# NOISE IMPACT ANALYSIS

## FOOTHILL PARKWAY WESTERLY EXTENSION

LSA

January 2008

# NOISE IMPACT ANALYSIS

## FOOTHILL PARKWAY WESTERLY EXTENSION

Prepared for:
City of Corona
400 South Vicentia Avenue
Corona, California 92882

Under Contract to:
RBF Consulting
14725 Alton Parkway
Irvine, California 92618

Prepared by:
LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614-4731
(949) 553-0666

LSA Project No. RBF0603

LSA

January 2008

# TABLE OF CONTENTS

INTRODUCTION ..... 1
PROJECT DESCRIPTION ..... 1
METHODOLOGY RELATED TO NOISE IMPACT ASSESSMENT ..... 4
CHARACTERISTICS OF SOUND ..... 5
MEASUREMENT OF SOUND ..... 5
PSYCHOLOGICAL AND PHYSIOLOGICAL EFFECTS OF NOISE ..... 6
STUDY METHODS AND PROCEDURES ..... 9
EXISTING CONDITIONS ..... 10
PROJECT IMPACTS ..... 24
MITIGATION MEASURES ..... 46
LEVEL OF SIGNIFICANCE ..... 47
REFERENCES ..... 48

## APPENDICES

A: TRAFFIC DATA
B: TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR CALIBRATION RUNS
C: TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR EXISTING CONDITIONS
D: TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) WITH NO FOOTHILL EXTENSION
E: TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH A CONNECTION TO BORDER AVENUE
F: TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH A CONNECTION TO MANGULAR AVENUE
G: TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH A CONNECTION TO BORDER AVENUE AND MANGULAR AVENUE
H: TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH NO CONNECTIONS TO BORDER AVENUE AND MANGULAR AVENUE
I: TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH SOUND BARRIERS
J: SOUND LEVEL METER CALIBRATION CERTIFICATIONS

# FIGURES AND TABLES

## FIGURES

Figure 1: Regional Location and Project Vicinity ..... 2
Figure 2: Monitoring and Modeled Receptor Locations ..... 11
Figure 3: Modeled Sound Barrier and Receptor Locations ..... 39

## TABLES

Table A: Definitions of Acoustical Terms ..... 7
Table B: Common Sound Levels and Their Noise Sources ..... 8
Table C: Land Use Compatibility for Exterior Community Noise ..... 9
Table D: Short-Term Ambient Noise Monitoring Results ..... 18
Table E: Physical Location of Noise Level Measurements ..... 19
Table F: Existing (2006) Traffic Noise Levels ..... 20
Table G: Model Calibration ..... 23
Table H: Typical Construction Equipment Noise Levels ..... 25
Table I: Projected Traffic Noise Levels, dBA CNEL ..... 27
Table J: Sound Barrier Modeling, dBA CNEL ..... 33

# FOOTHILL PARKWAY WESTERLY EXTENSION NOISE IMPACT ANALYSIS

## INTRODUCTION

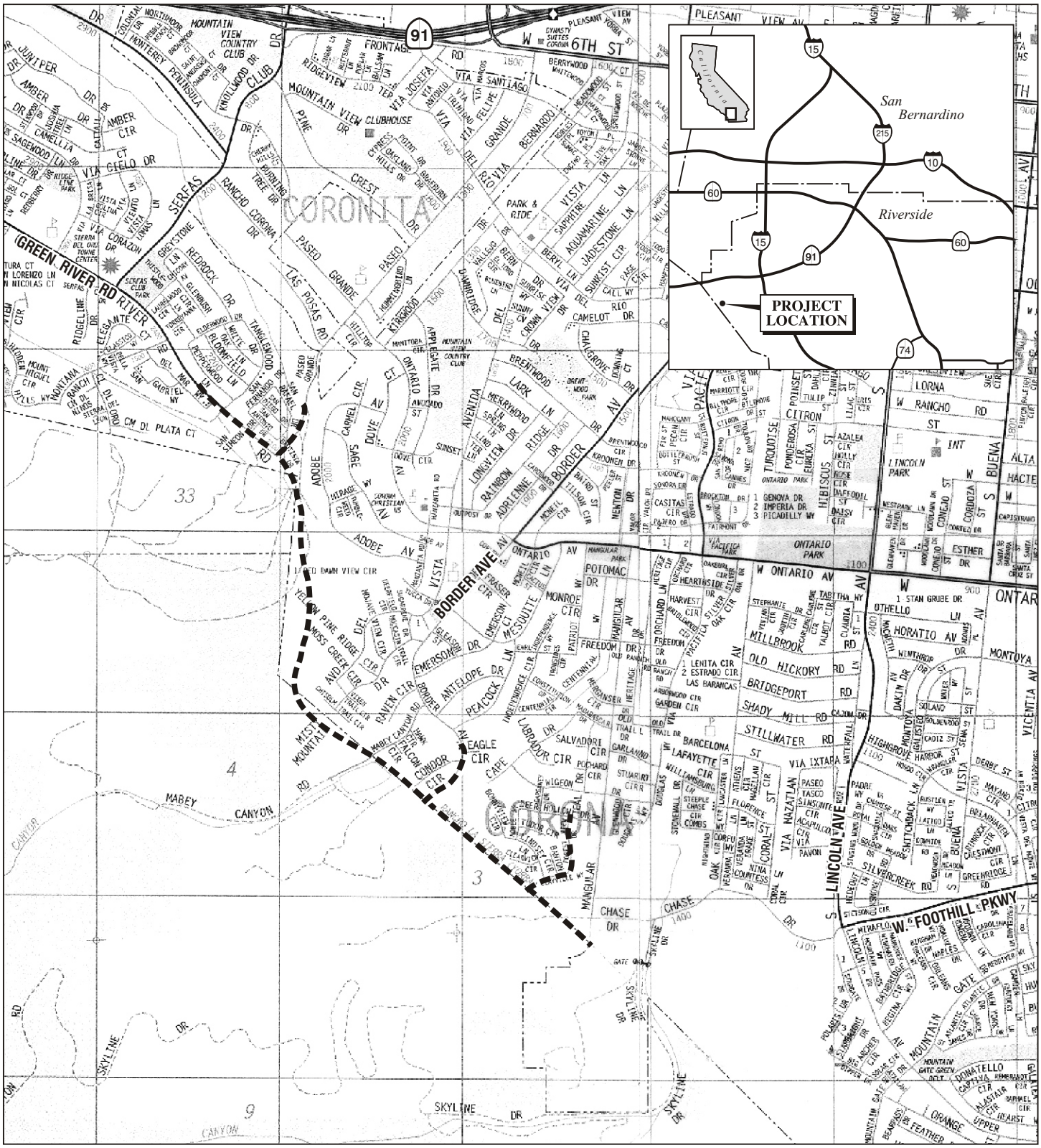
The proposed Foothill Parkway Westerly Extension project is located in the southern portion of the City of Corona along the base of the Santa Ana Mountains. The roadway would generally extend westerly from its existing terminus approximately 600 feet (ft) west of Skyline Drive to the Green River Road/Paseo Grande intersection, for a distance of approximately two miles. Portions of Foothill Parkway have been recently completed as a four-lane divided roadway from I-15 to Skyline Drive. Green River Road in the vicinity of Paseo Grande is paved as a two-lane roadway and would be improved to four lanes from Paseo Grande to Tanglewood Drive. The remainder of Green River Road to State Route 91 (SR-91) is paved as a four-lane roadway.

The roadway extension is situated along the northeastern base of the Santa Ana Mountains and transects both private and public properties within the City of Corona and County of Riverside. The proposed alignment is located immediately adjacent to the Cleveland National Forest, which is under jurisdiction of the United States Forest Service (USFS). The proposed alignment traverses undeveloped terrain generally in an east/west direction and would cross the Mabey Canyon Debris Basin and traverse a 108-inch Metropolitan Water District (MWD) feeder line located approximately 1,000 ft southeast of Paseo Grande. Topography through the alignment generally ranges from gently sloping terraces transected by ravines in the eastern and western portions of the alignment to steep, mountainous terrain in the central portion of the alignment. Elevations range from approximately 800 to 1,300 ft above mean sea level (msl).

Land uses surrounding and adjacent to the project alignment include mostly residential uses, vacant properties, limited agricultural uses, and USFS property. The City of Corona Zoning Ordinance designates properties within the project area as Agricultural (A), Single-Family Residential (R-1A), and Single-Family Development (SFD). The regional location and the project vicinity are shown in Figure 1.

## PROJECT DESCRIPTION

The proposed project would involve the westerly extension of Foothill Parkway as a four-lane roadway from approximately 600 ft west of Skyline Drive to Green River Road. At Skyline Drive, the roadway would veer to the west into unincorporated Riverside County and continue in an east/ west direction along the City/County boundary. The alignment would then curve to the north and connect to Green River Road in the vicinity of Paseo Grande. A bridge structure is incorporated into the roadway design to protect the 108-inch MWD feeder line located approximately 500 ft east of Paseo Grande. The proposed project would require right-of-way (R/W) acquisition for roadway improvements, slopes, and drainage facilities. The project also includes a new signalized intersection at Paseo Grande and two possible additional signalized intersections at the proposed extensions of




LSA

LEGEND

- - - - - Project Limits

N

0 1000 2000

FEET

SOURCE: The Thomas Guide

FIGURE 1

*Foothill Parkway Westerly Extension*

Project Location

I:\RBF0603\G\LocationR2.cdr (8/3/06)

Border Avenue and Chase Drive. Street lighting is planned in the median along the entire roadway. (See Exhibit 3 for a Site Plan and Exhibit 19 for full-size Plan and Profile views and Typical Sections for Foothill Parkway. Typical Sections and Illustrative Cross Sections for proposed Foothill Parkway and other roadway improvements are included as Exhibits 6 and 7, respectively.)

Roadway R/W will vary from 105 ft to 118 ft in width, with an actual roadway width ranging from 72 to 78 ft. The narrower roadway width is proposed through Wardlow Wash, from Paseo Grande to Border Avenue, to minimize impacts and maintain the alignment outside of the Cleveland National Forest. This will be accomplished by the use of a 10 ft wide median. A 14 ft wide median is proposed for the remainder of the extension, from Border Avenue to the existing Foothill Parkway. Four travel lanes (two in each direction) will be provided.

The number 1 lane width will be 12 ft, and the number 2 lane width will be 11 ft, with an 8 ft wide outside shoulder. Roadway grades will vary from a minimum of 0.6 percent to a maximum of 9 percent.

Retaining walls are proposed at three locations along Foothill Parkway in order to minimize grading impacts at critical locations.

In order to accommodate anticipated traffic volumes and the associated turn lane requirements, Paseo Grande will be widened at Foothill Parkway. The roadway R/W will be increased from approximately 56 ft to 82 ft. This will allow for 14 ft and 12 ft southbound right-turn lanes, one 10 ft wide southbound left-turn lane, two 12 ft wide northbound lanes, and a 5 ft wide northbound shoulder. The widening will continue north approximately 225 ft and then taper to join the existing two-lane Paseo Grande roadway to the north. Due to the necessary turn lane lengths, the proposed roadway striping will create a right-in, right-out only condition at the San Bautista Road/Paseo Grande intersection. The existing stop sign on Paseo Grande will be removed at that location.

Five project scenarios and a brief description of each scenario are listed below:

**No Foothill Parkway Extension.** Under this scenario, Foothill Parkway would not be extended from approximately 600 ft west of Skyline Drive to Green River Road.

**Foothill Parkway Extension with no connection to Border Avenue or Mangular Avenue.** Under this scenario, Foothill Parkway would be extended with no connections to Border Avenue or Mangular Avenue.

**Foothill Parkway Extension with a connection to Border Avenue.** Under this scenario, Foothill Parkway would be extended with a connection to Border Avenue, but Mangular Avenue would not be connected.

**Foothill Parkway Extension with a connection to Mangular Avenue.** Under this scenario, Foothill Parkway would be extended with a connection to Mangular Avenue, but Border Avenue would not be connected.

**Foothill Parkway Extension with a connection to Border Avenue and Mangular Avenue.** Under this scenario, Foothill Parkway would be extended with a connection to Border Avenue and Mangular Avenue.

### Purpose and Need

The Foothill Parkway Westerly Extension is included as a planned arterial in the City of Corona's General Plan and Circulation Element and has been a part of the City's planning process for over 20 years. The primary purpose of the Foothill Parkway Westerly Extension project is to complete a critical east/west connection from its current terminus, approximately 600 ft west of Skyline Drive, to Green River Road. The roadway extension would alleviate existing traffic congestion on the local circulation network and accommodate traffic generated by approved and planned development in southern Corona. Additionally, Foothill Parkway will provide greater access to existing and future developments in the southern portion of Corona, not only for routine daily traffic, but for emergency response vehicles as well. The operation goal for the roadway, at a minimum, is level of service (LOS) "D," which has been adopted by the City as the standard for local streets and arterial highways. The goal of this project is to identify the most cost-effective improvements that will be compatible with existing and future physical and legal constraints while minimizing impacts and providing value to the community.

Recent growth in population and land uses, both within the City and in the adjacent communities, has put increasing pressure on the City's arterial street system. Congestion on SR-91 and I-15, as well as congestion at the interchange of the two freeways, has resulted in a significant amount of local and regional "by-pass" traffic using City streets to avoid freeway congestion. Ontario Avenue traverses the southeastern portion of Corona and has become increasingly congested due to vehicles attempting to reach the freeway from Ontario Avenue during congested peak periods. Currently, Ontario Avenue does not provide a direct freeway connection, and vehicles utilize residential streets to access the Green River Road, Maple Street, or Serfas Club Drive interchanges. Construction of Foothill Parkway with local roadway connections at Border Avenue and Chase Drive is necessary to complete the City's overall traffic circulation plan in the southern portion of the City and provide relief for the ever-growing congestion on the City's existing arterial and local roadway network.

## METHODOLOGY RELATED TO NOISE IMPACT ASSESSMENT

Evaluation of noise impacts associated with the proposed project includes the following:

- Determine the noise impacts associated with short-term construction of the proposed project on adjacent noise-sensitive uses
- Determine the long-term traffic noise impacts for each project scenario on noise-sensitive uses adjacent to the project site
- Determine the required mitigation measures to reduce short-term and long-term noise impacts

This noise impact analysis uses the City's noise standards, including the City's Noise Element and Municipal Code, as thresholds against which potential noise impacts are evaluated.

## CHARACTERISTICS OF SOUND

Sound is increasing to such disagreeable levels in the environment that it can threaten quality of life. Noise, usually defined as unwanted sound, consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a wave resulting in the tone's range from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment and is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves, combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

## MEASUREMENT OF SOUND

Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units, such as inches or pounds, decibels are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 decibels (dB) are 10 times more intense than 1 decibel, 20 decibels are 100 times more intense, and 30 decibels are 1,000 times more intense. Thirty decibels represent 1,000 times more acoustic energy than one decibel. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 decibels. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10-decibel increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 A-weighted decibels (dBA) (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound levels decrease approximately six decibels for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source, such as highway traffic or railroad operations, the sound decreases three decibels for each doubling of distance in a hard site environment. Line source noise, when produced within a relatively flat environment with absorptive vegetation, decreases four and one-half decibels for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoyance effects of sound. Equivalent continuous sound level ($L_{eq}$) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the $L_{eq}$ and community noise equivalent level (CNEL) or the day-night average level ($L_{dn}$) based on dBA. CNEL is the time-

varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly $L_{eq}$ for noise occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). $L_{dn}$ is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and $L_{dn}$ are within 1 dBA of each other and are normally interchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level ($L_{max}$), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by $L_{max}$ for short-term noise impacts. $L_{max}$ reflects peak operating conditions and addresses the annoyance aspects of intermittent noise.

Another noise scale often used together with the $L_{max}$ in noise ordinances for enforcement purposes is noise standards in terms of percentile noise levels. For example, the $L_{10}$ noise level represents the noise level exceeded 10 percent of the time during a stated period. The $L_{50}$ noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The $L_{90}$ noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the $L_{eq}$ and $L_{50}$ are approximately the same.

Noise impacts can be described in three categories. The first is audible impact, which refers to increases in noise levels noticeable to humans. Audible increases in noise levels generally require a change of 3.0 dB or greater, since this level has been found to be barely perceptible in an exterior environment. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise levels of less than 1.0 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

## PSYCHOLOGICAL AND PHYSIOLOGICAL EFFECTS OF NOISE

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 160–165 dBA will result in dizziness or loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less developed areas.

Table A lists Definitions of Acoustical Terms, and Table B shows Common Sound Levels and Their Noise Sources. Table C shows Land Use Compatibility for Exterior Community Noise recommended by the California Department of Health, Office of Noise Control.

**Table A: Definitions of Acoustical Terms**

| Term | Definition |
|---|---|
| Decibel, dB | A unit of level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio. |
| Frequency, Hz | Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second). |
| A-Weighted Sound Level, dBA | The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.[1] |
| $L_{02}$, $L_{08}$, $L_{50}$, $L_{90}$ | The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period, respectively. |
| Equivalent Continuous Noise Level, $L_{eq}$ | The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound. |
| Community Noise Equivalent Level, CNEL | The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 decibels to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m. |
| Day/Night Noise Level, $L_{dn}$ | The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m. |
| $L_{max}$, $L_{min}$ | The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging. |
| Ambient Noise Level | The all-encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant. |
| Intrusive | The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level. |

Source: Handbook of Acoustical Measurement and Noise Control 1991.

[1] All sound levels in this report are A-weighted, unless reported otherwise.

**Table B: Common Sound Levels and Their Noise Sources**

| Noise Source | A-Weighted Sound Level in Decibels | Noise Environments | Subjective Evaluations |
|---|---|---|---|
| Near jet engine | 140 | Deafening | 128 times as loud |
| Civil defense siren | 130 | Threshold of pain | 64 times as loud |
| Hard rock band | 120 | Threshold of feeling | 32 times as loud |
| Accelerating motorcycle at a few feet away | 110 | Very loud | 16 times as loud |
| Pile driver; noisy urban street/heavy city traffic | 100 | Very loud | 8 times as loud |
| Ambulance siren; food blender | 95 | Very loud | |
| Garbage disposal | 90 | Very loud | 4 times as loud |
| Freight cars; living room music | 85 | Loud | |
| Pneumatic drill; vacuum cleaner | 80 | Loud | 2 times as loud |
| Busy restaurant | 75 | Moderately loud | |
| Near freeway auto traffic | 70 | Moderately loud | Reference level |
| Average office | 60 | Quiet | ½ as loud |
| Suburban street | 55 | Quiet | |
| Light traffic; soft radio music in apartment | 50 | Quiet | ¼ as loud |
| Large transformer | 45 | Quiet | |
| Average residence without stereo playing | 40 | Faint | ⅛ as loud |
| Soft whisper | 30 | Faint | |
| Rustling leaves | 20 | Very faint | |
| Human breathing | 10 | Very faint | Threshold of hearing |

Source: Compiled by LSA Associates, Inc., 2004.

**Table C: Land Use Compatibility for Exterior Community Noise**

| Land Use Category | Noise Range ($L_{dn}$ or CNEL), dB | | | |
|---|---|---|---|---|
| | I | II | III | IV |
| Passively used open spaces | 50 | 50–55 | 55–70 | 70+ |
| Auditoriums, concert halls, amphitheaters | 45–50 | 50–65 | 65–70 | 70+ |
| Residential: low-density single-family, duplex, mobile homes | 50–55 | 55–70 | 70–75 | 75+ |
| Residential: multifamily | 50–60 | 60–70 | 70–75 | 75+ |
| Transient lodging: motels, hotels | 50–60 | 60–70 | 70–80 | 80+ |
| Schools, libraries, churches, hospitals, nursing homes | 50–60 | 60–70 | 70–80 | 80+ |
| Actively used open spaces: playgrounds, neighborhood parks | 50–67 | — | 67–73 | 73+ |
| Golf courses, riding stables, water recreation, cemeteries | 50–70 | — | 70–80 | 80+ |
| Office buildings, business commercial and professional | 50–67 | 67–75 | 75+ | — |
| Industrial, manufacturing, utilities, agriculture | 50–70 | 70–75 | 75+ | — |

Source: Office of Noise Control, California Department of Health 1976.

Noise Range I—Normally Acceptable: Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Noise Range II—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 are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Noise Range III—Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Noise Range IV—Clearly Unacceptable: New construction or development should generally not be undertaken.

## STUDY METHODS AND PROCEDURES

### Noise Level Measurement Program

Existing noise levels in the project vicinity were sampled during off-peak traffic hours when traffic was flowing freely (9:00 a.m. to 3:00 p.m.). All measurements were made using a Larson Davis Model 824 Type 1 sound level meter (Serial No. 1612).

The following measurement procedures were used:

- Calibrate sound level meter.
- Set up sound level meter at a height of 1.5 meters (m) (5 ft).
- Commence noise monitoring.

- Collect site-specific data such as date, time, direction of traffic, and distance from the sound level meter to the R/W.
- Count passing vehicles for a period of 15 minutes. Vehicles were split into three categories: heavy trucks, medium trucks, and automobiles.
- Stop measurement after 20 minutes.
- Calibrate sound level meter.
- Proceed to next monitoring site and repeat.

The traffic counts were expanded to hourly volumes (multiplied by four to normalize the results to hourly values) and entered into the traffic noise model (TNM) 2.5 model runs for each monitoring site. The monitoring results were used to calibrate the model outputs.

### Noise Modeling

The TNM 2.5 model was used to evaluate traffic noise levels at noise-sensitive receptor locations because of the large topographic changes in the project area. The traffic volumes counted and the noise levels measured during the ambient noise monitoring were used to calibrate the TNM 2.5 model for the existing conditions. Ambient noise monitoring locations with low vehicular traffic in the project area were not used to calibrate the TNM 2.5 model; therefore the ambient noise level measurements were used to establish existing noise levels. The TNM 2.5 program is the traffic noise model used to evaluate traffic noise impacts against the City's noise standards. As TNM 2.5 generates noise levels in dBA $L_{eq}$ and the City's noise standards are expressed in CNEL, 2 dBA is added to the $L_{eq}$ to convert noise levels to CNEL. The existing (2006) and 2025 traffic noise levels were calculated using traffic volumes provided by Meyers, Mohaddes Associates, Inc. (June 2007). The traffic distribution obtained during ambient noise measurement was applied to the existing and 2025 traffic noise modeling. The existing and 2025 traffic data are included in Appendix A.

## EXISTING CONDITIONS

### Existing Sensitive Land Uses in the Project Area

Sensitive receptors include residences, schools, hospitals, and similar uses that are sensitive to noise. Existing land uses within the project area include single-family residential, multifamily residential, future planned residential, and a recreational area. These noise-sensitive land uses areas are located adjacent to Foothill Parkway, Green River Road, and other roadways within the project area. The generalized land use data and locations of particularly sensitive receptors were the basis for the selection of the noise-monitoring and analysis sites. A total of 150 receptor locations were modeled to represent noise-sensitive land uses in the project vicinity. These monitoring and modeled receptor locations are shown in Figure 2.

**Existing Ambient Noise Level.** The primary source of noise in the project area is traffic on Green River Road and Foothill Parkway. Ambient (20-minute) noise measurements were conducted to document existing noise levels at 10 representative sensitive receptor locations along the project

LSA

0 50 100 200 Feet

0 24 48 Meters

Legend

- Monitor Locations
- Receptor Locations
- Existing Walls

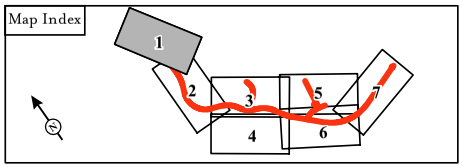



FIGURE 2

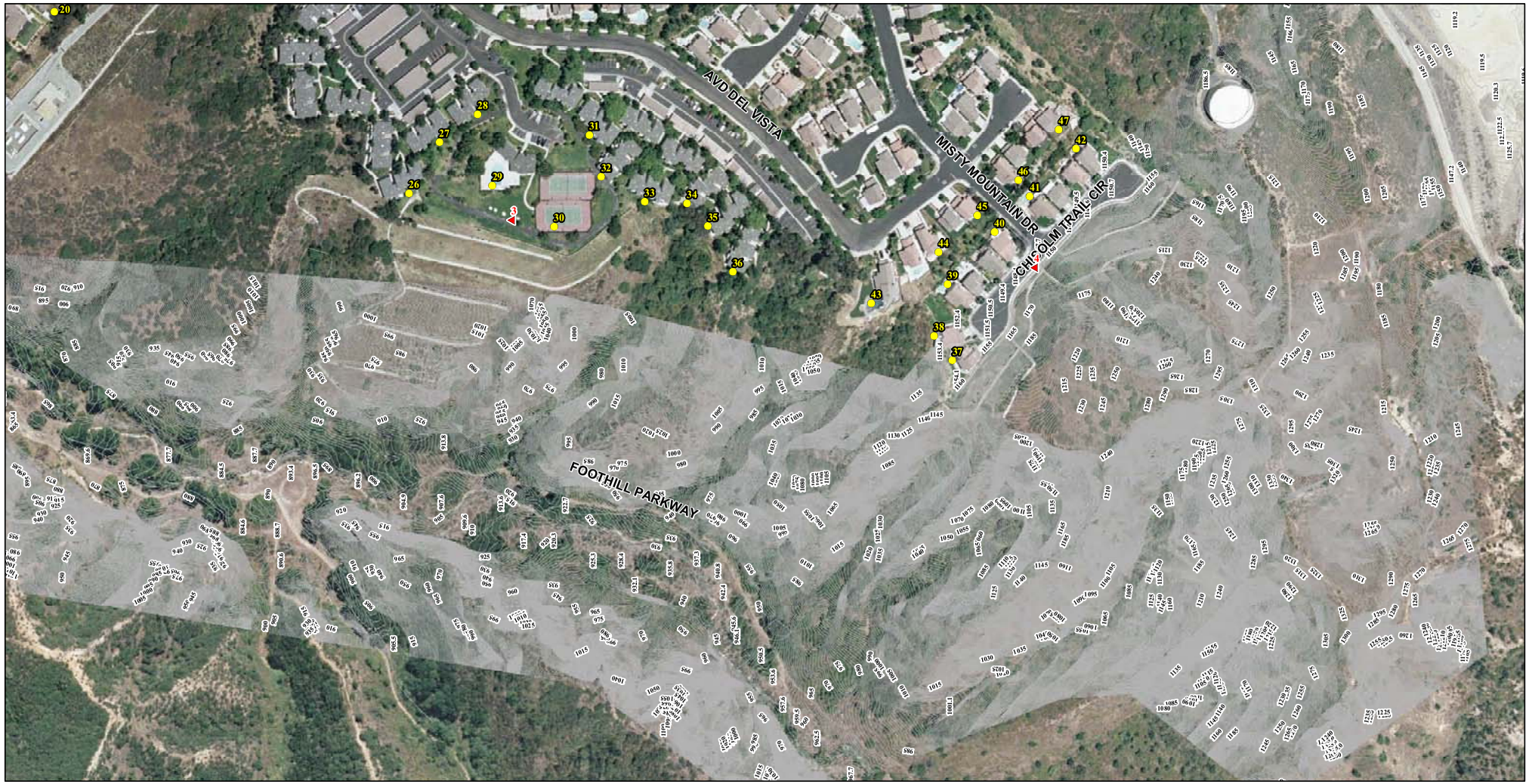
Sheet 1 of 7

*Foothill Parkway Westerly Extension*

Monitoring and Modeled Receptor Locations

SOURCE: Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F2_NoiseImpact_S1.mxd ( 8/6/2007 )




LSA

0 50 100 200 Feet

0 24 48 Meters

Legend

- Monitor Locations
- Receptor Locations
- Existing Walls

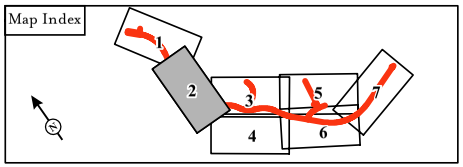



FIGURE 2

Sheet 2 of 7

*Foothill Parkway Westerly Extension*

Monitoring and Modeled Receptor Locations

SOURCE: Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F2_NoiseImpact_S1.mxd ( 8/6/2007 )

LSA

0 50 100 200 Feet

0 24 48 Meters

Legend

- Monitor Locations
- Receptor Locations
- Existing Walls

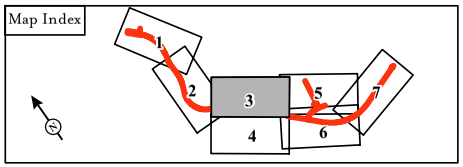



FIGURE 2

Sheet 3 of 7

*Foothill Parkway Westerly Extension*

Monitoring and Modeled Receptor Locations

SOURCE: Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F2_NoiseImpact_S1.mxd ( 8/6/2007 )

LSA

0 50 100 200 Feet

0 24 48 Meters

Legend

- Monitor Locations
- Receptor Locations
- Existing Walls

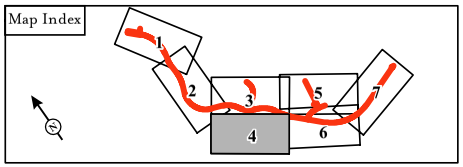



FIGURE 2

Sheet 4 of 7

*Foothill Parkway Westerly Extension*

Monitoring and Modeled Receptor Locations

SOURCE: Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F2_NoiseImpact_S1.mxd ( 8/6/2007 )

LSA

0 50 100 200 Feet

0 24 48 Meters

Legend

- Monitor Locations
- Receptor Locations
- Existing Walls

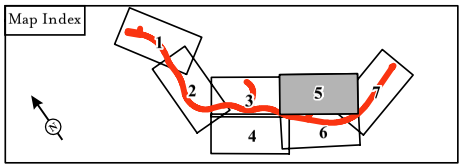



FIGURE 2

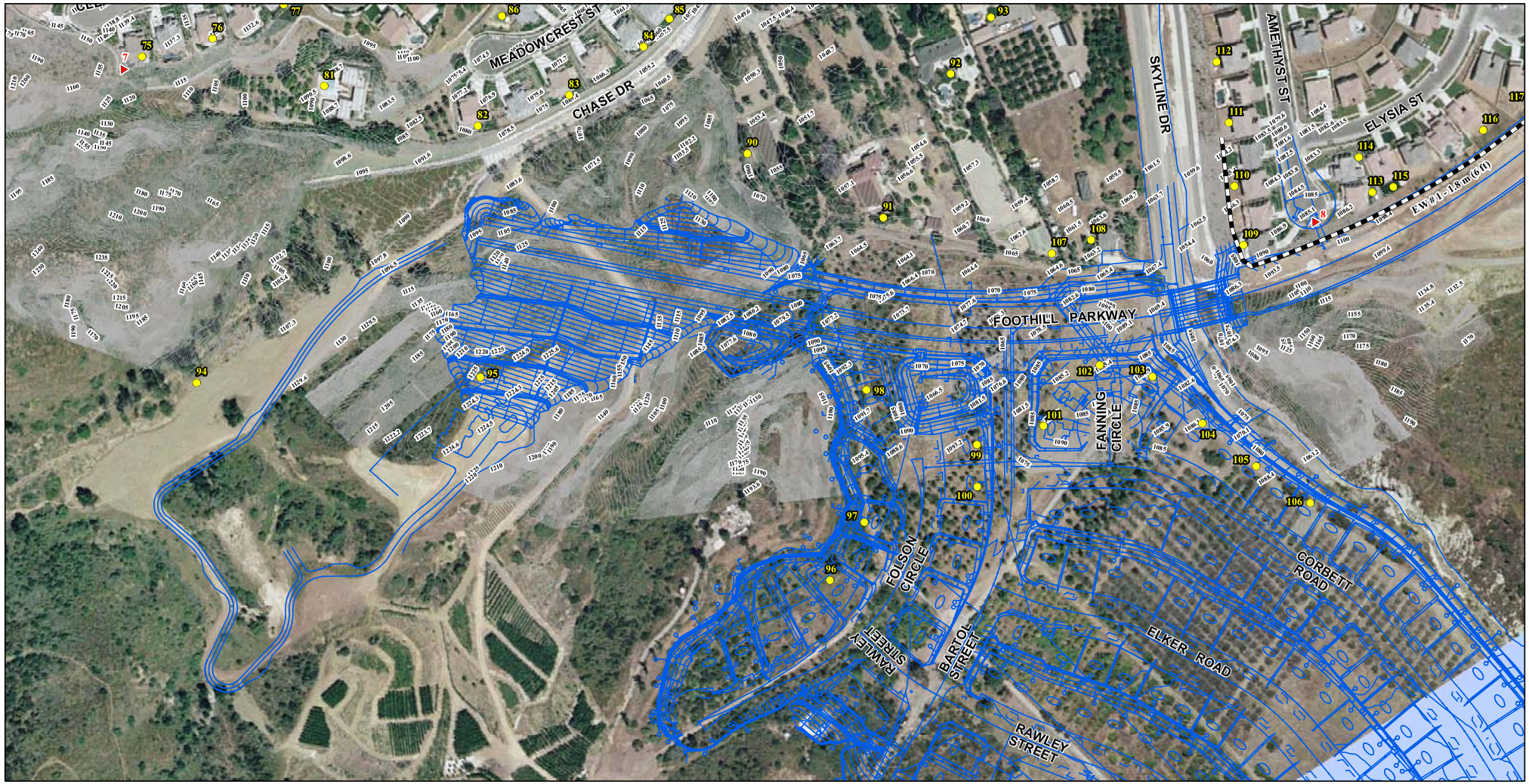
Sheet 5 of 7

*Foothill Parkway Westerly Extension*

Monitoring and Modeled Receptor Locations

SOURCE: Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F2_NoiseImpact_S1.mxd ( 8/6/2007 )




LSA

0 50 100 200 Feet

0 24 48 Meters

Legend

- Monitor Locations
- Receptor Locations
- Existing Walls

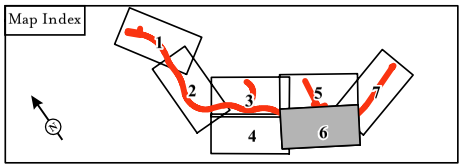


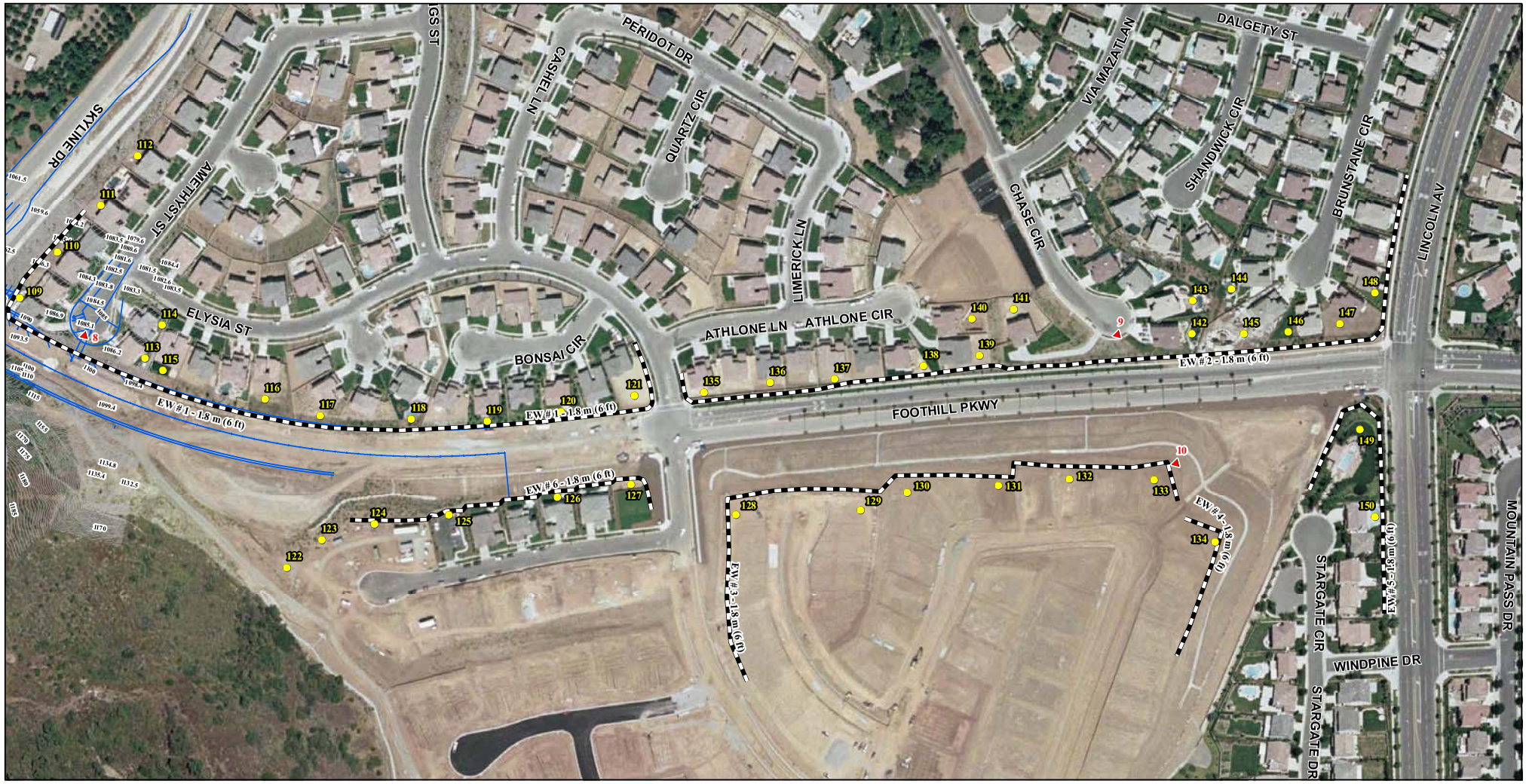

FIGURE 2

Sheet 6 of 7

*Foothill Parkway Westerly Extension*

Monitoring and Modeled Receptor Locations

SOURCE: Eagle Aerial (2004), RBF Consulting (2006).
I:\RBF0603\GIS\F2_NoiseImpact_S1.mxd ( 8/6/2007 )




LSA

0 50 100 200 Feet

0 24 48 Meters

Legend

- Monitor Locations
- Receptor Locations
- Existing Walls

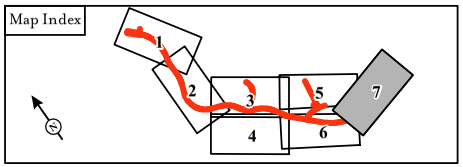



FIGURE 2

Sheet 7 of 7

*Foothill Parkway Westerly Extension*

Monitoring and Modeled Receptor Locations

SOURCE: Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F2_NoiseImpact_S1.mxd ( 8/6/2007 )

alignment (see Figure 2). The noise level measurements were performed using a Larson Davis Model 824 Type 1 sound level meter. Table D contains the results of these measurements. Table E describes the physical location of the noise monitoring. In areas with existing traffic in the project vicinity, these noise measurements were used to calibrate the noise model and to predict the noise levels at noise-sensitive land uses in the project area.

**Table D: Short-Term Ambient Noise Monitoring Results**

| Monitor No. | Date | Start Time | Duration | dBA $L_{eq}$ |
|---|---|---|---|---|
| M-1 | 6/27/2006 | 9:01 AM | 20 minutes | 54.0 |
| M-2 | 6/27/2006 | 9:44 AM | 20 minutes | 55.7 |
| M-3 | 6/27/2006 | 10:20 AM | 20 minutes | 43.8 |
| M-4 | 6/27/2006 | 10:52 AM | 20 minutes | 48.3 |
| M-5 | 6/27/2006 | 11:37 AM | 20 minutes | 42.0 |
| M-6 | 6/27/2006 | 12:39 PM | 20 minutes | 41.8 |
| M-7 | 6/27/2006 | 2:53 PM | 20 minutes | 51.0 |
| M-8 | 6/27/2006 | 3:23 PM | 20 minutes | 54.5 |
| M-9 | 6/27/2006 | 1:30 PM | 20 minutes | 58.1 |
| M-10 | 6/27/2006 | 2:09 PM | 20 minutes | 61.1 |

Source: LSA Associates, Inc., July 2006.

**Existing Traffic Noise.** The primary existing noise sources in the project area are transportation facilities. Traffic on Green River Road, Foothill Parkway, and other local streets is a steady source of ambient noise in the project vicinity. The FHWA TNM 2.5 was used to evaluate traffic-related noise conditions in the vicinity of the project site. As TNM 2.5 generates noise levels in dBA $L_{eq}$ and the City's noise standards are expressed in CNEL, 2 dBA is added to the $L_{eq}$ to convert noise levels to CNEL. The existing traffic volumes were obtained from the Traffic Impact Analysis prepared for the project by Meyer, Mohaddes Associates, Inc. (June 2007). The existing model printouts are provided in Appendix B.

Table F shows the existing noise levels in the project area. Table F also lists the location and type of development for each modeled receptor location. The ambient noise levels measured were used to establish the existing noise level at many locations within the project area because of low vehicular traffic in the surrounding area. As shown in Table F, existing residences in the project area would be exposed to existing noise levels ranging from 35 to 73 dBA CNEL.

Two separate model runs were performed using the traffic numbers collected during the ambient noise monitoring. The results of the model runs were compared to the ambient noise levels to ensure the accuracy of the TNM 2.5 model. Correction factors, known as K-factors, were applied to each of the modeled receptor locations so that the monitored and modeled noise levels were the same. Table G shows the ambient noise level, the modeled noise level, and the K-factor at monitoring locations M-1 and M-9. No correction factors were applied to the other eight monitoring locations due to low traffic volumes.

**Table E: Physical Location of Noise Level Measurements**

| Monitor No. | Location Description | Noise Sources | Vehicle Speed | Traffic Count (15 minutes) |
|---|---|---|---|---|
| M-1 | 2000 San Antonio, near the backyard area | Traffic on Green River Road and Paseo Grande | 45 mph | **Green River Road (WB[1] and EB[2])**<br>Autos = 97<br>Medium Trucks = 0<br>Heavy Trucks = 0 |
| M-2 | 2004 Adobe Avenue, near the backyard area | Some local traffic on Adobe Avenue, faint traffic from Green River Road and Paseo Grande, dogs barking in the background, birds chirping, aircraft noise, person walking past the noise meter and talking, children playing in the backyard | None | None |
| M-3 | Outdoor recreation area at the Crown Villas Condo | Birds chirping, street cleaner on Avenida Del Vista, and some aircraft noise | None | None |
| M-4 | 1751 Chisholm Trail Circle, on the south side of Chisholm Trail Circle | Birds chirping, some aircraft noise, some gardening activity, and noise from leaf blower in the background | None | None |
| M-5 | 2612 Falcon Circle, in the backyard | Birds chirping | None | None |
| M-6 | 2659 Condor Circle, in the backyard | Resident next door playing loud music and birds chirping | None | None |
| M-7 | 1490 Clearview Circle, in the backyard area | HVAC noise and some aircraft noise | None | None |
| M-8 | 3482 Amethyst Street, at the Cul-de-sac | Construction noise in the background | None | None |
| M-9 | Between 1140 and 1105 Chase Circle, at the cul-de-sac | Some traffic on Foothill Parkway, aircraft noise, and heavy truck idling in the background | 45 mph | **Foothill Parkway (WB and EB)**<br>Autos = 42<br>Medium Trucks = 1<br>Heavy Trucks = 5 |
| M-10 | 1121 Stoneberrry Street, in the backyard | Traffic on Foothill Parkway, truck idling across the street, and some aircraft noise | 45 mph | **Foothill Parkway (WB and EB)**<br>Autos = 54<br>Medium Trucks = 6<br>Heavy Trucks = 2 |

Source: LSA Associates, Inc., July 2006.

[1] Westbound.
[2] Eastbound.

**Table F: Existing (2006) Traffic Noise Levels**

| Rec No. | Location | Type of Development | Existing Noise Level, dBA CNEL |
|---|---|---|---|
| R-1 | San Antonio Drive | Residential | **66**[1] |
| R-2 | San Antonio Drive | Residential | **66** |
| R-3 | San Antonio Drive | Residential | **68** |
| R-4 | San Rafael Drive | Residential | **73** |
| R-5 | San Rafael Drive | Residential | **73** |
| R-6 | San Rafael Drive | Residential | **73** |
| R-7 | Adobe Avenue | Residential | 57 |
| R-8 | Adobe Avenue | Residential | 56 |
| R-9 | Adobe Avenue | Residential | 53 |
| R-10 | Adobe Avenue | Residential | 51 |
| R-11 | Adobe Avenue | Residential | 48 |
| R-12 | Adobe Avenue | Residential | 52 |
| R-13 | Adobe Avenue | Residential | 51 |
| R-14 | Adobe Avenue | Residential | 50 |
| R-15 | Adobe Avenue | Residential | 48 |
| R-16 | Adobe Avenue | Residential | 49 |
| R-17 | Adobe Avenue | Residential | 48 |
| R-18 | Adobe Avenue | Residential | 43 |
| R-19 | Adobe Avenue | Residential | 44 |
| R-20 | Adobe Avenue | Residential | 44 |
| R-21 | Adobe Avenue | Residential | 44 |
| R-22 | Avenida Del Vista | Residential | 48 |
| R-23 | Avenida Del Vista | Residential | 47 |
| R-24 | Avenida Del Vista | Residential | 46 |
| R-25 | Avenida Del Vista | Residential | 45 |
| R-26 | Avenida Del Vista | Residential | 42 |
| R-27 | Avenida Del Vista | Residential | 37 |
| R-28 | Avenida Del Vista | Residential | 35 |
| R-29 | Avenida Del Vista | Residential | 36 |
| R-30 | Avenida Del Vista | Recreation | 40 |
| R-31 | Avenida Del Vista | Residential | 34 |
| R-32 | Avenida Del Vista | Residential | 35 |
| R-33 | Avenida Del Vista | Residential | 35 |
| R-34 | Avenida Del Vista | Residential | 35 |
| R-35 | Avenida Del Vista | Residential | 37 |
| R-36 | Avenida Del Vista | Residential | 38 |
| R-37 | Chisholm Trail Circle | Residential | 37 |
| R-38 | Chisholm Trail Circle | Residential | 38 |
| R-39 | Chisholm Trail Circle | Residential | 38 |
| R-40 | Chisholm Trail Circle | Residential | 37 |

[1] Numbers in bold represent noise levels that exceed the City's exterior noise standards of 65 dBA CNEL.

| Rec No. | Location | Type of Development | Existing Noise Level, dBA CNEL |
|---|---|---|---|
| R-41 | Chisholm Trail Circle | Residential | 38 |
| R-42 | Chisholm Trail Circle | Residential | 37 |
| R-43 | Vixen Trail Circle | Residential | 38 |
| R-44 | Vixen Trail Circle | Residential | 38 |
| R-45 | Vixen Trail Circle | Residential | 38 |
| R-46 | Vixen Trail Circle | Residential | 38 |
| R-47 | Vixen Trail Circle | Residential | 37 |
| R-48 | Raven Circle | Residential | 36 |
| R-49 | Raven Circle | Residential | 36 |
| R-50 | Raven Circle | Residential | 38 |
| R-51 | Raven Circle | Residential | 39 |
| R-52 | Falcon Circle | Residential | 37 |
| R-53 | Falcon Circle | Residential | 38 |
| R-54 | Falcon Circle | Residential | 40 |
| R-55 | Condor Circle | Residential | 41 |
| R-56 | Condor Circle | Residential | 42 |
| R-57 | Condor Circle | Residential | 51 |
| R-58 | Condor Circle | Residential | 49 |
| R-59 | Condor Circle | Residential | 48 |
| R-60 | Condor Circle | Residential | 53 |
| R-61 | Condor Circle | Residential | 60 |
| R-62 | Condor Circle | Residential | 57 |
| R-63 | Eagle Circle | Residential | 55 |
| R-64 | Cape Drive | Residential | 46 |
| R-65 | Cape Drive | Residential | 48 |
| R-66 | Cape Drive | Residential | 46 |
| R-67 | Cape Drive | Residential | 45 |
| R-68 | Cape Drive | Residential | 44 |
| R-69 | Cape Drive | Residential | 43 |
| R-70 | Bonnyview Circle | Residential | 43 |
| R-71 | Bonnyview Circle | Residential | 43 |
| R-72 | Bonnyview Circle | Residential | 42 |
| R-73 | Bonnyview Circle | Residential | 41 |
| R-74 | Bonnyview Circle | Residential | 40 |
| R-75 | Clearview Circle | Residential | 40 |
| R-76 | Clearview Circle | Residential | 40 |
| R-77 | Clearview Circle | Residential | 42 |
| R-78 | Clearview Circle | Residential | 40 |
| R-79 | Clearview Circle | Residential | 41 |
| R-80 | Clearview Circle | Residential | 42 |
| R-81 | Meadowcrest Way | Residential | 40 |
| R-82 | Meadowcrest Way | Residential | 42 |
| R-83 | Meadowcrest Way | Residential | 45 |
| R-84 | Meadowcrest Way | Residential | 49 |
| R-85 | Meadowcrest Way | Residential | 52 |

| Rec No. | Location | Type of Development | Existing Noise Level, dBA CNEL |
|---|---|---|---|
| R-86 | Meadowcrest Way | Residential | 45 |
| R-87 | Meadowcrest Way | Residential | 49 |
| R-88 | Meadowcrest Way | Residential | 57 |
| R-89 | Mangular Avenue | Residential | 54 |
| R-90 | Mangular Avenue | Residential | 46 |
| R-91 | Mangular Avenue | Residential | 48 |
| R-92 | Chase Drive | Residential | 46 |
| R-93 | Chase Drive | Residential | 45 |
| R-94 | Foothill Parkway | Residential | 38 |
| R-95 | Foothill Parkway | Residential | 44 |
| R-96 | Folson Circle | Residential | 44 |
| R-97 | Folson Circle | Residential | 46 |
| R-98 | Folson Circle | Residential | 53 |
| R-99 | Folson Circle | Residential | 52 |
| R-100 | Folson Circle | Residential | 49 |
| R-101 | Fanning Circle | Residential | 55 |
| R-102 | Fanning Circle | Residential | 63 |
| R-103 | Fanning Circle | Residential | 61 |
| R-104 | Fanning Circle | Residential | 54 |
| R-105 | Corbett Road | Residential | 50 |
| R-106 | Corbett Road | Residential | 49 |
| R-107 | Chase Drive | Residential | 55 |
| R-108 | Skyline Drive | Residential | 54 |
| R-109 | Amethyst Street | Residential | 53 |
| R-110 | Amethyst Street | Residential | 48 |
| R-111 | Amethyst Street | Residential | 47 |
| R-112 | Amethyst Street | Residential | 46 |
| R-113 | Amethyst Street | Residential | 50 |
| R-114 | Amethyst Street | Residential | 48 |
| R-115 | Elysia Street | Residential | 51 |
| R-116 | Elysia Street | Residential | 51 |
| R-117 | Elysia Street | Residential | 53 |
| R-118 | Elysia Street | Residential | 52 |
| R-119 | Bonsai Circle | Residential | 55 |
| R-120 | Bonsai Circle | Residential | 55 |
| R-121 | Bonsai Circle | Residential | 56 |
| R-122 | Duxbury Circle | Residential | 53 |
| R-123 | Duxbury Circle | Residential | 57 |
| R-124 | Duxbury Circle | Residential | 52 |
| R-125 | Duxbury Circle | Residential | 52 |
| R-126 | Duxbury Circle | Residential | 53 |
| R-127 | Duxbury Circle | Residential | 54 |
| R-128 | Greenvale Circle | Residential | 49 |
| R-129 | Greenvale Circle | Residential | 47 |
| R-130 | Langtree Lane | Residential | 48 |

| Rec No. | Location | Type of Development | Existing Noise Level, dBA CNEL |
|---|---|---|---|
| R-131 | Langtree Lane | Residential | 48 |
| R-132 | Langtree Lane | Residential | 48 |
| R-133 | Langtree Lane | Residential | 48 |
| R-134 | Stoneyberry Lane | Residential | 48 |
| R-135 | Athlone Lane | Residential | 59 |
| R-136 | Athlone Lane | Residential | 59 |
| R-137 | Athlone Lane | Residential | 58 |
| R-138 | Athlone Lane | Residential | 62 |
| R-139 | Athlone Lane | Residential | 61 |
| R-140 | Athlone Lane | Residential | 58 |
| R-141 | Chase Drive | Residential | 56 |
| R-142 | Chase Drive | Residential | 61 |
| R-143 | Chase Drive | Residential | 59 |
| R-144 | Brunstane Circle | Residential | 60 |
| R-145 | Brunstane Circle | Residential | 64 |
| R-146 | Brunstane Circle | Residential | 63 |
| R-147 | Brunstane Circle | Residential | 65 |
| R-148 | Brunstane Circle | Residential | 65 |
| R-149 | Brunstane Circle | Residential | 61 |
| R-150 | Brunstane Circle | Residential | 63 |

Source: LSA Associates, Inc., January 2008.

**Table G: Model Calibration**

| Monitor No. | Monitored Noise Level (dBA) | Modeled Noise Level (dBA) | K-Factor (dBA) |
|---|---|---|---|
| M-1 | 54.0 | 55.1 | -1.1 |
| M-2 | 55.7 | --[1] | -- |
| M-3 | 43.8 | -- | -- |
| M-4 | 48.3 | -- | -- |
| M-5 | 42.0 | -- | -- |
| M-6 | 41.8 | -- | -- |
| M-7 | 51.0 | -- | -- |
| M-8 | 54.5 | -- | -- |
| M-9 | 58.1 | 55.7 | 2.4 |
| M-10 | 61.1 | -- | -- |

Source: LSA Associates, Inc., August 2007.

[1] Calibration was not applied at these locations due to low vehicular traffic or no traffic during ambient noise measurement.

### Thresholds of Significance

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas of conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the project site are the criteria in the City's Noise Element of the General Plan and the Municipal Code.

### City of Corona Noise Standards

**Noise Element of the General Plan.** One of the goals of the City's Noise Element of the General Plan is to develop and adopt specific policies and an effective implementation program to abate and avoid excessive noise exposures in the City by requiring that effective noise mitigation measures be incorporated into the design of new noise-generating and new noise-sensitive land uses. The noise standard for exterior living areas is 65 dBA CNEL, which is consistent with the State's guidelines. The interior noise standard is 45 dBA CNEL, which is consistent with the State Noise Insulation Standards (California Code of Regulations, Title 24) and Chapter 35 of the Uniform Building Code (UBC).

**Municipal Code.** The City's Municipal Code limits the hours of construction to 7:00 a.m. to 8:00 p.m. on Monday through Saturday and 10:00 a.m. to 6:00 p.m. on Sundays and federal holidays.

## PROJECT IMPACTS

### Construction Noise

Short-term noise impacts would be associated with the excavation and grading on site during construction of the proposed project. Construction-related short-term noise levels would be higher than existing ambient noise levels in the project area today but would no longer occur once project construction is completed.

Two types of short-term noise impacts could occur during construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the project site would increase noise levels incrementally on site access roads. As shown in Table H, there will be a relatively high single-event noise exposure potential at a maximum level of 86 dBA $L_{max}$ with trucks passing at 50 ft. However, the projected construction traffic will be minimal when compared to the existing traffic volumes on Green River Road, Border Avenue, Mangular Avenue, and Foothill Parkway. Therefore, short-term construction-related worker commutes and equipment transport noise impacts would not be substantial.

**Table H: Typical Construction Equipment Noise Levels**

| Type of Equipment | Range of Maximum Sound Levels Measured (dBA at 50 ft) | Suggested Maximum Sound Levels for Analysis (dBA at 50 ft) |
|---|---|---|
| Pile Drivers, 12,000 to 18,000 ft-lb/blow | 81–96 | 93 |
| Rock Drills | 83–99 | 96 |
| Jack Hammers | 75–85 | 82 |
| Pneumatic Tools | 78–88 | 85 |
| Pumps | 74–84 | 80 |
| Dozers | 77–90 | 85 |
| Scrapers | 83–91 | 87 |
| Haul Trucks | 83–94 | 88 |
| Cranes | 79–86 | 82 |
| Portable Generators | 71–87 | 80 |
| Rollers | 75–82 | 80 |
| Tractors | 77–82 | 80 |
| Front-End Loaders | 77–90 | 86 |
| Hydraulic Backhoe | 81–90 | 86 |
| Hydraulic Excavators | 81–90 | 86 |
| Graders | 79–89 | 86 |
| Air Compressors | 76–89 | 86 |
| Trucks | 81–87 | 86 |

Source: Noise Control for Buildings and Manufacturing Plants: Bolt, Beranek & Newman, 1987.

The second type of short-term noise impact is related to noise generated during excavation, grading, and construction on site. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on site. Therefore, the noise levels vary as construction progresses. Despite the variety in the types and sizes of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table H lists the maximum noise levels recommended for noise impact assessments for typical construction equipment based on a distance of 50 ft between the equipment and a noise receptor. Typical maximum noise levels range up to 91 dBA $L_{max}$ at 50 ft during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three or four minutes at lower-power settings.

Construction of the proposed project is expected to require the use of on-site scrapers, bulldozers, water trucks, and pickup trucks. Based on the information in Table H, the maximum noise level generated by each scraper is assumed to be 87 dBA $L_{max}$ at 50 ft from the scraper. Each bulldozer

would also generate 85 dBA $L_{max}$ at 50 ft. The maximum noise level generated by water trucks and pickup trucks is approximately 86 dBA $L_{max}$ at 50 ft from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case combined noise level during this phase of construction would be 91 dBA $L_{max}$ at a distance of 50 ft from the active construction area. The closest existing residences in the vicinity of the project area are located approximately 50 ft from the project construction area. The closest residences may be subject to short-term noise reaching 91 dBA $L_{max}$, generated by construction activities near the project boundary. To minimize construction noise impacts, compliance with the hours specified in the City's Municipal Code regarding construction activities is required. To further reduce construction noise impacts, temporary construction barriers with an effective height of 8 to 10 ft shall be installed around construction activities within 100 ft of residences where it is feasible to provide a noise reduction of 8 to 10 dBA. These barriers shall be provided along Green River Road, Paseo Grande, and Meadowcrest Street and near the cul-de-sacs of Condor Circle, Clearview Circle, and Folsom Circle. With the mitigation measure to install temporary construction barriers, the closest residence would experience a maximum noise level of 83 to 81 dBA $L_{max}$. As construction activities would still potentially generate high noise levels with the installation of temporary construction barriers, construction noise would cause disturbance or annoyance to persons of normal sensitivity residing in the area. Therefore, construction noise would have a significant and unavoidable impact on nearby residences.

### Traffic Noise Impact Assessment

Potential long-term noise impacts associated with project operations are solely from traffic noise. Traffic noise was evaluated for 2025 as the worst-case traffic condition. The proposed project was modeled using the TNM 2.5 model. Each scenario was modeled using computer assisted drafting and design (CADD) maps provided by RBF Consulting. Using coordinates obtained from the CADD maps, 150 receptor locations where residential uses and recreational areas currently exist were evaluated in the model.

The TNM 2.5 model is sensitive to the volume of trucks on the roadway because trucks contribute disproportionately to the traffic noise. Traffic volumes, speeds, and truck percentages on Foothill Parkway and Green River Road were obtained from the traffic counts during ambient noise measurements. The traffic mix on these roadways comprises 94 percent automobiles, 1 percent medium-duty trucks, and 5 percent heavy-duty trucks. The traffic distribution for heavy-duty trucks is higher than on typical streets. Although the proposed Foothill Parkway is not designated as a truck route under the General Plan, the traffic mix obtained during ambient noise measurement would generate a worst-case traffic noise level. Traffic volumes counted during the ambient noise monitoring were used in TNM 2.5 for existing settings to calibrate the modeling result. The model input and output data for the calibration model runs are included in Appendix A.

The existing traffic noise levels are shown in Table F. The model input and output data for the existing conditions are included in Appendix B. The 2025 traffic noise levels at the representative sensitive receptor locations along the project corridor were determined without sound barriers, using the traffic volumes as described in Section E. The model input and output data for the no Foothill Parkway extension (future no project) are included in Appendix C. The model input and output data for the Foothill Parkway extension with a connection to Border Avenue are shown in Appendix D.

## Table I: Projected Traffic Noise Levels, dBA CNEL

| Rec. No. | Location | Existing Noise Level | No Foothill Parkway Extension (Future No Build) | Foothill Parkway Extension with | | | |
|---|---|---|---|---|---|---|---|
| | | | | Border Connection | Mangular Connection | Border and Mangular Connection | No Border or Mangular Connection |
| R-1 | San Antonio Drive | **66**[1] | **68** | **66** | **66** | **66** | **66** |
| R-2 | San Antonio Drive | **66** | **68** | 65 | 65 | 65 | 65 |
| R-3 | San Antonio Drive | **68** | **69** | 65 | 65 | 65 | 65 |
| R-4 | San Rafael Drive | **73** | **74** | **71** | **71** | **71** | **72** |
| R-5 | San Rafael Drive | **73** | **74** | **71** | **71** | **71** | **71** |
| R-6 | San Rafael Drive | **73** | **74** | **71** | **71** | **71** | **71** |
| R-7 | Adobe Avenue | 57 | 58 | 60 | 60 | 60 | 60 |
| R-8 | Adobe Avenue | 56 | 57 | 61 | 61 | 62 | 62 |
| R-9 | Adobe Avenue | 53 | 55 | 64 | 64 | 64 | 64 |
| R-10 | Adobe Avenue | 51 | 52 | 64 | 64 | 64 | 64 |
| R-11 | Adobe Avenue | 48 | 49 | 63 | 63 | 64 | 63 |
| R-12 | Adobe Avenue | 52 | 53 | 57 | 57 | 58 | 58 |
| R-13 | Adobe Avenue | 51 | 53 | 58 | 58 | 58 | 58 |
| R-14 | Adobe Avenue | 50 | 52 | 58 | 58 | 58 | 58 |
| R-15 | Adobe Avenue | 48 | 50 | 59 | 59 | 60 | 59 |
| R-16 | Adobe Avenue | 49 | 50 | 59 | 59 | 59 | 59 |
| R-17 | Adobe Avenue | 48 | 49 | 57 | 57 | 58 | 57 |
| R-18 | Adobe Avenue | 43 | 45 | 58 | 58 | 58 | 58 |
| R-19 | Adobe Avenue | 44 | 46 | 55 | 55 | 56 | 55 |
| R-20 | Adobe Avenue | 44 | 46 | 54 | 54 | 54 | 54 |
| R-21 | Adobe Avenue | 44 | 45 | 52 | 52 | 53 | 52 |
| R-22 | Avenida Del Vista | 48 | 49 | 56 | 56 | 56 | 56 |
| R-23 | Avenida Del Vista | 47 | 48 | 54 | 54 | 54 | 54 |
| R-24 | Avenida Del Vista | 46 | 47 | 53 | 53 | 53 | 53 |
| R-25 | Avenida Del Vista | 45 | 47 | 51 | 51 | 52 | 51 |
| R-26 | Avenida Del Vista | 42 | 44 | 60 | 60 | 60 | 60 |
| R-27 | Avenida Del Vista | 37 | 38 | 59 | 59 | 59 | 59 |
| R-28 | Avenida Del Vista | 35 | 37 | 58 | 58 | 58 | 58 |

[1] Numbers in bold represent noise levels that exceed the City's exterior noise standards of 65 dBA CNEL.

| Rec. No. | Location | Existing Noise Level | No Foothill Parkway Extension (Future No Build) | Foothill Parkway Extension with | | | |
|---|---|---|---|---|---|---|---|
| | | | | Border Connection | Mangular Connection | Border and Mangular Connection | No Border or Mangular Connection |
| R-29 | Avenida Del Vista | 36 | 38 | 60 | 60 | 60 | 60 |
| R-30 | Avenida Del Vista | 40 | 42 | 61 | 61 | 61 | 61 |
| R-31 | Avenida Del Vista | 34 | 35 | 58 | 58 | 58 | 58 |
| R-32 | Avenida Del Vista | 35 | 36 | 59 | 59 | 59 | 59 |
| R-33 | Avenida Del Vista | 35 | 36 | 59 | 59 | 60 | 59 |
| R-34 | Avenida Del Vista | 35 | 36 | 59 | 59 | 59 | 59 |
| R-35 | Avenida Del Vista | 37 | 39 | 60 | 60 | 60 | 60 |
| R-36 | Avenida Del Vista | 38 | 40 | 61 | 61 | 61 | 61 |
| R-37 | Chisholm Trail Circle | 37 | 39 | 62 | 62 | 63 | 62 |
| R-38 | Chisholm Trail Circle | 38 | 39 | 62 | 62 | 62 | 62 |
| R-39 | Chisholm Trail Circle | 38 | 39 | 59 | 59 | 60 | 59 |
| R-40 | Chisholm Trail Circle | 37 | 39 | 57 | 57 | 57 | 57 |
| R-41 | Chisholm Trail Circle | 38 | 39 | 56 | 56 | 57 | 56 |
| R-42 | Chisholm Trail Circle | 37 | 38 | 57 | 57 | 57 | 57 |
| R-43 | Vixen Trail Circle | 38 | 39 | 61 | 61 | 61 | 61 |
| R-44 | Vixen Trail Circle | 38 | 39 | 58 | 58 | 59 | 58 |
| R-45 | Vixen Trail Circle | 38 | 39 | 57 | 57 | 57 | 57 |
| R-46 | Vixen Trail Circle | 38 | 39 | 56 | 56 | 56 | 56 |
| R-47 | Vixen Trail Circle | 37 | 38 | 57 | 57 | 57 | 57 |
| R-48 | Raven Circle | 36 | 36 | 56 | 56 | 56 | 56 |
| R-49 | Raven Circle | 36 | 37 | 55 | 55 | 55 | 55 |
| R-50 | Raven Circle | 38 | 38 | 57 | 56 | 57 | 57 |
| R-51 | Raven Circle | 39 | 39 | 55 | 55 | 55 | 55 |
| R-52 | Falcon Circle | 37 | 37 | 60 | 60 | 60 | 60 |
| R-53 | Falcon Circle | 38 | 39 | 59 | 59 | 59 | 59 |
| R-54 | Falcon Circle | 40 | 40 | 57 | 57 | 57 | 57 |
| R-55 | Condor Circle | 41 | 41 | 63 | 63 | 63 | 63 |
| R-56 | Condor Circle | 42 | 42 | 60 | 60 | 61 | 60 |
| R-57 | Condor Circle | 51 | 52 | 65 | 62 | 65 | 63 |
| R-58 | Condor Circle | 49 | 49 | 61 | 61 | 61 | 61 |
| R-59 | Condor Circle | 48 | 48 | 58 | 58 | 58 | 58 |
| R-60 | Condor Circle | 53 | 53 | 59 | 58 | 59 | 58 |

| Rec. No. | Location | Existing Noise Level | No Foothill Parkway Extension (Future No Build) | Foothill Parkway Extension with | | | |
|---|---|---|---|---|---|---|---|
| | | | | Border Connection | Mangular Connection | Border and Mangular Connection | No Border or Mangular Connection |
| R-61 | Condor Circle | 60 | 60 | 64 | 63 | 63 | 63 |
| R-62 | Condor Circle | 57 | 57 | 60 | 59 | 59 | 59 |
| R-63 | Eagle Circle | 55 | 55 | 57 | 57 | 57 | 57 |
| R-64 | Cape Drive | 46 | 47 | 52 | 51 | 52 | 51 |
| R-65 | Cape Drive | 48 | 48 | 53 | 53 | 53 | 53 |
| R-66 | Cape Drive | 46 | 46 | 53 | 53 | 53 | 53 |
| R-67 | Cape Drive | 45 | 45 | 52 | 52 | 52 | 52 |
| R-68 | Cape Drive | 44 | 44 | 51 | 51 | 51 | 51 |
| R-69 | Cape Drive | 43 | 43 | 51 | 51 | 51 | 50 |
| R-70 | Bonnyview Circle | 43 | 44 | 53 | 52 | 53 | 52 |
| R-71 | Bonnyview Circle | 43 | 43 | 53 | 53 | 53 | 53 |
| R-72 | Bonnyview Circle | 42 | 42 | 54 | 54 | 54 | 53 |
| R-73 | Bonnyview Circle | 41 | 42 | 55 | 55 | 55 | 54 |
| R-74 | Bonnyview Circle | 40 | 41 | 55 | 55 | 55 | 55 |
| R-75 | Clearview Circle | 40 | 41 | 64 | 64 | 64 | 64 |
| R-76 | Clearview Circle | 40 | 41 | 61 | 61 | 61 | 61 |
| R-77 | Clearview Circle | 42 | 43 | 60 | 60 | 60 | 60 |
| R-78 | Clearview Circle | 40 | 40 | 62 | 62 | 62 | 62 |
| R-79 | Clearview Circle | 41 | 41 | 59 | 59 | 60 | 59 |
| R-80 | Clearview Circle | 42 | 43 | 58 | 58 | 58 | 58 |
| R-81 | Meadowcrest Way | 40 | 41 | 61 | 61 | 61 | 61 |
| R-82 | Meadowcrest Way | 42 | 43 | 61 | 61 | 61 | 61 |
| R-83 | Meadowcrest Way | 45 | 45 | 59 | 64 | 64 | 59 |
| R-84 | Meadowcrest Way | 49 | 49 | 57 | 64 | 64 | 58 |
| R-85 | Meadowcrest Way | 52 | 52 | 57 | 62 | 62 | 58 |
| R-86 | Meadowcrest Way | 45 | 46 | 57 | 58 | 58 | 57 |
| R-87 | Meadowcrest Way | 49 | 49 | 56 | 57 | 57 | 57 |
| R-88 | Meadowcrest Way | 57 | 57 | 58 | 59 | 59 | 62 |
| R-89 | Mangular Avenue | 54 | 54 | 56 | 57 | 57 | 59 |
| R-90 | Mangular Avenue | 46 | 47 | 60 | 61 | 61 | 60 |
| R-91 | Mangular Avenue | 48 | 50 | 63 | 63 | 63 | 63 |
| R-92 | Chase Drive | 46 | 47 | 56 | 57 | 57 | 56 |

| Rec. No. | Location | Existing Noise Level | No Foothill Parkway Extension (Future No Build) | Foothill Parkway Extension with | | | |
|---|---|---|---|---|---|---|---|
| | | | | Border Connection | Mangular Connection | Border and Mangular Connection | No Border or Mangular Connection |
| R-93 | Chase Drive | 45 | 46 | 55 | 55 | 55 | 55 |
| R-94 | Foothill Parkway | 38 | 40 | 58 | 58 | 58 | 58 |
| R-95 | Foothill Parkway | 44 | 45 | 63 | 63 | 63 | 63 |
| R-96 | Folson Circle | 44 | 47 | 56 | 56 | 56 | 56 |
| R-97 | Folson Circle | 46 | 49 | 58 | 58 | 58 | 58 |
| R-98 | Folson Circle | 53 | 55 | **67** | **67** | **67** | **67** |
| R-99 | Folson Circle | 52 | 55 | 62 | 62 | 62 | 62 |
| R-100 | Folson Circle | 49 | 52 | 59 | 59 | 59 | 59 |
| R-101 | Fanning Circle | 55 | 58 | 63 | 63 | 63 | 63 |
| R-102 | Fanning Circle | 63 | 65 | **71** | **71** | **71** | **71** |
| R-103 | Fanning Circle | 61 | 63 | **68** | **68** | **68** | **68** |
| R-104 | Fanning Circle | 54 | 57 | 62 | 62 | 62 | 62 |
| R-105 | Corbett Road | 50 | 53 | 58 | 58 | 58 | 58 |
| R-106 | Corbett Road | 49 | 51 | 57 | 57 | 57 | 57 |
| R-107 | Chase Drive | 55 | 56 | 64 | 64 | 64 | 64 |
| R-108 | Skyline Drive | 54 | 56 | 63 | 63 | 63 | 63 |
| R-109 | Amethyst Street | 53 | 54 | 61 | 61 | 61 | 61 |
| R-110 | Amethyst Street | 48 | 50 | 56 | 56 | 56 | 56 |
| R-111 | Amethyst Street | 47 | 49 | 56 | 56 | 56 | 56 |
| R-112 | Amethyst Street | 46 | 49 | 55 | 55 | 55 | 55 |
| R-113 | Amethyst Street | 50 | 51 | 58 | 58 | 58 | 58 |
| R-114 | Amethyst Street | 48 | 50 | 57 | 57 | 57 | 57 |
| R-115 | Elysia Street | 51 | 52 | 59 | 59 | 59 | 59 |
| R-116 | Elysia Street | 51 | 52 | 60 | 60 | 60 | 60 |
| R-117 | Elysia Street | 53 | 54 | 61 | 61 | 61 | 61 |
| R-118 | Elysia Street | 52 | 54 | 61 | 61 | 61 | 61 |
| R-119 | Bonsai Circle | 55 | 57 | 64 | 64 | 63 | 63 |
| R-120 | Bonsai Circle | 55 | 57 | 64 | 64 | 64 | 64 |
| R-121 | Bonsai Circle | 56 | 57 | 64 | 64 | 64 | 64 |
| R-122 | Duxbury Circle | 53 | 56 | 62 | 62 | 62 | 62 |
| R-123 | Duxbury Circle | 57 | 60 | 65 | 65 | 65 | 65 |
| R-124 | Duxbury Circle | 52 | 53 | 60 | 60 | 60 | 60 |

| Rec. No. | Location | Existing Noise Level | No Foothill Parkway Extension (Future No Build) | Foothill Parkway Extension with | | | |
|---|---|---|---|---|---|---|---|
| | | | | Border Connection | Mangular Connection | Border and Mangular Connection | No Border or Mangular Connection |
| R-125 | Duxbury Circle | 52 | 54 | 61 | 61 | 61 | 61 |
| R-126 | Duxbury Circle | 53 | 55 | 62 | 62 | 62 | 62 |
| R-127 | Duxbury Circle | 54 | 56 | 63 | 63 | 63 | 63 |
| R-128 | Greenvale Circle | 49 | 50 | 57 | 57 | 57 | 57 |
| R-129 | Greenvale Circle | 47 | 49 | 55 | 55 | 55 | 55 |
| R-130 | Langtree Lane | 48 | 50 | 56 | 56 | 56 | 56 |
| R-131 | Langtree Lane | 48 | 49 | 55 | 55 | 55 | 55 |
| R-132 | Langtree Lane | 48 | 50 | 55 | 55 | 55 | 55 |
| R-133 | Langtree Lane | 48 | 49 | 54 | 54 | 54 | 54 |
| R-134 | Stoneyberry Lane | 48 | 49 | 52 | 51 | 52 | 52 |
| R-135 | Athlone Lane | 59 | 61 | **68** | **68** | **68** | **68** |
| R-136 | Athlone Lane | 59 | 60 | **67** | **67** | **67** | **67** |
| R-137 | Athlone Lane | 58 | 59 | **66** | **66** | **66** | **66** |
| R-138 | Athlone Lane | 62 | 64 | **70** | **70** | **70** | **70** |
| R-139 | Athlone Lane | 61 | 63 | **69** | **69** | **69** | **69** |
| R-140 | Athlone Lane | 58 | 60 | **66** | **66** | 65 | 65 |
| R-141 | Chase Drive | 56 | 58 | 65 | 65 | 65 | 65 |
| R-142 | Chase Drive | 61 | 63 | **68** | **68** | **68** | **68** |
| R-143 | Chase Drive | 59 | 61 | 65 | 65 | 65 | 65 |
| R-144 | Brunstane Circle | 60 | 62 | 65 | 65 | 65 | 65 |
| R-145 | Brunstane Circle | 64 | 65 | **69** | **69** | **69** | **69** |
| R-146 | Brunstane Circle | 63 | 64 | **68** | **68** | **68** | **68** |
| R-147 | Brunstane Circle | 65 | **66** | **68** | **68** | **68** | **69** |
| R-148 | Brunstane Circle | 65 | **66** | **66** | **66** | **66** | **67** |
| R-149 | Brunstane Circle | 61 | 62 | 64 | 64 | 64 | 64 |
| R-150 | Brunstane Circle | 63 | 64 | 64 | 64 | 64 | 64 |

Source: LSA Associates, Inc., January 2008.

The model input and output data for the Foothill Parkway extension with a connection to Mangular Avenue are shown in Appendix E. The model input and output data for the Foothill Parkway extension with a connection to Border Avenue and Mangular Avenue are shown in Appendix F. The model input and output data for the Foothill Parkway extension with no connection to Border Avenue are shown in Appendix G. The traffic noise model results for existing conditions, 2025 without project, and 2025 with project scenarios are shown in Table I. The modeled future traffic noise levels were compared to the City's noise standards to determine whether a traffic noise impact would occur.

Of the 150 modeled receptor locations, 18 receptors would be exposed to a traffic noise level exceeding 65 dBA CNEL under the following two scenarios: (1) connection to Border Avenue only and (2) connection to Mangular Avenue only. In addition, of the 150 modeled receptors, 17 receptors would be exposed to a traffic noise level exceeding 65 dBA CNEL under the remaining two scenarios: (1) connections Border Avenue and Mangular Avenue and (2) no connections to Border Avenue and Mangular Avenue. The following receptor locations will be exposed to noise levels that exceed the City's exterior noise standard of 65 dBA CNEL.

**R-1 and R-4 through R-6.** These receptor locations represent existing residences located at San Antonio Drive and San Rafael Drive that have outdoor active use areas exposed to traffic noise on Green River Road and Paseo Grande. These receptors would not experience a project-related noise increase of 3 dBA or more. Currently, no existing walls protect these residences. No sound barriers were evaluated to protect these residences. Traffic noise levels at these receptor locations are contributed by other roadways in the project area, such as Green River Road and Paseo Grande, and the project traffic would not contribute significantly to these receptors.

**R-98.** This receptor location represents an existing residence located at Folson Circle that has outdoor active use areas exposed to traffic noise on Foothill Parkway. This receptors would experience a project-related noise increase of 3 dBA or more. No existing barriers were assumed for this residence. One sound barrier was modeled to protect this residence. The results of the barrier analysis are shown in Table J.

**R-102 and R-103.** These receptor locations represent existing residences located at Fanning Circle that have outdoor active use areas exposed to traffic noise on Foothill Parkway. These receptors would experience a project-related noise increase of 3 dBA or more. No existing barriers were assumed for these residences. One sound barrier was modeled to protect these residences. The results of the barrier analysis are shown in Table J.

**R-135 through R-140, R-142, R-145, and R-146 under the connection to Border Avenue only and connection to Mangular Avenue only. R-135 through R-139, R-142, R-145, and R-146 under the connections to Border Avenue and Mangular Avenue and no connections to Border Avenue and Mangular Avenue.** These receptor locations represent existing residences located at Athlone Lane, Chase Drive, and Brunstane Circle that have outdoor active use areas exposed to traffic noise on Foothill Parkway. These receptors would experience a project-related noise increase of 3 dBA or more. An existing 1.8 m (6 ft) high wall along the residential property line currently protects these residences. One sound barrier was modeled to protect these residences. The results of the barrier analysis are shown in Table J.

**Table J: Sound Barrier Modeling, dBA CNEL**

| SB No. | Rec No. | 2025 Foothill Extension[1] (w/o Barrier) | With Barrier H = 1.8 m (6 ft) | | With Barrier H = 2.4 m (8 ft) | | With Barrier H = 3.05 m (10 ft) | | With Barrier H = 3.7 m (12 ft) | | With Barrier H = 4.3 m (14 ft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CNEL | IL[2] | CNEL | IL | CNEL | IL | CNEL | IL | CNEL | IL |
| | R-1 | **66**[3,4] | --[5] | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-2 | **65**[3] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-3 | **65**[3] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-4 | **71**[3] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-5 | **71**[3] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-6 | **71**[3] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-7 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-8 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-9 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-10 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-11 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-12 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-13 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-14 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-15 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-16 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-17 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-18 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-19 | 56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-20 | 54 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-21 | 53 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-22 | 56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-23 | 54 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

1 The 2025 Foothill Parkway extension with a connection to Border Avenue and Mangular Avenue scenario was used in the sound barrier modeling because it is one of the build scenarios that would generate the worst-case noise levels.

2 IL: Insertion Loss

3 Although receptors would continue to experience a traffic noise level exceeding the City's exterior noise standard of 65 dBA CNEL, no sound barriers were analyzed for these receptors because they would not experience a project-related noise increase of 3 dBA or more.

4 Numbers in bold represent noise levels that exceed the City's exterior noise standard of 65 dBA CNEL.

5 No barrier was evaluated at this receptor location because noise levels would not exceed the City's exterior noise standard of 65 dBA CNEL.

## Table J: Sound Barrier Modeling, dBA CNEL

| SB No. | Rec No. | 2025 Foothill Extension[1] (w/o Barrier) | With Barrier H = 1.8 m (6 ft) | | With Barrier H = 2.4 m (8 ft) | | With Barrier H = 3.05 m (10 ft) | | With Barrier H = 3.7 m (12 ft) | | With Barrier H = 4.3 m (14 ft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CNEL | IL[2] | CNEL | IL | CNEL | IL | CNEL | IL | CNEL | IL |
| | R-24 | 53 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-25 | 52 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-26 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-27 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-28 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-29 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-30 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-31 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-32 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-33 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-34 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-35 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-36 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-37 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-38 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-39 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-40 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-41 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-42 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-43 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-44 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-45 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-46 | 56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-47 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-48 | 56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-49 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-50 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-51 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-52 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-53 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-54 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-55 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-56 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-57 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-58 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## Table J: Sound Barrier Modeling, dBA CNEL

| SB No. | Rec No. | 2025 Foothill Extension[1] (w/o Barrier) | With Barrier H = 1.8 m (6 ft) | | With Barrier H = 2.4 m (8 ft) | | With Barrier H = 3.05 m (10 ft) | | With Barrier H = 3.7 m (12 ft) | | With Barrier H = 4.3 m (14 ft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CNEL | IL[2] | CNEL | IL | CNEL | IL | CNEL | IL | CNEL | IL |
| | R-59 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-60 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-62 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-63 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-64 | 52 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-65 | 53 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-66 | 53 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-67 | 52 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-68 | 51 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-69 | 51 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-70 | 53 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-71 | 53 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-72 | 54 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-73 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-74 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-75 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-76 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-77 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-78 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-79 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-80 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-81 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-82 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-83 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-84 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-85 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-86 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-87 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-88 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-89 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-90 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-91 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-92 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-93 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## Table J: Sound Barrier Modeling, dBA CNEL

| SB No. | Rec No. | 2025 Foothill Extension[1] (w/o Barrier) | With Barrier H = 1.8 m (6 ft) | | With Barrier H = 2.4 m (8 ft) | | With Barrier H = 3.05 m (10 ft) | | With Barrier H = 3.7 m (12 ft) | | With Barrier H = 4.3 m (14 ft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CNEL | IL[2] | CNEL | IL | CNEL | IL | CNEL | IL | CNEL | IL |
| | R-94 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-95 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-96 | 56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-97 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1 | R-98 | **67** | 64 | 3 | 64 | 3 | 64 | 3 | 64 | 3 | 64 | 3 |
| | R-99 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-100 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-101 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2 | R-102 | **71** | 61 | 10 | 59 | 12 | 58 | 13 | 57 | 15 | 56 | 16 |
| | R-103 | **68** | 60 | 9 | 61 | 7 | 61 | 8 | 61 | 8 | 61 | 8 |
| | R-104 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-105 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-106 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-107 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-108 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-109 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-110 | 56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-111 | 56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-112 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-113 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-114 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-115 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-116 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-117 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-118 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-119 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-120 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-121 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-122 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-123 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-124 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-125 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-126 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-127 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-128 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Table J: Sound Barrier Modeling, dBA CNEL**

| SB No. | Rec No. | 2025 Foothill Extension[1] (w/o Barrier) | With Barrier H = 1.8 m (6 ft) | | With Barrier H = 2.4 m (8 ft) | | With Barrier H = 3.05 m (10 ft) | | With Barrier H = 3.7 m (12 ft) | | With Barrier H = 4.3 m (14 ft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CNEL | IL[2] | CNEL | IL | CNEL | IL | CNEL | IL | CNEL | IL |
| | R-129 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-130 | 56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-131 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-132 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-133 | 54 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-134 | 52 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 3 | R-135 | **68** | 64 | 4 | 64 | 4 | 62 | 6 | 60 | 8 | 59 | 9 |
| | R-136 | **67** | 64 | 3 | 64 | 3 | 62 | 5 | 61 | 6 | 60 | 7 |
| | R-137 | **66** | 63 | 3 | 63 | 3 | 61 | 5 | 60 | 6 | 59 | 7 |
| | R-138 | **70** | **70** | 0 | **66** | 4 | 63 | 7 | 61 | 9 | 60 | 10 |
| | R-139 | **69** | **69** | 0 | 65 | 4 | 64 | 5 | 63 | 6 | 62 | 7 |
| | R-140 | 65 | 62 | 3 | 62 | 3 | 61 | 4 | 59 | 6 | 58 | 7 |
| | R-141 | 65 | 62 | 3 | 62 | 3 | 60 | 5 | 58 | 7 | 57 | 8 |
| | R-142 | **68** | **67** | 1 | **66** | 2 | 63 | 5 | 62 | 6 | 61 | 7 |
| | R-143 | 65 | 64 | 1 | 64 | 1 | 63 | 2 | 61 | 4 | 59 | 6 |
| | R-144 | 65 | 65 | 0 | 64 | 1 | 63 | 2 | 61 | 4 | 60 | 5 |
| | R-145 | **69** | **69** | 0 | **68** | 1 | 65 | 4 | 63 | 6 | 62 | 7 |
| | R-146 | **68** | **67** | 1 | **66** | 2 | 64 | 4 | 63 | 5 | 62 | 6 |
| | R-147 | **68**[1] | **68** | 0 | **67** | 1 | 65 | 3 | 63 | 5 | 62 | 6 |
| | R-148 | **66**[2] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-149 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | R-150 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

Source: LSA Associates, Inc., January 2008.

1 Receptor R-147 under the connection to Border Avenue only, connection to Mangular Avenue only, and connection to Border Avenue and Mangular Avenue scenarios would not experience a project-related noise increase of 3 dBA or more. No sound barriers are required for this receptor under these scenarios. However, Receptor R-147 under the no connection to Border Avenue and Mangular Avenue scenario is predicted to be 69 dBA CNEL and would experience a project-related noise increase of 3 dBA or more. A sound barrier height of 8 ft would reduce noise levels at this receptor to the City's exterior noise standard of 65 dBA CNEL or below.

2 Although receptors would continue to experience a traffic noise level exceeding the City's exterior noise standard of 65 dBA CNEL, no sound barriers were analyzed for these receptors because they would not experience a project-related noise increase of 3 dBA or more.

**R-147.** This receptor location represents an existing residence located at Brunstane Circle that has outdoor active use areas exposed to traffic noise on Foothill Parkway. This receptor would not experience a project-related noise increase of 3 dBA or more under the connection to Border Avenue only, connection to Mangular Avenue only, and connections to Border Avenue and Mangular Avenue scenarios. However, this residence would experience a project-related noise increase of 3 dBA or more under the no connections to Border Avenue and Manugular Avenue scenario. Sound barriers were evaluated to protect this residence under the no connections to Border Avenue and Mangular Avenue scenario. The results of the barrier analysis are shown in Table J.

**R-148.** This receptor location represents an existing residence located at Brunstane Circle that have outdoor active use areas exposed to traffic noise on Foothill Parkway and Lincoln Avenue. This receptor would not experience a project-related noise increase of 3 dBA or more. No sound barriers were evaluated to protect this residence. Traffic noise levels at this receptor location is contributed by other roadways in the project area, such as Lincoln Avenue, and the project traffic would not contribute significantly to this receptor.

## Modeling of Sound Barriers

The bold numbers in Table I show impacted receptor locations with projected noise levels that exceed the City's noise standards. Of the 150 modeled receptors, 18 receptors would experience a project-related noise increase of 3 dBA or more and would be exposed to a traffic noise level exceeding 65 dBA CNEL under the following two scenarios: (1) connection to Border Avenue only and (2) connection to Mangular Avenue only. In addition, of the 150 modeled receptors, 17 receptors would experience a project-related noise increase of 3 dBA or more and would be exposed to a traffic noise level exceeding 65 dBA CNEL under the remaining two scenarios: (1) connections Border Avenue and Mangular Avenue and 2) no connections to Border Avenue and Mangular Avenue. The 2025 Foothill extension with a connection to Border Avenue and Mangular Avenue scenario was used in the sound barrier modeling because it is one of the scenarios that would generate worst-case noise levels. Sound barriers (SB) were analyzed for sensitive receptors that would exceed the City's exterior noise standard of 65 dBA CNEL and have a project-related noise increase of 3 dBA or more. At each location, five sound barrier heights were analyzed: 1.8, 2.4, 3.05, 3.7, and 4.3 m (6, 8, 10, 12, and 14 ft). The results of the noise barrier modeling are shown in Table J. The locations of the modeled sound barriers are shown in Figure 3. The TNM 2.5 printouts for the sound barrier model runs are in Appendix I.

The following barriers were analyzed to protect the sensitive receptor locations that would experience a project-related noise increase of 3 dBA or more and would be exposed to a traffic noise level exceeding the City's exterior noise standard of 65 dBA CNEL.

**SB No. 1.** This barrier is located along Foothill Parkway along the residential property line to protect receptor R-98. As shown in Table J, a minimum barrier height of 1.8 m (6 ft) would reduce traffic noise levels to 65 dBA CNEL or below.

**SB No. 2.** This barrier is located along Foothill Parkway along the residential property line to protect receptors R-102 and R-103. As shown in Table J, a minimum barrier height of 1.8 m (6 ft) would reduce traffic noise levels to 65 dBA CNEL or below.

LSA

0 50 100 200 Feet

0 24 48 Meters

**Legend**

- Receptor Locations
- Proposed Alignment
- Sound Barriers
- Sound Barriers*

* Additional Sound Barrier length is required to protect receptor R-147 under the no connections to Border Avenue and Mangular Avenue scenario.

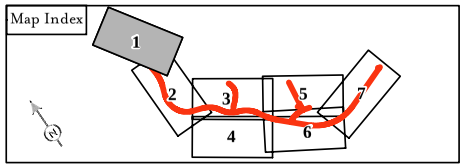



FIGURE 3

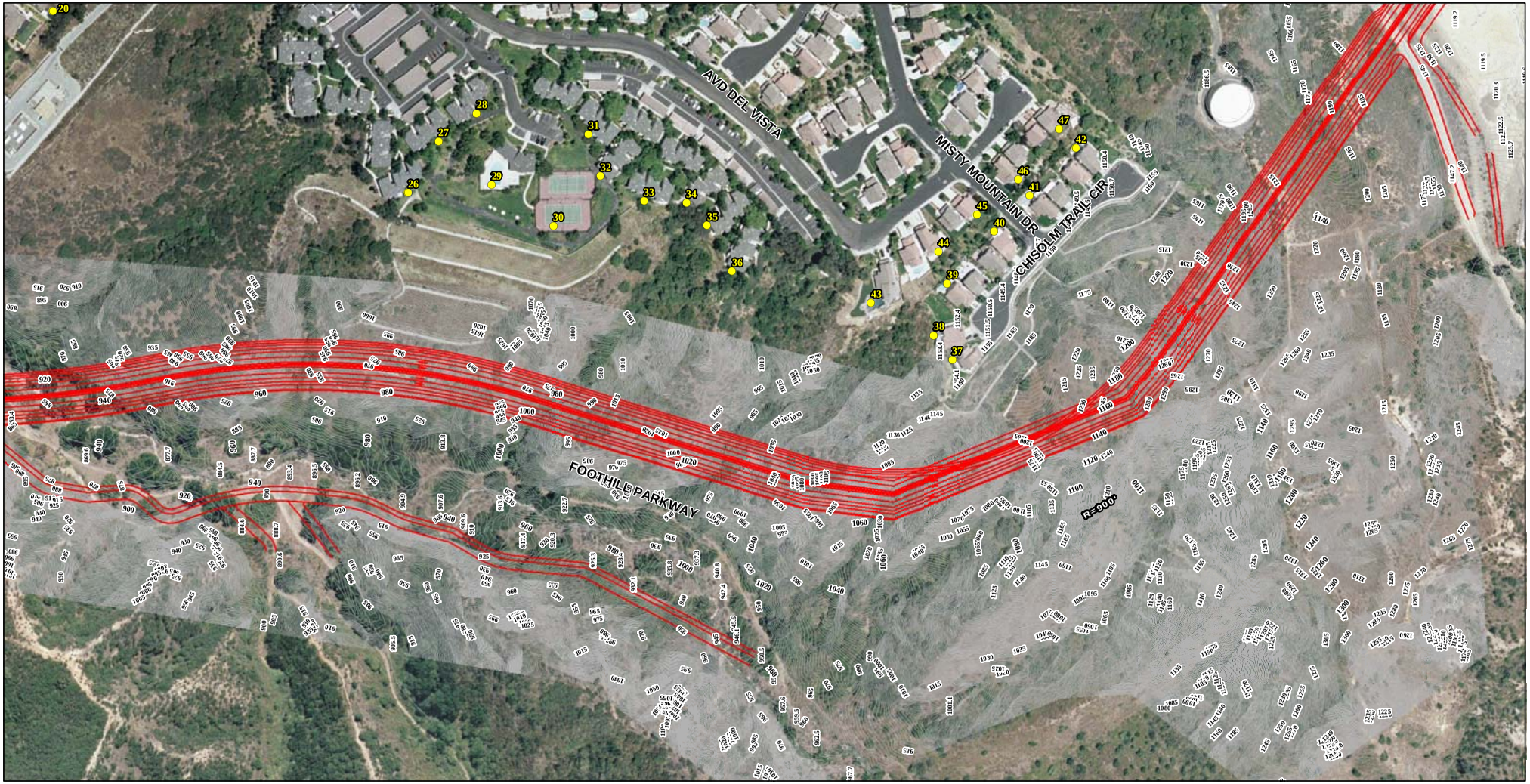
Sheet 1 of 7

*Foothill Parkway Westerly Extension*

Sound Barrier and Modeled Receptor Locations

SOURCE: ; Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F3_NoiseImpact_S1.mxd ( 1/15/2008 )




LSA

0 50 100 200 Feet

0 24 48 Meters

**Legend**

- Receptor Locations
- Proposed Alignment
- Sound Barriers
- Sound Barriers*

* Additional Sound Barrier length is required to protect receptor R-147 under the no connections to Border Avenue and Mangular Avenue scenario.

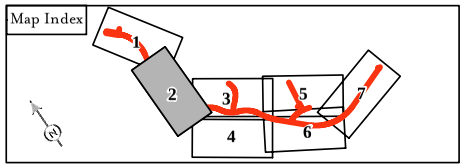



FIGURE 3
Sheet 2 of 7

*Foothill Parkway Westerly Extension*

Sound Barrier and Modeled Receptor Locations

SOURCE: ; Eagle Aerial (2004), RBF Consulting (2006).
I:\RBF0603\GIS\F3_NoiseImpact_S1.mxd ( 1/15/2008 )

LSA

0 50 100 200 Feet

0 24 48 Meters

**Legend**

- Receptor Locations
- Proposed Alignment
- Sound Barriers
- Sound Barriers*

* Additional Sound Barrier length is required to protect receptor R-147 under the no connections to Border Avenue and Mangular Avenue scenario.

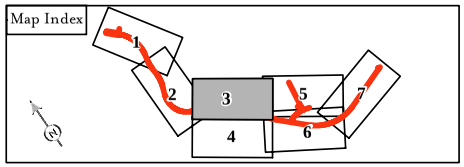



FIGURE 3

Sheet 3 of 7

*Foothill Parkway Westerly Extension*

Sound Barrier and Modeled Receptor Locations

SOURCE: ; Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F3_NoiseImpact_S1.mxd ( 1/15/2008 )

LSA

**Legend**

- Receptor Locations
- Proposed Alignment
- Sound Barriers
- Sound Barriers*

0 50 100 200 Feet

0 24 48 Meters

* Additional Sound Barrier length is required to protect receptor R-147 under the no connections to Border Avenue and Mangular Avenue scenario.

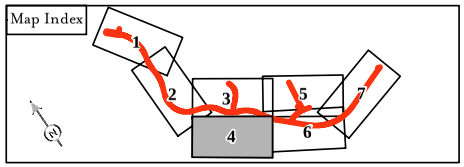



FIGURE 3

Sheet 4 of 7

*Foothill Parkway Westerly Extension*

Sound Barrier and Modeled Receptor Locations

SOURCE: ; Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F3_NoiseImpact_S1.mxd ( 1/15/2008 )

LSA

0 50 100 200 Feet

0 24 48 Meters

**Legend**

- Receptor Locations
- Proposed Alignment
- Sound Barriers
- Sound Barriers*

* Additional Sound Barrier length is required to protect receptor R-147 under the no connections to Border Avenue and Mangular Avenue scenario.

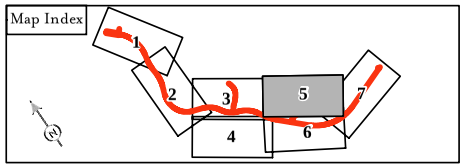



FIGURE 3

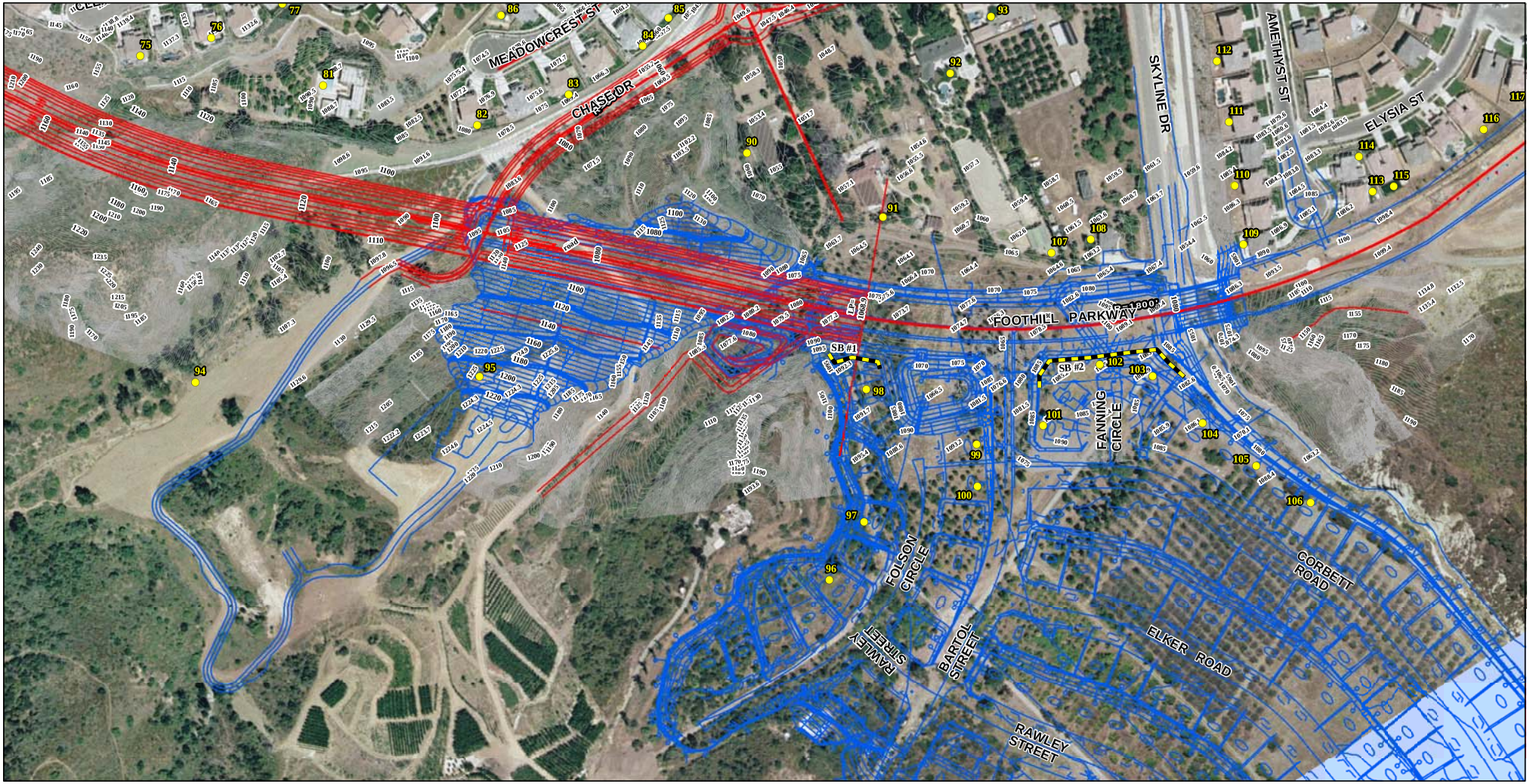
Sheet 5 of 7

*Foothill Parkway Westerly Extension*

Sound Barrier and Modeled Receptor Locations

SOURCE: ; Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F3_NoiseImpact_S1.mxd ( 1/15/2008 )




LSA

0 50 100 200 Feet

0 24 48 Meters

**Legend**

- Receptor Locations
- Proposed Alignment
- Sound Barriers
- Sound Barriers*

* Additional Sound Barrier length is required to protect receptor R-147 under the no connections to Border Avenue and Mangular Avenue scenario.

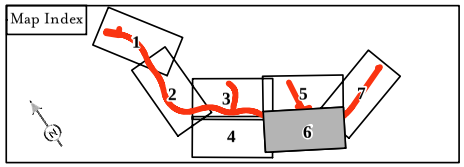



FIGURE 3

Sheet 6 of 7

*Foothill Parkway Westerly Extension*

Sound Barrier and Modeled Receptor Locations

SOURCE: ; Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F3_NoiseImpact_S1.mxd ( 1/15/2008 )

LSA

0 50 100 200 Feet

0 24 48 Meters

**Legend**

- Receptor Locations
- Proposed Alignment
- Sound Barriers
- Sound Barriers*

* Additional Sound Barrier length is required to protect receptor R-147 under the no connections to Border Avenue and Mangular Avenue scenario.

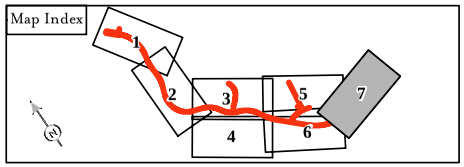



FIGURE 3

Sheet 7 of 7

*Foothill Parkway Westerly Extension*

Sound Barrier and Modeled Receptor Locations

SOURCE: ; Eagle Aerial (2004), RBF Consulting (2006).

I:\RBF0603\GIS\F3_NoiseImpact_S1.mxd ( 1/15/2008 )

**SB No. 3.** This barrier is located along Foothill Parkway along the residential property line to protect receptors R-135 through R-140, R-142, R-145, and R-146 under the following two scenarios: (1) connection to Border Avenue only, and (2) connection to Mangular Avenue only. Under the connection to Border Avenue and Mangular Avenue scenario, SB No. 3 would protect receptors R-135 through R-139, R-142, R-145, and R-146. Last, under the no connection to Border Avenue and Mangular Avenue scenario, SB No. 3 would protect receptors R-135 through R-139, R-142, and R-145 through R-147. As shown in Table J, a minimum barrier height of 2.4 to 3.05 m (8 to 10 ft) would reduce traffic noise levels to 65 dBA CNEL or below.

No sound barriers were analyzed for sensitive receptors that would not be exposed to a traffic noise level exceeding 65 dBA CNEL or that would experience an increase in project-related noise levels less than 3 dBA.

## MITIGATION MEASURES

**Construction Impacts.** Construction of the proposed project would potentially result in relatively high noise levels and annoyance at the closest residences. The following measures would reduce short-term construction-related noise impacts resulting from the proposed project:

- During all project excavation and on-site grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- During all project construction, the project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- During all project construction, the construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site.
- During all project construction within 100 ft of residences, the project contractor shall install temporary construction barriers with an effective height of 8 to 10 ft around construction activities to provide a noise reduction of 8 to 10 dBA. These barriers shall be provided along Green River Road, Paseo Grande, and Meadowcrest Street and near the cul-de-sacs of Condor Circle, Clearview Circle, and Folsom Circle.
- Prior to project construction, the project contractor shall develop and execute a community information program, notifying neighbors of planned construction schedules and periods of maximum activity. The notice shall provide a construction schedule, required noise conditions applied to the project, and the name and telephone number of the Construction Project Manager who can address questions and problems that may arise during construction.
- During all project construction, the construction contractor shall limit all construction-related activities to the hours of 7:00 a.m. to 10:00 p.m. on weekdays and weekends.

**Traffic Noise Impacts.** The following mitigation measures are required to reduce traffic noise impacts on noise-sensitive land uses:

- A minimum barrier height of 1.8 m (6 ft) for SB No. 1, located along Foothill Parkway west of Bartol Street (See Figure 3, Sheet 6 of 7).
- A minimum barrier height of 1.8 m (6 ft) for SB No. 2, located along Foothill Parkway east of Bartol Street (See Figure 3, Sheet 6 of 7).
- A minimum barrier height of 2.4 to 3.05 m (8 to 10 ft) for SB No. 3, located along Foothill Parkway between Elysia Street and Lincoln Avenue (See Figure 3, Sheet 7 of 7).

## LEVEL OF SIGNIFICANCE

With implementation of the standard conditions, potential short-term noise levels during construction would be significant and unavoidable.

## REFERENCES

Bolt, Beranek, and Newman. *Noise From Construction Equipment and Operations,* Building *Equipment, and Home Appliances,* December 31, 1971.

Bolt, Beranek & Newman. Noise Control for Buildings and Manufacturing Plants, 1987.

City of Corona, Municipal Code.

City of Corona, Noise Element of the General Plan.

Federal Highway Administration, Traffic Noise Model (TNM) Version 2.5, April 2004.

Harris, Cyril. *Handbook of Acoustical* Measurements *and Noise Control,* Third Edition, 1991.

Meyer, Mohaddes Associates, Inc. *Traffic Impact Analysis,* June 27, 2007.

# APPENDIX A

# TRAFFIC DATA

| | | Traffic Counts | | | | | | | | | | Modeled Volume | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Auto** | **Med** | **Heavy** | **Total** | | **Vehicle Distribution** | | | | | **Auto** | **Med** | **Heavy** |
| Green River Road | | 97 | 0 | 0 | 97 | | 1.00 | 0.00 | 0.00 | 1 | | 194 | 0 | 0 |
| Foothill Parkway | | 42 | 1 | 5 | 48 | | 0.88 | 0.02 | 0.10 | 1 | | 84 | 2 | 10 |
| | | | | | | | | | | | | | | |
| | | | | | | | 0.94 | 0.01 | 0.05 | 1.00 | | | | |

| | | | Vehicle Distribution | | | | Traffic Volumes | | |
|---|---|---|---|---|---|---|---|---|---|
| **Existing** | **Volumes** | | **Auto** | **Med** | **Heavy** | | | | |
| Green River Road | 1290 | | 0.94 | 0.01 | 0.05 | | 606 | 6 | 32 |
| Paseo Grande | 1220 | | 0.94 | 0.01 | 0.05 | | 573 | 6 | 31 |
| Foothill Parkway | 360 | | 0.94 | 0.01 | 0.05 | | 169 | 2 | 9 |
| Border Avenue | 300 | | 0.94 | 0.01 | 0.05 | | 141 | 2 | 8 |
| Mangular Avenue | 380 | | 0.94 | 0.01 | 0.05 | | 179 | 2 | 10 |
| Lincoln Avenue | 920 | | 0.94 | 0.01 | 0.05 | | 432 | 5 | 23 |
| | | | | | | | | | |
| **Border Connection** | | | | | | | | | |
| Green River Road | 2900 | | 0.94 | 0.01 | 0.05 | | 1363 | 15 | 73 |
| Paseo Grande | 750 | | 0.94 | 0.01 | 0.05 | | 353 | 4 | 19 |
| Foothill Parkway 1 | 2160 | | 0.94 | 0.01 | 0.05 | | 1015 | 11 | 54 |
| Foothill Parkway 2 | 2420 | | 0.94 | 0.01 | 0.05 | | 1137 | 12 | 61 |
| Border Avenue | 380 | | 0.94 | 0.01 | 0.05 | | 179 | 2 | 10 |
| Mangular Avenue | 380 | | 0.94 | 0.01 | 0.05 | | 179 | 2 | 10 |
| Lincoln Avenue | 920 | | 0.94 | 0.01 | 0.05 | | 432 | 5 | 23 |
| | | | | | | | | | |
| **Mangular Connection** | | | | | | | | | |
| Green River Road | 2900 | | 0.94 | 0.01 | 0.05 | | 1363 | 15 | 73 |
| Paseo Grande | 760 | | 0.94 | 0.01 | 0.05 | | 357 | 4 | 19 |
| Foothill Parkway 1 | 2160 | | 0.94 | 0.01 | 0.05 | | 1015 | 11 | 54 |
| Foothill Parkway 2 | 2410 | | 0.94 | 0.01 | 0.05 | | 1133 | 12 | 60 |
| Border Avenue | 300 | | 0.94 | 0.01 | 0.05 | | 141 | 2 | 8 |
| Mangular Avenue | 460 | | 0.94 | 0.01 | 0.05 | | 216 | 2 | 12 |
| Lincoln Avenue | 910 | | 0.94 | 0.01 | 0.05 | | 428 | 5 | 23 |
| | | | | | | | | | |
| **Border and Mangular Connection** | | | | | | | | | |
| Green River Road | 2900 | | 0.94 | 0.01 | 0.05 | | 1363 | 15 | 73 |
| Paseo Grande | 740 | | 0.94 | 0.01 | 0.05 | | 348 | 4 | 19 |
| Foothill Parkway 1 | 2170 | | 0.94 | 0.01 | 0.05 | | 1020 | 11 | 54 |
| Foothill Parkway 2 | 2420 | | 0.94 | 0.01 | 0.05 | | 1137 | 12 | 61 |
| Border Avenue | 360 | | 0.94 | 0.01 | 0.05 | | 169 | 2 | 9 |
| Mangular Avenue | 450 | | 0.94 | 0.01 | 0.05 | | 212 | 2 | 11 |
| Lincoln Avenue | 910 | | 0.94 | 0.01 | 0.05 | | 428 | 5 | 23 |
| | | | | | | | | | |
| **No Connections** | | | | | | | | | |
| Green River Road | 2900 | | 0.94 | 0.01 | 0.05 | | 1363 | 15 | 73 |
| Paseo Grande | 770 | | 0.94 | 0.01 | 0.05 | | 362 | 4 | 19 |
| Foothill Parkway 1 | 2150 | | 0.94 | 0.01 | 0.05 | | 1011 | 11 | 54 |
| Foothill Parkway 2 | 2410 | | 0.94 | 0.01 | 0.05 | | 1133 | 12 | 60 |
| Border Avenue | 300 | | 0.94 | 0.01 | 0.05 | | 141 | 2 | 8 |
| Mangular Avenue | 380 | | 0.94 | 0.01 | 0.05 | | 179 | 2 | 10 |
| Lincoln Avenue | 920 | | 0.94 | 0.01 | 0.05 | | 432 | 5 | 23 |
| | | | | | | | | | |
| **Future No Build** | | | | | | | | | |
| Green River Road | 1970 | | 0.94 | 0.01 | 0.05 | | 926 | 10 | 49 |
| Paseo Grande | 1580 | | 0.94 | 0.01 | 0.05 | | 743 | 8 | 40 |
| Foothill Parkway | 500 | | 0.94 | 0.01 | 0.05 | | 235 | 3 | 13 |
| Border Avenue | 300 | | 0.94 | 0.01 | 0.05 | | 141 | 2 | 8 |
| Mangular Avenue | 380 | | 0.94 | 0.01 | 0.05 | | 179 | 2 | 10 |
| Lincoln Avenue | 1080 | | 0.94 | 0.01 | 0.05 | | 508 | 5 | 27 |
| | | | | | | | | | |

# APPENDIX B

# TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR CALIBRATION RUNS

**REFER TO CD-ROM**

# APPENDIX C

# TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR EXISTING CONDITIONS

**REFER TO CD-ROM**

# APPENDIX D

# TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) WITH NO FOOTHILL EXTENSION

**REFER TO CD-ROM**

# APPENDIX E

# TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH A CONNECTION TO BORDER AVENUE

**REFER TO CD-ROM**

# APPENDIX F

# TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH A CONNECTION TO MANGULAR AVENUE

**REFER TO CD-ROM**

# APPENDIX G

# TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH A CONNECTION TO BORDER AVENUE AND MANGULAR AVENUE

**REFER TO CD-ROM**

# APPENDIX H

# TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH NO CONNECTIONS TO BORDER AVENUE OR MANGULAR AVENUE

**REFER TO CD-ROM**

# APPENDIX I

# TRAFFIC NOISE MODEL (TNM) 2.5 PRINTOUTS FOR FUTURE (2025) FOOTHILL EXTENSION WITH SOUND BARRIERS

**REFER TO CD-ROM**

# APPENDIX J

# SOUND LEVEL METER CALIBRATION CERTIFICATIONS

**Excalibur Engineering**
11 Musick
Irvine, CA 92618
Phone : (949) 454-6603
Fax : (949) 454-6642

# Certificate Of Calibration

| | | | |
|---|---|---|---|
| **Customer** | LSA | **Dept.** | N/A |
| **Report #** | 40162-1 | **Bar Code #** | |
| **Date Received** | FRIDAY, MARCH 17, 2006 | **P.O. #** | VERBAL-JASON |
| **Manufacturer** | LARSON DAVIS | **Serial #** | 824A1612 |
| **Model #** | 824 | **Asset #** | NAN |
| **Description** | SOUND LEVEL METER | | |

## Calibration Information

**Date Calibrated** 3/23/2006 **Calibration Due Date** 3/23/2007 **Calibration Interval** 12

**Maintenance Procedure** 4226

**Temperature** 24 ° C **Humidity** 32 % **Calibration Performed By** 6

**Accuracy** ANSI Type 1

## Condition Received

Received In Tolerance

**Remarks** Unit tested to ANSI TYPE 1 specifications under laboratory conditions.

## Condition Returned

Returned In Tolerance

**Remarks**

## Standards Employed

| ID # | Manufacturer | Model # | Description | Calibration Expires |
|---|---|---|---|---|
| 089 | BRUEL & KJAER | 4228 | PISTONPHONE | 12/2/2007 |
| 878 | BRUEL & KJAER | 4226 | SLM CALIBRATOR | 11/9/2006 |
| 178 | AGILENT | 34401A | 6 1/2 DIGIT MULTIMETER | 8/5/2006 |

Excalibur Engineering, Inc. certifies that the instrument specified above meets the manufacturer's specifications and has been calibrated using Standards and Instruments also listed above whose accuracies are traceable to the National Institute of Standards and Technology(NIST), and the calibration systems and records are in compliance to ISO-10012 and ANSI Z540-1-1994.

This certificate/report shall not be reproduced without written approval of Excalibur Engineering, Inc.

JW Rogers CEQA 8 MAR 23 2006

**Approved By**

Excalibur Engineering is not liable for any damages, consequences or any remedy regarding this certification with the exception of the calibration within 30 days

**Excalibur Engineering**
11 Musick
Irvine, CA 92618
Phone : (949) 454-6603
Fax : (949) 454-6642

# Certificate Of Calibration

| | | | |
|---|---|---|---|
| **Customer** | LSA | **Dept.** | N/A |
| **Report #** | 40162-2 | **Bar Code #** | |
| **Date Received** | FRIDAY, MARCH 17, 2006 | **P.O. #** | VERBAL-JASON |
| **Manufacturer** | LARSON DAVIS | **Serial #** | 3228 |
| **Model #** | CAL200 | **Asset #** | NAN |
| **Description** | PRECISION ACOUSTIC CALIBRATOR | | |

## Calibration Information

**Date Calibrated** 3/23/2006 **Calibration Due Date** 3/23/2007 **Calibration Interval** 12

**Maintenance Procedure** 1211

**Temperature** 24 ° C **Humidity** 32 % **Calibration Performed By** 6

**Accuracy** ± .2 dB

## Condition Received

Received In Tolerance

**Remarks** See data sheet.

## Condition Returned

Returned In Tolerance

**Remarks**

## Standards Employed

| ID # | Manufacturer | Model # | Description | Calibration Expires |
|---|---|---|---|---|
| 089 | BRUEL & KJAER | 4228 | PISTONPHONE | 12/2/2007 |
| 043 | BRUEL & KJAER | 4190 | 1/2" CONDENSER MICROPHONE | 4/17/2006 |
| 051 | BRUEL & KJAER | 2639 | MICROPHONE PREAMPLIFIER | 1/16/2007 |
| 949 | BRUEL & KJAER | 2636 | MEASURING AMPLIFIER | 12/21/2006 |
| 938 | AGILENT | 8903B | 20HZ100KHZ AUDIO ANALYZER | 12/28/2006 |
| 713 | FLUKE | 8920A | 20 MHZ TRUE RMS VOLTMETER | 7/19/2006 |

Excalibur Engineering, Inc. certifies that the instrument specified above meets the manufacturer's specifications and has been calibrated using Standards and Instruments also listed above whose accuracies are traceable to the National Institute of Standards and Technology(NIST), and the calibration systems and records are in compliance to ISO-10012 and ANSI Z540-1-1994.

This certificate/report shall not be reproduced without written approval of Excalibur Engineering, Inc.

EEQA 8 MAR 23 2006

**Approved By**

Excalibur Engineering is not liable for any damages, consequences or any remedy regarding this certification with the exception of the calibration within 30 days

*EXCALIBUR ENGINEERING*

*EQUIPMENT SPECIFICATION SHEET*

**Manufacturer : LARSON DAVIS** **Model : CAL200** **Procedure : 1211**
**Work Order : 40162-2** **Serial : 3228** **Asset : NAN**

| RANGE/FUNCTION | APPLIED | AS FOUND | AS LEFT | TOLERANCE |
|---|---|---|---|---|
| | | | | |
| **S.P.L** | **94.0 dB** | **93.9 dB** | **93.9 dB** | **±0.2 dB** |
| | **114.0 dB** | **114.0 dB** | **114.0 dB** | **±0.2 dB** |
| | | | | |
| **FEQUENCY** | **1000 Hz** | **1000.1 Hz** | **1000.1 Hz** | **±1% IV** |
| | | | | |
| **DISTORTION** | **--** | **0.4%** | **0.4%** | **<1%** |

**Excalibur Engineering**
11 Musick
Irvine, CA 92618
Phone : (949) 454-6603
Fax : (949) 454-6642

# Certificate Of Calibration

| | | | |
|---|---|---|---|
| **Customer** | LSA | **Dept.** | N/A |
| **Report #** | 40162-3 | **Bar Code #** | |
| **Date Received** | FRIDAY, MARCH 17, 2006 | **P.O. #** | VERBAL-JASON |
| **Manufacturer** | LARSON DAVIS | **Serial #** | 7977 |
| **Model #** | 2541 | **Asset #** | NAN |
| **Description** | MICROPHONE | | |

## Calibration Information

**Date Calibrated** 3/23/2006 **Calibration Due Date** 3/23/2007 **Calibration Interval** 12

**Maintenance Procedure** 1371

**Temperature** 24 ° C **Humidity** 32 % **Calibration Performed By** 6

**Accuracy** ±1.2dB

## Condition Received

Received In Tolerance

**Remarks** Microphone sensitivity @ - 28.03dB Re IV/Pa

Unable to chart frequency response at this time.

## Condition Returned

Returned In Tolerance

**Remarks**

## Standards Employed

| ID # | Manufacturer | Model # | Description | Calibration Expires |
|---|---|---|---|---|
| 089 | BRUEL & KJAER | 4228 | PISTONPHONE | 12/2/2007 |
| 043 | BRUEL & KJAER | 4190 | 1/2" CONDENSER MICROPHONE | 4/17/2006 |
| 051 | BRUEL & KJAER | 2639 | MICROPHONE PREAMPLIFIER | 1/16/2007 |
| 941 | BRUEL & KJAER | 1049 | SINE & NOISE GENERATOR | 9/9/2006 |
| 949 | BRUEL & KJAER | 2636 | MEASURING AMPLIFIER | 12/21/2006 |
| 938 | AGILENT | 8903B | 20HZ100KHZ AUDIO ANALYZER | 12/28/2006 |
| 655 | BRUEL & KJAER | 4142 | MICRPHN CALIB APPARATUS | 6/1/2010 |
| 923 | BRUEL & KJAER | 2706 | POWER AMPLIFIER | 4/25/2006 |
| 713 | FLUKE | 8920A | 20 MHZ TRUE RMS VOLTMETER | 7/19/2006 |

Excalibur Engineering, Inc. certifies that the instrument specified above meets the manufacturer's specifications and has been calibrated using Standards and Instruments also listed above whose accuracies are traceable to the National Institute of Standards and Technology(NIST), and the calibration systems and records are in compliance to ISO-10012 and ANSI Z540-1-1994.

This certificate/report shall not be reproduced without written approval of Excalibur Engineering, Inc.

EEQA

MAR 23 2006

**Approved By**

Excalibur Engineering is not liable for any damages, consequences or any remedy regarding this certification with the exception of the calibration within 30 days