9 NOISE ELEMENT

The purpose of the Noise Element is to identify and appraise noise generation in the community in order to minimize problems from intrusive sound and to ensure that new development does not expose people to unacceptable noise levels.

Noise can be defined as a sound or series of sounds that are intrusive, irritating, objectionable and/or disruptive to daily life. Noise varies widely in its scope, source, and volume, ranging from individual occurrences, such as a lawn mower, to the intermittent disturbances of train whistles, to the fairly constant noise generated by traffic on freeways. Noise is primarily a concern when in the vicinity of noise-sensitive uses such as residences, schools, churches, and hospitals.

State law requires a Noise Element as part of all city and county General Plans. Noise Elements are required to identify noise problems in the community and include policies to work towards their resolution. This Noise Element provides baseline information on the existing noise environment, including noise measurements taken throughout the City, and 2003 noise contours for major roadway segments, railroad corridors, and the Airport. It also identifies noise-sensitive uses in Livermore. This Noise Element also contains goals, objectives, policies, and actions for controlling noise for existing and future development.

A. Background Information

Measurement and Effects of Noise

This section describes the main aspects of community noise, provides definitions for measuring noise, and identifies the effects of noise.

The objectionable nature of sound is 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 caused by the intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave: it is a measure of the amplitude of the sound wave.

Beyond the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. These are listed in Table 9-1. The most basic noise measurement is the decibel (dB), which is a unit of measurement indicating 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, etc. Generally, the human ear cannot perceive a difference between two noises that are less than 3 decibels different from one another.

There are several methods of refining decibel scales to make them reflect human perception. Most commonly used 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 9-2. For example, light traffic heard from a distance of 100 feet would have a level of 50 dBA. A jet taking off 200 feet away would create 120 dBA.

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 their level of acoustical energy averaged over a period of time. This energy-equivalent sound/noise descriptor is called L_{eq}.

The most common L_{eq} averaging period is hourly, but L_{eq} can describe noise events of any specified time period.

TABLE 9-1 **DEFINITIONS OF ACOUSTICAL TERMS**

Term	Definitions
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, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	Sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network, which de-emphasizes 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. All sound levels referenced in the General Plan are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (respectively) of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The Average A-weighted noise level during a 24-hour day, obtained after adding 5 decibels to measurements taken in the evening (7 to 10 pm) and 10 decibels to measurements taken between 10 pm and 7 am.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level 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.

Term	Definitions
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.

TABLE 9-2 **TYPICAL SOUND LEVELS**

Noise Source	A-Weighted Sound Level in Decibels	Noise Environment	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a distance of several feet	110	Very Loud	16 time as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	
Near Freeway Auto Traffic	70	Moderately Loud	
Average Office	60	Moderate	1/2 as loud
Suburban Street	55	Moderate	
Light Traffic; Soft Radio Music in Apartment	50	Quiet	1/4 as loud

Noise Source	A-Weighted Sound Level in Decibels	Noise Environment	Subjective Evaluations
Large Transformer	45	Quiet	
Average Residence Without Stereo Playing	40	Faint	1/8 as loud
Soft Whisper	30	Faint	
Rustling Leaves	20	Very Faint	
Human Breathing	10	Very Faint	Threshold of Hearing

Since 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 increase the weighting for noise that occurs during quiet times of day. The increase is referred to as a penalty. For example, the Community Noise Equivalent Level (CNEL) measures the cumulative noise exposure in a place, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB penalty added to nocturnal (10:00 pm - 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.

Effects of Noise According to Levels

The known effects of noise on humans include hearing loss, sleep and speech interference, and annoyance. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion.

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above 45 dBA have been shown to affect sleep. Interior residential standards for multiple-family

dwellings are set by the State of California at 45 dBA CNEL. The standard is designed for sleep and speech protection. The walls of an average home decrease outdoor noise by about 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA CNEL or higher with open windows and 65 to 70 dBA CNEL or higher if the windows are closed.

Attitude surveys have been used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. Two common sources of noise, which cause annoyance, are ground transportation and air-craft noise. When measuring the percentage of the population "highly annoyed," the thresh-old for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is "highly annoyed." When the L_{dn} increases to 70 dBA, the percentage of the population "highly annoyed" increases to about 12 percent of the population. There appears to be a correlation between an increase of about one percent of population per dBA increase between an L_{dn} of 60 to 70 dBA.

Existing Noise Sources

Major noise sources within the City of Livermore include cars, trucks, buses, trains, aircraft, industrial plant equipment, and activities associated with neighborhoods and schools (lawn mowing and leaf blowing, children playing, etc.). The most important difference between transportation and non-transportation noise sources is that the City can generally exercise control on the level and duration of noise at the property line of a non-transportation source of noise. Cities often adopt noise exposure standards for noise levels generated from mobile sources, such as trucks, trains, or planes, and then make permitting decisions for land uses regarding their sensitivity in areas with excessive noise. Cities can play a role in enforcing the requirement in the State Vehicle Code regarding properly operating mufflers, and may also set speed limits or weight restrictions on streets. In general terms, a City's actions are primarily proactive with respect to stationary noise sources and reactive for those mobile sources beyond City control.

In early 2003, ambient noise monitoring was conducted at 15 sites that are representative of noise sensitive or noise-producing locations within the City of Livermore. The site locations and the monitoring results are shown in Table 9-3.

Table 9-3 **NOISE MONITORING LOCATIONS AND RESULTS**

Location #	Date	Time	Duration	L_{eq}
1. 1390 Arlington Rd. Residential neighborhood at the intersection of York Way and Arlington Rd.	3/18/2003	3:01-3:31 p.m.	30 minutes	62.4 dBA
2. 249 Alden Lane Residential neighborhood at the intersection of Old Oak Road and Alden Lane.	3/18/2003	2:02-2:17 p.m.	15 minutes	52.5 dBA
3. 4947 Candy Court Residential neighborhood. In the front yard near the intersection of Patterson Pass Road and Candy Court.	3/18/2003	8:41-8:56 a.m.	15 minutes	53.6 dBA
4. 3951 East Avenue East Avenue Middle School on East Avenue between Hill Crest and Estate Street. Next to St. Michaels Cemetery.	3/18/2003	9:22-9:37 a.m.	15 minutes	62.2 dBA
5. 1111 East Stanley Blvd. Valley Memorial Hospital/Hacienda Convalescent Hospital.	3/18/2003	1:26-1:41 p.m.	15 minutes	60.7 dBA
6. 298 Junction Avenue Junction Avenue Middle School and Park near the intersection of Junction Avenue and Ladd Avenue.	3/18/2003	10:14-10:29 a.m.	15 minutes	55.4 dBA
7. 2253 Fifth Street Del Valle High School. Near the intersection of I Street and Fifth Street.	3/18/2003	4:56-5:11 p.m.	15 minutes	53.8 dBA

Location #	Date	Time	Duration	L_{eq}
8. 600 Maple St. Livermore High School near intersection of Maple Street and East Avenue.	3/18/2003	9:47-10:02 a.m.	15 minutes	61.3 dBA
9. 3594 Ridgecrest Center Near the intersection of First Street and Portola Avenue.	3/18/2003	11:14-11:34 a.m.	20 minutes	58.7 dBA
10. 5757 Haggin Oaks Avenue Christensen School parking lot on Haggin Oak Avenue between Pasatiempo Street and Briadmoor Street.	3/18/2003	8:02-8:17 a.m.	15 minutes	57.3 dBA
11. 790 Holmes Street Tiffany Gardens (Assisted Care Center for Seniors) at the intersection of Holmes Street and Mocho Street.	3/18/2003	4:30-4:45 p.m.	15 minutes	65.2 dBA
12. 401 E. Jack London Blvd. Rancho Las Positas Elementary School and Nursery School. At the intersection of Jack London Blvd. and Arlington Road.	3/18/2003	2:38-2:53 p.m.	15 minutes	63.5 dBA
13. 2451 Portola Avenue Don Gasper De Portola Elementary School near the intersection of N. Livermore Avenue and Portola Avenue.	3/18/2003	10:49-11:04 a.m.	15 minutes	59.3 dBA
14. 458 Maple Street St. Michaels Church next to Livermore High School. Near the intersection of Maple Street and Fifth Street.	3/18/2003	12:04-12:19 p.m.	15 minutes	64.4 dBA

Location #	Date	Time	Duration	L_{eq}
15. 927 Aberdeen Avenue In the front yard near the intersection of Holmes Street and Anza Way. Down the street from Tiffany Gardens.	3/18/2003	1:13-2:13 p.m.	15 minutes	60.2 dBA

Traffic Noise

Traffic noise depends primarily on the speed of traffic and the percentage of truck traffic; traffic volume also has a major influence on traffic noise levels. The primary source of noise from automobiles is high frequency tire noise, which increases with speed. In addition, trucks and older automobiles produce engine and exhaust noise, and trucks also generate wind noise. While tire noise from autos is generally located at ground level, truck noise sources can be located as high as 10 to 15 feet above the roadbed due to tall exhaust stacks and higher engines; sound walls are not always effective for mitigating such noise unless they are taller than the noise source. According to common practice, maximum exterior noise levels of 60 dBA CNEL or L_{dn} are considered "normally acceptable" for unshielded residential development. "Normally acceptable" means that no noise evaluation is needed and any buildings may be constructed using conventional techniques. Noise levels from 60 to 70 dBA CNEL or L_{dn} fall within the "conditionally unacceptable" range, which means that detailed noise analysis and possibly mitigations are required, and those in the 70 to 75 dBA CNEL or L_{dn} range are considered "normally unacceptable," meaning that analysis and mitigations are required.

Major contributing roadway noise sources include Interstate 580 (I-580), State Route (SR) 84, Livermore Avenue, First Street, and other arterial and collector roadways throughout the City. Figure 9-1 provides a noise contour map for the City that identifies 2003 noise contours for major roadway segments. The noise contour map shows the 60 dBA CNEL contour along major roadways, railroad tracks, and near the Airport. As shown on the map, areas within this contour line would be affected by noise associated with these noise sources.

The Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate I-580 traffic-related noise conditions along roadway links within the City Planning Area. A typical vehicle mix for urban/suburban areas in California was used in this modeling effort. The modeled 24-hour CNEL levels for the existing (year 2003) baseline conditions are shown in Figure 9-1.

Table 9-4 shows that traffic noise along the majority of the roadway links in the City is moderate (i.e., the 70 dBA CNEL contour is confined within the roadway right-of-way). However, along some City streets (e.g., East Avenue, Holmes Street, Kitty Hawk Road, Murrieta Boulevard, North Canyons Parkway, Springtown Boulevard, Livermore Avenue, Mines Road, Vasco Road, Stanley Boulevard, and First Street), the 70 dBA CNEL extends up to 87 feet from the roadway centerline and toward existing development on fronting parcels. The 65 dBA CNEL extends up to 181 feet from the roadway centerline followed by the 60 dBA CNEL which extends up to 386 feet from the roadway centerline.

To address local street issues, Livermore adopted a Neighborhood Traffic Calming Program in March 2002. The purpose of the Neighborhood Traffic Calming Program is to improve safety, livability and quality of life within residential neighborhoods through the deployment of traffic calming devices. "Calming" or slowing traffic would also reduce high frequency tire noise.

TABLE 9-4 **2003 TRAFFIC NOISE LEVELS**

Roadway Segment[a]	Average Daily Traffic	Centerline to 70 CNEL (Feet)	Centerline to 65 CNEL (Feet)	Centerline to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outermost Lane[b]
Airway Boulevard					
Between North Canyons Pkwy. and I-580	28,500	< 50[a]	99	213	68.7
Between I-580 and Kitty Hawk Rd.	19,200	< 50	76	164	67.0
East Airway Boulevard					
Between Kitty Hawk Rd. and Portola Ave.	6,700	< 50	< 50	81	62.5
Altamont Pass Road					
East of Greenville Rd.	9,000	< 50	< 50	99	63.7
Arroyo Road					
Between College Ave. and Robertson Park Rd.	11,200	< 50	53	114	64.7
Between Robertson Park Rd. and Vancouver Way	10,000	< 50	< 50	106	64.2
Between Vancouver Way and Concannon Blvd.	9,200	< 50	< 50	100	63.8
Bluebell Road					
Between Springtown Blvd. and Heather Lane	8,000	< 50	< 50	92	63.2
Chestnut Street					
Between P St. and N. Livermore Ave.	6,600	< 50	< 50	81	62.4
Collier Canyon Road					
Between Las Positas College and North	6,000	< 50	< 50	76	62.0

Roadway Segment[a]	Aver-age Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Canyons Pkwy.					
Concannon Boulevard					
Between Isabel Ave. and Murdell Lane	12,700	< 50	90	189	66.4
Between Murdell Lane and Holmes St.	12,100	<50	88	183	66.2
Between Holmes St. and Arroyo Rd.	10,700	<50	81	169	65.7
Between Arroyo Rd. and Robertson Park Rd.	8,300	< 50	< 50	94	63.4
Between Robertson Park Rd. and S. Livermore Ave.	10,300	< 50	51	108	64.3
Dalton Avenue					
Between Ames St. and Vasco Rd.	6,100	< 50	< 50	76	62.1
Dolores Avenue					
Between East Ave. and Pacific Ave.	6,200	<50	59	119	63.3
East Avenue					
Between S. Livermore Ave. and Hill-crest Ave.	21,000	61	124	263	68.6
Between Hillcrest Ave. and Mines Rd.	19,400	59	118	250	68.3
Between Mines Rd. and Vasco Rd.	12,900	< 50	91	191	66.5
First Street					
Between Holmes St. and P St.	20,000	60	120	255	68.4
Between P St. and L St.	21,000	61	124	263	68.6
Between L St. and S. Livermore Ave.	27,500	72	148	315	70.0
Between S. Livermore Ave. and Inman St.	37,000	86	179	383	71.1
Between Inman St. and Mines Rd.	40,000	90	188	403	71.4

Roadway Segment[a]	Aver-age Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Between Mines Rd. and I-580	49,000	106	217	462	71.6
Fourth Street					
Between Holmes St. and P St.	13,300	< 50	93	195	66.6
Between P St. and S. Livermore Ave.	15,000	< 50	100	211	67.1
Between S. Livermore Ave. and Inman St.	7,200	< 50	64	131	64.0
Greenville Road					
Between Northfront Rd. and South-front Rd.	11,800	< 50	86	180	66.1
Between Southfront Rd. and National Dr.	10,000	< 50	78	162	65.4
Between National Dr. and East Ave.	8,900	< 50	73	150	64.9
Holmes Street					
Between Fourth St. and Concannon Blvd.	35,900	84	176	375	70.9
Between Concannon Blvd. and Wetmore Rd.	26,700	< 50	95	204	68.5
Isabel Avenue					
Between Jack London Blvd. and Stan-ley Blvd.	14,500	< 50	63	136	65.8
Between Stanley Blvd. and Vallecitos Rd.	14,500	< 50	63	136	65.8
Jack London Boulevard					
Between Isabel Ave. and Murrieta Blvd.	9,200	< 50	74	153	65.0
Kitty Hawk Road					

Roadway Segment[a]	Aver-age Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Between Airway Blvd. and E. Airway Blvd.	10,100	< 50	< 50	107	64.2
Between E. Airway Blvd. and Jack London Blvd.	19,600	59	119	251	68.3
North L Street					
Between Portola Ave. and Chestnut St.	7,700	< 50	67	136	64.3
L Street					
Between Chestnut St. and First St.	9,000	< 50	< 50	99	63.7
Between First St. and College Ave.	9,200	< 50	< 50	100	63.8
Las Positas Road					
Between N. Livermore Ave. and First St.	11,100	< 50	53	114	64.7
Between First St. and Vasco Rd.	10,800	< 50	52	112	64.5
Between Vasco Rd. and Greenville Rd.	6,800	< 50	< 50	82	62.5
North Livermore Avenue					
Between I-580 and Las Positas Rd.	33,600	81	168	359	70.6
Between Las Positas Rd. and Portola Ave.	28,200	73	150	320	69.9
Between Portola Ave. and First St.	17,500	56	110	233	67.8
South Livermore Road					
Between First St. and East Ave.	12,000	< 50	56	120	65.0
Between East Ave. and Concannon Blvd.	8,100	< 50	< 50	92	63.3

Roadway Segment[a]	Average Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Between Concannon Blvd. and Tesla Rd.	12,400	< 50	57	122	65.1
Maple Street					
Between First St. and East Ave.	5,500	< 50	< 50	71	61.6
Mines Road					
Between First St. and Patterson Pass Rd.	20,500	61	122	259	68.5
Between Patterson Pass Rd. and East Ave.	7,800	< 50	67	138	64.3
Murrieta Boulevard					
Between Portola Ave. and Jack London Blvd.	15,000	< 50	100	211	67.1
Between Jack London Blvd. and Stanley Blvd.	19,300	59	118	249	68.2
Between Stanley Blvd. and Holmes St.	16,200	< 50	105	222	67.5
North Canyons Parkway					
Between Airway Blvd. and Collier Canyon Rd.	26,900	71	146	310	69.7
Northfront Road					
Between Vasco Rd. and Greenville Rd.	7,400	< 50	< 50	87	62.9
Olivina Avenue					
Between Hagemann Dr. and Murrieta Blvd.	6,000	< 50	< 50	76	62.0
North P Street					
Between Portola Ave. and First St.	12,200	< 50	88	184	66.2

Roadway Segment[a]	Average Daily Traffic	Centerline to 70 CNEL (Feet)	Centerline to 65 CNEL (Feet)	Centerline to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outermost Lane[b]
Patterson Pass Road					
Between Mines Rd. and Joyce St.	10,000	< 50	78	162	65.4
Between Joyce St. and Vasco Rd.	6,700	< 50	62	125	63.6
Portola Avenue					
Between I-580 and Murrieta Blvd.	22,700	< 50	85	183	67.8
Between Murrieta Blvd. and N. Livermore Ave.	26,400	< 50	94	202	68.4
Between N. Livermore Ave. and First St.	11,300	< 50	84	175	65.9
Railroad Avenue					
Between Stanley Blvd. and N. Livermore Ave.	17,400	< 50	110	232	67.8
Between N. Livermore Ave. and First St.	13,800	< 50	61	131	65.6
Robertson Park Road					
Between Arroyo Rd. and Concannon Blvd.	10,600	< 50	52	110	64.5
Springtown Boulevard					
Between Bluebell Dr. and I-580	24,100	66	136	288	69.2
Stanley Boulevard					
West of Isabel Ave.	28,000	73	149	318	69.9
Between Isabel Ave. and Murrieta Blvd.	31,600	78	162	345	70.4
Between Murrieta Blvd. and Railroad Ave.	23,600	66	134	284	69.1
Southfront Road					

Roadway Segment[a]	Aver-age Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Between First St. and Vasco Rd.	7,200	< 50	< 50	85	62.8
Tesla Road					
East of Greenville Rd.	6,000	< 50	< 50	76	62.0
Vallecitos Road					
South of Isabel Ave.	27,400	< 50	97	208	68.6
Vasco Road					
North of Dalton Ave.	23,100	< 50	86	185	67.8
Between Dalton Ave. and Scenic Ave.	28,000	73	149	318	69.9
Between Scenic Ave. and I-580	37,500	87	181	386	71.1
Between I-580 and Las Positas Rd.	36,900	86	179	382	71.1
Between Las Positas Rd. and Daphine Dr.	18,200	57	113	239	68.0
Between Daphine Dr. and East Ave.	12,000	< 50	87	182	66.2
Between East Ave. and Tesla Rd.	6,100	< 50	< 50	76	62.1
Vineyard Avenue					
West of Isabel Ave.	8,400	< 50	< 50	95	63.4
Wall Street					
Between Stanley Blvd. and El Caminito	6,100	< 50	< 50	76	62.1
I-580					
Between N. Flynn Rd. and Greenville Rd.	117,000	334	714	1534	78.8
Between Greenville Rd. to Vasco Rd.	142,000	379	812	1746	79.7
Between Vasco Rd. and First St.	174,000	433	929	1999	80.5
Between First St. and N. Livermore	164,00	417	893	1921	80.3

Roadway Segment[a]	Average Daily Traffic	Centerline to 70 CNEL (Feet)	Centerline to 65 CNEL (Feet)	Centerline to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outermost Lane[b]
Ave.	0				
Between N. Livermore Ave. and Portola Ave.	164,000	417	893	1921	80.3
Between Portola Ave. and Airway Blvd.	183,000	448	961	2067	80.8
Between Airway Blvd. And El Charro Rd.	184,000	450	964	2074	80.8

[a] This noise contour analysis was based on the average daily traffic projected to occur along individual roadway segments only. Receptors in the vicinity of a given roadway segment could also be affected by other noise sources (e.g. I-580 and train operations) not included in these noise levels.

[b] The noise analysis was programmed to provide noise levels beyond 50 feet of the roadway centerline, because areas within 50 feet of the centerline are usually assumed within the roadway right-of-way for major roadway segments. Traffic noise within 50 feet of the roadway centerline will be provided with site specific analysis, as necessary.

Source: LSA Associates, Inc., May 2003.

Railroad Noise and Rail Transit

Activity on the Union Pacific rail lines represents a significant source of noise and ground borne vibration in the City. Train whistles and engine noise from freight trains and the Altamont Commuter Express, with six trips a day, are the primary noises associated with trains. Freight trains generally emit higher noise levels than passenger or commuter trains. Therefore, in areas where the tracks are used more frequently by freight trains, the single event noise exposure levels and total train noise would be higher than in areas with less frequent freight train use. In Livermore an estimated five freight trains per day with an average of 60 to 80 cars per train traveling at 40 to 60 miles per hour use the Union Pacific rail lines. Noise levels reaching 60 dBA at approximately 650 feet from the rail line exist along the length of both rail lines. Residential neighborhoods are located north and south of the railroad tracks within Livermore's central core. Factors that influence the overall impact of railroad noise on adjacent uses include the distance of the uses from the tracks, the intermittent

nature of train events, and the lack of sound walls or other barriers between the tracks and adjacent uses.

It has been assumed for the purposes of this Noise Element that BART will extend service to Livermore via the I-580 centerline right-of-way. BART has established maximum pass-by exterior noise levels for its transit operations. These noise levels are higher than typical standards for noise sensitive uses because they are based on individual noise events rather than average noise levels over a period of time. The impact of BART pass-by noise on ambient CNEL levels would depend on the location, frequency and duration of the train pass-bys which will be determined during the planning process and environmental review for the BART extension.

Legend:

- Existing Traffic Noise 60dBA CNEL (2003)
- Railroad Train Noise 60dBA CNEL (2003)

Existing Airport CNEL Noise Contours (2009)

- 65 dBA CNEL
- 60 dBA CNEL
- 55 dBA CNEL

Source: City of Livermore, USGS, LSA Associates, Inc., Source: ESA Airports, 2009; ESRI, 2008; Brown-Buntin Associates; Inc., 2008; LSA Associates, Inc., 2009

FIGURE 9 - 1

EXISTING NOISE CONTOURS

Airport-Related Noise

The Livermore Municipal Airport is located in the northwest portion of the City and serves the City and Alameda County. The City of Livermore, in participation with surrounding cities, established an Airport Protection Area to keep surrounding land uses compatible with aviation activities. The City has adopted an Airport zoning district for aviation activities at the Airport in order to address the area's continuing population growth and demand for air transportation facilities. Anticipated noise contours in the vicinity of the Airport in the year 2030 are shown in Figure 9-2. (Reso. 2010-061)

Stationary Noise Sources

Major stationary noise sources in and around the City of Livermore generally include industrial facilities and mining operations. The City's two major industrial areas are located east of the Airport, and generally east of the Downtown area, south of I-580. The gravel quarries are generally located along the western edge of the City. These stationary sources can generate relatively loud noises. However, unlike the transportation sources that affect a relatively large area along the transportation facility, the stationary sources normally affect a smaller area immediately adjacent to the source. Noise from stationary sources are subject to the City's Municipal Code Noise Ordinance Requirements.

Sensitive Receptors

Sensitive receptors are those uses for which noise can disrupt or jeopardize the purpose and function of the use. Sensitive receptors are generally land uses such as residential areas, hospitals, nursing homes, health care facilities, libraries, schools and wildlife preserves. Table 9-5 provides a list of sensitive receptors within the City.

Projected Noise

Noise contours along major roadway segments and railroads were projected for 2025 conditions based on development of the General Plan. Noise contours depicting the year 2025 noise exposure along the major roads in the City are shown in Figure 9-2. Table 9-6 identifies projected noise levels for all modeled roadway segments.

B. Goals, Objectives, Policies, and Actions

Goal N-1 Minimize the exposure of community residents to excessive noise.

Objective N-1.1 Establish appropriate noise levels, design standards, and noise reduction techniques for all areas to minimize the adverse effects of noise.

Policies

P1. The City shall emphasize noise considerations when making land use planning decisions.

P2. Noise analysis shall be measured in dBA CNEL or dBA L_{dn} as defined in this Element.

NORTH

Legend:

2025 Noise Contours

- Preferred Alternative Traffic Noise 60dBA CNEL
- Railroad Train Noise 60dBA CNEL

2030 Airport CNEL Noise Contours

- 65 dBA CNEL
- 60 dBA CNEL
- 55 dBA CNEL
- Airport Influence Area
- Airport Protection Area

SOURCE: ESA Airports, 2009; ESRI, 2008; Brown-Buntin Associates; Inc., 2008; LSA Associates, Inc., 2009

FIGURE 9 - 2

2025-2030 NOISE CONTOURS

Table 9-5 **SENSITIVE RECEPTORS**

Site	Location
Schools	
Almond Avenue School	1401 Almond Avenue
Altamont Creek School	6500 Garavanta Ranch Road
Arroyo Mocho School	1040 Florence Road
Arroyo Seco School	5280 Irene Way
Christensen School	5757 Haggin Oaks Ave.
Croche School	5650 Scenic Avenue
Del Valle Continuation High School	2253 Fifth Street
East Avenue School	3951 East Avenue
Granada High School	400 Wall Street
Jackson Avenue School	554 Jackson Avenue
Junction Avenue School	298 Junction Avenue
Livermore High School	600 Maple Street
Marylin Avenue School	800 Marylin Avenue
Mendenhall School	1701 El Padro Drive
Michell School	1001 Elaine Avenue
Phoenix Continuation School	2253 Fifth Street
Portola Avenue School	2451 Portola Avenue
Rancho Las Positas School	401 East Jack London Boulevard
Emma C. Smith School	391 Ontario Drive
Sonoma Avenue School	543 Sonoma Avenue
St. Michael School	372 Maple Street
Sunset Elementary	1671 Frankfurt Drive
Vineyard School	543 Sonoma Avenue
Hospitals and Medical Facilities	
Hacienda Convalescent Hospital	76 Fenton Street
Livermore Manor Convalescent Hospital	788 Holmes Street
Valley Memorial	1111 E. Stanley Blvd.
Park	
Maitland Henry Park	680 Alameda Drive

TABLE 9-6 **PROJECTED TRAFFIC NOISE LEVELS**

Roadway Segment[a]	Average Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Airway Boulevard					
Between North Canyons Pkwy. and I-580	48,870	66	142	305	71.1
Between I-580 and Kitty Hawk Rd.	19,225	< 50[a]	76	164	67.0
East Airway Boulevard					
Between Kitty Hawk Rd. and Portola Ave.	29,505	< 50	101	218	68.9
Altamont Pass Road					
East of Greenville Rd.	12,804	< 50	58	125	65.3
Arroyo Road					
Between College Ave. and Robertson Park Rd.	11,725	< 50	55	118	64.9
Between Robertson Park Rd. and Vancouver Wy.	10,447	< 50	51	109	64.4
Between Vancouver Wy. and Concannon Blvd.	9,272	< 50	< 50	101	63.9
Bluebell Road					
Between Springtown Blvd. and Heather Ln.	14,465	< 50	63	136	65.8
Chestnut Street					
Between P St. and N. Livermore Ave.	10,185	< 50	< 50	107	64.3
Collier Canyon Road					
Between Las Positas College and North	21,965	< 50	83	179	67.6

Roadway Segment[a]	Aver-age Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Canyons Pkwy.					
Concannon Boulevard					
Between Isabel Ave. and Murdell Ln.	21,250	62	125	265	68.7
Between Murdell Ln. and Holmes St.	18,080	57	113	238	68.0
Between Holmes St. and Arroyo Rd.	16,390	< 50	106	223	67.5
Between Arroyo Rd. and Robertson Park Rd.	13,235	< 50	60	128	65.4
Between Robertson Park Rd. and S. Livermore Ave.	13,100	< 50	59	127	65.4
Dalton Avenue					
Between Ames St. and Vasco Rd.	7,660	< 50	< 50	89	63.0
Dolores Avenue					
Between East Ave. and Pacific Ave.	6,885	< 50	63	127	63.8
East Avenue					
Between S. Livermore Ave. and Hill-crest Ave.	24,420	67	137	291	69.3
Between Hillcrest Ave. and Mines Rd.	30,030	76	156	333	70.2
Between Mines Rd. and Vasco Rd.	24,810	68	138	294	69.3
First Street					
Between Holmes St. and P St.	11,155	< 50	53	114	64.7
Between P St. and L St.	5,305	< 50	< 50	70	61.4
Between L St. and S. Livermore Ave.	6,890	< 50	< 50	83	62.6
Between S. Livermore Ave. and Inman St.	5,380	< 50	< 50	108	62.7

Roadway Segment[a]	Aver-age Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Between Inman St. and Mines Rd.	39,445	89	187	400	71.3
Between Mines Rd. and I-580	57,350	116	240	513	72.3
Fourth Street					
Between Holmes St. and P St.	30,210	76	157	335	70.2
Between P St. and S. Livermore Ave.	29,875	75	156	332	70.1
Between S. Livermore Ave. and Inman St.	27,015	71	146	311	69.7
Greenville Road					
Between Northfront Rd. and South-front Rd.	43,885	95	200	429	71.8
Between Southfront Rd. and National Dr.	35,690	84	175	374	70.9
Between National Dr. and East Ave.	20,880	61	124	262	68.6
Holmes Street					
Between Fourth St. and Concannon Blvd.	41,194	92	192	411	71.5
Between Concannon Blvd. and Wetmore Rd.	23,774	66	134	286	69.1
Isabel Avenue					
Between Jack London Blvd. and Stan-ley Blvd.	56,475	112	237	507	72.9
Between Stanley Blvd. and Vallecitos Rd.	41,970	93	195	416	71.6

Roadway Segment[a]	Aver-age Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Jack London Boulevard					
Between Isabel Ave. and Murrieta Blvd.	32,895	80	166	354	70.6
Kitty Hawk Road					
Between Airway Blvd. and E. Airway Blvd.	12,210	< 50	57	121	65.1
Between E. Airway Blvd. and Jack London Blvd.	71,275	130	276	592	73.9
North L Street					
Between Portola Ave. and Chestnut St.	14,820	< 50	99	209	67.1
L Street					
Between Chestnut St. and First St.	11,285	< 50	54	115	64.7
Between First St. and College Ave.	9,815	< 50	< 50	105	64.1
Las Positas Road					
Between N. Livermore Ave. and First St.	29,410	75	154	329	70.1
Between First St. and Vasco Rd.	26,860	< 50	95	205	68.5
Between Vasco Rd. and Greenville Rd.	29,760	75	155	331	70.1
North Livermore Avenue					
Between I-580 and Las Positas Rd.	34,840	83	172	368	70.8
Between Las Positas Rd. and Portola Ave.	35,600	84	175	373	70.9
Between Portola Ave. and First St.	32,060	79	163	348	70.4
South Livermore Road					
Between First St. and East Ave.	16,560	< 50	69	148	66.4

Roadway Segment[a]	Average Daily Traffic	Centerline to 70 CNEL (Feet)	Centerline to 65 CNEL (Feet)	Centerline to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outermost Lane[b]
Between East Ave. and Concannon Blvd.	15,530	< 50	66	142	66.1
Between Concannon Blvd. and Tesla Rd.	17,240	< 50	71	152	66.6
Maple Street					
Between First St. and East Ave.	14,205	< 50	62	134	65.7
Mines Road					
Between First St. and Patterson Pass Rd.	40,635	91	190	408	71.5
Between Patterson Pass Rd. and East Ave.	25,115	68	139	296	69.4
Murrieta Boulevard					
Between Portola Ave. and Jack London Blvd.	10,745	< 50	81	169	65.7
Between Jack London Blvd. and Stanley Blvd.	31,225	77	160	342	70.3
Between Stanley Blvd. and Holmes St.	25,475	69	140	299	69.4
North Canyons Parkway					
Between Airway Blvd. and Collier Canyon Rd.	44,215	99	203	432	71.1
Northfront Road					
Between Vasco Rd. and Greenville Rd.	22,740	< 50	85	183	67.8
Olivina Avenue					
Between Hagemann Dr. and Murrieta	8,400	< 50	< 50	95	63.4

Roadway Segment[a]	Average Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Blvd.					
North P Street					
Between Portola Ave. and First St.	11,265	< 50	84	175	65.9
Patterson Pass Road					
Between Mines Rd. and Joyce St.	19,490	59	118	251	68.3
Between Joyce St. and Vasco Rd.	18,725	58	115	244	68.1
Portola Avenue					
Between I-580 and Murrieta Blvd.	39,860	58	124	266	70.2
Between Murrieta Blvd. and N. Livermore Ave.	38,525	88	184	393	71.2
Between N. Livermore Ave. and First St.	21,515	62	126	267	68.7
Railroad Avenue					
Between Stanley Blvd. and N. Livermore Ave.	30,590	76	158	338	70.2
Between N. Livermore Ave. and First St.	33,650	52	111	238	69.5
Robertson Park Road					
Between Arroyo Rd. and Concannon Blvd.	300	< 50	< 50	< 50	49.0
Springtown Boulevard					
Between Bluebell Dr. and I-580	30,325	76	157	336	70.2
Stanley Boulevard					
West of Isabel Ave.	39,495	89	187	400	71.4

Roadway Segment[a]	Aver-age Daily Traffic	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outer-most Lane[b]
Between Isabel Ave. and Murrieta Blvd.	48,335	105	215	458	71.5
Between Murrieta Blvd. and Railroad Ave.	31,370	78	161	343	70.4
Southfront Road					
Between First St. and Vasco Rd.	16,300	< 50	68	147	66.3
Tesla Road					
East of Greenville Rd.	13,310	< 50	60	128	65.4
Vallecitos Road					
South of Isabel Ave.	34,880	53	113	244	69.6
Vasco Road					
North of Dalton Ave.	28,000	< 50	98	211	68.7
Between Dalton Ave. and Scenic Ave.	29,460	75	154	329	70.1
Between Scenic Ave. and I-580	38,510	92	186	394	70.5
Between I-580 and Las Positas Rd.	70,645	132	275	589	73.2
Between Las Positas Rd. and Daphine Dr.	47,755	101	212	454	72.2
Between Daphine Dr. and East Ave.	21,700	63	127	269	68.8
Between East Ave. and Tesla Rd.	12,745	< 50	58	125	65.3
Vineyard Avenue					
West of Isabel Ave.	14,805	< 50	64	138	65.9
Wall Street					
Between Stanley Blvd. and El Caminito	8,725	< 50	< 50	97	63.6
I-580					
Between N. Flynn Rd. and Greenville	177,223	438	940	2,023	80.7

Roadway Segment[a]	Average Daily Traffic	Centerline to 70 CNEL (Feet)	Centerline to 65 CNEL (Feet)	Centerline to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outermost Lane[b]
Rd.					
Between Greenville Rd. to Vasco Rd.	200,491	476	1,021	2,197	81.3
Between Vasco Rd. and First St.	241,766	538	1,156	2,489	82.1
Between First St. and N. Livermore Ave.	226,795	516	1,108	2,385	81.8
Between N. Livermore Ave. and Portola Ave.	250,347	551	1,183	2,547	82.2
Between Portola Ave. and Airway Blvd.	254,569	557	1,197	2,576	82.3
Between Airway Blvd. And El Charro Rd.	307,822	632	1,358	2,923	83.1

[a] This noise contour analysis was based on the average daily traffic projected to occur along individual roadway segments only. Receptors in the vicinity of a given roadway segment could also be affected by other noise sources (e.g. I-580 and train operations) not included in these noise levels.

[b] The noise analysis was programmed to provide noise levels beyond 50 feet of the roadway centerline, because areas within 50 feet of the centerline are usually assumed within the roadway right-of-way for major roadway segments. Traffic noise within 50 feet of the roadway centerline will be provided with site specific analysis, as necessary.

Source: LSA Associates, Inc., May 2003.

P3. The City shall maintain a pattern of land uses that separates noise-sensitive land uses from major noise sources to the extent possible.

P4. The City shall use the Land Use Compatibility Guidelines for Exterior Noise (measured in dBA CNEL or L_{dn}) contained in Table 9-7 in this Element to direct the siting, design, and insulation of new development to reduce exposure to excessive noise. Within the 2030 Airport CNEL Noise Contours illustrated in Figure 9-2, the Noise Compatibility policies contained in section 3.3.1 et. Seq. of the Livermore Airport Land Use Compatibility Plan ("ALUCP"), dated August 2012, shall apply in conjunction with citywide General Plan Noise Element policies.

Where warranted, the City shall employ discretionary review of new development to ensure that the community will be protected from excessive noise levels. The City shall evaluate potential noise impacts and recommend mitigation measures through discretionary review procedures such as environmental review, design review, and evaluation of use permits. (Reso. 2013-113)

Table 9-7 **LAND USE COMPATIBILITY GUIDELINES FOR EXTERIOR NOISE**

Land Use	Normally Acceptable[a] (dBA)	Conditionally Acceptable[a] (dBA)	Normally Unacceptable[a] (dBA)	Clearly Unacceptable[a] (dBA)
Residential-Low Density, Single-Family, Duplex, Mobile Homes	≤60	55-70	70-75	>75
Residential Multi-Family	≤65	60-70	70-75	>75
Transient Lodging, Hotels, Motels	≤65	60-70	70-80	>80
School, Library, Church, Hospital, Nursing Home	≤70	60-70	70-80	>80
Auditorium, Concert Hall, Amphitheater	X	<70	X	>65
Sports Arena, Outdoor Spectator Sports	X	<75	X	>70
Playground, Neighborhood Park	≤70	X	70-75	>75
Golf Course, Water Recreation, Cemetery	≤75	X	70-80	>80
Office Building, Business Commercial, Professional, Retail	≤70	70-75	>75	X
Industrial, Manufacturing, Utilities, Agricultural	≤75	70-80	>75	X

[a] Where dBA levels overlap between these categories, determination of noise level acceptability will be made on a project-by-project basis. dBA is measured in CNEL or Ldn (see N-1.1.P4)

P5. Review development proposals with respect to the Land Use Compatibility Guidelines for Exterior Noise in Table 9-7 as follows:

(a) Normally Acceptable: If the noise level is within the "normally acceptable" level, noise exposure would be acceptable for the intended land use. Development may occur without requiring an evaluation of the noise environment unless the use could generate noise impacts on adjacent uses.

(b) Conditionally Acceptable: If the noise level is within the "conditionally acceptable" level, noise exposure would be conditionally acceptable; a specified land use may be permitted only after detailed analysis of the noise environment and the project characteristics to determine whether noise insulation or protection features are required. Such noise insulation features may include measures to protect noise-sensitive outdoor activity areas (e.g., at residences, schools, or parks) or may include building sound insulation treatments such as sound-rated windows to protect interior spaces in sensitive receptors.

(c) Normally Unacceptable: If the noise level is within the "normally unacceptable" level, analysis and mitigation are required. Development should generally not be undertaken unless adequate noise mitigation options have been analyzed and appropriate mitigations incorporated into the project to reduce the exposure of people to unacceptable noise levels.

(d) Clearly Unacceptable: If the noise level is within the "clearly unacceptable" level, new construction or development should not be undertaken unless all feasible noise mitigation options have been analyzed and appropriate mitigations incorporated into the project to adequately reduce exposure of people to unacceptable noise levels.

P6. In an effort to support active uses in the Downtown Area, the Downtown Area shall be subject to a different noise standard than the rest of the City, as follows:

- *Downtown Core District:* Between 7 a.m. and 12 a.m., exterior noise levels of up to 75 dBA would be considered Normally Acceptable for all uses; and, between 12 a.m. and 7 a.m., exterior noise levels up to 65 dBA would be considered Normally Acceptable for all uses.

- *Boulevard and Transit Gateway Districts:* Between 7 a.m. and 12 a.m., exterior noise levels up to 70 dBA would be considered Normally Acceptable for all uses; and, between 12 a.m. and 7 a.m., exterior noise levels up to 60 dBA would be considered Normally Acceptable for all uses.

- *North and South Side Neighborhood Districts:* Between 7 a.m. and 12 a.m., exterior noise levels of up to 65 dBA would be considered Normally Acceptable for all uses; and between 12 a.m. and 7 a.m., exterior noise levels up to 60 dBA would be considered Normally Acceptable for all uses.

For all residential development in the Downtown Area, interior noise levels of up to 45 dBA with windows closed would be considered Normally Acceptable.

P7. The City shall work with LARPD to locate new neighborhood parks such that the existing and anticipated future noise environment is conducive to passive and active outdoor recreational activities, whenever possible.

P8. Development in the Isabel Neighborhood area is subject to modified noise standards similar to those in the Downtown Specific Plan(see Figure 3-3 for boundaries). Refer to the Isabel Neighborhood Specific Plan (INSP) for the noise standards applicable to the Isabel Neighborhood area.

Objective N-1.2 Adopt design standards and identify effective noise attenuation programs to prevent noise or reduce noise to acceptable levels.

Policies

P1. When crafting mitigation programs for adverse noise exposure from new development, the City shall encourage the use of noise attenuation programs that avoid constructing sound walls.

P2. The City shall require applicants for new noise-sensitive development, such as private schools, residences, and private hospitals, in areas subject to noise levels greater than 65 dBA CNEL to obtain the services of a professional acoustical en-

gineer to provide a technical analysis and to design mitigation measures to attenuate noise to acceptable levels.

P3. The City shall require the control of noise at the source for new development deemed to be noise generators through site design, building design, landscaping, hours of operation, and other techniques.

P4. The City shall require operational limitations and feasible noise buffering for new uses that generate significant noise impacts near sensitive uses.

P5. During all phases of construction, the City shall take measures to minimize the exposure of neighboring properties to excessive noise levels from construction-related activity.

P6. The City shall require mitigation measures to minimize noise impacts on surrounding areas as part of the permit review process for land uses of a temporary nature, such as fairs or exhibits. The noise level from the temporary use should be in conformance with the noise level guidelines for nearby land uses.

P7. The City shall seek to reduce impacts from ground borne vibrations associated with rail operations by requiring that habitable buildings are sited at least 100-feet from the centerline of the tracks, whenever feasible. An interior noise level of up to 45 dBA, with windows closed, must not be exceeded.

P8. It shall be the responsibility of new development or new land uses to be consistent with noise standards appropriate and sensitive to adjacent land uses.

Actions

A1. Promote use of noise insulation materials in new construction and major rehabilitation.

A2. Identify noise attenuation programs for mitigation of noise adjacent to existing residential areas, including such measures as wider setbacks, intense landscaping, double-pane windows, and building orientation away from the noise source.

A3. For habitable buildings located within 100-feet from the centerline of railroad tracks, developments shall provide a study demonstrating that ground borne vibration issues associated with rail operations have been adequately addressed (i.e., by building siting or construction techniques). This study must demonstrate that an interior noise level of up to 45 dBA will not be exceeded with windows closed.

Objective N-1.3 Increase public awareness of the negative effects of noise through public education and the enforcement of existing noise control measures.

Actions

A1. Enforce City, State, and federal noise level standards.

A2. Continue to enforce the City's Noise Ordinance to reduce noise impacts.

A3. Revise the Noise Ordinance, as necessary, to improve the City's ability to reduce noise impacts.

A4. Promote increased public awareness concerning the adverse effects of excessive noise on humans.

A5. Enforce muffler laws.

A6. Coordinate with the California Occupational Safety and Health Administration (Cal-OSHA) to provide information on and enforcement of occupational noise requirements within the City of Livermore.

A7. Work with other public agencies to address both existing and potential noise impacts resulting from public agency activities. Cooperate with other public agencies in determining the appropriate mitigation measures necessary to meet City noise guidelines.

Objective N-1.4 Reduce noise levels from traffic, which is the single largest continual source of unacceptable noise in the City.

Policies

P1. The City shall support federal and State legislation to attain lower operating noise levels on motor vehicles.

P2. The City shall minimize potential transportation noise through proper design of street circulation, coordination of routing, and other traffic control measures.

P3. The City shall provide planned industrial areas with truck access routes separated from residential areas to the maximum feasible extent. Consider methods to restrict truck travel times in sensitive areas.

P4. The City shall require exterior noise in backyards to be Normally Acceptable at a maximum of 60 dBA CNEL for single-family development and a maximum of 65 dBA CNEL for multi-family development.

P5. The City will consider sound walls as a means of noise mitigation along proposed and existing roadway segments and railroad right-of-ways only after other noise attenuation programs such as building construction, larger landscaped berms, and distances have been considered to reduce noise to appropriate levels in residential areas.

Actions

A1. Promote and encourage new vehicle technologies to reduce transportation noise levels.

A2. Work with the Livermore Amador Transit Authority (LAVTA) to reduce bus noise.

A3. Work with local and regional agencies to reduce local and regional traffic.

A4. Implement the Neighborhood Traffic Calming Program to encourage motorists to slow down thereby decreasing noise levels in all residential areas.

A5. Prior to the construction or implementation of future transit systems, quantify noise levels and assess impacts generated by vehicle noise. Identify noise impacts of transit vehicles (such as BART) on existing development and evaluate the transit project's compatibility with existing land use. In coordination with transit service providers, identify mitigation measures to ensure that existing developed areas are not subject to excessive noise levels from proposed transit improvements.

Objective N-1.5 Reduce the level of noise generated by mechanical and other noise-generating equipment by means of public education, regulation, and/or political action.

Policies

P1. The City shall require that industrial and commercial uses be designed and operated so as to avoid the generation of noise effects on surrounding sensitive land uses (e.g., residential, churches, schools, hospitals) from exceeding the following noise levels for exterior environments:

(a) 55 dBA L_{50} (7:00 a.m. to 10:00 p.m.)

(b) 45 dBA L_{50} (10:00 p.m. to 7:00 a.m.)

P2. In order to allow for temporary construction, demolition or maintenance noise and other necessary short-term noise events, the stationary source noise standards in Policy N-1.5.P1, above, may be exceeded within the receiving land use by:

(a) 5 dBA for a cumulative period of no more than fifteen (15) minutes in any hour.

(b) 10 dBA for a cumulative period of no more than five (5) minutes in any hour.

(c) 15 dBA for a cumulative period of no more than one (1) minute in any hour.

P3. In order to allow for temporary construction, demolition or maintenance noise and other necessary short-term noise events, the stationary noise standards in Policy N-1.5.P1, above, shall not be exceeded within the receiving land use by more than 15 dBA for any period of time.

P4. The following sources of noise are exempt from the standard in N-1.5.P1: motor vehicles on public streets; trains; emergency equipment, vehicles, devices, and activities; temporary construction, maintenance, or demolition activities conducted between the hours of 7:00 a.m. and 8:00 p.m.

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