4.10 NOISE

INTRODUCTION

This section describes the existing noise environment in the project site vicinity and potential noise impacts resulting from the proposed project. This noise analysis has been prepared using analytical methodologies and evaluation criteria outlined in the California Environmental Quality Act (CEQA) Guidelines (Appendix G), the Town of Corte Madera General Plan (Town of Corte Madera, 2009), and the Corte Madera Code of Ordinances (Town of Corte Madera, 1970).

ENVIRONMENTAL SETTING

FUNDAMENTALS OF ENVIRONMENTAL NOISE

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

In addition to the concepts of pitch and loudness, there are several noise measurement scales that are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, and so on. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in **Table 4.10-1**.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level or dBA.* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in **Table 4.10-2**. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be used. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

TABLE 4.10-1 DEFINITIONS OF ACOUSTICAL TERMS USED IN THIS REPORT

Term	Definition
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Day-Night level, L_{dn}	L_{dn} is the equivalent noise level for a continuous 24-hour period with a 10-decibel penalty imposed during nighttime and morning hours (10:00 PM to 7:00 AM).
Community Noise Exposure Level, CNEL	CNEL is the equivalent noise level for a continuous 24-hour period with a 5-decibel penalty imposed in the evening (7:00 PM to 10:00 PM) and a 10-decibel penalty imposed during nighttime and morning hours (10:00 PM to 7:00 AM).
L_1, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Harris, 1998.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night (because excessive noise interferes with the ability to sleep), 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level,*

TABLE 4.10-2 TYPICAL NOISE LEVELS IN THE ENVIRONMENT

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
	120 dBA	
Jet fly-over at 1,000 feet		Rock concert
	110 dBA	
Pile driving at 70 feet	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 50 feet		
	80 dBA	Noisy restaurant
		Garbage disposal at 3 feet
Gas lawn mower at 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial/Urban area daytime		Normal speech at 3 feet
Suburban expressway at 300 feet	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	Quiet recording studio
Threshold of human hearing	10 dBA 0 dBA	Threshold of human hearing

Source: California Department of Transportation, 2009.

CNEL, is a measure of the cumulative noise exposure in a community, with a 5-dB penalty added to evening (7:00 PM to 10:00 PM) and a 10-dB addition to nocturnal (10:00 PM to 7:00 AM) noise levels. The *Day/Night Average Sound Level, L_{dn},* is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

FUNDAMENTALS OF GROUNDBORNE VIBRATION

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the Peak Particle Velocity (PPV); another is the Root Mean Square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration. In this section, a PPV descriptor with units of millimeters per second (mm/sec) or inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints. **Table 4.10-3** displays the reactions of people and the effects on buildings that continuous vibration levels produce. The annoyance levels shown in Table 4.10-3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying.

TABLE 4.10-3 REACTION OF PEOPLE AND DAMAGE TO BUILDINGS FOR CONTINUOUS OR FREQUENT INTERMITTENT VIBRATION LEVELS

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect.
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings, such as plastered walls or ceilings
0.5	Severe – Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

Source: California Department of Transportation, 2013.

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

EXISTING NOISE ENVIRONMENT

The project site consists of the Best Western Corte Madera Inn hotel and restaurant. The surrounding land uses include an office building to the north, the Town Center Shopping Center to the south (across Madera Boulevard), U.S. Highway 101 to the east, and a residential neighborhood of single-family homes to the west (across Tamal Vista Boulevard).

Illingworth & Rodkin, Inc. conducted a noise monitoring survey to quantify ambient noise levels at representative noise-sensitive locations on and surrounding the project site. The monitoring survey occurred between 10:30 AM on April 16, 2014 and 3:00 PM on April 18, 2014. Noise levels were measured at five locations. Two of the measurements were long-term measurements (LT-1 and LT-2), which collected data for the entire testing period. These measurements were made to quantify the daily trend in noise levels along the eastern boundary (near U.S. Highway 101) and the western boundary (near Tamal Vista Boulevard) of the project site. The other three noise measurements were 10 minutes in duration (ST-1, ST-2, and ST-3). The short-term measurements were made at the northern boundary (near the existing office buildings), the southern boundary (near Madera Boulevard), and at the hotel pool area. **Figure 4.10-1** shows a map of the project site with the long-term and short-term measurement locations identified. Weather conditions during the noise measurements were characterized by clear to partly cloudy skies, temperatures ranging from 48 to 77 degrees Fahrenheit (9 to 25 degrees Celsius), and calm to 18-mile-per-hour winds.

Noise measurements were made using Larson-Davis Model 820 integrating sound level meters, fitted with precision microphones and windscreens. The sound level measuring assemblies were calibrated before and after the noise monitoring survey, and the response of the systems were always found to be within 0.2 dB of the calibrated level. No calibration adjustments were made to the measured noise levels.

Noise measurement site LT-1 was selected to quantify the daily trend in noise levels at the eastern boundary of the project site, adjacent to U.S. Highway 101. LT-1 was positioned in a tree just east of the existing pond, which would be filled in as part of the proposed project. According to the proposed project plans, this location would represent parking spaces on the eastern side of the future building. At this location, LT-1 was approximately 75 feet from the center line of the near lane on U.S. Highway 101. Hourly average noise levels during the measurement period ranged from 56 to 70 dBA L_{eq}. The day-night level (L_{dn}) at LT-1 was 70 dBA L_{dn}. The daily distribution of noise levels at LT-1 is summarized in **Figure 4.10-2**.

Noise measurement site LT-2 was selected to quantify the daily trend in noise levels along the western boundary of the project site, adjacent to Tamal Vista Boulevard. Across from Tamal Vista Boulevard from LT-2 is a single-family residential neighborhood. LT-2 is approximately 26 feet from the center line of the near lane of Tamal Vista Boulevard. Hourly average noise levels during the measurement period ranged from approximately 47 to 70 dBA L_{eq}, and the day-night was 64 dBA L_{dn}. The daily distribution of noise levels at LT-2 is summarized in **Figure 4.10-3**.

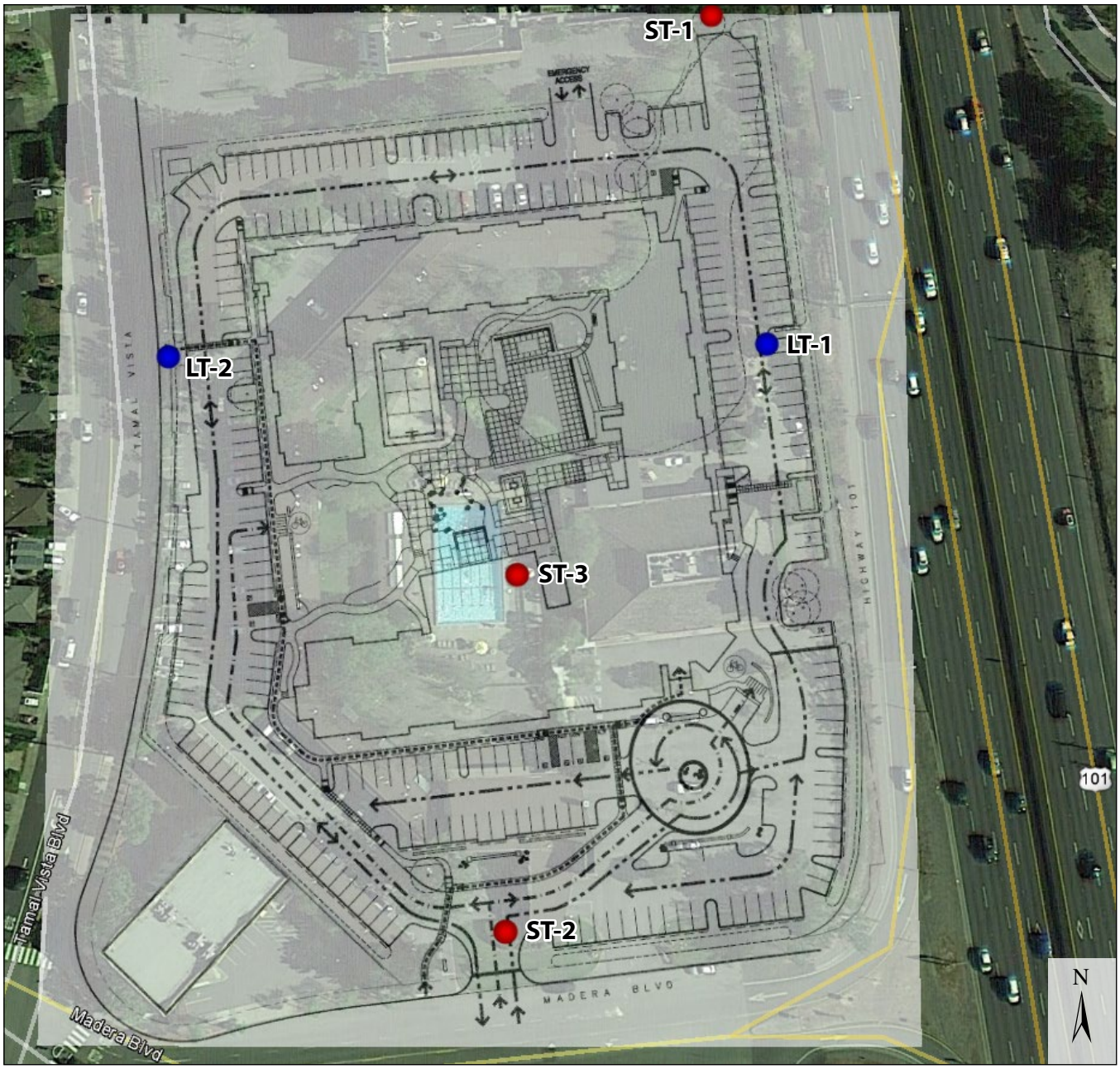

Figure 4.10-1

SOURCE: Illingworth & Rodkin, Inc., 2014

PROJECT SITE MAP SHOWING RECEPTOR LOCATIONS

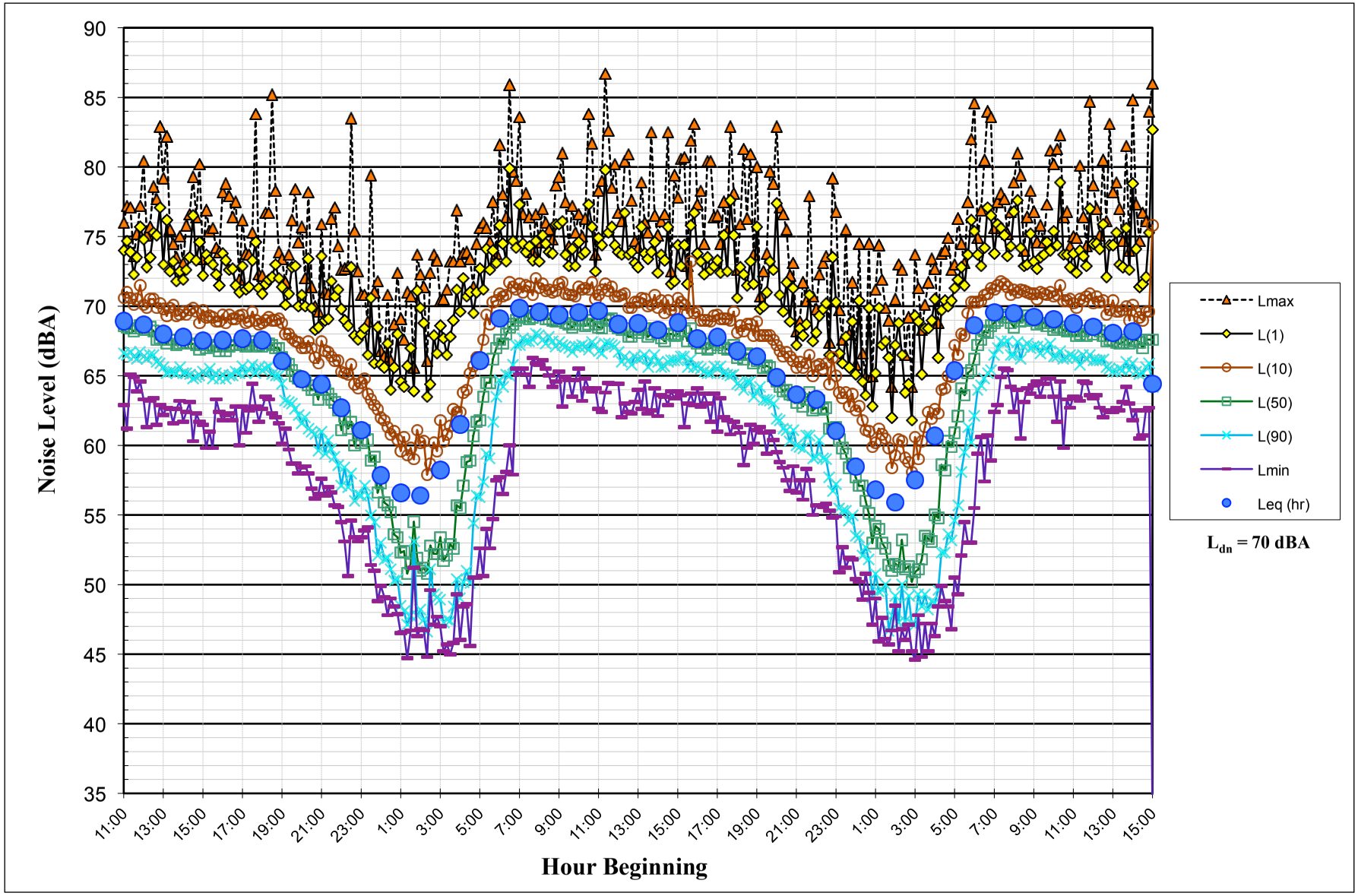

Figure 4.10-2

SOURCE: Illingworth & Rodkin, Inc., 2014

NOISE LEVELS AT NOISE MEASUREMENT SITE LT-1

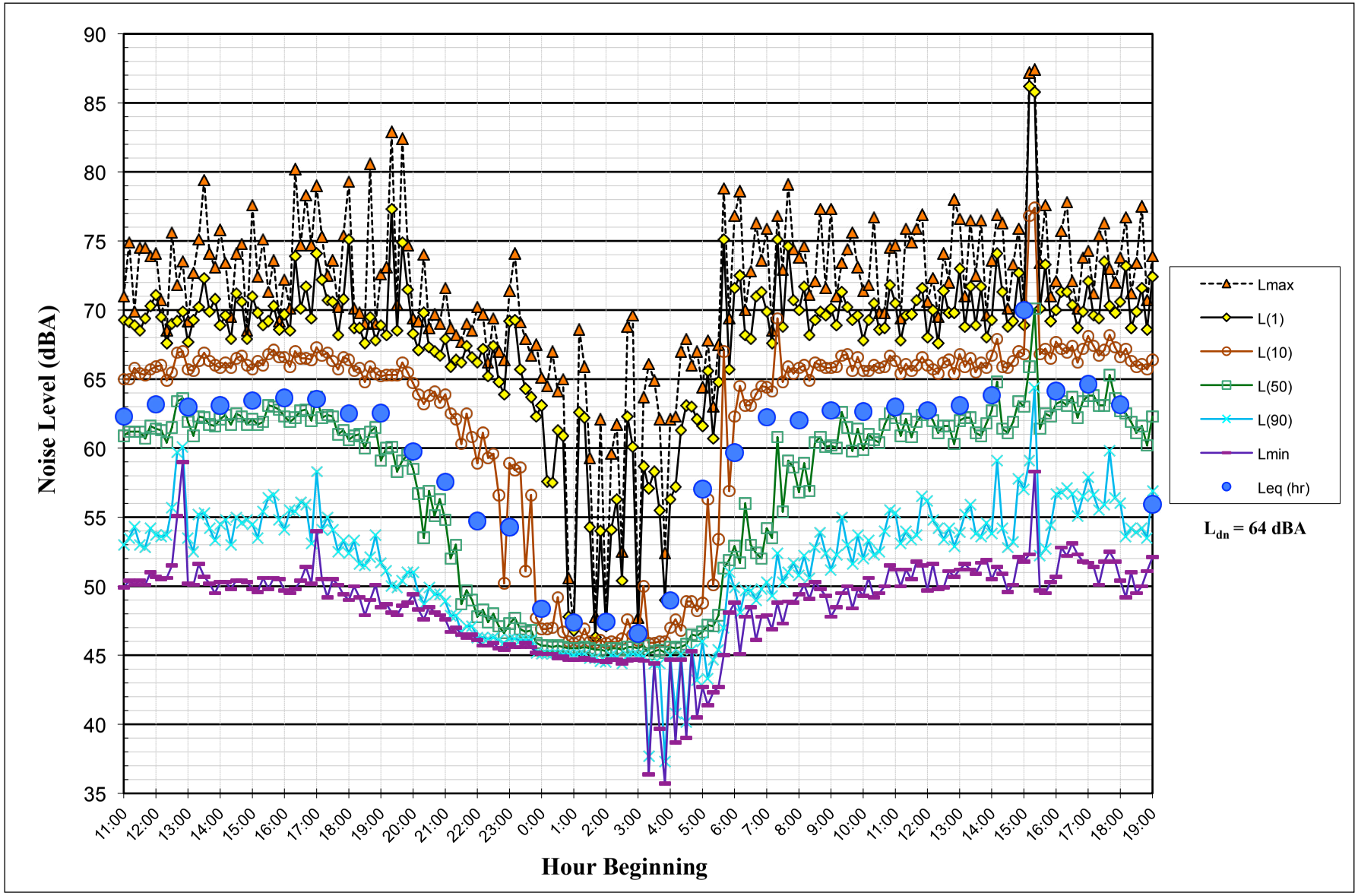

Figure 4.10-3

SOURCE: Illingworth & Rodkin, Inc., 2014

NOISE LEVELS AT NOISE MEASUREMENT SITE LT-2

Short-term noise measurements were conducted at three additional locations, as indicated in Figure 4.10-1 (ST-1 to ST-3). **Table 4.10-4** summarizes the results of the short-term noise measurements. For this project, the only noise-sensitive land uses surrounding the project site are located to the east, across Tamal Vista Boulevard and were represented by LT-2. The three short-term measurements represented the northern boundary of the project site, adjacent to existing office buildings; the southern boundary, adjacent to Madera Boulevard and across the street from Town Center Shopping Center; and the central part of the project site where the existing swimming pool area is located.

TABLE 4.10-4 SHORT-TERM NOISE MEASUREMENT RESULTS

Noise Measurement Location (Date, Time of Measurement)	Noise Level (dBA)					
	L_{eq}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{dn}
ST-1: Northern boundary, ~77 feet west of U.S. Highway 101 (4/18/2014, 14:10-14:20)	67	74	69	67	64	69
ST-2: Southern boundary, ~51 feet north of Madera Boulevard (4/18/2014, 14:30-14:40)	59	65	62	58	55	62
ST-3: Pool area of Corte Madera Inn (4/18/2014, 14:40-14:50)	55	60	57	55	53	57

REGULATORY FRAMEWORK

The State of California and the Town of Corte Madera establish regulatory criteria that are applicable in this noise impact assessment. The State's CEQA Guidelines are used to assess the potential significance of environmental noise impacts pursuant to local policies set forth in the Town of Corte Madera General Plan and Code of Ordinances.

FEDERAL REGULATIONS

There are no federal noise standards that regulate noise or vibration related to the construction or operation of the proposed project.

STATE REGULATIONS

The California Department of Health Services has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure (California Office of Planning and Research, 2003). These guidelines for land use and noise exposure compatibility are to be considered by local governments when setting standards for human exposure to noise.

LOCAL REGULATIONS

Town of Corte Madera General Plan

Chapters 8.5 and 8.6 of the Public Safety and Hazards Element of the Town of Corte Madera General Plan set forth policies related to the control of traffic-related environmental noise at new development properties in the Town of Corte Madera (Town of Corte Madera, 2009). The policies applicable to the proposed project include the following:

Policy PSH-5.1: The interior and exterior noise level standards for noise-sensitive areas of new uses affected by traffic-related noise are as follows [summarized in Table 4.10-5].

Policy PSH-5.7.a: Construction activities shall be limited to the hours between 7:00 a.m. and 5:00 p.m. on weekdays, and 10:00 a.m. and 5:00 p.m. on weekends, unless an exemption is first obtained from the Town in response to special circumstances.

Policy PSH-5.7.b: All internal combustion engines used in conjunction with construction shall be muffled according to the equipment manufacturer's requirements.

Corte Madera Municipal Code

Chapter 9.36 of the Corte Madera Municipal Code provides regulations to prohibit unnecessary, excessive and annoying noises from all sources (Town of Corte Madera, 1970). The provisions that apply to this proposed project include the following:

9.36.030-Specific maximum noise levels

Except as modified in subsections (c) and (d) below, it is unlawful for any person to operate any machinery or equipment, pump, fan, air-conditioning apparatus, or similar mechanical device or any radio receiving set, musical instrument, phonograph, television set, or other similar device in any manner so as to create any noise which would cause the noise level at the property plane of the property from which the noise is emitted to exceed the following values (summarized in **Table 4.10-6**). If the measurement location is on a boundary between two zoning districts, the lower sound level shall apply.

The provisions of subsection (a) shall not apply to construction or demolition work performed during the following times: Monday through Friday from 7:00 a.m. to 5:00 p.m.; and Saturdays and Sundays from 10:00 a.m. to 5:00 p.m.; provided, that all powered construction equipment is equipped with intake and exhaust mufflers recommended by the manufacturers thereof; and provided, further, pavement breakers and jackhammers shall also be equipped with acoustical attenuating shields or shrouds recommended by the manufacturers thereof. In lieu of or in the absence of manufacturer's recommendations, the town engineer shall have the authority to prescribe such means of accomplishing maximum noise attenuation as he deems to be in the public interest, considering the available technology and economic feasibility.

TABLE 4.10-5 MAXIMUM NOISE LEVELS FOR NEW USES AFFECTED BY TRAFFIC NOISE

New Land Use	Outdoor Activity Areas (L_{dn})	Interior Spaces – L_{dn}/Peak Hour L_{eq}[1]	Notes
All Residential	60-65	45	2,3,4
Transient Lodging	65	45	5
Hospitals & Nursing Homes	60	45	6
Theaters & Auditoriums	--	35	
Churches, Meeting Halls, Schools, Libraries, etc.	60	40	
Office Buildings	65	45	7
Commercial Buildings	65	50	7
Playgrounds, Parks, etc.	70	--	
Light Industry	65	50	7

Notes:
1. For traffic noise within Corte Madera, L_{dn} and peak-hour L_{eq} values are estimated to be approximately similar. Interior noise level standards are applied within noise-sensitive areas of the various land uses, with windows and doors in the closed positions.
2. Outdoor activity areas for single-family residential uses are defined as backyards. For large parcels or residences with no clearly defined outdoor activity area, the standard shall be applicable within a 100-foot radius of the residences.
3. For multi-family residential uses, and for mixed-use projects that include residential units, the exterior noise level standard shall be applied at the common outdoor recreation area, such as at pools, play areas or tennis courts.
4. Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn} or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn} may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.
5. Outdoor activity areas of transient lodging facilities include swimming pool and picnic areas.
6. Hospitals are often noise-generating uses. The exterior noise level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by either hospital staff or patients.
7. Only the exterior spaces of these uses designated for employee or customer relaxation have any degree of sensitivity to noise.

TABLE 4.10-6 SPECIFIC MAXIMUM NOISE LEVELS FOR MACHINERY

Zoning District	Time	Sound Level, dBA
R-1-A, R-1, R-2	10:00 p.m. – 7:00 a.m.	50
R-1-A, R-1, R-2	7:00 a.m. – 10:00 p.m.	55
P, C	10:00 p.m. – 7:00 a.m.	60
P, C	7:00 a.m. – 10:00 p.m.	70

The provisions of subsection (a) shall not apply to any burglar alarm or other emergency signaling device, nor to any standby machinery or equipment necessarily operated in emergency situations.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This subsection analyzes impacts related to noise and vibration that could result from implementation of the proposed project. It lists the criteria of significance, which establish the thresholds for determining whether an impact is significant, and discusses the potential significance of impacts attributable to the project.

SIGNIFICANCE CRITERIA

Based on the California Environmental Quality Act (CEQA) statute and guidelines, the proposed project would have a significant noise or vibration effect if it would:

- Expose people to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Expose people to or generate excessive groundborne vibration or groundborne noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airstrip, expose people residing or working in the project area to excessive noise levels; or
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

LESS-THAN-SIGNIFICANT IMPACTS

Construction Vibration

The proposed project would not expose people to or generate excessive groundborne vibrations. Vibration levels generated during demolition and construction activities may, at times, be perceptible at neighboring land uses but, due to the distance between the project site and the nearest sensitive receptors, all groundborne vibrations created by the project would have a less-than-significant impact. Furthermore, vibration levels would not cause excessive cosmetic or structural damage to buildings.

The construction of the project would generate groundborne vibration when heavy equipment or impact tools (e.g., jackhammers, hoe rams, etc.) are used. Construction activities would include demolition of existing structures, excavation, site preparation work, foundation work, filling in of the

existing on-site pool, and new building framing and finishing. A new sewer line would also be constructed along Monona Drive.

For structural damage, the California Department of Transportation uses a vibration limit of 0.5 in/sec PPV for buildings structurally sound and designed to modern engineering standards, 0.3 in/sec PPV for older residential structures, and a conservative limit of 0.08 in/sec PPV for ancient buildings or buildings that are documented to be structurally weakened. No ancient buildings or buildings that are documented to be structurally weakened adjoin the project site. Therefore, groundborne vibration levels exceeding 0.3 in/sec PPV would have the potential to result in a significant vibration impact.

Table 4.10-7 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. Pile driving would not occur for this project. Project construction activities, such as drilling, the use of jackhammers, rock drills, and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.) may generate substantial vibration in the immediate vicinity. Jackhammers typically generate vibration levels of 0.035 in/sec PPV, and drilling typically generates vibration levels of 0.09 in/sec PPV at a distance of 25 feet. Vibration levels would vary depending upon soil conditions, construction methods, and equipment used. Vibration levels from typical construction activities would be expected to be 0.2 in/sec PPV or less at a distance of 25 feet, which would be below the 0.3 in/sec PPV significance threshold. Vibration generated by construction activities near the common property line or along Monona Drive would, at times, be perceptible, but would not be expected to result in "architectural" damage to nearby buildings.

The nearest noise-sensitive receptor is more than 100 feet to the west of the project site, opposite Tamal Vista Boulevard. Along Monona Drive, the nearest sensitive receptors are approximately 30 feet from the proposed sewer line. While vibration levels generated by construction activities would at times be perceptible indoors and may be considered annoying, land uses adjacent to the project site would not be subject to excessive vibrations over extended periods of time, considering the amount of work anticipated in close proximity to the noise-sensitive receptors. Furthermore, if the proposed construction hours are during the daytime only, the potential for residential annoyance would be reduced during typical periods of rest or sleep.

For these reasons, the project's construction vibration impact would be less than significant.

Project-Generated Traffic Noise

The proposed project would not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. Traffic generated by the proposed project would not substantially increase noise levels at noise-sensitive uses in the vicinity. A significant impact would be identified if traffic generated by the project would substantially increase noise levels at sensitive receivers in the vicinity. The Town of Corte Madera General Plan and Municipal Code do not define what constitutes a substantial increase. Typically, however, a substantial increase would occur if the L_{dn} increases by more than 5 dBA, if the L_{dn} increases by more than 3 dBA and exceeds the Normally Acceptable standard, or if the L_{dn} increases by more than 3 dBA and the Normally Acceptable standard was already exceeded.

TABLE 4.10-7 VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment		PPV at 25 Feet (in/sec)	Approximate L_v at 25 Feet (VdB)
Pile driver (impact)	upper range	1.158	112
	typical	0.644	104
Pile driver (sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory roller		0.210	94
Hoe ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: United States Department of Transportation, 2006.

Traffic volume information at the intersections surrounding the project site was reviewed to calculate the permanent noise increase attributable to project-generated traffic. Traffic volumes under the "Existing" and "Existing Plus Project" scenarios were compared to calculate the relative increase in traffic noise attributable to the proposed project. The comparison of the traffic volumes under these scenarios indicates that the project would increase traffic noise levels by less than 1 dBA L_{dn} at all intersections in the project site vicinity. The permanent noise increase attributable to the project would not be considered substantial, and the impact would be less than significant.

Aircraft Noise

The proposed project site does not lie within 2 miles of a public airport or public use airstrip. Furthermore, the proposed project site does not lie within close-proximity of a private airstrip. Therefore, people residing or working in the project area would not be exposed to excessive aircraft noise levels. The proposed project would be located in a compatible noise environment with respect to noise generated by local airports. Gnoss Field is located over 14 miles north of the

project site. There is also a private airport in San Rafael that is located approximately 5.5 miles north of the project site. To the northeast of the project site, there is the San Rafael Private Heliport.. It is approximately 1.8 miles from the proposed project site. The Commodore Center Heliport and Seaplane Base in Sausalito is approximately 3.5 miles south of the project site. Although aircraft-related noise is occasionally audible at the project site, the project site does not lie within the Airport Influence Area of local airports. The project's impact with respect to aircraft noise would therefore be less than significant.

POTENTIALLY SIGNIFICANT IMPACTS

Impact NOISE-1: Future commercial hotel uses developed at the project site would be exposed to exterior noise levels ranging from under 60 to 69 dBA L_{dn}. The resulting interior noise levels would be expected to exceed the Town's interior noise guideline of 45 dBA L_{dn} without the incorporation of noise insulation features into the project's design. The proposed project would, therefore, expose people to noise levels in excess of the Town's established guidelines. (PS)

The future noise environment at the project site would continue to result mostly from traffic along U.S. Highway 101. According to the plans for the proposed project, there would be windows from the outward-facing rooms with direct line-of-sight to the highway, as well as parking spaces, but there would be no outdoor use areas with direct line-of-sight to U.S. Highway 101. Traffic along Madera Boulevard and Tamal Vista Boulevard would also affect the future noise environment.

Future Exterior Noise Environment

While no direct line-of-sight to outdoor use areas would occur along Madera Boulevard, there would be a direct line-of-sight from Tamal Vista Boulevard to outdoor use areas, which would be located in the center of the project site. The distance from the center line of the near lane along Tamal Vista Boulevard to the outdoor use areas at the project site would range from approximately 170 to 290 feet. The projected noise levels at the outdoor use areas of the proposed project would be less than 60 dBA L_{dn}. According to the Town of Corte Madera General Plan, outdoor use areas at transient lodgings have a maximum allowable noise level of 65 dBA L_{dn}. Since the projected noise levels at the noise-sensitive outdoor activity areas located on the project site would be less than the allowed maximum level, this would be a less-than-significant impact.

Future Indoor Noise Environment

Interior noise levels within new transient lodgings are required by the Town of Corte Madera General Plan to be maintained at or below 45 dBA L_{dn}. At the project site, perimeter hotel rooms would be exposed to future exterior noise levels ranging from under 60 dBA L_{dn} at rooms adjacent to Tamal Vista Boulevard and Madera Boulevard to 69 dBA L_{dn} at rooms adjacent to U.S. Highway 101.

Interior noise levels would vary depending upon the design of the buildings (relative window area to wall area) and the selected construction materials and methods. Standard commercial hotel construction provides approximately 20 to 25 dBA of exterior-to-interior noise reduction, assuming

the windows are closed. For exterior noise environments ranging from 65 to 70 dBA L_{dn}, interior noise levels can typically be maintained below 45 dBA L_{dn} with the incorporation of an adequate forced air mechanical ventilation system in each hotel room, allowing the windows to be closed. In noise environments of 70 dBA L_{dn} or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods are often necessary to meet the interior noise level limit.

Projected interior noise levels for the proposed project would potentially be as high as 49 dBA L_{dn} at the rooms adjacent to U.S. Highway 101. Therefore, this would be a potentially significant impact.

Mitigation Measure NOISE-1: The following mitigation measures shall be incorporated into the project:

- *A qualified acoustical consultant shall review the final site plan, building elevations, and floor plans prior to construction to calculate expected interior noise levels. Building facades with a view of U.S. Highway 101 would require analysis for potential sound-rated construction methods and building façade treatments to maintain interior noise levels at or below acceptable levels. These treatments would include, but are not limited to, sound-rated windows, sound-rated wall constructions, acoustical caulking, and sound-insulating ventilation systems. A preliminary review of the building floor plans and elevations indicates that windows with a minimum Sound Transmission Class (STC)[1] rating of 26 to 32 would be needed at units having direct line-of-sight to U.S. Highway 101. The specific determination of what noise insulation treatments are necessary shall be conducted on a room-by-room basis during final design of the project. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the Town along with the building plans and approved design prior to issuance of a building permit.*
- *Building sound insulation requirements shall include the provision of forced-air mechanical ventilation for all hotel rooms, so that windows could be kept closed at the discretion of the occupants.*

The combination of the above measures would reduce this impact to a less-than-significant level. (LTS)

Impact NOISE-2: The project could generate noise in excess of the Town's exterior noise guidelines. The proposed project would, therefore, expose people to and generate noise levels in excess of the Town's established guidelines. (PS)

The proposed project would include mechanical equipment, such as heating, ventilation, and air conditioning systems. Under the Corte Madera Municipal Code, noise generated by mechanical equipment would be restricted according to Town zoning. While the project site is currently zoned C-3, Highway Commercial, it is bordered to the west by a residential neighborhood that is zoned R-1, Medium-Density Residential. According to the Municipal Code, if the measurement location is on the boundary between two zoning districts, the lower noise level restriction should be applied, which would be R-1 for this project. The maximum allowed noise levels for an R-1 zoning district,

[1] **Sound Transmission Class (STC)** A single figure rating designed to give an estimate of the sound insulation properties of a partition. Numerically, STC represents the number of decibels of speech sound reduction from one side of the partition to the other. The STC is intended for use when speech and office noise constitute the principal noise problem.

as shown in Table 4.10-6, would be 55 dBA L_{max} during daytime hours from 7:00 AM to 10:00 PM and 50 dBA L_{max} during nighttime hours from 10:00 PM to 7:00 AM.

Information regarding the number, type, and size of mechanical equipment units to be used in the project was not available at the time of this study. The placement of such equipment on or surrounding the proposed hotel also had not yet been determined. Without this information, calculations cannot be made regarding noise levels at nearby sensitive receptors. Noise from mechanical equipment was therefore conservatively identified as a potentially significant impact.

Mitigation Measure NOISE-2: Due to the number of variables inherent in the mechanical equipment needs of the project (number and type of units, locations, size, housing or enclosures, etc.), the impacts of mechanical equipment noise on nearby noise-sensitive uses shall be assessed during the final stage of project design. Design planning shall take into account the noise criteria associated with such equipment and use site planning to locate equipment in less noise-sensitive areas, where feasible. Other controls could include, but shall not be limited to, fan silencers, enclosures, and screen walls.

An acoustical study shall be prepared during final project design to evaluate the potential noise generated by building mechanical equipment and to identify the necessary noise controls that are included in the design to meet the Town's 55 dBA L_{max} daytime and 50 dBA L_{max} nighttime noise limits. The study shall be submitted to the Town of Corte Madera Building Department for review and approval prior to issuance of any building permits. Implementation of these mitigation measures would reduce this impact to a less-than-significant level. (LTS)

Impact NOISE-3: Project construction could result in a substantial temporary increase in noise. The proposed project would result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. (PS)

Noise-generating construction activities are anticipated to result in noise levels that exceed 60 dBA L_{eq} and be at least 5 dBA L_{eq} above the ambient noise environment at adjacent noise-sensitive land uses on a temporary basis. Noise generated by construction activities would temporarily elevate noise levels at adjacent noise-sensitive receptors.

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

Construction activities generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. The highest maximum noise levels generated by project construction would typically range from about 90 to 95 dBA L_{max} at a distance of 50 feet from the noise source. Typical hourly average construction-generated noise levels are about 81 to 88 dBA L_{eq}, measured at a distance of 50 feet from the center of the site during busy construction periods (e.g., during use of earth-moving equipment, impact tools, etc.). Hourly average noise levels generated by the construction of hotel would range from about 65 to 88 dBA L_{eq}, measured at a distance of 50 feet, depending upon the amount of activity at the site. Construction-generated

noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain often result in lower construction noise levels at distant receptors.

Approximately 12 to 16 months would be required to complete the demolition and construction phases of the proposed project including the new sewer proposed along Monona Drive. Construction phases at the project site would include filling of the pond, demolition, grading and foundation development, building construction, paving for new parking areas and internal road, and final landscaping. Once construction moves indoors, minimal noise would be generated at off-site locations. The replacement of the Monona Drive sewer would occur over an approximate 3-week period.

Mitigation Measure NOISE-3: The following best management practices shall be incorporated into the project:

- *Pursuant to the Town of Corte Madera General Plan Municipal Code, restrict noise-generating activities at the construction site or in areas adjacent to the construction site to the hours of 7:00 AM to 5:00 PM, Monday through Friday, and to the hours of 10:00 AM to 5:00 PM, Saturday and Sunday. Construction shall be prohibited on legal holidays.*
- *Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.*
- *Strictly prohibit unnecessary idling of internal combustion engines.*
- *Locate stationary noise-generating equipment, such as air compressors or portable power generators, as far as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses. Temporary noise barriers could reduce construction noise levels by 5 dBA.*
- *Use "quiet" air compressors and other stationary noise sources where technology exists.*
- *Route all construction traffic to and from the project site via designated truck routes, where possible. Prohibit construction-related heavy truck traffic in residential areas, where feasible.*
- *Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.*
- *Require the contractor to prepare and submit to the Town for approval a detailed construction plan identifying the schedule for major noise-generating construction activities.*
- *Designate a "disturbance coordinator," who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and shall require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include in it the notice sent to neighbors regarding the construction schedule.*

- *With the incorporation of these practices, the noise impact resulting from project construction would be reduced to a less-than-significant level. (LTS)*

CUMULATIVE IMPACTS

Traffic volumes along roadways serving the project site would increase as a result of cumulative growth planned in and around Corte Madera. Significant cumulative traffic noise impacts are not anticipated in the project site vicinity, and the project would not make a "cumulatively considerable" contribution to cumulative traffic noise increases.

The only existing noise-sensitive receptors in the project site vicinity are in the single-family residential neighborhood to the west of the project site, along Tamal Vista Boulevard. The project would result in a significant cumulative traffic noise impact if these sensitive receptors would be exposed to cumulative traffic noise level increases greater than 3 dBA L_{dn} above existing traffic noise levels and if the project would make a "cumulatively considerable" contribution to the overall traffic noise increase. A "cumulatively considerable" contribution would be defined as an increase of 1 dBA L_{dn} or more attributable solely to the proposed project.

Cumulative traffic noise level increases were calculated by comparing "Cumulative No Project" traffic volumes and "Cumulative Plus Project" volumes to "Existing" traffic volumes. Existing levels along Madera Boulevard and the U.S. Highway 101 off-ramp are approximately 62 dBA L_{dn}. The cumulative no project and the cumulative plus project traffic noise increase along this segment is calculated to be less than 2 dBA L_{dn}. Along Tamal Vista Boulevard, the existing levels are approximately 64 dBA L_{dn}. The cumulative no project and the cumulative plus project traffic noise increase is calculated to be less than 3 dBA L_{dn} along this segment. Therefore, the difference between the noise level increases with and without the project is calculated to be less than 1 dBA $L_{dn,}$ which would not be considered a substantial increase. The project would not make a cumulatively considerable contribution to increased noise levels.

REFERENCES

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

California Department of Transportation, 2009. "Technical Noise Supplement (TeNS)," November.

California Office of Planning and Research, 2003. "State of California General Plan Guidelines," Chapter 4: Required Elements of the General Plan – Noise Element, October.

Harris, Cyril M., 1998. *Handbook of Acoustical Measurements and Noise Control*.

Marin County Community Development Agency, 2007. *Marin Countywide Plan*, November.

Town of Corte Madera, 1970. Code of Ordinances (Municipal Code), Title 9 – Peace, Safety and Morals, Chapter 9.36.

Town of Corte Madera, 2009. *Town of Corte Madera General Plan*, Public Safety and Hazards Element, Chapters 8.5 and 8.6.

United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, 2006. "Transit Noise and Vibration Impact Assessment," May.