

City of Calexico
Draft Noise Element

Table of Contents

7.1	INTRODUCTION	7-1
7.2	NOISE RATING SYSTEM AND TERMINOLOGY	7-1
7.3	HARMFUL EFFECTS OF NOISE	7-1
7.4	LAND USE COMPATIBILITY WITH NOISE	7-2
7.5	NOISE STANDARDS	7-4
	7.5.1 Federal Noise Standards.....	7-4
	7.5.2 State Noise Standards.....	7-6
7.6	EXISTING NOISE CONDITIONS	7-6
	7.6.1 Mobile Noise Sources.....	7-6
	7.6.2 Other Noise Sources.....	7-10
	7.6.2.1 Southern Pacific Railroad Company.....	7-10
	7.6.2.2 Calexico International Airport.....	7-10
	7.6.2.3 International Border Traffic.....	7-10
7.7	FUTURE NOISE CONDITIONS AND DESIGN CONSIDERATIONS	7-11
7.8	GOAL, OBJECTIVES AND POLICIES	7-14
	7.8.1 Goal.....	7-14
	7.8.1.1 Acceptable Noise Levels.....	7-14
	7.8.1.2 Land Use Compatibility.....	7-15
	7.8.1.3 Circulation Compatibility.....	7-15
	7.8.1.4 Requirement for Project Specific Noise Studies.....	7-15
	7.8.1.5 Noise Attenuation Measures.....	7-16
	7.8.1.6 Noise Ordinances.....	7-16
7.9	NOISE ELEMENT IMPLEMENTATION PROGRAM	7-17

List of Tables

Table N 1	Harmful Effects of Noise.....	7-2
Table N 2	Federal Exterior Noise Acceptability Criteria for Housing.....	7-4
Table N 3	FHWA Design Noise Level/Land Use Relationships.....	7-5
Table N 4	Existing Roadway (North-South) Noise Levels.....	7-8
Table N 5	Existing Roadway (East-West) Noise Levels.....	7-9
Table N 6	Future Roadway (North-South) Noise Levels.....	7-12

Table N 7	Future Roadway (East-West) Noise Levels.....	7-13
Table N 8	Noise Element Implementation.....	7-18

List of Figures

Figure N 1	State Land Use Compatibility.....	7-3
Figure N 2	Federal Exterior Noise Acceptability Criteria for Housing.....	7-5

List of Exhibits

Exhibit N 1	Calexico International Airport Noise Contours.....	7-11
-------------	--	------

DRAFT NOISE ELEMENT

7.1 INTRODUCTION

The environment is full of both natural and man-made noises. Noise must be regulated for the health and safety of residents. Unacceptable noise is principally caused by the operation of vehicles (ground and air), and agricultural and industrial production. In Calexico, vehicular traffic movement on the City's road system is the predominant cause of high noise levels in the City.

The Noise Element is closely related to other elements of the General Plan, particularly the Land Use, Circulation, Housing, Parks and Recreation and Open Space Elements. A major objective of the Noise Element is to encourage noise-compatible land uses. Effective land use planning can alleviate both perceived and real noise problems.

7.2 NOISE RATING SYSTEM AND TERMINOLOGY

The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the "A-weighted" noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A-weighted measurements are written dB(A) or dB. Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling a traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease. A 10 dB increase represents a 10-fold increase in sound intensity, a 20 dB change is a 100-fold difference, 30 dB is a 1000-fold increase, etc.

Average noise levels over a period of minutes or hours are usually expressed as dB Leq, or the equivalent noise level for that period of time. For example, Leq(3) would represent a three hour average. When no period is specified, a one-hour average is assumed. Noise standards for land use compatibility are stated in terms of the Community Noise Equivalent Level (CNEL) and the Day-Night Average Noise Level (Ldn). CNEL is a 24-hour weighted average measure of community noise. The computation of CNEL adds 5 dB to the average hourly noise levels between 7 p.m. and 10 p.m. (evening hours), and 10 dB to the average hourly noise levels between 10 p.m. and 7:00 a.m. (nighttime hours). This weighting accounts for the increased human sensitivity to noise in the evening and nighttime hours. Ldn is a very similar 24-hour weighted average, which weights only the nighttime hours and not the evening hours. CNEL is normally about 1 dB higher than Ldn for typical traffic and other community noise levels.

7.3 HARMFUL EFFECTS OF NOISE

According to the National Institute on Deafness and Other Communication Disorders ("NIDCD"), approximately 28 million people in the United States currently have some degree of hearing loss, a third of which is noise-induced¹. In many of these cases, exposures to very loud, impulsive, or sustained noises caused damage to the inner ear which was substantial even before a hearing loss was actually noticed. To prevent the spread of hearing loss, a desirable goal would be to minimize the number of noise sources which expose people to sound levels above 70 decibels. However, hearing impairment is only one of the harmful effects of noise on people.

Noise can also cause other temporary physical and /psychological responses in humans. Temporary physical reactions to passing noises range from a startle reflex to constriction in the peripheral blood vessels, the secretion of saliva and gastric juices; and changes in heart rate, breathing patterns, the chemical composition of the blood and urine, the dilation of the pupils of

DRAFT NOISE ELEMENT

the eye, visual acuity and equilibrium. The chronic recurrence of these physical reactions has been shown to aggravate headaches, fatigue, digestive disorders, heart disease, and circulatory and equilibrium disorders. Moreover, as a source of stress, noise is a contributory factor in stress-related ailments such as ulcers, high blood pressure, and anxiety.

Two other harmful effects of noise which are commonly of concern involve speech interference and the prevention or interruption of sleep. Table N 1 identifies how excessive background noises can reduce the amount and quality of verbal exchange and thereby impact education, family lifestyles, occupational efficiency and the quality of recreation and leisure time. As shown on Table N 1, speech interference begins to occur near 50 decibels and becomes severe above 60 decibels. Background noise levels affect performance and learning processes through distraction, annoyance and irritability, and the inability to concentrate.

Several factors determine whether or not a particular noise event will interfere with or prevent sleep. These factors include the noise level and characteristics, the stage of sleep, the individual's age, and the motivation to waken. Ill or elderly people are particularly susceptible to noise-induced sleep interference, which can occur when intruding noise levels exceed the typical 35-45 decibel background noise level in bedrooms (i.e., 45 dB Ldn).

¹NIDCD, "Noise-Induced Hearing Loss", <http://nidcd.nih.gov/health/hearing/noise.asp#who>, accessed 9/23/2005

Table N 1 Harmful Effects of Noise

Effect	Noise Level at Which Harmful Effects Occur
Hearing Damage	75 dB (40 years)
Speech Interference	66 dB (3 feet apart) 52 dB (20 feet apart)
Community Reaction	60 dB (sporadic complaints) 65 dB (widespread complaints)
Outdoor Activity Interference	55 dB (annual Ldn)
Indoor Activity Interference*	45 dB (annual Ldn)

*including sleep

Source: *Protective Noise Levels*, EPA 550/9-79/100, Nov. 1987

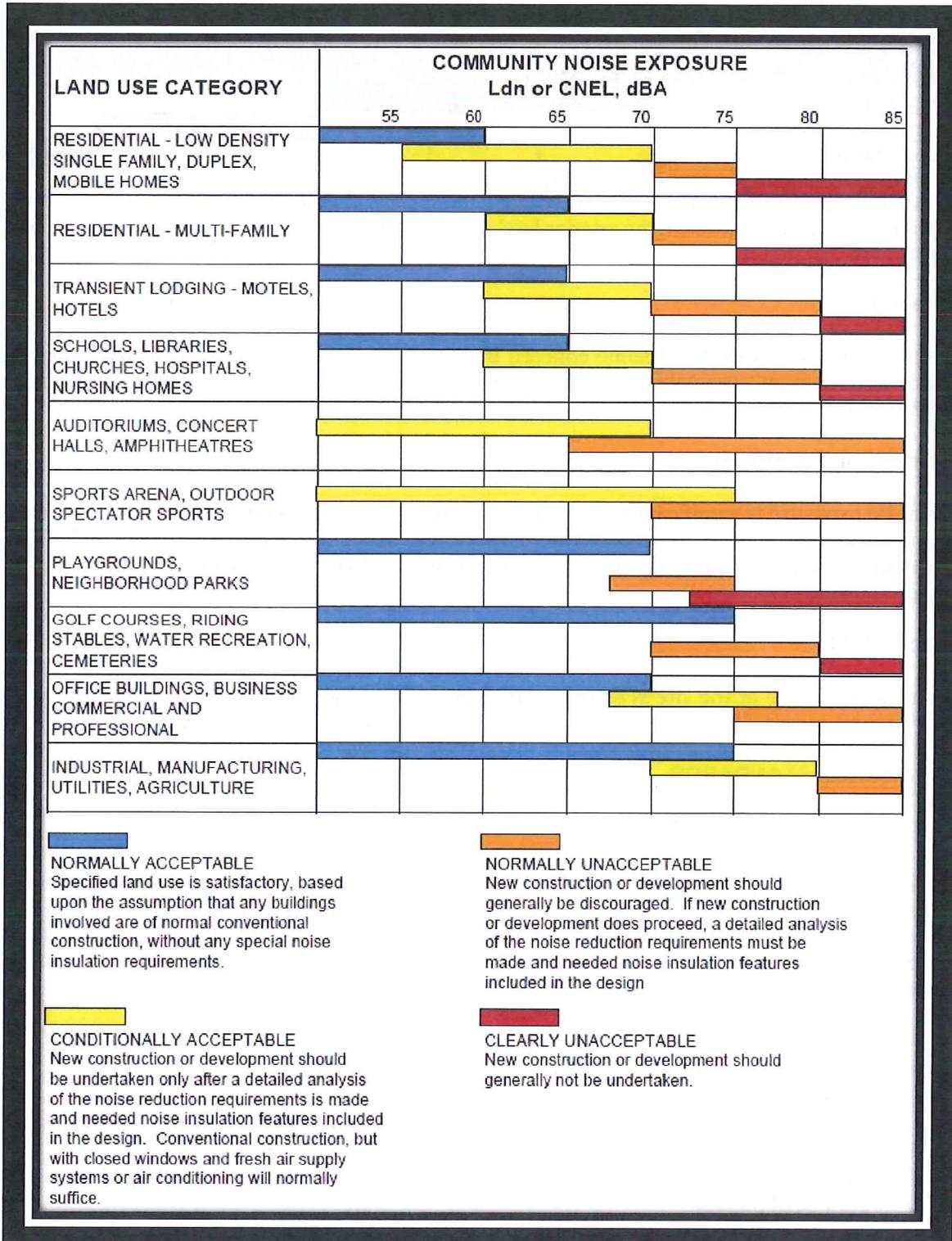
7.4 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than commercial or manufacturing activities. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design of new developments. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth of a community by reducing the area's desirability as a place to live, shop, and work.

The City of Calexico must make a determination regarding how much noise is too much. Figure N 1 illustrates guidelines for noise and land use compatibility as generated by the U.S. Department of Housing and Urban Development and the California State Office of Noise Control. Table N 2 illustrates the federal exterior noise acceptability criteria for housing. These guidelines are used by local governing agencies to set noise/land use compatibility thresholds.

DRAFT NOISE ELEMENT

Figure N 1 State Land Use Compatibility



Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, California Office of Planning and Research, 2003

DRAFT NOISE ELEMENT

**Table N 2
Federal Exterior Noise Acceptability Criteria for Housing**

Degree of Acceptability	Exterior Noise Exposure (Ldn (dB))					
	55	60	65	70	75	80
Acceptable						
Normally Unacceptable						
Unacceptable						

Source: HUD Noise Guidebook, published March, 2009

Note: HUD regulations do not contain standards for interior noise. A goal of 45 dB Ldn is set. It is assumed that with standard construction, if the exterior level is 65 dB Ldn or less, the interior noise level will be 45 dB Ldn or less.

Acceptable

The noise exposure may be of some concern but common building construction will make the indoor environment acceptable and the outdoor environment will be reasonably pleasant for recreation and play.

Normally Unacceptable

The noise exposure is significantly more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building constructions may be necessary to ensure that people indoors are sufficiently protected from outdoor noise.

Unacceptable

The noise exposure at the site is so severe that the construction cost to make the indoor noise environment acceptable may be prohibitive and the outdoor environment still be unacceptable.

7.5 NOISE STANDARDS

7.5.1 Federal Noise Standards

The Federal Highway Administration (FHWA) has developed a series of maximum design noise levels for various activity categories which are expressed in terms of Leq and L10 values (L10 refers to noise levels that are exceeded ten percent of the time). The FHWA design noise levels represent maximum values and incorporate trade-offs between desirable and feasible noise levels. These design levels appear in Table N 3 and are to be applied to:

- Those undeveloped lands for which development is planned, designed, and programmed on the date of public knowledge of the highway or other federally funded construction project.
- Those activities and land uses in existence on the date of public knowledge of the project.
- Those areas which have regular human use and in which a lowered noise level would be of benefit.

DRAFT NOISE ELEMENT

Table N 3 FHWA Design Noise Level/Land Use Relationships
[Hourly A-Weighted Sound Level decibels (dBA)\1]

Activity Category	Activity Criteria\2\		Evaluation Location	Activity Description
	Leq(h)	L10(h)		
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B\3\	67	70	Exterior	Residential
C\3\	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E\3\	72	75	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	-	-	-	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	-	-	-	Undeveloped lands that are not permitted

Source: FHWA Noise Control Standards and Procedures, Document Number FHWA-HEP-10-025, Section 772.3 amended December 2010

\1\ Either Leq(h) or L10(h) (but not both) may be used on a project.

\2\ The Leq(h) and L10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.

\3\ Includes undeveloped lands permitted for this activity category.

DRAFT NOISE ELEMENT

7.5.2 State Noise Standards

Section 1092 of Title 25 of the California Administrative Code includes sound transmission control standards which detail specific requirements for new multi-family structures (motels, apartments, condominiums, and other attached dwellings) located within the 60 CNEL contour adjacent to roads, rapid transit lines, or manufacturing areas. An acoustical analysis is required showing that the multi-family units have been designed to limit interior noise levels (with doors and windows closed) to 45 CNEL in any habitable room. Title 21 of the California Administrative Code (Subchapter 6, Article 2, Section 5014) also specifies that multi-family, attached units incorporate noise reduction features sufficient to assure that interior noise levels in all habitable rooms do not exceed 45 CNEL.

Section 6502(f) of the Government Code specifies that it is the responsibility of the City of Calexico to specify the manner in which the Noise Element, once adopted, also becomes the guideline for determining compliance with the State noise insulation standards discussed above. The Office of Noise Control established by the California Noise Control Act of 1973, has developed criteria and guidelines for local agencies to use in setting standards for human exposure to noise and preparing noise elements.

An interior CNEL of 45 dB is mandated by the State of California Noise Insulation Standards (CCR, Title 24, Part 6, Section T25-28) for multiple family dwellings, dormitories, long-term care facilities, apartments, and hotel and motel rooms. A 45 dB CNEL is also typically considered a desirable noise exposure for single-family dwelling units. Since normal noise attenuation within residential structures with closed windows is about 20-25 dB, an exterior noise exposure of 65 dB CNEL will result in an interior noise level of 40 to 45 dB CNEL and therefore, is generally the noise land use compatibility guideline for noise sensitive receiver sites in California. Since commercial and industrial activities are generally conducted indoors, the exterior noise exposure standard for such less sensitive land uses is less stringent.

7.6 EXISTING NOISE CONDITIONS

As a requisite to the formation of an effective noise control program, the City must be cognizant of the location and extent of local noise problems, namely major noise source locations, the number of persons exposed, and what levels of exposure exist.

The two types of noise sources that should be considered are stationary and mobile sources. Stationary sources of noise typically include manufacturing and construction activities, air conditioning/refrigeration units, whistles or bells, high-level radio, stereo or television usage, power tools, lawnmowers, home appliances, and barking dogs. Mobile noise sources are typically transportation-related and include: trains, airplanes, automobiles, trucks, buses, motorcycles, and off-road vehicles for both recreational and agricultural use.

7.6.1 Mobile Noise Sources

Motor vehicles on area roadways are the major source of continuous noise in and around the City. As a result, they affect the noise environment of both the existing and planned land uses adjacent to the said circulation system. Traffic noise is generated by tire friction on the roadway surface, as well as noise from the vehicle engines and exhaust. Generally, higher noise levels result from higher traffic volumes and higher traffic speeds. The mix of vehicles using the roadway also affects noise levels. For example, a truck route would have higher noise levels compared to another street where truck traffic was prohibited.

DRAFT NOISE ELEMENT

Noise/land use compatibility for traffic sources is normally expressed in terms of the CNEL or Ldn metrics. These descriptors assign a +10 dB penalty to noise events at night (10 p.m. to 7 a.m.). A +10 dB weighting is the noise-equivalent of around 20 cars. In the CNEL/Ldn descriptor, one nocturnal heavy truck makes as much noise as 200 daytime cars. The Calexico area experiences considerable nocturnal truck traffic as drivers seek to avoid daytime heat and to operate with reduced on-road capacity constraints.

The Federal Highway Administration (“FHWA”) has developed a noise prediction model (FHWA-RD-77-108) to estimate the noise levels generated by roadways. This model was used to estimate the current noise impacts from roadway traffic in the City of Calexico and the results are contained in Tables N 4 and N 5. The calculations in Tables N 4 and N 5 presume that the peak traffic hour accurately predicts the weighted 24-hour CNEL or Ldn. These calculations also presume that the surface beyond the roadway pavement is vegetated by crops or landscaping, or is lumpy barren soil (acoustically “soft”). Truck mixes on SR-111 and SR-98 were obtained from Caltrans and posted speed limits were applied on state highways. Default mixes and speeds were used for non-highway segments. These tables show the distance from the centerline of each roadway to the point where the noise level is 65 dBA (the maximum allowable outdoor noise level for all residential uses in the City of Calexico according to Policy 1(a) below). The tables also show the distance to the 70 dB CNEL contour as the normally acceptable set-back for office buildings and business commercial or professional uses.

DRAFT NOISE ELEMENT

**Table N 4
City of Calexico
Existing Roadway (North-South) Noise Levels**

Roadway Segment		ADT	dB CNEL at 50 feet ¹	Distance to 65 dB Contour (feet) ²	Distance to 70 dB Contour (feet) ²
Dogwood Road	Jasper to Coal	6,800	66.2	60	<50
	Cole to SR-98	5,200	65.0	65	<50
SR 111	Heber to Jasper	32,000	77.0	316	147
	Jasper to Cole	35,000	77.5	341	158
	Cole Rd to SR-98	33,500	77.3	331	154
	SR-98 to Grant St	32,000	71.5	136	63
	Grant St to 7th St	30,500	71.3	132	61
	7th St to 2nd St	30,500	71.3	130	60
Bowker Road	Heber to Jasper	2,319	63.8	<50	<50
	Jasper to Cole	2,396	63.9	<50	<50
	Cole Rd to SR-98	3,245	65.2	52	<50
Yourman Road	North of Jasper	624	58.1	<50	<50
	South of Jasper	2,981	64.9	<50	<50
	North of East Rd	2,981	64.9	<50	<50
	East to Cole	12,908	71.2	130	60
Cesar Chavez Boulevard	2nd St to Grant	7,200	66.4	62	<50
	Grant to SR-98	6,500	66.0	58	<50

¹ The roadway centerline is used as the reference point for these noise level calculations.

²The roadway centerline is used as the reference point for these noise level calculations and the numbers listed in this column are the distance from the centerline to the 65 dB CNEL and 70 dB CNEL contour lines. The noise levels at 50 feet were calculated and used to estimate the distance to the 65 dBA contour using $dB_2 = dB_1 - 15 \cdot \log D_2/D_1$ where dB_1 =measured dBA at 50', $D_1=50$, and $D_2=x$.

DRAFT NOISE ELEMENT

**Table N 5
City of Calexico
Existing Roadway (East-West) Noise Levels**

Roadway Segment		ADT	dB CNEL at 50 feet ¹	Distance to 65 dB Contour (feet) ²	Distance to 70 dB Contour (feet) ²
Jasper Road	Kloke to SR-111	1,173	60.8	<50	<50
	SR-111 to Yourman	2,937	64.8	<50	<50
	Yourman to Martin Luther King	414	56.3	<50	<50
	Martin Luther King to Meadows	414	56.3	<50	<50
	Meadows to Bowker	401	56.1	<50	<50
	Bowker to Barbara Worth	318	55.1	<50	<50
Cole Road	Kloke to SR-111	12,530	71.1	128	59
	SR-111 to Rockwood	24,098	73.9	197	92
	Rockwood to Meadows	17,757	72.6	161	75
	Andrade to Bowker	6,499	68.2	82	<50
	Bowker to SR-98	4,923	67.0	68	<50
SR-98/Birch Road	Dogwood to Kloke	8,400	70.6	118	55
	Kloke Rd SR-111	18,900	70.9	124	58
	SR-111 to Rockwood	23,500	70.1	110	51
	Rockwood to Blair	24,400	72.7	163	76
	Blair to Encinas	22,200	74.4	212	98
	Encinas to East Riviera	17,700	73.5	185	86
	East Riviera to Bowker	9,500	72.3	154	71
	Bowker to Cole	5,000	69.5	100	<50
Cole to Barbara Worth	9,500	72.3	154	71	

¹The roadway centerline is used as the reference point for these noise level calculations.

²The roadway centerline is used as the reference point for these noise level calculations and the numbers listed in this column are the distance from the centerline to the 65 dB CNEL and 70 dB CNEL contour lines. The noise levels at 50 feet were calculated and used to estimate the distance to the 65 dBA contour using $dB_2 = dB_1 - 15 * \log D_2/D_1$ where dB_1 =measured dBA at 50', $D_1=50$, and $D_2=x$.

DRAFT NOISE ELEMENT

7.6.2 Other Noise Sources

7.6.2.1 Southern Pacific Railroad Company

The railroad is significant in its contribution to the nuisance noise level. Increased rail traffic volumes which have led to additional truck traffic have made the railroad and its vicinity much noisier than in the past. Noise from the trains using the railroad tracks depends on the number of locomotives per train, the number of cars per train, and the speed of the train. For example, the hourly Leq at a distance of 50 feet from the tracks resulting from 5 trains (each train with 3 locomotives and 100 rail cars traveling at 30 miles per hour) passing through a certain area would be approximately 72.7 dBA. If train activity continues at this pace throughout the day and night, the noise levels could be as high as 79.4 dBA CNEL. Therefore, this mode of transportation has an impact on the noise levels in the City and must be taken into consideration in land use planning. In terms of land use, the railroad is a significant part of the urban fabric in Calexico. It is also an important part of the industrial, commercial and agricultural economic base of the community.

7.6.2.2 Calexico International Airport

The Calexico International Airport is located west of the City on Anza Road, adjacent to the international border. The nearest residential area to the airport is no closer than 2400 feet. The airport offers its services 365 days a year, and had a monthly average of 420 arrivals and departures in 2014. Five percent of these operations are performed during the hours between 5 pm and 7 am. The type and weight of aircraft that is able to use the airport facilities is limited by its 4,683-foot runway which runs east-west. With prevailing west to east winds, a majority of takeoffs are toward the west, away from the residential areas and towards the open agricultural areas to the west. Exhibit N 1 shows the noise contours for the Calexico International Airport. Note that the noise contours presented herein are conservative and are based on future 60,000 annual operations; the Calexico International Airport Master Plan forecasts 27,200 annual operations by 2020². Existing (2014) annual operations of 5,060 per year suggest that the master plan forecasts will likely not be reached.

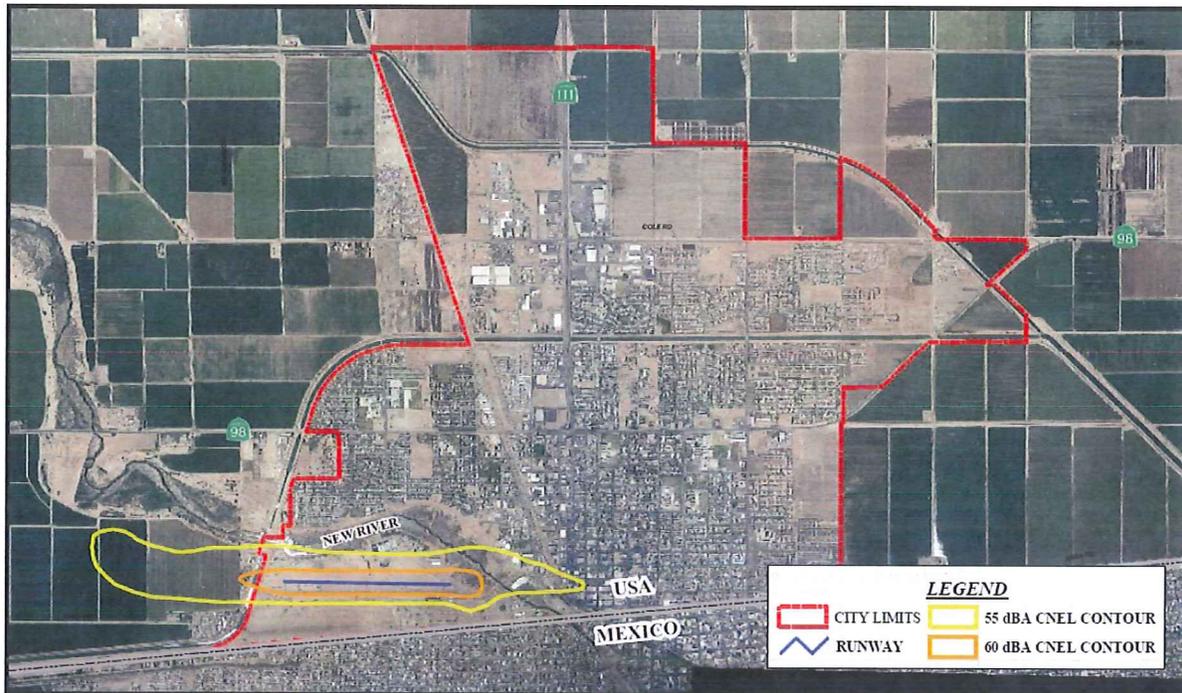
7.6.2.3 International Border Traffic

The City of Calexico is known as the gateway to Mexico. The international border is located in downtown Calexico, not more than half a block from most of downtown's commercial establishments. State Highway 111 runs north-south, from the border to northern Imperial County. This highway is a principal route for vehicles traveling to or from Mexico via Mexicali. The opening of an alternate port of entry east of the downtown has dramatically reduced truck noise through the downtown area. Fewer trucks, especially at night, have led to substantially reduced traffic noise along SR-111. Whereas traffic volumes on SR-111 from the border to SR-98 have historically been as high as 50,000 per day, that same segment now carries 30,000 vehicles. The noise constraint imposed by the previous single port-of-entry has been somewhat relaxed.

² P&D Aviation, *2001 Calexico International Airport Master Plan*

DRAFT NOISE ELEMENT

Exhibit N 1 Calexico International Airport Noise Contours



7.7 FUTURE NOISE CONDITIONS AND DESIGN CONSIDERATIONS

Growth in and near the City of Calexico will generate increased traffic volumes. As traffic levels rise, existing residences will be exposed to higher noise levels. As noted in Policy 4(d), a substantial noise impact is presumed to exist if noise levels increase by +3 dB CNEL, a clearly perceptible change. For the same traffic mix, time of day and travel speeds, it requires a doubling of traffic volumes to achieve a +3 dB noise increase. Doubling the traffic volume will increase the need for controlling the noise source whenever feasible and protecting the noise receptors when noise source control measures are inadequate.

Table N 6 and Table N 7 provide an estimate of where the 65 and 70 dBA CNEL noise level contour lines occur relative to the roadway centerline. The data contained in these tables can be used as a quick reference to decide if future projects will have the potential to expose sensitive receptors to unacceptable outdoor noise levels without mitigation.

Acoustic architectural design involves the incorporation of noise reducing strategies in the design and layout of individual structures. Building heights, room arrangements, window size and placement, balcony and courtyard design, and the provision of air conditioning all play an important role in shielding noise sensitive activities from intrusive noise levels.

DRAFT NOISE ELEMENT

**Table N 6
City of Calexico
Future Roadway (North-South) Noise Levels**

Roadway Segment		ADT	dB CNEL at 50 feet ¹	Distance to 65 dB Contour (feet) ²	Distance to 70 dB Contour (feet) ²
Kloke Road	Jasper to Cole	2,400	63.9	<50	<50
	Cole to SR-98	2,400	63.9	<50	<50
SR-111	Heber to Jasper	108,400	82.3	715	332
	Jasper to Cole	88,300	81.5	630	293
	Cole -SR-98	78,700	81.0	584	271
	SR-98 to Grant	64,300	74.5	217	101
	Grant to 7th	51,700	73.6	188	87
	7th to 2nd St	41,650	72.6	162	75
	Jasper to Cole	21,200	68.4	85	<50
Meadows Road	Cole to SR-98	11,700	65.9	57	<50
Andrade Road	SR-98 to 7th	17,500	67.6	75	<50
Bowker Road	Heber to Jasper	35,200	75.6	254	118
	Jasper to Cole	35,500	75.6	256	119
	Cole -SR-98	35,900	75.7	257	120
Cesar Chavez Boulevard	2nd St to Grant	49,300	77.0	318	148
	Grant St to SR-98	46,700	76.8	307	142

¹The roadway centerline is used as the reference point for these noise level calculations.

²The roadway centerline is used as the reference point for these noise level calculations and the numbers listed in this column are the distance from the centerline to the 65 dB CNEL and 70 dB CNEL contour lines. The noise levels at 50 feet were calculated and used to estimate the distance to the 65 dBA contour using $dB_2 = dB_1 - 15 \cdot \log D_2/D_1$ where dB_1 =measured dBA at 50', $D_1=50$, and $D_2=x$.

DRAFT NOISE ELEMENT

**Table N 7
City of Calexico
Future Roadway (East-West) Noise Levels**

Roadway Segment		ADT	dB CNEL at 50 feet ¹	Distance to 65 dB Contour (feet) ²	Distance to 70 dB Contour (feet) ²
Jasper Road	Dogwood to Kloke	31,300	75.1	235	109
	Kloke Rd to SR-111	58,100	77.8	355	165
	SR-111 to Martin Luther King	59,500	77.9	361	167
	Martin Luther King to Meadows	54,700	77.5	341	158
	Meadows to Bowker	50,000	77.1	321	149
	Bowker to Barbara Worth	53,810	77.4	337	157
Cole Road	Dogwood to Kloke	23,800	73.9	196	91
	Kloke to SR-111	33,870	75.4	248	115
	SR-111 to Rockwood	35,000	75.6	253	118
	Rockwood to Meadows	31,090	75.0	234	109
	Bowker to SR-98	31,090	75.0	234	109
SR-98	Dogwood to Kloke	38,697	77.3	331	154
	Kloke to Cesar Chavez Rd	36,300	75.0	233	108
	Cesar Chavez Rd to SR-111	46,800	74.7	222	103
	SR-111 to Rockwood	46,100	73.0	171	79
	Rockwood to Blair	46,100	75.5	251	117
	Blair to Andrade	44,900	77.5	341	158
	Andrade to Bowker	34,409	77.6	347	161
	Bowker to Cole	34,409	77.8	358	166
Anza Road	Cole Rd to Barbara Worth	29,072	77.1	321	149
	Dogwood to Cesar Chavez Rd	19,600	73.0	172	80
2nd Street	Cesar Chavez Rd to SR-111	33,750	70.5	116	54
	SR-111 to Andrade	25,830	69.3	97	<50
	Andrade to Bowker	5,500	67.5	74	<50

¹The roadway centerline is used as the reference point for these noise level calculations.

²The roadway centerline is used as the reference point for these noise level calculations and the numbers listed in this column are the distance from the centerline to the 65 dB CNEL and 70 dB CNEL contour lines. The noise levels at 50 feet were calculated and used to estimate the distance to the 65 dBA contour using $dB_2 = dB_1 - 15 * \log D_2/D_1$ where dB_1 =measured dBA at 50', $D_1=50$, and $D_2=x$.

DRAFT NOISE ELEMENT

Acoustic construction is the treatment of various parts of a building to reduce interior noise levels. Acoustic wall design, doors, ceilings and floors, as well as dense building materials, the use of acoustic windows (double glazed, double paned, thick, unopenable, or small with air-tight seals) and the inclusion of maximum air spaces in attics and walls are all available options. Site planning can also address noise concerns through setbacks, front yards facing streets, and courtyard housing arrangements.

Noise barriers are relatively easy to design and are inexpensive. Consequently they are often used indiscriminately in place of the techniques discussed above. For example, developments where each road is bordered by six-foot block walls behind which residences are "protected" from excessive noise levels tends to become unsightly and reduces the open, more rural feel that Calexico has had throughout its history. Ideally, noise barriers incorporate the placement of berms, walls, or a combination of the two in conjunction with appropriate landscaping to create an aesthetically pleasing environment. Where space is available, a meandering earth berm is both effective and pleasing. Where space is restricted, a wall is effective. In either case, however, thick landscaping (utilizing evergreen plants) should be specified to reduce the visual impact of the barrier and retain the rural ambience.

7.8 GOAL, OBJECTIVES AND POLICIES

7.8.1 Goal

Maintain the quiet rural residential nature of the community through the use of sensitive land use practices and appropriate noise mitigation measures.

7.8.1.1 Acceptable Noise Levels

Objective 1

The City should establish adverse noise levels for various noise-sensitive uses.

Policy 1

- a. 65 dBA CNEL is established as the acceptable outdoor noise exposure level for all private residential areas such as backyards.
- b. Indoor noise levels shall not exceed 45 dBA CNEL for single- and multiple-family dwellings, dormitories, hospitals, nursing homes, apartments, and hotel and motel rooms.
- c. 70 dBA CNEL is established as the acceptable outdoor noise exposure level for schools (public and private), libraries, churches, hospitals, nursing homes, parks, and recreation areas.
- d. 70 dBA CNEL is established as the acceptable outdoor noise exposure level for office buildings, business, commercial, professional, and mixed-use developments.
- e. 75 dBA CNEL is established as the acceptable outdoor noise exposure level for golf courses, riding stables, water recreation, cemeteries, industrial, manufacturing, utilities, and agriculture.

DRAFT NOISE ELEMENT

7.8.1.2 Land Use Compatibility

Objective 2

Land use distribution should account for the noise characteristics of basic uses.

Policy 2

- a. The location and distribution of land uses throughout the City should take into account the compatibility of the different uses and their respective noise levels.
- b. The review of development applications shall consider the impact of the use on the noise environment of existing or planned contiguous uses.
- c. Where necessary because of incompatibilities, noise attenuation measures shall be required by the City to achieve the acceptable noise exposure levels.

7.8.1.3 Circulation Compatibility

Objective 3

Noise levels generated by arterial and larger classification roadways should be considered when planning improvements to the circulation system.

Policy 3

- a. The potential for increasing the general noise level shall be considered when planning improvements to the City's circulation system.
- b. In the event that it is determined that increased noise levels will result from an improvement to the circulation system, mitigation measures shall be required which reduce the noise levels to those determined acceptable.
- c. Traffic speeds shall be regularly monitored to determine the feasibility of lowering the speeds and thus lower the traffic noise generated.
- d. The City should examine areas where truck traffic should be restricted in residential areas to reduce adverse noise and vibration levels. (see Circulation Element.)

7.8.1.4 Requirement for Project Specific Noise Studies

Objective 4

Noise studies shall be required for certain projects which have the potential to increase ambient noise levels or the potential to expose sensitive receptors to unacceptable noise levels.

Policy 4

- a. A noise study shall be required for all projects which will be in violation of Policy 1. Tables N 6 and N 7 will be used as screening tables to determine the estimated outdoor noise levels and if the project is in violation of Policy 1.
- b. A noise study shall be required for all projects within 700 feet of railroad tracks (350 feet, if there are intervening buildings). In addition, a vibrational analysis should also be required of residential projects within 200 feet of railroad tracks and any projects within 120 feet of railroad tracks.

DRAFT NOISE ELEMENT

- c. A noise study shall be required for all projects proposing to locate commercial or industrial land uses adjacent to residential land uses (or vice versa) in order to determine the noise impacts to residents.
- d. A noise study which determines that a project will result in an increase in noise exposure levels of 3 dBA CNEL or less (with or without the implementation of noise attenuation measures) shall not be considered in violation of the acceptable noise levels set forth in Policy 1, as such an increase is indistinguishable to the human ear.

7.8.1.5 Noise Attenuation Measures

Objective 5

Noise attenuation measures shall be required to reduce noise levels to an acceptable level.

Policy 5

- a. Where feasible, setbacks should be used to mitigate adverse noise conditions, to ensure an acceptable noise exposure level.
- b. Parcels affected by adverse noise levels should be properly site planned to reduce noise through the following measures:
 - ✓ Uses that are compatible with higher noise levels should be located adjacent to noise generators to block noise from noise sensitive uses.
 - ✓ Clustering of commercial, office, or multi-family uses can reduce interior open space (e.g., courtyard) noise levels.
- c. Noise barriers and berms shall be required where other noise attenuation measures fail to reduce the adverse levels, or will significantly increase the costs of continuation of land improvements.
- d. Architectural design in adverse noise areas should shield noise sensitive uses through:
 - ✓ Proper entrance and window location;
 - ✓ Proper patio and balcony location; building projections and heights; and
 - ✓ Internal arrangement of rooms; and location of air conditioning equipment.
- e. Construction techniques should consider the following methods of noise reduction:
 - ✓ Acoustical wall design;
 - ✓ Use of dense building materials;
 - ✓ Use of acoustical windows (double glazed, double paned, thick and nonoperable windows); and
 - ✓ Use of noise-tight doors, ceilings, and floors.

7.8.1.6 Noise Ordinance

Objective 6

The City's community Noise Ordinance shall be consistent with the policies in the Noise Element.

Policy 6

The City shall update the community noise ordinance to reflect and implement the policies in the Noise Element.

DRAFT NOISE ELEMENT

7.9 NOISE ELEMENT IMPLEMENTATION PROGRAM

This implementation program provides actions to implement the adopted policies and plans identified in the Noise Element. Table N 8 describes the responsible department within the City of Calexico and other agencies, funding source(s), time frame to complete the action, and related policies within the Noise and other Elements of the General Plan.

DRAFT NOISE ELEMENT

Table N 8 Noise Element Implementation

Objective	Policy Summary	Responsible Agency/ Department	Funding Source	Time Frame	Related Policies
Objective 1 Maintain the quiet rural residential nature of the community through the use of sensitive land use practices and appropriate noise mitigation measures.	1a. 65 dBA CNEL acceptable outdoor noise exposure for all private residential areas	Engineering Planning Building	None required	Complete upon GP adoption	Noise: 1a – 1e
	1b. Indoor noise levels shall not exceed 45 dBA CNEL in habitable rooms	Engineering Planning Building	None required	Complete upon GP adoption	Noise: 1a – 1e
	1c. 70 dBA CNEL acceptable outdoor noise exposure for schools, libraries, churches, hospitals, nursing homes, parks, and recreation areas	Engineering Planning Building	None required	Complete upon GP adoption	Noise: 1a – 1e
	1d. 70 dBA CNEL acceptable outdoor noise exposure for office, business, commercial, professional, and mixed-use	Engineering Planning Building	None required	Complete upon GP adoption	Noise: 1a – 1e
	1e. 75 dBA CNEL acceptable outdoor noise exposure for golf courses, riding stables, water recreation, cemeteries, industrial, manufacturing, utilities, and agricultural	Engineering Planning Building	None required	Complete upon GP adoption	Noise: 1a – 1e
Objective 2 Land use distribution should account for the noise characteristics of basic uses.	2a. Land use should consider compatibility of different uses & noise levels	Planning	General Fund Development Review Fees	Ongoing	Noise: 2a – c
	2b. Noise environment of existing or planned contiguous uses	Planning	General Fund Development Review Fees	Ongoing	Noise: 2a – c
	2c. Noise attenuation measures shall be required by the City to achieve the acceptable noise exposure levels	Planning	General Fund Development Review Fees Private Funds		

DRAFT NOISE ELEMENT

Table N 8 Noise Element Implementation Continued

Objective	Policy Summary	Responsible Agency/ Department	Funding Source	Time Frame	Related Policies
Objective 3 Noise levels generated by arterial and larger classification roadways should be considered when planning improvements to the circulation system.	3a. Increasing the general noise level shall be considered in City's circulation system	Engineering Planning	Road Impact Fees Fed/state highway funds	Ongoing as planning and CEQA/NEPA compliance done on roads.	Noise: 3a – d
	3b. Increased noise levels will result in mitigation measures to reduce the noise levels to acceptable	Engineering Caltrans County Planning	Road Impact Fees Fed/state highway funds General Fund	Ongoing as planning and CEQA/NEPA compliance done on roads	Noise: 3a – d
	3c. Traffic speeds shall be regularly monitored to lower the traffic noise	Engineering Caltrans County Police	Road Impact Fees Fed/state highway funds General Fund	Ongoing	Noise: 3a – d
	3d. Truck traffic should be restricted in residential to reduce adverse noise and vibration	Engineering Caltrans County Police	Road Impact Fees Fed/state highway funds General Fund	Ongoing	Noise: 3a – d
Objective 4 Noise studies shall be required for certain projects which have the potential to increase ambient noise levels or the potential to expose sensitive receptors to unacceptable noise levels.	4a. Noise study required for all projects in violation of Policy 1	Planning	General Fund Development Review Fees	Ongoing	Noise: 4a-d; 1a-e
	4b. Noise study required for all projects near railroad tracks	Planning	General Fund Development Review Fees	Ongoing	Noise: 4a-d; 1a-e
	4c. Noise study required for potentially incompatible land uses, industrial or other noise-generating uses	Planning	General Fund Development Review Fees	Ongoing	Noise: 4a-d; 1a-e
	4d. Noise impacts resulting in noise exposures of less than 3 dBA CNEL should be considered in compliance with Policy 1	Planning	General Fund Development Review Fees	Ongoing	Noise: 4a-d; 1a-e

DRAFT NOISE ELEMENT

Table N 8 Noise Element Implementation Continued

Objective	Policy Summary	Responsible Agency/ Department	Funding Source	Time Frame	Related Policies
Objective 5 Noise attenuation measures shall be required to reduce noise levels to an acceptable level.	5a. Setbacks should be used to mitigate adverse noise	Planning	General Fund	Ongoing	Noise: 51 – e; 2c
	5b. Parcels affected by adverse noise should be site planned to reduce noise	Planning	General Fund	Ongoing	Noise: 51 – e; 2c
	5c. Noise barriers shall be required where other noise attenuation measures fail	Planning	General Fund	Ongoing	Noise: 51 – e; 2c
	5d. Architectural design should shield noise-sensitive uses	Planning Building	General Fund	Ongoing	Noise: 51 – e; 2c
	5e. Construction techniques should consider noise reduction	Planning Building	General Fund	Ongoing	Noise: 51 – e; 2c
Objective 6 The City’s community noise ordinance shall be consistent with the policies in the Noise Element.	6a. The City shall periodically update the community noise ordinance as needed	Planning	General Fund or Grants	Within 3 yrs.	Noise: 1a – 1e; 5a – e