NOISE ELEMENT

Adopted by City Council
Resolution 69-75
September 15, 1975

CONTENTS

INTRODUCTION

LEGAL BASIS AND GENERAL OBJECTIVES

California State Government Code Section 65302(g) requires a Noise Element of all city and county general plans. This code section requires that the Noise Element be expressed in quantitative terms, showing contours of present and projected noise levels associated with all existing and proposed major transportation elements. The sources of environmental noise considered in this analysis shall include, but are not limited to, the following: (i) highways and freeways, (ii) primary arterials and major local streets, (iii) passenger and freight on-line railroad operations and ground rapid transit systems, (iv) commercial, general aviation, heliport, helistop, and military airport operations, aircraft overflights, jet engine test stands, and all, other ground facilities and maintenance functions related to airport operation, (v) local industrial plants, including, but not limited to, railroad classification yards, and (vi) other ground stationary noise sources identified by local agencies as contributing to the community noise environment.

The scope and nature of Noise Elements are outlined as follows by the California Council on Intergovernmental Relations.

1. A statement of general policy indicating the local jurisdiction's general intentions regarding noise and noise sources in the community.

2. Desired maximum noise levels by land use categories.

3. Standards and criteria for noise emissions from transportation facilities. (It should be noted that control of some noise sources has been pre-empted by State and Federal governments.)

4. Standards and criteria for compatible noise levels for local "fixed point" noise sources.

5. Guide to implementation.

6. Appendix describing methodology of preparation and sources of data.

The three main purposes of the Burlingame Noise Element deal with noise control in planning, surveillance and enforcement actions. With regard to planning, the objective of the Noise Element is to present noise level criteria which future planning, zoning and building inspection processes can utilize to promote maximum compatibility of land uses and activities. With regard to surveillance, the Noise Element should determine the present noise climate in Burlingame, predict the noise climate for 1990, and determine what surveillance (monitoring) is necessary to assure that noise levels do not increase. Additional surveillance may be needed with regard to specialized noise sources such as the San Francisco International Airport. With regard to enforcement, the Noise Element should determine which enforcement programs are best suited

to the City of Burlingame; that is, where Burlingame should apply its police powers to have the most beneficial impact on its noise climate.

The Noise Element begins with a background section which is followed by a description and analysis of existing and future acoustic conditions in the City; a measurement program was conducted to quantify the existing noise climate. This description is followed by the Planning Criteria Emissions Section which sets forth suggested planning criteria and standards. The Noise Abatement and Control Section follows with a description of a wide range of noise abatement and control programs available to the City. Finally, the Implementation Section recommends goals, policies and implementation programs thought appropriate for Burlingame considering its present and future noise climate, its General Plan and its citizen interests.

SUMMARY OF FINDINGS

The City of Burlingame is highly impacted by noise from five major traffic arteries - Bayshore Freeway, Southern Pacific Railroad, California Drive, El Camino Real and the Junipero Serra Freeway. While airport noise most acutely impacts industrial and commercial land uses, it also affects residential areas adversely. During worst case months in the winter and early spring, airport noise severely impacts many residential areas. Residential and public facilities (schools, parks, hospitals) land uses adjacent to the City's major traffic arteries are highly impacted by noise with the area adjacent to Bayshore Freeway being impacted to the greatest degree. Noise in these areas immediately adjacent to the arterials is unacceptable from both a hearing conservation and land use compatibility standpoint. Noise levels in commercial areas are generally acceptable except in those areas immediately adjacent to major traffic arteries. Noise levels in industrial areas are generally acceptable.

MAJOR RECOMMENDATIONS

In order to attain acceptable noise levels in the future, the following programs are recommended.

1. **Administrative Review Process** - Existing City processes involved with environmental impact review and building plan check, permit and inspection should be altered to include specific noise level planning criteria. Proposed new construction projects and major remodeling projects should be required to conform to specific noise provisions of the State Housing Act; this will require acoustical analysis in many cases.

2. **Airport Noise Surveillance Program** - A two to three year monitoring program is recommended to record especially the worst case noise in Burlingame from the airport. This program would specifically monitor the noise caused by aircraft flights over Burlingame during adverse weather conditions.

3. **Vehicle Noise Emission Standards Enforcement** - An enforcement program should be undertaken to assure that State vehicle noise emission standards are being met by motor vehicles on Burlingame's streets.

4. **Municipal Vehicle and Maintenance Operations Control, Educational Campaign, Noise Ordinance, and Bayshore Freeway Noise Attenuation Study** - are other programs recommended in the Noise Element; it is recommended that any domestic animal noise ordinance program be deferred until San Francisco's recent experience with such a program can be monitored and assessed.

BACKGROUND

AREA COVERED

The City of Burlingame is located in northern San Mateo County approximately 16 miles southeast of San Francisco. The City's close proximity to San Francisco and its airport together with the fact that many of its residential buildings are more than 40 years old or predate the airport has brought pressures for increased density in many parts of the City and for commercial development along the waterfront near the airport. In future years, some parts of the City will be developed for the first time and other parts of the City will be redeveloped at higher densities. This Noise Element of the General Plan will help to assure that future development will be carried out so as to promote a quieter Burlingame. The entire City was monitored to determine its present noise climate. Measurement sites covered (i) all of the major sources of noise in Burlingame - motor vehicles, aircraft and stationary sources, e.g. car washes, (ii) all of the receptor land uses of noise - residential and public facility (parks, hospitals, schools) land uses, commercial land uses, and industrial land uses.

FACTORS CONSIDERED

The Community Noise Equivalent Level (CNEL) measurement descriptor was chosen most appropriate to the City of Burlingame; this technique weights (or penalizes) evening (1900-2200) and nighttime (2200-0700) noise more heavily than daytime (0700-1900) noise to account for the greater annoyance caused by noise during these periods. In addition to accounting for the diurnal variation of noise, the choice of this CNEL descriptor also permits comparison with airport CNEL contours developed by the San Francisco International Airport. Other factors taken in account in the production of the CNEL contours are vehicle volume and mix (day, evening and night), average speed, pavement width, vehicle flow characteristics, and topography. The effect of buildings as noise barriers was not taken into account in contour production. Development of the planning criteria and implementation sections of the Noise Element involved consideration of many factors - the Burlingame General Plan, citizen interests (as indicated by the Burlingame Noise Questionnaire), present and future acoustic conditions, and current governmental rulings and information on noise-related matters. A bibliography on sources of information relating to the various aspects of noise is provided in Appendix 8, Part A.

EXISTING AND PROJECTED ACOUSTIC CONDITIONS

In order to arrive at city-wide goals and determine acceptable land uses which will provide a pleasing acoustic environment for members of the community, it is necessary to identify present acoustic conditions and to attain some knowledge of probable future conditions. This was achieved by taking actual measurements of ambient noise in Burlingame and by the application of a noise propagation model to predict the noise climate for the years 1975 and 1990. A more complete description of the methodology used is given in Appendix 8, Technical Part A, although a brief description is included in the two following sections.

EXISTING ACOUSTIC CONDITIONS

In order to determine the existing Community Noise Equivalent Level (CNEL) in Burlingame and to characterize spatial and temporal variations, 52 sound level measurements were made. Measurements were made during rush hour, midday, evening and night and on both weekday and weekend. The Community Noise Equivalent Level is expressed in decibels on the A-weighting scale (dBA) and weights evening noise (1900-2200) three times as much as daytime noise (0700-1900) and nighttime noise ten times as much as daytime noise. Thus, this weighting of evening and nighttime noise purposely causes CNELs to appear higher than actual evening and nighttime measurements are; this is done to account for increased annoyance and activity interference caused by noise during the evening and nighttime periods. The measurement sites were chosen so as to represent a variety of land uses and zoning types, including residential, commercial, industrial, school, hospital, parks and open space areas; 15-minute samples were collected.

The sound level acquisition system used was a Bruel and Kjaer Model 166B/S45 Environmental Noise Classifier. This noise monitoring instrument registers the time during which noise was measured in 12 different noise level ranges as well as the total time of the monitoring sample. The output is a digital readout which is recorded manually in the field. Concurrent observations of meteorology, traffic and noise source characteristics were made. The instrument was calibrated before each sampling period.

The A-weighting network was used for all measurements. This network modifies sounds in the same way as the human ear does, and noise measured on this scale (the dBA scale) correlates well with human annoyance. The dBA unit is the one most commonly used in describing all types of community noise sources. In addition, most laws and ordinances pertaining to noise from highway and stationary sources are expressed in terms of dBA. Table 3-1 shows typical dBA levels for common noise sources.

The 52 samples, each of 15 minute duration, were taken at 36 different locations in Burlingame; 15 minutes is considered to be a sufficient time period for a statistically valid representation of both constant noise and noise sources such as traffic streams. Total traffic volume and truck counts were noted, as well as vehicle speed estimates. The measurement sites are shown graphically in Figure 3-1.

To obtain estimated CNEL values for all of the measurement locations, five locations were chosen as representative of the various noise sub-climates in the City and the different land uses upon which they occur; the location of these sites is also indicated on Figure 3-1. For industrial land uses, the representative measurement site chosen was along Bayshore Highway between Malcolm and Mitten streets. This site was chosen for three purposes: (i) it is representative of industrial land use noise, (ii) it is representative of airport-generated noise which impinges on the majority of time industrially zoned area of Burlingame, and (iii) it is an area which the Burlingame General Plan indicates for future development as waterfront commercial. For commercial land uses, the representative measurement site chosen was along El Camino immediately west of its intersection with Primrose and Bayswater. This site was chosen (i) because of its location near El Camino Real - representative of the many well-traveled streets which traverse all commercial areas in the City, (ii) because of its close proximity to the downtown commercial area and the traffic entering and exiting this area.

TABLE 3-1: TYPICAL SOUND LEVELS FOR COMMON NOISE SOURCES IN dBA

Overall Quality	**dBA**	**Outdoor**	**Indoor**
Uncomfortably loud	130	50-horsepower siren at 100 feet	-
	120	Jet take-off at 200 feet	-
	110	-	Rock-n-Roll Band
Very loud	100	Jet flyover at 1000 feet, power mower	Newspaper Press
	90	Motorcycle at 25 feet	Food blender
Moderately loud	80	High urban ambient sound; passenger car, 65 miles per hour at 25 feet	Garbage disposal, clothes washer
	70	-	TV audio, vacuum cleaner
	60	Air conditioner at 20 feet	Electric typewriter, conversation
Quiet	50	Light traffic and 100 feet	Average residence
	40	Bird calls, lower limit urban ambient sound	-
Very quiet	30	-	Soft whisper
Just audible	20	-	Television studio, leaves rustling
	10	-	-
Threshold of hearing	0	-	-

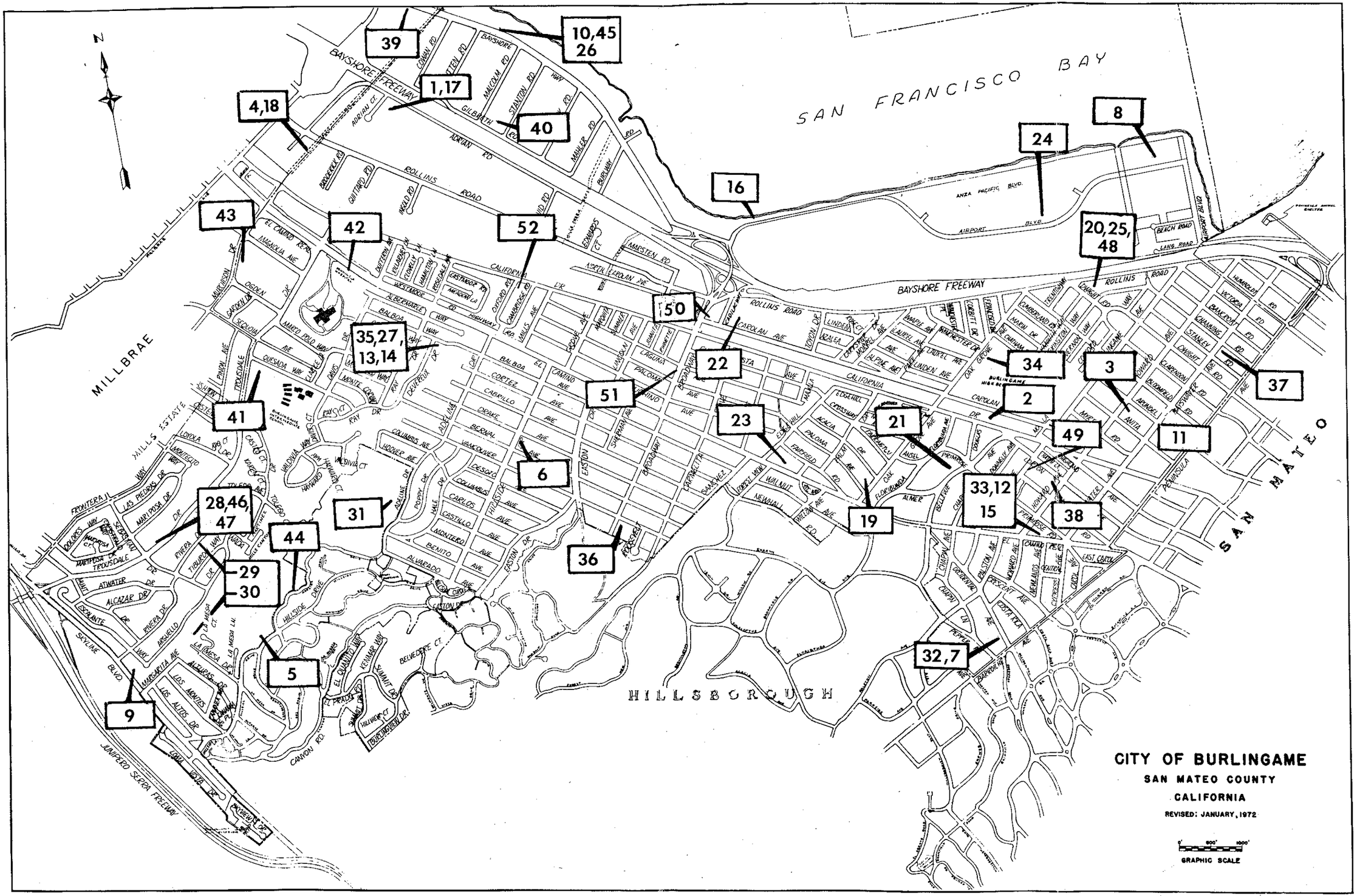


Figure 3-1.
Noise Measurement Sites

TABLE 3-2. CNEL NOISE MEASUREMENTS AT FIVE LOCATIONS REPRESENTATIVE OF BURLINGAME•S NOISE SUB-CLIMATES

Site Measurement No.	Site Description	L_{day}/ $L_{evening}$/ L_{night}	Computed CNEL
10 24 45	**Airport Industrial** - Old Bayshore Highway between Malcolm and Mitten	L_d - 68.4 L_e - 68.4 L_n - 65.4	73
33 12 15	**Arterial Commercial** - El Camino Real West of Primrose	L_d - 68.2 L_e - 68 L_n - 65.9	73
35 27 14	**Quietest Residential** - Devereux Dr. south of Balboa at Abraham Lincoln School	L_d - 58.8 L_e - 47.2 L_n - 54.7	62
28 46 47	**Airport Residential** - Trousdale Drive north of Sebastian	L_d - 63.2 L_e - 59.5 L_n - 60.7	68
20 25 48	**Freeway Residential** - Bayshore Blvd. At its intersection with Trenton and Dwight	L_d - 73.4 L_e - 73.7 L_n - 70.0	76

Note: L_{day} (L_d), $L_{evening}$ (L_e), and L_{night} (L_n) are $L_{equivalent}$ (L_{eq}) measurements taken during the day (07000-1900), evening (1900-2200) and nighttime (2200-0700) periods.

As residential land uses are the most sensitive land uses with regard to noise intrusion, three separate measurement sites were chosen to represent different residential areas. Noise intrusion into residential areas of Burlingame takes three forms - little outside intrusion, intrusion from Bayshore Freeway--from traffic arterials, and from aircraft noise. Along Rollins Road adjacent to Bayshore Freeway, a measurement site was chosen at its intersection with Dwight Road and Trenton Way. This is the residential area in Burlingame which is most affected by freeway noise. Along Trousdale Drive, a measurement site was chosen north of Sebastian Drive in order to represent residential areas in Burlingame affected by airport noise; this site is located within the 65 CNEL contour in the Airport Land Use Commission's adopted Interim Airport Land Use Plan. It should be noted that this area is not located within the 65 CNEL contour in the latest EIAR published by the San Francisco International Airport. A third measurement site was chosen on Devereux Drive near its intersection with Balboa Avenue. This measurement was taken at Abraham Lincoln School and is representative of those residential areas which are not affected by noise generated outside the area - that is, by noise on an arterial street such as El-Camino Real, Peninsula Avenue, etc.

Table 3-2(see previous page N-8) presents the results of the actual CNEL measurements taken at these five representative sites. The computed CNEL values on this table illustrate the range of noise levels found near various roadways and other noise sources. The CNEL levels are related to land use and Federally recommended levels in the Planning Criteria and Noise Emissions Section of this report. To summarize, the freeway residential area is presently at an exterior noise level which the U.S. Environmental Protection Agency (EPA) considers harmful to health. The industrial and commercial area are not substantially quieter. Only the quietest residential noise levels measured are presently within CNEL levels recommended for single family living. Utilizing the L evening and L night values from these representative measurement sites, the CNEL was estimated for the remainder of the sites which were monitored during the day. Table 3-3 presents the results of all the 15 minute roadway noise measurements, including the day, evening, or night average noise level (Ld, Le, Ln) for the period measured, the L-10 and the estimated CNEL.

The 52 measurements just described were next utilized to validate a computer model; the validated model then was used to predict noise propagation.

Basic input information for the model was made up of ground transportation and roadway characteristics such as Average Daily Traffic (ADT), vehicle mix or percent of trucks, roadway width and number of travel lanes. The output from the computer run of this model was translated onto a zoning map of Burlingame in the form of noise impacted areas or contours. This map of present acoustic conditions in Burlingame is included here as Figure 3-5.

In order to make Figure 3-5 more meaningful, a discussion of Burlingame's major noise sources and their relative contribution to the City's noise climate is also presented. The City's major sources of noise are automobile, truck and motorcycle traffic, airport related takeoff, landing and ground operations, and railroad traffic.

Existing Automobile, Truck and Motorcycle Noise

In Burlingame, automobile, truck and motorcycle traffic noise affects more land area to a greater degree (higher noise level) than does aircraft noise. Figure 3-2 indicates the Average Annual Daily Traffic (ADT) on the highways and well-traveled streets in the City. Many properties of noise cause the traffic on these highways and streets to affect the areas through which they pass. The number of heavy-duty trucks relative to the total traffic volume (truck mix) is very important with regard to noise propagation, since trucks, especially diesels, are generally considerably noisier than cars. Truck noise is also emitted at a greater height (for both tires and engine noise) than is car noise and is therefore more difficult to abate. Truck mix on Burlingame's streets and highways is typical of the Bay Area; it varies from two percent in residential areas to eight percent on Bayshore Freeway to twelve percent on Rollins Road in Burlingame's industrial area.

TABLE 3.3: RESULTS OF15-MINUTE ROADWAY NOISE MEASUREMENTS INCLUDING ESTIMATED CNEL.

Site Measurement Number	Site Description: Land Use	L_{day} $L_{evening}$ L_{night}	Measured L_{10}	Estimated CNEL	Time of Measurement
1	Adrian Road east of Adrian: Industrial	67.2	72.5	72	3:55-4:10 p.m.
2	California between Douglas and Bellevue Commercial	67.9	71.8	73	3:48-4:03 p.m.
3	Howard Avenue at Washington School: Public Facility/Residential	64.1	68.2	64	4:20-4:35 p.m.
4	Rollins Road between Mills Creek and Railroad tracks: Industrial	67.1	72	73	3:30-3:45 p.m.
5	Hillside Drive west of Adeline: Residential	60.9	64.1	62	9:50-10:05 a.m.
6	Hillside Drive between Bernal and Drake: Residential	61.9	66.3	63	9:17-9:32 a.m.
7	Occidental Avenue between Howard and Barroilet: Residential	62.1	65.4	63	11:12-11:27 a.m.
8	Airport Boulevard - east end: vacant commercial	63.3	66.3	72	11:55 a.m. 12:10 p.m.
9	Skyline Boulevard between Margarita and Riviera: Residential	62.9	67.3	63	10:20-10:35 a.m.
10	Old Bayshore Highway between Malcolm and Mitten Industrial	68.4	72.4	73	1:50-2:05 p.m.
11	Peninsula Avenue between Arundel and Bloomfield: Residential	66.4	70.7	65	12:30-12:45 p.m.
12	El Camino Real West of Primrose: Commercial	68*	70*	73	9:11-9:26 p.m.
13	Devereux Drive south of Balboa at Abraham Lincoln School: Public Facility, Residential	55.7*	58.4*	62	9:45-10:00 p.m.
14	same as number 13	54.7*	57.4**	62	10:35- 10:50 p.m.
15	El Camino Real west of Primrose: Commercial	65.9*	68.9**	73	11:10-11:25 p.m.
16	Airport Boulevard - eastern end; Vacant Commercial	69.7	70.4	73	12:17-12:32 p.m.
17	Adrian Road: Industrial	72.6	74	74	1:12-1:27 p.m.
18	Rollins Road between Mills Creek and the rail road: Industrial	72.5	73.8	74	1:42-1:57 p.m.
19	Grove Avenue at Collidge Community Center: Residential	61.8	65.8	63	2:15-2:30 p.m.
20	Bayshore Boulevard at its intersection with Dwight and Trenton: Residential	73.4	75.8	76	2:53-3:08 p.m.
21	Primrose Avenue and Bellevue at City Hall: Commercial	59.6	63.2	62	3:30-3:45 p.m.
22	Carolan Avenue east of Cadillac Way: Industrial	73.2	75.9	74	4:55-5:10 p.m.
23	El Camino Real east of Forest View: Residential	70.5	73.6	73	5:25-5:40 p.m.
24	Airport Boulevard behind Chinese	52	55.4	73	6:10-6:25 p.m.

Site Measurement Number	Site Description: Land Use	L_{day} $L_{evening}$ L_{night}	Measured L_{10}	Estimated CNEL	Time of Measurement
	Cuisine: Vacant Commercial				
25	Bayshore Boulevard at its Intersection with Dwight and Trenton: Residential	73.7*	75.3*	76	8:45-9:00 p.m.
26	Old Bayshore Highway between Malcolm and Mitten: Industrial	68.4*	71.3*	73	9:30-9:45 p.m.
27	Devereux Drive south of Balboa at Abraham Lincoln School: Public Facility/residential	47.2*	52*	62	9:50-10:05 p.m.
28	Trousdale Drive south of Sebastian: Residential	63.2	67.3	68	2:21-2:36 p.m.
29	Granada Drive east of Riviera Drive - SFO Airport Monitoring Station: Residential	52.7	54.9	61	1:45-2:00 p.m.
30	Mills Canyon Park - dirt road off La Mesa Court: Open Space	48.3	52.0	61	1:17-1:32 p.m.
31	Sisters of Mercy School - Adeline Drive south of school entrance: Residential	58.3	60.0	62	12:45-1:00 p.m.
32	Occidental Drive between Howard and Barroilhet: Residential	58.4	63.0	62	12:15-12:30 p.m.
33	El Camino Real west of Primrose: Commercial	68.2	70.0	73	11:47 a.m. 12:02 p.m.
34	Oak Grove Avenue between Carolan and Chatham at Burlingame High School: Public Facility	59.8	63.5	62	11:17-11:32 a.m.
35	Devereux Drive South of Balboa at Abraham Lincoln School: Public Facility/residential	58.8	63.2	62	11:35-11:50 a.m.
36	Broadway cul-de-sac at Roosevelt School: Public Facility/residential	61.0	65.7	63	11:04-11:19 a.m.
37	Bayswater Avenue between Channing and Stanley: Residential	56.9	57.4	62	10:26-10:41 a.m.
38	Bayswater Avenue between Lorton and Highland: Commercial	58.2	60.0	62	9:55-10:10 a.m.
39	Old Bayshore Highway between Millbrae Avenue and Cowan: Industrial	73.9	76.3	75	5:09-5:24 p.m.
40	Gilbreth Road between Malcolm and Stanley: Industrial	75.6	76.9	75	5:41-5:56 p.m.
41	Trousdale Drive west of Quesada: Public facility/residential	65.5	69.0	65	6:18-6:33 p.m.
42	El Camino Real at Peninsula Hospital: Public Facility	68.7	72.8	69	10:20-10:35 p.m.
43	Murchison south of Magnolia: Commercial	71	70	72	9:45-10:00 p.m.
44	Adeline Drive above Mills Canyon: Residential	62.9	67.8	63	9:10-9:25 p.m.
45	Old Bayshore Highway between Malcolm and Mitten: Industrial	65.4**	69.1*	73	10:40-10:55 p.m.
46	Trousdale Drive south of Sebastian: Residential	59.5*	63.6*	68	9:45- 10:00 p.m.

Site Measurement Number	Site Description: Land Use	^{L}day ^{L}evening ^{L}night	Measured ^{L}10	Estimated CNEL	Time of Measurement
47	Trousdale Drive South of Sebastian: Residential	60.7**	64.1**	68	10:10-10:25 p.m.
48	Rollins Road at its intersection with Dwight and Trenton: Residential	70**	71.9**	76	11:05-11:20 p.m.
49	Broadway between Carolan and Bayshore Freeway: Industrial	75.8	79.3	78	4:20-4:35 p.m.
50	Burlingame Avenue south of Lorton: Commercial	66.2	69.6	72	4:00-4:15 p.m.
51	Broadway between California and El Camino: Commercial	68.4	70	73	10:43-10:58 a.m. Saturday
52	California Drive between Oxford and Cambridge: Commercial	71.4	73.3	74	11:15-11:30 a.m. Saturday

Notes: ^{L}day (^{L}d), ^{L}evening (^{L}e) and ^{L}night (^{L}n) are ^{L}equivalent (^{L}eq) measurements taken during the day (0700-1900), evening (1900-2200), and nighttime (2200-0700) periods. ^{L}evening measurements are indicated by one asterisk (*); ^{L}night measurements are indicated by two asterisks (**); ^{L}day measurements have no asterisks.

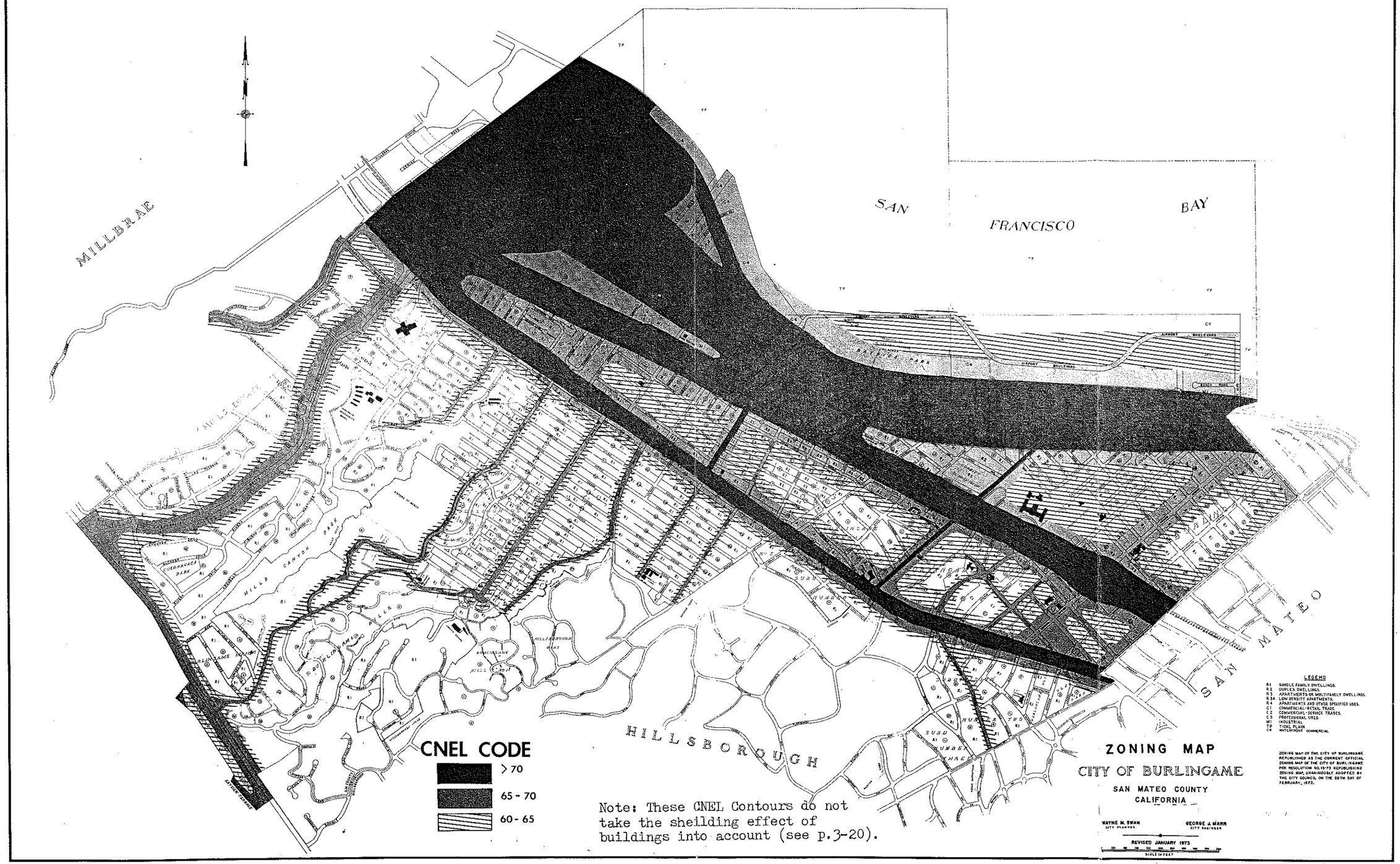


Figure 3.5.
1975 CNEL Contours

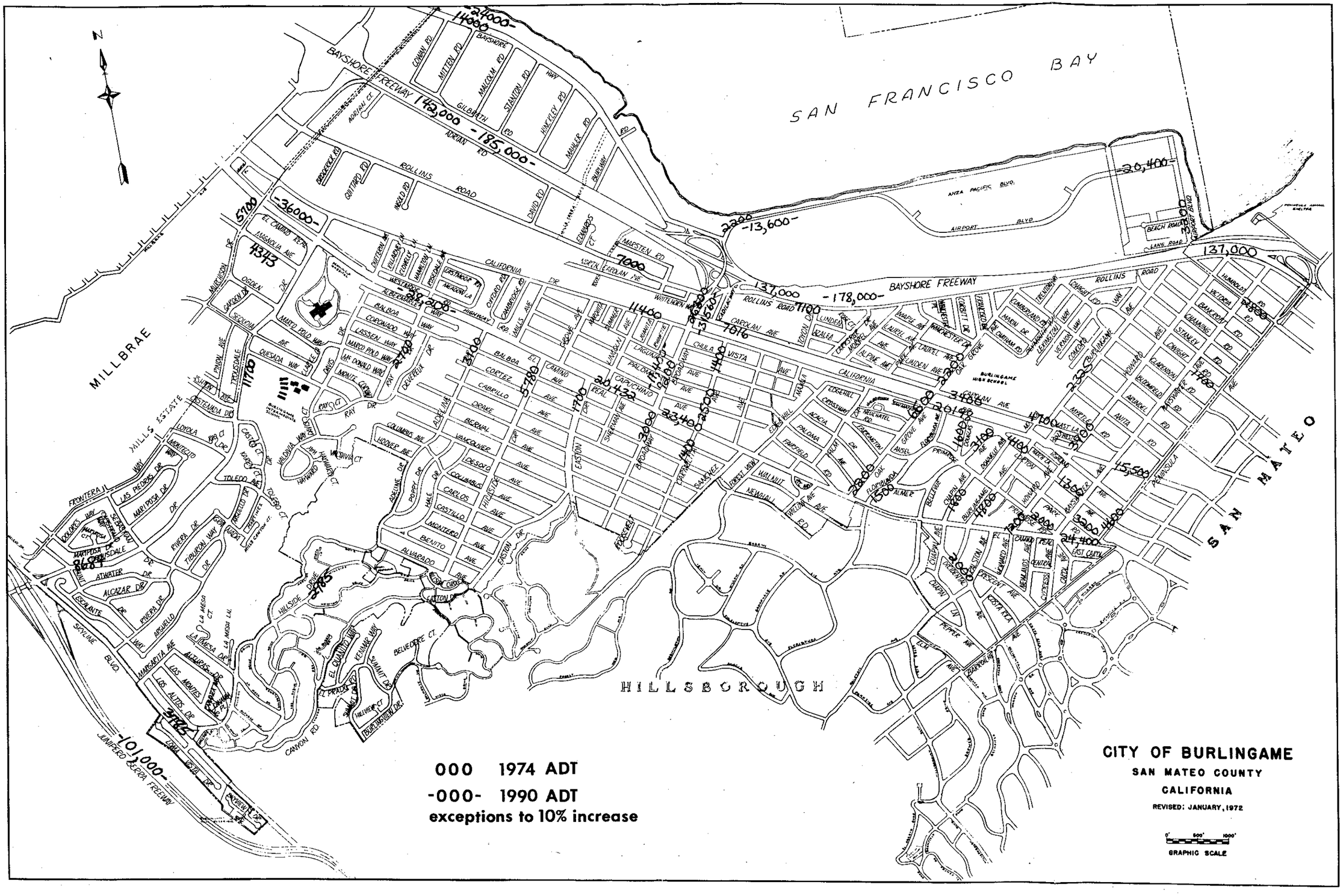
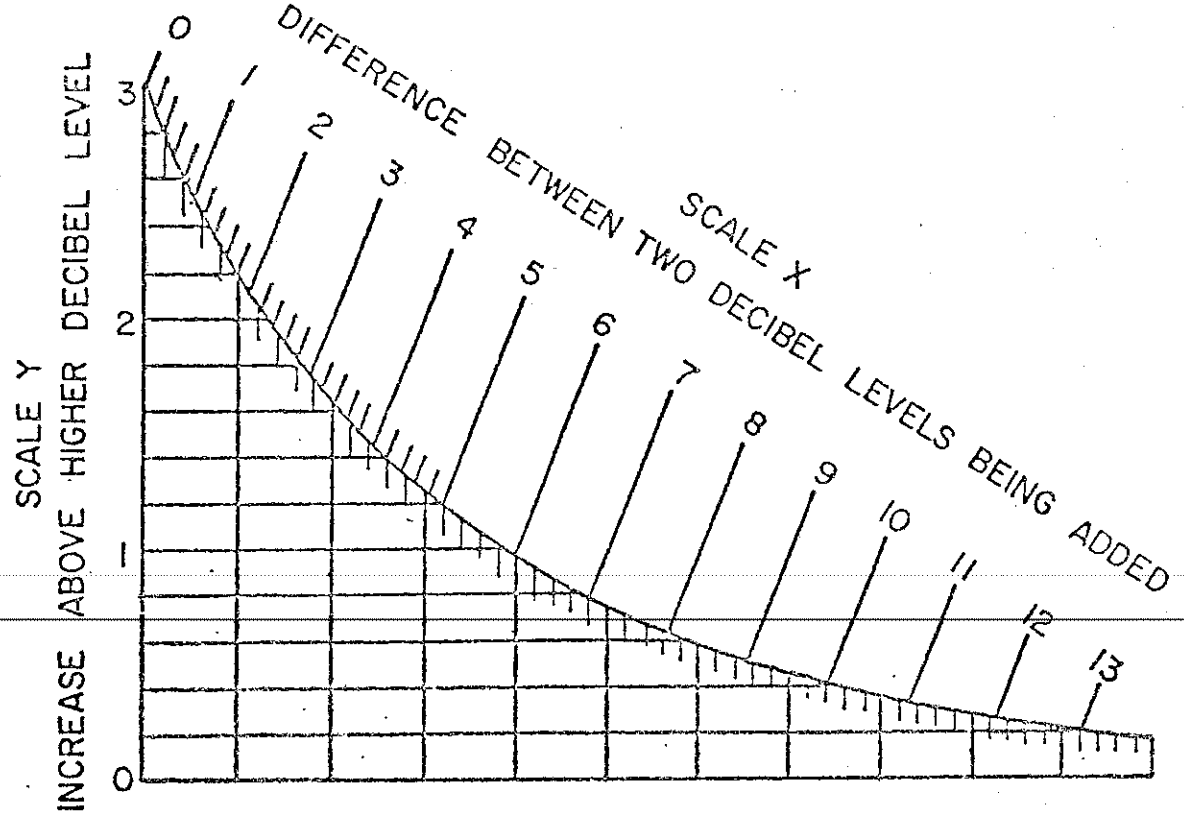


Figure 3-2.
1974 Average Daily Traffic
Annual: Highways and Busy Streets

Other very important characteristics of noise which affect the City's noise climate relate to the effect of distance on noise and more importantly the additive effect of two noise sources. With a doubling of distance from the source the noise level will drop from 3-6 dBA; the actual drop is dependent upon complex relationships such as those between topographic and meteorologic conditions. The additive effect of noise is important with regard to Burlingame's noise climate because of the locational aspects of its major ground transportation corridors - Bayshore Freeway, Southern Pacific Railroad, and El Camino Real. A combination of two or more noise sources will clearly yield a noisier environment than would occur if the noise sources existed separately. (Because of the logarithmic base of the decibel scale, two sounds of 50 decibels each do not combine to total 100; rather, they produce a combined noise level of 53 decibels. Combining two equal CNEL or dBA levels will always yield an increase of three decibels; combining unequal levels will add less than three decibels to the louder sound. The rule for this addition is illustrated in Figure 3-3.)

The additive effect causes noise levels to be higher than would be expected from any single source in areas where sound propagation from two noise sources reaches the land in between. Such areas occur between Bayshore Freeway and Southern Pacific Railroad as Broadway is approached from the east and west, and between California Drive and El Camino Real approaching Trousdale Avenue and, to a lesser extent, approaching Peninsula Avenue. In these areas, the additive effect becomes most pronounced where the contributing noise sources (the roads) become closer together.

FIGURE 3-3. CHART FOR COMBINING LEVELS OF UNCORRELATED SOUNDS.



Existing Airport Noise

Airport noise from San Francisco International Airport takes many forms. The airport contours shown in Figure 3-5 are the 1975 CNEL Average Annual contours from the San Francisco International Airport (SFO) Environmental Impact Assessment Report (EIAR). Because these are average annual contours, they do not reflect the worst-case airport noise which occurs in Burlingame. Even the 1974 Average Seasonal Day CNEL contours also contained in the EIAR do not represent the worst case airport noise in Burlingame. These seasonal contours were based upon runway utilization distributions during the months of May and June; the worst-case months during which Burlingame is affected by airport noise are historically October, December, January, February and March.

During these latter five months, southerly and south-westerly winds necessitate takeoff and landing patterns to shift so that aircraft arrive and depart over the City of Burlingame. The operations depart from Runway 19 and arrive on Runway 1. According to Landrum and Brown 1974 data utilized in the latest EIAR (3-2), annual departures from Runway 19 totaled 1 percent; annual arrivals onto Runway 1 totaled .33 percent. More importantly, March was the peak departure month with 7 percent of total departures from Runway 1, December and February were peak arrival months with 2 percent of total landings onto Runway 1. Applying these percentages to the arrival/departure totals for these months, it can be determined that 823 total aircraft departed from Runway 19 in March, 240 total aircraft arrived on Runway 1 in December and 207 total planes arrived on Runway 1 in February.

The percentage number of flights utilizing this runway pair during worst-case months (relative to Burlingame) fluctuates according to weather fluctuations each year. For instance, 1972 data indicates the peak arrival month to be February with 3.58 percent of its total arrivals onto Runway 1; in March of that year, arrivals onto Runway 1 comprised 1.64 percent of total arrivals. Historically, the 1974,7 percent figure for March is high. These calculations indicate that while these worst-case months aren't reflected in the average annual impact of airport noise in Burlingame and don't show up on average annual noise contours, the City of Burlingame is more heavily affected by noise for certain months of each year than others. During these months, some aircraft take off over Burlingame's industrial area, make a left turn over Peninsula Hospital and fly south above El Camino Real; other aircraft land in approximately the reverse pattern.

Although the worst-case months were not able to be monitored during this study, many measurements were taken to assess the airport's contribution to Burlingame's noise climate.

Utilizing the Airport Land Use Commission's (ALUC) adopted CNEL contours for the airport as a guide, many measurement sites were chosen in the hilly areas of Burlingame on either side of Trousdale Drive including an area extending toward Hillside Drive east of Sebastian Drive. The representative airport industrial CNEL site in Table 3-2 had a measured CNEL of 73; the airport residential CNEL site had a measured CNEL of 68. Estimated CNELs for the residential area described above were 61, 62 or 63; it should be noted that these are estimates and actual CNELs might be found different if evening and nighttime measurements were taken at all these locations and actual CNELs computed. Because of the weighting factors involved in CNEL computation,

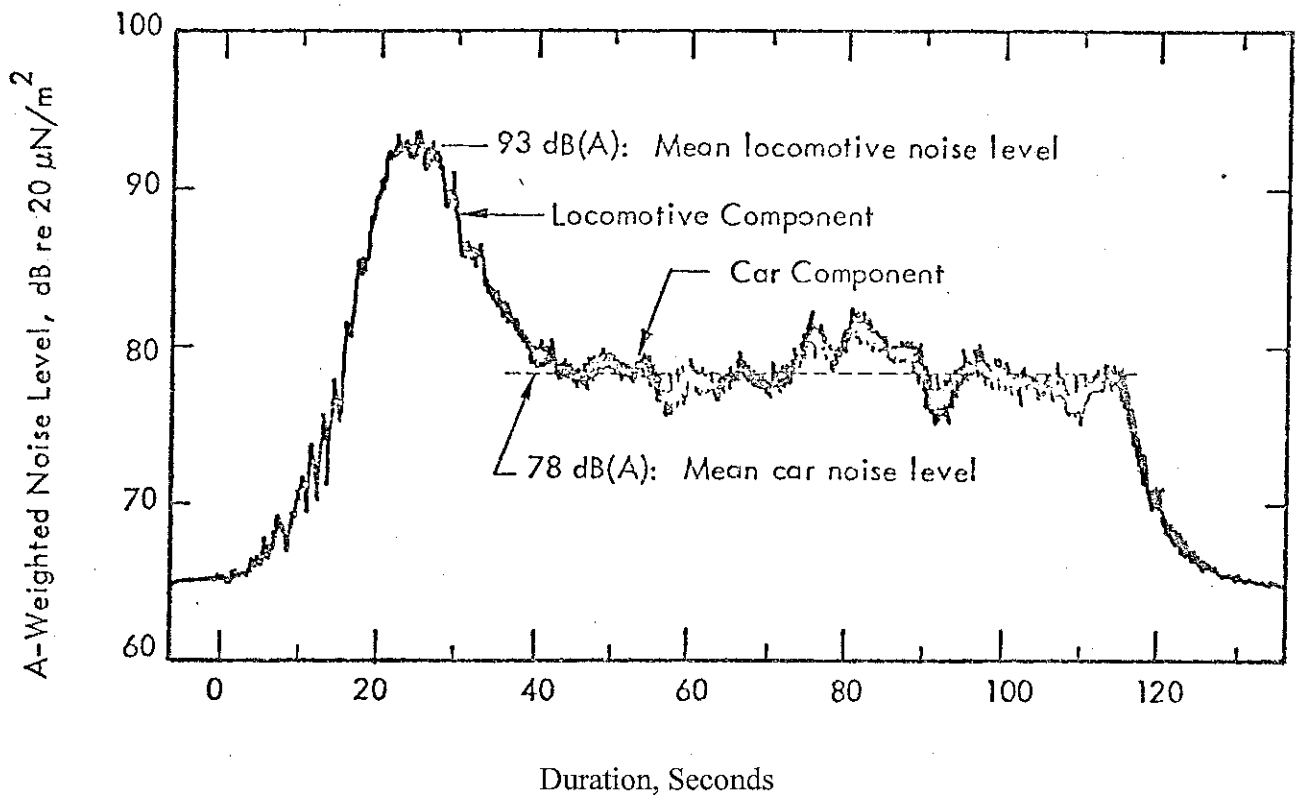
estimation utilizing representative measurement sites is only as accurate as the representativeness of the sample sites.

The freeway residential CNEL site, while not within ALUC adopted airport contours, indicates an important property of noise especially in regard to the airport's contribution to the overall noise climate. This site had a measured CNEL of 76 and it illustrates the masking property of noise. The masking property comes about when two unequal levels of noise are involved in the same noise climate. The louder noise will mask the quieter noise especially very near the louder noise. Thus, Bayshore Freeway noise is generally the major transportation noise that people living adjacent to the freeway (between Cadillac Way and Peninsula Avenue) hear. Two of the other representative sites in Table 3-2 also serve to indicate the airport's contribution to the overall noise climate. While there is approximately a 30 percent difference in ADT between Bayshore Highway and El Camino Real with Bayshore Highway being the lighter traveled street, the measured CNELs for these two sites are both 73. This indicates that the airport has the effect of adding approximately 3 dBA to this site on Bayshore Highway.

Existing Railroad Noise

Railroad transportation noise includes the mechanical clanking and rattling of rolling stock, the sounds of braking, rail wheel noise, aerodynamic friction, engine noise, whistles and the release of air brake pressure after the train has stopped. Since the Southern Pacific Railroad passes through the center of Burlingame directly north of California Drive, it is a significant noise source in the City. Figure 3-4 indicates the high noise level, short time duration of a single train pass-by. Twenty-two round trip commuter trains, eight freight trains and eight to ten small peddler or stop and start trains pass through the City each day. Because of the number of train operations occurring in each time period of a 24-hour day and because of the high noise levels propagated by each train, the noise contours on either side of the railroad tracks cover great amounts of land. For instance, the contour on the south side of the tracks contains the noise contour resulting from California Drive motor vehicle traffic; that is, the railroad operations generate more noise than do the motor vehicle operations on California Drive. During measurement number 2, taken 25 feet from California Drive on the railroad side of the street, one train passed by; two trains passed by during measurement number 22 on Carolan Avenue.

FIGURE 3-4. TYPICAL A-WEIGHTED TIME HISTORY OF A TRAIN PASS-BY (Measured at 100 Feet from Track, 32 mph at +0.6 percent grade, Tehachapi Summit.)



Combined Noise Climate

Figure 3-5 then represents the present acoustic climate in Burlingame expressed in CNEL zones. Immediately apparent is the fact that only the part of the City located away from major traffic arteries is not impacted by noise; this area is located southwest of El Camino Real in the hills above the City. Even this area is surrounded by its main traffic arteries Junipero Serra Freeway, Trousdale Drive and Hillside Drive. It should be noted that the noise impacted areas in this figure do not take into account the noise abatement or shielding effects of buildings. Because of the high noise levels in Burlingame and because it takes three rows of buildings to reduce noise levels by five dBA (CNEL is measured in dBA units) and six rows of buildings to reduce noise levels by ten dBA, this shielding effect is of little practical consequence. For instance, the residential area bounded by Cadillac, Bayshore Freeway, Peninsula Avenue and Carolan is very heavily impacted by noise from Bayshore Freeway. The fact that there are two and three story buildings along Bayshore Freeway's Frontage Road, Rollins Road, does not significantly protect the second row of dwellings from this noise impact. This first row of dwellings only causes a 3 dBA drop in the noise level because the dwellings do not form a solid wall, because there are spaces in between the dwellings. This residential area as well as those residential areas immediately adjacent other arterials in the City such as El Camino Real, California Drive,

As is described in the Planning Criteria and Noise Emissions Section, the Environmental Protection Agency has determined that long-term exposure to noise levels higher than an CNEL of 70 dBA could result in a loss of hearing. This implies that the areas outside of the dwellings in the residential areas just described are critical with regard to hearing loss. EPA has also determined that 55 CNEL is the noise level which protects against activity interference and annoyance.

The second critical land use heavily impacted by present noise in the City is the Public Facilities land use including schools, parks, hospitals and other public buildings. As can be seen on Figure 3-5, only Pershing School, Hoover School, Abraham Lincoln School, Burlingame Intermediate School, Peninsula Hospital and the undeveloped Mills Canyon Park are located in areas where noise levels are below 60 CNEL. None of these schools are located in a 55 CNEL noise environment which is the level the State has indicated as compatible with educational land uses. Commercial land uses are generally within the 65 CNEL outdoor noise level planning criterion suggested in the Planning Criteria and Noise Emissions Section. Exceptions occur along California Drive, north of El Camino Real in the Trousdale Drive area and along Bayshore Highway; CNEL levels of 70 and above occur in these commercial areas of the City. All industrial land uses are within the 75 CNEL outdoor noise level planning criterion suggested in the Planning Criteria and Noise Emissions Section. All CNEL noise impacted areas are out-of-doors; interior noise levels will be 12-25 dBA lower depending on type of building construction, window type and whether windows are open or closed.

FUTURE ACOUSTIC CONDITIONS

For planning and other purposes, it is useful to have an estimate of the future noise climate. With this in mind, predicted CNEL noise impacted areas have been developed for the ear 1990 and these levels are presented in Figure 3-6. These noise impacted areas have been predicted utilizing a noise propagation model; the most important input data was future traffic volumes and noise characteristics of future vehicle model year mix. Average Daily Traffic (ADT) projections used assumed a ten percent increase from present in traffic on most highways and streets; exceptions were Bayshore and Junipero Serra Freeways, Bayshore Highway, the western end of El Camino Real and Broadway which utilized higher projections developed in the San Francisco International Airport (SFO) Environmental Impact Assessment Report (EIAR), and Airport Boulevard which utilized projections performed for Burlingame by the JHK traffic consulting firm. These exceptions to the ten percent increase are indicated in Figure 3-2. Standard projections of the noise characteristics of future vehicle model year mix were utilized to account for the increasingly stringent California noise emission standards (outlined in the planning Criteria and Noise Emissions Section) and the fact that quieter vehicles will replace many of the relatively noisy vehicles on the road today. The percent of trucks on the road was assumed to remain constant.

Future Automobile, Truck and Motorcycle Noise

In the future, somewhat quieter automobiles, trucks and motorcycles are expected to replace relatively noisy motor vehicles now on the road. Largely because of this fact, noise impacted areas due to motor vehicle sources are predicted to decrease in size even though ADT will increase in the future. Because of a sizeable increase in ADT predicted for Airport Boulevard as it becomes developed, this area will encounter increased noise emanating from the boulevard onto adjacent lands. This fact is of special significance for two reasons: (i) this area is largely undeveloped at present and therefore noise attenuation measures can be required of and designed into new developments as they occur, (ii) the proposed Bayside City Park in this area is a land use upon which noise impaction is a critical factor. While a similar, somewhat larger increase in ADT might be predicted for Bayshore Highway with regard to its potential for bayside commercial developments, detailed predictions haven't been made regarding such development. The prediction utilized for this area is based upon increased traffic caused by SFO expansion. The point is that Figure 3-6 shows the noise climate along Bayshore Highway decreasing by 1990; this prediction might be greatly different if increased traffic from future waterfront commercial development was predicted in detail.

In 1990, CNEL (Figure 3.6) noise impacted areas along the majority of highways and streets in the City will decrease by approximately five dBA. Along Bayshore Freeway, Junipero Serra Freeway, California Drive, El Camino Real, Howard Avenue and Trousdale Drive, noise impacted areas decrease in size. Along other streets in the City such as Peninsula, Lorton, Park, Burlingame, Bellevue, Primrose, Carmelita, Broadway south of El Camino Real, Easton, Hillside, Adeline, Ray, Skyline, Magnolia and Murchison, CNEL levels decrease by approximately five dBA from the 65-70 range to the 60-65 range. Areas in which noise levels are below 60 CNEL enlarge in the most areas in the City and especially in residential areas between Carolan Avenue and Bayshore Freeway.

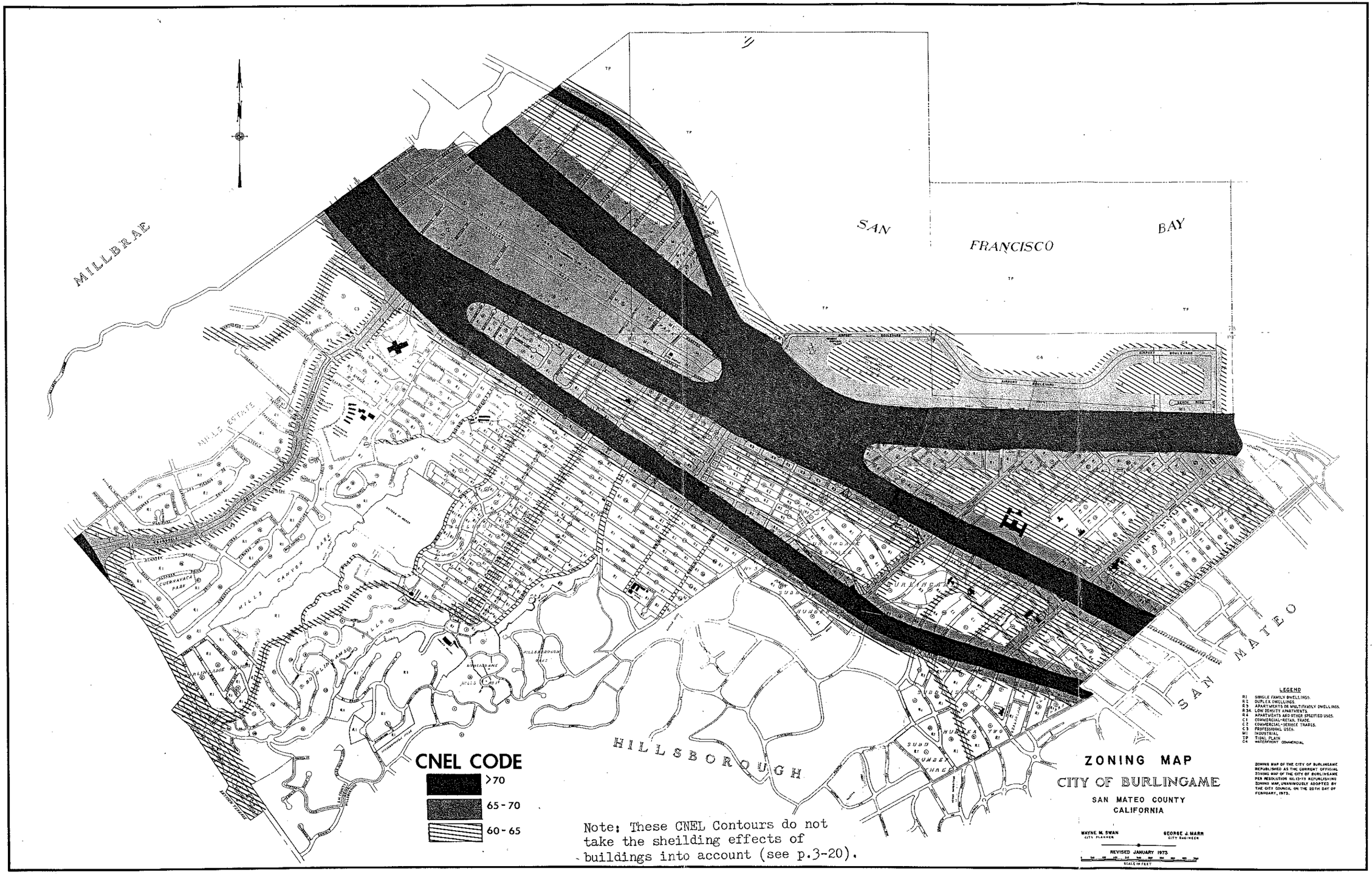


Figure 3.6.
1990 CNEL Contours

Noise intrusion into residential areas is less intense but many areas still do not meet the Planning Criteria and Noise Emissions Section planning criterion; the residential area adjacent to Bayshore Freeway is still the most severely impacted residential area in the City and parts of this area and other residential areas immediately adjacent major arterials are still seriously impacted with regard to hearing loss criteria. Public facilities land uses have an improved noise climate in 1990. City Hall, a portion of Washington Park and Cuernevaca Park now have a noise environment lower than 60 CNEL. All other schools, parks and public facilities buildings except Burlingame High School, a portion of Washington Park and McKinley School encounter noise environments approximately five CNEL lower than at present. Commercial land uses in the City meet the Section Four planning criterion of 65 CNEL except for areas adjacent to Broadway Avenue, California Avenue, old Bayshore Highway and the area north of El Camino Real near Trousdale Drive. The industrial land uses have an improved motor vehicle-caused noise climate in 1990 with the majority of land in this use at 65-70 CNEL, well below the Planning Criteria and Noise Emissions Section planning criterion of 75 CNEL.

Future Airport Noise

Prediction of future airport noise is not included on Figure 3-6. The reason for this is that one major assumption upon which the SFO EIAR prediction of future noise climate is based has recently come into question. This assumption is that all aircraft flying in 1990 (with the exception of the B-727) will have been retrofitted with noise suppressors, "quiet nacelles" or "refanned" engines in order to meet Federal Aviation Regulations - Part 36. The recent recommendation to the Federal Aviation Administration (FAA) by the President's Council on Wage and Price Stability that the retrofitting noisy jets is not worth the cost and would be unduly inflationary. In addition to this recent Notices of Proposed Rule Makings (NPRMS) from both EPA and FAA are
still unresolved. Until these NPRMS (one of which involves the retrofit program) are resolved, definitive future noise predictions of airport noise cannot be made.

Future Railroad Noise

Future railroad noise is not predicted in Figure 3-6; instead, present railroad noise is indicated. The reason for this, as with future airport noise, is uncertainty with future events related to the noise source. Until BART, an upgraded Southern Pacific Railroad or some type of improved fixed-rail transit extends down the Peninsula, it is assumed that Southern Pacific will continue to operate at approximately its present level. Until some type of improvements are made on the existing system, noise will remain approximately the same. Present, at grade segments of BART propagate noise levels of 70-75 dBA at a distance of 50 feet; this would be a 20-25 dBA reduction compared- to present Southern Pacific Railroad noise levels. However, if Burlingame should receive a BART station or maintenance yard, attendant noise from motor vehicle trips to and from, the station and/or increased station or maintenance yard activity might very well increase over that noise at the present Southern Pacific Railroad station. This type of possible noise should be adequately handled by an Environmental Impact report and subsequent required mitigation measures to deal with such noise.

PLANNING CRITERIA AND NOISE EMISSION STANDARDS

In planning for a desired community noise climate, two types of consideration are important. First, due to existing noise sources which are essentially fixed (such as freeways, railroads, and airports) certain areas may be unsuitable for some types of land use. It is therefore desirable to establish criteria by which the planner may determine acceptable land uses for a given site with respect to noise compatibility. Second, limits must be placed on the noise emissions of individual sources to ensure that noise levels within any given land use remain within or are scheduled to descend to some recommended level.

Urban areas in general, and the City of Burlingame in particular (considering its proximity to the San Francisco International Airport) are often too noisy to permit economically feasible methods of reducing noise levels to theoretically optimal levels. Because of this fact, these theoretical levels, the actual noise climate, the General Plan and the wishes of the people of Burlingame (as determined by the noise questionnaire, Appendix C) were all considered prior to formulation of the noise level planning criteria presented below.

LAND USE PLANNING CRITERIA

The United States Environmental Protection Agency (EPA) has published the results of its research regarding noise levels and their effects on people. Table 4-1 summarizes the findings of this document. The three noise levels it arrives at are 70 dB for hearing loss, 55 dB for outdoor activity interference and annoyance and 45 dB for indoor activity interference and annoyance. One of the major activities involved in "activity interference and annoyance" concerns the maintenance of a noise level low enough so as not to interfere with normal human speech; other activities are sleep, reading, studying, eating, relaxing, listening to records, tapes or radio, watching television, and occupation-related activities.

TABLE 4-1
Summary of Noise Levels Identified as Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety

EFFECT	LEVEL	AREA
Hearing Loss	^{L}eq(24) < 70 dB	All areas
Outdoor activity interference and annoyance	^{L}dn < 55 dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	^{L}eq(24) < 55 dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	^{L}dn < 45 dB	Indoor residential areas
	^{L}eq < 45 dB	Other indoor areas with human activities such as schools, etc.

*Notes:
^{L}eq(24) represents the sound energy averaged over a 24-hour period while ^{L}dn represents the ^{L}eq with a 10 dB nighttime weighting. ^{L}dn is approximately equal to CNEL.

The hearing loss level identified here represents annual averages of the daily level over a period of forty years. (These are energy averages, not to be confused with arithmetic averages.)

These levels are most probably unattainable in much of Burlingame. A Set of recommended levels which will provide a reasonable noise climate within the City yet not severely inhibit development have been derived. The suggested outdoor noise levels suitable to various land use categories are given in Table 4-2.

TABLE 4-2
Outdoor Noise Level Planning Criteria

MAXIMUM OUTDOOR NOISE LEVELS (dBA)	
LAND USE CATEGORIES	CNEL
Public, Quasi-Public and Residential: Schools, Hospitals, Libraries, Auditoriums, Intensively Used Parks and Playgrounds, Public Buildings, Single Family Home, Multiple Family Apartments and Condominiums, Mobile Home Parks	60
Passively-Used Open Space: Wilderness-Type Parks, Nature or Contemplation Areas of Public Parks	45
Commercial Shopping Centers, Self-Generative Business, Commercial Districts, Offices, Banks, Clinics, Hotels and Motels	65
Industrial Non-Manufacturing Industry, Transportation, Communications, Utilities, Manufacturing	75

These criteria may be invoked for the following purposes:

a. to determine the suitability of development on lands considered as receptors to which the standards apply; and

b. to determine the suitability of building types arid proposed construction materials to be applied on the site.

With regard to indoor noise levels, noise reduction as a result of building type has been documented by the Federal Highway Administration; this information is contained in Table 4-3 below:

TABLE 4-3
Sound Level Reduction Due to Building Type and Window Condition

Building Type	**Window Condition**	**Reduction of Noise from Outside Sources**
All	Open	10 dB
Light Frame	Ordinary, sash closed	20 dB
Masonry	Single pane, closed	25 dB
Masonry	Double pane, closed	35 dB

The recently adopted State Housing Act (Administrative Code, Title 25, Article 4) requires the following of non-single family detached residential units:

"(e) Noise Insulation from Exterior Sources

(1) Location and Orientation. Consistent with land-use standards, residential structures located in noise critical areas, such as proximity to select system of county roads and streets (as specified in 186.4 of the State of California Streets and Highways Code), railroads, rapid transit lines, airports, or industrial areas shall be designed to prevent the intrusion of exterior noises beyond prescribed levels with all exterior doors and windows in the closed position. Proper design shall include, but shall not be limited to, orientation of the residential structure, set-backs, shielding, and sound insulation of the building itself.

(2) Interior Noise Levels. Interior community noise equivalent levels (CNEL) with windows closed, attributable to exterior sources shall not exceed an annual CNEL of 45 dB in any habitable room.

(3) Airport Noise Source. Residential structures to be located within an annual CNEL contour (as defined in Title 4, Subchapter 6, California Administrative Code) of 60 dB require an acoustical analysis showing that the structure has been designed to limit intruding noise to the prescribed allowable levels. CNEL's shall be as determined by the local jurisdiction in accordance with its local general plan.[1]

(4) Vehicular and Industrial Noise Sources. Residential buildings or structures to be located within annual exterior community noise equivalent level contours of 60 dB adjacent to the select system of county roads and city streets (as specified in Section 186.4 of the State of California Streets and Highways Code), freeways, state highways, railroads, rapid transit lines and industrial noise sources shall require an acoustical analysis showing that the proposed building has been

[1]It should be noted that neither the Airport Land Use Commission's (ALUC) adopted airport contours nor the latest San Francisco International Airport (SFO) Environmental Impact Assessment Report (EIAR) contours delineate the 60 CNEL line.

designed to limit intruding noise to the allowable interior noise levels prescribed in Section T25-1092(e) (2). Exception: Railroads where there are no nighttime (10:00 p.m. to 7:00 a.m.) railway operations and where daytime (7:00 a.m. to 10:00 p.m.) railway operations do not exceed four (4) per day."

Since most residential structures (with windows closed and single pane glass) have the capability of reducing noise levels, from exterior sources by 20 dBA, the State's interior standard of 45 dBA should normally be achieved when exterior levels do not exceed 65 dBA. It should also be noted that implementation of the State act requires that the precise location of the 60 dBA (CNEL) contour be known.

In certain cases where the functional use of a building is such that windows are not opened and outdoor areas are not used for any reason other than parking and walking into the building, outdoor noise levels can be ignored and indoor noise level planning criteria may be appropriate. Such building uses might include indoor auditoriums, certain public buildings, totally-enclosed shopping centers, certain self-generative business, professional offices, banks, clinics and motels without outdoor pool or park areas.

In such cases, the indoor noise level planning criterion should be 45 CNEL. The outdoor noise level planning criteria chosen assure that the 45 CNEL indoor level will be achieved by the noise attenuation of regular construction materials. Because the indoor noise level planning criteria waive the outdoor criteria, it is of utmost importance that building plans and building inspections be very detailed and extensive to assure that the indoor criterion will be achieved. Improper choice of materials and/or improper installation of such materials can make them ineffectual.

The Occupational Safety and Health Administration (OSHA) and EPA have jurisdiction over occupational noise; OSHA allows a maximum Leq of 90 dB for an eight hour day. In view of the fact that these agencies are still debating the question of adequate occupational noise levels, and since OSHA has enforcement authority over these levels, it is recommended that the City of Burlingame defer to the Federal authorities for consideration of occupational noise produced indoors.

NOISE EMISSION STANDARDS

Noise emission standards may be invoked for the following purposes:

a. to regulate any noise source (other than aircraft and motor vehicles operating on public thoroughfares) which cause violation of the standards.
b. to determine the suitability of land to be developed considered as a noise source with nearby properties considered as receptors to which the standards apply.

Standards for aircraft and ground transportation noise, Burlingame's two major sources of noise, have been established by State and Federal government agencies. Burlingame can enforce ground transportation emission standards through its police department; these standards are therefore presented here. Table 4-4 presents State standards for motor vehicles operating on public roadways; Table 4-5 presents State standards for new motor vehicles at the time of sale.

Recommended noise emission standards for construction equipment operating in the City of Burlingame are listed in Table 4-6. These are to be applicable to the named source whether operated by individuals, companies, public agencies or other organizations. Enforcement of these standards are discussed in the Noise Abatement and Control Section of this element in addition to these specific standards, the following standard should be met:

> No person shall be allowed to cause any noise to be emitted past his/her property line in any manner so as to create any noise which would cause the ambient L .0 noise level to be increased by more than 5 dBA. The procedure for determining if this standard is being violated is described in Appendix A in the General Appendix Document.

The CNEL noise descriptor was not chosen for this standard (i) because it is not adequate for measuring peak type annoyance noises for which this standard is designed; (ii) it requires measurements during the day, evening and nighttime periods which make it prohibitively costly in terms of enforcement. This standard, being both quantitative and measurable prevents possible errors of subjectivity involved in the enforcement of a noise ordinance.

TABLE 4.4
California State Noise Emission Standards for Motor Vehicles
(at 50 feet from center lane of travel).

Vehicle Type	**< 35 mph**	**> 35 mph**
Trucks*	88	90
Motorcycles	82	86
Automobiles	76	82

*For all trucks manufactured after 1973, and operating at 35 mph or less, the maximum level allowed for is 86 dBA.

Notes:
Trucks are defined to be: "Any motor vehicle with a manufacturer's gross vehicle weight of 6000 lbs. or more, and any combination of vehicles towed by such motor vehicles."

Motorcycles are defined to be: "Any motorcycle other than a motor driven cycle."

Automobiles are defined to be: "Any other motor vehicle and any combination of vehicles towed by such motor vehicle."

TABLE 4.5
California Noise Standards for New Motor Vehicles

CLASS	CALIFORNIA
Motorcycles	
Until 1.1.73	88 dBA
After 1.1.73	86 dBA
After 1.1.75	80 dBA
After 1.1.77	75 dBA
Light Vehicles	
Until 1.1.73	86 dBA
After 1.1.73	84 dBA
After 1.1.75	80 dBA
After 1.1.77	75 dBA
Heavy Vehicles:	**(6,000 #)**
Until 1.1.73	88 dBA
After 1.1.73	86 dBA
After 1.1.75	83 dBA
After 1.1.77	80 dBA

TABLE 4.6
Maximum Allowable Noise Levels From Construction Equipment

EQUIPMENT	PEAK NOISE LEVEL IN dBA AT 50 FT.
Earthmoving	
front loader	75
backhoes	75
dozers	75
tractors	75
scrapers	80
graders	75
truck	75
paver	80
Materials Handling	
concrete mixer	75
concrete pump	75
crane	75
derrick	75
Stationary	
pumps	75
generators	75
compressors	75
Impact	
pile drivers	95
jackhammers	75
rock drills	80
pneumatic tools	80
Other	
saws	75
vibrator	75

NOISE ABATEMENT AND CONTROL PROGRAMS

Noise levels in Burlingame can be reduced by controlling the three factors of noise propagation: 1) the source of the noise, 2) the path the noise travels, and 3) the receptors of the noise (the people who hear the noise). The most effective method of noise control is preventing noise from being generated; all other methods of noise control limit the area affected by the noise. However, control of the noise source is often not within the realm of local government capability. Most often, local governments must concentrate on control over the path or the receptor of noise. Various programs of noise abatement and control are available. A wide range of such programs is presented here in order that they may be available for the City of Burlingame's consideration and possible implementation either now or in the future.

ADMINISTRATIVE REVIEW PROCESS

Existing administrative review processes involving environmental impact and building permits offer local governments a definite method with which to control noise paths, receptors, and to some extent, sources. There are several existing administrative processes which may be used to abate noise:

(1) Determination of need for an Environmental Impact Report for public and private projects;

(2) Design of scope of work for Environmental Impact Report; and

(3) Inspection of building plans, and issuance of a building permit

Determination of Need For An Environmental Impact Report

In determining the need to produce an Environmental Impact Report (EIR) pursuant to requirements of the California Environmental Quality Act (CEQA), City staff should follow these guidelines to determine whether significant potential acoustic impacts may arise from the project. These guidelines are derivative from the noise standards, noise ordinance and the applicability of CERA to upheld local environmental standards.

Significant acoustic impact may arise whenever any of the following hold within the planning time window (usually between 2 and 20 years after construction).

Roadway Alteration or Construction:

The guidelines which follow, for determination of need for an environmental impact report in the event of roadway alteration or construction, provide a means for evaluating noise increases due to normal growth in traffic as well as those due to increased traffic attracted by a new roadway. An EIR is required:

a. If additional average daily traffic (ADT) in excess of 20% is generated by a project over and above normal traffic growth of a roadway segment where neighboring land use is hospital, school, park, open space, residential, professional office or commercial; if additional average daily truck traffic in excess of 10% is generated adjacent to the same land uses; or if roadway operating speeds will increase by more than 10 mph adjacent to the same land uses.

b. If additional ADT in excess of 30% is generated over any roadway segment; if additional average truck traffic in excess of 15% is generated by the project over any roadway segment; if roadway operating speeds will increase by more than 20 mph over any roadway segment.

c. If additional or new design capacity in excess of 20% of existing ADT is generated by a project over any roadway segment whose, neighboring land use is hospital, school, park, open space, residential; if additional design capacity in excess of 30% ADT is generated by the project adjacent to any land use.

d. If other significant roadway operations are altered such as: appreciable upward change in uphill grade (>3 sustained for linear distance of 100 meters), significant additional congestion where average speeds are already less than 20 mph, or significant altered traffic corridors of major traffic-carrying roadways (>10,000 ADT).

Residential Developments:

a. If the development is greater than 40 dwelling units and meets one or more of the following:

    (1) Adds more than 10 percent to ADT on one or more adjacent roadways;

    (2) Is adjacent to a roadway of peak hour design capacity or approved planned capacity greater than 1000 vehicle/hour;

    (3) If the development has inter-unit walls (e.g. apartments, townhouses, condominiums).

b. If the development is greater than 80 dwelling units.

Hospitals and Schools:

If the development provides for more than 100 new or additional beds or enrollment positions and either the facility adds more than 10 percent to the ADT on one or more adjacent roadways or is adjacent to a roadway of peak hour design capacity greater than 1000 vehicles/hour.

Professional Office and Commercial:

If the development adds more than 10,000 square feet of leasable commercial or professional office space and adds more than 10 percent to the ADT on one or more roadways or is adjacent to a roadway of peak hour design capacity greater than 1000 vehicles/hour.

Construction Activity:

If the development requires construction activity for more than 30 elapsed days using any combination of sources of noise listed in Table 4-6.

Recreational or Sports Facilities:

If the development could generate peak arrivals or departures of more than 1000 vehicles/hour.

Other:

If the development introduces a now source of stationary noise or otherwise induces increased traffic levels, railroad activity, or loudspeaker use such that the noise climate for residential, hospital, school, park, commercial, professional or open space use may be materially modified.

Design of Scope of Work for Environmental Impact Report

If a project has been determined to require an environmental impact report by having met exactly one of the conditions specified in the Determination of Need for an Environmental Impact Report, the environmental impact report shall include the following tasks:

Level 1 - Acoustic Analysis:

a. Measure existing noise levels for at least two distinct sites appropriate to the time of day of sensitive activities for the nearby receptor land uses (Including the project site itself).

b. Predict future noise using a noise propagation model for the most noise sensitive times of day for each land use, and for build and no-build futures. The prediction shall consider topography, building locations, diffraction effects, microclimate, traffic conditions (including vehicle volume, speed, and mix), and combinations of noise sources. Two future years shall be considered; 2 and 20 years after construction.

c. Derive mitigating measures for abating and reducing noise, including a consideration of ways of altering traffic volumes, other traffic operating characteristics, zoning, and a consideration of the use of noise barriers. In this sense the proposed project must be considered both as a noise receptor and a noise producer.

If the project has been determined to require an environmental impact report by having met two or more of the conditions specified in the Determination of Need for an Environmental Impact Report, or if one condition is met with any traffic volume more than twice the threshold traffic volume specified, then the following tasks shall be included in the environmental impact report:

Level 2 - Acoustic Analysis:

a. Measure noise levels for at least five distinct locations appropriate to the time of day of noise sensitive activities for the nearby receptor land uses (including the project site itself).

b. Predict future noise using a noise propagation model for the most noise sensitive times of day for each land use, and for build and no-build futures. The prediction shall consider topography, building locations, diffraction effects, microclimate, traffic conditions (including vehicle volume, speed and mix) and combinations of noise sources. Two future years shall be considered; 2 and 20 years after construction.

c. Derive mitigating measures for abating and reducing noise, including a consideration of ways of altering traffic volumes, other traffic operating characteristics, zoning, and a consideration of the use of noise barriers. In this sense the proposed project must be considered both as a noise receptor and a noise producer. Consider project alternatives specifically to mitigate acoustic impacts. Consider trade-offs of noise, air quality, traffic, water quality and other impacts in these mitigating actions and project alternatives.

Implementation of the California State Uniform Building Code Acoustical Clearances

As an integral part of the building permit system, the following procedure is recommended for implementation by the city staff initiation of the program requires the city to appoint a member of the city staff to administer the acoustical review process which could include review of the noise elements of the Environmental Impact Statement. Hereafter, the term "city staff" is used to denote such an administrator. One of his functions is also to determine one or more companies qualified to perform acoustical analyses until such time as the city may have field measurement equipment, trained field personnel, and an operational noise propagation model.

Step 1: Review for Adequacy of Data:

The city staff will review plans for proposed buildings which are subject to the provisions of the State Code, to insure adequate data has been submitted for an acoustical analysis to be performed. The data submitted must contain:

a. Name, address and telephone number of project architect.

b. Project location and plan of final grading, including description and location of any noise abatement structures.

c. Plan view of entire project structure, showing distance from each perimeter wall to the property line.

d. Plans of each wall showing the height of each door and window with respect to final grade.

e. Cross sections of walls and roof; additional cross sections for windows and doors and their connections to the rest of the structure.

f. Description of construction and insulation materials for all exterior walls, roof, doors, and window.

g. All acoustical data (or citations thereto) of which the applicant is aware concerning the acoustical characteristics of the vicinity of the proposed development or special characteristics of the proposed building materials. This data should specifically include the location of the 60 CNEL contour as required by State law (see Land Use Planning Criteria Section).

Step 2: Acoustical Analysis:

After the city staff reviews the initial project description, and the above data, written notice will be given to the applicant indicating (i) areas of insufficient data or (ii) a statement that data needs are adequate and a list of approved acoustical consultants from whom the applicant may obtain services. Note that two future noise forecast years are required. The acoustical analysis must be rendered for representative dwellings along each project boundary to assure that traffic or other external sources which vary around the development perimeter are addressed. The acoustical analyst will certify compliance of plans with the State Code, or alternatively, lack of compliance, with recommended abatement measures.

AIRCRAFT NOISE

Aircraft noise emanating both from overhead and ground operations is an important noise consideration in Burlingame. The principal practical methods available to the City for abatement of such noise are related to indoor levels. Considering the outdoor life style prevalent in California, this method of noise abatement is not totally satisfactory; control over the source is therefore another alternative method for consideration in abating aircraft noise. Since control over aircraft as a noise source is pre-empted by the Federal Aviation Administration (FAA) and the Environmental Protection Agency (EPA), the City of Burlingame's ability to influence aircraft noise levels is largely limited to technical, legal and political interfaces with San Francisco Airport, the FAA and the EPA.

A 1973 EPA report, required by the 1974 Federal Noise Control Act, for aircraft and airport noise problems concluded that it appears that existing FAA flight and operational controls do not adequately protect the public health and welfare from aircraft noise. Since this report, EPA and FAA have been working together on various measures to assure that aircraft noise is abated or controlled in a timely manner. It should be noted that the final decision to modify or adopt new regulations for the control of aviation noise is the responsibility of FAA. It is recommended that Burlingame act in a technical review capacity to insure that (i) airport monitoring sites are in the most meaningful locations to report the exposure of Burlingame residents to aircraft noise and (ii) aircraft noise abatement is taking place as quickly as feasible and on schedule with stated goals and those levels required by law.

Airport Noise Surveillance Program

It is recommended that the City of Burlingame require its staff or a noise consultant to independently assess the noise climate on an annual basis and especially during the January-February storm, weather season based on the San Francisco Airport's required noise monitoring data. Utilizing the assessment of 1975 airport noise climate in Burlingame (presented in the Existing and Projected Acoustical Conditions Section), the annual assessment would give a technical appraisal of progress toward reduced levels of airport noise. This assessment should include (i) determining the locational suitability of the SFO Airport noise monitoring system; (ii) assessing the validity of noise measurements taken at this system's locations in Burlingame; and (iii) analyzing the thoroughness of data reduction in particular to insure meteorological factors affecting atmospheric noise propagation.

It is recommended that the City would assign a staff member or consultant the task of keeping abreast of all airport activities relevant to the City of Burlingame's noise climate. This person would be in contact with the City and County of San Francisco Airport's Commission, the County of San Mateo Airport Land Use Commission, the San Francisco International Airport, the Federal Aviation Administration, the Environmental Protection Agency, the Association of Bay Area Governments and other Bay Area cities surrounding and impacted by the airport.

This person should bring matters of import to the Planning Commission and City Council in order that these bodies might consider policy statements, recommendations etc. to be sent to various governmental organizations for various reasons.

Litigation

The City Attorney for Burlingame should also keep abreast of airport-related litigation in the State and in the Country. The tracking activity described above could aid the City Attorney in keeping abreast of litigation, and also might suggest possible avenues of action by the City of Burlingame with respect to various governmental agencies connected with the airport. The results of the noise consultant's annual monitoring of aircraft noise may constitute grounds for litigation.

All of the above recommendations for staff participation in aircraft noise related activity could be (at the City's discretion) combined with tasks of a Noise Enforcement Officer also responsible for enforcement of other aspects of the noise element.

SURFACE TRANSPORTATION NOISE

There are many possible noise control and abatement programs to deal with surface transportation noise. The administrative review process covered above is one method of dealing with such noise; other methods will be outlined below.

Truck Routes

Since trucks are generally the noisiest vehicles on the road, establishment and strict enforcement of truck routes in the City could serve to lower noise levels in noise sensitive areas. It must be realized that such enforced truck routes will cause increases in noise on the subject streets and hardship for truck drivers with tight time schedules. For this reason, existing somewhat out-of-date truck routes should be reassessed with both truck freight time schedules and noise sensitive areas taken into account. After such consideration, truck routes may be redesignated with educational campaign and leniency period set up after which strict enforcement should take place. After a period of one to three months, a review should be undertaken and modifications in the truck routes made to alleviate unforeseen problems.

Vehicle Remission Standard Enforcement

The enforcement of vehicle noise emission standards presented in the Planning Criteria and Noise Emissions Standards Section can help to reduce the number of illegally loud vehicles operating on Burlingame streets. This would require assignment of one police officer (part or full-time); this person would need to be trained to use at least a small inexpensive noise meter (less than $500) which the City would purchase. For instance, the City of Palo Alto has had great success with such a program. Such a police enforcement officer might also respond to noise complaints not involving vehicles. Such complaints as barking dogs or loud music might be found to be illegally noisy depending upon which noise standards are finally agreed upon for inclusion in a City Noise Ordinance. Alternatively the City might rely on consulting support for measurement and technical assistance to reduce the time and training demands on a police officer.

Rerouting Traffic/Neighborhood Traffic Plans

A study of traffic rerouting schemes could be employed to adjust the noise climate (via traffic routes) to the City's wishes. Neighborhood traffic plans utilizing such techniques as traffic diverters and dead end streets might be employed to assure that through traffic does not utilize short-cuts through residential areas. The City of Berkeley has recently adopted a city-wide traffic plan aimed at forcing through traffic onto major arterials. Such a plan should take into account the potential increases in noise due to such a shift as well as the decreases.

Encourage Quiet Transit

Encouragement and actual implementation of mass transit and carpool systems (buses or BART type systems) has potential in terms of decreasing the number of noise-producing vehicles on the road. Progress on these systems may be limited by available capital and coordination with other agencies.

Municipal Vehicle Noise Control

The City should set a good example, especially prior to any educational campaign, by making sure that all municipal vehicles are as quiet as possible. This is especially true of City vehicles operating at noise-sensitive hours such as street-sweepers.

Reduce Roadway Speeds

By reducing the speed of traffic flow, there will generally be a reduction of the sound levels, emanating from those roadways. Selective enforcement along problem roads, possibly by the same enforcement person as discussed above in the Surface Transportation Noise Section, could be of great value.

Noise Barriers

In the event that a noise standard is exceeded, various mitigating and abatement measures are available for implementation. These involve various levels of expense and effectiveness. A list of possible abatement measures appears in Table 5-1. Some of the more practical measures are discussed in more detail in Appendix A of the General Plan Appendix Volume. It should be noted that some of the measures in Table 5-1 may be cost prohibitive; others may not provide the effectiveness required. Each particular noise problem will need to be dealt with individually by a competent acoustical analysis firm in order for the suitable method to be chosen. In addition, most abatement measures, such as barriers and insulation need to be custom designed to meet the individual needs (in terms of effectiveness) of the problem. Aesthetic, urban design considerations must be kept foremost in mind with regard to acoustical barriers; there are many examples of poorly designed walls in the Bay Area.

TABLE 5.1
Insulation and Abatement Measures (in order of approximately increasing effectiveness)

Landscaping
Acoustical Barriers*
Precast-Concrete Panel Wall
Poured in Place Concrete Wall
Cor-Ten Steel Wall
Bock Wall (Without air gaps)
Aluminum Wall
Wood Wall
Earth Berm
Insulation of Noise Receptor
Insulation of Noise Source
Relocation of Noise Receptor
Relocation of Noise Source

*Source: Noise Barrier Design Report, Washington State Department of Highways: May, 1974.

UPDATING THE NOISE ELEMENT

The Noise Element should be updated to account for current traffic levels, land uses, and source characteristics whenever any of the following occur:

(1) The entire General Plan is updated.

(2) Major traffic additions or rearrangements exist compared to the base year of 1975.

(3) Major new industrial sources are introduced.

(4) Major rail traffic increases are made.

(5) 1980 is reached or a population of 35,000.

At that time, the data base should be assessed, new forecasts made, the ordinance reviewed and planning procedures updated.

NOISE ORDINANCE AND CONTROL OF OTHER NOISE SOURCES

Various noise ordinances have been reviewed. The model ordinance developed by the League of California Cities appears to be the best approach for the City of Burlingame. Any final noise ordinance enacted by the City should address other noise sources such as barking dogs, loud music and parties, maintenance operations carried out by the City, etc. Provisions for the control of such noise sources are contained in the League of California Cities Model Ordinance. Enforcement of any noise ordinance will require that a city staff person be assigned as a noise enforcement officer at least part-time. Allocation of staff time to such an enforcement program will depend upon the City's overall resources. The City may wish to adopt a noise ordinance which covers only those noise sources considered most annoying to the Burlingame populace; such a selective noise ordinance would serve to focus staff time in those areas where it is most needed.

IMPLEMENTATION: POLICIES, GOALS AND PROGRAMS

The following goals, policies and implementation programs are recommended for adoption by the City of Burlingame based upon results of a recent Noise Questionnaire (described in Appendix C) as well as a knowledge of present and future acoustic conditions throughout the City, an understanding of present land use, and consideration of the General Plan.

DECLARATION OF POLICY

The City of Burlingame declares a policy of excluding and prohibiting all annoying, excessive and unnecessary noises from all sources which are subject to its regulatory, administrative and police powers. The City takes notice that for certain intensity levels, noise is detrimental to the health, welfare and enjoyment of the citizenry as well as detrimental to the quality of the environment. The City takes special notice that it is the penetration of unwanted sound from sources not controllable by an individual household that deserve the highest priority in order to insure each person's right to peaceful surroundings.

POLICY GOALS

The policy goals of city-wide noise control are to:

N(A): Preserve peaceful noise conditions in the City where they do exist.

N(B): Reduce annoying levels of noise for existing situations; aircraft, motor vehicle and domestic animal noise were identified by a Noise Questionnaire to be the most annoying at present.

N(C): Achieve a peaceful acoustic environment in portions of the city to be developed.

N(D): Consider use of existing city and inter-governmental processes to accomplish noise control.

N(E): Arrive at resultant implementation programs which are consistent with State and Federal guidelines and which are (i) legally valid, (ii) not unduly costly, and (iii) do not impose undue hardship upon residential property owners and community business interests.

N(F): Foster in the citizens of all segments of the City an assurance that their concerns with unwanted sound levels are of importance to the City, and publicize the existence of avenues by which these problems can be quantified and mitigated.

IMPLEMENTATION OF PROGRAMS

There are many possible implementation programs which the City could employ to improve the acoustic conditions within its boundaries; a wide range of such programs is presented in the Noise Abatement and Controls Section. The following programs are recommended by Earth Metric for the City of Burlingame considering the City's noise climate, General Plan and citizen interests. The highest priority programs are discussed first including a discussion of potential problems with their implementation.

N(1) Consider Adoption of Administrative Review Process

The specific content of this program is outlined in detail in the Administrative Review Process Section under Noise Abatement and Controls. It involves two basic processes already established in the City: the environmental impact review process and the building permit plan check and inspection process. Regarding the environmental review process, very specific guidelines are given in the Administrative Review Process Section under Determination of Need for an EIR and Design of Scope of Work for an EIR which will aid the Planning Department in (i) its determination of the need for an environmental impact report with regard to noise impacts of certain projects, and (ii) the design of the scope of work for environmental impact reports assessing various types and magnitudes of acoustic impact. Regarding the building plan check, permit and inspection process, the Implementation of the California State Uniform Building Code Acoustical Clearance title under the Administrative Review Process Section outlines specifically (i) the type of acoustic data which should be required of all proposed buildings which are subject to the provisions of the State Uniform Building Code (the State Housing Act specifically requires that the precise location of 60 CNEL line be determined)[2] and (ii) the contents of the required acoustic analysis to be performed by acoustic consultants or a staff member trained in acoustic analysis.

This recommended administrative review process can be built upon the City's existing process with more specific guidelines and procedures relating to acoustic impacts of proposed projects and buildings. The City may require a conditional use permit if proposed projects, buildings, subdivision maps, tentative parcel maps or recordings do not meet the outdoor noise level planning criteria in Table 4-2. It may require more time on the part of city staff especially during its initial phase-in period. Depending upon the amount of follow-up time available in the Building Department, an acoustic check could be added to the existing building inspection process. This would require a short course for building inspectors in order that they might become familiar with inspection techniques used to assure that the proper type of acoustic materials have been installed and that they have indeed been installed properly. Improper installation of insulation materials can render them useless. Problems for the City with the administrative review process would probably center around staff time constraints and small processing problems expected during the first few months.

[2]The City of Burlingame should request both ALUC and SPO to identify the 60 CNEL line in order that State Housing Act provisions relating to airport noise might be enforced in the City.

N(2) Airport Noise Surveillance Program

The airport noise surveillance program is discussed in detail in the Aircraft Noise Section of Noise Abatement and Control. It is recommended that this program be instituted for a period of two to three years. Each year, airport noise would be monitored during the storm weather season to obtain a running record of the worst-case noise (relative to Burlingame) caused by that source. The monitoring program would consist of approximately 20-25 measurements per year; some 24 hour measurements might be necessary.

Depending upon the outcome or trends monitored by such a survey, subsequent action by the City could take many different courses. The Planning Commission and/or City Council could address letters to various organizations responsible in one way or another for the control of airport noise; these organizations are listed in Aircraft Noise Section. One good application of these yearly surveys would be to use them as a check to see that the San Mateo County Airport Land Use Commission adopted CNEL contours are correct and up-to-date relative to Burlingame; these adopted contours should tend to overestimate rather than underestimate the areas exposed to airport noise. The fact that Burlingame has such an on-going airport surveillance program should, in itself, assure responsible noise monitoring by other governmental agencies.

N(3) Consider Vehicle Noise Emission Standards Enforcement

The vehicle emission standards enforcement program is presented in the Surface Transportation Noise Section under Noise Abatement and Control. The recommended program would work in the following way; during one week per month for a period of three to four months, one police officer and one noise consultant (with noise monitoring equipment) would work together. This team would choose and set up the monitoring equipment on a suitable street. The street chosen should have enough traffic to provide a good sample of vehicles but not so much traffic as to prevent or seriously hamper the police officer from stopping and citing illegal vehicles. As vehicles pass by, the noise consultant would tell the police officer which of them violated the standard; the police officer would then stop and cite the identified vehicles.

This program is recommended for many reasons. It helps to ease the Police Department personnel into the rather technical noise field instead of having them thrust into it immediately by being responsible for the operation of newly-acquired noise monitoring equipment. The Police Department personnel can slowly become accustomed to the noise equipment and terminology while being initially responsible for stopping and citing illegally-noisy vehicles. In addition, the City in general, and the Police Department in particular can slowly gain a working knowledge of this type of enforcement program and the minor problems involved. One possible problem the City should be aware of is related to citizen reaction; even though over 70 percent of the people responding to the Noise Questionnaire advocated limited to strong control for automobiles, trucks and motorcycles, there may be some adverse citizen reaction to such a vehicle noise emission enforcement program, especially from those people cited for violation. There are many positive reactions which could also occur; one illegally-loud vehicle can annoy many people. This program could be specifically focused at trucks and/or motorcycles; these vehicle classes are the noisiest on the, road and citizens surveyed were highly in favor of strong control over them.

N(4) Consider Municipal Vehicle and Maintenance Operations Noise Control

This program is recommended in order that the City set a good example, of noise abatement by assuring that all city operated vehicles conform to the standards listed in Tables 4-4, 4-5 and 4-6. In addition to this, the City should make a concerted effort to assure that all of its maintenance operations such as street repaving, tree trimming, sewer and park maintenance are constructed in the quietest manner possible and avoid noise-sensitive hours (evening and nighttime) whenever possible. This probably should not require significant extra staff time but will require constant attention and possible financial outlay for modification of noisy equipment.

N(5) Educational Campaign

It is recommended that consideration be given to an educational campaign to describe to the citizenry of Burlingame their noise climate and what they can do to change it. One or a series of small pamphlets and bumper stickers could be designed to educate the public about the major contributors to the noise problem, the major methods of dealing with noise and the small things which every citizen can do to help lower the noise climate of the City and Bay Area in general. Such pamphlets could be consumer-oriented, advising citizens who to insulate, where to get a better vehicle muffler and how much they should pay for these various items. Such pamphlets could be sent out with utility bills and passed out to churches and libraries.

N(6) Consider Adoption of Noise Ordinance

After review of several noise ordinances including one from the airport noise impacted City of Inglewood, the League of California Cities Model Noise Ordinance was chosen as best for Burlingame. It is a general noise annoyance ordinance which has provisions covering miscellaneous noise sources such as loud amplified equipment and fans; two sources covered, of special interest to Burlingame, relate to animals and fowl, and train horns and whistles. The ordinance should be studied in detail with deletions made according to the wishes of the City. For instance, the animal and fowl section might be deleted until San Francisco's Experience is monitored and analyzed as mentioned below in the domestic animals program.

N(7) Updating of the Noise Element

The noise element should be updated to account for current traffic levels, land uses, and source characteristics whenever any of the following occur: the entire General Plan is updated; major traffic additions or rearrangements exist compared to the base year of 1975; major new industrial sources are introduced; major rail traffic increases are made; or 1980 is reached or a population of 35,000. At that time, the data base should be assessed, new forecasts made, the ordinance reviewed and planning procedures updated.

N(8) Bayshore Freeway Noise Attenuation Study

The City should consider a study regarding the costs and effectiveness of construction of a noise barrier, or the insulation of existing houses, and apartments along Bayshore Boulevard from Cadillac Way on the north to Peninsula Avenue to the south; noise barriers and insulation are

discussed in the Surface Transportation Noise Section under the title of Noise Barriers, and Part A of Appendix 8. Bayshore Freeway along this length causes very great noise impacts to be imposed upon the residential area. Immediately adjacent to Bayshore Boulevard and the Freeway; this is the residential area in Burlingame impacted most by noise as can be seen on the maps in the Existing and Projected Acoustic Conditions..

A detailed acoustic analysis would be required to ascertain whether or not an effective noise barrier wall could be designed or effective insulation materials installed in existing dwelling units along this section of Bayshore Freeway(US 101). Topography, height of existing and future housing along Bayshore Boulevard, the great numbers of vehicles which utilize Bayshore Freeway daily, the great percentage of trucks which use the freeway and many other factors must be studied in detail in order to assess the effectiveness and proper design of such a wall. A wall might also act to protect this residential area from air pollution. As most land along Rollins Road in this area is already developed with two story apartment buildings, noise insulation of the existing structures would seem to be the most effective way of protecting these dwellings from the noise; this is especially true of the second story apartments which will not be protected by a one story wall. Insulation for noise would also act as insulation from cold in the winter and heat in the summer.

With regard to Bayshore Freeway in general, local legislators, city officials and city staff should utilize their influence to urge Caltrans to improve existing freeway design (including interchanges) in Burlingame. Freeway noise contours and actual measurement sites contained in this Element define the extent of those noise problems along, Bayshore Freeway

N(9) Domestic Animal Noise

A program or ordinance relating to domestic animal noise is not recommended at this time. Presently, the City of San Francisco is instituting such a program; their program operates as follows. A dog barking or whining for a period of ten minutes is considered a nuisance and a citizen witnessing such an occurrence can register a complaint with the Police Department. An officer is then sent out to bear witness to the same occurrence and to see that the dog is not barking or whining for good reason (i.e. burglar). If it is found to be a nuisance, a citation (carrying approximately $15 -$500 fine) can be issued to the dog's owner. An amendment currently pending would allow the police officer to issue a citation without himself bearing witness if a total of two complaints are received from two separate nearby residences.

Considerable adverse citizen reaction is very possible with the institution of such a program. One complaint encountered in San Francisco is that citizens do not want police services allocated to this type of enforcement. It is recommended that Burlingame defer institution of such a program until further results of San Francisco's experience can be monitored and evaluated.