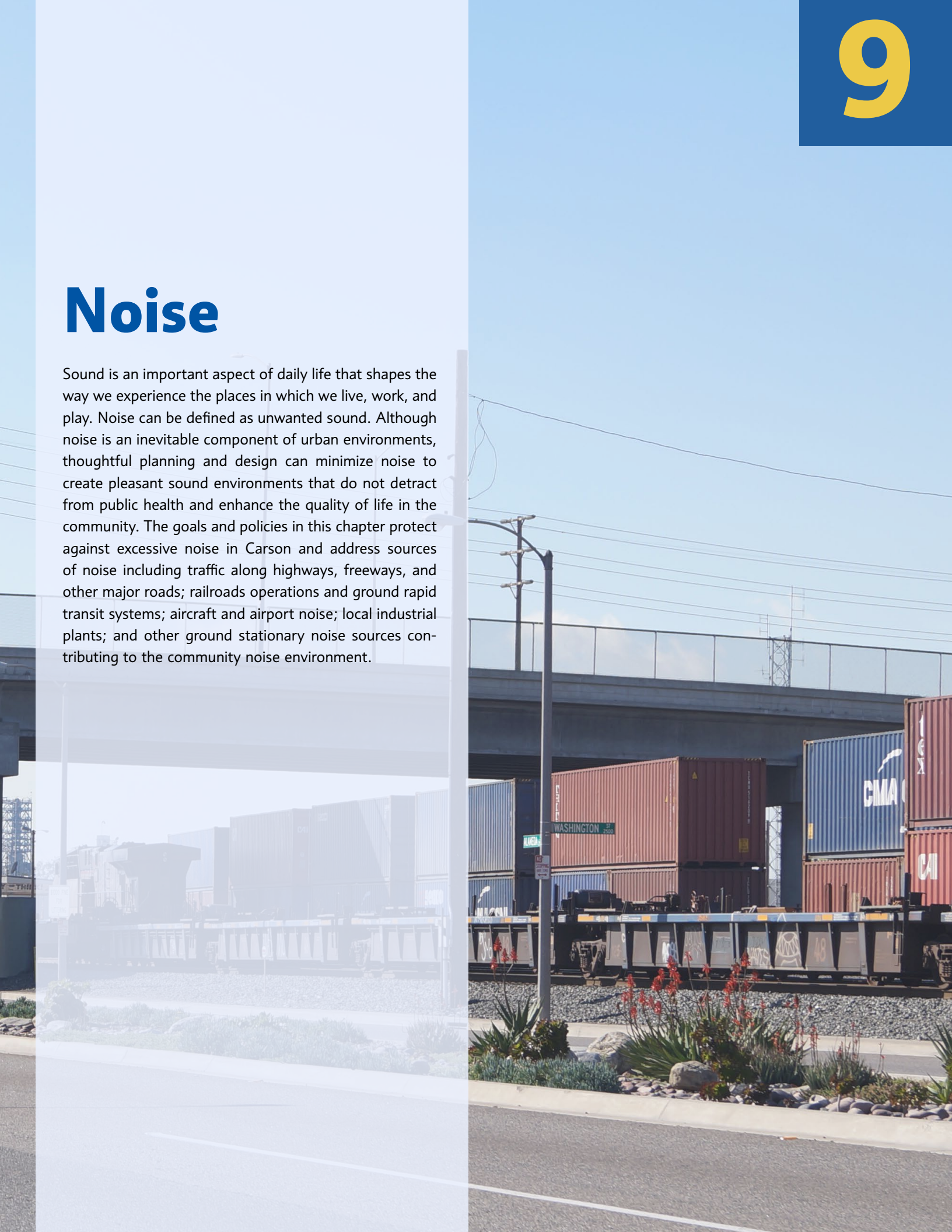


Noise

Sound is an important aspect of daily life that shapes the way we experience the places in which we live, work, and play. Noise can be defined as unwanted sound. Although noise is an inevitable component of urban environments, thoughtful planning and design can minimize noise to create pleasant sound environments that do not detract from public health and enhance the quality of life in the community. The goals and policies in this chapter protect against excessive noise in Carson and address sources of noise including traffic along highways, freeways, and other major roads; railroad operations and ground rapid transit systems; aircraft and airport noise; local industrial plants; and other ground stationary noise sources contributing to the community noise environment.





RELATIONSHIP TO STATE LAW

California Government Code Section 65302(f) requires general plans to identify and appraise noise problems within the community by analyzing and quantifying current and projected noise levels. In accordance with State law, this element satisfies the statutory requirements for noise elements and includes goals and policies to address noise issues.

RELATIONSHIP TO GUIDING PRINCIPLES

Creating a healthy noise environment for Carson residents most closely relates to the following guiding principles:

- **Guiding Principle 2:** Promote vibrant, safe, and walkable mixed-use districts and neighborhoods, and revitalized corridors.
- **Guiding Principle 6:** Foster harmony between industrial and residential land uses.
- **Guiding Principle 7:** Improve public health and sustainability.
- **Guiding Principle 9:** Enhance the public realm and promote quality design.

9.1 Background

NOISE SCALES AND DEFINITIONS

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. Sound refers purely to the mechanical energy of a vibrating object transmitted by pressure waves through the air. Sound intensity is measured in decibels (dB), which is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain, as depicted in Figure 9-1.¹

Sound frequency (the number of vibrations or sound waves per second) is measured in hertz (Hz). When assessing potential noise impacts, sound is measured in frequencies between 1,000 and 5,000 Hz to reflect the range of human hearing sensitivity. Frequencies outside of this range are filtered or deemphasized in a method referred to as A-weighting, expressed in units of A-weighted decibels (dBA), which is typically applied to community noise measurements.

¹ M David Egan, Architectural Acoustics, Chapter 1, March, 1988.

Community noise is the product of many distant noise sources, which constitute a relatively stable background noise exposure. Typical activities such as traffic volume contribute to gradually changing levels of background noise throughout the day but can be punctuated by short-duration, single-event noise sources including aircraft flyovers, motor vehicles, and sirens that are more distinctly identifiable to the human ear. To capture both types of fluctuations, noise exposure is measured over periods of time to legitimately characterize a community's noise environment and evaluate cumulative noise impacts. The predominant community noise rating scale used in California for land use compatibility assessment is the community noise equivalent level (CNEL). The CNEL reading represents the average of 24-hourly readings of equivalent levels (L_{eq})—or the sound level over a given sample time period, typically measured over one-, eight- and 24-hour periods—measured in dBA adjusted for increased noise sensitivity in the evening and at night (i.e., +5 dBA between 7:00 p.m. and 10:00 p.m. and +10 dBA between 10:00 p.m. and 7:00 a.m.).

Another commonly used method is the day/night average level (L_{dn}), which was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for evaluation of community noise exposure. Like CNEL, L_{dn} takes the 24-hour average noise level at a given location and adds 10 dBA for nighttime hours (10:00 p.m. to 7:00 a.m.). The maximum noise level recorded during a noise event is referred to as L_{max} , and the sound level exceeded over a specified time frame can be expressed as L_n (e.g., L_{50} , L_{10} , etc.). L_{50} , for example, equals the level exceeded 50 percent of the time, and L_{10} is the level exceeded ten percent of the time.

NOISE REGULATIONS

Federal, State, and local agencies regulate different aspects of environmental noise. Generally, the federal government sets noise standards for transportation-related noise sources that are closely linked to interstate commerce including aircraft, locomotives, and trucks. The state government sets noise standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Part 2, Title 24 of the California Code of Regulations, California Noise Insulation Standards establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under this regulation, these facilities should not be located in areas where exterior ambient noise levels exceed 65 dBA, and whenever such facilities are located in areas with exterior ambient noise levels exceeding this level, the developer must incorporate into building design construction features which reduce interior noise levels to 45 dBA CNEL.

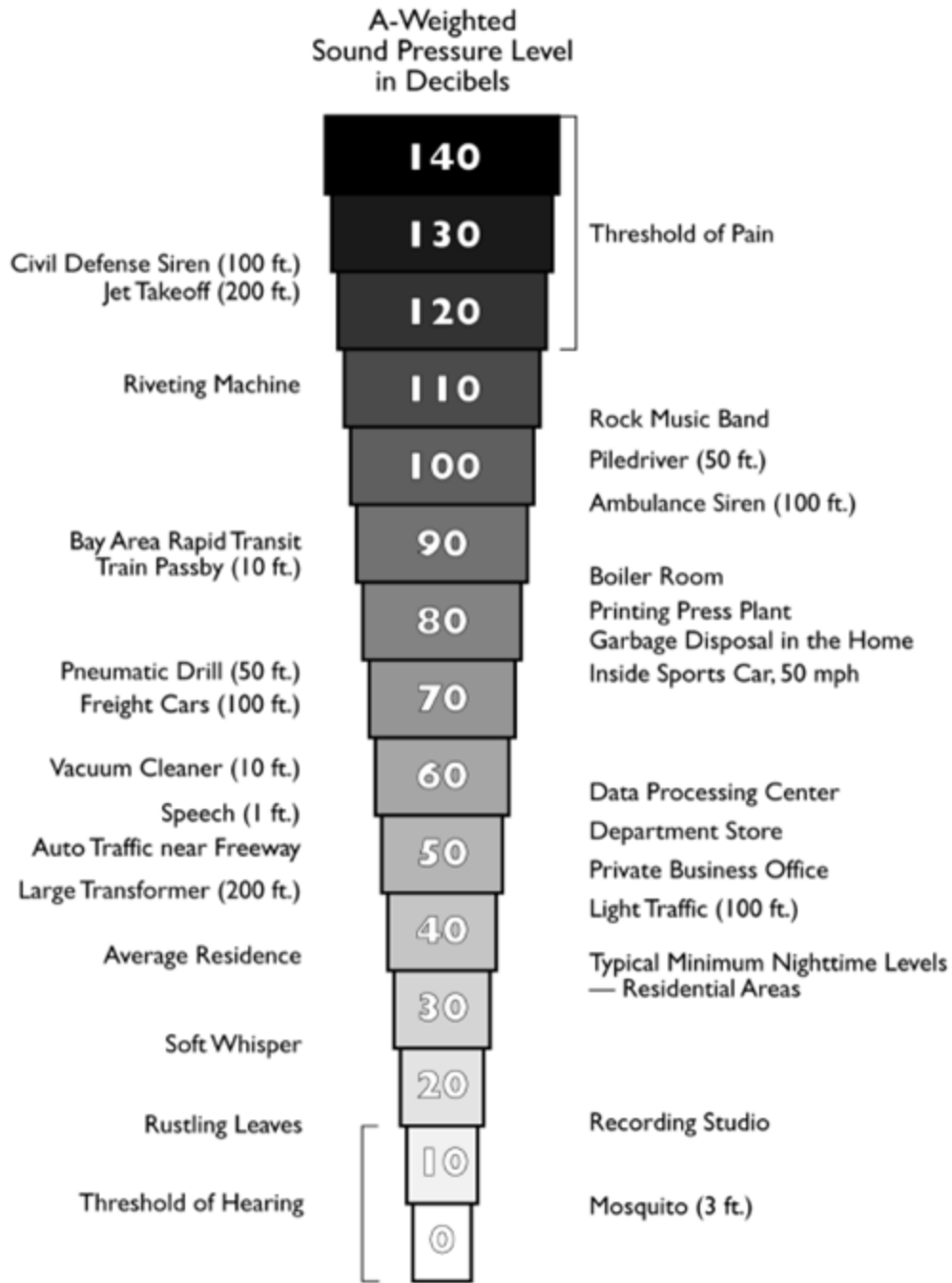
Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through performance standards in municipal codes or noise ordinances, as well as General Plan policies, included in this chapter, that are intended to guide and influence development plans.

The City's noise and land use compatibility standards define the type of land uses that can acceptably be developed in a given ambient noise environment. Depending on the type of land use to be built and ambient noise level at the site, noise that is anticipated to be generated by the new use is considered normally acceptable, conditionally acceptable, normally unacceptable, or clearly unacceptable. These compatibility noise standards are shown in Table 9-1 below.

Table 9-2 indicates acceptable limits of noise from transportation sources for various land uses in both exterior and interior environments. While Table 9-1 establishes standards to help the City establish the appropriateness of locating specific uses in noise-prone environments, Table 9-2 provides standards permitted development shall attain through noise attenuation measures; the standard for interior noise for residential land uses (45 dBA CNEL) is consistent with that in the California Building Code.



Figure 9-1 Noise Measurement



(n ft.) = Distance in feet between source and listener

TABLE 9-1: NOISE AND LAND USE COMPATIBILITY

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dB)						Interpretation
	55	60	65	70	75	80	
Residential - Low Density	Green	Yellow	Orange	Red			<p>Normally Acceptable Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.</p> <p>Conditionally Acceptable New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning features included in the design.</p> <p>Normally Unacceptable New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.</p> <p>Clearly Unacceptable New construction or development should generally not be undertaken.</p>
Residential - Multifamily	Green	Yellow	Orange	Red			
Transient Lodging - Motels, Hotels	Green	Yellow	Orange	Red			
Schools, Libraries, Churches, Hospitals, Nursing Homes	Green	Yellow	Orange	Red			
Auditoriums, Concert Halls, Amphitheaters	Yellow	Orange	Red				
Sports Arenas, Outdoor Spectator Sports	Yellow	Orange	Red				
Playgrounds, Neighborhood Parks	Green	Orange	Red				
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Green	Orange	Red				
Office Buildings, Business Commercial and Professional	Green	Yellow	Orange				
Industrial, Manufacturing, Utilities, Agriculture	Green	Yellow	Orange				

TABLE 9-2: ALLOWABLE NOISE EXPOSURE FROM TRANSPORTATION SOURCES

<i>Land Use</i>	<i>Outdoor Activity Areas¹ (dBA CNEL)</i>	<i>Interior Spaces² (dBA CNEL)</i>
Residential		
Single family, Duplex, Multifamily	50 – 60	45 – 55
Mobile Home	65	45
Commercial/Industrial/Institutional		
Hotel, Motel, Transient Lodging	-	45
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 Classrooms	65	45
Church, Library	-	45
Open Space		
Parks	65	-

1. Outdoor environment limited to: (1) Private yard of single family; (2) Multifamily private patio or balcony served by a means of exit from inside the dwelling (Balconies 6 feet deep or less are exempt); (3) Mobile home park; (4) Park picnic area; and (5) School playground.
2. Indoor environment includes bedrooms, living areas, bathrooms, toilets, closets, and corridors.
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as required by Building Code.
4. Exterior noise levels should be such that interior noise levels will not exceed 45 dBA CNEL. An exterior noise exposure level of 65 dBA CNEL is allowable for residential uses in a mixed-use project.

TABLE 9-3: NOISE GENERATION PERFORMANCE STANDARDS FOR NON-TRANSPORTATION SOURCES

<i>Noise Level Descriptor</i>	<i>Daytime (7 a.m.-10 p.m.)</i>	<i>Nighttime (10 p.m. to 7 a.m.)</i>
Hourly L_{eq} , dB	55	45
Maximum Level, dB	75	65

- Each of the noise levels specified above shall be lowered by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

Table 9-3 provides standards for noise generation from non-transportation noise sources such as industrial facilities, automotive servicing, or equipment yards. These standards apply to the noise sources themselves, as measured at the edge of the property line; noise caused by motor vehicles traveling to and from the site is exempt from this standard.

CITY OF CARSON NOISE ORDINANCE

In 1995, Carson adopted the Noise Control Ordinance of the County of Los Angeles, as amended, as the City's Noise Control Ordinance. The adopted Noise Ordinance sets standards for noise levels citywide and provides the means to enforce the reduction of obnoxious or offensive noise. The noise sources enumerated in the Noise Ordinance include radios, phonographs, loudspeakers and amplifiers, electric motors or engines, animals, motor vehicles and construction equipment. The Noise Ordinance sets interior and exterior noise levels for all properties within designated noise zones, unless exempted. Enforcing the Noise Ordinance includes requiring proposed development projects to show compliance with the ordinance and requiring construction activity (including operation of construction vehicles and other equipment) to comply with established scheduling limits. Environmental impacts of construction noise are assessed in the General Plan EIR, and future projects may also be subject to project-level analysis. In case of any discrepancies between the General Plan and the Noise Ordinance standards, standards in the General Plan prevail.

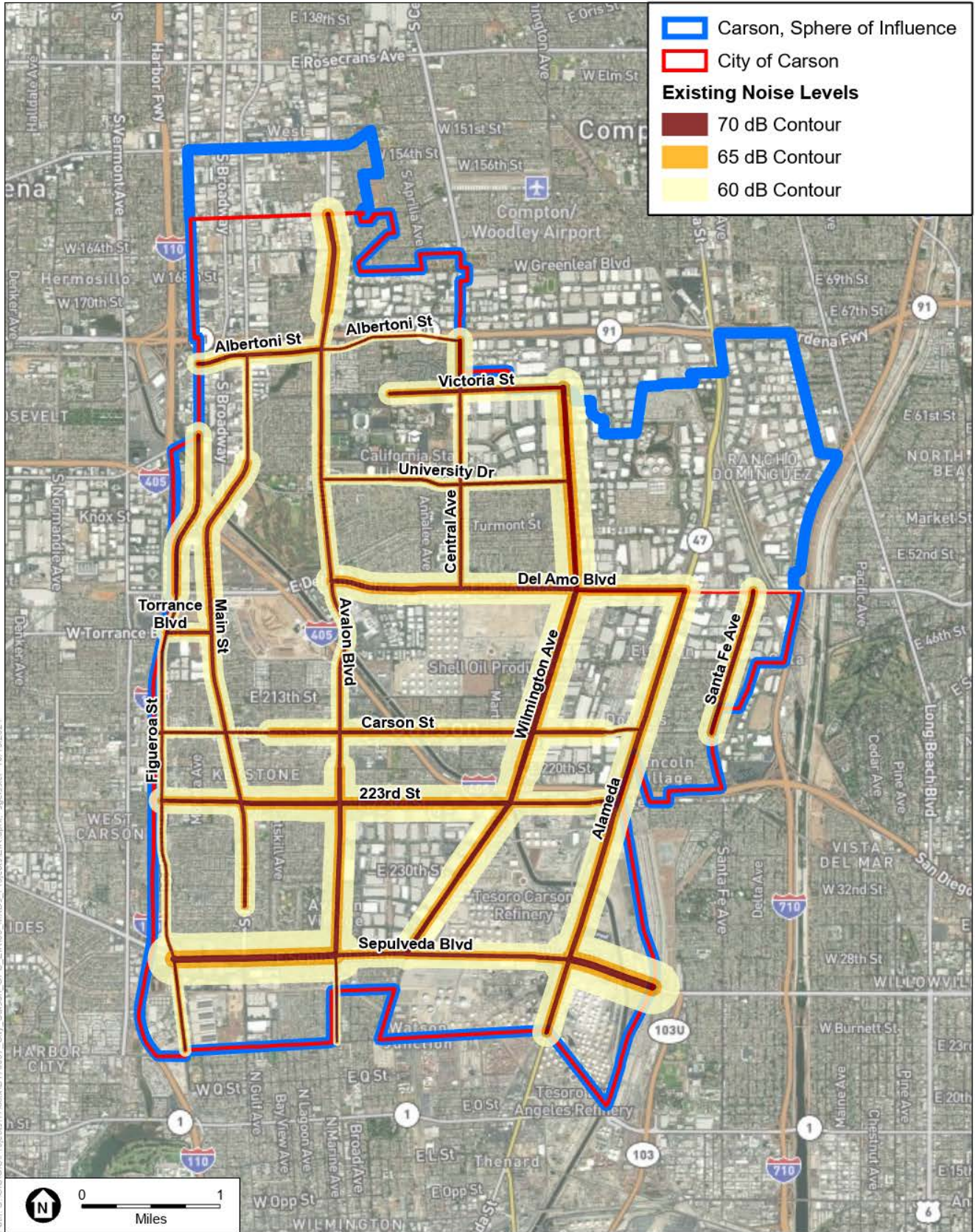
NOISE SENSITIVE RECEPTORS

The City has identified residences, public and private school/preschool classrooms, churches, hospitals and elderly care facilities as noise sensitive receptors. The maximum interior exposure for these land uses, consistent with State standards, is 45 dBA CNEL (maximum exterior exposure is 65 dBA CNEL).

The potential exists for noise sensitive receptors located adjacent to roadways to experience excessive noise levels. Depending on the setback location of these adjacent noise sensitive receptors and nature of existing noise attenuation features (if any), the 65 CNEL contour may fall within the outdoor living areas of these land uses (i.e., playground or backyard). Noise sensitive land uses are generally distributed throughout the city and directly abut noise generating uses in some areas. Please see the Land Use and Revitalization Element for more about existing land use patterns and General Plan land use designations.



Figure 9-2 Existing Roadway Noise Contours



SOURCE: ESA, 2021.

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9.2 Existing Noise Environment

AMBIENT NOISE

Carson's noise environment is predominantly characterized by vehicular-generated noise along Interstate 405 (I-405), State Route 91 (SR-91), Interstate 110 (I-110), and other primary and major arterial roadways. The Compton and Long Beach airports, railroad operations within the city, and other sources such as construction activities, power tools, industrial operations, gardening equipment, loudspeakers, auto repair, radios, children playing, and dogs barking also contribute to the overall noise environment.

To understand the existing community noise exposure levels (CNEL) throughout the city, long-term (24-hour) and short-term (15-minute) field measurements of the equivalent continuous sound pressure levels (Leq) were conducted in December 2017, taking into account both mobile and stationary noise sources. These measurements were taken in areas with single- and multifamily residential uses as well as near schools, which generally had an average noise level of about 71 dBA. More detailed information about existing noise levels is included in Chapter 4.11: Noise of the Environmental Impact Report (EIR).

ROADWAY NOISE

Existing roadway noise levels were calculated for 30 roadway segments in the city using the Federal Highway Administration's (FHWA's) Highway Noise Prediction Model and existing peak hour traffic volumes at the study intersections that were analyzed for the General Plan background traffic study conducted by Fehr & Peers in 2018. The FHWA model calculates the average noise level at specific locations based on traffic volumes, average speeds, and site environmental conditions.

The average daily noise levels along these roadway segments, and the line-of-sight distance from the roadway segment to the noise contours of 70, 65, and 60 dBA CNEL are shown in Figure 9-2. A noise contour is a line behind which the noise level does not exceed a certain value. For instance, the 60 dBA CNEL contour indicates that the CNEL between the roadway centerline and the contour line is equal to, or greater than 60 dBA; the CNEL beyond the contour line—away from the street—is less than 60 dBA CNEL.

AIRPORT NOISE

Long Beach (Daugherty Field) Airport is located in the City of Long Beach approximately 3.1 miles east of the City of Carson. The airport is subject to strict noise ordinances which limits airport noise and the number of commercial flights. The minimum allowed number of commercial flights per day is 41; the maximum number of commercial flights is determined by measured noise levels, and air carriers are permitted increases in the number of flights if they are below the noise budget, which seeks to maintain a CNEL within 65 dBA. The 65 dBA noise contours do not reach Carson’s City Limits.

RAIL NOISE

There are three railways that run through the Planning Area: The Alameda Corridor, the Burlington Northern Santa Fe (BNSF) Railway—also referred to as the Harbor Subdivision—and the Los Angeles Metropolitan Transportation Authority (Metro) Blue Line.

The Alameda Corridor is primarily used for goods movement from the Los Angeles and Long Beach ports and serves approximately 38 trains per day. Within city limits, it passes through predominantly industrial uses, though the northeastern portion between the I-405 and Dominguez Street is separated from single-family residential uses only by the four-lane Alameda Street.

The BNSF Railway also extends from the ports of Los Angeles and Long Beach to rail yards in Vernon. The line traverses the City of Carson in the southern portion of the city, extending west to the I-110 from the Alameda Corridor between Sepulveda and Lomita boulevards. The line has been sold to MTA and is currently under study for commuter rail use. BNSF retains rights to run freight on the tracks; however, since completion of the Alameda Corridor, use of this line for freight has significantly diminished.

Metro operates the Blue Line extending from Long Beach to Downtown Los Angeles. Commuter trains operate in 15-minute headways. The line primarily runs to the east of city boundaries adjacent, to industrial uses; however, the line runs near residential uses within Carson, northwest of the I-405 and I-710 interchange.

According to the United States Department of Transportation, the maximum sound level from a single noise event from rail transit is 88 dBA L_{max}^2 at a distance of 50 feet. Residential uses east of Alameda Street are located approximately 100 feet from the nearest track along the Alameda Corridor and would be exposed to approximately 82 dBA L_{max} when a train passes. Residential uses adjacent to the MTA Blue Line and the Harbor Subdivision are located approximately 50 feet from the track, resulting in maximum train noise exposure of 88 dBA L_{max} .

2 L_{max} is the highest root mean squared sound pressure level within a measured period of time.



9.2 Projected Noise Environment

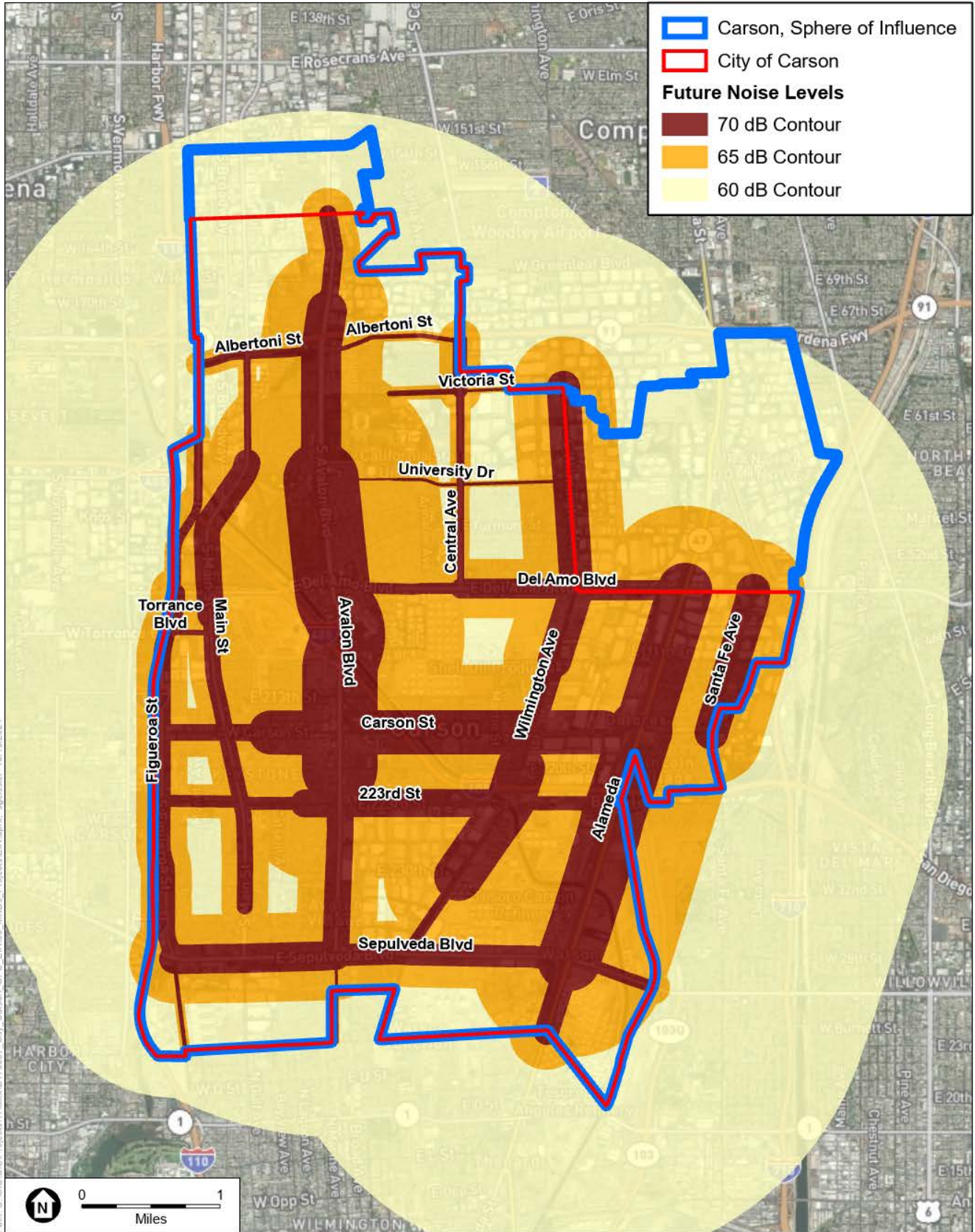
Future development within the City's Planning Area along with pass-through traffic will result in increased noise levels. The primary noise sources in Carson will continue to be I-405, I-110, SR-91, railroads, and traffic along other major thoroughfares. Future noise contours are illustrated in Figure 9-3. Compared with existing conditions, noise levels emanating from the freeways represent the greatest increase in potential noise impacts. Noise levels from the railroads are not expected to increase substantially. The 70 and 65 dB contours (the more severe impacts) are only projected to increase slightly over the planning period.

The noise exposure standards outlined in Table 9-1 in the form of a matrix explains the compatibility of land uses, given their respective levels of community noise exposure. This matrix can be used to review land use decisions within a given contour.

Increases in traffic levels may be counteracted by the implementation of alternate forms of transportation and land use design that reduce vehicle miles traveled in the region. In addition, the General Plan calls for locating noise-sensitive uses (e.g. residences, schools, other public facilities) away from high-noise areas, such as freeways and railroads. Where such uses are already planned, such as along Figueroa Street and along I-405, noise studies and additional mitigations are required under the General Plan and in accordance with State building standards. These measures include siting residences appropriately near noise sources and requiring design features to reduce impacts, such as natural berms, double-paned windows or soundproofing.



Figure 9-3 Future Roadway Noise Contours



SOURCE: ESA, 2021.

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9.3 Guiding and Implementing Policies

This section contains guiding and implementing policies that focus on citywide issues and those of a programmatic high-level nature as it relates to promoting a healthy noise environment in the community. Text in italics is for reference only and is not considered adopted policy.

GUIDING POLICIES

- NO-G-1** Maintain healthy sound environments and protect noise-sensitive uses from excessive noise exposure.
- NO-G-2** Continue efforts to incorporate noise considerations into land use planning decisions and guide the location and design of noise-generating facilities, such as transportation and industrial facilities, to minimize the effects of noise on adjacent land uses.
- NO-G-3** Seek to reduce noise impacts along major freeways, roadways, and truck routes to improve the health of nearby inhabitants.

IMPLEMENTING POLICIES

- NO-P-1** Use the noise and land use compatibility matrix (Table 9-1) and Future Noise Contours map (Figure 9-3) as criteria to determine acceptability of a land use. Seek to limit new noise-sensitive uses—including schools, hospitals, places of worship, and homes—where noise levels exceed “Normally Acceptable” or “Conditionally Acceptable” levels if alternative locations are available for the uses in the City, or impose appropriate mitigation measures to bring noise levels down to acceptable levels.
- NO-P-2** Require applicants for projects with noise exposure levels that exceed the standards listed in Table 9-1 to provide a technical analysis by a professional acoustical engineer and incorporate noise-attenuating features into site planning and architecture. With mitigation, development should meet the allowable outdoor and indoor noise exposure standards in Table 9-2, or California Building Code, whichever is stricter. When a building’s openings to the exterior are required to be closed to meet the interior noise standard, mechanical ventilation should be provided.

NO-P-3 Where site conditions permit, require noise buffering consistent with Policy NO-P-4 for all noise generators producing noise levels greater than the maximum allowed CNEL listed in Table 9-3, especially those located near noise-sensitive development.

NO-P-4 For aesthetic reasons, discourage the use of sound walls for noise mitigation; rather, encourage the use of project design techniques such as increasing the distance between the noise source and the noise sensitive receiver, natural berms, and use non-noise sensitive structures (e.g., a garage) to shield noise sensitive areas. If a sound wall is determined necessary to mitigate noise, discourage exclusive use of walls in excess of six feet in height and encourage use of natural barriers such as site topography or constructed earthen berms. When walls are determined to be the only feasible solution to noise mitigation, then sound walls shall be designed to limit aesthetic impacts.

NO-P-5 Require control of new developments deemed to be noise generators through site design, building design, landscaping, hours of operation, and other techniques for such that noise at site edges do not exceed performance-based standards outlined in Table 9-3.

NO-P-6 Work with Los Angeles Metropolitan Transportation Authority (Metro) and other service providers to ensure that transit services through the city result in minimal impacts from noise and ground-borne vibration.

NO-P-7 Seek to mitigate noise impacts from loud noise generating uses—including industrial uses, construction activity, goods movement by train and trucking, and along freeways, major corridors, and truck routes—to surrounding non-industrial uses.

NO-P-8 Review the City of Carson Noise Ordinance for adequacy to meet noise requirements set forth in the General Plan and amend as needed to address future community needs and development patterns.

