

3.14 NOISE

Noise is often referred to as “unwanted sound.” Noise interferes with human activities that depend on audible communication. Noise distracts us from activities that require concentration, and interferes with sleep. At high levels, noise can be painful or can permanently damage our hearing.

Sound is quantified by measuring the energy carried by pressure waves in the air. The sound energy is converted to a numerical value by comparing it to the amount of energy produced by a reference pressure at the threshold of audibility, and the resulting ratio is expressed as a sound level. Because of the wide range of sound energy that is audible to humans, sound levels are expressed on a logarithmic scale of “decibels” (abbreviated as dB), in which an increase of 10 units on the decibel scale reflects a 10-fold increase in sound energy. A 10-fold increase in sound energy roughly translates to a doubling of perceived loudness to humans.

In evaluating human response to noise, acousticians compensate for the response of people to varying frequency or “pitch” components of sound. The human ear is most sensitive to sounds in the middle frequency range used for human speech, and is less sensitive to lower and higher-pitched sounds. The “A” weighting scale is used to account for this sensitivity; thus, most community noise standards are expressed in dB on the “A”-weighted scale, abbreviated dB(A). Zero on the dB scale is set roughly at the threshold of human hearing. Table 3.14-1 shows the relationship of various noise levels to commonly experienced noise events.

3.14.1 Noise Standards

Community noise consists of a wide variety of sounds, some near and some far away, which vary over the 24-hour day. Scientists and planners have found that humans respond generally to the 24-hour variation in noise based on the total energy content of the sound over the day, with a greater sensitivity to noise in the evening and at night.

State of California

California standards for community noise use the Community Noise Equivalent Level (CNEL), in which the energy is averaged over a 24-hour day with a 5-dB penalty from 7:00 p.m. to 10:00 p.m. and a 10-dB penalty from 10:00 p.m. to 7:00 a.m. The USEPA uses the Day-Night Noise Level (L_{dn}) measure, which is identical to the CNEL but without the evening noise weighting. The USEPA has

**Table 3.14-1
Sound Levels of Typical Noise Sources and Noise Environments**

Noise Source (at a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgement of Noise Loudness*
Military Jet Take-off with After-burner (50 ft) Civil Defense Siren (100 ft)	130	Carrier Flight Deck	
Commercial Jet Take-off (200 ft)	120	Commercial Airport Runway	Threshold of Pain *32 times as loud
Pile Driver (50 ft)	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Power Lawn Mower (3 ft)	100		Very Loud *8 times as loud
Motorcycle (25 ft) Propeller Plane Flyover (1000 ft)	90	Boiler Room Printing Press Plant	*4 times as loud
Diesel Truck, 40 mph (50 ft) Garbage Disposal (3 ft)	80	High Urban Ambient Sound	*2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (3 ft) Electronic Typewriter (10 ft)	70		Moderately Loud *70 dB (Reference Loudness)
Normal Conversation (5 ft) Air Conditioning Unit (100 ft)	60	Data Processing Center Department Store	*1/2 as loud
Light Traffic (100 ft)	50	Private Business Office	*1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	Quiet *1/8 as loud
Soft Whisper (5 ft)	30	Quiet Bedroom	
	20	Recording Studio	Just Audible
	10		Threshold of Hearing
	0		

*Relative to a Reference Loudness of 70 Decibels

found that the point where noise becomes a significant contributor to what most people perceive as the environmental quality of their residential area is 55 dBs. At 65 dBs CNEL or L_{dn} , noise clearly has a significant adverse effect on environmental quality in residential areas.

Title 24 of the California Administrative Code requires that residential structures, other than detached single-family dwellings, be designed to prevent the intrusion of exterior noise so that the interior CNEL with windows closed, attributable to exterior sources, shall not exceed 45 dB in any habitable room. For areas where exterior noise levels are above 60 dB CNEL, a noise evaluation is required to determine if additional sound insulation is required to meet this standard.

City of Tustin

Noise standards for the City of Tustin are contained in the General Plan, Noise Element (City of Tustin 1994) and in the Tustin City Code, Chapter 6, Noise Control. Table 3.14-2 shows the noise and land use compatibility standards in the City of Tustin. These standards limit construction activities to between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, and the hours of 9:00 a.m. and 5:00 p.m. on Saturdays, and never on Sundays or city-observed federal holidays.

City of Irvine

Noise standards for the City of Irvine are contained in the General Plan, Noise Element (City of Irvine 1997) and in the Irvine Municipal Code (Title 6, Division 8, Chapter 1). Table 3.14-3 shows the noise and land use compatibility standards for the City of Irvine. These standards limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and the hours of 9:00 a.m. and 6:00 p.m. on Saturday, and never on Sundays or city-observed federal holidays.

City of Santa Ana

Noise standards for the City of Santa Ana are contained in the General Plan, Noise Element (City of Santa Ana 1997) and in the Santa Ana Municipal Code (Noise Control, Article 6, Subsection 18-314, Subsection E). Table 3.14-4 shows the noise and land use compatibility standards for the City of Santa Ana. These standards limit construction activities to between the hours of 7:00 a.m. and 8:00 p.m., Monday through Saturday, and never on Sundays or city-observed federal holidays.

3.14.2 Sensitive Receptors

Residences, schools, libraries, hospitals, and recreational areas are generally considered sensitive noise receptors. Existing on-site residential developments are considered sensitive noise receptors. The area surrounding the site contains numerous sensitive receptors in the cities of Irvine, Tustin, Santa Ana, and the County of Orange.

**Table 3.14-2
City of Tustin
Noise/Land Use Compatibility Standards**

Land Use Categories		Community Noise Equivalent Level CNEL (dBA)						
		<55	60	65	70	75	80>	
Categories	Uses							
RESIDENTIAL	Single Family, Duplex, Multiple Family	A	A	B	C	C	D	D
RESIDENTIAL	Mobile Home	A	A	B	C	C	D	D
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional, village District, special	Commercial Retail, Bank, Restaurant, Movie Theater	A	A	A	A	B	B	C
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheater, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Childrens' Amusement Park, Miniature Golf Course, Co-cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
COMMERCIAL General, special INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehouse, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library, Schools' Classroom	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

Interpretation

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

Source: City of Tustin 1994a

**Table 3.14-3
City of Irvine
Noise/Land Use Compatibility Standards**

Land Use Categories		Energy Average (CNEL)						
Categories	Uses	<55	60	65	70	75	80>	
RESIDENTIAL	Single Family	A	A	B	B	C	D	D
RESIDENTIAL	Mobile Home	A	A	B	C	C	D	D
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional, village District, special	Commercial Retail, Bank, Restaurant, Movie Theater	A	A	A	A	B	B	C
COMMERCIAL INDUSTRIAL INSTITUTIONAL General	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheater, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Childrens' Amusement Park, Miniature Golf Course, Co-cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
COMMERCIAL General, special INDUSTRIAL General INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehouse, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library, Schools' Classroom	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

Interpretation

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

Source: City of Irvine 1997

Table 3.14-4
City of Santa Ana
Noise/Land Use Compatibility Standards

Land Use	Desirable Maximum (CNEL)	Maximum Acceptable (CNEL)
Residential, Low Density	55	65
Residential, Medium Density	60	65
Residential, High Density	65	70
Schools	60	70
Commercial, Office	65	75
Industrial	70	75

Source: City of Santa Ana 1997

3.14.3 Existing Noise Sources and Noise Levels

The major noise sources at and near the site are motor vehicles and railroad trains. There are currently no aircraft operations at MCAS Tustin but the historic helicopter noise is addressed under baseline, Section 3.14.4. The MCAS Tustin site is both a source and a receptor of noise.

Traffic Noise

Noise from vehicular traffic generates noise levels of 70 dB CNEL or greater on many streets adjacent to or near the reuse plan area. Adjacent to the Air Station, only Warner Avenue does not have a 70 dB CNEL at 75 feet from the street centerline along abutting properties, due to its low traffic volumes. A listing of selected existing traffic noise levels on major roadways near the site is shown in Table 3.14-5. The noise levels were calculated from the existing traffic volumes listed in the MCAS Tustin traffic study, Appendix F to this EIS/EIR, using the Federal Highway Administration (FHWA) *Highway Traffic Noise Prediction Model* (1978). Noise levels greater than 65 dB CNEL could be incompatible with adjacent land uses, in accordance with the standards shown in Tables 3.14-2 through 3.14-4. However, most of the residential developments on major roadways in the area have solid walls between the roads and the homes. These walls provide noise attenuation, and are likely to reduce the exterior noise levels to 65 dB CNEL or less.

Railroad Noise

The MCAS Tustin site is affected by noise from an existing railroad parallel to Edinger Avenue. Until 1994, noise was generated only by Amtrak passenger trains and Atchison, Topeka and Santa

**Table 3.14-5
Selected Existing Traffic Noise Levels**

City Roadway	Noise Level (NL) at 75 feet from roadway centerline, dB CNEL		
	NL < 70	65 < NL < 70	NL < 65
Tustin			
Red Hill north of Warner	X		
Red Hill north of Edinger	X		
Red Hill south of Edinger	X		
Red Hill north of I-5	X		
Valencia west of Red Hill			X
Tustin/Santa Ana			
Red Hill north of Dyer/Barranca	X		
Tustin/Irvine			
Barranca east of Red Hill	X		
Harvard north of Warner		X	
Harvard south of Irvine Center		X	
Harvard north of Irvine Center		X	
Harvard north of Warner		X	
Jamboree north of Barranca	X		
Santa Ana			
Warner east of Grand		X	
Irvine			
Barranca east of Jamboree		X	
Harvard north of Barranca		X	
Irvine east of Jamboree		X	
Warner east of Culver			X
Warner west of Culver			X
Warner west of Harvard			X

Fe (AT&SF) freight trains. Noise from the trains, combined with noise from vehicular traffic on Edinger Avenue generated an average noise level of about 70 dB CNEL at the MCAS Tustin northern boundary (City of Tustin 1993a).

In March 1994, the SCRRA began the Metrolink Orange County Line commuter rail service. The current number of Metrolink trains on the line is 19 (Metrolink 1999). The current number of Amtrak passenger trains on the line is approximately 30 (Amtrak 1999). Freight trains of the Burlington Northern Santa Fe also use the tracks. The Draft Noise Element of the City of Tustin General Plan (City of Tustin 1997a) indicates that an increase of railroad noise up to 6 dB CNEL may be expected by the year 2010 due to increased commuter rail traffic. Maintenance of the railroad track, which may occur between midnight and 4:00 a.m., when fewer trains are scheduled to operate, may include noisy, heavy on-track equipment, bright lights, and dust (OCTA 1998).

Aircraft Noise

John Wayne Airport is located about two miles to the southwest. MCAS Tustin is not included in the John Wayne Airport Planning Area. The Airport Environs Land Use Plan does not show a 60 dB CNEL contour over MCAS Tustin from John Wayne Airport (Airport Land Use Commission 1995).

3.14.4 Baseline Noise Sources and Noise Levels

As described in Section 3.0, the noise impact analyses compare traffic conditions for each reuse alternative and the No Action Alternative with a corresponding "baseline" condition. The following sections describe the baseline noise sources and levels.

Traffic Noise

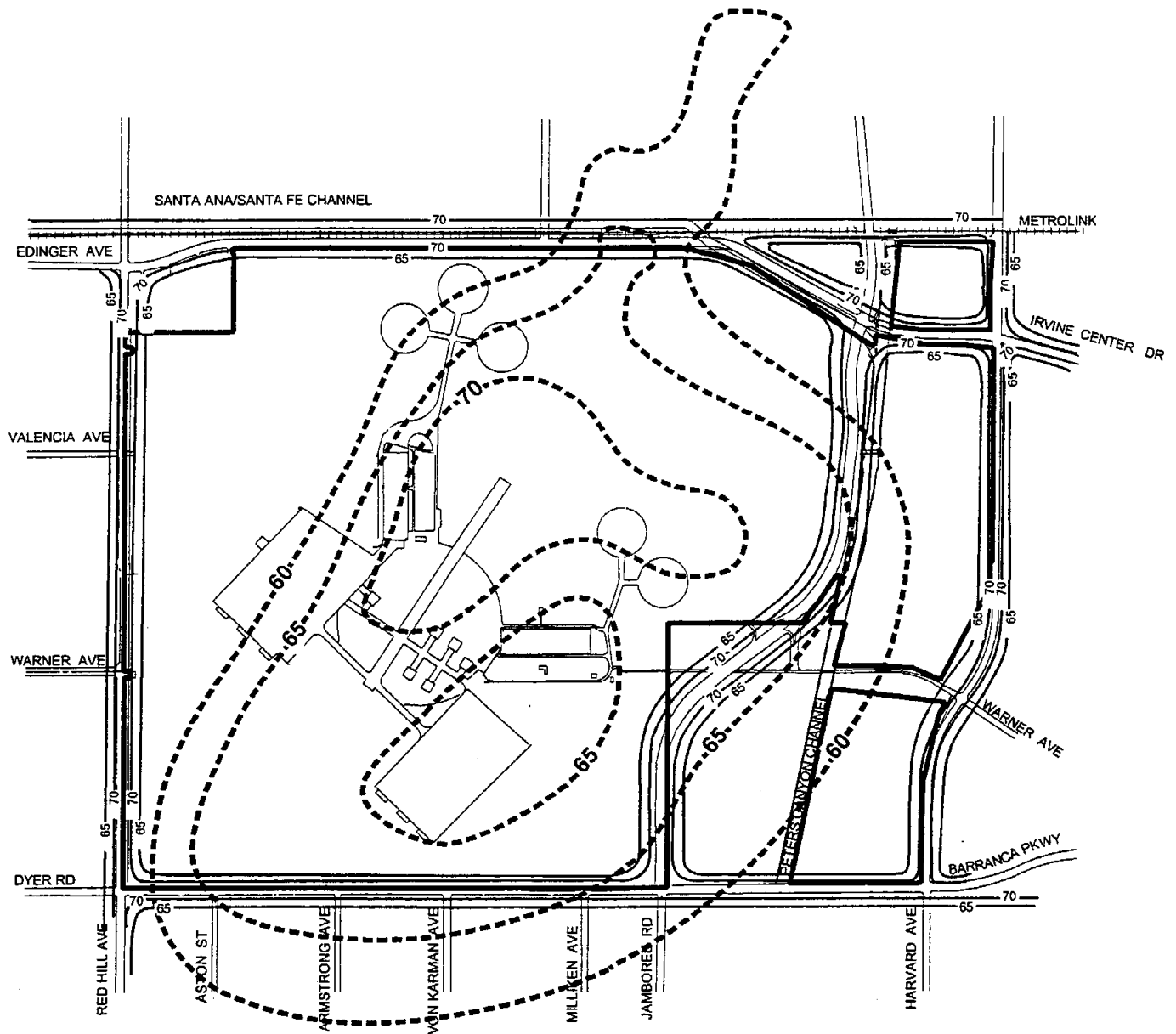
As indicated in Section 3.12 of this EIS/EIR, comparison of traffic counts taken in 1993 and 1997/98 in the reuse plan area indicate similar volumes. Therefore, baseline traffic noise levels are similar to the existing traffic noise levels described in Section 3.14.3 and Table 3.14-5, above. Baseline traffic noise contours are shown on Figure 3.14-1.

Railroad Noise

In the NEPA baseline condition, there were Amtrak and freight operations on the rail line but, as described in Section 3.14.3 above, Metrolink operations had not started. Baseline railroad noise contours are shown on Figure 3.14-1.

Aircraft Noise

In the baseline condition, military helicopter operations generated aircraft noise that affected the areas in the vicinity of the reuse plan area and around the flight paths. The runway is located in the center of the Air Station, and its operations exposed most of the site to a CNEL in the range of 65 to over 70 dB. Aircraft noise contours are shown in Figure 3.14-1. No residential land uses, within or outside of the reuse plan area, are within the 65 dB CNEL aircraft noise contour. Residential land uses within the 60 dB CNEL contour are limited to two portions of military housing on either side of Warner Avenue, adjacent to Jamboree Road.



REUSE PLAN BOUNDARY

--70-- HELICOPTER NOISE CONTOURS, dB, CNEL

--70-- TRAFFIC AND TRAIN NOISE CONTOURS, dB, CNEL

NOTE: TRAFFIC AND NOISE CONTOURS ARE FOR FLAT TOPOGRAPHY. THERE ARE WALLS AT RESIDENTIAL PROPERTIES WITHIN THE REUSE PLAN AREA ALONG EDINGER AVENUE AND ALONG HARVARD AVENUE THAT ATTENUATE TRAFFIC NOISE BY AT LEAST 5 dB. THERE ARE ALSO WALLS AT MOST OFF SITE RESIDENTIAL AREAS THAT FACE MAJOR ROADWAYS.

Source: Traffic Noise Contours based on traffic volumes from *MCAS Reuse Plan Traffic Study*, City of Tustin, March 1999; Aircraft Noise Contours from *Masterplan Marine Corps Air Station Tustin*, DON 1989

Base map: HNTB 1999



Figure 3.14-1
Baseline Aircraft and Traffic
Noise Contours