

8.14 NOISE



**SANTA CLARA
GENERAL PLAN**

8.14 NOISE

This section provides the basis for which noise is evaluated for the General Plan, including noise measurement and sources applicable to the City of Santa Clara.

Noise can be defined as a sound or series of sounds that are intrusive, irritating, objectionable and/or disruptive to daily life. Background noise is primarily the product of many distant noise sources, which constitute a relatively stable noise background exposure, with individual contributors unidentifiable. Noise levels are also affected by short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual. The known effects of noise on humans include hearing loss, communication interference, sleep interference, physiological responses and annoyance.

Factors that can influence human response to noise include intensity, frequency, and time pattern of noise sources; the amount of background noise present prior to the intruding noise; and the nature of work or human activity that is exposed to the noise. People in residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, natural areas, parks and outdoor recreation areas are generally more sensitive to noise than are people at commercial and industrial establishments. Consequently, noise standards for sensitive land uses are more stringent than for those at less sensitive uses. To protect various human activities in sensitive areas, lower noise levels are generally required.

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet Fly-over at 300m (1000 ft)	110	Rock Band
Gas Lawn Mower at 1 m (3 ft)	100	
Diesel Truck at 15 m (50 ft), at 80 km (50 mph)	90	Food Blender at 1 m (3 ft)
Noisy Urban Area, Daytime	80	Garbage Disposal at 1 m (3 ft)
Gas Lawn Mower, 30 m (100 ft)	70	Vacuum Cleaner at 3 m (10 ft)
Commercial Area		Normal Speech at 1 m (3 ft)
Heavy Traffic at 90 m (300 ft)	60	Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime		Library
Quiet Rural Nighttime	30	Bedroom at Night, Concert Hall (Background)
	20	Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

8.14.1 Noise Measurement

Noise is measured in decibels (dB), which are units of sound energy intensity. Sound waves, traveling outward from a source, exert a sound pressure level measured in dB. The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. To account for this variation, the A-weighted scale is used. A-weighting is a method of frequency weighting to account for the variation in sensitivity of the human ear to the range of frequencies of the audible spectrum. Average noise exposure in the community is measured by a Community Noise Equivalent Level (CNEL). This is the computed average of noise over a 24-hour period, weighted to reflect the increased sensitivity to noise during the evening and night.



Typically, decibel level changes of 1 dB cannot be distinguished, a 3 dB change is just noticeable, a change of 5 dB is distinct and a change of 10 dB is perceived as a doubling of noise. The General Plan noise standards are reflected on the following table.

TABLE 8.14-1: GENERAL PLAN NOISE STANDARDS

Noise and Land Use Compatibility (Ldn & CNEL)										
Land Use	50	55	60	65	70	75	80	85		
Residential	Compatible		Require Design and insulation to reduce noise levels			Incompatible. Avoid land use except when entirely indoors and an interior noise level of 45 Ldn can be maintained				
Educational	Compatible		Require Design and insulation to reduce noise levels			Incompatible. Avoid land use except when entirely indoors and an interior noise level of 45 Ldn can be maintained				
Recreational	Compatible				Require Design and insulation to reduce noise levels		Incompatible. Avoid land use except when entirely indoors and an interior noise level of 45 Ldn can be maintained			
Commercial	Compatible				Require Design and insulation to reduce noise levels		Incompatible. Avoid land use except when entirely indoors and an interior noise level of 45 Ldn can be maintained			
Industrial	Compatible					Require Design and insulation to reduce noise levels		Incompatible. Avoid land use except when entirely indoors and an interior noise level of 45 Ldn can be maintained		
Open Space	Compatible									
	Compatible									
	Require Design and insulation to reduce noise levels									
	Incompatible. Avoid land use except when entirely indoors and an interior noise level of 45 Ldn can be maintained									

8.14.2 Noise Levels and Sources

Transportation facilities, including vehicular traffic, railroads and the San José Norman Y. Mineta International Airport (Airport) are all factors in determining the noise environment of the City. The quietest areas of the City are those furthest from major City streets. The noisiest areas are under the airport flight pattern and immediately adjacent to freeways and railways.

8.14.3 Vehicular Traffic

Roadway traffic is one of the more prevalent sources of noise within the City. Traffic noise varies in how it affects land uses depending upon the type of roadway, distance of the land use from that roadway, topographical setting, and other physical land features such as walls, buildings and other structures. Some variables that affect the amount of noise emitted from a road are speed of traffic, flow of traffic and type of traffic (e.g. cars versus heavy duty trucks). Another variable affecting the overall measure of noise is a perceived increase in sensitivity to noise at night. Because of the high traffic volumes for the freeways and expressways in the area, U.S. 101, Central Expressway, Lawrence Expressway, San Tomas Expressway and Montague Expressway constitute the loudest roadway source noise in the City. Industrial and commercial uses are located primarily along U.S. 101 and Central Expressway; however, there are residences located along the Lawrence, San Tomas and Montague Expressways. Noise from arterial roadways is also a contributor to the noise environment.

8.14.4 Airports

The San José Norman Y. Mineta International Airport is located to the east of, and adjacent to, the City. Noise generated by aircraft using the Airport has a noticeable effect on Santa Clara residents in the area north of the U.S. 101. The City uses the official Santa Clara County ALUC Referral Boundary (65 dB CNEL) Map as a basis of referring proposed projects to the Airport Land Use Commission (ALUC). This is consistent with noise restrictions in the California Administrative Code, Title 21, Subchapter 6 “Noise Standards.” Local plans, policy actions or development activities that affect areas within the ALUC boundary need approval, or a finding of overriding consideration, prior to the issuance of local permits.

An important factor for calculated CNEL values is that, while the maximum noise levels produced by individual aircraft are a major component, CNEL does not explicitly measure peak, or maximum, noise levels. A CNEL of 65 dB means that peak noise levels above 65 db will likely be experienced. At CNEL 65 dB, individual aircraft noise events loud enough to be disruptive are common. Based on the noise monitoring survey conducted for the General Plan update, aircraft generate maximum noise levels in the range of 75 to 78 dBA Lmax at residences located north of U.S. 101.

8.14.5 Railroads

Two Union Pacific Railroad rail lines run through the City. The San Francisco line bisects the City in a generally east-west direction and generally forms a boundary between residential uses to the south and industrial uses to the north. The other rail line parallels Lafayette Street from State Route 237 in the north to El Camino Real where it turns to the east toward the Airport. Operations on these lines include both passenger and freight service, with spur tracks in industrial areas. Based on noise monitoring survey of existing operations, the San Francisco rail line generates a noise level of about 65 dBA CNEL at a distance of 100 feet and the Lafayette Street rail line generates a noise level of about 64 dBA CNEL at a distance of 100 feet.

8.14.6 Industry

Industrial and manufacturing facilities within the City involve moving and stationary noise sources that may affect adjacent noise-sensitive land uses. Industrial processes, such as fabricating and grinding, have the potential to exert a relatively high level of noise impact within their immediate operating environments. In addition, activities such as truck movements and deliveries can also generate noise along the local Roadway Network. The scope and degree of noise from industrial uses depends on various critical factors, including the type of industrial activity, hours of operation and the site’s location relative to other land uses. Residential land uses are adjacent to industrial land uses in the northeast area of the City, north of Bayshore in the Rivermark area. During the noise monitoring survey, industrial uses in this area generated a constant noise level of about 45 dBA at adjacent residences. Noisy activities could take place at other times of the day/year were not accounted for in the noise monitoring survey.



8.14.7 Other Noise Sources

Other sources of noise include commercial, recreational and school uses. Noise sources associated with commercial uses include mechanical equipment, as well as activities associated with parking lots and loading docks. Noise generating activities associated with schools include children at play, bells and public address systems. High schools may include stadiums for day and evening athletic events, and public address/loudspeaker systems.

Intermittent or temporary noise sources include construction noise and noise from landscaping maintenance activities. Although these noise sources are typically short in duration, they are often loud and can be a source of annoyance.