Section 3.9
Noise

Introduction

This section addresses noise impacts associated with the construction and operation of proposed roadway improvements to the Carmel Valley Road corridor. Cumulative noise impacts associated with growth projected in the CVMP area are also evaluated.

This study includes a discussion of existing conditions, a summary of local policies and regulations related to noise issues, an analysis of environmental noise impacts related to the proposed program, and cumulative growth per the CVMP. Where significant impacts are identified, mitigation measures are recommended where feasible to reduce impacts.

Methodology

Jones & Stokes reviewed the following sources of information to prepare this section.

- Carmel Valley Master Plan, 1986.
- Monterey County General Plan.
- Greater Monterey Peninsula Area Plan, September 1997.
- Traffic Study prepared for the Carmel Valley Master Plan by DKS Associates, (Appendix F).

Environmental Setting

This section discusses existing conditions related to noise in the program area.

Noise Terminology

Sound, Noise, and Acoustics

Sound is a disturbance that is created by a moving or vibrating source in a gaseous or liquid medium or the elastic stage of a solid and that is capable of being detected by the hearing organs. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium to a hearing organ, such as a human ear. For traffic sound, the medium of concern is air. Noise is defined as loud, unpleasant, unexpected, or undesired sound.

Sound is actually a process that consists of three components: the sound source, the sound path, and the sound receiver. All three components must be present for sound to exist. Without a source to produce sound or a medium to transmit sound pressure waves, there is no sound. Sound must also be received; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receivers, not only one of each. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound.

Frequency and Hertz

A continuous sound can be described by its frequency (pitch) and its amplitude (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch, like the low notes on a piano, whereas high-frequency sounds are high in pitch, like the high notes on a piano. Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of hertz. The human ear can generally hear frequencies ranging from 20 Hz on the low end, to about 20,000 Hz (20 kHz) on the high end.

Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. Loudness of sound increases and decreases with increasing and decreasing amplitude. Sound-pressure amplitude is measured in units of micro-Newtons per square meter (FN/m^2), also called micro-Pascals (μPa). One μPa is approximately one hundred billionth

(0.00000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million µPa, or 10 million times the pressure of the weakest audible sound (20 µPa). Because expressing sound levels in terms of µPa would be cumbersome, sound pressure level (SPL) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called bels, named after Alexander Graham Bell. To provide finer resolution, a bel is divided into 10 decibels (dB).

Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted by ordinary arithmetic means. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. When two sounds of equal SPL are combined, they produce a combined SPL 3 dB greater than the original individual SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sound levels differ by 10 dB or more, the combined SPL is equal to the higher SPL; the lower sound level would not increase the higher sound level.

A-Weighted Decibels

SPL alone is not a reliable indicator of loudness. The frequency of a sound also has a substantial effect on how humans respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, the healthy human ear is most sensitive to sounds from 1,000 to 5,000 Hz and perceives a sound within that range as being more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of SPL adjustments is usually applied to the sound measured by a sound level meter. The adjustments, referred to as a weighting network, are frequency-dependent.

The A-scale weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with highway-traffic noise. Noise levels for environmental noise studies are typically reported in terms of A-weighted decibels (dBA). In environmental noise studies, A-weighted SPLs are commonly referred to as noise levels. Table 3.9-1 shows typical A-weighted noise levels.

Table 3.9-1. Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 300 meters (1000 feet)		
	— 100 —	
Gas lawn mower at 1 meter (3 feet)		
	— 90 —	
Diesel truck at 15 meters (50 feet) at 80 kph (50 mph)		Food blender at 1 meter (3 feet)
	— 80 —	Garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime		
Gas lawn mower, 30 meters (100 feet)	**— 70 —**	Vacuum cleaner at 3 meters (10 feet)
Commercial area		Normal speech at 1 meter (3 feet)
Heavy traffic at 90 meters (300 feet)	**— 60 —**	
		Large business office
Quiet urban daytime	**— 50 —**	Dishwasher next room
Quiet urban nighttime	**— 40 —**	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	**— 0 —**	Lowest threshold of human hearing

Source: Caltrans 1998b.

Human Response to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the midfrequency range. Outside such controlled conditions, the trained ear can detect 2-dB changes in normal environmental noise. However, it is widely accepted that the average healthy ear can barely perceive 3-dB noise level changes. A 5-dB change is readily perceptible, and a 10-dB change is perceived as being twice or half as loud. As discussed above, doubling sound energy results in a 3-dB increase in sound; therefore, doubling sound energy (e.g., doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

- Equivalent Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level ($L_{eq[}$h]), is the energy average of the A-weighted sound levels occurring during a 1-hour period.

- Percentile-Exceeded Sound Level (L_x): L_x represents the sound level exceeded for a given percentage of a specified period (e.g., L10 is the sound level exceeded 10% of the time, L90 is the sound level exceeded 90% of the time).

- Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period.

- Day-Night Level (L_{dn}): L_{dn} is the energy average of the A-weighted sound levels occurring during a 24-hour period with 10 dB added to the A-weighted sound levels occurring between 10 p.m. and 7 a.m.

- Community Noise Equivalent Level (CNEL): CNEL is the energy average of the A-weighted sound levels occurring during a 24-hour period with 10 dB added to the A-weighted sound levels occurring between 10 p.m. and 7 a.m. and 5 dB added to the A-weighted sound levels occurring between 7 p.m. and 10 p.m.

Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

Geometric Spreading: Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates (or drops off) at a rate of 6 dBA for each doubling of distance. Highway noise is not a single, stationary point source of sound. The movement of the vehicles on a highway makes the source of the sound appear to emanate from a line (i.e., a line source) rather than a point. This line source results in cylindrical spreading rather than the spherical spreading that results from a point source. The change in sound level from a line source is 3 dBA per doubling of distance.

Ground Absorption: The noise path between the highway and the observer is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is done for simplification only because prediction results based on this scheme are sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., those sites with a reflective surface, such as a parking lot or a smooth body of water, between the source and the receiver), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, between the source and the receiver), an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed. When added to the geometric spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dBA per doubling of distance for a line source and 7.5 dBA per doubling of distance for a point source.

Atmospheric Effects: Atmospheric conditions can have a significant effect on noise propagation. Wind has been shown to be the most important meteorological factor within approximately 500 feet of the source, whereas vertical air-temperature gradients are more important for greater distances. Other factors such as air temperature, humidity, and turbulence also have significant effects. Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lower noise levels. Increased sound levels can also occur as a result of temperature inversion conditions (i.e., increasing temperature with elevation).

Shielding by Natural or Human-Made Features: A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by this shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction. A taller barrier may provide as much as 20 dB of noise reduction.

Noise-sensitive Land Uses

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of noise could adversely affect the use of the land. Typical sensitive receptors include residents, school children, hospital patients, the elderly, etc. Sensitive land uses in the program area that could be affected include:

- single-family residences located along Carmel Valley Road and connecting roadways,
- multi-family residences and condominiums located along Carmel Valley Road and Rio Road,
- places of worship,
- schools, athletic fields, and playgrounds,
- parks and actively used open space areas,
- lodging, motels and hotels, and
- golf courses.

The noise-sensitive areas affected by traffic on Carmel Valley Road were divided into twelve segments for this study. A description of these segments and associated land use is shown in Table 3.9-2.

Table 3.9-2. Land Use adjacent to segments in the Carmel Valley Road study area

Segment Number	Roadway	Segment ends	Land Use
1	Carmel Valley Road	East of Holman Road	Low-density single-family residences
2		Holman Road to Esquiline Road	Single- and multi-family residences, sports court
3		Esquiline Road to Ford Road	Single- and multi-family residential, commercial
4		Ford Road to Laureles Grade	Single-family residences, lodging
5		Laureles Grade to Robinson Canyon Road	Low-density single family residences, golf course, Carmel Valley High School, Garland Ranch Regional Park, open space
6		Robinson Canyon Road to Schulte Road	Single-family residences, Hall School, Carmelo School, Places of Worship
7		Schulte Road to Rancho San Carlos Road	Low-density single-family residences, golf course, open space
8		Rancho San Carlos Road to Rio Road	Low-density single-family residences, place of worship, golf course, open space
9		Rio Road to Carmel Rancho Boulevard	Single-family residences, Carmel Middle School
10		Carmel Rancho Boulevard to Highway 1	Single-family residences, commercial

Existing Noise Environment

The program area includes residential and public land uses located along Carmel Valley Road between the City of Carmel-by-the Sea and the village of Carmel Valley. The existing noise environment in the program area is dominated by noise from traffic traveling on Carmel Valley Road.

The existing noise environment in the program area has been characterized both with sound level measurements taken in the program area and traffic noise modeling as described below.

Noise Monitoring

The existing noise environment in the program area was characterized by conducting short- and long-term noise monitoring in locations adjacent to Carmel Valley Road, Rio Road, and Laureles Grade.

Jones & Stokes selected the noise monitoring sites. Sites were selected to document existing ambient noise levels at representative locations in the program area where noise-sensitive land uses are located. The noise monitoring sites are described below.

Long-Term Monitoring

Long-term monitoring was conducted at two positions using Larson-Davis Model 720 Type 2 sound level meters (serial numbers 0502 and 0506). The purpose of the long-term monitoring is to record the day-night variation in noise levels. The long-term sound level data was collected over 24-hours, beginning Monday, June 5, 2006, and ending Tuesday, June 6, 2006.

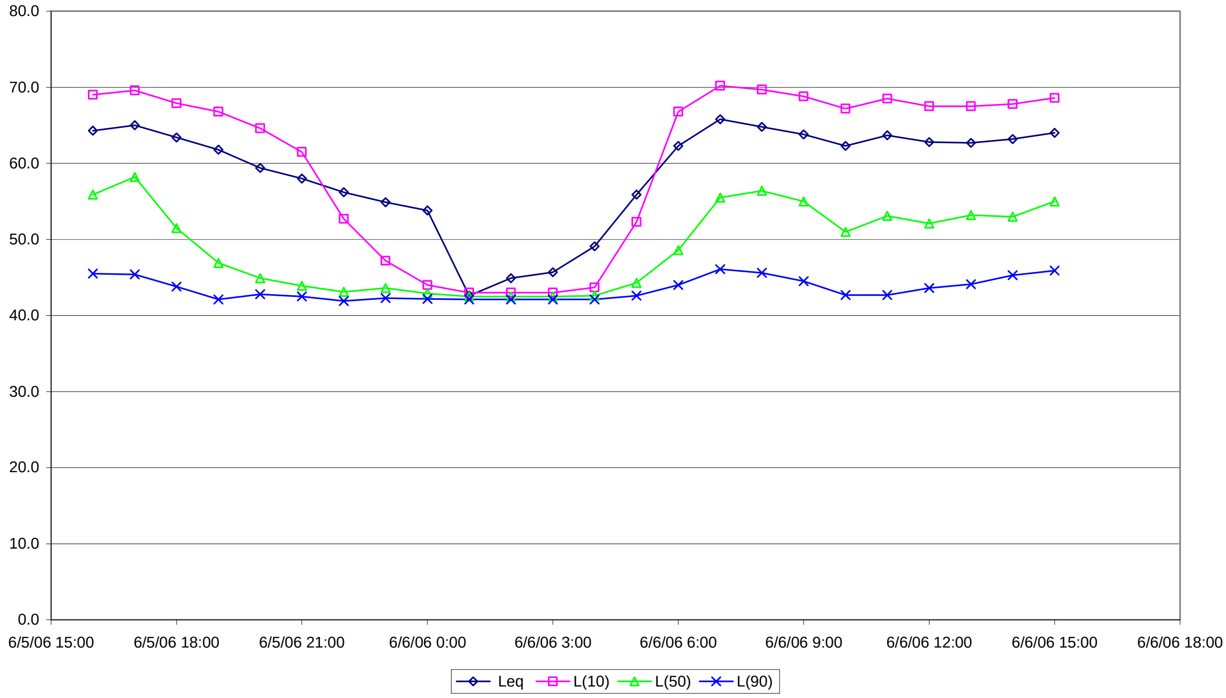
Position LT-1. The long-term monitoring position LT-1 was located in the front yard of the residence at 1 Holman Road in Carmel Valley. The residence is in a first-row location relative to East Carmel Valley Road, at the top of an embankment about 10 feet in height. The microphone was located within line-of-sight to East Carmel Valley Road, approximately 50 feet from the edge-of-pavement. The posted speed for traffic on East Carmel Valley Road was 35 miles per hour (mph). The loudest hour sound level measured was 65.8 dBA L_{eq}1h, during the 7:00 a.m. hour. The day-night noise level was measured to be 64.3 dBA L_{dn}. Table 3.9-3 and Figure 3.9-1 summarize the results of the long-term monitoring.

Table 3.9-3. Summary of Long-Term Monitoring, Site LT-1

Hour Beginning	One-hour average noise levels (dBA, L_{eq}[h])	Difference from Loudest Hour (dB)
12:00 a.m.	53.8	-12.0
1:00 a.m.	42.6	-23.2
2:00 a.m.	44.9	-20.9
3:00 a.m.	45.7	-20.1
4:00 a.m.	49.1	-16.7
5:00 a.m.	55.9	-9.9
6:00 a.m.	62.3	-3.5
7:00 a.m.	**65.8**	0
8:00 a.m.	64.8	-1.0
9:00 a.m.	63.8	-2.0
10:00 a.m.	62.3	-3.5
11:00 a.m.	63.7	-2.1
12:00 p.m.	62.8	-3.0
1:00 p.m.	62.7	-3.1
2:00 p.m.	63.2	-2.6
3:00 p.m.	64.0	-1.8
4:00 p.m.	64.3	-1.5
5:00 p.m.	65.0	-0.8
6:00 p.m.	63.4	-2.4
7:00 p.m.	61.8	-4.0
8:00 p.m.	59.4	-6.4
9:00 p.m.	58.0	-7.8
10:00 p.m.	56.2	-9.6
11:00 p.m.	54.9	-10.9
L_{dn}	**64.3**	NA

Note: Worst noise hour noise level is in **bold** text.

Figure 3.9-1. Long-Term Monitoring at Site LT-1, June 5-6, 2006



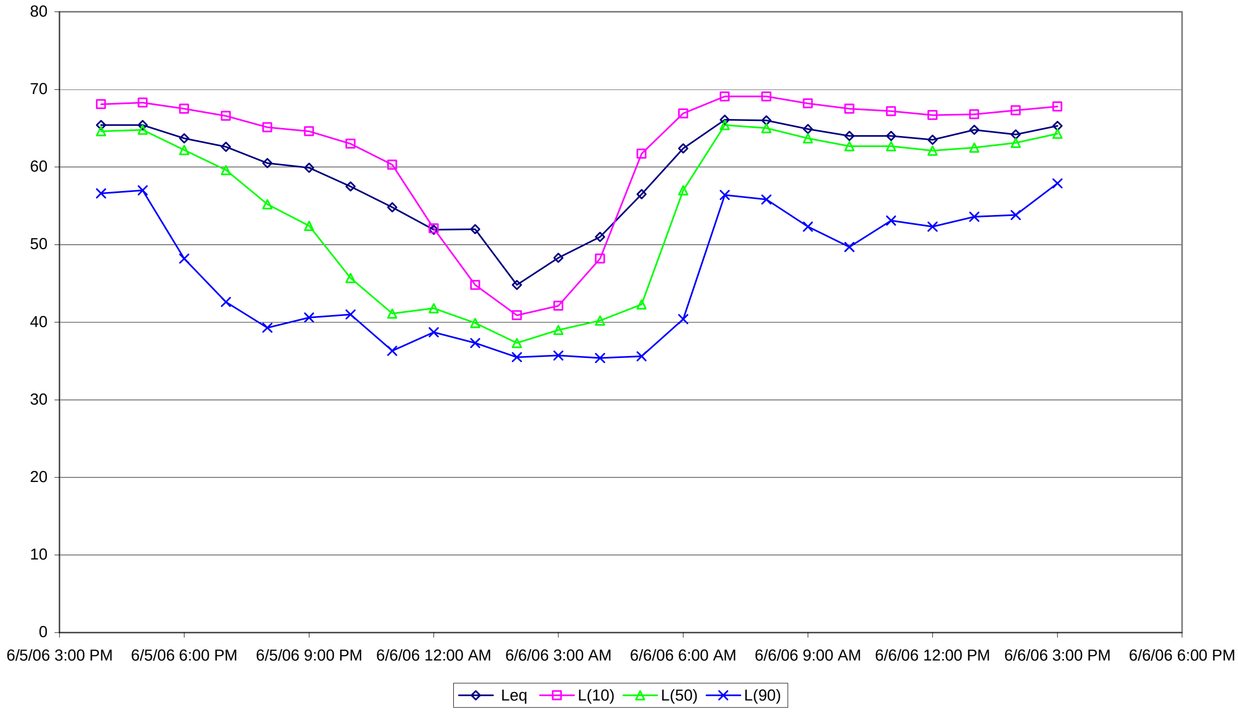
Position LT-2. The long-term monitoring position LT-2was located in the front yard of the residence at 7470 Carmel Valley Road. The residence is in a first-row location relative to Carmel Valley Road. The microphone was located within line-of-sight to Carmel Valley Road, approximately 75 feet from the edge-of-pavement. The posted speed for traffic on Carmel Valley Road was 50 mph. The loudest hour sound level measured was 66.1 dBA L_{eq}1h, during the 7:00 a.m. hour. The day-night noise level was measured to be 65.0 dBA L_{dn}. Table 3.9-4 and Figure 3.9-2 summarize the results of the long-term monitoring.

Table 3.9-4. Summary of Long-Term Monitoring, Site LT-2

Hour Beginning	One-hour average noise levels (dBA, L_{eq}[h])	Difference from Loudest Hour (dB)
12:00 a.m.	51.9	-14.2
1:00 a.m.	52.0	-14.1
2:00 a.m.	44.8	-21.3
3:00 a.m.	48.3	-17.8
4:00 a.m.	51.0	-15.1
5:00 a.m.	56.5	-9.6
6:00 a.m.	62.4	-3.7
7:00 a.m.	**66.1**	0
8:00 a.m.	66.0	-0.1
9:00 a.m.	64.9	-1.2
10:00 a.m.	64.0	-2.1
11:00 a.m.	64.0	-2.1
12:00 p.m.	63.5	-2.6
1:00 p.m.	64.8	-1.3
2:00 p.m.	64.2	-1.9
3:00 p.m.	65.3	-0.8
4:00 p.m.	65.4	-0.7
5:00 p.m.	65.4	-0.7
6:00 p.m.	63.7	-2.4
7:00 p.m.	62.6	-3.5
8:00 p.m.	60.5	-5.6
9:00 p.m.	59.9	-6.2
10:00 p.m.	57.5	-8.6
11:00 p.m.	54.8	-11.3
L_{dn}	**65.0**	NA

Note: Worst noise hour noise level is in **bold** text.

Figure 3.9-2. Long-Term Monitoring at Site LT-2, June 5-6, 2006



Short-Term Monitoring

Attended short-term monitoring was conducted on Monday, June 5, 2006 through Tuesday, June 6, 2006, using a Larson-Davis Model 812 Precision Type 1 sound level meter (serial number 0430). At each position, the meter was positioned on a tripod at a microphone height of 5 feet above the ground. Sound levels and audible noise sources were recorded on field data sheets in order to characterize the noise environment at each position. Monitoring was conducted for a 15-minute duration at each location. The short-term measurement positions are the positions indicated as ST-1 through ST-12 in Figure 3.9-3.

The noise monitoring was conducted in residential areas adjacent to roadway study segments identified by DKS Associates. One short-term measurement was conducted in each of the program segments. Traffic noise from Carmel Valley Road and other local roadways was the dominant noise source observed during attended monitoring. Measurements were taken during the daytime hours between 10:00 a.m. and 5:00 p.m. Noise levels between 60 and 68 dBA L_{eq} were measured at eight of the ten measurement sites, while noise levels below 60 dBA L_{eq} were measured at the other two sites.

Temperature, wind speed, and humidity were recorded manually during the short-term monitoring session using a Kestrel 3000 portable weather station. During the attended measurements, skies were clear and wind speeds were typically in the range of 0–5 mph. Temperatures were in the range of 16–25°C (61–77°F), with relative humidity typically in the range of 65–85%.

Table 3.9-5 summarizes the short-term monitoring results.

Table 3.9-5. Summary of Short-Term Sound Level Measurements, June 5-6, 2006

Receivers	Location	Time	Duration (minutes)	Measured Sound Level (dBA)		
				L_{eq}	L_{33}	L_{90}
ST-1	End of Camp Stefani Road	4:42 p.m.	15	62.4	59.0	45.8
ST-2	Sports Court near Esquiline Road	2:30 p.m.	15	54.0	51.9	45.4
ST-3	End of Hidden Valley Institute entrance	3:00 p.m.	15	62.5	61.9	53.8
ST-4	Near Boronda Road	3:31 p.m.	15	58.6	58.5	53.4
ST-5	Garland Ranch Regional Park	1:23 p.m.	15	61.0	61.7	56.3
ST-6	Across from Via Del Cinco Road	12:40 p.m.	15	62.5	61.9	53.7
ST-7	Near Enlace Road	12:05 p.m.	15	63.0	59.7	52.4
ST-8	Near Congregation Beth Israel Synagogue	11:31 a.m.	15	68.0	68.5	60.4
ST-9	In front of Carmel Valley Middle School	11:05 a.m.	15	63.9	63.5	55.9
ST-10	Near Carmel Knolls Drive	10:05 a.m.	15	61.5	61.4	54.8
ST-11	Arroyo Carmel Condos	10:33 a.m.	15	54.6	54.8	50.9
ST-12	In front of 373 Laureles Grade	4:42 p.m.	15	64.0	64.8	54.3

Existing Conditions

Existing traffic noise levels were calculated using the Federal Highway Administration Traffic Noise Prediction Model (FHWA-RD-77-108) and existing traffic volumes provided by the program traffic engineers, DKS Associates (DKS Associates 2007a). Table 3.9-6 summarizes the traffic noise modeling results based on existing traffic conditions. As shown in the table, areas adjacent to eight of ten segments of Carmel Valley Road currently exceed the County’s performance standard of 60 dB L_{dn} at 100 feet from the road centerline.

Table 3.9-6. Existing Noise Levels along Program Segments

Roadway	Section	Land Use Description	Performance Standard, L_{dn}/CNEL	Existing Condition dBA L_{dn}, 100 feet from Roadway Centerline
Carmel Valley Road	East of Holman Road	Residential	60	61
	Holman Road to Esquiline Road	Residential	60	58
	Esquiline Road to Ford Road	Residential	60	57
	Ford Road to Laureles Grade	Residential	60	60
	Laureles Grade to Robinson Canyon Road	Residential	60	65
	Robinson Canyon Road to Schulte Road	Residential	60	65
	Schulte Road to Rancho San Carlos Road	Residential	60	66
	Rancho San Carlos Road to Rio Road	Residential	60	68
	Rio Road to Carmel Rancho Boulevard	Residential	60	68
	Carmel Rancho Boulevard to Highway One	Residential	60	67

Regulatory Setting

Local Regulations and Standards

Noise standards in the County of Monterey are defined in the General Plan Noise Element, the Greater Monterey Area Specific Plan, and the Carmel Valley Master Plan. The following is a brief discussion of each as they apply to the program.

County of Monterey General Plan

Policy 22.2.1 from the County's General Plan Noise Element addresses land use compatibility for new developments. New developments must conform to the noise parameters established by Table 6 within the County's General Plan. The County's land use compatibility guidelines established in Table 6 of the General Plan are summarized in Table 3.9-7, below.

In addition to the County's land use compatibility guidelines, the Monterey County Resource Management Agency - Planning Department has established 60 dB as the maximum acceptable noise level for residential uses.

For new roadway improvement projects and general construction projects, the acceptable noise levels shown in Table 3.9-7 must be met. Further, construction-related noise is subject to the County's Noise Control Ordinance, described below.

Where existing noise-sensitive land uses may be exposed to increased noise levels, the following criteria is used to determine the significance:

- Where existing noise levels are less than 60 dB L_{dn} at outdoor activity areas of noise-sensitive land uses, a 5 dB L_{dn} increase in noise levels will be considered significant;
- Where existing noise levels are between 60 and 65 dB L_{dn} at outdoor activity areas of noise-sensitive land uses, a 3 dB L_{dn} increase in noise levels will be considered significant; and
- Where existing noise levels are greater than 65 dB L_{dn} at outdoor activity areas of noise-sensitive land uses, a 1.5 dB L_{dn} increase in noise levels will be considered significant.

Guidance from the Monterey County Health Department indicates that using thresholds contained within the General Plan is appropriate and may be used in the determination of significance for the proposed program (Beretti pers. comm.).

Table 3.9-7. Land Use Compatibility for Exterior Community Noise

Land Use Category	Noise Ranges (Ldn or CNEL) dB			
	I	II	III	IV
Passively used open spaces	50	50–55	55-70	70+
Auditoriums, concert halls, amphitheaters	45-50	50–65	65-70	70+
Residential—low density single-family, duplex, mobile homes	50–55	50–70	70–75	75+
Residential—multi-family	50–60	60–70	70–75	75+
Transient lodging—motels, hotels	50–60	60–70	70–80	80+
Schools, libraries, churches, hospitals, nursing homes	50–60	60–70	70–80	80+
Actively used open spaces—playgrounds, neighborhood parks	50–67	---	67-73	73+
Golf courses, riding stables, water recreation, cemeteries	50–70	---	70–80	80+
Office buildings, business commercial and professional	50–67	67–75	75+	---
Industrial, manufacturing, utilities, agriculture	50–70	70–75	75+	---

Notes:

Noise Range I—Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Noise Range II—Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Noise Range III—Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Noise Range IV—Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: Office of Noise Control, California Department of Health 1976.

County of Monterey Health and Safety Noise Control Ordinance

Chapter 10.60.030 prohibits the generation of mechanical noise in excess of 85 dBA, measured 50 feet from the noise source. This ordinance is only applicable to noise generated within 2,500 feet of any occupied dwelling unit. As mentioned above, the County's Draft General Plan uses the Noise Control Ordinance to regulate construction-related noise.

Greater Monterey Peninsula Specific Plan

The Specific Plan does not specify criteria for noise impacts, but cites a noise level of 60 dBA as generally a threshold of concern.

Criteria for Determining Significance

In accordance with CEQA, State CEQA Guidelines, Monterey County plans and policies, Greater Monterey Peninsula Area Plan plans and policies, Carmel Valley Master Plan plans and policies, and agency and professional standards, implementation of the program is considered to result in a significant noise impact if it would:

A. Long-Term Program-Related Increases in Traffic Noise

Expose outdoor activity areas of noise-sensitive land uses to a 5 dB increase in noise where existing noise levels are below 60 dBA Ldn, a 3 dB increase in noise where existing noise levels are between 60 and 65 dBA Ldn, or a 1.5 dB increase in noise where existing noise levels are above 65 dBA Ldn. (Increases are evaluated by comparing to future with-project conditions to future no-project conditions.)

B. Short-Term Construction Noise

Expose outdoor activity areas of noise sensitive land uses to construction noise of greater than 85 dB at 50 feet.

C. Vibration

Expose persons to or generate excessive groundborne vibration or groundborne noise levels.

Impacts and Mitigation Measures

Approach Methodology

CEQA requires the significance of noise impacts to be determined for proposed projects. The process of assessing the significance of noise impacts associated with a proposed project starts by establishing thresholds at which significant impacts are considered to occur. Next, noise levels associated with project-related activities are predicted and compared to the criteria for determining significance, outlined in the previous section. A significant impact is considered to occur when a predicted noise level exceeds a threshold.

Because detailed project-level information on the proposed traffic improvements has not been determined at this time, the traffic noise analysis has been conducted at a program level based on roadway segment volumes. Noise from traffic on segments of Carmel Valley Road in the CVMP area has been evaluated under future project buildout Year 2030 conditions, both with and without implementation of the program. Impacts related to the grade separation project have been evaluated qualitatively.

The FHWA-RD-77-108 noise model was used for calculating future traffic noise levels, using traffic information provided by DKS Associates (DKS Associates 2007a). Noise levels were calculated along roadway segments potentially affected by the program. Construction noise was evaluated using methods recommended by the U.S. Department of Transportation (FTA 2006).

Traffic improvements assessed were described in Chapter 2, “Program Description”.

A. Long-Term Program-Related Increases in Traffic Noise

Impact N-1: Exposure of Noise-Sensitive Land Uses to Increased Traffic Noise (Less than Significant with Mitigation)

Table 3.9-8 summarizes the predicted traffic noise levels along roadway segments in the program area under future-year 2030 conditions both with and without implementation of the proposed roadway improvements. The results in Table 3.9-8 indicate that implementation of the proposed traffic improvements will not increase traffic volumes to a level that will result in any change in traffic noise. This impact is therefore considered **less-than-significant**.

Because the proposed grade-separation at the intersection of Carmel Valley Road and Laureles Grade specified in the program will substantially modify the vertical alignment of the roadway and will expand the footprint of the existing roadway to accommodate added turning lanes, the proposed grade separation has the potential to substantially increase noise levels at noise-sensitive locations adjacent to the intersection. This impact is considered to be potentially significant. Implementation of the following mitigation measure would reduce this impact to a **less-than-significant level**.

Mitigation Measure N-1.1: Implement Noise-Reducing Treatments at the Grade Separation Project

If significant noise impacts are identified as part of the project-level noise study for the grade separation project, the County shall implement noise-reducing treatments where feasible to a less-than-significant level. These treatments may include but are not limited to:

- Use of noise-reducing asphalt such as open-graded asphalt or rubberized asphalt.
- Placement of solid barriers in the form of walls or berms between the roadway and adjacent land uses.
- Implementation of upgraded acoustical insulation at residences where interior noise levels are predicted to exceed 45 Ldn.

Table 3.9-8. Existing and Future Year 2030 Traffic Noise Levels along Carmel Valley Road Segments 100 feet from Roadway Centerline

Roadway		County Compatibility Standard, L_{dn}/CNEL	Significant Increase Criterion[a]	Existing L_{dn} Noise Level (dBA)	No-Project L_{dn} Noise Level (dBA)	Future Increase Relative to Existing Conditions (dB)	With-Project L_{dn} Noise Level (dBA)
Carmel Valley Road	East of Holman Road	60	3 dB	61	63	+2	63
	Holman Road to Esquiline Road	60	5 dB	58	60	+2	60
	Esquiline Road to Ford Road	60	5 dB	57	59	+2	59
	Ford Road to Laureles Grade	60	3 dB	60	62	+2	62
	Laureles Grade to Robinson Canyon Road	60	1.5 dB	65	67	+2	67
	Robinson Canyon Road to Schulte Road	60	1.5 dB	65	67	+2	67
	Schulte Road to Rancho San Carlos Road	60	1.5 dB	66	67	+1	67
	Rancho San Carlos Road to Rio Road	60	1.5 dB	68	69	+1	69
	Rio Road to Carmel Rancho Boulevard	60	1.5 dB	68	69	+1	69
	Carmel Rancho Boulevard to Highway One	60	1.5 dB	67	68	+1	68

[a] See *Thresholds of Significance* section, and Table 3.9-6.

B. Short-Term Construction Noise

Impact N-2: Exposure of Noise Sensitive Land Uses to Construction Noise Levels (Less than Significant with Mitigation)

The proposed roadway improvement projects along Carmel Valley Road have the potential to result in short-term or periodic increases in ambient noise levels above existing levels from construction activities. Table 3.9-9 shows noise levels produced by typical construction equipment (FTA 2006).

Table 3.9-9. Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level 50 feet from Source (dBA)
Air Compressor	81
Backhoe	80
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Bulldozer	85
Excavator/Shovel	82
Generator	81
Grader	85
Loader	85
Scraper	89
Truck	88

Source: Federal Transit Administration 2006.

Noise from construction sources typically drops off at a rate of about 6 dB per doubling of distance. The data in Table 3.9-10 indicates that noise sensitive land uses in the vicinity of Carmel Valley Road could be exposed to construction noise that exceeds 85 dBA at 50 feet. Therefore, this impact is considered significant. Implementation of the following mitigation measures would reduce this impact to **less-than-significant** levels.

Mitigation Measure N-2.1: Limit hours of Construction Operations

Construction operations should be limited to the hours of 8:00 a.m. to 5:00 p.m. Monday through Friday.

Mitigation Measure N-2.2: Locate Noise-Generating Equipment as Far as Practicable from Noise-Sensitive Receptors

All stationary noise-generating equipment, such as pumps and generators, will be located as far as possible from nearby noise-sensitive receptors as practicable. Where practicable, stationary noise-generating equipment will be shielded from nearby noise-sensitive receptors by noise-attenuating buffers, such as structures or haul truck trailers. Stationary noise-generating equipment located less than 300 feet from noise-sensitive receptors will be equipped with noise reducing engine housings. Portable acoustic barriers will be placed around stationary noise-generating equipment located within 200 feet of residences. Water tanks and equipment storage, staging, and warm-up areas will also be located as far from noise-sensitive receptors as possible.

Mitigation Measure N-2.3: Use Sound-Control Devices on Combustion-Powered Equipment

All construction equipment powered by gasoline or diesel engines will be required to use sound-control devices that are at least as effective as those originally provided by the manufacturer. No equipment will be permitted to have an unmuffled exhaust.

Mitigation Measure N-2.4: Use Shortest Possible Traveling Routes When Practicable

Construction vehicles accessing the project sites shall be required to use the shortest possible route to and from local freeways, provided the routes do not expose additional receptors to noise, and comply with local roadway ordinances.

Mitigation Measure N-2.5: Disseminate Essential Information to Residences and Implement a Complaint Response and Tracking Program

Residences within 500 feet of a construction area shall be notified of the construction schedule before construction begins. Monterey County and the construction contractor shall designate a noise disturbance coordinator to be responsible for responding to complaints regarding construction noise. The coordinator will determine the cause of complaint and will ensure that reasonable measures are implemented to correct the problem for valid complaints. A contact telephone number for the noise disturbance coordinator will be conspicuously posted on construction site fences and will be included in the notification to nearby residents.

Mitigation Measure N-2.6: Implementation of Additional Mitigation Measures, as Needed and/or Required

Throughout a project's construction period, the project contractor will implement additional noise mitigation measures at the request of Monterey County to ensure that noise levels at the nearest residences do not exceed the appropriate agency significance criteria. Additional measures may include changing the location of stationary noise-generating equipment, shutting off idling equipment, rescheduling construction activity, installing acoustic barriers around stationary sources of construction noise, using alternative equipment or construction methods that produce less noise, and other site-specific measures.

C. Vibration

Impact N-3: Potential Exposure of Sensitive Receivers to Excessive Groundborne Vibration Levels (Less than Significant with Mitigation)

Project-specific construction activities such as grading and other earthmoving activities may result in minor amounts of ground vibration and noise. These activities are not expected to result in the exposure of persons to perceptible levels of groundborne vibration. Vibration that may occur from these activities would generally be short-term and will end when construction is completed. However, if high-impact activities such as pile driving occur, there is potential for significant groundborne vibration impacts. Therefore, these impacts are considered potentially significant. Implementation of **Mitigation Measures N-2.1, N-2.2, N-2.5, and N-2.6** will likely reduce this impact to a **less-than-significant** level.