F. NOISE

INTRODUCTION

This section addresses noise impacts associated with the proposed project. It analyzes both potential noise impacts caused by the construction and operation of the proposed project on the ambient noise environment as well as potential noise impacts of the existing noise environment on future users of the project. Background information on environmental acoustics, including definitions of terms commonly used in noise analysis, is provided with the discussion.

SETTING

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level.

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 (sound power). 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. As a consequence, 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 ears decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).[1] Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements.

[1] All noise levels reported herein reflect A-weighted decibels unless otherwise stated.

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. Rather, 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. 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.

These successive additions of sound to the community noise environment varies 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. The most frequently used noise descriptors are summarized below:

L_{eq}: The equivalent sound level is used to describe noise over a specified period of time, typically one hour, 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.

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

L_x: The sound level that is equaled or exceeded x percent of a specified time period. The L_{50} represents the median sound level.

DNL: 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.

EFFECTS OF NOISE ON PEOPLE

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

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants generally 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 it compares to the existing environment 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 will 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;

- 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 adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. 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, but rather 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

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 to 7.5 dBA per doubling of distance from the source, depending on the topography of the area and environmental conditions (i.e., atmospheric conditions and noise barriers, either vegetative or manufactured, etc.). Widely distributed noise, such as a large industrial facility spread over many acres or a street with moving vehicles, would typically attenuate at a lower rate, approximately 4 to 6 dBA.

SENSITIVE RECEPTORS

The proposed project is located in a light industrial area designated for research and development (R&D) by the Redwood City General Plan. Such uses are normally not considered to be sensitive to noise.

The project site is immediately bounded by Redwood Creek to the north and east; the Redwood City Port Authority parking lot and office uses in the Seaport Center office park to the south; and the Seaport Center office park and Seaport Plaza to the west. The project site is approximately ¾-mile north of the Bayshore Freeway (U.S. 101).

The site is located in an area designated for Light Industrial Use (Research and Development) by the Redwood City General Plan Land Use map. The nearest noise sensitive uses are existing and proposed residential uses to the southwest of the project site. Residential uses are considered more sensitive to noise particularly at night due to the lower background noise levels and the sensitive nature of activities that take place in residences such as sleep and relaxation. Other uses surrounding the site such as commercial, mixed use, and light and heavy industrial uses are considered less sensitive to noise. The City also considers recreational and educational uses such as the Marine Sciences Institute, currently located on the site's northern shoreline, the municipal marina and the Seaport Conference Center located to the east of the site, as sensitive receptors. These uses would be considered as the nearest noise-sensitive receptors for the analysis of daytime noise impacts of the project.

The Villas at Bair Island and the Bair Island Marina is a recently completed development located approximately 1,300 feet to the southwest of the site across Redwood Creek. This includes a 155-unit apartment and 100-slip marina development. These apartments would be considered the nearest noise-sensitive receptors for the analysis of nighttime noise impacts. Residential uses are also proposed to be located on the Peninsula Marina property to the south and the Pete's Harbor property north of the Villas at Bair Island development. These proposed developments are anticipated to be constructed in phases over the same timeframe as the proposed project and are expected to be complete by 2013. The proposed project is expected to be completely operational by about 2010. The Pete's Harbor property currently includes several occupied recreational vehicles and a mobile home, and approximately 90 live-aboard boats along the marina that would also be considered sensitive uses.

The project proposes to possibly include a child care center during the third and final phase of construction. However, since it would be operational upon completion of all three construction phases, the child care center would not be adversely affected by project-related construction noise.

EXISTING NOISE ENVIRONMENT

Transportation sources, such as automobiles, trucks, trains, and aircraft, are the principal sources of noise in the urban environment. Along major transportation corridors, noise levels can reach 80 DNL, while along arterial streets, noise levels typically range from 65 to 70 DNL. Industrial and commercial equipment and operations also contribute to the ambient noise environment in their vicinities.

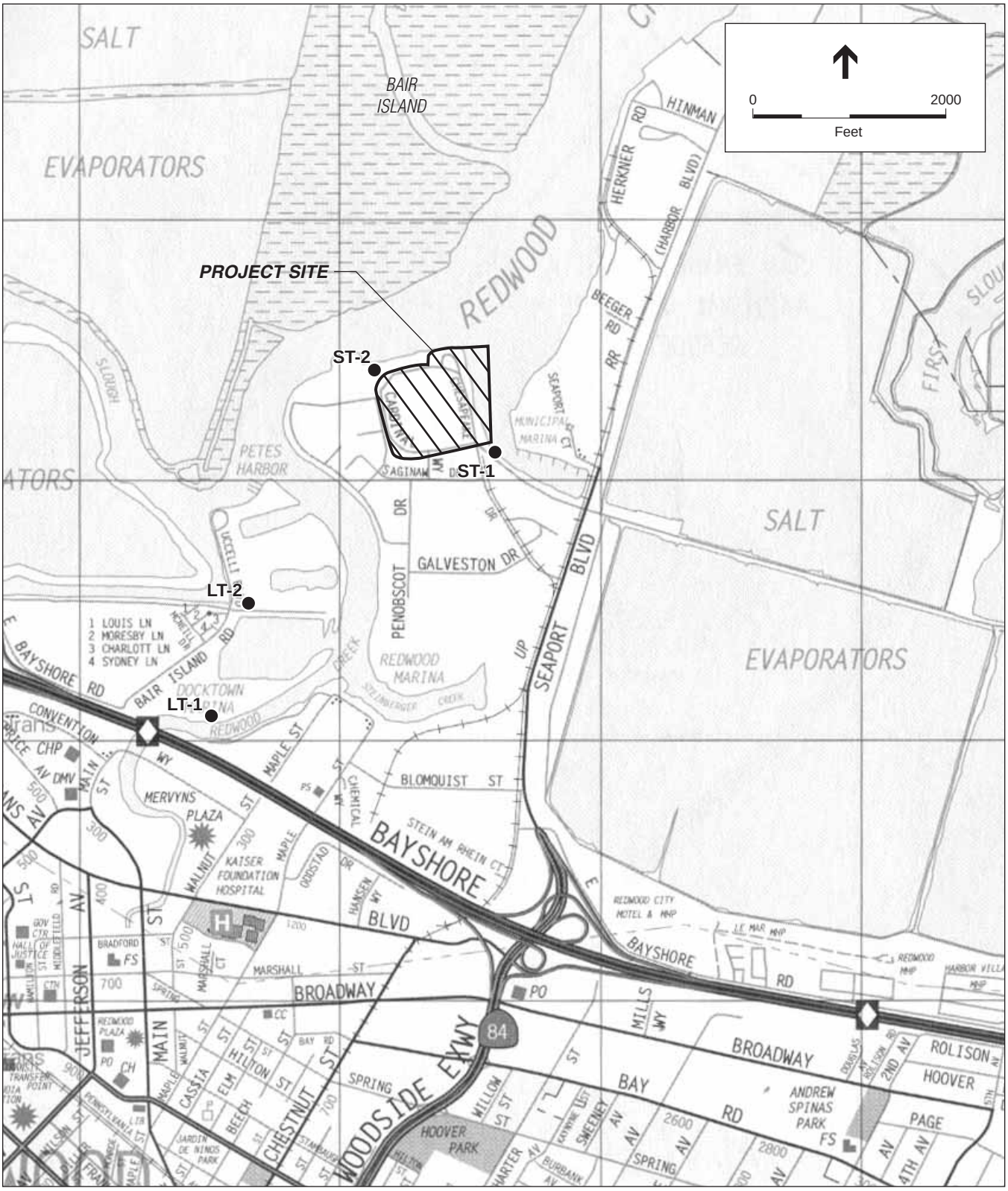
The proposed project site is located along the Redwood City waterfront approximately ¾ mile north of U.S. 101. Much of the project site is currently vacant. The Marine Science Institute, a non-profit educational facility, currently occupies 1.4 acres in existing (temporary) buildings along the site's northern waterfront. The site also functions as the final destination for bittern production for Cargill Corporation, the former site owner and occupant. The remaining portion of the project site is occupied by heavy equipment once used for salt mining, underground channels for the conveyance of bittern, an existing single-story office and storage shed along the site's southern boundary, and an access road along the east side of the property that connects to Chesapeake Drive. A dock extending approximately 100 feet into the waters of Redwood Creek is located along the site's northern boundary. The Marine Science Institute uses this dock as an embarkation point for excursions on Redwood Creek and the San Francisco Bay. Noise generated by these onsite activities was found to be minimal. To provide the basis for evaluating potential impacts of the project on the nearest noise-sensitive uses, this analysis includes noise measurements taken on the project site. Short measurements were taken at two locations along the western and southeastern boundaries of the project site. The noise monitoring locations are shown in Figure IV.F-1 and the monitored Leq is shown in Table IV.F-1. At the first location at the southeastern edge of the site, the primary noise sources were activities at the Port's parking and storage area, aircraft flyovers and a minimal amount of traffic on Chesapeake Drive. At the second location, the noise environment was primarily influenced by vehicular traffic and aircraft flyovers.

Generally, noise in the vicinity of the project area is influenced by traffic on the local roadway network, distant noise from U.S. 101, and aircraft activity from San Carlos Airport located approximately 3.5 miles to the west of the project site. Though the project site is not located within the 55 dBA CNEL contour for the airport, it is close to the flight path of the airport and as a result experiences noise levels much higher than 55 dBA during aircraft flyovers throughout the day.

Noise monitoring data from the Marina Shores Village Project Draft EIR were also considered in the noise analysis for this EIR (Redwood City, 2003). The Marina Shores project proposes to build a residential development at the Peninsula Marina and Pete's Harbor properties located to the southwest of the project site. Two long-term measurements and several short-term measurements were conducted as part of this analysis. The monitored long-term data are also presented in Table IV.F-1. Short-term measurements indicate noise levels of 54 to 69 dBA Leq at the two properties. These measurements provide an idea of the ambient noise environment at the nearest residential receptors to the Abbott Laboratories' site.

REGULATORY SETTING

The proposed project would be subject to regulations, plans and policies developed by the City of Redwood City and the San Mateo County Airport Land Use Commission (ALUC) to limit noise exposure at noise-sensitive land uses. These include the Redwood City Strategic General Plan Noise Element, the Redwood City Municipal Code, and the San Carlos Airport Land Use Plan (ALUP).



Abbott Laboratories West Coast Research Center / 202108 ■

SOURCE: The Thomas Guide

Figure IV.F-1
Noise Monitoring Locations

TABLE IV.F-1
AMBIENT NOISE LEVELS AT MONITORED LOCATIONS, dBA

Site[a]	Location	Measurement Period	Noise Level in dBA	
			L_{eq}	CNEL
ST-1	Along Chesapeake Drive close to the Port of Redwood City Launch Ramp. This represents the noise level at the southeastern boundary of the project site.	15-minute	57	NA
ST-1	Next to the existing Marine Sciences Institute at the northern end of the project site.	15-minute	52	NA
LT-1 [b]	At the Peninsula Marina property approximately 375 feet from the centerline of the nearest northbound U.S. 101 lane.	48-Hour Measurement	58 – 72	73
LT-2 [b]	Approximately 50 feet from the centerline of Bair Island Road near existing residential receptors.	48-Hour Measurement	51 – 78	67

[a] Locations correspond to those shown in Figure IV.F-1.
[b] data from the Marina Shores Village Project DEIR.

NA = Not Applicable.

SOURCE: Environmental Science Associates, 2003.

Redwood City Strategic General Plan Noise Element

The Redwood City Strategic General Plan Noise Element was adopted in 1990. The overall purposes of the Noise Element are to develop a public awareness of noise as an adverse environmental factor; control or abate objectionable or harmful noises at their source; moderate noises to acceptable and safe levels; increase the livability of all sections of Redwood City; and provide a guide for Redwood City in matters of noise, for its control, prevention, or abatement (General Plan, pp. 11-1 – 11-4). The following are the objectives set forth in the General Plan:

1. Minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies.

2. Reduce future impact of all types of point source noises.

3. Reduce ambient noise levels in all parts of the City to safe, optimum levels.

The following are a list of General Plan noise policies applicable to the project site and proposed project:

- Limit the hours of operation at all noise generation sources wherever practicable, unless an emergency exists (Policy N-2, p. 11-2) Require all exterior noise sources (construction operations, air compressors, pumps, fans, and leaf blowers) to use available noise suppression devices and techniques to bring exterior noise down to acceptable levels compatible with adjacent land uses (Policy N-3, p. 11-2).

- Land uses within the Planning Boundary of San Carlos Airport shall be compatible with the Aircraft Noise/Land Use Compatibility Standards found at page 8 of the 1981 San Mateo County Airport Land Use Plan. The "Planning Boundary" for San Carlos Airport is considered the ground area encompassed by the line depicting the 55 CNEL Noise Contour, as shown on the Noise Contour Map at page 7 of the 1981 San Mateo County Airport Land Use Plan and the outer boundary (Elevation 359) of the Hazard Zoning Map at page 11 of the 1981 San Mateo County Land Use Plan (Policy N-5, p. 11-2).

The General Plan's Noise Element contains guidelines for determining the compatibility of various land uses with different noise environments. The Noise Element recognizes that some land uses are more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. The General Plan designation for the site is Light Industrial Use (Research and Development). For industrial uses, which are generally less noise-sensitive, a noise environment of CNEL 75 dBA or less is considered satisfactory with little noise impact and requiring no special noise insulation for new construction. A CNEL of 75 to 85 dBA is considered acceptable only after an analysis of the noise reduction requirements is made and the required noise insulation features are included in the design (conditionally acceptable). In noise environments with CNEL above 85 dBA, new construction or development should not be undertaken unless related to airport activities or services (generally unacceptable). Conventional construction will generally be inadequate, and special noise insulation features should be included in construction.

For residential and educational uses, a noise environment of less than 55 CNEL is considered satisfactory; between 55 and 60 DNL is considered conditionally acceptable, while a noise environment of greater than 60 CNEL is considered generally unacceptable. Based on noise measurements conducted near the residences, noise levels are already in the "generally unacceptable" range.

Redwood City Noise Code

The City of Redwood City also regulates short-term noise through enforcement of city noise codes. Sections 24.30 and 24.31 of the Redwood City Noise Code limits noise levels generated by construction and demolition activities to 110 dBA as measured at any point within a residential district of the City and outside the property boundary of the noise source. Section 24.32 of the noise code also prohibits construction and demolition activities in residential areas or within 500 feet of residential areas between the hours of 8:00 p.m. and 7:00 a.m. on weekdays and at all times during weekend and holidays if the noise level generated by such activities exceeds the local ambient noise levels measures at any point within the residential district and outside the property boundary generating the noise. However, the proposed project would not be located within a residential district or within an area 500 feet from a residential district. Therefore, these time restrictions would not be applicable to the proposed project.

San Carlos Airport Land Use Plan

The San Carlos Airport Land Use Plan, which is a chapter of the San Mateo County ALUP, establishes airport noise and land use compatibility standards for development in the vicinity of San Carlos Airport and its takeoff and approach zones. Residential uses are considered more sensitive than commercial or industrial uses. 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 presented in the plan is recognized as the threshold for review by the ALUC. The project site is not located within the 55-dBA contour for the San Carlos Airport, according to the noise contours in the ALUP. Also the proposed project does not include any residential uses.

IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Based on the *CEQA Guidelines*, a project would be considered to have a significant effect on the environment if it would result in:

- 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;
- a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

A change in noise levels of less than three dBA is not discernible to the general population; an increase in average noise levels of three dBA is considered barely perceptible, while an increase of five dBA is considered readily perceptible to most people (Caltrans, 1998). Therefore, for evaluation of operational noise due to project-related traffic, a noise increment of 5 dBA at sensitive receptors would be used as the significance threshold for this project. To assess both short-term construction noise and long-term operational changes in the ambient noise due to the operation of the project, the following significance criteria take into account both the absolute change in noise levels due to the project and the relationship between the resultant noise level and the City's noise/land use compatibility standards. Where the resultant noise level would remain "normally acceptable" for the affected land use, a change of 5-DNL or more would be considered significant. Where the resultant noise level would be in the range described as "conditionally acceptable" or "normally unacceptable," a change of 3-DNL or more over existing noise levels would be considered significant, and where the resultant noise level would be "clearly unacceptable," any increase in noise over existing levels would be considered significant. In addition, non-conformance with the requirements of the Redwood City noise codes would be considered a significant impact.

For land use compatibility impacts (noise impacts of the environment on the proposed project occupants), the noise compatibility interpretation in the Redwood City Strategic General Plan and the State of California's Land Use/Noise Compatibility Guidelines would apply to the proposed project.

CONSTRUCTION IMPACTS

Impact F.1: Construction activities would intermittently and temporarily generate noise levels above existing ambient levels in the project vicinity. (Potentially Significant)

Project demolition and construction noise levels at and near locations on the project site would fluctuate depending on the particular type, number, and duration of use of various types of construction equipment. The effect of construction noise would depend upon how much noise would be generated by construction, the distance between construction activities and the nearest noise-sensitive uses, and the existing noise levels at those uses.

Table IV.F-2 shows typical noise levels generated by construction of commercial buildings. As shown in Table IV.F-2, the noisiest phases of construction (pile-driving) can generate noise levels of 90 to 105 dBA at a distance of 50 feet. Noise from construction activity generally attenuates (decreases) at a rate of 6 to 7.5 dBA per doubling of distance. Conservatively assuming an attenuation of 6 dBA per doubling of distance, during pile driving, noise levels of 62 to 77 dBA are possible at the nearest residential receptors located 1,300 feet from the project site. On the project site, noise levels at the MSI could be as high as 90 to 105 dBA. Other noise-sensitive uses located within approximately 1,600 feet of pile-driving activity could also be substantially affected, depending on the presence of intervening barriers or other insulating materials. As construction activities would occur during daytime hours, construction noise would be disruptive to recreational and open space uses to the east and north of the site, where noise levels could reach 78 to 93 dBA. At noise levels of 85 dBA, normal conversation is extremely difficult. Intermittent noises such as pile-driving noise are more disturbing to many people than typical continuous construction noise. Without mitigation, this impact would be considered significant.

Noise during the other phases of construction (such as excavation and exterior finishing) would also be disruptive at the sensitive uses and would therefore be considered significant. The main noise sources associated with excavation are the operation of excavators removing material and trucks hauling excavated materials away. The main noise sources associated with exterior finishing would be operation of concrete mixers and pumps.

The contractor shall be required to implement the following measures throughout the duration of construction activity in order to mitigate this potentially significant impact:

Mitigation Measure F.1a: Limit construction activities to the hours between 7:00 a.m. and 7:00 p.m. Monday through Friday. Pile driving activities shall be limited to the hours between 8:00 a.m. and 4:00 p.m. Monday through Friday. Except as provided in Mitigation Measure F.2c, no construction activities shall be allowed on weekends except in enclosed building areas. (Identified by this EIR)

TABLE IV.F-2
TYPICAL COMMERCIAL 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 Operations, Building Equipment, and Home Appliances*, December 1971.

Mitigation Measure F.1b: To reduce daytime noise impacts due to construction, the applicant shall require construction contractors to implement the following measures:

- **Equipment and trucks used for project construction shall utilize 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, wherever feasible);**

- **Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever feasible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, 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 (which could achieve a reduction of 5 dBA). Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible; and**

- **Stationary noise sources shall be located as far from sensitive receptors as feasible, shall be muffled and enclosed within temporary sheds, and insulation barriers shall be incorporated to the extent feasible.**

Significance after Mitigation: Less than Significant.

Impact F.2: Pile driving associated with project construction would result in adverse noise effects. (Significant)

As discussed in Impact F.1, construction activities would include pile driving. Mitigation Measures F.2a through F.2c would reduce this significant impact to a less-than-significant level.

Mitigation Measure F.2a: To reduce the potential for noise impacts from pile driving, alternate methods of driving shall be used, if feasible. (Identified by this EIR)

Alternate measures may include pre-drilling of piles, the use of more than one pile driver concurrently to lessen the total time required for driving piles, or similar measures.

Mitigation Measure F.2b: Establish a process for responding to and tracking complaints pertaining to construction noise that includes the following components:

- **a procedure for notifying City Building Division staff and Police Department;**
- **a plan for posting signs onsite pertaining to permitted construction days and hours and complaint procedures, who to notify in the event of a problem; and a listing of telephone numbers to call (during regular construction hours and off-hours);**
- **designation of a construction complaint manager for the project; and**
- **posting of notices to notify neighbors within 300 feet of the project construction area at least 30 days in advance of pile-driving activities about the nature and estimated duration of the activity.**

The applicant is considering alternative schedules for pile driving operations to maintain flexibility in construction scheduling could result in longer hours of pile driving, in some instances up to around the clock. This would generate noise levels greater than the ambient noise levels at residential receptors. Operation of pile drivers during the more noise-sensitive evening and nighttime hours would lead to a perceptible increase in DNL at all nearby sensitive receptors over the duration of the activity. The residential receptors would be impacted to a greater degree by evening and nighttime operations than other recreational and educational uses which operate primarily during daytime hours. Also, due to lower background noise levels during evenings and nights, noise from pile driving would be more disturbing to occupants of the nearby residences. If pile driving were to take place around the clock, it would result in a DNL of 78 to 93 dBA at the nearest residential receptors. Given that existing noise levels at these residences are in the order of 67 to 73 DNL, noise from pile driving would be clearly perceptible over ambient noise levels, which would be a significant impact. However, it must be noted that although the impact would be more severe over the duration of pile driving, the duration of the activity itself would be shorter.

Mitigation Measure F.2c: If pile driving would be conducted during hours outside those specified in Mitigation Measure F.1a, in addition to Mitigation Measures F.1b, F.2a, and F.2b, the project applicant shall implement the following measures to reduce the impact of pile driving noise on nearby sensitive receptors:

- **The project applicant shall erect temporary plywood barriers along the southwest boundary of the project site, between the site and sensitive receptors to attenuate noise from pile driving;**

- **The project applicant shall hire a third party acoustical consultant to recommend additional mitigation measures to reduce pile driving noise based on site and project-specific factors;**

- **The project applicant shall retain a third party to conduct noise monitoring at sensitive receptors over the duration of the pile driving activity in order to ensure that noise levels from the project site do not exceed ambient noise levels.**

Implementation of Mitigation Measure F.2c in combination with Mitigation Measures F.1a, F.1b, F.2a, and F2.b would reduce Impact F2.c to a less-than-significant level. However, should the project applicant decide not to implement Mitigation Measure F2.c, effects related to 24-hour pile driving activities would be considered significant and unavoidable.

Significance after Mitigation: Less than Significant.

OPERATIONAL IMPACTS

Impact F.3: Project-generated traffic and other operational noise, including mechanical equipment noise, would result in less-than-significant noise impacts at nearby noise receptors. (Less than Significant)

Operational activities associated with the project that would generate noise include vehicular circulation and operation of HVAC systems. Noise modeling using Federal Highway Administration's Noise Prediction Model was conducted for segments of Blomquist Street, Galveston Drive, Saginaw Drive, Chesapeake Drive and Cardinal Way using data from the traffic analysis prepared for this EIR. Modeling was conducted for the following scenarios:

- Existing
- 2010 without Project – Without Blomquist Extension
- 2010 with Project – Without Blomquist Extension
- 2010 without Project – With Blomquist Extension
- 2010 with Project – With Blonmquist Extension
- Cumulative (2020) without Project – With Blomquist Extension
- Cumulative (2020) with project – With Blomquist Extension

Results of the modeling effort are presented in Table IV.F-3. As illustrated in Table IV.F-3, the increase in ambient noise levels along all but two of the analyzed roadway segments, due to the addition of project-related traffic would be less than the 5-dBA significance threshold identified previously. Along segments of Chesapeake Drive to the north of Saginaw Drive and Cardinal Way to the north of Saginaw Drive, the increase in ambient noise level for project conditions would be 5 dBA above existing conditions. While this would represent a perceptible increase in noise during the morning and afternoon peak-hours and possibly during the other daytime hours,

TABLE IV.F-3
TRAFFIC NOISE INCREASES ALONG LOCAL ROADWAYS IN THE PROJECT AREA

	CNEL Noise Level at 50 Feet From Roadway Centerline									
		Without Blomquist Extension			With Blomquist Extension					
Street Segment	**Existing**	**2010 No Project**	**2010 + Project**	**Change vs. Existing**	**2010 No Project**	**2010 + Project**	**Change vs. Existing**	**2020 No Project**	**2020 + Project**	**Change vs. Existing**
Seaport Boulevard										
- East of Blomquist Street	68.7	71.8	72.6	+3.9	71.8	72.6	+3.9	72.4	73.1	+4.4
- East of Chesapeake Dr.	60.9	65.8	65.8	+4.9	65.8	65.8	+4.9	66.4	66.4	**+5.5**
- West of Chesapeake Dr.	63.7	66.9	67.7	+4.1	66.9	67.7	+4.1	67.5	68.3	+4.6
Chesapeake Drive										
- North of Saginaw Dr.	46.8	46.8	51.8	**+5.0**	46.8	51.8	**+5.0**	47.5	52.0	**+5.1**
- South of Saginaw Dr.	57.9	57.9	62.3	+4.4	57.9	62.3	+4.4	58.7	62.6	+4.7
- North of Galveston Dr.	58.6	58.6	62.5	+3.9	58.6	62.4	+3.8	59.4	62.9	+4.3
Saginaw Drive										
- West of Chesapeake Dr.	57.7	57.7	61.9	+4.2	57.7	61.9	+4.2	58.5	62.2	+4.5
- East of Cardinal Wy.	57.2	57.2	61.8	+4.5	57.2	61.8	+4.5	58.0	62.1	+4.8
Cardinal Way										
- North of Saginaw Dr.	52.8	52.8	60.6	**+7.9**	52.8	60.6	**+7.9**	53.5	60.8	**+8.0**

SOURCE: Environmental Science Associates, 2003

since traffic activity related to the project would be limited primarily to daytime hours, the CNEL (which is a 24-hour average with penalties for noise during evening and nighttime hours) along these segments would not be affected significantly. Further, since there are no residential or other sensitive uses located along these segments, this increase in roadside noise due to project-related traffic would be considered a less than significant impact. This conclusion applies to noise conditions both with and without the Blomquist Extension. Also, since existing and project volumes along these segments are low, the resultant noise level would be in compliance with the noise compatibility interpretation of the Redwood City General Plan Noise Element for the land use designations along these segments.

Noise from the operation of HVAC equipment and cars using the parking lots may also be audible in the immediate vicinity of the project site. The location of the HVAC equipment will probably be on building roofs. Typical building equipment and their respective noise ranges at 3 feet include: unit heaters – 45 to 80 Leq; boilers and rooftop air conditioning units – 70 to 90 Leq; and self-contained air conditioning units – 55 to 95 Leq (Bolt, 1971). At 100 feet, the maximum noise from these sources (95 Leq) would attenuate to 65 Leq. Further, HVAC equipment would be operated during the less noise sensitive daytime hours when the facilities at the project site are in operation. For these reasons, noise from HVAC equipment would not be expected to significantly affect the noise environment at nearby land uses. HVAC equipment to be used for the proposed project is anticipated to be of recent manufacture and be compliant with the operational restrictions of the City Noise Codes.

Use of parking lots proposed as part of the project would also generate noise. Parking lot noise could include occasional car alarm noise, vehicle horns, vehicle doors/trunks opening and closing, and conversation of people using the parking lots. The most pervasive of these noise sources would be associated with car alarm noise and vehicle horns. Parking lots are generally not considered significant sources of noise. Noise from parking lot activities would be attenuated primarily by distance and intervening structures that would block the line of sight of the parking lot from nearby uses, and would not be considered significant.

Additionally, there would be operational noise related to the arrival, departure, and loading / unloading of goods from delivery trucks associated with the project. Since the number of truck trips generated by the project would be small, loading and unloading activities would take place well with the site, and would be enclosed to minimize noise impacts to on-site project occupants this impact would be considered less than significant.

Mitigation: None required.

Impact F.4: The project proposes to locate sensitive receptors in a noise environment incompatible with such uses. (Less than significant)

A childcare facility with indoor and outdoor space at ground level near the campus entrance may be included in the project's third and final phase of development. Since childcare facilities are

considered sensitive receptors with respect to noise, project noise levels could potentially be incompatible with such uses.

The *Redwood City Strategic General Plan* nor the State of California Land Use/Noise compatibility guidelines contain noise compatibility standards specifically for child care uses. Therefore, the State of California Land Use/Noise compatibility guidelines for schools, libraries, churches, hospitals, and nursing homes have been used for this analysis as the level of noise sensitivity of these uses is comparable to that of child care centers. According to the State's guidelines, a noise environment of up to 70 dBA is considered acceptable for such uses. Based on noise measurements undertaken at the proposed project site, the existing ambient noise level was found to be 57 dBA, which is currently well below the standard of 70 dBA. However, in the future, the childcare center would be affected by noise from project activities in addition to the existing noise. Based on the discussion under Impact F.3, activities associated with the operation of the project would not result in any significant impacts. Given the logarithmic nature of sound, it highly unlikely that noise from project activities would result in an ambient noise environment in excess of the 70 dBA standard. Therefore the noise environment at the site of the child care center would be compatible with the proposed use and the impact would be considered less than significant.

However, it should be noted that the project site is located close to the flight path of the San Carlos airport. While the site is outside the 55 dBA CNEL contour of the Airport and the average noise levels from aircraft are below 55 dBA, there are peaks considerably above 55 dBA which will occur in the general area under discussion throughout the day. Therefore, outdoor areas associated with the child care center could experience higher noise levels during aircraft flyovers.

Mitigation: None required.

CUMULATIVE IMPACTS

Impact F.5: The proposed project together with other existing and anticipated future development in the area could result in long-term traffic increases and could cumulatively increase noise levels along affected roadways. (Less than Significant)

Noise from cumulative development in the area would primarily occur from associated increases in motor vehicle traffic. Cumulative noise levels in the project area were estimated using traffic data developed for this EIR and are presented in Table IV.F-3. The table shows that increases in traffic noise along all but three analyzed segments would be less than significant. Along segments of Saginaw Drive north of its intersections with Chesapeake Drive and Cardinal Way and along Chesapeake Drive east of Seaport Boulevard, increases in noise due to project-related traffic would be greater than 5 dBA. There are no sensitive receptors currently located along these segments. Also, the likelihood of sensitive receptors locating along these segments is low given that the area is zoned for light industrial uses. Therefore, cumulative increases in traffic on roadways in the project area would result in a less than significant cumulative noise impact.

Mitigation: None required.

REFERENCES – Noise

(*The references cited below are available at the Redwood City Planning Services Department, 1017 Middlefield Road, Redwood City, California, unless specified otherwise below.*)

Bolt, Baranek, and Newman, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, 1971.

Caltrans, *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects*, October 1998.

Governor's Office of Planning and Research, *CEQA: California Environmental Quality Act Statutes and Guidelines*, 1994.

City of Redwood City, *Redwood City Strategic General Plan* Noise Element, 1990.

City of Redwood City, Draft *Environmental Report for the Marina Shores Village Project*, February 2003.

U.S. Department of Transportation, Urban Mass Transportation Administration, *Guidance Manual for Transportation - Noise and Vibration Impact Assessment*, July 1995.

U.S. Department of Housing and Urban Development, *Noise Assessment Guidelines*, April, 1995.