NOISE ELEMENT

HAWTHORNE GENERAL PLAN 1989

Revised May 2018

NOISE ELEEMNT

CITY OF HAWTHORNE GENERAL PLAN

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SECTION I INTRODUCTION

The Noise Element of this General Plan is a comprehensive program for including noise control in the planning process. It is a tool for local planners to use in achieving and maintaining compatible land use with environmental noise levels. The Noise Element identifies noise sensitive land uses and noise sources, and defines areas of noise impact for the purpose of developing programs to ensure that Hawthorne residents will be protected from excessive noise intrusion.

The element quantifies the community noise environment in terms of noise exposure contours for both near and long-term levels of growth and traffic activity. The information will become a guideline for the development of land use policies to achieve compatible land uses and provide baseline levels and noise source identification for local noise ordinance enforcement. The Technical Appendix contains background information and a glossary that defines a number of key terms used in noise assessments.

Background on Noise

Noise Definitions. Sound is technically described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the Decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud; and 20 dBA higher four times as loud; and so forth. Everyday sounds normally range from 30 dB (very quiet) to 100 dB (very loud). Examples of various sound levels in different environments are shown in Figure I.

Noise Metric and Assessment Criteria. Community noise is generally not a steady state and varies with time. Under conditions of non-steady state noise, some type of statistical metric is necessary in order to quantify noise exposure over a long period of time. Several rating scales have been developed for describing the effects of noise on people. They are designed to account for the above known effects of noise on people.

Based on these effects, the observation has been made that the potential for noise to impact people is dependent on the total acoustical energy content of the noise. A number of noise scales have been developed to account for this observation. These scales are: the Equivalent Noise Level (LEQ), the Day Night Noise Level (LON), and the Community Noise Equivalent Level (CNEL).

FIGURE 1
Examples of Typical Sound Levels

(A-Scale Weighted Sound Levels)

dB(A)	OVERALL LEVEL (Sound Pressure Level Approx. 0.0002 Microbar)	Community (Outdoor)	HOME OR INDUSTRY (Indoor)	LOUDNESS (Human Judgement of Different Sound Levels)
130	UNCOMFORTABLY			
120	LOUD	Military jet aircraft take-off with after-burner from aircraft carrier at 50 ft. (130)	Oxygen torch (121)	120 dB(A) 32 times as loud
110	VERY	Turbo-fan aircraft at take-off power at 200 ft. (118)	Riveting machine (110) Rock-n-roll band (108-114)	110 dB(A) 16 times as loud
100	LOUD	Jet flyover at 1,000 ft. (103) Boeing 707, DC-8 at 6,080 ft. before landing (106) Bell J-2A Helicopter at 100 ft. (100)		100 dB(A) 8 times as loud
90		Power mower (96) Boeing 737, DC-9 at 6,080 ft. before landing (97) Motorcycle at 25 ft. (90)	Newspaper press (97)	90 dB(A) 4 times as loud
80	MODERATELY LOUD	Car wash at 20 ft. (89) Prop plane flyover at 1,000 ft. (88) Diesel truck, 40 MPH at 50 ft. (84) Diesel train, 45 MPH at 100 ft. (83)	Food blender (88) Milling machine (85) Garbage disposal (80)	80 dB(A) 2 times as loud
70		High urban ambient sound (80) Passenger car, 65 MPH at 25 ft. (77) Freeway at 50 ft. from pavement edge, 10 AM (76+/-6)	Live room music (76) TV-audio, vacuum cleaner (70)	70 dB(A)
60	QUIET	Air conditioning unit @ 100 ft. (50)	Cash register at 10 ft. (65-70) Electric typewriter at 10 ft. (64) Dishwasher (rinse) at 10 ft. (60) Conversation (60)	60 dB(A) ½ times as loud
50		Large transformers at 100 ft. (50)		50 dB(A) ¼ times as loud
40		Bird calls (44) Lower limit of urban ambient sound (40)		40 dB(A) 1/8 times as loud
	JUST AUDIBLE	dB(A) Scale Interrupted		
10				
0	THRESHOLD OF HEARING			

Source: Reproduced from Melville C. Branch and R. Dale Beland, "Outdoor Noise in the Metropolitan Environment" Published by the City of Los Angeles, 1970. P. 2

FIGURE 2
Typical Outdoor Noise Levels

CNEL Scale	Outdoor Location
90	Apartment next to freeway ¾ mile from touchdown at major airport
85	
80	Downtown with some construction activity Urban high density apartment
75	
70	Urban row housing on major avenue
65	
60	Old urban residential area
55	Wooded residential
50	
45	Agricultural crop land
40	Rural residential
35	Wilderness ambient
30	

SECTION II EXISTING CONDITIONS

This section contains a detailed description of the current and projected noise environment within the City. This description of the noise environment is based on an identification of noise sources and noise sensitive land uses, a community noise measurement survey and noise contour maps.

To define the noise exposure, this section of the report first identifies the major sources of noise in the community. The sources of noise in Hawthorne include: freeway, aircraft, overflights, arterial roadways, and industrial and commercial centers. To completely assess the noise environment in the City, noise sensitive receptors must also be identified. As mandated by the State, noise sensitive receptors include, but are not limited to, areas containing schools, hospitals, rest homes, long-term medical or mental care facilities, or any other land use area deemed noise sensitive by the local jurisdiction.

Based upon the identification of the major noise sources and the location of sensitive receptors, a noise measurement survey was conducted. The function of the survey is threefold. The first is to determine the existing noise levels at noise sensitive land uses. The second function is to provide empirical data for the correlation and calibration of the computer modeled noise environment. A third important aspect of the survey is to obtain an accurate description of the ambient noise levels in various communities throughout the City.

Noise contours for all of the major noise sources in Hawthorne were developed based upon current traffic conditions. The contours were determined from the traffic levels for these sources. The contours are expressed in terms of the Community Noise Equivalent Level (CNEL). The existing conditions scenario is derived from 1987 traffic levels and environmental conditions. Future conditions are assumed to remain essentially the same as existing conditions except for the freeways, where the anticipated freeway development and the growth in traffic is included in these estimates.

Sources of Noise

The sources of noise in Hawthorne fall into four basic categories. These are: freeways, aircraft overflights, major and minor arterial roadways, and stationary sources. Each of these sources and their impacts on the noise environment of Hawthorne are summarized in the following paragraphs and discussed in greater detail in the Technical Appendix.

The most common sources of noise in urban areas are transportation related noise sources. These include automobiles, trucks, motorcycles, railroads, and aircraft. Motor vehicle noise is of concern because it is characterized by a high number of individual events which often create a sustained noise level and its proximity to areas sensitive to noise exposure. Aircraft operations, though infrequent, may generate high noise levels that can be disruptive to human activity.

Freeways

The City of Hawthorne is bisected by a freeway, and a number of arterial roadways. A new major freeway is also being planned for the northern portion of the city. The

San Diego Freeway runs in a north/south direction, in the western portion of the city. The freeway is currently under reconstruction, and included as part of this construction project will be sound barriers to meet the FHWA/Caltrans 67 LEQ Peak Hour Noise Standard. Residential developments are located along the freeway.

The Century Freeway right-of-way is located along the north boundary of the City. This future project will traverse residential developments within the City. The project design does include sound barriers as part of the project. These barriers will be designed such that adjacent residential land uses will not exceed the Caltrans/ FHWA standards.

Major and Minor Arterial Roadways

Traffic noise on surface streets is a significant source of noise within the community. The major roadways in the City include: Imperial Highway, El Segundo Boulevard, Rosecrans Avenue, and Compton Boulevard in the east/west direction and Aviation Boulevard, Inglewood Avenue, Hawthorne Boulevard, Prairie Avenue and Crenshaw Boulevard in the north/south direction.

Aircraft

Another major source of noise within the City of Hawthorne is aircraft noise. Hawthorne Municipal Airport is located at the northeast end of the City. Operations from departing and arriving aircraft result in significant noise levels in the north portion of the city. Contours for the airport show that some residential areas west of the airport are exposed to noise levels greater than 60 CNEL.

Los Angeles International Airport is located northwest of the city. The published airport noise studies show that the 65 CNEL noise contours from these operations is located just outside the City boundary, however, the noise levels from these operations in the north portion of the City boundary exceed 60 CNEL. Enroute helicopters will fly over the city following the path of the freeway. Occasional single event disturbances from these overflights do occur.

Stationary Sources

The City of Hawthorne has industrial and commercial sources of noise at a number of locations throughout the City. These include commercial centers that range in size from major aerospace corporations to small industrial operations. Many of these smaller operations are located in strip commercial zones with adjacent residential land use. The types of noise disturbance from these activities can range from short duration loud events such as trucks accessing the facility to continuous noise such as from refrigeration units or compressors.

Noise Sensitive Receptors

The City of Hawthorne has a number of noise sensitive land uses. Within the city are a number of public and private schools, day care centers and rest homes. The locations of these facilities are shown in the Safety Element. The distribution of these facilities varies from moderately quiet residential areas to major transportation corridors.

Community Noise Measurement Survey

The determination of the major noise sources and the identification of noise sensitive receptors provide the basis of developing a community noise survey. The noise measurement survey was conducted at locations which reflect the noise levels at these facilities. Each site was monitored for a minimum of 20 minutes with longer measurements at locations near noise sources where the events are sporadic. The results of the survey and the methodology used in the measurement are summarized in the Technical Appendix.

Community Noise Contours

The noise contours for the City of Hawthorne are presented in Figures 3 and 4 for existing 1987 and future 1997 conditions respectively. The noise contours for
Hawthorne Municipal Airport are being prepared as part of the Airport Master Plan Update and will be included in Figure 5. The contours are based on the existing conditions of traffic volumes and other sources of noise in the community. Future conditions are expected to remain the same as existing conditions except for the freeways. The methodology used for computing the noise contours is presented in the Technical Appendix.

Noise contours represent lines of equal noise exposure, just as the contour lines on a topographic map are lines of equal elevation. The contours shown on the map are the 60 and 65 dB CNEL noise level. The noise contours presented should be used as a guide for land use planning. The 60 dB CNEL contour defines the Noise Referral Zone. This is the noise level for which noise considerations should be included when making land use policy decisions.

The contours presented in this report are a graphic representation of the noise environment. These distances to contour values are also shown in tabular format in the Technical Appendix. Topography and intervening buildings or barriers have a very complex effect on the propagation of noise. To present a worst case estimate, the topographic affect is not included in these contours to present a worst case project. The contours for the Century Freeway represent the noise levels without the sound barrier. These contour values are shown with a dashed line.

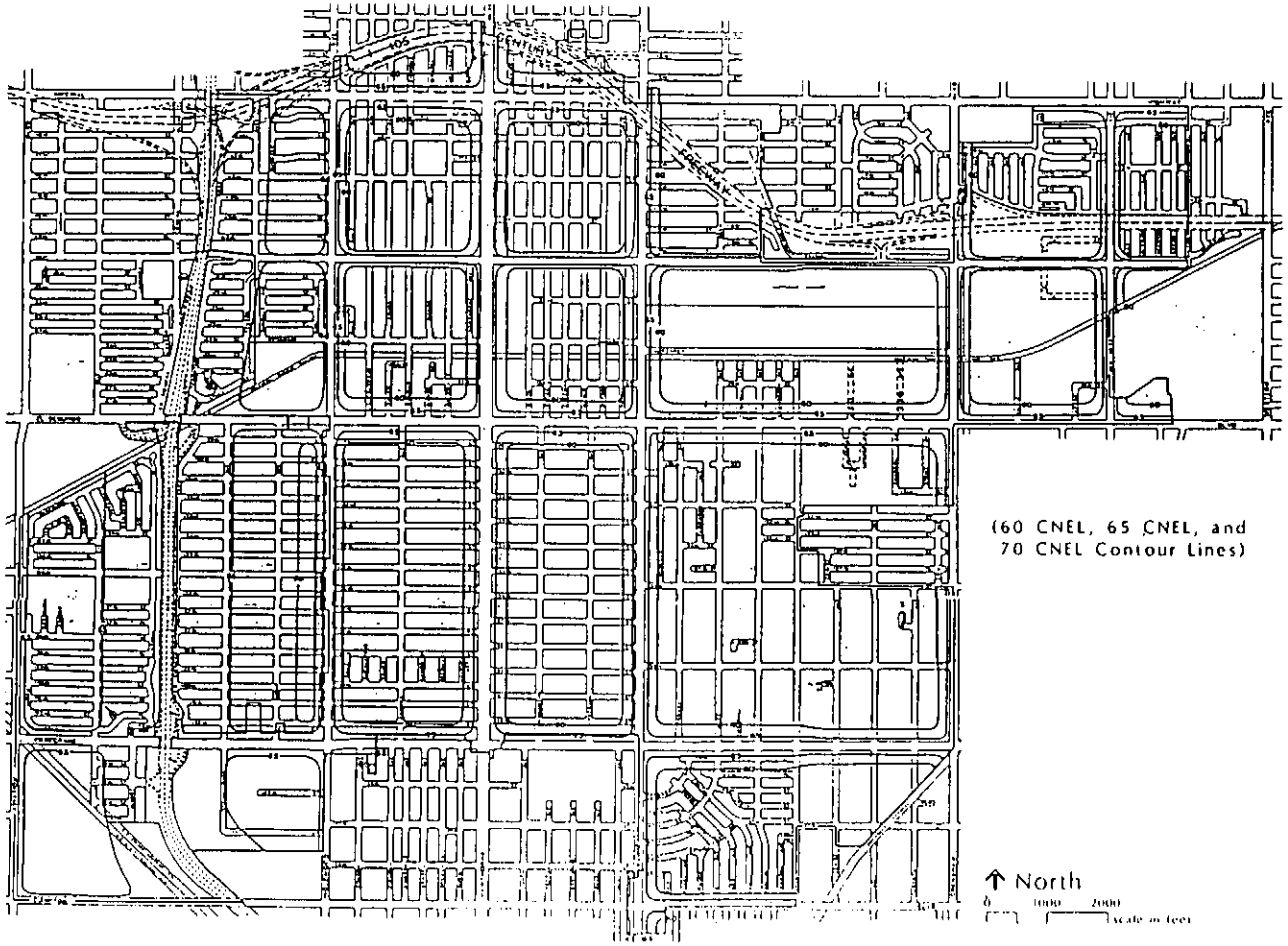

Figure 3
Existing CNEL
Contour Map

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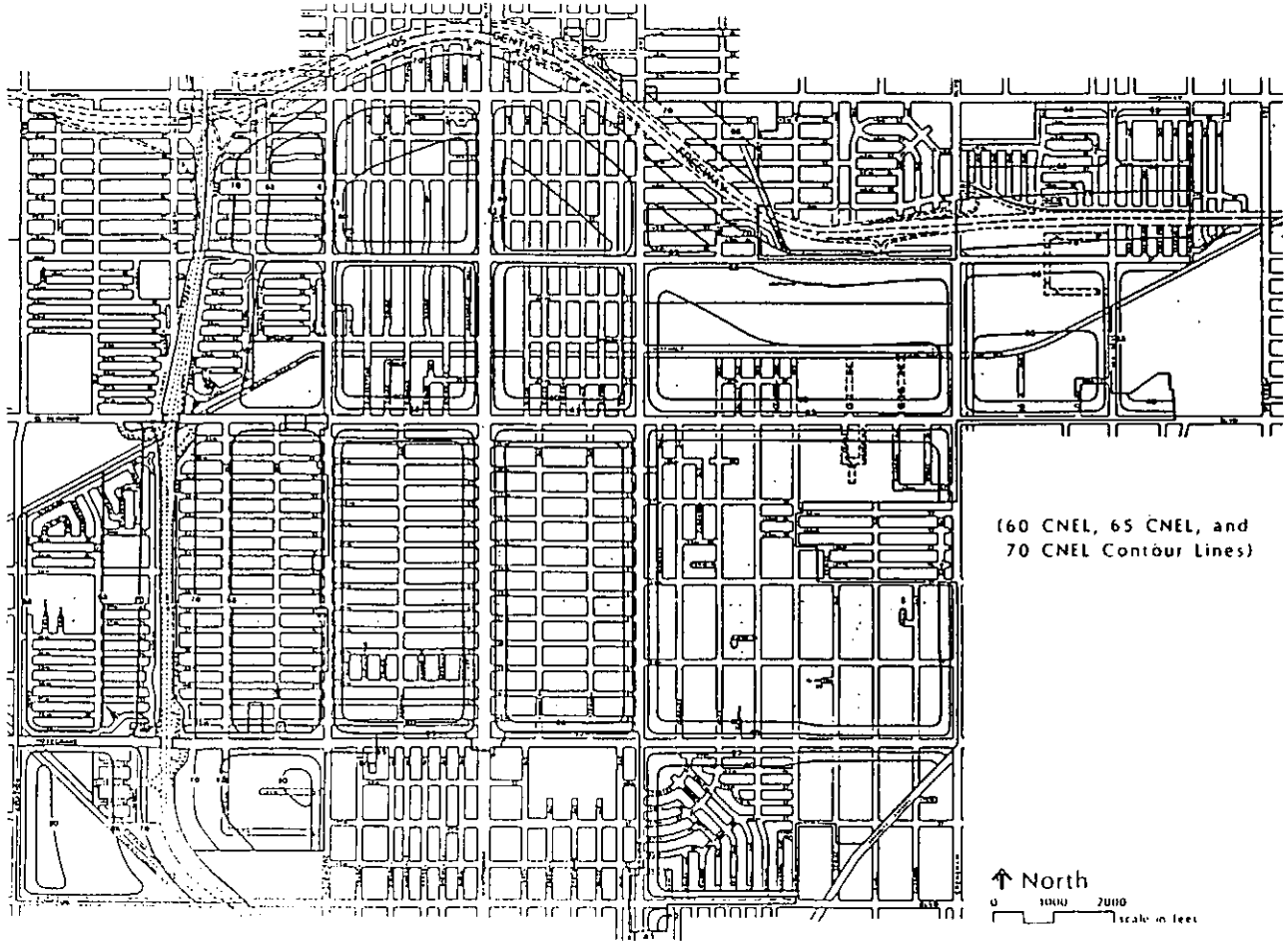
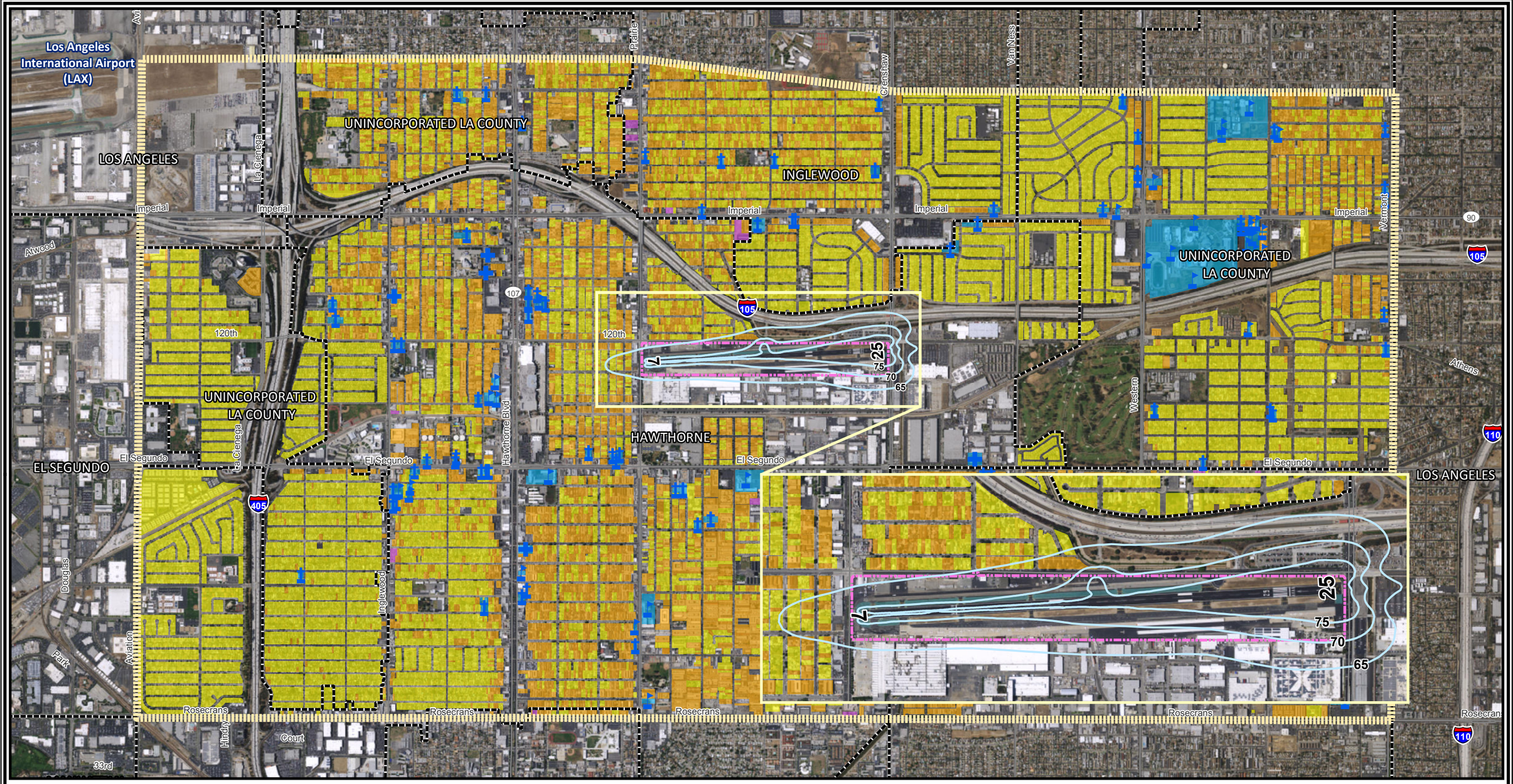


Figure 4
Future CNEL
Contour Map

HAWTHORNE
GENERAL
PLAN · 1989



Legend

- Jurisdictional Boundaries

Streets

- Interstates
- Highways
- Secondary Roads
- Detailed Study Area

Noise-Sensitive Land Uses

- Single Family Residential
- Multi-Family Residential
- Mixed Use with Residential
- Manufactured Homes
- Noise-Sensitive Institution
- Airport Property Line
- Healthcare
- Place of Worship
- School, Preschool, Day Care

Noise Contours

- 2012 Noise Contour

N

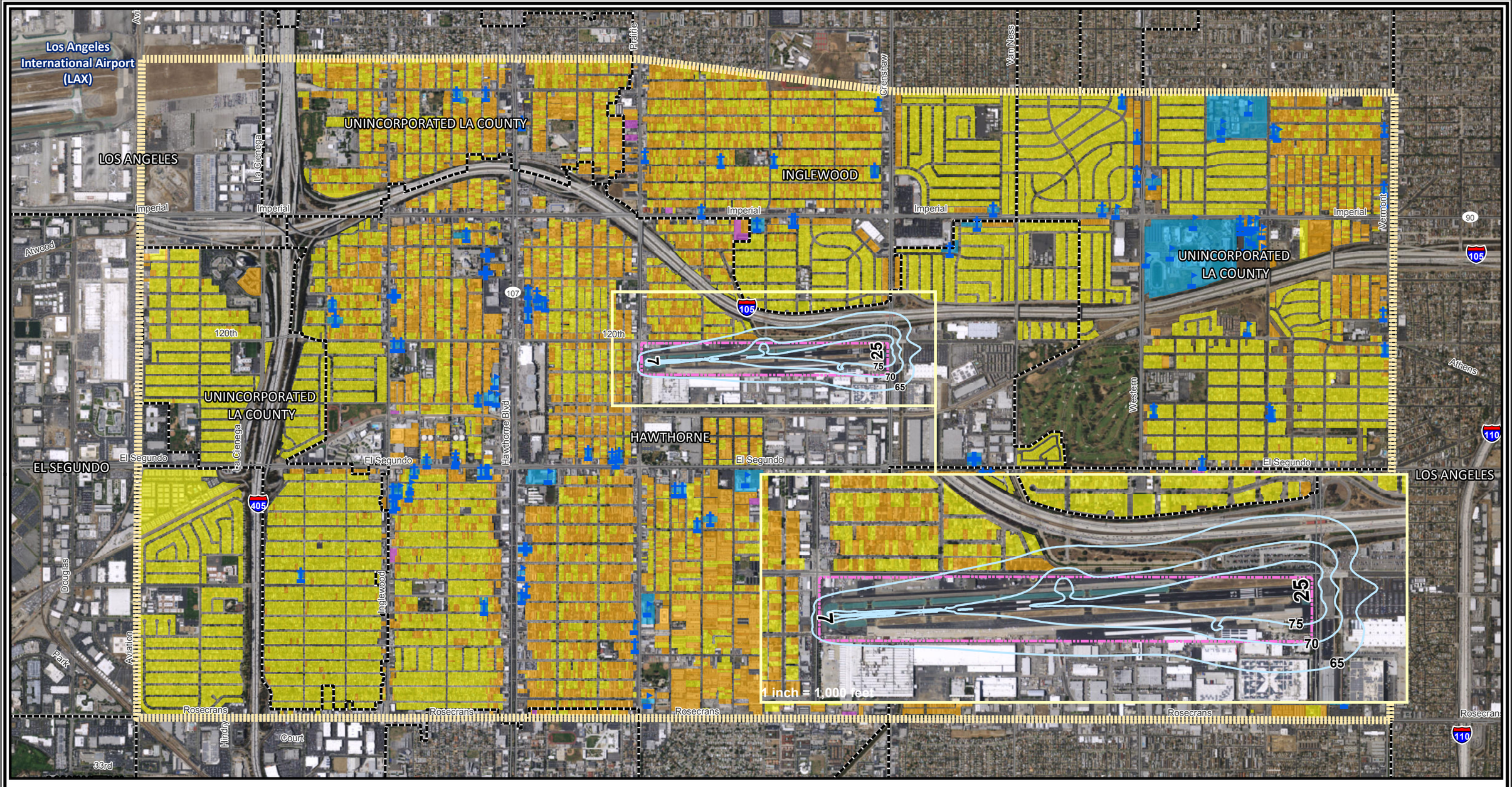
0 2,000

1" = 2000'

Source: Hawthorne Municipal Airport 14 CFR Part 150 Noise Compatibility Program. June 2017

Figure 5A

2012 65 CNEL Noise Contour



Legend

- Jurisdictional Boundaries

Streets

- Interstates
- Highways
- Secondary Roads
- Detailed Study Area[1]

Noise-Sensitive Land Uses

- Single Family Residential
- Multi-Family Residential
- Mixed Use with Residential
- Manufactured Homes
- Noise-Sensitive Institution
- Airport Property Line
- Healthcare
- Place of Worship
- School, Preschool, Day Care

Noise Contours

- 2017 Noise Contour

Source: Hawthorne Municipal Airport 14 CFR Part 150 Noise Compatibility Program. June 2017

N

0 2,000

1" = 2000'

Figure 5B
2017 65 CNEL Noise Contour

SECTION III ISSUES AND OPPORTUNITIES

Transportation Nose Control

Within the City of Hawthorne are a number of transportation related noise sources including freeways, aircraft overflights, major arterials, and collector roadways. These sources are the major contributors of noise in Hawthorne. Cost effective strategies to reduce their influence on the community noise environment are an essential part of the Noise Element.

Noise and Land Use Planning

Information relative to the existing and forecast noise environment within Hawthorne should be integrated into future land use planning decisions. The Element presents the noise environment in order that the City may include noise impact considerations in development programs.

Community Noise Control for Non-Transportation Noise Sources
Residential land uses and areas identified as noise sensitive must be protected from excessive noise from non-transportation sources including commercial and industrial activities. These impacts are most effectively controlled through the adoption and applications of a City Noise Ordinance.

Findings

The predominant noise sources in Hawthorne, as in most other communities, come from mobile noise sources including motor vehicles. A number of freeways and arterials expose the City to significant noise levels, particularly in those areas directly adjacent to these sources. Hawthorne Municipal Airport, located within the City, and Los Angeles International Airport, located to the northwest, significantly contribute to the noise environment. To a lesser extent, helicopter operations result in some single-event disturbance from occasional overflights. The noise environment in Hawthorne is typical of what would be expected of a community located within a major urban area such as the Los Angeles Basin.

Other sources of noise within the City are from non-transportation sources including industrial and commercial activities, construction activities and associated vehicular truck traffic. Within the City are a number of large aerospace firms and small industrial plants.

Noise affects all types of land uses and activities, although some are more sensitive to high noise levels than others. Land uses identified as noise sensitive include residences of all types, hospitals, rest-homes, convalescent hospitals, places of worship and schools. Within the City are a number of public and private schools, day care centers and rest homes.

The noise environment for Hawthorne can be described using noise contours developed for the major noise sources within the City. The contours are developed for existing
1987 conditions and future 1997 conditions and are presented in Figures 3 and 4 respectively. Figure 5 presents the CNEL noise contours for Hawthorne Municipal Airport. Both the 60 and 65 dB CNEL contour levels are shown on these maps. The 60 dB CNEL contour represents the Noise Referral Zone

for which any proposed noise sensitive land use within this zone should be evaluated on a project specific basis and the project may require mitigation to meet City or State (Title 24) standards. The 65 CNEL represents zones where residential development should be discouraged without proper mitigation as part of the project. To present a worst case estimate, the contours for the Century Freeway represent the noise levels without the sound barrier. These are shown on the contour map as dashed lines.

The sources of noise in Hawthorne can be divided into two basic categories, transportation sources and non-transportation sources. A local government has little direct control of transportation noise at the source. State and Federal agencies have the responsibility to control the noise from the source, such as vehicle noise emissions levels. The most effective method the City has to mitigate transportation noise is through reducing the impact of the noise onto the community (i.e. noise barriers and site design review).

Mitigation

Mitigation through the design and construction of a noise barrier (wall, berm, or combination wall berm) is the most common way of alleviating traffic noise impacts. The effect of a noise barrier is critically dependent on the geometry between the noise source and the receiver. A noise barrier effect occurs when the "line of sight" between the source and receiver is penetrated by the barrier. The greater the penetration, the greater the noise reduction.

Land Use Compatibility Standards

Noise concerns should be incorporated into land use planning to reduce future noise and land use incompatibilities. This is achieved by establishing standards and criteria that specify acceptable limits of noise for various land uses throughout the City. These criteria are designed to integrate noise considerations into land use planning to prevent noise/land use conflicts. Table 1 presents criteria used to assess the compatibility of proposed land uses with the noise environment. These criteria are the basis for the development of specific Noise Standards. These standards, presented in Table 2, present the City policies related to land uses and acceptable noise levels. These tables are the primary tools which allow the City to ensure integrated planning for compatibility between land uses and outdoor noise.

Community Noise Ordinance

The most effective method to control community noise impacts from non-transportation noise sources is through application of the Community Noise Ordinance. The City should consider amending and adopting a new comprehensive community noise ordinance to help ensure that City residents are not exposed to excessive noise levels from non-transportation noise sources. The Noise Ordinance is designed to protect quiet residential areas from stationary noise sources. The noise levels encouraged by the ordinance are typical of a quiet residential area.

Table 1
Land Use Compatibility Matrix

LAND USE CATEGORIES		COMMUNITY NOISE EQUIVALENT LEVEL (CNEL)						
CATEGORIES	USES	≤55	60	65	70	75	80>	
RESIDENTIAL	Single Family, Duplex, Multiple Family	A	A	B	B	C	D	D
RESIDENTIAL	Mobile Home	A	A	B	C	C	D	D
COMMERCIAL (Regional, District)	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL (Regional, Village, District, Special)	Commercial Retail, Bank, Restaurant, Movie Theater	A	A	A	A	B	B	C
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL (Recreation) INSTITUTIONAL (Civic Center)	Amphitheater, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL (Recreation)	Children's Amusement Park, Miniature Golf Course, Go-Cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
COMMERCIAL (General, Special) INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL (General)	Hospital, Church, Library, School Classroom	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemetery, Nature Center, Wildlife Reserve, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

INTERPRETATION

ZONE A CLEARLY COMPATIBLE	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
ZONE B NORMALLY COMPATIBLE	New construction or development should be undertaken only after detailed analysis of noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
ZONE C NORMALLY INCOMPATIBLE	New construction or development should generally be discouraged. If new construction or development does not proceed, a details analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
ZONE D CLEARLY INCOMPATIBLE	New construction or development should generally not be undertaken.

Table 2
Interior and Exterior Noise Standards

LAND USE CATEGORIES		ENERGY AVERAGE CNEL	
CATEGORIES	USES	INTERIOR [1]	EXTERIOR [2]
RESIDENTIAL	Single Family, Duplex, Multiple Family	45 [3]	65
	Mobile Home	--	65 [4]
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Hotel, Motel, Transient Lodging	45	65 [5]
	Commercial Retail, Bank, Restaurant	55	--
	Office Building, Research and Development, Professional Offices, City Office Building	50	--
	Amphitheater, Concert Hall Auditorium, Meeting Hall	45	--
	Gymnasium (Multipurpose)	50	--
	Sports Club	55	--
	Manufacturing, Warehousing, Wholesale, Utilities	65	--
	Movie Theaters	45	--
INSTITUTIONAL	Hospital, School Classroom	45	65
	Church, Library,	45	--
OPEN SPACE	Parks	--	65

INTERPRETATION

1. Indoor environment excluding: bathrooms, toilets, closets, corridors
2. Outdoor environment limited to: Private yard of single family, multi-family private patio or balcony served by a means of exit from inside, mobile home park, hospital patio, park picnic area, school playground, hotel and motel recreation area
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.
4. Exterior noise level should be such that interior noise level will not exceed 45 CNEL.
5. Except those areas affected by aircraft noise.

SECTION IV - NOISE ELEMENT GOALS AND POLICIES

The Noise Element seeks to protect the quality of life by minimizing the impact of noise sources and requiring noise sensitive areas to be protected from noise.

The following goals and policies are intended to assist the City in determining compatible land uses and providing adequate protection to its residents from noise intrusion.

GOAL 1.0: PROVIDE FOR THE REDUCTION OF NOISE WHERE THE NOISE ENVIRONMENT IS UNACCEPTABLE

POLICY 1.1: Provide for measures to reduce noise impacts from transportation noise sources. These measures include:

- Construct barriers to mitigate sound emissions where necessary or where feasible. Actively participate in the development of noise abatement plans for freeways and rapid transit.
- Ensure the inclusion of noise mitigation measures in the design of new roadway projects in Hawthorne.
- Reduce transportation noise through proper design and coordination of routing.
- Ensure the effective enforcement of City, State and Federal noise levels by all appropriate city divisions.
- Mitigate potential impacts for existing or proposed helicopter operations.
- Explore noise control programs as part of the Hawthorne Municipal Airport Master Plan to minimize noise levels from these operations.
- To help minimize noise impacts from Los Angeles International Airport, actively support the FAA Part 150 Noise Compatibility Program as described in the "Noise Control and Land Use Compatibility Study, Los Angeles International Airport," (March 1984).
- The City of Hawthorne completed a 14 CFR Part 150 (Part 150) Noise Compatibility Study in 1990; the Part 150 Study was updated in 2016. A complete study update is needed periodically to respond to changing conditions in the local area and in the aviation industry. The Hawthorne Municipal Airport Part 150 study should be updated every 7 to 10 years or as noise conditions warrant.

GOAL 2.0: PROTECT AND MAINTAIN THOSE AREAS HAVING ACCEPTABLE NOISE ENVIRONMENTS

POLICY 2.1: Incorporate noise considerations into land use planning decisions. These measures will be achieved through the following programs:

- Establish acceptable limits of noise for various land uses throughout the community. Zoning changes should be consistent with the compatibility of the projected noise environment.
- Ensure acceptable noise levels near schools, hospitals, convalescent homes, and other noise sensitive areas.
- Establish standards for all types of noise not already governed by local ordinances or permitted by state or federal law.

- Encourage acoustical design in new construction.

GOAL 3.0: PROVIDE SUFFICIENT INFORMATION CONCERNING THE COMMUNITY NOISE LEVELS SO THAT NOISE CAN BE OBJECTIVELY CONSIDERED IN LAND USE PLANNING DECISIONS.

POLICY 3.1: The City shall develop measures to control non-transportation noise impacts.

POLICY 3.2: The City shall establish a new Community Noise Ordinance to mitigate noise conflicts.

POLICY 3.3: The City shall evaluate noise generated by construction activities.

POLICY 3.4: Establish and maintain coordination among the city agencies involved in noise abatement.

POLICY 3.5: The City shall evaluate the development of noise-sensitive uses within the vicinity of the Hawthorne Municipal Airport using noise exposure contours developed as part of the Airport's 14 CFR Part 150 study and the compatibility criteria presented in the land use compatibility guidelines contained in Table 3.

TABLE 3

Hawthorne Airport Land Use Compatibility Table

Satisfactory
Caution. Review Noise Insulation Needs
Avoid Land Use Unless Related to Airport Services

Land Use Category	*Community Noise Exposure* 55	60	65	70	75
Residential					
Educational Facilities					
Commercial					
Industrial					
Agriculture					
Recreation					

Consider FAR Part 150 for commercial and recreational uses above the 75 CNEL.

Source: Hawthorne Municipal Airport 14 CFR Part 150 Noise Compatibility Program. June 2017

NOISE ELEMENT TECHNICAL APPENDIX

Methodology of Analysis

The noise environment in Hawthorne was determined through the employment of a comprehensive noise measurement survey of existing noise sources and incorporating these results into computer noise models to model the noise environment (it is, of course, impossible to measure future noise levels so we must rely on computer noise models for future noise estimates). The noise environment is commonly presented graphically in terms of lines of equal noise levels, or noise contours. The following paragraphs detail the methodology used in the measurement survey and computer modeling of these results into noise contours.

Measurement Procedure. Twenty-four sites were selected for measurement of the noise environment in Hawthorne. A review of noise complaints and identification of major noise sources in the community provided the initial base for development of the community noise survey. The measurement locations were selected on the basis of proximity to major noise sources and noise sensitivity of the land use. The measurement locations are depicted in Figure 1.

The Hawthorne Noise Element measurement survey utilized the Bruel & Kjaer 4427 automated digital noise data acquisition system. This instrument automatically calculates both the Equivalent Noise Level (LEQ) and Percent Noise Level (L%) for any specific time period. The noise monitors were equipped with a Bruel & Kjaer inch electret microphone. The system was calibrated with a Bruel & Kjaer calibrator with calibration traceable to the National Bureau of Standards. Calibration for the calibrator is certified through the duration of the measurements by Bruel & Kjaer.
This measurement system satisfies the ANSI (American National Standards Institute) Standards 1.4 for Type I precision noise measurement instrumentation.

Computer Modeling. The traffic noise levels projected in the Noise Element were computed using the Highway Noise Model published by the Federal Highway Administration ("FHWA Highway Traffic Noise Prediction Model," FHWA-RD-77-108, December 1978). The FHWA Model uses traffic volume, vehicle mix, vehicle speed, and roadway geometry to compute the LEQ noise level. A computer code has been written which computes equivalent noise levels for each of the time periods used in CNEL. Weighting these noise levels and summing them results in the CNEL for the traffic projections used. The traffic data used to project these noise levels are derived from the Circulation Element for the City. The traffic mix data for the arterials are based on measurements for roadways in Southern California and are considered typical for arterials in this area. The traffic mix for the freeways is based upon Caltrans data.

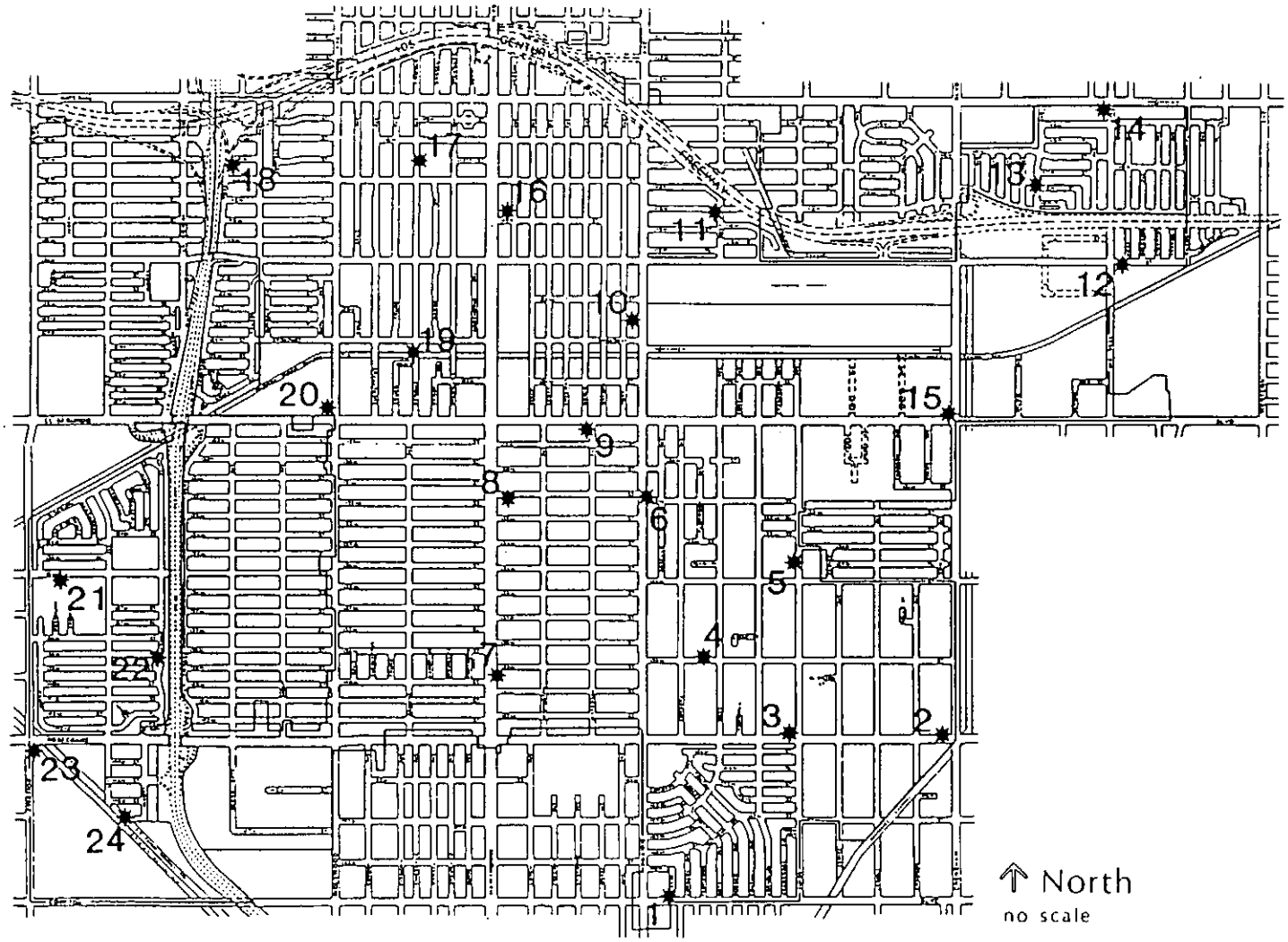
The Hawthorne Airport noise contours were developed as part of the Airport Master Plan update. These contours were generated using the Integrated Noise Model (INM), developed by the Federal Aviation Administration (FAA). Los Angeles International Airport noise contours were developed from this same model. The INM is a large computer program developed to plot noise contours for airports. The program is provided with standard aircraft noise and performance data that can be tailored to the characteristics of the airport in question. The INM program requires the input of the physical and operational characteristics of the airport. Physical characteristics include runway coordinates, airport altitude, and temperature. Operational characteristics include aircraft mix, flight tracks, and approach profiles.

Measurement Results. The noise measurement program was conducted on three separate days from August 4, 1987 to August 6, 1987 at twenty-four locations throughout the City. The results of the ambient noise measurements at each site are depicted in Figure 2 (Parts 1 through 3). These figures also depict the date and time of the measurement and the primary noise source affecting the noise environment. Each site was monitored for a minimum of 20 minutes. Locations near Hawthorne Airport or near stationary noise sources that occur only occasionally were measured for longer durations. The quantities measured were the Equivalent Noise Level (LEQ), the maximum noise level and the Percent Noise Levels (L%). Percent Noise Levels are another method of characterizing ambient noise where, for example, L90 is the noise level exceeded 90 percent of the time, LSO is the level exceeded 50 percent, and LIO is the level exceeded 10 percent of the time. L90 represents the background or minimum noise level, LSO represents the average noise level, and LI0 the peak or intrusive noise levels.

Noise Contours

The existing and future noise levels in the city were established in terms of the CNEL indices by modeling all of the traffic noise sources for the existing and future traffic and speed characteristics. The future traffic volumes for the arterials roadways are projected to be near capacity as they currently are for the existing volumes.

The results for the roadways are also presented in tabularized format in Table 1. The traffic mix assumptions used in this analysis are also shown in this table. The distances to the CNEL contours for the roadways in the vicinity of Hawthorne are given in these tables. These represent the distance from the centerline of the road to the contour value shown. Note that these tables do not include the mitigating effect of noise barriers or topography.



SOURCE: Mestre Greve Associates

00 Noise Measurement Locations

Figure 1
Noise Measurement Locations

HAWTHORNE
GENERAL
PLAN·1989

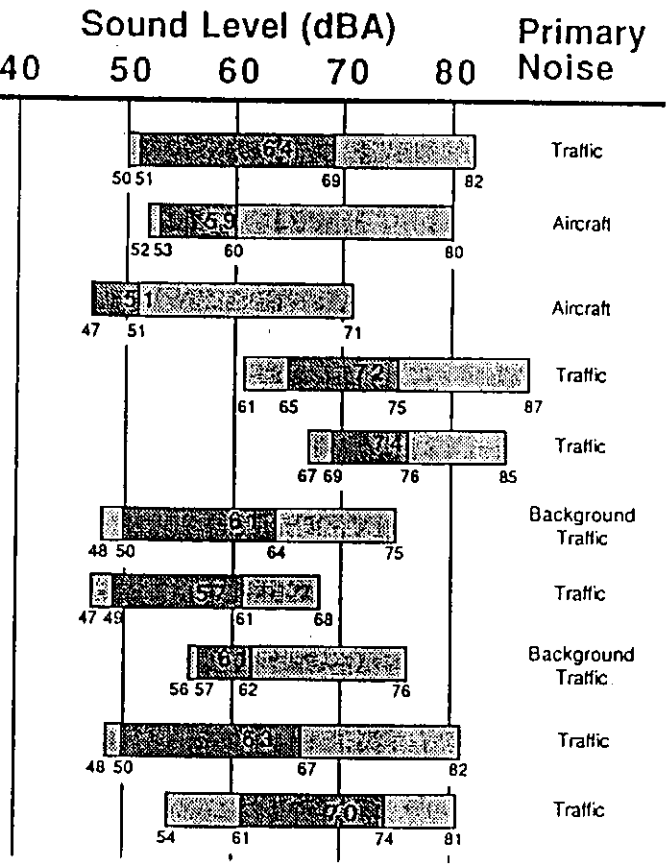
	Location	Date	Sound Level (dBA) 40 50 60 70 80	Primary Noise
1	Compton @ Gerkin	8/4/87	Lmin 50, L10 54, L90 64, Lmax 72	Background Traffic
2	Rosecrans @ Crenshaw	8/4/87	Lmin 56, L10 60, L90 73, Lmax 83	Traffic
3	Rosecrans @ Yukon	8/4/87	Lmin 58, L10 62, L90 73, Lmax 82	Traffic
4	139th	8/4/87	Lmin 62, L10 66, L90 80	Traffic
5	Zela Davis School	8/4/87	Lmin 50, L10 52, L90 66, Lmax 75	Traffic
6	132nd	8/4/87	Lmin 53, L10 55, L90 70, Lmax 78	Traffic
7	Hawthorne	8/4/87	Lmin 57, L10 61, L90 73, Lmax 90	Traffic
8	132nd	8/4/87	Lmin 52, L10 53, L90 65, Lmax 77	Traffic
9	Jefferson & El segundo	8/4/87	Lmin 53, L10 57, L90 67, Lmax 83	Traffic
10	Alley	8/5/87	Lmin 49, L10 51, L90 66, Lmax 91	Traffic

SOURCE: Mestre Greve Associates

Figure 2
Noise Measurement Results

HAWTHORNE
GENERAL
PLAN·1989

	Location	Date	Primary Noise
11	Doty @ 118th	8/5/87	Traffic
12	120th	8/5/87	Aircraft
13	Casimer	8/5/87	Aircraft
14	Imperial @ Van Ness	8/5/87	Traffic
15	Crenshaw @ El Segundo	8/5/87	Traffic
16	Acacia	8/4/87	Background Traffic
17	Robert Kennedy Med Center	8/4/87	Traffic
18	117th	8/4/87	Background Traffic
19	Rail Road Tracks	8/4/87	Traffic
20	Ingelwood @ El Segundo	8/5/87	Traffic



SOURCE: Mestre Greve Associates

Figure 2 (Part 2)
Noise Measurement Results

HAWTHORNE
GENERAL
PLAN 1989

	Location	Date	Sound Level (dBA) 40 50 60 70 80	Primary Noise
21	Juan Carrillo School	8/6/87	55 57 66 70 81	Traffic
22	138th @ Glascow	8/6/87	59 60 64 65 72	Freeway Traffic
23	Rosecrans @ Aviation	8/6/87	62 64 69 72 79	Traffic
24	147th	8/6/87	51 52 58 60 73	Traffic

SOURCE: Mestre Greve Associates

Figure 2 (Part 3)
Noise Measurement Results

HAWTHORNE
GENERAL
PLAN 1989

Inventory of Current and Forecast Conditions

This section contains a detailed description of the current and projected noise environment within the City. This description of the noise environment is based on an identification of noise sources and noise sensitive land uses, a community noise measurement survey and noise contour maps.

To define the noise exposure, this section of the report first identifies the major sources of noise in the community. The sources of noise in Hawthorne include: freeway, aircraft overflights, arterial roadways, and industrial and commercial centers. To completely assess the noise environment in the City, noise sensitive receptors must also be identified. As mandated by the State, noise sensitive receptors include, but are not limited to, areas containing schools, hospitals, rest homes, long-term medical or mental care facilities, or any other land use area deemed noise sensitive by the local jurisdiction.

Based upon the identification of the major noise sources and the location of sensitive receptors, a noise measurement survey was conducted. The function of the survey is threefold. The first is to determine the existing noise levels at noise sensitive land uses. The second function is to provide empirical data for the correlation and calibration of the computer modeled noise environment. A third important aspect of the survey is to obtain an accurate description of the ambient noise levels in various communities throughout the City.

Noise contours for all of the major noise sources in Hawthorne were developed based upon current traffic conditions. These contours were determined from the traffic levels for these sources. The contours are expressed in terms of the community Noise Equivalent Level (CNEL). The existing conditions scenario is derived from 1987 traffic levels and environmental conditions. Future conditions are assumed to remain essentially the same as existing conditions except for the freeways, where the anticipated freeway development and the growth in traffic are included in these estimates.

Table 1
Distance to CNEL Contours (From Roadway Centerline)

Roadway Name	Extent	Distance to CNEL Contour (feet) 70 CNEL	65 CNEL	60 CNEL
IMPERIAL HIGHWAY	San Diego Frwy to Inglewood	86	185	399
	Inglewood to Firmosa	81	174	374
	Firmosa to Hawthorne	85	182	393
	Hawthorne to Eastwood	86	186	401
	Eastwood to Prairie	75	161	348
	Prairie to Crenshaw	70	151	325
	Crenshaw to Western	84	180	389
EL SEGUNDO	San Diego Frwy to Inglewood	77	167	359
	Inglewood to Ramona	76	164	353
	Ramona to Hawthorne	76	163	351
	Hawthorne to Freeman	76	163	351
	Freeman to Prairie	75	162	349
	Prairie to Yukon	73	158	341
	Yukon to Crenshaw	73	157	338
	Crenshaw to Van Ness	68	146	316
	Van Ness to Western	70	150	323
ROSECRANS	West of Aviation	72	156	336
	Aviation to SAn Diego Frwy	84	180	388
	San Diego Frwy to Inglewood	85	184	396
	Inglewood to Hawthorne	73	156	337
	Hawthorne to Jefferson	73	156	337
	Jefferson to Prairie	72	155	334
	Praire to Yukon	77	166	358
	Yukon to Crenshaw	63	135	290
	East of Crenshaw	69	149	321
COMPTON	West of Aviation	42	92	197
	Aviation to San Diego Freeway	47	100	217
	San Diego Frwy to Hawthorne	54	117	251
	Hawthorne to Prairie	48	103	222
	Prairie to Crenshaw	46	100	216
120TH	Aviation to San Diego Frwy	29	62	134
	San Diego Frwy to Inglewood	27	58	126
	Inglewood to Prairie	29	63	
	Prairie to Cornblum	26	57	123
	Kornblum to Crenshaw	21	46	98
BROADWAY	Prairie to Crenshaw	19	40	87
135TH	Aviation to Isis	16	34	74
AVIATION	South of Compton	67	144	310
	Compton to Rosecrans	72	156	336
	Rosecrans to El Segundo	66	141	304
INGLEWOOD	Compton to Rosecrans	57	123	266
	Rosecrans to El Segundo	50	107	231
	El Segundo to Imperial	51	110	237
HAWTHORNE	Compton to Rosecrans	79	171	368
	Rosecrans to 135th	78	168	363
	135th to El Segundo	75	162	350
	El Segundo to 120th	74	160	346
	120th to Imperial	62	134	290
	North of Imperial	64	139	299

Table 1 (continued)
Distance to CNEL Contours (From Roadway Centerline)

Roadway Name	Extent	Distance to CNEL Contour (feet) 70 CNEL	65 CNEL	60 CNEL
PRAIRIE	Compton to Rosecrans	65	140	301
	Rosecrans to 135th	66	142	306
	135th to El Segundo	63	137	294
	El Segundo to 120th	65	141	304
	120th to Imperial	61	132	284
CRENSHAW	Compton to Rosecrans	61	132	285
	Rosecrans to 139th	59	128	276
	139 th to 132th	62	134	289
	132th to El Segundo Blvd	60	130	281
	El Segundo to Imperial	59	126	272
VAN NESS	El Segundo to Imperial	52	112	240
	North of Imperial	34	72	156
FREEWAYS EXISTING				
SAN DIEGO FREEWAY	Imperial to El SEgundo	469	1010	2175
	El Segundo to Rosecrans	470	1012	2181
	Rosecrans to Inglewood	462	996	2146
FREEWAYS 2010				
SAN DIEGO FREEWAY	Imperial to Century Frwy	536	1154	2486
	Century Frwy to El Segundo	484	1042	2245
	El Segundo to Rosecrans	492	1061	2285
	Rosecrans to Inglewood	418	901	1941
CENTURY FREEWAY	Western to Crenshaw	392	845	1821
	Crenshaw to Hawthorne	399	860	1853
	Hawthorne to San Diego Frwy	376	809	1744
	San Diego Frwy to Aviation	228	491	1057

Traffic Distribution Per Time Of Day In Percent Of ADT

	Arterials Percent Of ADT			Freeways Percent Of ADT		
	Day	Evening	Night	Day	Evening	Night
Automobile	75.51	12.57	9.34	74.10	11.40	9.50
Medium Truck	1.56	0.09	0.19	1.95	0.30	0.25
Heavy Truck	0.64	0.02	0.08	1.95	0.30	0.25

Sources of Noise

The sources of noise in Hawthorne fall into four basic categories. These are: freeways (both the San Diego Freeway and the future Century Freeway); aircraft (Hawthorne Municipal Airport and other aircraft overflights); major and minor arterial roadways; and stationary sources. These sources and their impacts on the noise environment of Hawthorne are summarized in the following paragraphs.

Freeways. The San Diego Freeway runs in a north/south direction, in the western portion of the city. The freeway is generally at grade or slightly elevated with respect to the adjacent areas and in general no sound walls exist at the present time. The freeway is currently under reconstruction, and included as part of this construction project will be sound barriers to meet the FHWA/Caltrans 67 LEQ Peak Hour Noise Standard. @For the traffic conditions projected for these freeways, this standard is approximately 2 dBA less stringent than the 65 CNEL criteria. Residential developments are located along the freeway. The closest developments are partially shielded from the freeway by the grading berm of the freeway. Many of these homes are exposed to noise levels greater than 65 CNEL.

The Century Freeway right-of-way is located along the north boundary of the City. This future project will traverse residential developments within the City. The project design does include sound barriers as part of the project. These barriers will be designed such that adjacent residential land uses will not exceed the Ca1trans/FHWA standard.

Major and Minor Arterial Roadways. Traffic noise on surface streets is a significant source of noise within the community. The major roadways in the City include: Imperial Highway, E1 Segundo Boulevard, Rosecrans Avenue, and Compton Boulevard in the east/west direction and Aviation Boulevard; Inglewood Avenue, Hawthorne Boulevard, Prairie Avenue and Crenshaw Boulevard in the north/south direction.

Noise levels along roadways are affected by a number of traffic characteristics. Most important is the average daily traffic (ADT). Additional factors include the percentage of trucks, vehicle speed, the time distribution of this traffic and gradient of the roadway.

In general, most of the land uses along the major roadways are commercial and industrial. However, there are a number of multi- and single-family homes that are located along many of these roadways. This is the case along sections of Rosecrans Boulevard, Inglewood, El Segundo and Imperial Highway. Many of these homes are exposed to noise levels greater than 65 CNEL.

Aircraft Operations. A major source of noise within the City of Hawthorne is aircraft noise. Hawthorne Municipal Airport is located at the northeast end of the City. Operations from departing and arriving aircraft result in significant noise levels in the north portion of the city.

The operations at this general aviation airport are predominately single engine piston aircraft. However, there are a number of corporate aircraft, including some loud business jet aircraft. The main flow of traffic is to the west. The City of Hawthorne is currently updating the airport master plan. The results of this study were utilized to develop the CNEL noise contours for the airport. These contours show that some residential areas west of the airport are exposed to noise levels greater than 60 CNEL.

Los Angeles International Airport is located northwest of the city. The primary approach pattern to the airport is to the west along the City's north boundary. Some aircraft flight patterns will also overfly the city. The published airport noise studies and the noise measurements have shown that the 65 CNEL noise contour from these operations is located just outside the City boundary, however, the noise levels during the flyover are sufficient enough that they do result in some single event disturbance from the flyover. The noise levels from these operations in the north portion of the city exceed 60 CNEL.

Private helipads and helicopter flight corridors are also located within environs of Hawthorne. Helicopter operations from these facilities have only limited flights. In route helicopters will fly over the city following the path of the freeway. However, these events occur only occasionally, and are not considered a major noise source of Hawthorne. However, occasional single event disturbance from these overflights is likely to occur.

Stationary Sources. The City of Hawthorne has industrial and commercial sources of noise at a number of locations throughout the City. These include commercial centers that range in size from major aerospace corporations to small industrial operations. Many of these smaller operations are located in strip commercial zones. Residential land uses are located near many of these zones. The primary noise associated with the facilities is attributed to automobile and truck traffic making deliveries to these facilities. Additional sources of noise include air compressors, generators and outdoor loudspeakers. A number of businesses have paging systems that are audible in the adjacent residential developments.

GLOSSARY OF TERMS

A-WEIGHTED SOUND LEVEL. The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

AMBIENT NOISE LEVEL. The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7 p.m. to 10 p.m. and after addition of ten (10) decibels to sound levels in the night before 7 a.m. and after 10 p.m.

DAY-NIGHT AVERAGE LEVEL (LON). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of ten (10) decibels to sound levels in the night before 7 a.m. and after 10 p.m.

DECIBEL (dB). A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A). A-weighted sound level (see definition above);

EQUIVALENT SOUND LEVEL (LEQ). The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time varying noise level. The energy average noise level during the sample period.

FREQUENCY. The number of times per second that a sound pressure signal oscillates about the prevailing atmosphere pressure. The unit of frequency is the hertz. The abbreviation is Hz.

INTRUSIVE NOISE. That noise which intrudes over and above the ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, and tonal or informational content as well as the prevailing ambient noise level.

LIO. The A-weighted sound level exceeded 10 percent of the sample time. Similarly, LSD, L90, L99, etc.

NOISE. Any unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound ..."

NOISE ATTENUATION. The ability of a material, substance, or medium to reduce the noise level from one place to another or between one room and another. Noise attenuation is specified in decibels.

NOISE EXPOSURE CONTOURS. Lines drawn around a noise source indicating constant or equal level of noise exposure. CNEL and LDN are typical metrics used.

NOISE REFERRAL ZONES. Such zones are defined as the area within the contour defining a CNEL level of 60 decibels. It is the level at which either State or Federal laws and standards related to land use become important and, in some cases, pre-empted local laws and regulations. Any proposed noise sensitive development which may be impacted by a total noise environment of 60 dB CNEL or more should be evaluated on a project specific basis.

NOISE SENSITIVE LAND USE. Those specific land uses which have associated indoor and/or outdoor human activities that may be subject to stress and/or significant interference from noise produced by community sound sources. Such human activity typically occurs daily for continuous periods of 24 hours or is of such a nature that noise is significantly disruptive to activities that occur for short periods. Specifically, noise sensitive land uses include: residences of all types, hospitals, rest homes, convalescent hospitals, places of worship and schools.

SOUND LEVEL (NOISE LEVEL). The weighted sound pressure level obtained by use of a sound level meter having a standard frequency-filter for attenuating part of the sound spectrum.

SOUND LEVEL METER. An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.