

Road Segments	Noise Monitoring Location	Measured Noise Level Adjusted to L_{dn}	Distance From Measurement to Roadway Centerline (ft.)	Distances From Roadway Centerline		
				70 L_{dn} Contour (ft.)	65 L_{dn} Contour (ft.)	60 L_{dn} Contour (ft.)
<u>I-80</u> •West side - no soundwall •East side - 6-ft. soundwall (Pinole) •East side - no soundwall (Pinole) •East side - terrain and soundwall •East side - terrain	LA	74	200	370	796	1715
	LB	65	500	232	500	1077
	LC	71	500	583	1256	2706
	LD	60	300	65	139	300
	L3	65	500	232	500	1077
<u>Route 4</u> •West of Willow •East of Willow •At Franklin Canyon	L2	70	250	250	539	1160
	L5	72	125	170	366	789
	S1	62	210	62	133	285
San Pablo Avenue •Near Hercules Ave. •Near Sycamore •Near Linus Pauling	L1	66	110	60	128	276
	S8	65	300	139	300	646
	L4	65	90	42	90	194
Sycamore •At Redwood	L7	67	60	38	82	176
	<u>Other Roadways</u> •Willow Ave. at Mariners Pointe •Refugio Valley Rd. •Pheasant Way near Tanager •Hercules near Zeus	L10	64	65	26	56
L8		66	60	32	70	151
L9		60	35	8	16	35
L11		65	30	14	30	65
<u>Railroads</u> •AT&SF RR behind City Hall •Union Pacific along the waterfront	L6	75	100	183	336	616
	L12	68	100	78	144	264

HERCULES NOISE CONTOURING

TABLE 5

GOALS AND POLICIES

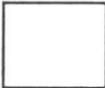
GOALS: The goals of the City of Hercules' Noise Element are to:

- Ensure that all new development is compatible with the existing and future noise environment;
- Prevent all new noise sources from increasing the existing noise level above acceptable standards; and
- Eliminate or reduce noise from existing or objectionable noise sources.

Policy 1: New residential development projects shall meet acceptable exterior noise level standards. The noise contour map on file at City Hall shall be used to screen projects to determine if acoustical studies will be required. The "normally acceptable" noise standards for new land uses established in Land Use Compatibility for Community Exterior Noise Environments shown in Table 6 shall be modified by the following:

- The maximum acceptable noise levels in residential areas is an L_{dn} of 60 dBA. This level shall guide the design and location of future development, and is a goal for the reduction of noise in existing development. A 60 dBA L_{dn} goal will be applied where outdoor use is a major consideration (e.g., backyards in single-family housing developments and recreation areas in multi-family housing projects). The outdoor standard will not normally be applied to small decks associated with apartments and condominiums, but these will be evaluated on a case-by-case basis. Where the City determines that providing an L_{dn} of 60 dBA or lower cannot be achieved after the application of feasible mitigations, an L_{dn} of 65 dBA may be permitted at the small decks at the discretion of the City Council.
- Indoor noise level shall not exceed an L_{dn} of 45 dBA in new housing units.

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE L _{dn} OR CNEL, dB					
	55	60	65	70	75	80
Residential, Hotels, and Motels		////////// //////////				XXXXXXXXXX XXXXXXXXXX
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds			////////// //////////			XXX XXX
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches		////////// //////////				XXXXXXXXXX XXXXXXXXXX
Office Buildings, Business Commercial, and Professional				////////// //////////		XXX XXX
Auditoriums, Concert Halls, Amphitheaters	////////// //////////					XXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX
Industrial, Manufacturing, Utilities, and Agriculture				////////// //////////		



NORMALLY ACCEPTABLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal convention construction, without any special insulation requirements.



CONDITIONALLY ACCEPTABLE

Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features are included in the design to mitigate noise to normally acceptable levels.



UNACCEPTABLE

New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

- If the noise source is a railroad, then the outdoor noise exposure criterion should be 70 dBA L_{dn} for future development.
- Noise levels in new residential development exposed to an exterior L_{dn} of 60 dBA or greater shall be limited to a maximum instantaneous noise level in bedrooms of 50 dBA. Maximum instantaneous noise levels in all other habitable rooms should not exceed 55 dBA. The typical repetitive maximum instantaneous noise level at each site would be determined by noise monitoring. Examples would include truck passbys on busy streets, train passbys and train warning whistles.
- Appropriate interior noise levels in commercial, industrial, and office buildings are a function of the use of space and shall be evaluated on a case-by-case basis. Interior noise levels in offices generally should be maintained at 45 dBA L_{eq} (hourly average) or less.
- These guidelines are not intended to be applied reciprocally. In other words, if an area currently is below the desired noise standards, an increase in noise up to the maximum should not necessarily be allowed. The impact of a proposed project on an existing land use should be evaluated in terms of the potential for adverse community response based on a significant increase in existing noise levels, regardless of the compatibility guidelines.
- For non-transportation related noise sources, outdoor noise levels within a residential property should not exceed the limits in Table 7. Interior noise levels shall be 15 decibels lower than those shown in Table 7.

Policy 2: New non-residential land development projects shall meet acceptable exterior noise level standards set forth in Table 6. The noise contour map on file at City Hall shall be used to screen projects to determine if acoustical studies will be required.

MAXIMUM ALLOWABLE NOISE EXPOSURE
STATIONARY NOISE SOURCES¹

	Daytime ⁵ (7 AM to 10 PM)	Nighttime ^{2,5} (10 PM to 7 AM)
Hourly L_{eq} , dBA ³	50	45
Maximum Level, dBA ³	70	65
Maximum Level, dBA Impulsive Noise ⁴	65	60

Note: Stationary noise sources include all non-transportation sources.

- ¹ As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures.
- ² Applies only where the receiving land use operates or is occupied during nighttime hours.
- ³ Sound level measurements shall be made with "slow" meter response.
- ⁴ Sound level measurements shall be made with "fast" meter response.
- ⁵ Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced 5 dBA if the ambient hourly L_{eq} is at least 10 dBA lower than the allowable level.

**Maximum Allowable Noise Exposure
Stationary Noise Sources**

Table 7

Policy 3: Protect existing noise-sensitive land uses from long-term noise impacts generated by new projects. The City shall use the following criteria to judge the significance of long-term noise impacts on existing noise-sensitive land uses:

- Noise level increases resulting from traffic associated with new projects will be considered significant if: (1) the noise level increase is 5 dBA Ldn or greater and the future noise level is less than 60 dBA Ldn; or (2) the noise level increase is 3 dBA Ldn or greater and the future noise level is 60 dBA Ldn or greater.
- Noise levels produced by stationary sources associated with new projects will be considered significant if they exceed the noise level standards set forth in Table 7 as measured at any affected noise-sensitive land use.
- Noise levels produced by other noise sources (such as ballfields, etc.) will be considered significant if an acoustical study demonstrates that a significant adverse community response would occur. The criteria to judge the significance of the community response would be based on acceptable analysis techniques such as the International Standards Organization's "Assessment of Noise with Respect to Community Response, ISOR-1996-1971".

Policy 4: Noise created by commercial or industrial sources associated with new projects or developments shall be controlled so as not to exceed the noise level standards set forth in Table 7 as measured at any affected residential land use.

Policy 5: Adopt/update a noise ordinance or nuisance ordinance to control noise generating activities, such as barking dogs, loudspeakers, parties, power tools, etc.

Policy 6: Control the level of noise at noise-sensitive land uses generated by construction activities through implementation of the following measures:

- For construction near noise-sensitive areas, as determined by the Community and Business Development Department, require that noisy construction activities (including truck traffic) be scheduled for periods, according to construction permit to limit impact on adjacent residents or other sensitive receptors.
- Develop a construction schedule that minimizes potential cumulative construction noise impacts and accommodates particularly noise-sensitive periods for nearby land uses (e.g., for schools, churches, etc.)
- Where feasible, require that holes for driven piles be pre-drilled to reduce the level and duration of noise impacts.
- Where feasible, construct temporary solid noise barriers between source and sensitive receptor(s) to reduce offsite propagation of construction noise. This measure could reduce construction noise by up to 5 decibels.
- Require internal combustion engines used for construction purposes to be equipped with a properly operating muffler of a type recommended by the manufacturer. Also, require impact tools to be shielded per manufacturer's specifications.

Policy 7: Reduce the level of truck-generated noise in residential areas through implementation of the following restrictions:

- The City shall restrict truck traffic in residential areas except for non-regular deliveries within the area or on designated truck routes. The City shall review and update the noise ordinance to limit truck traffic noise impacts to sensitive receptors.
- The City shall post signs prohibiting trucks from using the proposed Claeys Road extension, except for local deliveries. All other trucks shall be required to use Sycamore Avenue to reach the Claeys Road/SR4 interchange.

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IMPLEMENTATION

Implementation of the objectives and standards set forth in this element includes community planning procedures and noise attenuation techniques to eliminate much of the negative effects of noise through the design process. Some established communities have adopted noise ordinances where there has been a concern over rising noise levels. Noise levels should be monitored as the City grows and develops.

1. Community Planning Procedures

Noise considerations will be an integral part of the community planning and design process. At each phase, more definitive information will be required to insure that the objectives and standards of the Noise Element are satisfied. In a more specific sense the noise exposure contours are the City's noise data base, and will be of interest to all who prepare EIR's or are involved in the environmental impact review process.

The land use compatibility table will be helpful in identifying the potential noise impacts associated with a project during the initial study phase. Those who prepare EIR's or other environmental studies will use the noise exposure maps to help them in identifying noise impacts.

a. General Plan and Zoning Proposals

The review of the General Plan and zoning proposals considered noise in terms of general land use, open space, and traffic circulation patterns. Noise contour maps have been prepared for the present. These contours are not expected to change significantly in the future. Areas of potential noise impacts have been identified based on the community noise standards contained in this Element. These areas will received special attention in subsequent planning and design reviews.

b. Neighborhood Plans

The proposed neighborhood plan will be reviewed in terms of present and future noise levels and means of noise attenuation. Techniques such as site and building design, barriers, and traffic planning will be considered and incorporated into the Plan where needed.

c. Tentative Maps and Planned Unit Developments

Tentative maps and PUD's will incorporate noise attenuation techniques into the site design based on more definitive noise considerations. These can be required as conditions to the approval of such maps and permits.

2. Noise Attenuation Techniques

Where noise levels exceed community noise standards for a proposed land use, one or more of the following techniques may be required to reduce the noise to acceptable level.

a. Traffic Planning

Roadway design, traffic signalization and other traffic planning techniques can reduce noise caused by speed or acceleration of vehicles. The limiting of truck traffic to certain designated sections of the City can help in maintaining acceptable noise levels in residential neighborhoods.

b. Site Planning

Proper site planning to reduce noise impacts is the first area that should be investigated for a given project. By taking advantage of the natural shape and contours of the site, it is often possible to arrange the buildings and other uses in a manner which will reduce and possibly eliminate noise impact. Planning unit developments are particularly conducive to site planning techniques. Site planning techniques include:

- (1) Increasing the distance between the noise sources and the receiver.
- (2) Placing non-noise sensitive structures such as parking lots, maintenance facilities and utility areas between the source and the receiver.
- (3) Using non-noise sensitive structures such as garages to shield noise-sensitive areas.
- (4) Orienting buildings to shield outdoor spaces from a noise source.

c. Architectural Layout

In many cases, noise reduction requirements can be met by giving attention to layout of noise-sensitive spaces. Bedrooms, for example, will be considerably quieter if placed on the side of the house facing away from the freeway. Similarly, balconies facing freeways should be avoided. Quiet outdoor spaces can be provided next to a noisy highway by creating a U-shaped development which faces away from the highway. Proper architectural layout often can eliminate the need for costly construction modifications.

d. Noise Barriers

Noise barriers or walls are commonly used to reduce noise levels from ground transportation noise sources and industrial sources. Noise barriers serve a dual purpose in that they can reduce the noise level both outdoors and indoors.

To be effective, a noise barrier must be massive enough to prevent significant noise transmission through it and high enough to shield the receiver from the noise source. The minimum acceptable surface weight for a noise barrier is 4 lbs./sq. ft. (equivalent to 3/4-inch plywood) and the barrier must be carefully constructed so that there are no cracks or openings. To be effective, a barrier must interrupt the line-of-sight between the noise source and the receiver. As an example of this relationship, consider a flat area with a housing tract next to a road. If there are no diesel trucks on the road, a 7-foot high barrier will reduce the traffic noise by about 8 dBA. If there are trucks then the noise from the trucks will only be reduced by about 4 dBA. The reason is that the stacks of the diesel trucks will be visible above the barrier and the noise path will not be completely interrupted.

Another important and often overlooked consideration in the design of noise barriers is the phenomenon of "flanking". Flanking is a term used to describe the manner by which a noise barrier's performance is compromised by noise passing around the end of a barrier. Short barriers regardless of height, provide essentially no reduction in the overall noise level. The effects of flanking can be minimized by bending the wall back from the noise source at the ends of the barriers.

In addition to meeting acoustical requirements, noise barriers must be evaluated for possible maintenance problems, aesthetic and environmental considerations, safety conflicts and cost.

e. Construction Modifications

If site planning, architectural layout, noise barriers or a combination of these measures do not achieve the required noise reduction for the building in question, it will be necessary to modify the building's construction. Indoor noise levels due to exterior sources are controlled by the noise reduction characteristics of the building shell. The walls, roof, ceilings, doors, windows and other penetrations are all determinants of the structure's overall noise reduction capabilities.

In general, windows and doors are the acoustical weak links in a building. Often all that is required is that the windows be sealed on the noise side of the building and an alternate means of ventilating the building can be provided. Beyond this, thicker windows or double-glazed windows will be required. Doors should not be located on the side of the building facing a noisy source. If they are, they should be solid-core doors and should be equipped with an appropriate acoustical door gasket.

In cases where more noise reduction is required, the ceiling/roof and/or the walls must be modified to provide the required noise reduction. The actual modifications will depend on the amount of noise reduction required.

f. The Noise Exposure Contours and The California Noise Insulation Standards

The California Noise Insulation Standards (Title 24 of the California Government Code) for multi-family dwellings requires an acoustical report for dwellings proposed in areas where the L_{dn} exceeds 60 dBA. The purpose of the acoustical report is to demonstrate the manner by which the development will meet the standards for interior noise levels. The 60 dBA L_{dn} noise contour on the noise exposure map should be used to determine where a noise measurement will be required to determine compliance with the standard. In those cases where the development would be located in an area where the L_{dn} exceeds 60 dBA, on-site noise measurements should be required because local on-site conditions may cause somewhat different noise levels than the contours show. If the noise measurement shows that the on-site L_{dn} exceeds 60 dBA, then the acoustical report would be required. Developments located outside the 60 dBA L_{dn} contour would not require a measurement.

3. Noise Monitoring

Noise levels from transportation systems and other sources should be monitored in terms of community standards as the City grows. If levels are found to be increasing to unacceptable levels, the City may choose to adopt and enforce ordinances regulating various noise generators within the City.

Adequate enforcement of the ordinance would require expertise necessary to accurately measure noise levels and analyze noise reduction alternatives. The role of enforcement could be handled by the police.