7 NOISE ELEMENT

State law requires a Noise Element as part of all city and county General Plans. The Noise Element provides a systematic approach to measuring and modeling noise, establishing noise standards, controlling major noise sources, and planning for the regulation of noise. This Noise Element provides background information about evaluating the effects of noise on communities and the current regulatory framework. It also presents baseline information for the existing noise environment in the Eden Area and Alameda County along with goals, policies and actions for controlling noise in existing and future development.

A. Background Information

This section provides a brief discussion of acoustical fundamentals to assist the reader in understanding the current noise environment of the Eden Area. Current noise policies regulating development in the area are discussed. A description of the existing noise environment, based on the results of a noise monitoring survey conducted by Illingworth & Rodkin, Inc., concludes the section.

1. Understanding Noise

This section explains how noise is measured and gives an overview of the potential effects from excessive noise. An explanation of how noise affects various land uses is also provided.

a. Measurement of Noise

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

the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to gauge noise in a particular location. A decibel (dB) is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 7-1.

There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 7-2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the sum of all the time-varying events. This energy-equivalent sound/noise descriptor is called Equivalent Noise Level (Leq). The most common averaging period is hourly, but Leq can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about $\pm$ 1 dBA. Various computer models are used to predict environmental noise levels from sources such as roadways and airports.

TABLE 7-1 **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	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L01, L10, L50, L90	The A-weighted noise levels that are exceeded 1%, 10% and 90% of the time during the measurement period.
Equivalent Noise Level, Leq	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 addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 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.
Lmax, Lmin	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.
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 7-2 **TYPICAL SOUND LEVELS**

Noise Generators (Distance from Noise Source)	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
	140		
Civil defense siren (100 feet)	130		
Jet take-off (200 feet)	120		Pain threshold
	110	Rock music concert	
Diesel pile driver (100 feet)	100		Very loud
Freight cars (50 feet)	90	Boiler room Printing press plant	
Pneumatic drill (50 feet) Freeway (100 feet) Vacuum cleaner (10 feet)	80 70	In kitchen with garbage disposal running	Moderately loud
	60	Data processing center	
Light traffic (100 feet) Large transformer (200 feet)	50	Department store	
	40	Private business office	Quiet
Soft whisper (5 feet)	30	Quiet bedroom	
	20	Recording studio	
	10		Threshold of hearing

The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about ±1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The Community Noise Equivalent Level, CNEL, is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 p.m. – 10:00 p.m.) and a 10 dB addition to nocturnal (10:00 p.m. – 7:00 a.m.) 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.

b. Effects of Noise

There are numerous short and long term effects of noise on communities. These include hearing loss, sleep and speech interference and annoyance.

i. Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has produced a noise exposure standard, which is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

ii. Sleep and Speech Interference

The threshold for speech interference indoors is approximately 45 dBA if the noise is steady or above 55 dBA if the noise fluctuates. Outdoors, the threshold is approximately 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above approximately 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. These standards are designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses.

Typical structural attenuation is 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 newer homes. Sleep and speech interference is therefore possible when exterior noise levels are between 57 to 62 dBA L_{dn} with open windows and between 65 to 70 dBA L_{dn} if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70 dBA is a typical value for a major arterial. Levels of 75 to 80 dBA are normal noise levels for development immediately fronting on a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways may have operable windows; those facing major roadways and freeways typically need specially designed glass installed in window frames.

iii. Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. 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.

There continues to be disagreement about the relative annoyance of noise from aircrafts and roadways. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA

L_{dn}. At an L_{dn} of about 60 dBA, approximately two 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 is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60 to 70 dBA. Between an L_{dn} of 70 to 80 dBA, each decibel increase results in about a two percent increase in population that is highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately ten percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about two percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a three percent increase in the percentage of the population highly annoyed.

c. Land Use Compatibility

Different types of land uses are considered to have various sensitivities to noise based on the types of activities that are expected to take place in those uses. The State of California Office of Noise Control (ONC) has developed a noise/land use compatibility matrix, which shows noise standards for various land use categories. This matrix is shown in Figure 7-1. The noise standards are intended to provide guidelines for the development of municipal noise elements. These basic guidelines may be tailored to reflect the existing noise and land use characteristics of a particular community.

Land uses deemed noise sensitive by ONC include schools, hospitals, rest homes, long-term care and mental care facilities. Many jurisdictions also consider residential uses particularly noise sensitive because families and individuals expect to use time in the home for rest and relaxation, and noise can interfere with those activities. Some variability in standards for noise sensitivity may apply to different densities of residential development, and single-family uses are frequently considered the most sensitive. Jurisdictions may identify other uses as noise sensitive such as churches, libraries, day care centers and parks.

Land Use Category	Exterior Noise Exposure (L_{dn})					
	55	60	65	70	75	80
Single-Family Residential						
Multi-Family Residential, Hotels, and Motels		(a)				
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches						
Office Buildings, Business Commercial, and Professional						
Auditoriums, Concert Halls, Amphitheaters						

(a) Residential development sites exposed to noise levels exceeding 60 Ldn shall be analyzed following protocols in Appendix Chapter 12, Section 1208A, Sound Transmission Control, California Building Code.

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

Conditionally Acceptable
Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable
New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

FIGURE 7-1

LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENT

Land uses that are less sensitive to noise include some office and retail developments. There is a range of insensitive noise receptors which generate significant noise levels or where human occupancy is typically low. Examples of insensitive uses include industrial and manufacturing uses, utilities, agriculture, vacant land, parking lots, salvage yards and transit terminals.

2. Regulatory Framework

In addition to the policies in this Noise Element, community noise within the unincorporated Eden Area of Alameda County is currently governed by the standards established in the Alameda County Noise Regulations. Other noise policies that affect development in the area are those established by the California Noise Insulation Standards, the California Environmental Quality Act (CEQA) and the Federal Highway Administration (FHWA). The California Department of Transportation (Caltrans) regulates highway noise and the State of California and the Federal Aviation Administration (FAA) control airport noise. A review of these noise guidelines and regulations follows.

a. Alameda County General Plan Noise Element

The Alameda County Noise Element contains goals, objectives and implementation programs for the entire county to provide its residents with an environment that is free from excessive noise, and promotes compatibility of land uses with respect to noise. The County-wide Noise Element does not explicitly state what the acceptable outdoor noise level is for the backyards of single-family homes or common outdoor spaces of multi-family housing projects. However, the County-wide Noise Element recognizes the Federal Environmental Protection Agency (EPA) noise level standards for residential land uses. These standards are an exterior L_{dn} of 55 dBA and an interior L_{dn} of 45 dBA. The Noise Element also references noise and land use compatibility standards developed by an Association of Bay Area Governments (ABAG) sponsored study. The ABAG study establishes a CNEL of 65 dBA or less to result in little noise impact on residential land uses, levels between 65 and 70

to produce moderate impacts, and a CNEL above 70 dBA to cause significant impacts.[1]

b. Alameda County Noise Ordinance

Section 6.60.040 of the Alameda County Noise Ordinance establishes regulations and standards for the generation of noise. The regulations identify exterior noise levels affecting residential or commercial land uses. Noise level standards are set forth in Table 7-3A and 7-3B.

c. Alameda County Building Code

The Alameda County Building Code (Building Code) is consistent with the California Building Code, which only regulates average interior noise levels within multi-family homes. Regulation of interior sound levels within single-family homes is typically addressed by City or County General Plans and noise ordinances.

The Building Code uses sound transmission classes and impact insulation classes to rate the effects of noise within a building. Sound transmission class (STC) is a single-number rating used to compare walls, floor-ceiling assemblies and doors for their sound-insulating properties with respect to speech and small household appliance noise. The STC is derived from laboratory measurements of sound transmission loss. Impact insulation class (IIC) is a single-number rating used to compare floor-ceiling assemblies in providing reduction of impact-generated sounds such as footsteps. The IIC is derived from laboratory measurements of impact sound pressure level. Both STC and IIC may be tested outside of the laboratory in the field, but such tests are less ac curate and thus Alameda County has imposed more stringent standards for field tested STC and IIC standards.[2]

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[1] Alameda County Planning Commission, *Noise Element of the Alameda County General Plan,* Adopted July 31, 1975, amended May 5, 1994, pages 4-5 through 4-7.

[2] Alameda County Building Code 15.08.030, Volume 1 Appendix Chapter 12 Division IIA, Section 1208 A.

TABLE 7-3A **NON-COMMERCIAL[a] NOISE ORDINANCE LIMITS**

Category	Cumulative Minutes in 1-Hour Period	Daytime, dBA (7 a.m. – 10 p.m.)	Nighttime, dBA (10 p.m. – 7 a.m.)
1	30	50	45
2	15	55	50
3	5	60	55
4	1	65	60
5	0	70	65

[a] Non-commercial uses include single- or multi-family residential, school, hospital, church or public library properties.
Source: Noise Ordinance Table 6.60.040A.

TABLE 7-3B **COMMERCIAL NOISE ORDINANCE LIMITS**

Category	Cumulative Minutes in 1-Hour Period	Daytime, dBA (7 a.m. – 10 p.m.)	Nighttime, dBA (10 p.m. – 7 a.m.)
1	30	65	60
2	15	70	65
3	5	75	70
4	1	80	75
5	0	85	80

Source: Noise Ordinance Table 6.60.040B.

Building Code Title 15.08.030, Volume 1 Appendix Chapter 12 Division IIA, Sections 1208 -1209 and 3502-3504 provide specifications for sound insulation and standards for noise levels inside and outside of new hotels, motels dormitories, apartment houses and other attached dwellings. The Alameda County

Building Code requires that airborne sound insulation be sufficient to meet a STC of 50, 45 if field tested. Impact sound insulation must be sufficient to meet an IIC of 50, 45 if field tested.

d. California Environmental Quality Act Guidelines

The California Environmental Quality Act (CEQA) has established guidelines to evaluate whether noise from a proposed project is significant. As part of compliance with CEQA, applicants must determine if there is a significant impact with respect to the following:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan, Noise Ordinance or applicable standards of other agencies.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

CEQA does not define a "substantial noise level increase."

e. California Insulation Standards

Noise insulation standards were officially adopted by the California Commission of Housing and Community Development in 1974. In November 1988, the Building Standards Commission approved revisions to these standards (Title 24, Part 2, California Code of Regulations). The standards currently reside in Appendix Chapter 12 of the California Building Code and apply to all new construction in the State of California.

Title 24 requires that interior noise levels attributable to exterior sources must not exceed 45 dB in any habitable room. Additionally, the code specifies that multi-family residential buildings or structures that will be located within exterior CNEL (or L_{dn}) contours of 60 dB or greater of sources such as a freeway, expressway, parkway, major street, thoroughfare, airport, rail line, rapid transit line or industrial noise source shall require an acoustical analysis

showing that the building has been designed to limit intruding noise to an interior CNEL (or L_{dn}) of 45 dB. Worst case noise levels must be used to determine compliance. Predictions must also be made for future noise levels for a period of at least ten years from the time of building permit application.

f. Federal Highway Administration and Caltrans Policies

The Federal Highway Administration (FHWA) provides procedures and criteria for noise assessment studies for federal highway projects. It requires that noise abatement measures be considered on all major transportation projects if the project will cause a significant increase in noise levels, or if projected noise levels approach or exceed the noise abatement criteria level for activities occurring on adjacent lands. The California Department of Transportation (Caltrans) utilizes similar procedures and criteria.

The FHWA Noise Abatement Criteria for various land use ratings are shown in Table 7-4. These noise criteria are assigned to both exterior and interior activities. The FHWA identifies a traffic noise impact when the predicted traffic noise levels approach or exceed the noise abatement criteria. If these criteria sound levels are predicted to be approached or exceeded during the noisiest 1-hour period, noise abatement measures must be considered and, if found to be reasonable and feasible, they must be incorporated into project design. Following the Caltrans protocol, a traffic noise impact will occur when predicted noise levels approach or exceed criteria sound levels within 1 dBA (e.g. 66 dBA for Category B).

g. Aircraft Noise Regulations

The Federal Aviation Administration (FAA) and the State of California Airport Noise Standards have established the Yearly Average CNEL as the noise standard by which airport noise and land compatibility is judged. The agencies have identified the 65 dBA CNEL contour for airport operations as the Noise Impact Boundary. Within this boundary airport operators are required to ensure that all land uses are compatible with the aircraft noise environment or the operator must provide noise mitigation or secure a variance from the governing agencies. Under most circumstances residences are considered to

TABLE 7-4 **FEDERAL NOISE ABATEMENT CRITERIA**

Rank	A-Weighted Sound Level, dBA	Suitable Locations
A	57 exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to serve its intended purpose.
B	67 exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	---	Undeveloped lands.
E	52 interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

Source: Federal Highway Administration, 1982.

be an incompatible land use within the 65 dBA CNEL noise contour. The City of Hayward's Ordinance 91-16 (Airport Noise Ordinance) regulates the noise levels resulting from aircraft operations at the Hayward Executive Airport and provides noise abatement policies and procedures restricting flight paths to abate noise from aircraft operations.

3. Existing Noise Environment

The most pervasive and significant noise source in the Eden Area is vehicular traffic noise on streets and highways. Interstates 880 and 580 and Highway 238 carry the highest volumes of traffic and are the noisiest roadway corridors, though large arterials and collectors, such as Hesperian Boulevard, Grant Avenue and East 14th Street/Mission Boulevard, are also significant contributors.

Rail operations are also a significant source of noise. There are three rail lines in the Eden Area, all of which are now owned by Union Pacific Railroad (UPRR). The westernmost set of UPRR tracks (Coast Subdivision) separates the Grant Avenue Industrial Area and the San Lorenzo community. The UPRR Niles Subdivision runs between Hathaway and Meekland Avenues, through Ashland and along the border between San Lorenzo and Cherryland. These two lines carry mostly freight traffic as well as the Capital Corridor passenger service. The third railroad line is the UPRR Oakland Subdivision (the former Western Pacific Railroad), which runs along Western Boulevard. This UPRR track very rarely carries freight, however it is still a source of noise through Ashland and Cherryland.

The Bay Area Rapid Transit (BART) system runs on elevated tracks above Western Boulevard and the third UPRR set of tracks. The elevated BART tracks are not buffered to reduce noise. Thus, the frequent commuter trains produce a significant amount of noise that affects the surrounding residential and commercial uses.

There are two sources of aircraft noise in the Eden Area: the Hayward Executive Airport and the Oakland International Airport. The former is primarily a general aviation aircraft facility. Noise issues related to its operations are described in the *Hayward Executive Airport Master Plan Draft Environmental Impact Report*, April 23, 2001. Noise measurements conducted in support of the *Airport Master Plan EIR* indicate maximum instantaneous noise levels of about 70 to 80 dBA at locations to the northwest of the airport runways, near Skywest Public Golf Course and the adjacent residences in the San Lorenzo portion of the Eden Area.

To the south of the Hayward Executive Airport, noise levels during the monitoring survey were dominated by vehicular traffic on Hesperian Boulevard. Individual propeller aircraft and turbo prop aircraft operations produce maximum noise levels of about 60 to 68 dBA in the Hayward Mobile Homes Estates. A noise attenuation berm is located at the south end of the airport (runway 28L). Noise studies performed during preparation of the *Airport*

Master Plan indicate the berm effectively reduces noise from aircraft departing the airport.

The noise generated from aircraft using the Oakland International Airport are regulated by the FAA and are outside of the jurisdiction and influence of local governments. Several flight paths from this airport pass over the Eden Area. The FAA has defined a noise contour to characterize the airport's noise impact area, using the State of California's 65 decibel (dB) Community Noise Equivalent Level (CNEL). The 65 dB CNEL contour is an annual average noise measurement that is continually validated by noise abatement specialists and acoustical consultants. Homes located within the airport's 65 db CNEL are eligible to participate in the airport's sound insulation program. The Oakland International Airport has a sound insulation program for noise abatement within this contour which includes five schools in San Leandro and San Lorenzo. Additionally, the FAA established the Oakland Airport Community Noise Management Forum, consisting of representatives from local communities, airport staff, airlines and the FAA, to address community noise concerns and make recommendations on noise-related issues at the airport.[3]

New development in areas surrounding the Hayward Executive Airport and the Oakland International Airport is subject to compatibility criteria established by the Alameda County Airport Land Use Commission (ALUC). ALUC develops land use policies and plans to minimize exposure to excessive noise and safety hazards for new development, and to ensure that incompatible development does not occur on lands surrounding airports.

Other sources of noise within the Eden Area include stationary sources associated with industrial and commercial operations. Noise is generated in industrial areas from the regular operation of equipment such as generators, fans, chillers, compressors, boilers, pumps and air conditioning systems,

[3] Oakland International Airport website page on noise and environmental concerns, http://www.oaklandairport.com/noise_environment.shtml, accessed on March 29, 2005.

which may run for 24 hours a day. Other industrial sources of noise such as horns, buzzers and loading activities may be intermittent. Industrial noise sources are of greatest concern when they are close to residential areas, schools, hospitals and other noise-sensitive land uses since the combination of transportation and industrial noise sources have the potential for producing significant noise impacts.

Other significant stationary sources of noise include gas stations, car washes, fire stations, commercial mechanical equipment, child care centers and schools. Although these sources do not usually produce sound levels as great as those from industrial uses, they are often located near residential or other noise sensitive uses and thus can be sources of irritation and complaints.

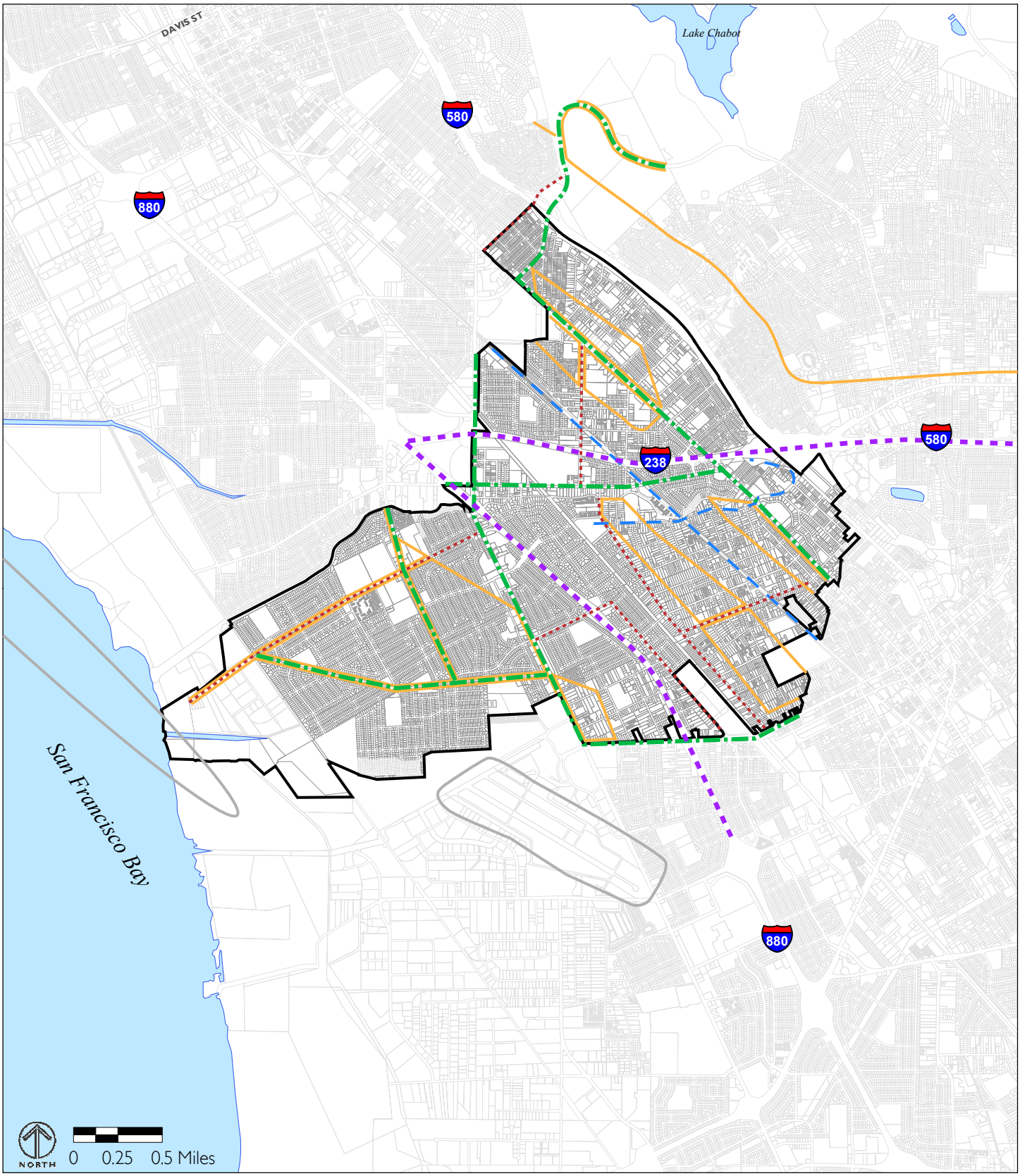
In order to quantify local noise levels for this Noise Element, noise levels were monitored in the Eden Area along major transportation corridors, including BART, the freeways and railroads. Long-term noise measurements (over a continuous 24-hour period) were made at seven locations selected to represent noise levels along major thoroughfares, highways, railroad lines and BART. The results of these measurements are shown in Table 7-5. The 24-hour day/night average noise level (L_{dn}) is shown for each of the long-term meters. The equivalent sound level (L_{eq}) during the daytime and nighttime as well as selected statistical descriptors representing near maximum noise levels (L_{01} and L_{10}), median noise levels (L_{50}) and background noise levels (L_{90}) are provided to describe the noise levels that occurred during the measurement.

Existing noise contours in the Eden Area due to transportation related noise sources are presented in Figure 7-2. Noise monitoring locations are shown in Figure 7-3. The noise contour map shows areas exposed to a noise level of greater than 60 dB L_{dn} and the source noise levels along major roadways at a distance of 50 feet from the roadway. The source noise levels are depicted in 5 dB increments.

Table 7-5 **NOISE MEASUREMENT SUMMARY**

Location	Average Levels	Sound Levels, dBA L_{01}	L_{10}	L_{eq}	L_{50}	L_{90}	L_{dn}	Primary Noise Source
LT-1: At the corner of Grant Avenue and Via Nueva, approximately 35 ft. from the centerline of Grant Avenue.	Day	78	71	68	64	56	72	Traffic on Grant Avenue
	Night	78	68	65	57	49		
LT-2: In front of # 15831 Hesperian Boulevard, 50 feet from the center of the near lane of Hesperian Boulevard.	Day	78	73	70	67	59	72	Traffic on Hesperian Blvd.
	Night	73	68	64	60	56		
LT-3: In the rear yard of # 15934 Via Descanso, approximately 20 ft. from the I-880 soundwall.	Day	70	64	62	61	59	67	Traffic on I-880
	Night	66	62	60	59	56		
LT-4: At the corner of Meekland and Poplar Avenues: approx. 45 ft. from the centerline of Meekland Ave.	Day	74	68	65	62	57	67	Traffic on Meekland Avenue
	Night	69	62	59	56	53		
LT-5: Galway Drive adjacent to Hwy. 238.	Day	71	69	67	67	65	72	Traffic on Hwy 238
	Night	70	68	65	64	60		
LT-6: 60 feet from the centerline of the BART tracks – Adjacent to the UPRR line. Near the Ashland Avenue over-crossing.	Day	77	66	65	60	57	69	BART Rail Traffic
	Night	71	60	60	55	52		
LT-7: Foothill Blvd. between 166th and 167th Streets, adjacent to I-580.	Day	73	72	70	70	68	72	Traffic on I-580
	Night	69	66	64	63	59		

Source: Illingworth & Rodkin, 2003.



Source: Illingworth and Rodkin, 2003

Contours

- Study Area Boundary
- 60 dBA Ldn, Road and Rail
- 65 dBA CNEL, Oakland International and Hayward Executive Airports

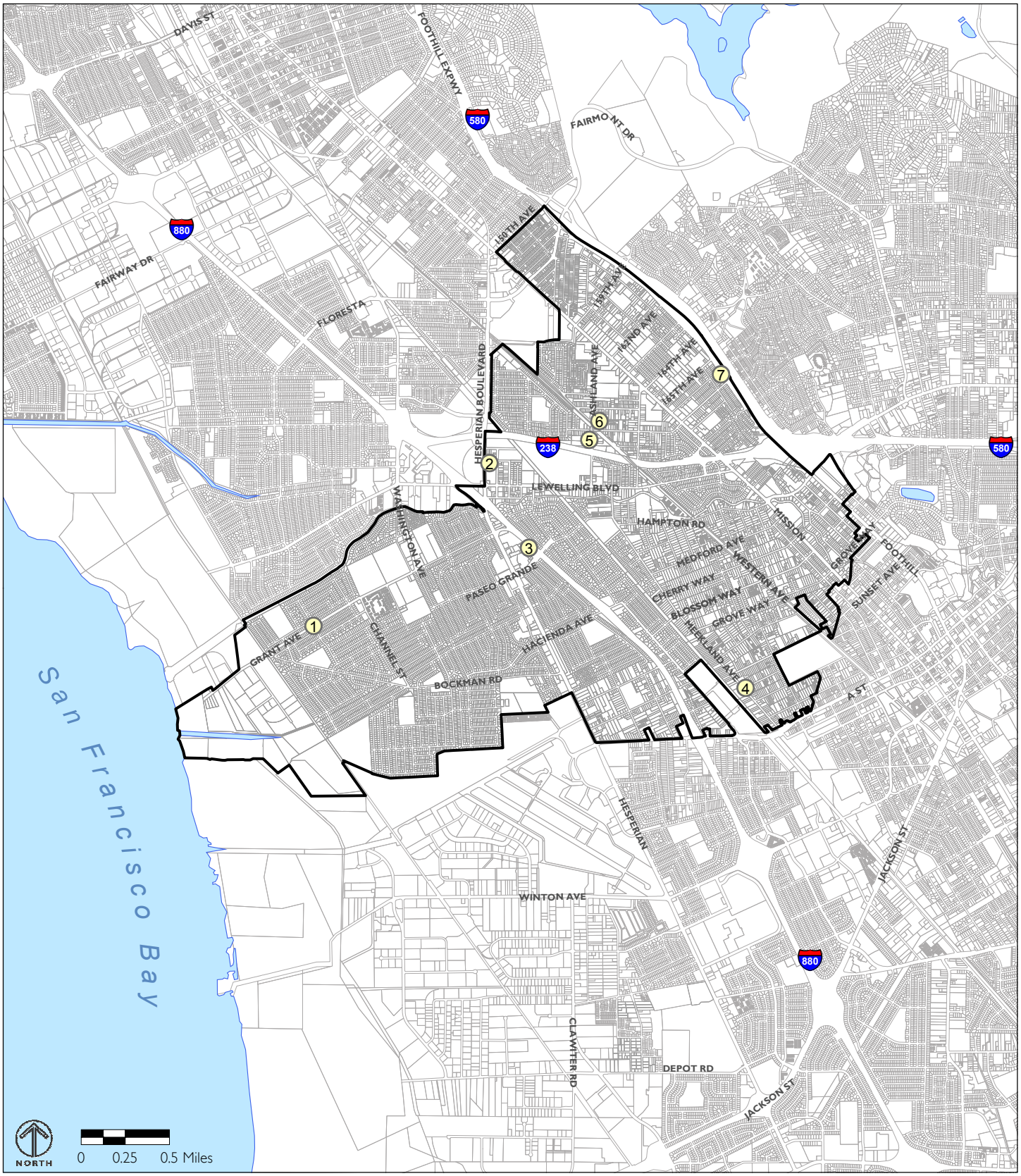
Roadway Coding (Ldn 50ft from rdwy)

- 60 to 64 dBA
- 64 to 69 dBA
- 70 to 75 dBA
- Above 75 dBA

FIGURE 7-2

NOISE EXPOSURE CONTOURS

COUNTY OF ALAMEDA
EDEN AREA GENERAL PLAN



Source: Illingworth and Rodkin, Inc. 2003

1. **Grant Avenue and Via Nueva**
2. **15831 Hesperian Boulevard**
3. **15934 Via Descanso (rear yard)**
4. **Meekland Avenue and Poplar Avenue**
5. **Galway Drive adjacent to Highway 238**
6. **BART tracks, adjacent to the UPRR line near Ashland Avenue over-crossing**
7. **Foothill Boulevard between 166th and 167th Streets, adjacent to I-580**

FIGURE 7-3

NOISE MONITORING LOCATIONS

COUNTY OF ALAMEDA
EDEN AREA GENERAL PLAN

B. Goals, Policies and Actions

Goal N-1 Protect citizens from excessive noise.

Policies

P1. New land uses shall not be located in areas where either indoor or outdoor noise levels exceed those considered normally acceptable for each land use, as shown in Figure 7-1, unless measures can be implemented to reduce noise to acceptable levels.

P2. New single-family residential development shall maintain a standard of 60 dB L_{dn} maximum (day/night average noise level) for exterior noise in private use areas.

P3. Existing residential development sites exposed to noise levels exceeding 60 dB L_{dn} shall be analyzed following protocols in Appendix Chapter 12, Section 1208A, Sound Transmission Control, California Building Code.

P4. New multi-family residential developments shall be designed to maintain a standard of 65 dB L_{dn} maximum in community outdoor recreation areas. Balconies shall not be considered outdoor recreation areas, thus no noise standards shall apply to these areas.

P5. All new residential land uses shall be designed to maintain a standard of 45 dB L_{dn} maximum in building interiors.

P6. New residential development affected by noise from railroad, BART, freeway or aircraft operations shall be designed to limit typical maximum instantaneous noise levels to 50 dBA in bedrooms and 55 dBA in other rooms. These maximum instantaneous noise levels are compatible with

airport noise regulations of 45-dBA CNEL, which is an average day/night level.

P7. Noise-sensitive projects proposed within noise-affected areas (subject to noise levels exceeding 60 dB L_{dn}) shall be subject to acoustical studies and provide necessary mitigation from noise.

P8. The reduction of noise inside buildings shall be achieved by requiring architectural design techniques that meet noise attenuation requirements such as:

- Locating noise-tolerant rooms (garages, kitchens, bathrooms) closest to the noise source and noise sensitive rooms or areas (living rooms and bedrooms) away from the noise source.
- Using architectural design techniques and building façade materials that help shield noise.
- Orienting buildings to shield noise sensitive outdoor spaces from a noise source.
- Locating bedrooms or balconies on the sides of buildings facing away from noise sources.

Actions

A1. Adopt significance thresholds to assess noise impacts for projects reviewed under the CEQA process.

A2. Require preparation of acoustical studies and provision of appropriate mitigation of ultimate noise levels for all proposed noise-sensitive projects within noise-affected areas exposed to levels greater than "normally acceptable." Acoustical studies should consider the effects of significant short-term noise sources (such as passing trains or planes) as well

as the average noise levels that may be experienced over a 24-hour period.

A3. Amend the Alameda County Building Code to extend the provisions in the California Building Code Appendix Chapter II, Sections 1208A.8, Exterior Sound Transmission Control to new single-family residences.

A4. Amend the Alameda County Noise Ordinance as necessary to be consistent with this General Plan.

A5. Actively enforce the Alameda County Noise Ordinance to reduce the number of incidents of excessive noise.

Goal N-2 Minimize the noise impacts from the construction and operation of new land uses.

Policies

P1. As a condition of project approval, a noise analysis shall be required for all proposed projects that may result in potentially significant noise impacts to nearby noise-sensitive land uses, such as residential areas. The noise analysis shall include recommendations for design mitigation where significant impacts are identified.

P2. Mitigation measures shall be required for all projects that would cause a significantly adverse community response or cause any of the following criteria to be exceeded:

- Normally acceptable L_{dn} for land use
- Increase of 5 dB L_{dn} at noise-sensitive uses
- Noise ordinance limits (after adoption)

P3. Inclusion of site design techniques for new construction shall be encouraged to minimize noise impacts, including building placement, landscaped setbacks, orientation of noise tolerant components (i.e. parking, utility areas and maintenance facilities) between noise sources and the sensitive receptor areas.

P4. All construction in the vicinity of noise sensitive land uses, such as residences, hospitals or convalescent homes, shall be limited to 7:00 a.m. to 7:00 p.m. Monday through Friday, and to 8:00 a.m. to 5:00 p.m. Saturday and Sunday. These noise source standards may be exceeded as specified in the Alameda County Noise Ordinance in order to allow for temporary construction, demolition or maintenance noise and other necessary short-term noise events.

P5. Mitigation measures for construction noise shall be included in EIRs or other appropriate environmental documents as a requirement of construction permit approval.

P6. Industrial and commercial land uses shall be designed and operated so as to avoid the generation of noise effects on surrounding sensitive land uses (e.g. residences, schools, hospitals, and churches) from exceeding the following noise level standards:

- 55 dBA L_{50} (7:00 am to 10:00 pm)
- 45 dBA L_{50} (10:00 pm to 7:00 am)

P7. Local businesses shall be encouraged to reduce noise impacts on the community by replacing excessively noisy equipment and machinery, applying noise-reduction technologies and following operating procedures that limit the potential for conflicts with noise-sensitive land uses.

Goal N-3 **Control sources of excessive noise from transportation sources.**

Policies

P1. The County shall explore innovative approaches to reducing noise levels (i.e. reducing speed limits, alternative paving materials and street trees) on Eden Area streets and, where feasible and appropriate when undertaking improvements, extensions or design changes.

P2. The County shall prioritize the implementation of noise reduction actions on Corridors and Districts identified in the Land Use Element.

Actions

A1. Adopt an ordinance to restrict overnight truck parking in industrial areas that abut residential uses to minimize noise problems associated with idling trucks.

A2. Enforce existing regulations that protect residents from the undesirable effects of excessive noise from transportation sources. Enforcement actions include:

- Speed limits on all Eden Area roads to reduce noise from vehicle traffic.
- California Motor Vehicle Code Section 27007, which controls the sound of vehicle amplification systems (e.g., loud stereos) by prohibiting amplified sound that can be heard 50 or more feet from a vehicle.
- California Motor Vehicle Code Section 27150, which addresses excessive exhaust noise.

A3. Where shown to be effective and cost beneficial, install alternative pavement surfaces that reduce noise from roadways when repaving opportunities arise.

A4. Encourage BART and AC Transit to develop and apply noise-reduction technologies that reduce noise impacts associated with BART trains and bus traffic.

A5. Work with federal and State agencies and authorities from the Union Pacific Railroad to attain effective relief from freight train noise, including train horns.

A6. Work with Caltrans to achieve noise reduction along major surface streets and to mitigate noise from Interstates 880 and 580 and Highway 238. Encourage Caltrans to use noise reduction techniques such as landscaping, berms, alternative pavement and soundwalls to reduce noise impacts.

Goal N-4	**Minimize noise impacts created by the operations of the Hayward Executive Airport and the Oakland International Airport.**

Policies

P1. Mitigation of airport noise impacts shall be pursued to the fullest extent possible through advocacy for better operational practices, new quieter technologies and physical improvements to airports that would reduce the number of properties in the Eden Area impacted by aircraft noise.

P2. The County shall actively participate in forums and discussions regarding operations and expansion plans for the Hayward Executive Airport and the Oakland International Airport.

P3. The County shall seek local representation on task forces, commissions, and advisory boards established to guide airport policies and programs.

P4. The County shall encourage the Port of Oakland and the City of Hayward to undertake noise abatement and mitigation programs that are based not only on the airport noise contour maps, but that consider other factors such as the frequency and single event noise levels for aircraft overflights, standard flight path deviations, the altitude of aircraft and the hours of operation.

Actions

A1. Work with the Hayward Executive Airport and the Oakland International Airport to ensure that any changes to airport operations that would potentially result in higher noise levels in the Eden Area incorporate comprehensive noise mitigation measures.

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