

4.10 Noise

This section analyzes the potential effects of development under the Inner Harbor Specific Plan to noise. Discussed are the environmental and regulatory setting of noise and vibration, the baseline for determining environmental impacts, the significance criteria used for determining environmental impacts, and potential construction and operational impacts of implementation of the Specific Plan on existing sensitive receptors. Mitigation measures are identified to reduce potentially significant impacts. Background information on environmental acoustics, including definitions of terms commonly used in noise and vibration analysis, is also provided.

This section also presents a project-level analysis of the Harbor View project, which is located largely within the Specific Plan Area.

While potential effects of the environment on the project are arguably not required to be analyzed or mitigated under CEQA, this section nevertheless analyzes potential effects of existing noise levels on proposed sensitive receptors that would occur under the Specific Plan, as set forth in CEQA *Guidelines*, Appendix G, Significance Criteria. Including this assessment provides for a conservative analysis and in the interest of providing information to the public and decision-makers.

4.10.1 Environmental Setting

Noise Background

Noise Exposure and Community Noise

An individual's noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. However, noise levels rarely persist consistently over a long period of time. In fact, community noise varies continuously with 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. Background noise levels change throughout a typical day, but do so gradually, corresponding with the addition and subtraction of distant noise sources and atmospheric conditions. The addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens) makes community noise constantly variable throughout a day.

Sound is characterized by various parameters that describe the rate of oscillation (frequency) of sound waves, the distance between successive troughs or crests in the wave, the speed that it travels, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound, and the decibel (dB) scale is used to quantify sound intensity. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called "A-weighting," expressed as "dBA." The dBA, or

A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated. **Table 4.10-1** shows some representative noise sources and their corresponding noise levels in dBA (HUD, 2009).

**TABLE 4.10-1
TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT**

Examples of Common, Easily Recognized Sounds	Decibels (dBA) at 50 feet	Subjective Evaluations
Near Jet Engine	140	Deafening
Threshold of Pain (Discomfort)	130	
Threshold of Feeling – Hard Rock Band	120	
Accelerating Motorcycle (at a few feet away)	110	
Loud Horn (at 10 feet away)	100	Very Loud
Noisy Urban Street	90	
Noisy Factory	85	
School Cafeteria with Untreated Surfaces	80	Loud
Near Freeway Auto Traffic	60	Moderate
Average Office	50	
Soft Radio Music in Apartment	40	Faint
Average Residence Without Stereo Playing	30	
Average Whisper	20	Very Faint
Rustle of Leaves in Wind	10	
Human Breathing	5	
Threshold of Audibility	0	

NOTE: Continuous exposure above 85 dBA is likely to degrade the hearing of most people. Range of speech is 50 to 70 dBA.

SOURCE: United States Department of Housing and Urban Development, *The Noise Guidebook*, 2009.

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. Other frequently used noise descriptors are summarized below:

L_{eq} : The equivalent sound level is used to describe noise over a specified period of time, in terms of a single numerical value. The L_{eq} is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max} : The instantaneous maximum noise level measured during the measurement period of interest.

DNL: The day-night noise level (DNL; also referred to as L_{dn}) or the energy average of the A-weighted sound levels occurring during a 24-hour period and which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night

(“penalizing” nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

CNEL: Similar to the DNL, the Community Noise Equivalent Level (CNEL) adds a 5-dBA “penalty” for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

Typical Noise Levels

Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right of way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need special glass windows.

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- **Interference with activities such as speech, sleep, and learning** – The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors, the thresholds are about 15 dBA higher. Interior residential standards for multi-family dwellings are set by the State of California at 45 DNL. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses.
- **Subjective effects of annoyance, nuisance, and dissatisfaction** – Based on attitude surveys used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas, the main causes for annoyance are interference with speech, radio and television, house vibrations, and interference with sleep and rest. The DNL as a measure has been found to provide a valid correlation of noise level and the percentage of people annoyed. Three aspects of community noise are most important in determining subjective response – the level of sound, the frequency composition or spectrum of the sound, and the variation of sound level with time.
- **Physiological effects such as hearing loss or sudden startling** – 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.

Environmental noise typically produces effects in the first two categories. Workers at industrial plants often experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance and different tolerances to noise tend to develop based on an individual’s past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way the new noise compares to the existing noise levels to which one has adapted: the so called “ambient noise” level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise would be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1-dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference when the change in noise is perceived but does not cause a human response;
- A change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness and can cause an adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. A ruler is a linear scale: it has marks on it corresponding to equal quantities of distance. One way of expressing this is to say that the ratio of successive intervals is equal to one. A logarithmic scale is different in that the ratio of successive intervals is not equal to one. Each interval on a logarithmic scale is some common factor larger than the previous interval. A typical ratio is 10, so that the marks on the scale read: 1, 10, 100, 1,000, 10,000, etc., doubling the variable plotted on the x-axis. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather they combine logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Sound level naturally decreases as with distance from the source. This basic attenuation rate is referred to as the geometric spreading loss. The basic rate of geometric spreading loss depends on whether a given noise source can be characterized as a point source or a line source. Point sources of noise, including stationary mobile sources such as idling vehicles or on-site construction equipment, attenuate (lessen) at a rate of 6.0 dBA per doubling of distance from the source. In many cases, additional noise attenuation occurs due to ground absorption, reflective wave canceling, and physical barriers and/or topography that block the line of sight between the source and receiver. These factors are collectively referred to as excess ground attenuation.

Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed.

Trees and vegetation, buildings, and barriers reduce the noise level that would otherwise occur at a given receptor distance. However, for a vegetative strip to have a noticeable effect on noise levels, it must be dense and wide. For example, a stand of trees must be at least 100 feet wide and dense enough to completely obstruct a visual path to the source to attenuate noise by five dB (Caltrans, 2009). A row of structures can shield more distant receivers depending upon the size and spacing of the intervening structures and site geometry. Generally, for an average residential area where the first row of houses covers at least 40 percent of the total area, the reduction provided by the first row of houses is approximately 3.0 dB and 1.5 dB for each additional row.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal and, as velocity, is discussed in terms of inches per second. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is the average of the squared amplitude of the signal. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration (FTA, 2006).

Existing Ambient Noise Environment

The existing noise environment of the Specific Plan Area is dominated by the presence of U.S. Highway 101 to the south and the operations of the Graniterock concrete and asphalt processing plant located to the east. Other noise sources in the area include truck traffic on Blomquist Street and Seaport Boulevard and operations of the freight rail line adjacent to Seaport Boulevard. Although the portion of the Inner Harbor area west of Maple Street is within the Airport Influence Area of the San Carlos Airport (CCAG, 2004), no portion of the Specific Plan area lies within the lowest published noise contour (a community noise exposure level of 55 decibels) (City of San Carlos, 2009) and aircraft noise is not a substantial contributor to existing noise levels in the area.

Noise from vehicle traffic on Highway 101 is a fairly constant noise source with subtle fluctuations during off-peak hours. Noise generated by the Graniterock facility includes substantial truck traffic along Blomquist Street, loading of rail cars on the plant western boundary, and nighttime operation of freight trains on the rail spur. Plant operation noise was monitored as beginning at 5:00 a.m. Nighttime freight operation on the rail spur between the Plan Area and Graniterock facility was recorded occurring between 8:00 p.m. and 11:00 p.m. All noise monitoring also captures aircraft operations at San Carlos Airport during the October 2013 weekdays monitored.

A review of existing available noise data within the Inner Harbor area was conducted along with long-term noise monitoring at three locations and modeling of highway noise. These data were used to generate the noise contours presented in **Figure 4.10-1**. Noise contours are presented for the 75 decibel (dBA) and 70 dBA community noise exposure level (CNEL).

Figure 4.10-1 presents the 70 and 75 CNEL noise contours for the Plan area. These contours were selected because they are identified in the General Plan *Public Safety Element* as the upper bounds for exposure to sensitive land uses (see Section 4.10-3).

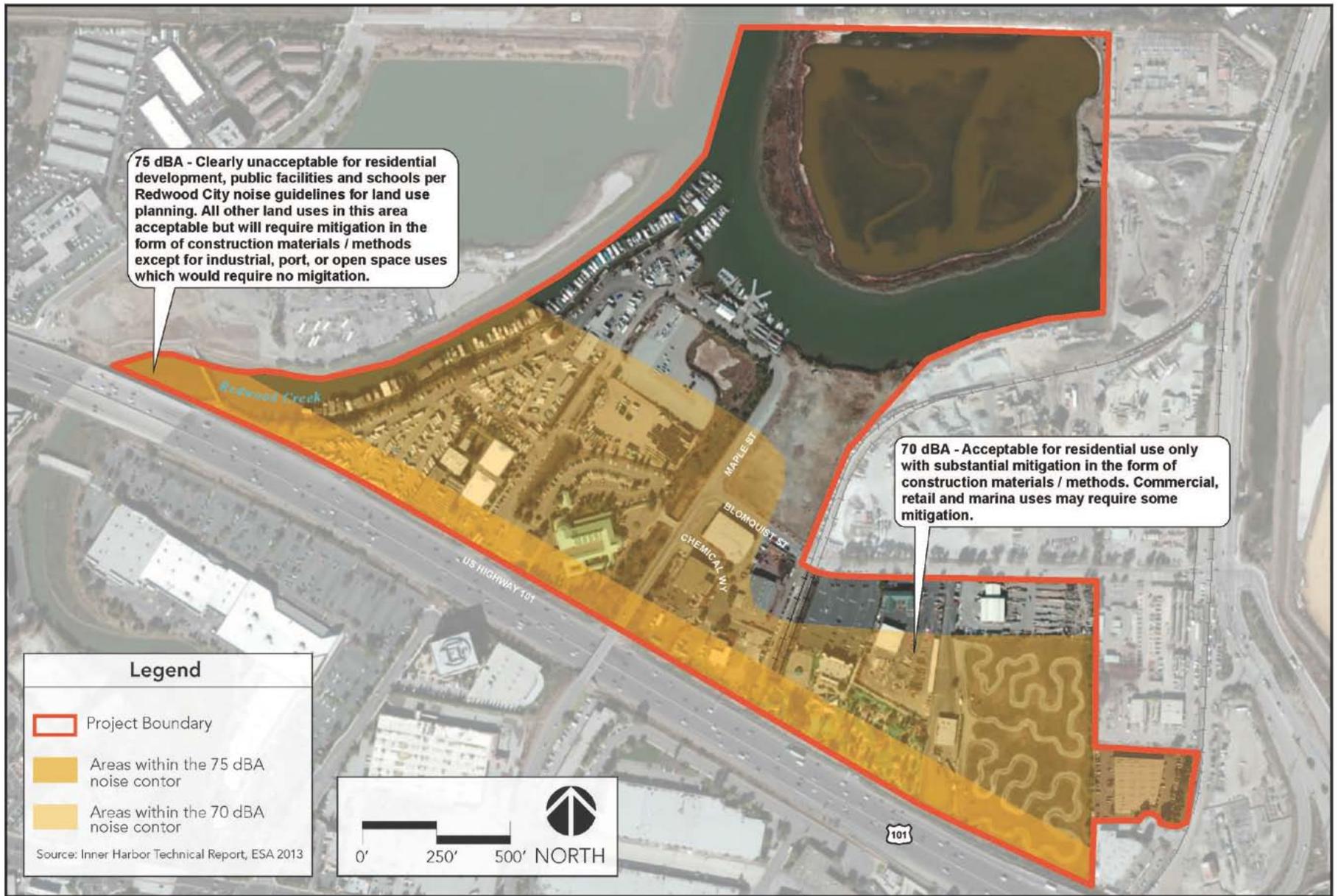
Sensitive Receptors

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication, and can cause physiological and psychological stress and hearing loss. Given these effects, 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 period of time in them including the nighttime hours. Therefore noise impacts to 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 and 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.

There are no residential uses within the Plan Area. The residential receptors nearest to the Plan Area are the condominium developments (One Marina and Marina Point) west of the Plan Area, across Redwood Creek. The existing residents of live-aboard vessels in Docktown Marina would represent existing sensitive receptors within the Plan Area. The San Mateo County Women's Jail and Work Furlough Facility (existing) and the Replacement County Jail on Maple Street (currently under construction) are located within the south/southwest portion of the Plan Area. The existing women's Jail is located approximately 1,100 feet from the project site boundary of the Harbor View Place project. The Replacement Jail is located adjacent to the Harbor View Place project boundary (approximately 100 feet) and upon completion of construction would also house the occupants of the existing Women's Jail. Therefore, the inmates housed within this new jail, would be considered the most impacted sensitive receptors within the Plan Area.

4.10.2 Regulatory Setting

Federal, State, and local agencies regulate different aspects of environmental noise. Federal and State agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies. Local regulation of noise involves implementation of general plan policies and noise ordinance standards. Local general plans identify general principles intended to guide and influence development plans; local noise ordinances and codes establish standards and procedures for addressing specific noise sources and activities.



SOURCE: ESA, 2013; MIG, 2015

Inner Harbor Specific Plan . 130467

Figure 4.10-1
Existing Noise Conditions (2013)

Federal

Federal regulations establish noise limits for medium and heavy trucks (i.e., more than 4.5 tons, gross vehicle weight rating) under the Code of Federal Regulations, Title 40, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters (approximately 50 feet) from the vehicle pathway centerline. These standards are implemented through regulatory controls on truck manufacturers.

State of California

The State of California establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dBA. The State pass-by standard for light trucks and passenger cars (i.e., less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the vehicle pathway centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by State and local law enforcement officials.

City of Redwood City

Redwood City General Plan

Redwood City addresses issues of land use/noise compatibility, transportation noise, and community noise in the *Public Safety Element* of the Redwood City General Plan. The goals and policies in the General Plan *Noise Chapter* promote compatible development throughout the city and those listed below relate to the Specific Plan and/or the Harbor View project. Policies pertaining to noise and adopted for the purpose of avoiding or mitigating an environmental effect issues are listed below. Policies listed below that are also considered land use policies are addressed in Section 4.9, *Land Use and Planning*, of this Draft EIR.

- Policy PS-13.3: Consider noise impacts as part of the development review process, particularly the location of parking, ingress/egress/loading, and refuse collection areas relative to surrounding residential development and other noise-sensitive land uses.
- Policy PS-13.4: In accordance with the Municipal Code and noise standards contained in the General Plan, strive to provide a noise environment that is at an acceptable noise level near schools, hospitals, and other noise sensitive areas
- Policy PS-13.5: Limit the hours of operation at all noise generation sources that are adjacent to noise sensitive areas, wherever practical.
- Policy PS-13.6: Require all exterior noise sources (construction operations, air compressors, pumps, fans, and leaf blowers) to use available noise suppressions devices and techniques to bring exterior noise down to acceptable levels that are compatible with adjacent land uses.
- Policy PS-13.8: Implement appropriate standard construction noise controls for all construction projects.
- Policy PS-13.9: Require noise created by new non-transportation noise sources to be mitigated so as not to exceed acceptable interior and exterior noise level standards.

- Policy PS-13.10: Do not allow new residential or other noise sensitive land use development in noise impacted areas unless effective mitigation measures are incorporated into the project design to reduce outdoor activity area noise levels

The General Plan also sets standards identifying appropriate noise levels for various uses within the City. **Figure 4.10-2** presents the City's Noise Guidelines for Land Use Planning, as presented in the City's General Plan Public Safety Element. The guidelines indicate acceptable and unacceptable noise environments for a variety of land uses, establishing more restrictive acceptable noise environments for noise sensitive uses such as residential, and less restrictive standards for noise tolerant industrial/port land uses.

Redwood City Municipal Code

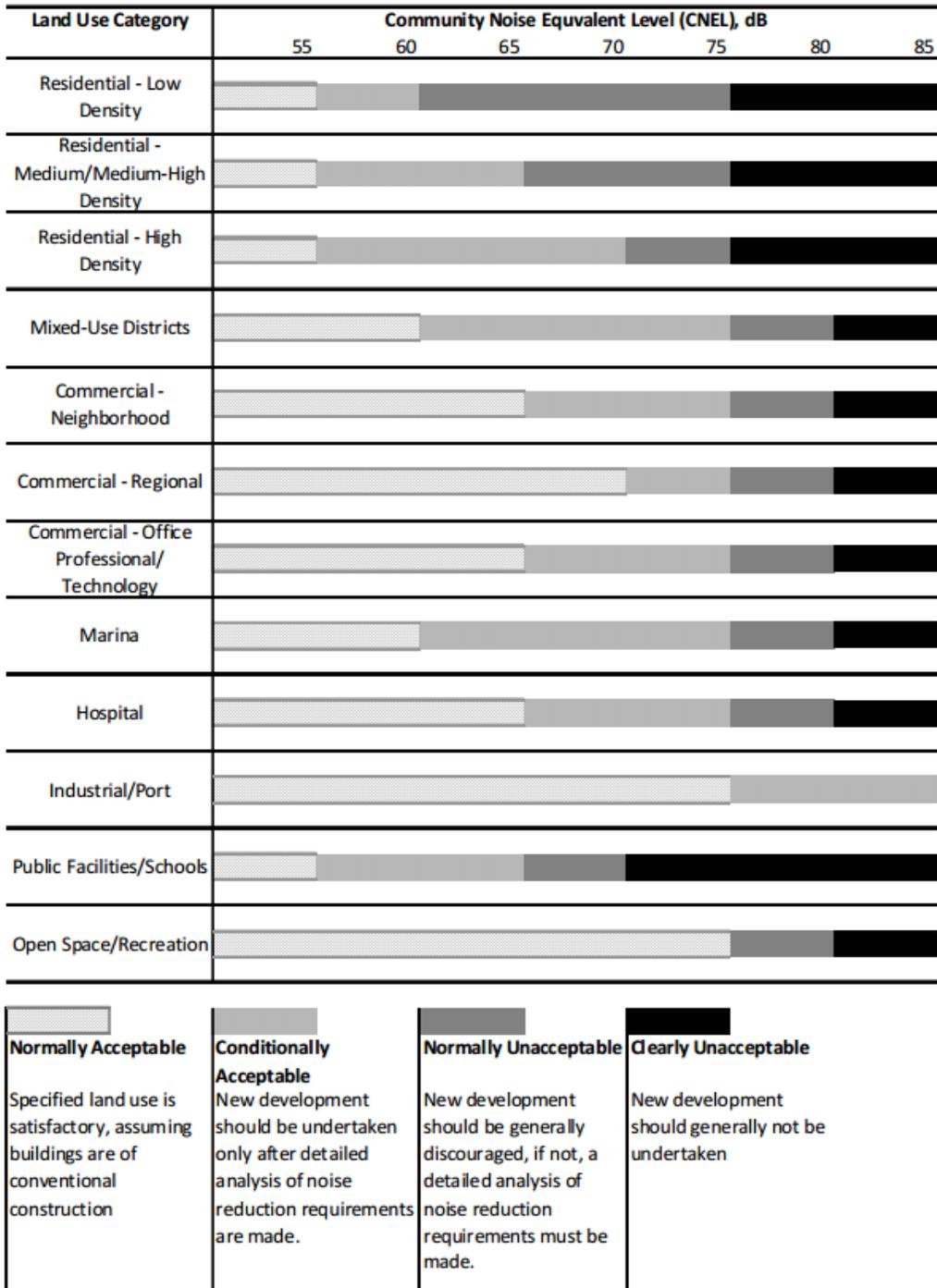
Chapter 24 (Noise Regulation) of the Redwood City Municipal Code sets allowable noise limits for different types of receiving land uses. The noise levels allowed by the Noise Ordinance depend primarily on the background noise level in the area. For the residential developments in the project vicinity, applicable noise limits are discussed in Chapter 24, Article II, Division 2 and 3. Section 24.21 prohibits noise increases of 6 dB above local ambient measured noise at any point within a residential district due to an assemblage of 3 or more people during the hours of 8:00 PM and 8:00 AM. Section 24.31 of the Noise Ordinance prohibits noise levels from exceeding 110 dBA for any item of machinery, equipment, or device used during construction in a residential district. Section 24.32 of the Ordinance prohibits construction during the hours of 8:00 PM to 7:00 AM weekdays, and at any time on Saturdays, Sundays, and holidays, if the construction generates noise levels exceeding the local ambient noise level measured at any point within a residential district.

San Carlos Airport Land Use Plan

The *San Carlos Airport Land Use Plan* (ALUP), which is a chapter of the San Mateo County ALUP, establishes airport noise and land use compatibility standards for development in the airport vicinity of San Carlos Airport and its takeoff and approach zones. Projected airport takeoff and approach zone CNEL noise contours presented in this plan are used to evaluate land use compatibility for proposed underlying developments; the 55 dBA CNEL noise contour is recognized as the threshold for review by the Airport Land Use Commission (ALUC).

Underlying commercial land uses are considered compatible in noise environments less than 70 dBA CNEL, conditionally compatible in noise environments between 70 and 80 dBA CNEL, and incompatible in noise environments greater than 80 dBA CNEL. These compatibility guidelines are the same as those applied by Redwood City (see Figure 4.10-2).

**Figure 4.10-2
Redwood City Noise Guidelines for Land Use Planning**



SOURCE: City of Redwood General Plan, *Public Safety Element*, Noise Chapter. 2010.

4.10.3 Project Baseline

Baseline conditions for this noise analysis reflect existing conditions at the Specific Plan Area in October 2013, when the existing ambient noise levels were obtained (see Figure 4.10-1). Because the noise environment of the Planning Area has not changed¹ since the ambient noise levels were obtained, these baseline conditions reflect the setting in the Specific Plan Area as they existed generally at the time the Notice of Preparation for the Project was issued on November 6, 2014.

4.10.4 Significance Criteria

- a) Based on CEQA *Guidelines*, a project would cause adverse impacts to noise if it would: Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- b) Exposure of persons to or generation of, excessive ground borne vibration or ground borne noise levels;
- c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels; or
- f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Approach to Analysis

Inner Harbor Specific Plan and Harbor View Project

A significant impact would be identified if land uses proposed by the Specific Plan would be exposed to noise levels exceeding the City's established guidelines for noise and land use compatibility. The Redwood City land use/noise compatibility guidelines are shown in Figure 4.10-2. A significant noise impact would also result if noise levels increase substantially at existing noise-sensitive land uses (e.g., residences). For the assessment of traffic related noise, based on Caltrans' definition of a readily perceptible increase in noise levels, a permanent increase of 5 dBA or more in ambient noise levels in and around the project area over levels existing without the project would constitute a significant impact, especially if sensitive receptors are located along these roadways. Caltrans considers a noise increase of less than 3 dBA to be barely perceptible to people, while a 5-dBA increase is readily noticeable.² Generally, traffic volumes on area streets would have to approximately double for the resulting traffic noise levels

¹ Primary noise sources in the Specific Plan area are vehicle traffic on U.S. Highway 101 and operations of the Granite Rock facility neither of which have experienced a substantial change in traffic volumes or operation intensity in the intervening period.

² California Department of Transportation, Division of Environmental Analysis, "Technical Noise Supplement," November 2009; pp. 2-48 – 2-49. Available on the internet at: http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf.

to increase by 3 dBA, the smallest perceptible change. Noise from other stationary sources would be considered to have a significant impact, if their operation increases noise levels at nearby sensitive receptors by 3 dBA or more.

Construction noise levels would be treated differently because they are temporary and intermittent. Significant noise impacts would result from construction if noise levels were sufficiently high to interfere with speech, sleep, or normal residential activities. Construction-related hourly average noise levels received at noise-sensitive land uses above 60 dBA during the daytime and 55 dBA at night and at least 5 dBA higher than ambient noise levels would be considered significant.

The California Department of Transportation uses a vibration limit of 12.7 mm/sec (0.5 inches/sec) PPV for structurally sound buildings designed to modern engineering standards. A conservative vibration limit of 5 mm/sec (0.2 inches/sec) PPV has been used for buildings that are found to be structurally sound but for which structural damage is a major concern. The City of Redwood City has not adopted significance thresholds specific to groundborne vibration.

Cumulative

Cumulative traffic noise level significance is determined by a two-step process. First a comparison is made of the increase in noise levels between cumulative conditions with the project and existing conditions. If the roadside noise levels would increase by 5 dBA, a cumulative noise impact would be considered to occur. However, the proposed project would only be considered to result in a significant cumulative roadside noise impact if its contribution to an increase of 5 dBA or more were to be cumulatively considerable. Consequently, the second step of the cumulative roadside noise analysis (if a cumulative noise impact is predicted) is to evaluate if the contribution of the project to roadside noise levels is cumulatively considerable. This second procedure (if necessary) involves assessing whether the project contribution to roadside noise levels (i.e., the difference between cumulative conditions and cumulative plus project conditions) would result in an increase of 3dBA or more which Caltrans recognizes as a barely perceptible increase (Caltrans, 2013).

Topics Considered and Determined No Impact

Based on the characteristics of the Specific Plan and the Plan Area location, adoption and development under the Specific Plan would not result in impacts related to the following criteria. No impact discussion is provided for these topics for the following reasons:

- Airports (Criteria e and f). The Plan Area is not located within the ALUP area for San Carlos Airport nor within close proximity to a private airstrip. Therefore, it can be assumed that no impact would occur with regard to criteria e and f.

4.10.5 Program-Level Impacts of the Inner Harbor Specific Plan

Construction Noise

Impact NOI-1.SP: Construction of development under the Specific Plan could result in substantial temporary or periodic increases in ambient noise levels in the Plan Area (Criteria a and d). (Potentially Significant)

As indicated in Table 3-1 in Chapter 3, *Project Description*, adoption and development under the Specific Plan would allow for demolition and construction for a net increase of approximately 450 residential units, 1.2 million square feet of general office space, 55,000 square feet of retail space and 2 soccer fields over the planning period.

Construction, although typically short-term, can be a significant source of noise. Construction is most significant when it takes place near sensitive land uses, occurs at night, or in early morning hours. Local governments typically regulate noise associated with construction equipment and activities through enforcement of noise ordinance standards, implementation of General Plan policies and imposition of conditions of approval for building or grading permits. **Table 4.10-2** shows typical exterior noise levels at various phases of commercial construction and **Table 4.10-3** shows typical noise levels associated with various types of construction equipment.

**TABLE 4.10-2
TYPICAL CONSTRUCTION NOISE LEVELS**

Phase	Noise Level (L_{eq})^a
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Exterior Finishing	89
Pile Driving	90-105

^a Estimates correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase and 200 feet from the other equipment associated with that phase.

SOURCE: U.S. Environmental Protection Agency, *Noise from Construction Equipment and Building Operations, Building Equipment and Home Appliances*, December 1971

**TABLE 4.10-3
TYPICAL MAXIMUM NOISE LEVELS FROM CONSTRUCTION EQUIPMENT**

Construction Equipment	Noise Level (dBA, L _{eq} at 50 feet)
Backhoe	80
Rock Drill	98
Air Compressor	81
Dozer	85
Air Compressor	85
Mobile Crane	83
Grader	85
Front End Loader	85
Trucks	88
Cranes	83
Pile Driver (Sonic)	96
Pile Driver (Impact)	101

SOURCE: FTA, 2006.

Construction-related activities would temporarily increase ambient noise levels within the Plan Area over the duration of construction. Construction activities would be temporary and intermittent, occurring at different parts of the Plan Area based on when and where individual projects under the Specific Plan are proposed for development. Construction-related noise levels would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. The effect of construction noise would depend upon the phase of construction, level of construction activity on a given day, the related noise generated by that activity, the distance between construction activities and the nearest noise-sensitive uses, the presence or absence of barriers between the noise and the receptor, and the existing noise levels at the receptors.

The dominant construction equipment noise source is usually a diesel engine. Stationary equipment consists of equipment that generates noise from one general area and includes items such as pumps, generators, compressors, etc. These types of equipment operate at a constant noise level under normal operation and are classified as non-impact equipment. Other types of stationary equipment such as pile drivers, jackhammers, and pavement breakers, etc., produce variable and sporadic noise levels and often produce impact-type noises. Impact equipment is equipment that generates impulsive noise, where impulsive noise is defined as noise of short duration (generally less than one second), high intensity, abrupt onset, rapid decay, and often rapidly changing spectral composition. For impact equipment, the noise is produced by the impact of a mass on a surface, typically repeating over time. Mobile equipment such as dozers, scrapers, graders, etc., may operate with power applied in a cyclic fashion in which a period of full power is followed by a period of reduced power. Other equipment such as compressors, although generally considered to be stationary when operating, can be readily relocated to another location for the next operation.

Section 24.31 of the Redwood City Noise Ordinance prohibits noise levels from exceeding 110 dBA for any item of machinery, equipment, or device used during construction in a residential

district. Section 24.32 of the Ordinance prohibits construction during the hours of 8:00 PM to 7:00 AM weekdays, and at any time on Saturdays, Sundays, and holidays, if the construction generates noise levels exceeding the local ambient noise level measured at any point within a residential district.

As shown in Table 4.10-3, operation of construction equipment would generate noise levels as high as 89 dBA at 50 feet using typical construction methods and up to 105 dBA at 50 feet if pile driving is required. Noise from construction activities generally attenuates at a rate of 6.0 to 7.5 dBA per doubling of distance. The exact phasing of development under the Specific Plan is not known at this point. However, in general, when construction takes place in the vicinity of existing sensitive receptors, these receptors could temporarily and intermittently experience maximum noise levels of up to 105 dBA with pile driving, typically the loudest source of construction noise. Impacts from pile driving can result from both elevated single-event or “impact” noise levels and from vibration.

Residential uses are considered most sensitive to noise. The existing residents in the Plan Area reside in the approximately 100 watercraft used as live-aboards in the area known as Docktown along the western boundary of the Plan Area. The remaining Plan Area contains varying levels of recreational and watercraft uses, marinas and businesses, public and industrial uses. Residential uses are also located approximately 250 feet to the west of Redwood Creek. However at this distance, even the loudest construction noise from pile driving would attenuate to levels below those specified in the Redwood City Noise Ordinance. The future occupants of the new San Mateo County Jail located on Maple Street would be the most impacted receptors within the Plan Area and would be affected by construction noise when construction takes place in the south/southwestern part of the Plan Area. Likewise, the impact of construction activities would be noticeable at the Docktown area only when it takes place in the area adjacent to Redwood Creek. Implementation of Mitigation measure NOI-1.SP would ensure that this impact to sensitive uses would be less than significant.

Users of the Bay Trail would also be subject to increased noise levels when construction takes place in its vicinity. But as they would be considered transient receptors, they would not be exposed to these elevated noise levels for extended periods of time and therefore any impact of construction noise on Bay Trail users would be considered less than significant. Implementation of Mitigation measure NOI-1.SP would further reduce this impact.

Overall, as described above, noise levels would comply with the Redwood City Noise Ordinance. Mitigation Measure NOI-1.SP is identified to address the potential effect on existing residences and would reduce the impact of construction noise on nearby sensitive receptors to less than significant.

Mitigation Measure NOI-1.SP: Throughout demolition, grading and construction, the project applicants shall require construction contractors to limit standard construction activities as follows:

- Consistent with Section 24.32 of the Redwood City Noise Ordinance, construction activities shall be limited to the hours of 7:00 AM to 8:00 PM on weekdays; no construction shall take place at any time on Saturdays, Sundays, and holidays, if the construction generates noise levels exceeding the local ambient noise level measured at any point within a residential area.
- Equipment and trucks used for construction shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds).
- Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible; this could achieve a reduction of 5 dBA.
- Stationary noise sources shall be located as far from adjacent receptors as possible and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or include other measures.

Significance after Mitigation: Less than Significant

The potential for construction activities to adversely affect sensitive fish and marine mammals, is discussed in detail in Impact BIO-1.SP in Section 4.3, *Biological Resources*, of this Draft EIR. Specifically, water-based construction activities such as demolition of existing shoreline structures, levee construction, pile installation, and construction of development within the proposed Water Dependent Development-2 (WD-2) zoning district could impact fish potentially present in the Plan Area and vicinity. Mitigation Measures BIO-1a.SP and BIO-1b.SP, and the incorporation of best management practices (BMPs) demonstrated to reduce noise levels to safe levels for fish, would reduce such impacts to less than significant.

Impact NOI-2.SP: Construction of development under the Specific Plan could result in exposure of persons to or generation of, excessive ground borne vibration or ground borne noise levels in the Plan Area above existing levels without the Specific Plan (Criterion b). (Potentially Significant)

Demolition and construction activities in the Specific Plan Area could generate substantial temporary ground-borne vibration (e.g., from pile driving) exceeding standard vibration thresholds in the vicinity, which could interfere with normal activities or cause a nuisance or damage to adjacent properties.

Depending on the construction equipment used, groundborne vibrations can be perceptible within 30 to 100 feet of a source. Structural damage from pile driving typically does not occur in buildings more than 50 feet from the location of the activity (Caltrans, 2004). Existing development within the Specific Plan area has substantial setbacks and parking areas that provide sufficient buffer area

to avoid vibration impacts from project construction. However, as the Plan Area is developed in phases, nuisance vibration impacts could occur when if pile driving or impact compaction equipment is operated in close proximity to future proposed buildings.

Implementation of **Mitigation Measure NOI-1.SP**, presented above, would reduce nuisance impacts from both construction noise and vibration by prohibiting such activity during sensitive time periods. Measures listed under Mitigation Measure NOI-1.SP restrict the hours and days of construction activity, and require contractors to implement a construction noise reduction program. Implementation of these measures would reduce construction impacts associated with vibration to less than significant levels.

Mitigation: Implement Mitigation Measure NOI-1.SP.

Significance after Mitigation: Less than Significant

Operational Noise

Impact NOI-3.SP: Development under the Specific Plan could increase operational noise levels in the Plan Area to levels in excess of standards established in the Redwood City Noise Ordinance and Planning Code (Criteria a and c). (Less than Significant)

The Redwood City Municipal Code does not specify noise emission limits for operational noise sources. However, Chapter 24 (Noise Regulation) of the Municipal Code limits nighttime noise levels at receiving land uses, particularly for residential uses that are sensitive to noise. Section 24.21 prohibits noise increases of 6 dB above local ambient measured noise at any point within a residential district due to an assemblage of three or more people during the hours of 8:00 PM and 8:00 AM.

The adoption and development under the Specific Plan would generate some noise from heating, ventilating, and air conditioning (HVAC) mechanical equipment in buildings that would operate throughout the day, as well as emergency backup generators. HVAC equipment is typically located on rooftops enclosed within equipment wells. This provides for adequate acoustical shielding to reduce any noise impacts, even if future residential receptors were to be located in the immediate vicinity. Moreover, Section 4.6.4.B of the draft Specific Plan specifies development standards that mechanical equipment shall be designed into the building, screened, and baffled to reduce sound to levels that conform with allowable noise levels described in Chapter 24 (Noise Regulation) of the Municipal Code.

Existing residential receptors are located almost 250 feet to the west of the planning area. The emergency backup generators would be tested regularly, and operated occasionally. Typically, the BAAQMD permits emergency backup generators to operate for up to 50 hours per year, or on average about one hour per week. The noise generated by generator testing would be akin to that of a diesel-powered truck engine and this occasional testing would not result in a substantial permanent increase in noise levels over ambient conditions. Also, residential development

proposed and developed as part of the Specific Plan would include adequate noise insulation to ensure compliance with Title 24 interior noise standard of 45 dBA.

Therefore, operational noise impacts from adoption and development under the Specific Plan related to stationary sources would be less than significant.

Mitigation: None Required.

Impact NOI-4.SP: Development under the Specific Plan could expose persons to exterior noise levels in conflict with the land use compatibility guidelines of the Redwood City General Plan (Criterion a). (Significant)

The Redwood City General Plan contains Land Use Compatibility Guidelines to determine compatibility of the proposed development with the existing noise environment (see Figure 4.10-2 above). The Land Use Compatibility standards of the City's General Plan are exterior noise standards which allow for an assessment of exterior noise levels to determine whether standard construction techniques would be sufficient to achieve appropriate noise levels for each land use. New residential development is considered "normally acceptable" in noise environments up to 55 DNL. This assumes that standard construction techniques would achieve 15 dBA of attenuation and provide for an interior environment of 45 dBA. For single family residential uses, noise environments between 55 to 60 DNL represent "conditionally acceptable" exposure, while for multifamily residential development, noise levels between 55 to 70 DNL is considered "conditionally acceptable".

The Specific Plan proposes residential uses to be developed in the IH-1, IH-2 and WD-2 districts of the Specific Plan. Due to the proximity of US Highway 101 and noise from the operation of the Graniterock concrete facility (in the General Industrial zone), noise levels in large portions of the IH-1 and IH-2 districts are as high as 75 DNL. Based on the noise contours generated using measured and modeled data (Figure 4.10-1), the noise environment in most of the IH-1 and IH-2 districts would be in the "normally unacceptable" category for residential uses. "Normally unacceptable" means that new construction in such areas is generally discouraged and development should be undertaken only after a detailed acoustical study has been conducted and the needed noise insulation features are included in the design. Therefore development of residential uses in these areas, as proposed within the IH-1 district, would expose receptors to noise levels greater than those allowed by the City's General plan land use/noise compatibility standards and this would constitute a significant impact. Commercial and retail uses proposed in these areas may also require site specific assessment in order to comply with the General Plan's land use compatibility standards.

Section 4.5.2.B of the draft Specific Plan specifies development standards that are restrictions for locating residential uses in the Specific Plan Area. Standards that effectively reduce or avoid adverse noise effects on sensitive uses include restricting residential units within 200 feet of areas zoned General Industrial (GI) or within 500 feet of the outermost lane of Highway 101 without approval of a conditional use permit (and required compliance with other locational restrictions

addressing setbacks addressing for roadway toxic air contaminants). Under the proposed development standards in the draft Specific Plan, in no case could residential uses be allowed within 100 feet of the aforementioned areas, which would restrict residences from being located in areas where the existing noise levels are unacceptable for such uses, as shown in Figure 4.10-1.

However, for multi-family dwellings, bed and breakfasts, and long-term care facilities (residential categories proposed by the Specific Plan) beyond the minimum 100-foot restriction area, the land use compatibility standard of 60 dBA for normally acceptable environments assumes that standard construction techniques would achieve 15 dBA of attenuation and provide for an interior environment of 45 dBA. As discussed above, many portions of the Plan Area exhibit noise levels considered “normally unacceptable” for residential uses. If such uses are proposed in these areas, Title 24 interior noise standards would not be met by using conventional materials and construction. Consequently, the adoption and development under the Specific Plan would have a significant impact with regard to both land use/noise compatibility standards and interior noise exposures. Implementation of **Mitigation Measure NOI-4.SP** would reduce the impact to a less than significant level.

Mitigation Measure NOI-4.SP: Applicants for individual projects under the Specific Plan shall conduct a project specific noise study to determine compatibility of the proposed use with the existing noise environment based on land use/noise compatibility guidelines in the City’s General Plan. If the noise environment is found to be “conditionally acceptable” or “normally unacceptable” for the proposed use, a detailed acoustical analysis shall be conducted to specify the noise insulation measures needed to reduce noise exposure to “normally acceptable” levels. Measures may include but are not limited to, appropriate site design to achieve maximum sound attenuation, use of enhanced noise insulation features in the form of appropriate sound-rated assemblies and/or other features/measures to reduce interior noise levels to meet Title 24 requirements.

Significance after Mitigation: Less than Significant

Traffic Noise

Impact NOI-5.SP: Traffic generated by development under the Specific Plan could substantially increase traffic noise levels in the Plan Area (Criterion c). (Less than Significant)

Additional vehicles traveling throughout the Plan Area as a result of the adoption and development under the Specific Plan would increase noise levels adjacent to nearby roads. As discussed under Significance Thresholds, traffic related ambient noise increase of 5 dBA or more would be considered a significant impact, especially if sensitive receptors are located along the affected roadway segments. Traffic noise levels for this analysis were determined using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model and the turning movements in the traffic section for Existing (2015) and Existing plus Project conditions (see Section 4.14, *Transportation and Circulation*, and related Appendix H to this Draft EIR).

Trips associated with development under the Specific Plan would be distributed over the local street network within and surrounding the Plan Area and would affect roadside noise levels. Peak hour (evening/PM) intersection turning data from the traffic study were analyzed to evaluate increases and resulting traffic-generated noise increases on roadway links most affected by traffic generated by development under the Specific Plan. Noise levels at other times would be lower. The segments analyzed and the modeled noise increases along these segments are shown in **Table 4.10-4**, below.

The increase in traffic noise from the Existing plus Plan scenario compared to the Existing scenario would increase peak hour noise levels by less than 5 dBA at all studied roadway segments and would therefore be a less than significant impact along these roadway segments.

Additionally, as discussed for ImpactAIR-1.SP (see Section 4.2, *Air Quality*) the Specific Plan requires all future private development projects within the Plan Area to participate in a transportation management association, which will administer (and monitor for effectiveness) a TDM Plan, approved by the City and C/CAG. The TDM Plan includes strategies to reduce peak single-occupancy vehicle trips and encourage use of transit, walking, and biking as transportation modes. Therefore, implementation of TDM Plans would further help reduce noise impacts of traffic generated by development under the Specific Plan.

Mitigation: None required.

Impact NOI-6.SP: Development under the Specific Plan could generate, or result in exposure of persons to, excessive ground borne vibration or ground borne noise levels in the Plan Area (Criteria b). (Less than Significant)

Development under the proposed Specific Plan would not introduce any permanent new sources of significant groundborne vibration, nor would it place sensitive uses adjacent to existing sources of vibration. This impact would be less than significant.

Mitigation: None required.

**TABLE 4.10-4
PEAK-HOUR TRAFFIC NOISE LEVELS IN AND AROUND THE SPECIFIC PLAN AREA**

Roadway Segment	(A) Existing	(B) Existing Plus Plan	(B-A) Difference between Existing Plus Plan and Existing^a	(C) Cumulative No Plan (2040)	(D) Cumulative Plus Plan (2040)	(D-A) Difference between Cumulative Plus Plan and Existing^b	(D-C) Difference between Cumulative Plus Plan and Cumulative No Plan
Bair Island Road north of E. Bayshore Road	56.7	58.3	1.6	66.2	66.2	9.6	0.0
Maple Street north of Veterans Blvd	61.5	63.6	2.1	63.8	65.0	3.5	1.2
Maple Street south of Veterans Blvd	60.7	62.2	1.5	62.7	63.6	2.9	0.6
Maple Street east of Blomquist Street	59.9	63.8	3.9	63.2	65.4	5.5	2.4
Blomquist Street south of Maple Street	60.1	62.7	2.6	62.4	64.0	3.9	1.6
Veterans Blvd east of Woodside Road	65.6	66.3	0.7	63.9	66.5	0.9	2.6
Woodside Road south of Veterans Blvd	68.3	68.6	0.3	68.3	69.4	1.1	1.1
Blomquist Street west of Seaport Blvd	60.4	63.9	3.5	63.3	65.4	5.0	2.1
Seaport Blvd south of Blomquist street	65.6	67.1	1.5	66.3	67.6	2.0	1.3
Woodside Road north of Broadway	68.3	69.1	0.8	69.2	69.9	1.6	0.7
Woodside Road south of Broadway	68.2	68.5	0.3	69.2	69.5	1.3	0.3

Notes: Road center to receptor distance is 15 meters (approximately 50 feet) for all roadway segments. Noise levels were determined using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model. The analysis considered the vehicle mix based on – cars 95 percent, medium trucks 3 percent, and heavy trucks 2 percent. Traffic speeds for all vehicle classes were set at 30 mph.

^a Considered significant if the incremental increase in noise from traffic is greater than the existing ambient noise level by 5 dBA Leq,. Violations are in **bolded** text.

^b Considered significant cumulative if the incremental increase in noise is greater than 5 dBA over existing conditions.

^c Considered a cumulatively considerable contribution to a significant noise increase if the incremental increase in noise is greater than 3 dBA when the cumulative increase in the preceding column is greater than 5 dBA.

SOURCE: ESA, 2015

4.10.6 Project-Level Impacts of the Harbor View Project

Construction Noise

Impact NOI-1.HV: Construction activities associated with the Harbor View project would result in substantial temporary or periodic increases in ambient noise levels in the project vicinity (Criteria a and d). (Less than Significant)

Noise impacts from construction generally result when construction activities occur during the noise-sensitive times of the day (early morning, evening, or nighttime hours), in areas immediately adjacent to noise-sensitive receptors (primarily residential uses), or when construction noise lasts over extended periods of time.

As discussed under Impact NOI-1.SP, above, noise levels from construction activity at and near the project site would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. Construction-related vehicle trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. Table 4.10-2 presented above shows typical exterior noise levels during different phases of construction, and Table 4.10-3 presented above shows typical noise levels generated by various types of construction equipment. Section 24.31 of the Redwood City Noise Ordinance prohibits noise levels from exceeding 110 dBA for any item of machinery, equipment, or device used during construction in a residential district. Section 24.32 of the Ordinance prohibits construction during the hours of 8:00 PM to 7:00 AM weekdays, and at any time on Saturdays, Sundays, and holidays, if the construction generates noise levels exceeding the local ambient noise level measured at any point within a residential district.

As shown in Table 4.10-3, operation of construction equipment would generate noise levels as high as 105 dBA at 50 feet if pile driving is required as part of construction. Noise levels could be higher when more than one equipment is in operation. Noise from construction activities generally attenuates at a rate of 6.0 to 7.5 dBA per doubling of distance. Existing uses in the vicinity of the project area are primarily industrial and recreational, and residential uses, which are considered most sensitive to noise, are located almost 1,500 feet from the project site. Therefore noise levels would attenuate to levels well below the standards specified by the Redwood City Noise Ordinance at these residences. However, the inmates housed in the new San Mateo County jail and Correctional Facility would be located within 100 feet of the Harbor View Place project boundary and would be most impacted by project construction noise. Though construction of the Harbor View project would take place over a 19-month period, impacts would be highest only for the duration when project construction takes place along the western boundary of the project area. Further, construction activities would comply with the construction hour limitations set forth in the Redwood City Noise Ordinance and other noise reduction measures detailed in Mitigation Measure NOI-1.SP; therefore, the impact of construction noise on nearby sensitive receptors would be less than significant.

The Specific Plan proposes completion of a segment of the Bay Trail along Redwood Creek and Steinberger Slough. Users of the Bay Trail would be subject to increased noise levels during project construction. But these users would be considered transient receptors and would not be

exposed to increased noise levels for extended periods of time. Therefore the impact of construction noise on users of the Bay Trail would be temporary and less than significant.

Mitigation: None Required.

The potential for construction activities to adversely affect sensitive fish and marine mammals occurs in development areas near Redwood Creek and Steinberger Slough (e.g., WD-1 and WD-2 districts) is discussed in detail in Impact BIO-1.SP in Section 4.3, *Biological Resources*, in this Draft EIR..

Impact NOI-2.HV: Construction activities associated with the Harbor View project would not result in exposure of persons to or generation of, excessive ground borne vibration or ground borne noise levels in the project vicinity above levels existing without the project (Criterion b). (Less than Significant)

Groundborne vibrations can be perceptible within 30 to 100 feet of a source. The Harbor View project site is more than 1,000 feet from the nearest existing residential receptors as well as the IH-1 and WD-2 districts where new residential uses could be developed under the Specific Plan. Therefore, any temporary impacts of groundborne noise and groundborne vibration from construction would attenuate within these distances to less-than-significant levels.

Mitigation: None Required.

Operational Noise

Impact NOI-3.HV: Operational activities associated with the Harbor View project would not increase long term noise levels in the project vicinity to levels in excess of standards established in the Redwood City Noise Ordinance and Planning Code (Criteria a and c). (Less than Significant)

Operation of the Harbor View project would generate noise from stationary sources such as HVAC mechanical equipment in project buildings that would operate throughout the day. Project buildings would also house emergency backup generators that provide power to the buildings during power outages. Though these generators are used only for emergency situations, they need to be regularly tested and maintained. These routine activities would also add to the operational noise levels generated by the project.

The Redwood City Municipal Code does not specify noise emission limits for operational noise sources. But, Chapter 24 of the Municipal Code limits nighttime noise levels at receiving land uses, particularly for residential uses that are sensitive to noise. Section 24.21 prohibits noise increases of 6 dB above local ambient measured noise at any point within a residential district due to an assemblage of three or more people during the hours of 8:00 PM and 8:00 AM.

Noise from the operation of mechanical equipment within project buildings would not carry through to residential receptors located almost 1,500 feet away. Regardless, equipment would be housed within equipment wells located on building rooftops, which would provide adequate insulation and would not constitute a significant source of noise even in the immediate vicinity. Section 4.6.4.B of the draft Specific Plan specifies development standards that mechanical equipment shall be designed into the building, screened, and baffled to reduce sound to levels that conform with allowable noise levels described in Chapter 24 (Noise Regulation) of the Municipal Code.

Testing of the emergency generators would be limited to maximum of 50 hours per year, or on average about one hour a week, per BAAQMD permit requirements. The noise generated from the generators would be similar to that of a diesel-powered truck engine and this occasional testing would not result in a substantial permanent increase in noise levels over ambient conditions. Therefore the operational impact of the project's stationary sources would be less than significant.

Mitigation: None Required.

Impact NOI-4.HV: Development of the Harbor View project would expose persons to exterior noise levels in conflict with the land use compatibility guidelines of the Redwood City General Plan (Criterion a). (Less than Significant)

According to the existing noise contours shown in Figure 4.10-1 ambient noise level in the project area ranges between 70 – 75 dBA, DNL. The primary contributors to the noise environment in the area are traffic from Highway 101 along the southern boundary of the project site and the operation of the Graniterock quarry across the northern boundary. According to the Redwood City land use/noise compatibility guidelines (see Figure 4.10-2), an ambient noise environment of up to 65 DNL is considered “normally acceptable” for commercial office uses. Noise environments between 65 to 75 DNL represent “conditionally acceptable” exposure, exposure between 75 to 80 DNL is considered “normally unacceptable” and anything beyond 80 DNL is considered “clearly unacceptable”.

The Harbor View project proposes commercial office uses in an area where the ambient noise environment is considered “conditionally acceptable” for such uses. “Conditionally acceptable” means that new development should be undertaken only after a detailed analysis of noise reduction requirements is made and incorporated into the project. This assessment thoroughly considers the proposed land uses and the existing and future noise context. Commercial office uses are not considered sensitive receptors, and its introduction on the project site would not conflict with the Redwood City's land use/noise compatibility guidelines. The proposed project would be constructed in adhere to all required sound-rated assemblies and noise insulation standards applicable to the proposed building use to meet all commercial building requirements. The project will introduce employees in commercial offices to the project site, General Plan. The impact is less than significant.

Mitigation: None Required.

Traffic Noise

Impact NOI-5.HV: Traffic generated by the Harbor View Project would not substantially increase traffic noise levels in the project vicinity (Criterion c). (Less than Significant)

Once operational, the Harbor View project would generate additional vehicle trips to the project area resulting in an increase in traffic along the roadway network in and around the area. This would increase noise levels along roadway segments and intersections leading to the area as well as within the project area. As discussed under Significance Thresholds, traffic related ambient noise increase of 5 dBA or more would be considered a significant impact, especially if sensitive receptors are located along the affected roadway segments. Traffic noise levels along most affected roadway segments due to the project were determined using the FHWA Traffic Noise Prediction Model and the turning movements in the traffic section for Existing (2015) and Existing plus Project conditions (see Section 4.14, *Transportation and Circulation* and Appendix H to this Draft EIR).

Peak hour (evening/PM) intersection turning data from the traffic study was used to estimate increase in traffic noise on roadway links most affected by traffic generated by development of the Harbor View project. This represents a worst case analysis as noise levels at other times of the day would be lower. The segments analyzed and the modeled noise increases along these segments are shown in **Table 4.10-5**, below.

Additionally, while not factored into the Harbor View traffic study, the project sponsor of Harbor View has developed a project-specific draft TDM Plan that will reduce peak-hour vehicle trips from the project and thereby reduce traffic generated noise. The TDM Plan is under review by C/CAG and then will be verified by the City prior to implementation of the Harbor View project (see Impacts AIR-3.HV and AIR-4.HV, in Section 4.2, *Air Quality*, in this Draft EIR).

The increase in traffic noise from the Existing plus Project scenario compared to the Existing scenario would increase peak hour noise levels by less than 5 dBA at all studied roadway segments and would therefore be a less than significant impact with respect to traffic noise along these roadway segments.

Mitigation: None Required.

Impact NOI-6.HV: Operation of the Harbor View Project would not result in exposure of persons to or generation of, excessive ground borne vibration or ground borne noise levels in the Plan Area above existing levels without the Specific Plan (Criteria b). (Less than Significant)

Development of the Harbor View project would not introduce any permanent new sources of significant groundborne vibration, nor would it place sensitive uses adjacent to existing sources of vibration; the project proposes a commercial office campus and associated parking. This impact would be less than significant.

Mitigation: None Required.

**TABLE 4.10-5
PEAK-HOUR TRAFFIC NOISE LEVELS IN AND AROUND THE PROJECT AREA**

Roadway Segment	(A) Existing	(B) Existing Plus Project	(B-A) Difference between Existing Plus Project and Existing^a	(C) Cumulative No Project (2040)	(D) Cumulative Plus Project (2040)	(D-A) Difference between Cumulative Plus Project and Existing^b	(D-C) Difference between Cumulative Plus Project and Cumulative No Project
Bair Island Road north of E. Bayshore Road	56.7	58.3	+1.6	64.3	64.3	+7.7	0
Maple Street north of Veterans Blvd	61.5	63.8	+2.3	64.2	65.3	+3.8	+1.0
Maple Street south of Veterans Blvd	60.7	62.3	+1.6	63.0	63.9	+3.2	+0.9
Blomquist Street east of Maple Street	59.9	64.8	+4.8	63.8	66.0	+6.0	+2.2
Maple St north of Blomquist St	53.5	57.5	+3.9	57.0	57.0	+3.5	0
Maple St south of Blomquist St	60.1	63.1	+2.9	63.0	64.4	+4.2	+1.3
Blomquist St west of Seaport Blvd	60.4	63.9	+3.5	63.8	65.2	+4.8	+1.4
Seaport Blvd south of Blomquist St	65.6	66.9	+1.3	66.7	67.5	+1.9	+0.7
Woodside Road north of Broadway	68.3	69.1	+0.8	69.8	69.8	+1.5	0
US 101 SB Off Ramp north of Broadway	64.1	68.6	+4.6	67.5	67.6	+3.5	0
Broadway west of Woodside Road	63.7	64.3	+0.6	65.7	65.8	+2.1	0

Notes: Road center to receptor distance is 15 meters (approximately 50 feet) for all roadway segments. Noise levels were determined using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model. The analysis considered the vehicle mix based on – cars 95 percent, medium trucks 3 percent, and heavy trucks 2 percent. Traffic speeds for all vehicle classes were set at 30 mph.

^a Considered significant if the incremental increase in noise from traffic is greater than the existing ambient noise level by 5 dBA Leq.. Violations are in **bolded** text.

^b Considered significant cumulative if the incremental increase in noise is greater than 5 dBA over existing conditions.

^c Considered a cumulatively considerable contribution to a significant noise increase if the incremental increase in noise is greater than 3 dBA when the cumulative increase in the preceding column is greater than 5 dBA.

SOURCE: ESA, 2015

4.10.7 Cumulative Noise

Impact NOI-1.CU: Traffic generated by development under the Specific Plan and/or the Harbor View project, in combination with traffic from cumulative development in the Plan Area and citywide, including past, present, existing, approved, pending and reasonably foreseeable future development; and construction and operational noise levels in combination with traffic from cumulative development could contribute considerably to cumulative noise impacts (Criterion c). (Less than Significant)

The geographic area considered for cumulative noise analysis includes areas within and surrounding the Plan Area and roadways examined in the transportation analysis in Section 4.14, *Transportation and Circulation*. Cumulative development contributing to the existing and future noise environment considered in this includes those in the development forecasts conducted for this EIR based on the countywide transportation model and the Highway 101/SR84 (Woodside Road) Interchange Improvement Project and other approved, pending, and reasonably foreseeable future projects citywide, including the nearby San Mateo County Replacement Jail and several recent, existing, and anticipated projects underway in downtown Redwood City under the Downtown Precise Plan (see Section 4.0.4 *Cumulative Analysis* in Section 4.0 of this chapter).

Long-term noise from cumulative development would primarily occur from motor vehicle traffic. When considered alone, development under the Specific Plan and/or development of the Harbor View project would generate noise mainly by adding more traffic to the area. Other anticipated projects would also contribute to noise in the area due to increased traffic volumes. Notably, any project that would individually have a significant project level noise impact would also be considered to have a significant cumulative noise impact.

As indicated above under *Approach to Analysis*, a permanent noise increase of 5 dBA or more in ambient noise levels in the project vicinity above levels existing without the plan would be considered to generate a significant impact. Traffic noise levels at intersections most impacted by Specific Plan traffic and the Harbor View project traffic were modeled using the FHWA Traffic Noise Prediction Model and the turning movements for Cumulative No Project and Cumulative plus Project (2040) conditions. The segments analyzed and the results of the noise modeling are shown in Table 4.10-4 for Cumulative No Project and Cumulative plus Project traffic, which includes Project traffic combined with traffic from other approved or pending projects for the year 2040 (assumed buildout year).

Specific Plan

For the Specific Plan, as shown in Table 4.10-4, the increase in peak hour traffic noise between Existing (2015) and Cumulative Plus Project (2040) scenario would be less than 5 dBA at most roadway segments. The increase would be greater than 5 dBA along three analyzed segments: Bair Island Road north of E. Bayshore Road, Maple Street east of Blomquist Street and Blomquist Street west of Seaport Boulevard and would constitute a significant cumulative impact. Therefore, it must then be determined whether development under the Specific Plan would result in a cumulatively considerable contribution to this projected cumulative roadway noise impact along these three roadways.

To assess the Specific Plan's cumulative contribution, a comparison of the Cumulative plus Plan noise levels to Cumulative No Plan levels is made. Table 4.10-4 also shows the increase in Cumulative plus Plan noise over Cumulative No Plan noise levels (the Plan increment in 2040). It can be seen that this increase is less than 3 dBA for all three roadway segment that showed a significant cumulative impact with respect peak hour traffic noise. Caltrans identifies a 3 dBA increase as a barely perceptible increase by the human ear. Therefore, while a significant cumulative noise increase would occur, the contribution of traffic noise from the adoption and development under the Specific Plan to the 2040 cumulative roadway noise levels in and around the Plan Area would be less than significant.

Harbor View Project

For the Harbor View project, Table 4.10-5 shows that the increase in peak hour traffic noise between Existing (2015) and Cumulative Plus Project (2040) scenario would be less than 5 dBA at all roadway segments. Therefore the project would not have a significant contribution to the 2040 cumulative roadway noise levels in and around the Plan Area, and the impact would be less than significant.

Construction

The cumulative effect of construction noise and vibration impacts resulting from cumulative development would be less than significant since, although near-term development is anticipated in the IH-2 district of the Specific Plan (and potentially the IH-1 district), other future cumulative development projects would not occur simultaneously (including the noisiest phases of construction) and would be spread out over the planning period. Also, since noise is a localized impact that attenuates significantly with distance, construction of projects in different areas of and around the Specific Plan would not necessarily cumulatively increase ambient noise levels. The geographic scope of analysis for cumulative noise and vibration impacts encompasses sensitive receptors within approximately 500 feet of the Plan Area. Beyond 500 feet, the contributions of noise from other development projects would be lessened greatly with both distance and due to intervening structures (such as Highway 101), and their contribution to a combined effect is reasonably considered to be minimal. Similarly, operational noise associated primarily with mechanical operations (HVAC) of cumulative development would also be at less than significant levels as these sources would be spread throughout and around the Plan Area and such operations would occur in accordance with all manufacturer and building code requirements addressing operational noise levels of the equipment.

Overall, the contribution of noise and vibration effects from development under the Specific Plan and/or the Harbor View project would not be cumulatively considerable, and the impact is less than significant.

Mitigation: None Required.

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