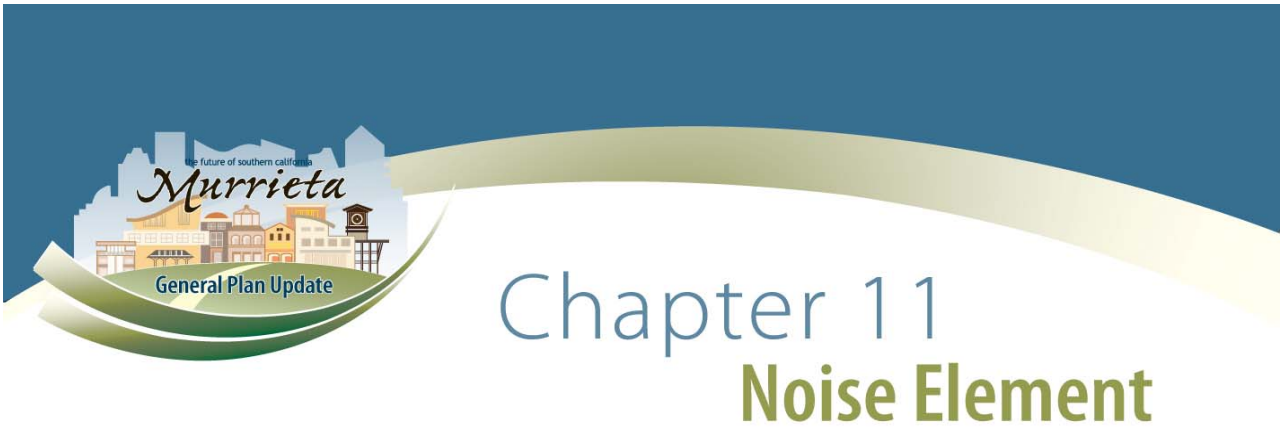
Chapter 11:
Noise Element



Chapter 11
Noise Element

11.1 INTRODUCTION

The Noise Element examines noise sources in the City to identify and assess the potential for noise conflicts and problems, and to identify ways to reduce existing and potential noise impacts. This Element addresses noise that affects the larger community, rather than noise associated with site-specific conditions. Existing and future noise from mobile and stationary sources are considered, as well as the compatibility of land uses and sensitive receptors. The Element identifies projected noise levels and contains goals and policies to maintain noise levels that are compatible with various types of land uses, as well as prevent high noise levels in sensitive areas. The regulatory framework, background information, and existing and future conditions can be found in the General Plan EIR.

11.2 AUTHORITY FOR ELEMENT

Government Code Section 65302(f) requires that a General Plan include:

> *"... a noise element which shall identify and appraise noise problems in the community. The Noise Element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify… current and projected noise levels for all of the following sources: (1) highways and freeways; (2) primary arterials and major local streets; (3) passenger and freight on-line railroad operations and ground rapid transit systems; (4) commercial, general aviation, heliport, and military airport operations, aircraft overflights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation; (5) local industrial plants, including but not limited to, railroad classification yards; (6) other ground stationary noise sources identified by local agencies as contributing to the community noise environment."*

11.3 SUMMARY OF EXISTING STANDARDS AND CONDITIONS

Noise, defined as unwanted sound, is principally caused by the operation of machinery for transportation (automobiles, trucks, trains, and aircraft) and machinery for production (industry and construction). Noise affects the quality of the environment, both at home and work, as well as enjoyment of recreational activity. Excessive amounts of noise may have adverse affects on physical activity and psychological stability. The effect of noise on the individual and the community varies with its duration, intensity, and the tolerance level of the individual.

NOISE DESCRIPTORS

The standard unit of measurement of the loudness of sound is the decibel (dB). This unit expresses an exponential increase, where an increase of 10 decibels represents a tenfold increase in the sound generated. In order to describe "average noise levels," the measurements are then weighted and added over a specified time period to reflect the magnitude of the sound, as well as its duration, frequency, and time of occurrence.

The sound pressure level is measured on a logarithmic scale. The 0 dB level is based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). The decibel scale has a value of 1.0 dB at the threshold of hearing and 140 dB at the threshold of pain. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. A 1.0-decibel increase is just audible, and a 10-decibel increase means the sound is perceived as being twice as loud as before. In most situations a 3 dB change in sound pressure level is considered a "just-detectable" difference and a 5 dB change (either louder or quieter) is readily noticeable.

Sound from a small localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates or drops-off at a rate of 6 dB for each doubling of the distance (6 dB/DD). This decrease, due to the geometric spreading of the energy over an ever-increasing area, is referred to as the inverse square law. However, highway traffic noise is not a single, stationary point source of sound. The movement of the vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. Since the change in surface area of a cylinder only increases by two times for each doubling of the radius instead of four times associated with spheres, the change in sound level is 3 dB per doubling of distance.

Noise levels are expressed as A-weighted decibels (dBA), which adjusts the actual sound level to reflect only those frequencies audible to the human ear. The human ear is most sensitive to frequencies around 4,000 Hz (about the highest note on a piano) and less sensitive to low frequencies below 100 Hz (such as a low rumble). Other examples of the decibel level of various noise sources include: the quiet rustle of leaves (10 dBA), a soft whisper (20 to 30 dBA), the hum of a small electric clock (40 dBA), ambient noise outdoors or in a kitchen (50 dBA), normal conversation at five feet (55 dBA), and a busy street at 50 feet (75 dBA).

Examples of various sound levels are shown in *Exhibit 11-1, Sound Levels and Human Response*.

SCALES AND DEFINITIONS

Numerous methods have been developed to measure sound over a period of time. These methods typically include (1) the community noise equivalent level (CNEL); (2) equivalent sound level (Leq); and (3) day/night average sound level (Ldn). These methods are described in *Table 11-1, Noise Descriptors*.

Table 11-1
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM.
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The L_{dn} is calculated by averaging the Leq's for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM), by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Single Event Noise Exposure Level (SENEL)	The Single Event Noise Exposure Level (SENEL) is the most appropriate noise level duration rating scale for a single noise occurrence. The SENEL, given in decibels, is the noise exposure level of a single event measured over the time interval between the initial and final times for which it exceeds the threshold noise level.
Exceedance Level (L_n)	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (L_{01}, L_{10}, L_{50}, L_{90}, respectively) of the time during the measurement period.
Source: Cyril M. Harris, *Handbook of Noise Control*, 1979.	

SENSITIVE NOISE RECEPTORS

Sensitive populations are more susceptible to the effects of noise and air pollution than are the general population. Land uses considered sensitive by the State of California include schools, playgrounds, athletic facilities, hospitals, rest homes, rehabilitation centers, long-term care and mental care facilities. Some jurisdictions also consider day care centers, single-family dwellings, mobile home parks, churches, and libraries to be sensitive to noise. Generally, a sensitive receptor is identified as a location where human populations (especially children, senior citizens, and sick persons) are present, and where there is a reasonable expectation of continuous human exposure to noise.

Schools are a type of land use that is considered sensitive to noise.

According to the Murrieta Police Department, other than noise complaints associated with site-specific domestic activity, the majority of calls include complaints pertaining to commercial activities such as deliveries/loading docks, lot sweeping, employee activities (i.e., talking and music), and mowing.

Land uses less sensitive to noise are business, commercial, and professional developments. Noise receptors categorized as being least sensitive to noise include industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, motorcycle parks, rifle ranges, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals. These types of land uses often generate high noise levels. Moderately sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, and outpatient clinics. Current land uses located within the City that are sensitive to intrusive noise include residential uses (particularly those in the vicinity of I-15 and I-215 Freeways), schools, hospitals (particularly the Golden Triangle Medical Center and Rancho Springs Medical Center), churches, and parks.

NOISE REGULATIONS

Noise Standards and Land Use Compatibility

The State of California General Plan Guidelines, published by the state Governor's Office of Planning and Research (OPR), provides guidance for the acceptability of specific land use types within areas of specific noise exposure. *Table 11-2*, *Land Use Compatibility for Community Noise Environments*, presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. OPR guidelines are

advisory in nature. Local jurisdictions, including the City of Murrieta, have the responsibility to set specific noise standards based on local conditions.

Table 11-2
Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density, Single-Family, Duplex, Mobile Homes	50 - 60	55 – 70	70 – 75	75 – 85
Residential – Multiple Family	50 – 65	60 – 70	70 – 75	70 – 85
Transient Lodging – Motel, Hotels	50 – 65	60 – 70	70 – 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 – 70	70 – 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 – 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 – 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 77.5	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 – 80	80 – 85
Office Buildings, Business Commercial and Professional	50 – 70	67.5 – 77.5	75 – 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 – 80	75 – 85	NA

CNEL = community noise equivalent level; NA = not applicable

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.
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 have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
NORMALLY UNACCEPTABLE: New construction or development should 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 must be included in the design.
CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken.

Source: Office of Planning and Research, California, *General Plan Guidelines,* October 2003.

City of Murrieta Noise Standards

The City of Murrieta's regulations with respect to noise are included in Chapter 16.30 of the *Development Code*, also known as the *Noise Ordinance*. Construction-related and operational noise restrictions are discussed below.

- **Construction Noise.** Section 16.30.130 of the City of Murrieta *Noise Ordinance* regulates construction noise. The *Noise Ordinance* prohibits noise generated by construction activities between the hours of 7:00 PM and 7:00 AM and on Sundays and holidays. Construction activities shall be conducted in a manner that the maximum noise levels at the affected structures will not exceed those listed in *Table 11-3, City of Murrieta Construction Noise Standards*.

Table 11-3
City of Murrieta Construction Noise Standards

Equipment Type	Single-Family Residential	Multi-Family Residential	Commercial
Mobile Equipment			
Daily, except Sundays and holidays, 7:00 AM to 8:00 PM	75 dBA	80 dBA	85 dBA
Daily, except Sundays and holidays, 8:00 PM to 7:00 AM	60 dBA	64 dBA	70 dBA
Stationary Equipment			
Daily, except Sundays and holidays, 7:00 AM to 8:00 PM	60 dBA	65 dBA	70 dBA
Daily, except Sundays and holidays, 8:00 PM to 7:00 AM	50 dBA	55 dBA	60 dBA
Source: City of Murrieta, *City of Murrieta Development Code Section 16.30.130*.			

- **Operational Noise.** Within the City of Murrieta, the *Noise Ordinance* governs operational noise generated between two properties and does not regulate noise from transportation sources, such as traffic, aircraft, and railways. Section 16.30.090 of the *Noise Ordinance* establishes the exterior noise standards for all receptor properties within a designated noise zone. The City's exterior noise level limits between properties are presented in *Table 11-4*, *City of Murrieta Exterior and Interior Noise Limits*.

Table 11-4
City of Murrieta Exterior and Interior Noise Limits

Noise Zone	Land Use (Receptor Property)	Time Period	Allowed Exterior Noise Level (dBA)
Exterior Noise Limits			
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 PM to 7:00 AM	45
		7:00 AM to 10:00 PM	50
	Residential properties within 500 feet of a kennel(s)	7:00 AM to 10:00 PM	70
III	Commercial properties	10:00 PM to 7:00 AM	55
		7:00 AM to 10:00 PM	60
IV	Industrial properties	Anytime	70
Interior Noise Limits			
All noise zones	Multi-family residential	10:00 PM to 7:00 AM	40
		7:00 AM to 10:00 PM	45
Source: City of Murrieta, *City of Murrieta Development Code Section 16.30.090*.			

Section 16.30.090(B) of the *Development Code* further restricts noise levels. Section 16.30.090(B) states, in part:

> *No person shall operate or cause to be operated any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by a person that causes the noise level, when measured on any other property to exceed the following exterior noise standards:*
>
> 1. *Standard No. 1 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than thirty (30) minutes in any hour. Standard No. 1 may be the applicable noise level from Table 11-4 above.*
>
> 2. *Standard No. 2 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than fifteen (15) minutes in any hour. Standard No. 2 shall be the applicable noise level from Table 11-4 above, plus five dB.*
>
> 3. *Standard No. 3 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from Table 11-4 above plus ten dB.*
>
> 4. *Standard No. 4 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the applicable noise level from Table 11-4 above plus fifteen (15) dB.*
>
> 5. *Standard No. 5 shall be the exterior noise level which shall not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from Table 11-4 above plus twenty (20) dB.*

Section 16.30.100 sets forth interior noise levels limits for multi-family residential properties, as stated in *Table 11-4*. Section 16.30.100 states, in part:

> *No person shall operate or cause to be operated within a residential unit any source of sound, or allow the creation of any noise, that causes the noise level when measured inside a neighboring receiving residential unit to exceed the following standards:*
>
> 1. *Standard No. 1. The applicable interior noise level for cumulative period of more than five minutes in any hour;*
>
> 2. *Standard No. 2. The applicable interior noise level plus five dB for a cumulative period of more than one minute in any hour; or*
>
> 3. *Standard No. 3. The applicable interior noise level plus ten dB for any period of time.*

Vibration Standards

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic,

trains, construction equipment). Vibration sources may be continuous, (e.g., machinery) or transient in nature (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency relative to displacement, velocity, or acceleration. Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings. PPV and RMS vibration velocity are normally described in inches per second (in/sec). Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as vibration decibels (VdB). The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

CEQA states that the potential for any excessive groundborne noise and vibration levels must be analyzed; however, it does not define the term “excessive” vibration. Numerous public and private organizations and governing bodies have provided guidelines to assist in the analysis of groundborne noise and vibration. The City’s *Development Code* Section 16.30.130(K) prohibits the operation of any device that creates vibration above the City’s established perception threshold of 0.01 in/sec over the range of one to 100 Hertz.

11.4 SETTING THE CONTEXT: KEY ISSUES AND CHALLENGES

LAND USE COMPATIBILITY

Land use decisions can have significant impacts on the noise environment. When determining the placement of land uses, it is important to consider the activities associated with potential uses and existing uses within the surrounding environment. Incompatible uses can impact the quality of life of the community. Policies in the General Plan, zoning regulations, and the City’s Noise Ordinance are implemented to ensure land use compatibility with respect to noise and locations of sensitive receptors throughout the City.

Noise Measurements

Noise measurements were taken throughout the City of Murrieta at 15 locations as illustrated in *Exhibit 11-2*, *Noise Measurement Locations*. Based upon the City’s development patterns, the City was divided into Acoustical Analysis Zones (AAZ) to identify areas of homogenous acoustical conditions. Aerial imagery with a one-foot pixel resolution was utilized for a visual representation of the City’s roadway and land use layout. In addition, the City’s existing General Plan/Zoning Map and proposed land use change areas (Focus Areas) maps were utilized to determine the City’s existing and proposed patterns of development.

The noise measurement locations were selected as a representative sample of the more urbanized portions of the City in order to identify ambient baseline levels. The noise measurements described in *Table 11-5*, *Noise Measurements*, were taken to identify ambient noise exposure in the City.

Table 11-5
Noise Measurements

Site No.	Location	Leq (dBA)	Lmin (dBA)	Lmax (dBA)	Peak (dBA)	Date and Time[1]
1	Corner of Elm Street and Madison Avenue	52.7	41.8	68.5	9.8	10:47 AM – 10:57 AM
2	Intersection of Arjay Drive and Estate Hill Way	41.9	33.1	57.8	79.0	11:21 AM – 11:31 AM
3	Intersection of Jefferson Avenue and Kalmia Street	58.4	49.6	72.3	102.0	11:52 AM – 12:02 PM
4	Cul-de-sac of Pomerado Court off of Douglas Avenue	51.3	41.9	72.1	89.4	12:16 PM – 12:26 PM
5	Cul-de-sac of Summit Park Center off of Vineyard Knoll Drive	49.9	35.7	71.0	89.9	12:45 PM – 12:55 PM
6	Cul-de-sac of Kilkare Circle off of Boldin Drive	47.8	40.4	64.1	87.7	1:30 PM – 1:40 PM
7	Intersection of Catalina Street and Chateau Drive	51.4	45.4	68.3	92.0	1:56 PM – 2:06 PM
8	Cul-de-sac of Kaelan Court off of Roland Road	47.1	38.7	65.7	94.9	3:10 PM – 3:20 PM
9	Cul-de-sac of Copperleaf Court off of Mimosa Drive	50.4	39.0	68.6	88.9	3:40 PM – 3:50 PM
10	Baxter Road off of Antelope Road (adjacent to Loma Linda Medical Center)	41.6	33.1	60.5	96.7	4:30 PM – 4:40 PM

Leq = equivalent sound level; dBA = A-weighted decibel.

1 - Each 10-minute measurement was taken during non-peak traffic hours because free flowing traffic conditions yield higher noise levels, as opposed to rush hour traffic during peak hours when vehicle speeds and heavy truck volumes are low.

Source: RBF Consulting, November 4, 2010.

Noise levels at the selected sensitive receptor sites were measured on November 4, 2010, using a Brüel & Kjær model 2250 sound level meter (SLM) equipped with Brüel & Kjær pre-polarized freefield microphone, which meets standards of the American National Standards Institute (ANSI) for general environmental noise measurement instrumentation. Each measurement was for 10 minutes, and the sound meter was calibrated prior to noise monitoring.

- **Measurement Site 1** was located at the corner of Elm Street and Madison Avenue. Sources of peak noise included vehicular noise from Elm Street, Madison Avenue, I-15, and I-215, an airplane, and truck horn. The noise level monitored at Site 1 was 52.7 dBA.

- **Measurement Site 2** was located at the intersection of Arjay Drive and Estate Hill Way. The monitored noise level was 41.9 dBA, with the majority of noise from traffic along Hayes Avenue, two airplanes, and a siren.

- **Measurement Site 3** was located at the intersection of Jefferson Avenue and Kalmia Street. The monitored noise level was 58.4 dBA with peak noise from traffic along Jefferson Avenue and Kalmia Street, and vehicles in the City Hall parking lot.

- **Measurement Site 4** was located at the cul-de-sac of Pomerado Court off of Douglas Avenue. Sources of peak noise included traffic along Douglas Avenue and an overhead aircraft. The monitored noise level was 51.3 dBA.

- **Measurement Site 5** was located at the cul-de-sac of Summit Park Center off of Vineyard Knoll Drive. The monitored noise level was 49.9 dBA. The source of peak noise included traffic along Clinton Keith Road and landscaping activities.

- **Measurement Site 6** was located at the cul-de-sac of Kilkare Circle off of Boldin Drive. The monitored noise level was 51.4 dBA. Sources of peak noise were from traffic along Kilkare Circle and three airplanes.

- **Measurement Site 7** was located at the intersection of Catalina Street and Chateau Drive. Sources of peak noise included traffic along Catalina Street, I-15, and I-215, and a siren. The monitored noise level was 51.4 dBA.

- **Measurement Site 8** was located at the cul-de-sac of Kaelan Court off of Roland Road. Sources of peak noise included a helicopter and an airplane. The monitored noise level was 47.1 dBA.

- **Measurement Site 9** was located at the cul-de-sac of Copperleaf Court off of Mimosa Drive. Sources of peak noise included an airplane, trucks, and maintenance activities. The monitored noise level was 50.4 dBA.

- **Measurement Site 10** was located along Baxter Road off of Antelope Road, adjacent to the Loma Linda Medical Center. The monitored noise level was 41.6 dBA and peak noise included traffic along I-215 and Antelope Road, and two airplanes.

MOBILE NOISE SOURCES

The most significant source of noise within the City is generated from mobile sources. In particular, freeway traffic (vehicles and trucks) and traffic on heavily traveled surface streets contribute the greatest amounts of mobile noise sources. The Murrieta community has identified traffic as a challenge, and has identified transportation, including improving accessibility without a car as a priority for the City.

Motor Vehicle Noise

The roadways within the City that generate the most traffic noise from vehicle and truck traffic include the major north-south trending I-15 and I-215 Freeways due to higher traffic volumes and vehicle speeds than other roadways. Major east-west arterials that generate significant noise include Jefferson Avenue and Washington Avenue. Major north-south arterials generating traffic noise include Clinton Keith Road, Kalmia Street/California Oaks Road, and Murrieta Hot Springs Road.

Vehicular noise along major roadways was modeled to estimate existing noise levels from mobile traffic. The existing and future roadway noise levels were projected using the FHWA Traffic Noise Prediction Model (RD-77-108), together with several roadway and site parameters. The FHWA model is based upon reference energy mean emission levels (REMELS) for automobiles, medium trucks (two axles) and heavy trucks (three or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. To predict CNEL values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume. The California Vehicle Noise (Calveno) traffic noise emission curves are used as recommended by the California Department of Transportation (Caltrans) to more accurately calculate noise levels generated by traffic in California.

Traffic volumes used in the FHWA model were obtained from Iteris (January 2011). These traffic inputs determine the projected impact of vehicular traffic noise and include the roadway cross-section (e.g., number of lanes), roadway width, average daily traffic (ADT), vehicle travel speed, percentages of automobile and truck traffic, roadway grade, angle of view, and site conditions (hard or soft). The model does not account for ambient noise levels (i.e., noise from adjacent land uses) or topographical differences between the roadway and adjacent land uses. *Exhibit 11-3*, *Existing Roadway Noise Contours* and *Table 11-6*, *Existing Roadway Noise Levels*, indicates the location of the 60-, 65-, and 70-CNEL noise contours associated with vehicular traffic along local roadways as modeled with the FHWA computer model.

As shown in *Table 11-6*, the existing noise levels adjacent to City roadways range from a low of 45.2 CNEL along Guava Street from Madison Avenue to Monroe Avenue to a high of 72.9 CNEL along Murrieta Hot Springs Road from I-215 to Alta Murrieta Drive.

Table 11-6
Existing Roadway Noise Levels

Roadway Segment	Existing				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Clinton Keith Road					
Southwest City Limits to Calle del Oso Oro	9,100	63.9	283	90	28
Calle del Oso Oro to Grand Avenue	11,100	65.9	448	142	45
Grand Avenue to Nutmeg Street	19,000	67.0	591	187	59
Nutmeg Street to Murrieta Oaks Road	27,300	68.6	848	268	85
Murrieta Oaks Road to I-215	27,040	68.6	842	266	84
I-215 to Antelope Road	5,281	58.9	91	29	9
Antelope Road to Meadowlark Road/Whitewood Lane	13,000	62.9	224	71	22
Calle del Oso Oro					
Clinton Keith Road to Calle Cipres	4,200	59.3	98	31	10
Calle Cipres to Washington Avenue	11,400	63.7	267	85	27
Nutmeg Street					
Washington Avenue to Adams Avenue	5,900	60.9	138	44	14
Adams Street to Jefferson Avenue	5,900	60.8	138	44	14
Jefferson Avenue to Jackson Avenue	9,300	62.8	218	69	22
Jackson Avenue to Clinton Keith Road	10,900	64.7	339	107	34
Lemon Street					
Washington Avenue to Adams Avenue	3,300	58.7	77	24	8
Adams Avenue to Jefferson Avenue	4,200	59.7	98	31	10
Kalmia Street					
Hayes Avenue to Washington Avenue	1,500	55.2	35	11	4
Washington Avenue to Adams Avenue	15,400	66.3	479	151	48
Adams Avenue to Jefferson Avenue	20,600	67.6	640	202	64
Jefferson Avenue to Madison Avenue	25,500	68.3	793	251	79
Madison Avenue to I-15	35,300	69.7	1,098	347	110
California Oaks Road					
I-15 to Monroe Avenue	29,500	68.8	918	290	92
Monroe Avenue to Jackson Avenue	29,200	68.7	908	287	91
Jackson Avenue to Hancock	24,900	67.0	584	185	58
Hancock to Clinton Keith Road	15,100	66.1	470	149	47

Table 11-6 [continued]
Existing Roadway Noise Levels

Roadway Segment	Existing				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Ivy Street					
Hayes Street to Washington Avenue	900	48.7	8	2	1
Washington Avenue to Adams Avenue	8,900	63.9	277	88	28
Adams Avenue to Jefferson Avenue	9,500	64.2	295	93	30
Jefferson Avenue to Madison Avenue	11,300	64.8	351	111	35
Los Alamos Road					
Madison Avenue to Lincoln Avenue	10,400	64.5	324	102	32
Lincoln Avenue to Hancock Avenue	19,000	67.0	591	187	59
Hancock Avenue to I-215	19,200	67.1	597	189	60
I-215 to Whitewood Lane	23,000	66.6	538	170	54
Whitewood Lane to Ruth Ellen Way	3,800	59.3	89	28	9
Murrieta Hot Springs Road					
Jefferson Avenue to Madison Avenue	18,285	67.1	568	180	57
Madison Avenue to I-15	42,600	70.2	1,325	419	132
I-15 to I-215	65,100	71.9	2,022	639	202
I-215 to Alta Murrieta Drive	74,500	72.9	2,315	732	231
Alta Murrieta Drive to Jackson Avenue	48,000	71.0	1,492	472	149
Jackson Avenue to Whitewood Road	43,263	70.5	1,347	426	135
Whitewood Road to Margarita Road	51,200	71.3	1,591	503	159
Margarita Road to Eastern City Limits	40,000	70.2	1,244	393	124
Guava Street					
West of Hayes Avenue	500	49.2	9	3	1
Hayes Avenue to Douglas Avenue	700	50.5	12	4	1
Douglas Avenue to Washington Avenue	1,200	53.0	21	7	2
Adams Avenue to Jefferson Avenue	2,100	55.4	36	11	4
Jefferson Avenue to Madison Avenue	3,100	57.1	53	17	5
Madison Avenue to Monroe Avenue	200	45.2	3	1	0
Elm Street					
Adams Avenue to Madison Avenue	2,500	55.9	43	14	4

Table 11-6 [continued]
Existing Roadway Noise Levels

Roadway Segment	Existing				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Hayes Avenue					
Nighthawk Way to Vineyard Parkway	1,900	54.8	33	10	3
Kalmia Street to Ivy Street	1,900	56.3	45	14	4
Ivy Street to Hawthorne Street	1,300	50.3	11	4	1
Hawthorne Street to Guava Street	700	50.5	12	4	1
Washington Avenue					
North of Calle del Oso Oro	10,000	63.2	234	74	23
Calle del Oso Oro to Nighthawk Way/Magnolia Street	14,300	64.8	335	106	34
Nighthawk Way/Magnolia Street to Vineyard Parkway	12,600	64.2	295	93	30
Vineyard Parkway to Kalmia Street	20,800	66.2	488	154	49
Kalmia Street to Ivy Street	8,300	58.3	71	23	7
Ivy Street to Hawthorne Street	1,400	53.6	24	8	2
South of Hawthorne Street	1,300	53.3	22	7	2
Jefferson Avenue					
North of Nutmeg Street	10,000	64.7	311	98	31
Nutmeg Street to Magnolia Street	9,000	62.8	211	67	21
Magnolia Street to Lemon Street	10,000	64.6	311	98	31
Lemon Street to Kalmia Street	11,200	65.0	348	110	35
Kalmia Street to Ivy Street	17,900	66.8	557	176	56
Ivy Street to Murrieta Hot Springs Road	12,000	65.1	373	118	37
Murrieta Hot Springs Road to Guava Street	27,800	68.7	864	273	86
Guava Street to Fig Street	28,000	69.9	1,131	358	113
Fig Street to Elm Street	29,000	70.1	1,172	371	117
South of Elm Street	20,736	67.4	644	204	64
Madison Avenue					
Kalmia Street to Ivy Street/Los Alamos Road	14,914	67.1	602	190	60
Ivy Street/Los Alamos Road to Murrieta Hot Springs Road	24,100	68.1	749	237	75
Murrieta Hot Springs Road to Guava Street	3,400	54.5	29	9	3
Jackson Avenue					
North of Nutmeg Street	7,100	61.7	167	53	17
Nutmeg Street to Monroe Avenue	14,900	64.9	349	110	35
Monroe Avenue to California Oaks Road	14,900	64.8	349	110	35

Table 11-6 [continued]
Existing Roadway Noise Levels

Roadway Segment	Existing				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Hancock Avenue					
California Oaks Road to Las Brisas Road	14,700	64.7	345	109	34
Las Brisas Road to Los Alamos Road	19,550	66.0	458	145	46
Los Alamos Road to Murrieta Hot Springs Road	19,500	66.0	457	144	46
I-15					
City Boundary to Nutmeg Street	124,000	79.0	11,989	3,791	1,199
Nutmeg Street to Kalmia Street	124,000	79.0	11,989	3,791	1,199
Kalmia Street Los Alamos Road	127,000	79.1	12,268	3,879	1,227
Los Alamos Road to I-215	127,000	79.1	12,268	3,879	1,227
I-215 to Cherry Street	186,000	80.8	18,005	5,694	1,801
I-215					
Scott Road to Los Alamos Road	89,000	77.3	7,074	2,237	707
Los Alamos Road to Murrieta Hot Springs Road	91,000	78.3	8,803	2,784	880
Murrieta Hot Springs Road to I-15	83,000	77.9	8,024	2,537	802

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level
Source: Traffic noise modeling is based on traffic data provided by Iteris, January 2011.

Under existing conditions, very few areas (seven segments along Murrieta Hot Springs Road) within the City experience traffic noise levels in excess of 70 CNEL. The 70-dBA contour along these roadway links extends to a maximum of 231 feet from the roadway centerline. However, many of the City's commercial areas experience noise levels in excess of 65 CNEL adjacent to major arterial roadways and freeway rights-of-way. Residences located within this area may experience unacceptable noise levels. It should be noted that these are modeled traffic noise levels, and are not based upon actual site measurements.

Freeways typically result in greater noise levels than other roadways due to higher traffic volumes and vehicle speeds. As depicted on *Exhibit 11-3*, the I-15 and I-215 Freeways traverse the City of Murrieta and represent a primary source of traffic noise. The following describes the traffic volumes and general characteristics of the freeways within the City.

- **Interstate 15.** I-15 is a major regional transportation corridor that serves as the backbone of the transportation system connecting the major urban centers of San Diego County and San Bernardino County, while passing through the western portion of Riverside County. Based on traffic data from Iteris, ADT along the segments of I-15 that pass through Murrieta ranges from approximately 124,000 to 186,000 for both northbound and southbound traffic.

- **Interstate 215.** I-215 is a major regional transportation corridor that serves as the backbone of the transportation system connecting western Riverside County to the major urban center of San Bernardino County. Based on traffic data from Iteris, ADT along the segments of I-215 that pass through Murrieta ranges from approximately 83,000 to 91,000 for both northbound and southbound traffic.

Airport Noise

Off-road transportation noise is also generated by aircraft traffic from one nearby airport, the French Valley (Rancho California) Airport, located outside of the City's Sphere of Influence. Aircraft flyovers are heard occasionally in the City; however, the aircraft do not contribute a significant amount of noise heard in the City. The Riverside County Airport Land Use Commission has prepared a Comprehensive Land Use Plan for the French Valley Airport (CLUP), which experiences an average of 506 daily operations. The CLUP indicates that the 55 CNEL noise level contour is located outside of City boundaries. The CLUP also designates portions of the City as being located within Compatibility Zones B1, C, D, and E, all of which require certain land use restrictions.

Railway Noise

Although there are currently no railway operations or associated noise sources within the City, opportunities to pursue future light rail transit and high speed rail are anticipated. The potential locations of these facilities have not been determined.

STATIONARY NOISE SOURCES

Stationary noise sources, including construction activities and commercial and industrial uses contribute to overall noise within the City. Existing and future noise associated with stationary noise will need to be considered. Residential land uses and areas identified as noise-sensitive must be protected from excessive noise from stationary sources including commercial and industrial centers. These impacts are best controlled through effective land use planning and application of the City *Noise Ordinance*.

Construction noise is one of the most common stationary noise sources in the City. The use of pile drivers, drills, trucks, pavers, graders, and a variety of other equipment can result in short, sporadic elevated noise levels. Although construction noise impacts are generally short-term in nature, it can often disturb nearby sensitive uses.

Commercial uses within the City are generally located along the I-15 and I-215 Freeway corridors, as well as other major roadways such as Jefferson Avenue, Madison Avenue, and Murrieta Hot Springs Road. The primary noise sources associated with commercial facilities are caused by delivery trucks, air compressors, generators, outdoor loudspeakers, and gas venting. Residential, institutional, and park uses are located adjacent to several commercial areas of the City. Commercial operations may cause annoyance to these nearby sensitive receptors.

The primary noise sources associated with these facilities are caused by mechanical equipment, loading and unloading of vehicles and trucks, and amplified communication.

Industrial noise is generally limited to the immediate source area and only impacts sensitive receptors if there is an incompatible mix of land uses in the vicinity of the industrial facility. Therefore, proper planning, zoning, and enforcement of the Noise Ordinance are important factors in limiting the amount of disturbance to sensitive receptors from industrial noise sources.

POPULATION GROWTH AND DEVELOPMENT

Future population growth and development within the City will generate new and additional noise. As vacant and underutilized land is developed in Murrieta, it will be important to ensure land use compatibility with respect to noise and locations of sensitive receptors.

11.5 SETTING THE VISION: KEY CONCEPTS AND VISION FOR GENERAL PLAN

Protecting the public's health, safety, and welfare from unnecessary, excessive, and harmful noise is a key objective of the City. The following key concepts and vision for the General Plan directly guide the Noise Element goals and policies and are intended to respond to the key issues and challenges identified above:

- Mobile Sources
- Stationary Sources
- Noise Control Techniques
- City Noise Ordinance

Setbacks and landscaped walls can help to buffer residential uses from noise associated with roadways. Home construction techniques can also reduce indoor noise levels.

MOBILE SOURCES

Mobile sources are the most significant noise generators within Murrieta. The most efficient and effective means of controlling noise from transportation systems is to reduce noise at the source. However, the City has no direct control over noise produced by trucks and cars because of State and Federal preemption rules. Vehicular noise emissions standards are established at the State and Federal levels. Local agencies can play a part in reducing traffic noise by controlling traffic volume and congestion. Therefore, City noise programs focus on reducing the impact of transportation noise along freeways and arterial roadways and on site planning, landscaping, topography, and the design and construction of noise barriers to alleviate vehicular traffic noise impacts.

Motor Vehicle Noise

Future noise levels have been calculated for various roadway segments within the City of Murrieta. *Table 11-7*, *General Plan Buildout Roadway Noise Levels*, outlines the City's future roadway noise levels under proposed General Plan 2035 buildout conditions and *Exhibit 11-4*, *General Plan 2035 Noise Contours*, illustrates the proposed General Plan 2035 noise contours. As indicated in *Table 11-7*, 24 modeled roadway segments (along Clinton Keith Road, Kalmia

Street, California Oaks Road, Los Alamos Road, Murrieta Hot Springs Road, and Jefferson Avenue, excluding freeway segments) would generate noise levels greater than 70 dBA CNEL at 100 feet from centerline.

Table 11-7
General Plan 2035 Roadway Noise Levels

Roadway Segment	Future 2035				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Clinton Keith Road					
Southwest City Limits to Calle del Oso Oro	33,600	69.5	1,045	330	104
Calle del Oso Oro to Grand Avenue	25,600	69.5	1,034	327	103
Western City Limits to Nutmeg Street	56,000	71.7	1,740	550	174
Nutmeg Street to Murrieta Oaks Road	82,900	73.4	2,580	816	258
Murrieta Oaks Road to I-215	79,000	73.3	2,455	776	246
I-215 to Antelope Road	70,200	70.2	1,211	383	121
Antelope Road to Meadowlark Lane/Whitewood Road	60,700	69.5	1,046	331	105
Calle del Oso Oro					
Clinton Keith Road to Calle Cipres	10,200	63.2	239	76	24
Calle Cipres to Washington Avenue	19,800	66.1	464	147	46
Nutmeg Street					
Washington Avenue to Adams Avenue	12,800	64.3	300	95	30
Adams Street to Jefferson Avenue	13,200	64.3	309	98	31
Jefferson Avenue to Jackson Avenue	14,200	64.6	333	105	33
Jackson Avenue to Clinton Keith Road	15,200	66.1	473	149	47
Lemon Street					
Washington Avenue to Adams Avenue	6,300	61.5	148	47	15
Adams Avenue to Jefferson Avenue	12,100	64.3	284	90	28
Kalmia Street					
Hayes Avenue to Washington Avenue	8,200	62.6	192	61	19
Washington Avenue to Adams Avenue	18,800	67.2	585	185	59
Adams Avenue to Jefferson Avenue	28,400	69.0	883	279	88
Jefferson Avenue to Madison Avenue	49,300	71.2	1,532	485	153
Madison Avenue to I-15	54,500	71.6	1,696	536	170
California Oaks Road					
I-15 to Monroe Avenue	54,500	71.5	1,693	535	169
Monroe Avenue to Jackson Avenue	52,400	71.2	1,629	515	163
Jackson Avenue to Hancock Avenue	31,700	68.0	743	235	74
Hancock Avenue to Clinton Keith Road	25,800	68.4	801	253	80

Table 11-7 [continued]
General Plan 2035 Roadway Noise Levels

Roadway Segment	Future 2035				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Ivy Street					
Hayes Street to Washington Avenue	700	47.6	6	2	1
Washington Avenue to Adams Avenue	8,900	63.9	277	88	28
Adams Avenue to Jefferson Avenue	14,100	65.9	438	139	44
Jefferson Avenue to Madison Avenue	22,600	67.8	703	222	70
Los Alamos Road					
Madison Avenue to Lincoln Avenue	24,700	68.2	767	243	77
Lincoln Avenue to Hancock Avenue	35,100	69.7	1,092	345	109
Hancock Avenue to I-215	53,600	71.5	1,668	528	167
I-215 to Whitewood Road	31,000	67.9	726	230	73
Whitewood Road to Ruth Ellen Way	3,800	59.3	89	28	9
Murrieta Hot Springs Road					
Jefferson Avenue to Madison Avenue	46,400	71.1	1,441	456	144
Madison Avenue to I-15	77,500	72.8	2,411	762	241
I-15 to I-215	91,000	73.4	2,830	895	283
I-215 to Alta Murrieta Drive	93,000	73.9	2,894	915	289
Alta Murrieta Drive to Jackson Avenue	63,200	72.2	1,966	622	197
Jackson Avenue to Whitewood Road	57,600	71.8	1,792	567	179
Whitewood Road to Margarita Road	66,400	72.4	2,064	653	206
Margarita Road to Eastern City Limits	52,500	71.4	1,633	516	163
Guava Street					
West of Hayes Avenue	5,900	59.9	102	32	10
Hayes Avenue to Douglas Avenue	6,300	60.1	109	34	11
Douglas Avenue to Washington Avenue	5,200	59.3	90	28	9
Adams Avenue to Jefferson Avenue	11,400	62.7	197	62	20
Jefferson Avenue to Madison Avenue	1,100	52.6	19	6	2
Madison Avenue to Monroe Avenue	3,300	57.3	57	18	6
Elm Street					
Adams Avenue to Madison Avenue	2,800	56.4	48	15	5

Table 11-7 [continued]
General Plan 2035 Roadway Noise Levels

Roadway Segment	Future 2035				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Hayes Avenue					
Nighthawk Way to Vineyard Parkway	3,600	57.6	62	20	6
Kalmia Street to Ivy Street	6,500	61.6	152	48	15
Ivy Street to Hawthorne Street	4,900	56.0	42	13	4
Hawthorne Street to Guava Street	4,500	58.6	78	25	8
Washington Avenue					
North of Calle del Oso Oro	10,000	63.2	234	74	23
Calle del Oso Oro to Nighthawk Way/Magnolia Street	14,900	65.0	349	110	35
Nighthawk Way/Magnolia Street to Vineyard Parkway	12,600	64.2	295	93	30
Vineyard Parkway to Kalmia Street	20,800	66.2	488	154	49
Kalmia Street to Ivy Street	8,300	58.3	71	23	7
Ivy Street to Hawthorne Street	1,400	53.6	24	8	2
South of Hawthorne Street	3,300	57.4	57	18	6
Jefferson Avenue					
North of Nutmeg Street	24,500	68.5	762	241	76
Nutmeg Street to Magnolia Street	39,700	69.2	931	294	93
Magnolia Street to Lemon Street	40,100	70.6	1,247	394	125
Lemon Street to Kalmia Street	46,900	71.2	1,458	461	146
Kalmia Street to Ivy Street	61,500	72.2	1,912	605	191
Ivy Street to Murrieta Hot Springs Road	53,600	71.6	1,668	527	167
Murrieta Hot Springs Road to Guava Street	53,100	71.6	1,650	522	165
Guava Street to Fig Street	45,100	72.0	1,822	576	182
Fig Street to Elm Street	44,600	71.9	1,798	569	180
South of Elm Street	30,300	69.1	942	298	94
Madison Avenue					
Kalmia Street to Ivy Street/Los Alamos Road	16,900	67.7	682	216	68
Ivy Street/Los Alamos Road to Murrieta Hot Springs Road	24,100	68.1	749	237	75
Murrieta Hot Springs Road to Guava Street	18,000	61.7	155	49	15
Jackson Avenue					
North of Nutmeg Street	9,600	63.0	225	71	23
Nutmeg Street to Monroe Avenue	18,000	65.7	422	133	42
Monroe Avenue to California Oaks Road	17,600	65.5	412	130	41

Table 11-7 [continued]
General Plan 2035 Roadway Noise Levels

Roadway Segment	Future 2035				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Hancock Avenue					
California Oaks Road to Las Brisas Road	15,300	64.9	358	113	36
Las Brisas Road to Los Alamos Road	24,600	67.0	576	182	58
Los Alamos Road to Murrieta Hot Springs Road	27,000	67.4	633	200	63
I-15					
City Boundary to Nutmeg Street	199,900	81.0	19,309	6,106	1,931
Nutmeg Street to Kalmia Street	199,900	81.0	19,309	6,106	1,931
Kalmia Street Los Alamos Road	197,000	91.0	19,045	6,022	1,904
Los Alamos Road to I-215	142,600	79.6	13,797	4,363	1,380
I-215 to Cherry Street	248,800	82.1	24,066	7,610	2,407
I-215					
Scott Road to Los Alamos Road	195,300	80.7	15,512	4,905	1,551
Los Alamos Road to Murrieta Hot Springs Road	170,600	81.1	16,506	5,220	1,651
Murrieta Hot Springs Road to I-15	149,900	80.5	14,501	4,586	1,450

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level
Source: Traffic noise modeling is based on traffic data provided by Iteris, January 2011.

Of the roadway segments modeled, 25 segments (along Clinton Keith Road, Calle del Oso Oro, Nutmeg Street, Kalmia Street, California Oaks Road, Ivy Street, Los Alamos Road, Elm Street, Washington Avenue, Jefferson Avenue, Madison Avenue, Jackson Avenue, and Hancock Avenue) would generate noise levels between 65 dBA CNEL and 70 dBA CNEL at 100 feet from the centerline.

Sixteen modeled roadway segments (along Calle del Oso Oro, Nutmeg Street, Lemon Street, Kalmia Street, Ivy Street, Elm Street, Hayes Avenue, and Washington Avenue) would generate noise levels between 60 dBA CNEL and 65 dBA CNEL at 100 feet from the centerline.

Thirteen modeled roadway segments (along Ivy Street, Los Alamos Road, Guava Street, Hayes Avenue, and Washington Avenue) would generate noise levels below 60 dBA CNEL at 100 feet from the centerline.

Rail Noise

Opportunities to pursue light rail transit and high speed rail are planned for the future of the City, which would create a new source of mobile noise. At this time, the location of any potential

stations or rail alignments is not known. The City would be proactive in coordinating with appropriate agencies in the siting, design, and construction of rail stations and track alignments to ensure that noise attenuation measures are addressed.

CALIFORNIA HIGH-SPEED TRAIN PROGRAM

The California High-Speed Rail Authority is currently in the process of analyzing the potential for a high-speed train connecting northern and southern California. The California High-Speed Train Program consists of a more than 700-mile-long high-speed train system capable of high-speed train (HST) speeds in excess of 200 miles per hour on a dedicated, fully grade-separated track with state-of-the art safety, automated train control systems, and signaling. The system described is designed to connect and serve the major metropolitan centers of California, extending from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego. The HST system is projected to carry approximately 88-117 million passengers annually by the year 2030.

As of October 2010, the Los Angeles-San Diego Section of the HST alignment is in the Preliminary Alternatives Analysis (AA) phase. Several alternative alignments are being analyzed as part of the process. The current set of alternatives will undergo analysis to determine if each alternative is practical and feasible. Evaluation factors include: operations, community disruption and impacts, travel time, capital and operating costs, constructability, environmental constraints and impacts, intermodal connections, development potential, property impacts and right-of-way constraints. Alignments being considered include the I-15 and I-215 Freeways through Murrieta with a potential station located within Murrieta or Temecula.

The HST has similar noise and vibration characteristics to conventional trains with unique features resulting from the higher speed of travel. The HST is expected to be a steel-wheel, steel-rail electrically-powered train operating on its own tracks in an exclusive right-of-way. Due to no highway grade crossings, the train horn and warning bells would be eliminated except in the case of emergencies. The use of electrical power cars eliminates the rumble associated with diesel-powered locomotives. All of these factors allow HST to generate lower noise levels than conventional trains at speeds with which most people are familiar. However, at higher speeds, HST shows a noise increase over conventional trains due to aerodynamic effects. A mitigating factor is that the high speeds enable HST noise to occur for a relatively short duration (a few seconds at the highest speeds).

Vibration of the ground caused by the pass-by of the HST is similar to that caused by conventional steel wheel/steel rail trains. The same speed-dependent vibration generation mechanisms are present in each type of train. Holding down vibration levels associated with the HST are the new track construction and smooth track and wheel surfaces resulting from high maintenance standards required for high speed operation.

Airport Noise

Off-road transportation noise is also generated by aircraft traffic from one nearby airport, the French Valley (Rancho California) Airport, located outside of the City's Sphere of Influence. The CLUP indicates that the 55 CNEL noise level contour is located outside of City boundaries. The CLUP also designates portions of the City as being located within Compatibility Zones B1, C, D,

and E, all of which require certain land use restrictions. The City will continue to work with the Riverside County Airport Land Use Commission in the development of the French Valley Airport Land Use Plan and other planning and environmental studies.

STATIONARY SOURCES

Commercial and industrial land uses are located near sensitive receptor areas. These uses currently generate occasional stationary noise impacts. Primary noise sources associated with these facilities are due to customer trips, delivery trucks, heavy machinery, air compressors, generators, outdoor loudspeakers, and gas vents. Other significant stationary noise sources within the City include construction activities, street sweepers, and gas-powered leaf blowers.

Residential Uses

Residential uses will comprise the largest land use category in Murrieta, with 10,255 acres and 56.5 percent of the total land in the City. Rural and single-family parcels cover the largest total area of land. A total of 93.7 percent of the residential land are rural and single-family, while 6.3 percent of the land contains multi-family uses. Future development of residential lots would create stationary noise typical of any new residential development. Noise that is typical of single-family residential areas includes children playing, pets, amplified music, pool and spa equipment operation, mechanical equipment, woodworking, car repair, and home repair. Noise from residential stationary sources would primarily occur during the “daytime” activity hours.

Commercial/Industrial Uses

Noise generally produced in commercial and industrial districts includes that typically associated with slow moving truck deliveries, parking areas, landscape maintenance, and similar activities. Overall, 6.2 percent (1,335 acres) of the total land within the City is designated for commercial use and 0.5 percent (108.69) acres is designated for industrial use. Commercial land uses are generally located along major corridors, including the I-15 and I-215 Freeways, and segments of Jefferson Avenue, Madison Avenue, California Oaks Road, Murrieta Hot Springs Road, and Clinton Keith Road. Industrial land uses are dispersed throughout the City. Noise strategies and actions require the reduction of noise transmission between commercial/industrial and residential uses. Proper site planning and design would ensure the reduction of noise transmission between these uses. Additionally, any future development of mixed uses would be designed to limit noise from loading areas, refuse collection, and other activities associated with commercial activity.

NOISE CONTROL TECHNIQUES

There are several basic techniques available to minimize the adverse effects of noise on sensitive noise receivers. Acoustical engineering principles suggest controlling the noise source whenever feasible and protecting the noise receptors when noise source control mechanisms have been pre-empted by State and Federal governments.

Noise producers within local jurisdictions include industrial processes, electrical substations, wastewater treatment facilities, transportation system locations, swimming pool/spa pump motors, air conditioning units, drive-through speakers, siren usage, and local government controlled or sanctioned activities (City vehicles, public works projects). Regulatory mechanisms available to control these noise sources include: City *Noise Ordinance*, the application of "conditions of approval" on new developments, land use policy and approval practices as outlined in the General Plan, and noise information in permit applications for sources of stationary noise. In the event that source control mechanisms have been employed and noise impacts persist or are projected to occur, additional techniques should be considered. The following is a partial listing of noise control techniques:

- **Site Planning.** Involves the careful arrangement of land uses, lots, and buildings to minimize intrusive noise levels. The placement of noise compatible land uses between the roadway and more sensitive uses is an effective planning technique. The use of buildings as noise barriers, and their orientation away from the source of noise, can shield sensitive activities, entrances, and common open space areas. Clustered and master planned developments can maximize the amount of open space available for landscaped buffers next to heavily traveled roadways and thereby allow aesthetic residential lot setbacks in place of continuous noise barriers.

- **Architectural Design.** Involves the incorporation of noise reduction 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 sound levels.

- **Construction.** Involves 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 (i.e., double glazed, double paned, thick, non-opening, or small with air-tight seals), and the inclusion of maximum air spaces in attics and walls are all available options.

- **Noise Barriers.** 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 (e.g., in clustered developments), a meandering earth berm is both effective and aesthetically pleasing. Where space is restricted, a wall is an effective treatment.

City Noise Ordinance

Implementation and enforcement of the City's *Noise Ordinance* will continue to be the primary means of regulating and controlling construction and operational noise. The City may require acoustical studies be prepared as part of the development review process to ensure adequate analysis of potential noise impacts associated with a development project. Additionally, the City will continue to coordinate with airport operators to minimize noise impacts associated with this use.

11.6 GOALS AND POLICIES

GOAL N-1 **Noise sensitive land uses are properly and effectively protected from excessive noise generators.**

POLICIES

N-1.1 Comply with the Land Use Compatibility for Community Noise Environments.

N-1.2 Protect schools, hospitals, libraries, churches, convalescent homes, and other noise sensitive uses from excessive noise levels by incorporating site planning and project design techniques to minimize noise impacts. The use of noise barriers shall be considered after all practical design-related noise measures have been integrated into the project. In cases where sound walls are necessary, they should help create an attractive setting with features such as setbacks, changes in alignment, detail and texture, murals, pedestrian access (if appropriate), and landscaping.

N-1.3 Discourage new residential development where the ambient noise level exceeds the noise level standards set forth in the Noise and Land Use Compatibility Guidelines and the City Noise Ordinance.

N-1.4 Coordinate with the County of Riverside and adjacent jurisdictions to minimize noise conflicts between land uses along the City's boundaries.

GOAL N-2 **A comprehensive and effective land use planning and development review process that ensures noise impacts are adequately addressed.**

POLICIES

N-2.1 Review and update the Noise Ordinance to ensure that noise exposure information and specific policies and regulations are current.

N-2.2 Integrate noise considerations into land use planning decisions to prevent new noise/land use conflicts.

N-2.3 Consider the compatibility of proposed land uses with the noise environment when preparing, revising, or reviewing development proposals.

N-2.4 Encourage proper site planning and architecture to reduce noise impacts.

N-2.5 Permit only those new development or redevelopment projects that have incorporated mitigation measures, so that standards contained in the Noise Element and Noise Ordinance are met.

N-2.6 Incorporate noise reduction features for items such as, but not limited to, parking and loading areas, ingress/egress point, HVAC units, and refuse collection areas, during site planning to mitigate anticipated noise impacts on affected noise sensitive land uses.

N-2.7 Require that new mixed-use developments be designed to limit potential noise from loading areas, refuse collection, and other activities typically associated with commercial activity through strategic placement of these sources to minimize noise levels on-site.

N-2.8 Encourage commercial uses in mixed-use developments that are not noise intensive.

N-2.9 Orient mixed-use residential units, where possible, away from major noise sources.

N-2.10 Locate balconies and operable windows of residential units in mixed-use projects away from the primary street and other major noise sources, where possible, or provide appropriate mitigation.

GOAL N-3 Noise from mobile noise sources is minimized.

POLICIES

N-3.1 Consider noise mitigation measures in the design of all future streets and highways and when improvements occur along existing freeway and highway segments.

N-3.2 Work with Caltrans to achieve maximum noise abatement in the design of new highway projects or with improvements to interchanges along the I-15 and I-215 Freeways, and with widening of SR-79.

N-3.3 Encourage the construction of noise barriers and maintenance of existing noise barriers for sensitive receptors located along the I-15 and I-215 Freeways.

N-3.4 Enforce the use of truck routes to limit unnecessary truck traffic in residential and commercial areas. Consider requiring traffic plans for construction projects and new commercial and industrial uses.

N-3.5 Consider the use of rubberized asphalt for new roadways or roadway rehabilitation projects.

N-3.6 Coordinate with appropriate agencies in the siting, design, and construction of rail stations and track alignments to ensure that adjacent land uses are considered and noise attenuation measures are addressed.

GOAL N-4 **Mobile source emissions are reduced by providing a balance of jobs and housing that serve the needs of the community.**

POLICIES

N-4.1 Regulate construction activities to ensure construction noise complies with the City's Noise Ordinance.

N-4.2 Limit the hours of construction activity in residential areas to reduce intrusive noise in early morning and evening hours and on Sundays and holidays.

N-4.3 Employ construction noise reduction methods to the maximum extent feasible. These measures may include, but not limited to, shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied sensitive receptor areas, and use of electric air compressors and similar power tools, rather than diesel equipment.

N-4.4 Encourage municipal vehicles and noise-generating mechanical equipment purchased or used by the City to comply with noise standards specified in the City's Municipal Code, or other applicable codes.

N-4.5 Allow exceedance of noise standards on a case-by-case basis for special circumstances including emergency situations, special events, and expedited development projects.

N-4.6 Ensure acceptable noise levels are maintained near schools, hospitals, convalescent homes, churches, and other noise-sensitive areas.

11.7 IMPLEMENTATION OF THE ELEMENT

Noise is generated by a variety of sources throughout the City. Protecting public health is a priority for Murrieta. The goals and policies of the Noise Element will be implemented by several City departments including, but not limited to, Community Development, Building, and Code Enforcement. Individual development projects and activities will be reviewed to determine whether the proposed use will have an impact on existing and proposed uses within the vicinity. Project review will include the analysis of land use patterns, compliance with Noise Ordinance requirements, and may include project-specific noise studies. Code enforcement activities include responding/investigation noise complaints and noise monitoring. Through coordinated efforts of all City departments, Murrieta will maintain acceptable noise levels for all residents and businesses.

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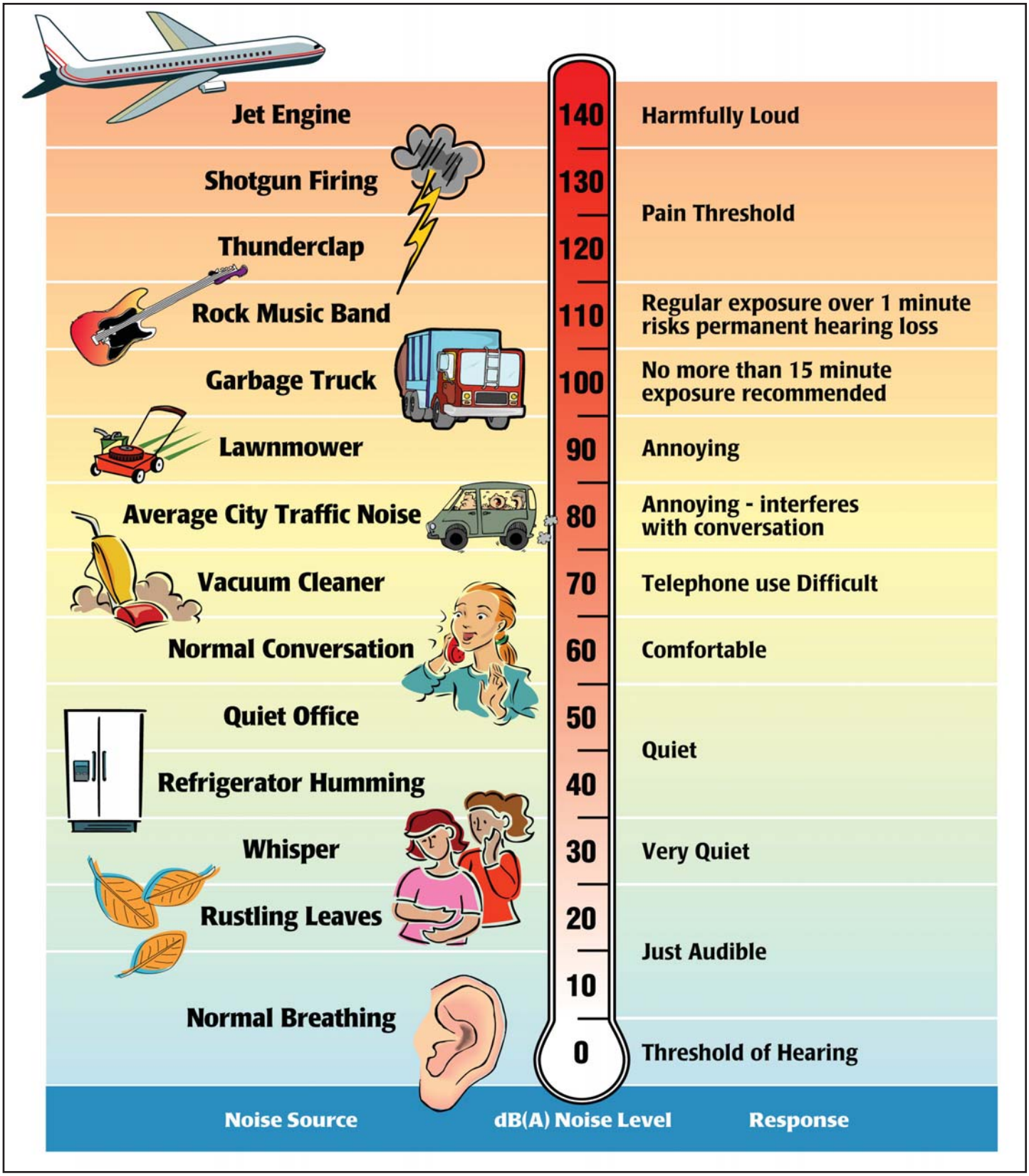

Source: Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.
Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA/ONAC 550/9-74-004), March 1974.

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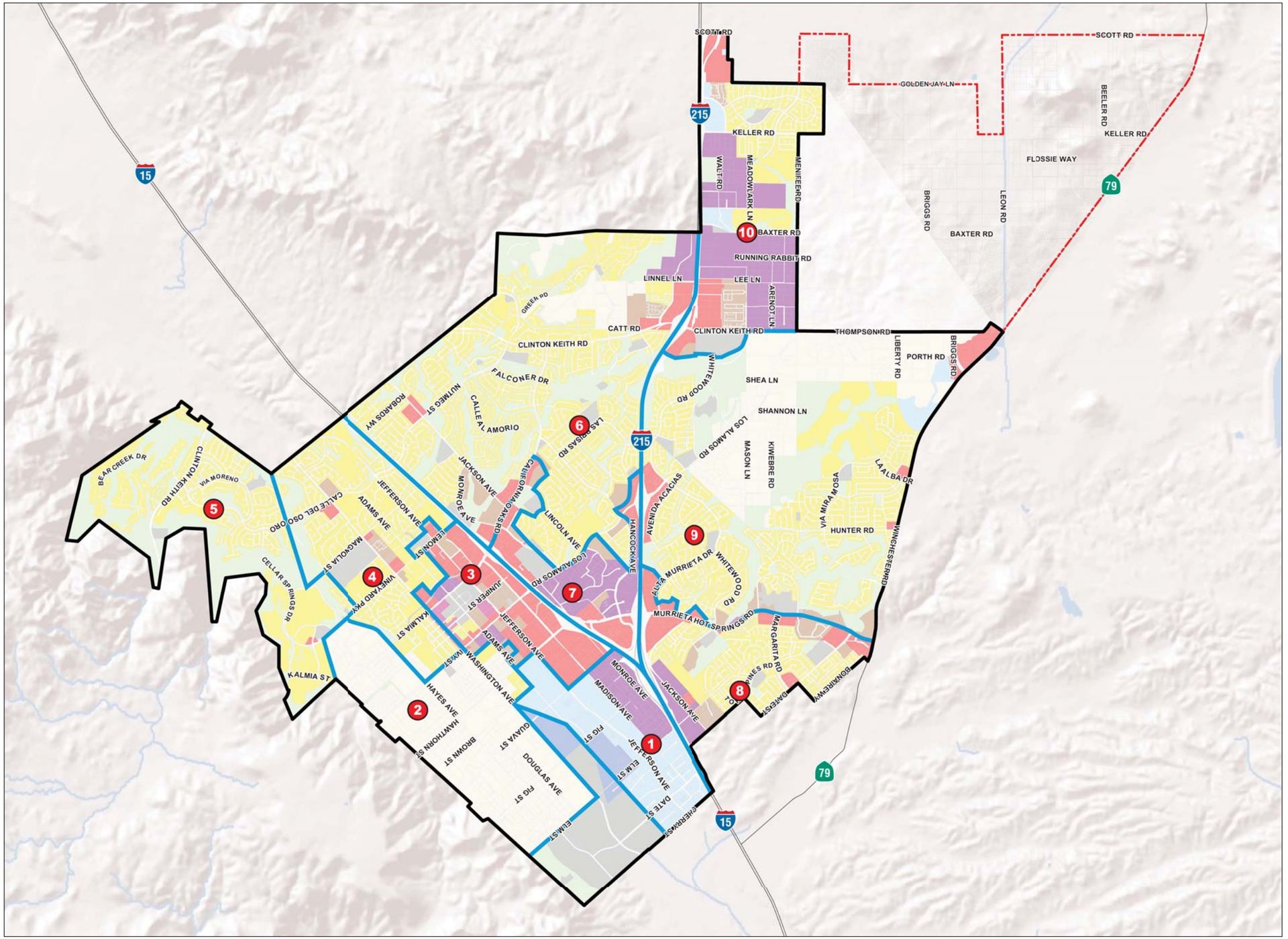
Sound Levels and Human Response

Exhibit 11-1



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LEGEND

- City Limits
- Sphere of Influence
- Acoustical Analysis Zones
- Noise Measurement Location

0 0.5 1
Miles

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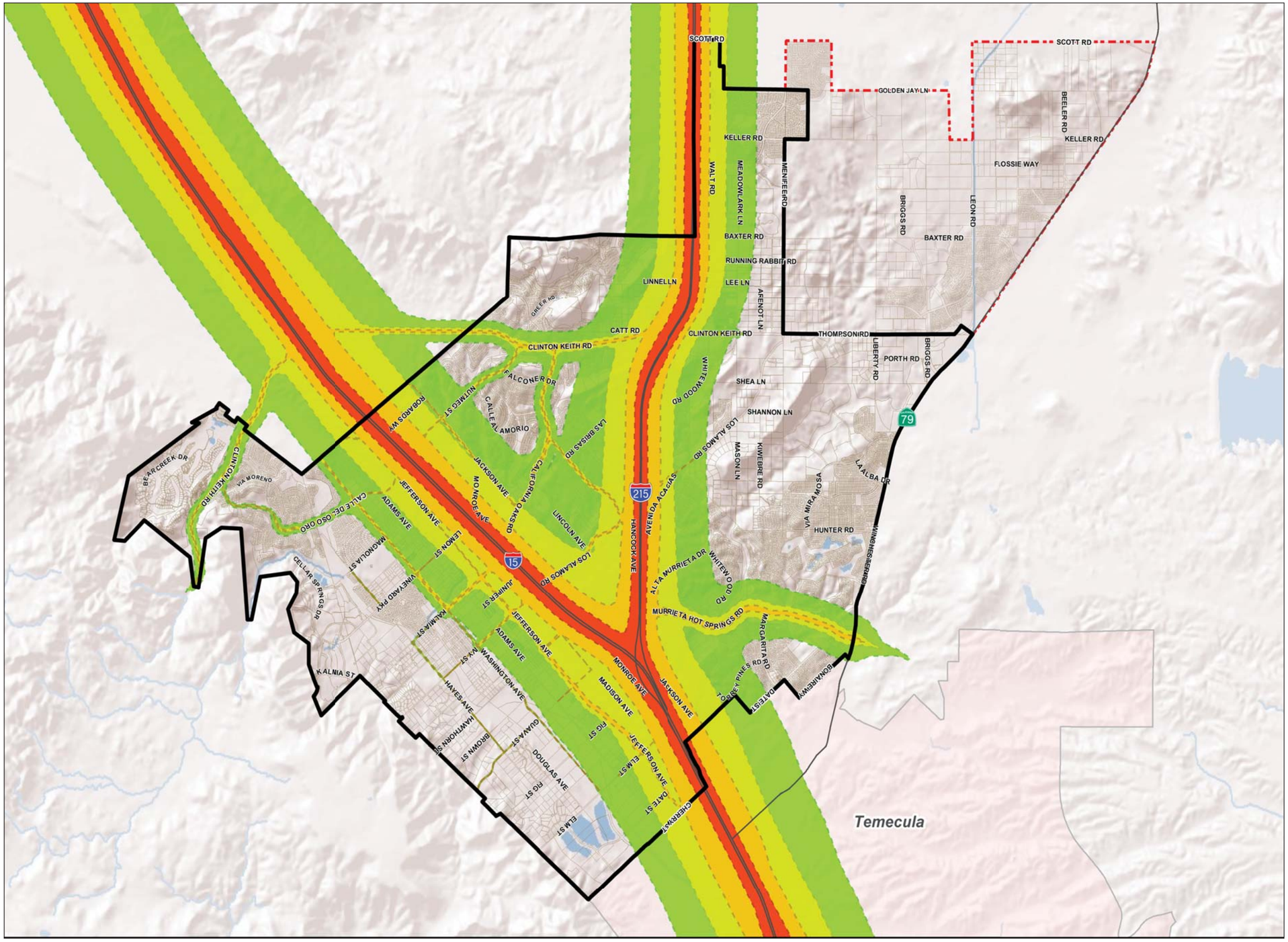
Noise Measurement Locations

Exhibit 11-2



LEGEND

- 75 CNEL
- 70 CNEL
- 65 CNEL
- 60 CNEL
- Parcels
- Sphere of Influence
- City Boundary

0 0.5 1
Miles

Source: County of Riverside, City of Murrieta and ESRI - World Shaded Relief.

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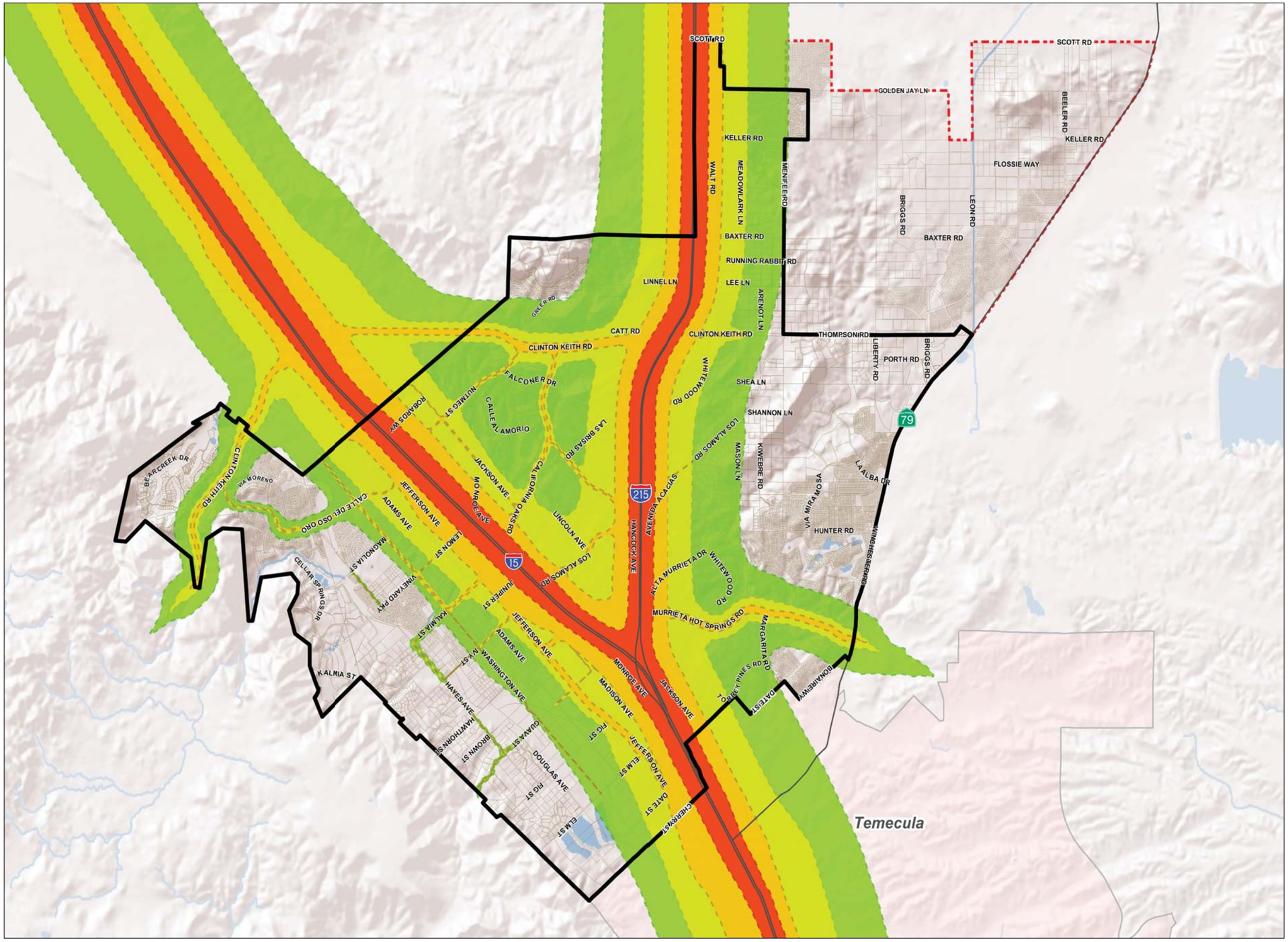
Existing Roadway Noise Contours

Exhibit 11-3



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LEGEND

- 75 CNEL
- 70 CNEL
- 65 CNEL
- 60 CNEL
- Parcels
- Sphere of Influence
- City Boundary

0 0.5 1
Miles

Source: County of Riverside, City of Murrieta and ESRI - World Shaded Relief.

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General Plan 2035 Noise Contours

Exhibit 11-4