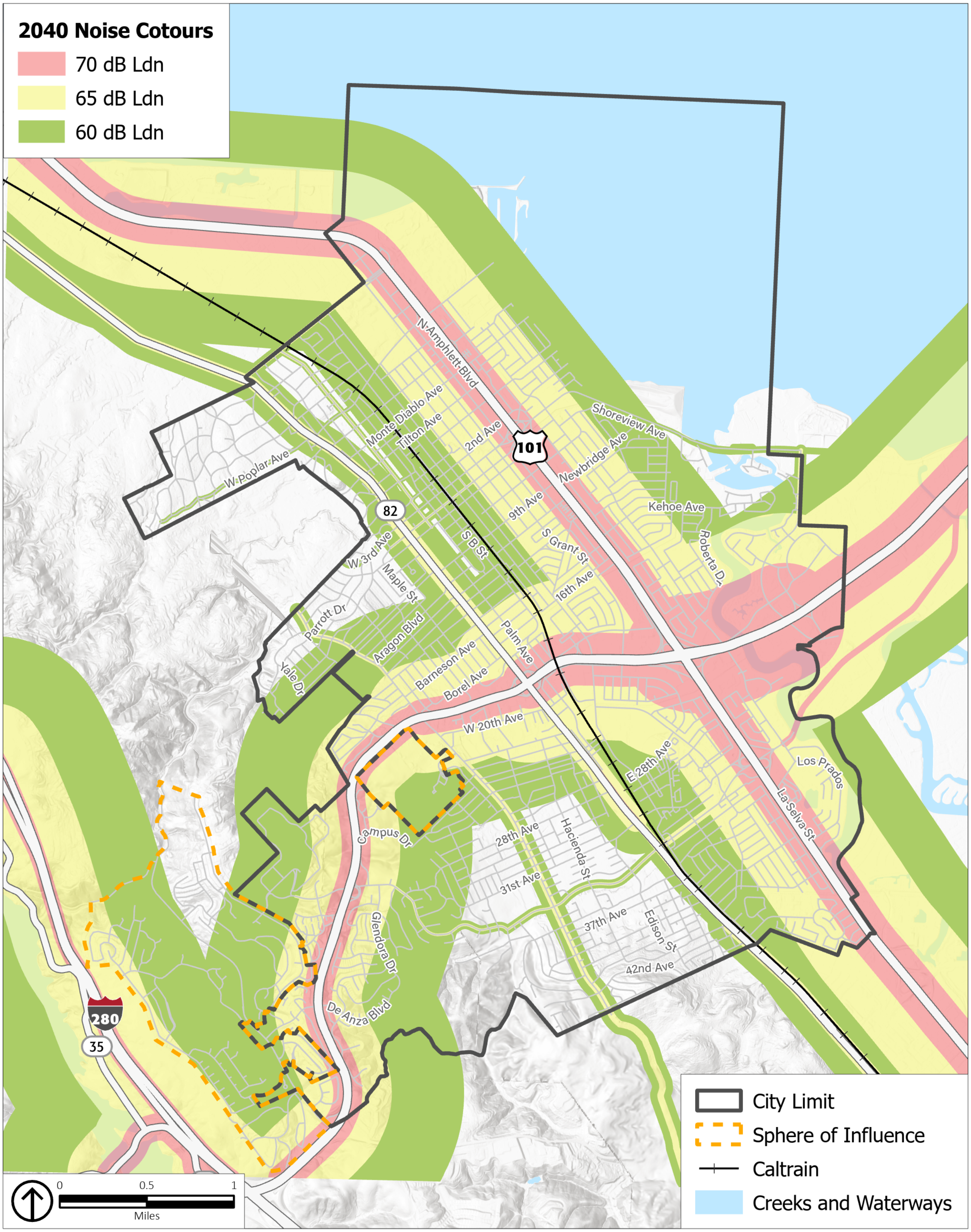
Roadway Segment	L_{dn} at 50 Feet		Difference	Significant Increase?	Distance to L_{dn} Contour – General Plan Buildout (feet)			
	Existing	Existing Plus Project			70 dBA	65 dBA	60 dBA	55 dBA
Between 3rd Avenue & 4th Avenue	60.9	61.5	**0.6**	No	-	-	71 ft	223 ft
South of 4th Avenue	60.0	61.6	**0.6**	No	-	-	72 ft	227 ft
Mariner's Island Boulevard								
Between 3rd Avenue & Fashion Island Boulevard	62.6	64.7	**2.1**	No	-	-	147 ft	464 ft
South of Fashion Island Boulevard	65.7	66.0	**0.3**	No	-	63 ft	201 ft	634 ft
Norfolk Street								
North of 3rd Avenue	61.5	63.0	**1.5**	No	-	-	99 ft	313 ft
Between 3rd Avenue & Kehoe Avenue	62.9	64.2	**1.3**	No	-	42 ft	132 ft	417 ft
Between Kehoe Avenue & Fashion Island Boulevard	62.8	64.2	**1.4**	No	-	42 ft	131 ft	416 ft
Between Fashion Island Boulevard & El Camino Real	62.8	63.7	**0.9**	No	-	-	117 ft	371 ft
Peninsula Avenue								
Between Bayshore Boulevard & Humboldt Street	67.5	68.2	**0.7**	No	-	104 ft	330 ft	1,042 ft
Between Humboldt Street & Delaware Street	64.8	65.3	**0.5**	No	-	53 ft	169 ft	535 ft
Between Delaware Street & San Mateo Drive	64.2	64.4	**0.2**	No	-	44 ft	139 ft	439 ft
Between San Mateo Drive & El Camino Real	60.3	61.1	**0.8**	No	-	-	65 ft	205 ft
Poplar Avenue								
Between US Highway 101 & Humboldt Street	61.7	61.7	**0.0**	No	-	-	75 ft	236 ft
Between Humboldt Street & Delaware Street	60.6	60.7	**0.1**	No	-	-	59 ft	187 ft
Between Delaware Street & San Mateo Drive	59.5	60.5	**1.0**	No	-	-	56 ft	178 ft
Between San Mateo Drive & El Camino Real	60.1	62.6	**2.5**	No	-	-	91 ft	287 ft
San Mateo Drive								
Between Peninsula Avenue & Poplar Avenue	64.9	65.0	**0.1**	No	-	50 ft	157 ft	497 ft
Between Poplar Avenue & 2nd Avenue	62.9	63.6	**0.7**	No	-	36 ft	114 ft	360 ft
Between 2nd Avenue & 3rd Avenue	59.9	62.4	**2.5**	No	-	-	86 ft	273 ft

TABLE 4.11-11 FUTURE (GENERAL PLAN BUILDOUT) ROADWAY NOISE LEVELS

Roadway Segment	L_{dn} at 50 Feet		Difference	Significant Increase?	Distance to L_{dn} Contour – General Plan Buildout (feet)			
	Existing	Existing Plus Project			70 dBA	65 dBA	60 dBA	55 dBA
Between 3rd Avenue 4th Avenue	59.4	62.0	**2.6**	No	-	-	80 ft	253 ft
Between 4th Avenue & 5th Avenue	58.3	59.8	**1.5**	No	-	-	48 ft	151 ft
Saratoga Drive								
Between Delaware Street & Franklin Parkway	64.1	66.1	**2.0**	No	-	65 ft	205 ft	649 ft
Between Franklin Parkway & Hillsdale Boulevard	63.9	65.7	**1.8**	No	-	58 ft	184 ft	583 ft
Between Hillsdale Boulevard & Santa Clara Way	60.6	60.9	**0.3**	No	-	-	62 ft	196 ft
Tilton Avenue								
East of El Camino Real	59.3	61.2	**1.9**	No	-	-	66 ft	209 ft

Notes: shading = significant increase
a. Modeled noise calculations adjusted to account for 10-foot-high sound walls adjacent to US Highway 101 as it traverses San Mateo.
b. The nearest segment of Interstate 280 to San Mateo traverses to the west of San Mateo, outside of the EIR Study Area. No Existing + Project traffic is available for Interstate 280.
Source: Traffic noise levels were calculated using the FHWA roadway noise prediction model in conjunction with the trip generation rate identified by Kittelson and Associates. Refer to Appendix D2 for traffic noise modeling assumptions and results.

All future projects subject to discretionary review under the proposed project would be required to be evaluated for noise/land use compatibility, including traffic noise/land use compatibility. Proposed General Plan Policy N 1.1 would require the integration of noise considerations into land use planning decisions to minimize new traffic noise impacts to or from new development. Proposed Policy N 1.2 would require the submittal of an acoustical analysis and interior noise insulation for all "noise sensitive" land uses that are determined to likely have an exterior noise level of 60 dBA L_{dn} or above, as shown on Figure N-2 of the General Plan (Figure 4.11-5 of this chapter). Similarly, proposed Policy N 1.3 would require the submittal of an acoustical analysis for all new multifamily common open space that have an exterior noise level of 60 dBA L_{dn} or above, as shown on Figure N-2 of the General Plan (Figure 4.11-5 of this chapter). The acoustical analyses at the project level would include refined evaluation of noise/land use compatibility in order to more precisely identify the existing ambient noise environment affecting the subject site, typically achieved through the conducting of baseline noise measurements with a sound level meter and/or calculating traffic noise from surrounding roadway facilities with regulatory traffic noise models. The location-specific baseline noise measurements and/or traffic noise calculations presented in the acoustical analyses either demonstrate the noise/land use compatibility between a proposed land use and location or assist with the characterization of the ambient noise environment in a manner that allows for implementation of the appropriate noise attenuation measures necessary to protect the new noise-sensitive land use.



Source: ECORP, 2023; PlaceWorks, 2023.

Figure 4.11-5
Future Traffic Noise Contours

The Noise (N) Element of the proposed General Plan also includes Policy N 2.4, which promotes reduced traffic noise along highways and high-volume roadway where noise-sensitive land uses are adversely impacted by excessive traffic noise levels as follows:

- **Goal N-2:** Minimize unnecessary, annoying, or unhealthful noise.
  - **Policy N 2.4: Traffic Noise.** Recognize projected increases in ambient noise levels resulting from future traffic increases, as shown on Figure N-2. Promote reduced traffic speeds and the installation of noise barriers or other methods to reduce traffic noise along highways and high-volume roadways where noise-sensitive land uses (listed in Table N-1) [of the proposed General Plan] are adversely impacted by excessive noise levels (60 dBA [Ldn] or above).

Nonetheless, the 1st Avenue roadway segment west of B Street would experience an increase of more than 5.0 dBA L_{dn} over existing conditions with buildout anticipated under the proposed project, and traffic noise under the proposed project would therefore be a *significant* impact.

Impact NOISE-1: Buildout under the proposed project is anticipated to result in unacceptable traffic noise with an increase of more than 5.0 dBA L_{dn} over existing conditions along one roadway segment (1st Avenue west of B Street) within the EIR Study Area.

Mitigation Measure: None available.

Significance with Mitigation: Significant and Unavoidable. Lead agencies have limited remedies at their disposal to effectively reduce traffic-related noise. Addressing traffic noise at the receiver rather than the source usually takes the form of noise barriers (i.e., sound walls). While constructing noise barriers along streets would reduce noise, the placement of sound walls between existing residences/businesses and local roadways would not be desirable as it would conflict with the community's aesthetic, design, and character, and is therefore deemed infeasible. Furthermore, such barriers would likely require property owner approval, which cannot be ensured. While measures such as encouraging ridesharing, carpooling, and alternative modes of transportation could reduce vehicle volumes, and are promoted by the City and by the proposed project, such measures cannot be relied upon to demonstrate a reduction in vehicle trips to the extent needed to ensure reduced vehicle noise levels below established thresholds. Therefore, no feasible mitigation measures exist to reduce this impact, and the impact to the 1st Avenue roadway segment west of B Street is significant and unavoidable.

NOISE-2 The proposed project would not result in the generation of excessive groundborne vibration or groundborne noise levels.

Construction Vibration

Future construction activities under the proposed project have the potential to expose sensitive land uses within San Mateo to groundborne vibration. Construction activities would occur in a variety of locations throughout the EIR Study Area, and may require the use of off-road equipment known to generate some degree of vibration. Construction activities that generate excessive vibration, such as blasting, would not be expected to occur from future development due to the urbanized nature of San Mateo and small number of undeveloped properties, which reduces the likelihood of blasting during construction. Receptors sensitive to vibration include structures (especially older masonry structures), people (especially residents, the elderly, and the sick), and equipment (e.g., magnetic resonance imaging equipment, high resolution lithographic, optical and electron microscopes). Regarding the potential effects of groundborne vibration to people, except for long-term occupational exposure, vibration levels rarely affect human health.

The majority of construction equipment is not situated at any one location during construction activities, but rather spread throughout a construction site and at various distances from sensitive receptors. Since specific future projects under the proposed project are unknown at this time, it is conservatively assumed that the construction areas associated with these future projects could be located within 50 feet of sensitive land uses. The primary vibration-generating activities would occur during grading, placement of underground utilities, and construction of foundations. Table 4.11-12, *Representative Vibration Source Levels for Construction Equipment,* shows the typical vibration levels produced by construction equipment at 50 feet.

TABLE 4.11-12 REPRESENTATIVE VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Peak Particle Velocity at 50 Feet (inches per second)	Vibration Level Vibration Velocity at 50 Feet (VdB)
Pile Driver (Impact)	0.225	95
Pile Driver (Sonic)	0.059	84
Vibratory Roller	0.073	85
Hoe Ram	0.031	78
Large Bulldozer	0.031	78
Caisson Drilling	0.031	78
Loaded Trucks	0.026	77
Jackhammer	0.012	70
Small Bulldozer	0.001	49

Source: California Department of Transportation, April 2020, *Transportation and Construction Vibration Guidance Manual*, https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf, accessed April 11, 2023. Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment*, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 11, 2023.

As identified in Table 4.11-2, the threshold at which there is a risk of architectural damage to historic and some old buildings is 0.25 PPV (in/sec). The threshold at which there is a risk of architectural damage to older residential structures is 0.3 PPV (in/sec). This is also the threshold at which vibrations may begin to feel severe to people in buildings. The threshold at which there is a risk of architectural damage to new residential structures and modern industrial/commercial buildings is 0.5 PPV (in/sec).

Proposed General Plan Policy N 2.7, discussed in impact discussion NOISE-1, would require construction noise limits and vibration monitoring around sensitive receptors, including through limiting construction hours and individual and cumulative noise from construction equipment. For larger development projects that demand intensive construction periods and/or use equipment that could create vibration impacts, proposed Policy N 2.7 requires a vibration impact analysis, as well as monitoring and reporting of noise/vibration levels throughout construction, consistent with industry standards.

Proposed Policy N 2.7 provides a strong policy framework for minimizing potential groundborne vibration impacts from construction. The use of the identified thresholds specific to building types during the requirement of construction vibration monitoring would ensure no damage to nearby structures. In the case that construction vibration monitoring was to identify a construction activity surpassing a threshold, vibration-reduction measures could be implemented. Examples of such measures include, but are not limited to:

- Implementing “quiet” pile-driving technology (such as the use of a sonic pile driver instead of an impact pile driver, and/or pre-drilling of piles and using more than one pile driver to shorten the total pile driving duration).
- Use of cushion blocks to dampen impact noise, if feasible based on soil conditions. Cushion blocks are blocks of material that are used with impact hammer pile drivers. They consist of blocks of material placed atop a piling during installation to minimize noise generated when driving the pile. Materials typically used for cushion blocks include wood, nylon and micarta (a composite material).
- Installing shrouds around the impact device.

Adherence to the vibration-reducing measures in the proposed Noise Element would ensure that vibration reduction is being provided to minimize the temporary impact that is construction. Construction vibration under the proposed project would be *less than significant*.

Train Vibration

As discussed in impact discussion NOISE-1, the proposed project would not generate any new train trips through the EIR Study Area. Vibration levels as a result of trains traveling along the existing railroad and light rail corridors under the proposed project would remain the same as existing conditions, unless otherwise changed by the respective rail authority. However, development under the proposed project has the potential to locate new development along the Caltrain/UPRR rail line, where it would potentially be exposed to substantial levels of vibration.

Passing trains create vibration events that last approximately 2 minutes, though it is extremely rare for vibration from train operations to cause substantial or even minor cosmetic building damage.[16] Older, historic buildings often considered fragile are the predominate source of concern from rail-related vibration.[17] According to the Federal Transit Administration, groundborne vibration from “locomotive-powered passenger and freight rail” is readily perceptible at distances of less than 50 feet between the track and building foundations (0.08 PPV), while vibration from “rapid transit/light rail” is barely

[16] Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment*, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 11, 2023.

[17] Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment*, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 11, 2023.

perceptible at that distance (0.01 PPV).[18] While each building has different characteristics relative to structure-borne vibration, in general, the heavier the building, the lower the levels of vibration. Additionally, community (human) response to vibration correlates with the frequency of events and, intuitively, more frequent events of low vibration levels may evoke the same response as fewer high vibration level events.

Table 4.11-13, *Representative Train Vibration Levels,* identifies train vibration levels at several distances within 200 feet, as determined by the Federal Transit Administration.[19]

TABLE 4.11-13 REPRESENTATIVE TRAIN VIBRATION LEVELS

Distance to Source (Feet)	Locomotive-Powered Trains		Rapid Transit/Light Rail	
	Peak Particle Velocity (inches per second)	Vibration Level Vibration Velocity (VdB)	Peak Particle Velocity (inches per second)	Vibration Level Vibration Velocity (VdB)
10	0.30	95	0.07	82
25	0.10	90	0.02	78
50	0.08	85	0.02	74
75	0.07	82	0.01 – 0.02	70
100	0.04	79	0.01 – 0.02	68
125	0.02	78	0.01 – 0.02	66
150	0.02	78	>0.01	64
175	0.01	73	>0.01	62
200	0.01	71	>0.01	60

Source: Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment*, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 11, 2023.

As shown in Table 4.11-13, a locomotive-powered train traversing at a distance of 10 feet from a receptor could be expected to result in 0.30 PPV (95 VdB) at the receptor, which is the threshold at which there is a risk of architectural damage to older residential structures. The construction of new buildings under the proposed project would be done in conformance with the most recent building standards, reducing the potential for damage to buildings from typical rail noise. In addition, the Noise (N) Element of the proposed General Plan addresses train vibration as follows:

- **Goal N-2:** Minimize unnecessary, annoying, or unhealthful noise.
  - **Policy N 2.6: Railroad Vibration.** Require that new residential projects (or other sensitive uses) within 200 feet of existing railroad lines conduct a ground-borne vibration and noise evaluation consistent with Federal Transit Administration-approved methodologies.

Adherence to proposed General Plan Policy N 2.6 would ensure that train-induced vibration under the proposed would be *less than significant*.

[18] Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment*, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 11, 2023.

[19] Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment*, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 11, 2023.

Significance without Mitigation: Less than significant.

NOISE-3	**The proposed project would not expose people residing or working in the project area to excessive noise levels within the vicinity of a private airstrip or an airport land use plan.**

The northeastern part of the EIR Study Area is somewhat affected by aircraft activity due to nearby San Francisco International Airport. Typically, aircraft are on approach (i.e., landing) over San Francisco Bay just to the east of San Mateo. However, the city is located outside of the Airport's 65 dBA CNEL noise contour, and the proposed project would not affect the frequency or flight paths of flights into the San Francisco International Airport. Therefore, people within the EIR Study Area would not be exposed to excessive noise levels and there would be *no impact*.

Significance without Mitigation: No Impact.

NOISE-4	**The proposed project, in combination with past, present, and reasonably foreseeable projects, would result in cumulative traffic noise impacts in the area.**

Cumulative Construction Noise and Vibration

Construction noise impacts primarily affect the areas immediately adjacent to the construction site. Development that could occur with implementation of the proposed project and cumulative development within nearby areas of San Mateo County be constructed contemporaneously and could result in construction noise levels higher than those of development of under the proposed project alone at some receptor locations. As discussed above, noise levels generated by individual pieces of construction equipment typically range from approximately 74 dBA to 101.3 dBA L_{max} at 50 feet and 67.7 dBA to 94.3 dBA L_{eq} at 50 feet. The City of San Mateo has established and enforces noise standards for construction activity for both daytime and nighttime hours. Further, the proposed General Plan Noise Element would regulate the construction noise of larger development projects that demand intensive construction periods by requiring construction noise monitoring and reporting of noise levels throughout construction. A monitoring plan would be required to be prepared to include information on the monitoring locations, durations and regularity, the instrumentation to be used, and appropriate noise-control measures to ensure compliance with the noise ordinance. Therefore, while the potential exists for construction projects under the proposed project and other foreseeable development to occur simultaneously and in proximity to one another, construction equipment operations would operate within the constraints of SMMC.

The potential for a cumulative vibration-related damage impact is minimal as vibration impacts are based on instantaneous PPV levels. Thus, worst-case groundborne vibration levels from construction are determined by whichever individual piece of equipment generates the highest vibration levels. Unlike the analysis for average noise levels, in which noise levels of multiple pieces of equipment can be combined to generate a maximum combined noise level, instantaneous peak vibration levels do not combine in this manner. Vibration from multiple construction sites, even if they are located close to one another, would not combine to raise the maximum PPV. Therefore, vibration impacts resulting from construction of future development under the proposed project would not combine with vibration effects from cumulative projects in the vicinity and the impact would be *less than significant*.

Cumulative Stationary Source Noise

Long-term stationary noise sources associated with the development and activities under the proposed project, combined with other cumulative projects, could cause local noise level increases. Noise levels associated with the proposed project and cumulative development combined could result in higher noise levels than considered separately. However, as described above, SMMC Chapter 7.30 establishes regulations to protect the inhabitants of the city against all forms of nuisances, including stationary source noise, as shown in Table 4.11-4. With adherence to SMMC Chapter 7.30, future development under the proposed project and cumulative development combined would not create cumulatively considerable stationary noise sources and the impact would be *less than significant*.

Significance without Mitigation: Less than significant.

Cumulative Traffic Noise

The discussion of cumulative operational noise impacts assesses whether future development under the proposed project, in conjunction with overall citywide growth and other cumulative projects, would significantly affect the roadway noise and, if so, whether the proposed project's contribution to the cumulative impact would be considerable. The analysis contained in impact discussion NOISE-1 above is largely a cumulative analysis in that the transportation modeling also includes the citywide and regional changes in housing units and employment that would occur through the General Plan horizon of 2040. As identified in Impact NOISE-1, the proposed project would result in a significant traffic noise impact to the segment of 1st Avenue west of B Street; therefore, the proposed project would result in a cumulatively considerable and *significant* noise impact associated with cumulative traffic noise.

Impact NOISE-6: Buildout under the proposed project is anticipated to result in unacceptable cumulative traffic noise within the EIR Study Area.

> **Mitigation Measures:** None available.
>
> **Significance with Mitigation:** Significant and unavoidable. As discussed in impact discussion NOISE-1, there are no feasible mitigation measures to reduce this impact.

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