Appendix G
Acoustical Assessment

ESA

MAY 2015

Acoustical Assessment for the Paseo Del Sol Tentative Tract No. 36483

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DEFINITIONS OF COMMONLY USED TERMS IN NOISE CONTROL

The definitions that follow are in general agreement with those contained in publications of various professional organizations, including the American National Standards Institute (ANSI); the American Society for Testing and Materials (ASTM); the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); the International Organization for Standardization (ISO); and the International Electrotechnical Commission (IEC).

TERMINOLOGY

acoustic; acoustical: *Acoustic* is usually used when the term being qualified designates something that has the properties, dimensions, or physical characteristics associated with sound waves (e.g., acoustic power); *acoustical* is usually used when the term which it modifies does not explicitly designate something that has the properties, dimensions, or physical characteristics of sound (e.g., acoustical material).

ambient noise: The all-encompassing noise associated with a given environment at a specified time, usually being a composite of sound from many sources arriving from many directions, near and far; no particular sound is dominant.

attenuation: The decrease in level of sound, usually from absorption, divergence, scattering, or the cancellation of the sound waves.

average sound level (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Unit: decibel.

A-weighted sound level (L_A): The sound level measured with a sound-level meter using A-weighting. *Unit*: decibel (dBA).

background noise: The total noise from all sources other than a particular sound that is of interest (e.g., other than the noise being measured or other than the speech or music being listened to).

decibel (dB): A unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels correspond to the logarithm (to the base 10) of this ratio. [In many sound fields, the sound pressure ratios are not proportional to the corresponding power ratios, but it is common practice to extend the use of the decibel to such cases. One decibel equals one-tenth of a *bel*.]

equivalent continuous sound level (average sound level) (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound. *Unit*: decibel (dBA).

frequency (*f*): Of a periodic function, the number of times that a quantity repeats itself in one second, i.e., the number of cycles per second. *Unit*: hertz (Hz).

noise: Any disagreeable or undesired sound, i.e., unwanted sound.

noise level: Same as sound level. Usually used to describe the sound level of an unwanted sound.

noise reduction (NR): The difference in sound pressure level between any two points along a path of sound propagation.

sound: (1) A change in air pressure that is capable of being detected by the human ear.
(2) The hearing sensation excited by a change in air pressure.

sound level: Ten times the logarithm to the base 10 of the square of the ratio of the frequency-weighted (and time-averaged) sound pressure to the reference sound pressure of 20 micropascals. The frequency-weightings and time-weighting employed should be specified; if they are not specified, it is understood that A-frequency-weighting is used and that an averaging time of 0.125 is used. *Unit*: decibel (dBA).

SYMBOLS, ABBREVIATIONS, AND ACRONYMS

ADT	Average Daily Traffic
ANSI	American National Standards Institute
AM	Ante Meridiem
ASTM	American Society for Testing and Materials
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
HVAC	heating, ventilation, and air conditioning
Hz	hertz
INCE	Institute of Noise Control Engineering
L_{dn}	day-night average sound level
L_{eq}	Equivalent Sound Level
L_{max}	maximum A-weighted sound level
L_{min}	minimum A-weighted sound level
L_{dn}	day-night average sound level
L_{eq}	Equivalent Sound Level
MPH	miles per hour
N/A	Not applicable
PM	Post Meridiem
SPL	sound pressure level
TNM 2.5	Traffic Noise Model, version 2.5

EXECUTIVE SUMMARY

This acoustical assessment analyzes potential mobile noise impacts for noise-sensitive uses within Tentative Tract Map No. 36483 (TTM 36483) of the proposed Paseo Del Sol project. The project site is located at the northwest corner of the intersection of Temecula Parkway and Butterfield Stage Road in the City of Temecula, California. The proposed project consists of 173 single-family dwelling units within TTM 36483, including a neighborhood park and open space drainage channels.

The Federal Highway Administration's (FHWA) Noise Prediction Model (RD-77-108) and Traffic Noise Model, Version 2.5 (TNM 2.5) were utilized to calculate the forecast noise levels. Utilizing Average Daily Traffic (ADT) Level of Service (LOS) "C" design capacities for the County of Riverside, existing mobile noise levels would range from 66.8 to 67.1 dBA along De Portola Road, Butterfield Stage Road, and Temecula Parkway. In order to reduce mobile noise levels at the project site to within the County's daytime exterior noise standard of 65 dBA for single-family residences, the project proposes a sound wall to be constructed along the northern, eastern, and southern boundaries of the project site. FHWA's TNM 2.5 model was utilized to determine the appropriate sound wall height required to prevent mobile noise from exceeding the County's daytime exterior noise standard. Modeled results indicate that minimum sound wall heights of six, seven, and eight feet are required to ensure proposed residential units within TTM 36483 are not exposed to sound levels in excess of the County's daytime exterior noise standards for single-family residences.

1.0 INTRODUCTION AND PROJECT SUMMARY

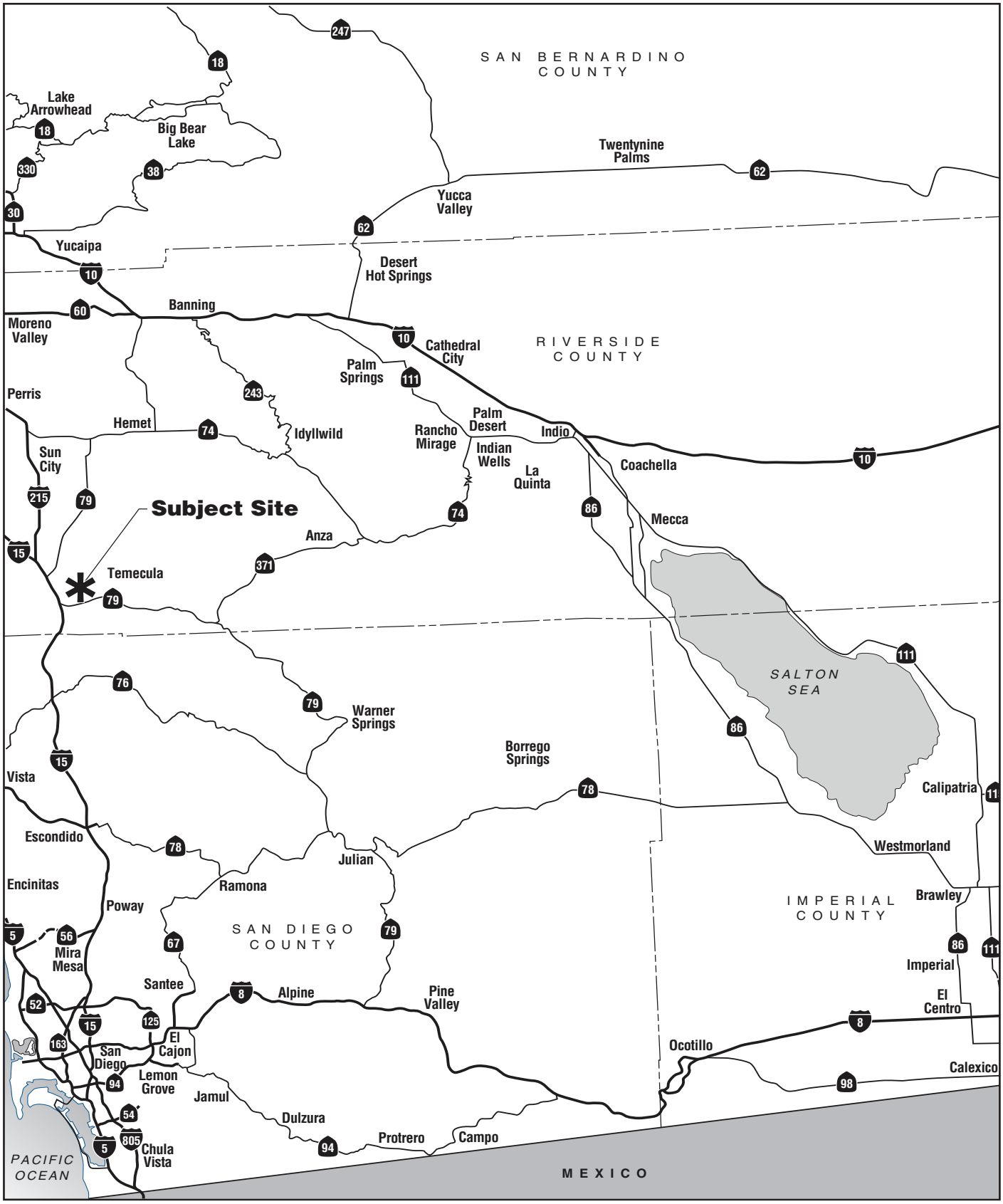
The purpose of this acoustical analysis is to evaluate potential mobile noise impacts for noise-sensitive uses that would be affected by the proposed Paseo Del Sol Tentative Tract Map No. 36483 (TTM 36483), located in the City of Temecula, California. Mobile noise impacts were assessed in accordance with applicable laws, ordinances, and guidelines established by the County of Riverside Department of Environmental Health.

1.1 PROJECT LOCATION

The project site is located at the northwest corner of the intersection of Temecula Parkway and Butterfield Stage Road in the City of Temecula, California; refer to Exhibit 1, *Regional Vicinity*. The project site is a vacant, 42-acre lot within the City's Paloma Del Sol Specific Plan, Planning Area (PA) No. 4; refer to Exhibit 2, *Site Vicinity*.

1.2 PROJECT CHARACTERISTICS

The project proposes development of 173 single-family dwelling units within TTM 36483; refer to Exhibit 3, *Site Plan*. The project also includes an approximate two-acre neighborhood park located in the center of the project site and open space drainage channels located along the southern portion of the project site. The project proposes nine internal roads, with primary site access provided at the northern boundary of TTM 36483 along the proposed "Street A" via the existing De Portola Road. A secondary access point for the project site would be provided at the western boundary of TTM 36483 along the proposed "Street J" via the existing Cenon Way that connects PA No. 3 to the project site.



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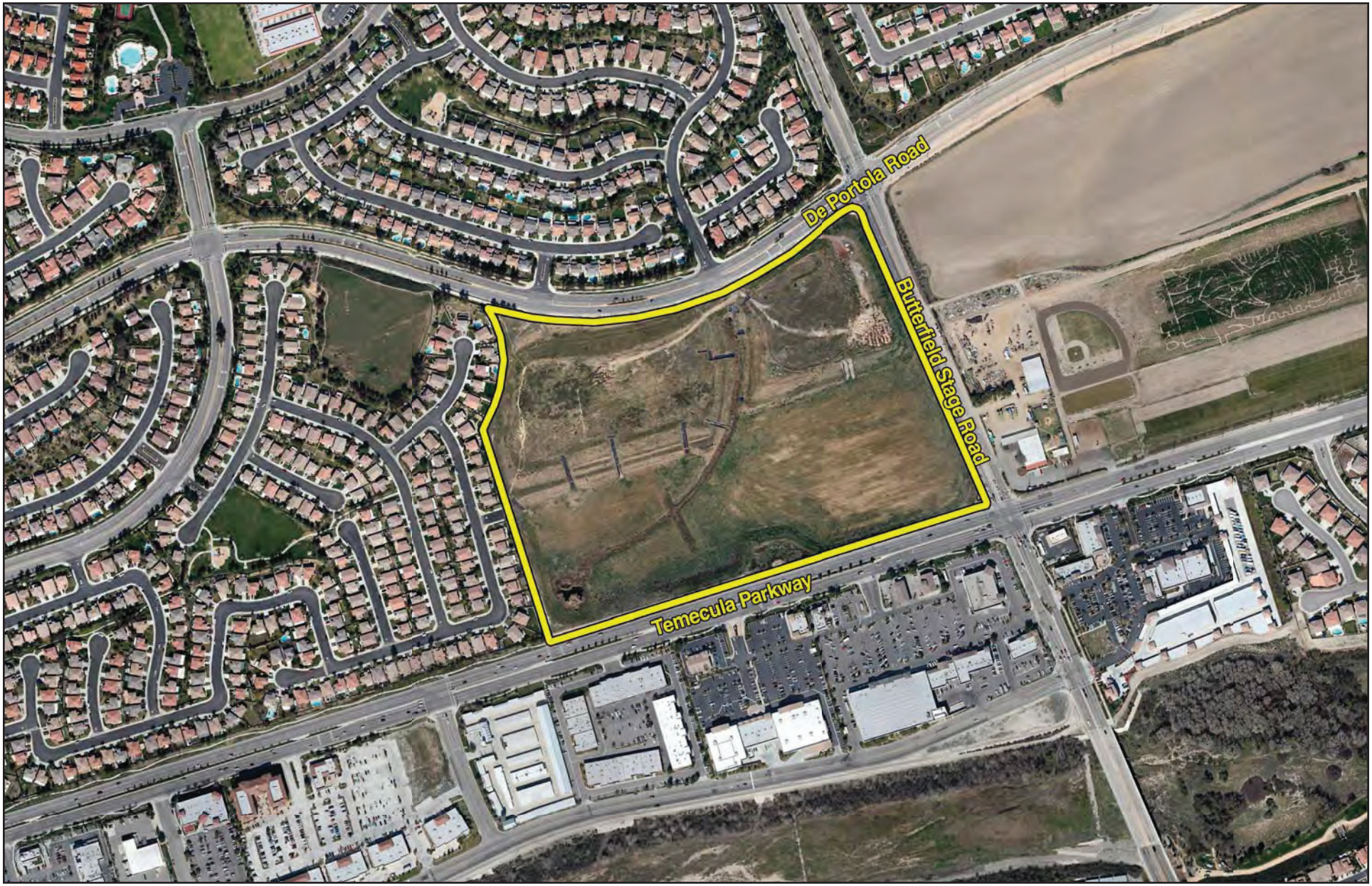
ACOUSTICAL ASSESSMENT
PASEO DEL SOL TENTATIVE TRACT NO. 36483

Regional Vicinity

Exhibit 1



Source: Google Earth, 2015.
- Project Boundary

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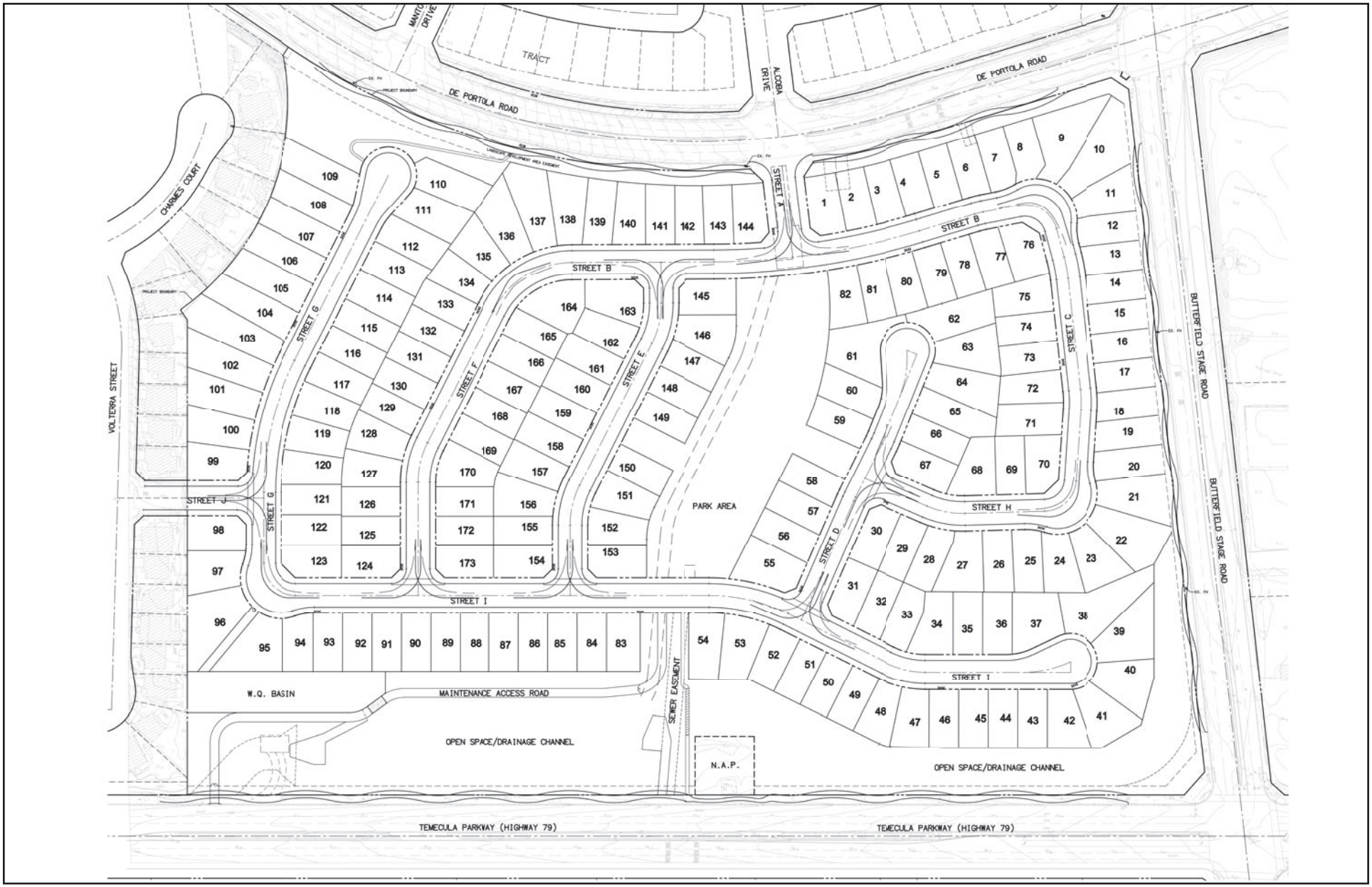
Site Vicinity

Exhibit 2



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PASEO DEL SOL TENTATIVE TRACT NO. 36483

Site Plan

Exhibit 3

2.0 NOISE SCALES AND DEFINITIONS

Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. The percentage of people claiming to be annoyed by noise will generally increase with the environmental sound level. However, many factors will also influence people's response to noise. The factors can include the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, will all influence people's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses will range from "not annoyed" to "highly annoyed."

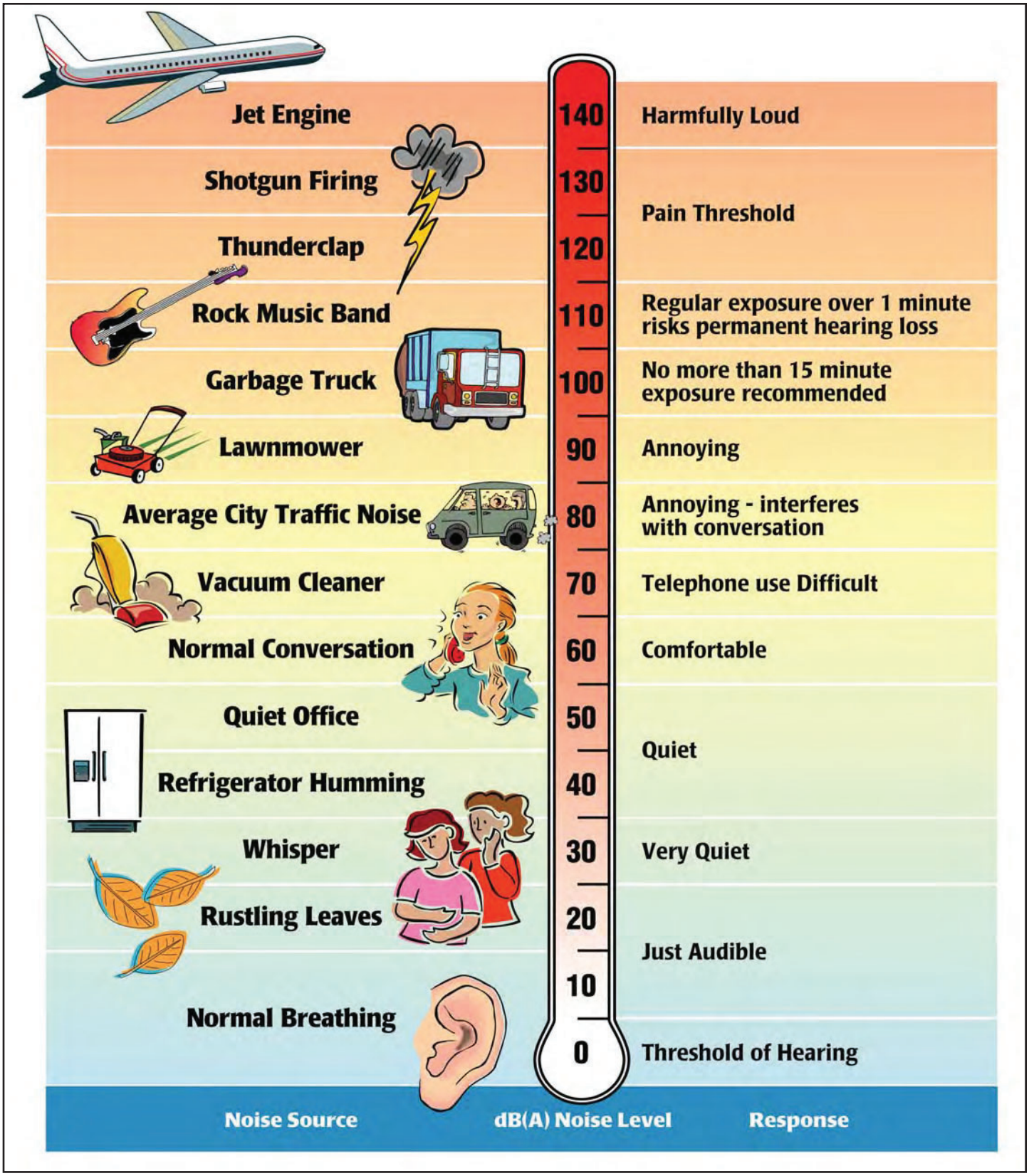
Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud, and 20 dBA higher four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on Exhibit 4, *Common Environmental Noise Levels*.

Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Numerous methods have been developed to measure sound over a period of time; refer to Table 1, *Noise Descriptors*.



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

ACOUSTICAL ASSESSMENT
PASEO DEL SOL TENTATIVE TRACT NO. 36483

Common Environmental Noise Levels

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Exhibit 4

Table 1
Noise Descriptors

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

Source: Cyril M. Harris, Handbook of Noise Control, 1979.

3.0 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Land uses deemed sensitive by the State of California (State) include schools, hospitals, rest homes, and long-term care and mental care facilities. Many jurisdictions also consider residential uses particularly noise-sensitive because families and individuals expect to use time in the home for rest and relaxation, and noise can interfere with those activities. Some jurisdictions may also identify other noise-sensitive uses such as churches, libraries, and parks. Land uses that are relatively insensitive to noise include office, commercial, and retail developments. There is a range of insensitive noise receptors that include uses that generate significant noise levels and that typically have a low level of human occupancy.

This noise analysis was conducted in accordance with Federal, State, and local criteria described in the following sections.

3.1 U.S. ENVIRONMENTAL PROTECTION AGENCY

The U.S. Environmental Protection Agency (EPA) offers guidelines for community noise exposure in the publication *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*. These guidelines consider occupational noise exposure as well as noise exposure in homes. The EPA recognizes an exterior noise level of 55 decibels day-night level (dB L_{dn}) as a general goal to protect the public from hearing loss, activity interference, sleep disturbance, and annoyance. The EPA and other Federal agencies have adopted suggested land use compatibility guidelines that indicate that residential noise exposures of 55 to 65 dB L_{dn} are acceptable. However, the EPA notes that these levels are not regulatory goals, but are levels defined by a negotiated scientific consensus, without concern for economic and technological feasibility or the needs and desires of any particular community.

3.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) was enacted in 1970 and requires that all known environmental effects of a project be analyzed, including environmental noise impacts. Under CEQA, a project has a potentially significant impact if the project exposes people to noise levels in excess of standards established in the local general plan or noise ordinance. Additionally, under CEQA, a project has a potentially significant impact if the project creates a substantial increase in the ambient noise levels in the project vicinity above levels existing without the project. If a project has a potentially significant impact, mitigation measures must be considered. If mitigation measures to reduce the impact to less than significant are not feasible due to economic, social, environmental, legal, or other conditions, the most feasible mitigation measures must be considered.

3.3 LOCAL JURISDICTION

County of Riverside General Plan

The Noise Element of the *County of Riverside General Plan* (General Plan) dated December 9, 2014, is a mandatory component of the General Plan pursuant to the California Planning and Zoning Law, Section 65302(f). The Noise Element provides a systematic approach to identifying and appraising noise problems in the community; quantifying existing and projected noise levels; addressing excessive noise exposure and community planning for the regulation of noise. Additionally, the Noise Element includes policies, standards, criteria, programs, diagrams, a reference to action items, and maps related to protecting public health and welfare from noise. The *State of California Office of Planning and Research Noise Element Guidelines* (Guidelines) include recommended interior and exterior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. These Guidelines describe the compatibility of various land uses with a range of environmental noise levels in terms of dBA CNEL.

Residential uses are normally unacceptable in areas exceeding 70 dB CNEL; and conditionally acceptable between 55-70 dB CNEL for low density single-family dwelling units, duplexes, and mobile homes, and between 60-70 dB CNEL for multiple-family units. Schools, libraries, hospitals, and nursing homes are treated as noise-sensitive land uses, requiring acoustical studies within areas exceeding 60 dB CNEL. Commercial/professional office buildings and industrial land uses are normally unacceptable in areas exceeding 75 dB CNEL, and are conditionally acceptable within 67 to 78 dB CNEL (for commercial/professional offices only).

Table 2, *Land Use Compatibility for Community Noise Exposure*, indicates the range of acceptable noise levels for various land uses in the County, as established by the General Plan. The noise level ranges shown in the Table should be considered guidelines with respect to the placement of land uses in the City.

Table 2
Land Use Compatibility for Community Noise Exposure

Land Use Category	Community Noise Exposure Level (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density Single Family, Duplex, Mobile Homes	< 60	55 - 70	70 – 75	75 >
Residential-Multiple Family	< 65	60 - 70	70 - 75	75 >
Transient Lodging-Motels, Hotels	< 65	60 - 70	70 - 80	80 >
Schools, Libraries, Churches, Hospitals, Nursing Homes	< 70	60 - 70	70 - 80	80 >
Auditoriums, Concert Halls, Amphitheaters	N/A	< 70	65 >	N/A
Sports Arena, Outdoor Spectator Sports	N/A	< 75	70 >	N/A
Playgrounds, Neighborhood Parks	< 70	N/A	67 - 75	74 >
Golf Courses, Riding Stables, Water Recreation, Cemeteries	< 75	N/A	70 - 80	80 >
Office Buildings, Businesses, Commercial, and Professional	< 70	67 - 72	N/A	75 >
Industrial, Manufacturing, Utilities, Agriculture	< 75	70 - 80	N/A	75 >

Normally Acceptable: Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice. Outdoor environment will seem noisy.
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 with needed noise insulation features included in the design. Outdoor areas must be shielded.
Clearly Unacceptable: New construction or development should generally not be undertaken. Construction costs to make indoor environmental acceptable would be prohibitive and the outdoor environment would not be usable.

Source: County of Riverside General Plan, *Noise Element*, December 9, 2014.

The following policies from the County's General Plan Noise Element are applicable to the proposed project:

- *Polic~~y~~ N ~~xxx~~*: Determine if existing land uses will present noise compatibility issues with proposed project by undertaking site surveys.

- *Polic~~y~~ N ~~xxx~~*: Require a qualified acoustical specialist to prepare acoustical studies for proposed noise-sensitive projects within noise impacted areas to mitigate existing noise.

- *Polic~~y~~ N ~~xxx~~*: Mitigate exterior and interior noises to the levels listed in Table 3, *Residential Stationar~~y~~ Noise Standards*, to the extent feasible, for stationary sources:

Table 3
Residential Stationary Noise Standards

Land Use	Time	Interior Standards	Exterior Standards
Residential	10:00 PM to 7:00 AM	40 L_{eq} (10 minute)	45 L_{eq} (10 minute)
	7:00 AM to 10:00 PM	55 L_{eq} (10 minute)	65 L_{eq} (10 minute)
Note: These are only preferred standards; final decision will be made by the Riverside County Planning Department and Office of Public Health.			
Source: County of Riverside General Plan, *Noise Element*, December 9, 2014.			

- *Policy N ____*: Require development that generates increased traffic and subsequent increases in the ambient noise level adjacent to noise-sensitive land uses to provide appropriate mitigation measures.

- *Policy N ____*: Require that all future exterior noise forecasts use Level of Service C, and be based on designed road capacity or 20-year projection of development (whichever is less) for future noise forecasts.

- *Policy N ____*: Require that field noise monitoring be performed prior to siting any sensitive land uses along arterial roadways. Noise level measurements should be of at least 10 minutes in duration and should include simultaneous vehicle counts so that more accurate vehicle ratios may be used in modeling ambient noise levels.

- *Policy N ____*: Minimize the impacts of construction noise on adjacent uses within acceptable practices.

- *Policy N ____*: Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas.

- *Policy N ____*: Condition subdivision approval adjacent to developed/occupied noise-sensitive land uses by requiring the developer to submit a construction-related noise mitigation plan to the County for review and approval prior to issuance of a grading permit. The plan must depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of the project, through the use of such methods as:

    a. Temporary noise attenuation fences;
    b. Preferential location of equipment; and
    c. Use of current noise suppression technology and equipment.

- *Policy N 3.3*: Require that all construction equipment utilizes noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.

- *Policy N 3.4*: Enforce the California Building Standards that sets standards for building construction to mitigate interior noise levels to the tolerable 45 CNEL limit. These standards are utilized in conjunction with the Uniform Building Code by the County's Building Department to ensure that noise protection is provided to the public. Some design features may include extra-dense insulation, double-paned windows, and dense construction materials.

County of Riverside Noise Ordinance

Ordinance No. 847, *Regulating Noise*, states that no person shall create any sound, on any property that causes the exterior sound level on any other occupied property to exceed the sound level standards set forth in Table 4, *General Sound Level Standards*.

Additionally, sound emanating from construction projects located within one-quarter mile or more from an inhabited dwelling is exempt from Ordinance No. 847, provided that construction does not occur between the hours of 6:00 PM and 6:00 AM during the months of June through September, or between the hours of 7:00 PM and 7:00 AM during the month of October through May.

Table 4
General Sound Level Standards

General Plan Land Use Designation	Maximum Decibel Level	
	7:00 AM – 10:00 PM	10:00 PM – 7:00 AM
Estate Density Residential	55	45
Very Low Density Residential	55	45
Low Density Residential	55	45
Medium Density Residential	55	45
Medium High Density Residential	55	45
High Density Residential	55	45
Very High Density Residential	55	45
Highest Density Residential	55	45
Retail Commercial	65	55
Office Commercial	65	55
Tourist Commercial	65	55
Community Center	65	55
Light Industrial	75	55
Heavy Industrial	75	75
Business Park	65	45
Public Facility	65	45
Specific Plan – Residential	55	45
Specific Plan – Commercial	65	55
Specific Plan – Light Industrial	75	55
Specific Plan – Heavy Industrial	75	75
Rural Residential	45	45
Rural Mountains	45	45
Rural Desert	45	45
Agriculture	45	45
Conservation	45	45
Conservation Habitat	45	45
Recreation	45	45
Rural	45	45
Watershed	45	45
Mineral Resources	75	45

Source: County of Riverside Ordinance No. 847, *Regulating Noise*, Amended July 19, 2007.

4.0 METHODOLOGY AND EXISTING CONDITIONS

4.1 METHODOLOGY

Noise Prediction Model

Prior to the release of the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM) 2.5, the FHWA Highway Traffic Noise Prediction Model (RD-77-108), or "108 model," was in use for over 20 years. Although an effective model for its time, the "108 model" was comprised of acoustic algorithms, computer architecture, and source code that dated to the 1970s. Since that time, significant advancements have been made in the methodology and technology for noise prediction, barrier analysis and design, and computer software design and coding. Given the fact that over $500 million were spent on barrier design and construction between 1970 and 1990, the FHWA identified the need to design, develop, test, and document a state-of-the-art highway traffic noise prediction model that utilized these advancements. This need for a new traffic noise prediction model resulted in TNM 2.5.

Per instruction from the County of Riverside, RD-77-108 was utilized, together with roadway and site parameters, to predict mobile noise along roadways in the immediate vicinity of the project site. These parameters determine the projected impact of vehicular traffic noise and include the roadway cross-section (such as the number of lanes), roadway width, ADT, vehicle travel speed, percentages of auto and truck traffic, roadway grade, angle-of-view, and site conditions ("hard" or "soft"). Roadway traffic volumes were modeled using ADT LOS "C" design capacities found in the Circulation Element of the County's General Plan. The model does not account for ambient noise levels (i.e., noise from adjacent land uses) or topographical differences between the roadway and adjacent land uses.

Traffic Noise Model

In March 1998, the FHWA released TNM, Version 1.0. It was developed as a means for aiding compliance with policies and procedures under FHWA regulations. Since its release in March 1998, Version 1.0a was released in March 1999, Version 1.0b in August 1999, Version 1.1 in September 2000, Version 2.0 in June 2002, Version 2.1 in March 2003 and the current version, Version 2.5 in April 2004. TNM 2.5 was utilized to determine the noise resulting from vehicular activity along the surrounding roadways.

TNM is a state-of-the-art computer program used for predicting noise impacts in the vicinity of highways. It uses advances in personal computer hardware and software to improve upon the accuracy and ease of modeling highway noise, including the design of effective, cost-efficient noise barriers.

TNM contains the following components:

- Modeling of five standard vehicle types, including automobiles, medium trucks, heavy trucks, buses, and motorcycles, as well as user-defined vehicles;
- Modeling of both constant-flow and interrupted-flow traffic using a 1994/1995 field-measured data base;
- Modeling of the effects of different pavement types, as well as the effects of graded roadways;
- Sound level computations based on a one-third octave-band data base and algorithms;
- Graphically-interactive noise barrier design and optimization;
- Attenuation over/through rows of buildings and dense vegetation;
- Multiple diffraction analysis;
- Parallel barrier analysis; and
- Contour analysis, including sound level contours, barrier insertion loss contours, and sound-level difference contours.

The TNM 2.5 database is made up of over 6,000 individual pass-by events measured at forty sites across the county. It is the primary building block around which the acoustic algorithms are structured. The model has been tested for accuracy with modeled and actual measured noise. In cooperation with the FHWA, the Volpe Center Acoustics Facility (Volpe) has conducted multiple-phase studies to assess the accuracy and make recommendations of the use of the TNM 2.5 model. The study, *TNM Version Addendum to Validation of FHWA Traffic Noise Model Phase I* (dated July 2004), included 100 hours of traffic noise data were collected at seventeen highway sites around the country. The sites had characteristics of those most commonly modeled by TNM users. TNM 2.5 was used to model and compare the predicted noise over the measured noise. The study determined that the model includes a 0.5 standard deviation of measured noise to modeled noise.

TNM 2.5 is also more user friendly compared to its predecessor Sound 2000. TNM 2.5 allows the user to import computer-aided design (CAD) files to determine precise locations of the noise at surrounding sensitive receptors. Per instruction from the County of Riverside, TNM 2.5 was utilized to calculate noise levels at the project's proposed residential properties from mobile noise sources along roadways in the immediate vicinity of the project site. Roadway traffic volumes were modeled using Average Daily Traffic (ADT) Level of Service (LOS) "C" design capacities found in the Circulation Element of the County's General Plan. Additionally, TNM 2.5 was utilized to determine the appropriate sound wall height required to prevent mobile noise from exceeding the County's daytime exterior noise standard of 65 dBA at the project's proposed residential properties. A sound wall is proposed to be constructed along the northern, eastern, and southern boundaries of the project site (refer to Exhibit 3, *Site Plan*).

Riverside County Noise Guidelines

The County of Riverside Department of Environmental Health has established guidelines for determining and mitigating mobile noise impacts from traffic on residential structures. The following guidelines were used in developing this acoustical analysis.

- The exterior noise level shall not exceed 65 L_{dn}/CNEL.
- Required Noise Prediction Model – Traffic Noise: FHWA RD-77-108 Highway Prediction Model, Sound 32 or the equivalent.
- All roadways must be modeled using ADT level "C" design capacities.
- For County roads, assume an average traffic speed of 40 mph.
- It is assumed that standard residential design (with windows closed) will provide no more than 20 dBA of attenuation.
- Noise levels must be estimated at the exterior face of the nearest residence at an elevation of five feet above the finished pad.
- Required Vehicle Fleet Mix:

Vehicle	Percent			
	Overall Percent	Day (7:00 AM – 7:00 PM)	Evening (7:00 PM – 10:00 PM)	Night (10:00 PM – 7:00 AM)
Auto	92	69.5	12.9	9.6
Medium Truck	3	1.44	0.06	1.5
Heavy Truck	5	2.4	0.1	2.5

- Initial calculations shall be based on a receiver height of five feet above the ground. If these calculations result in a barrier less than or equal to six feet in height, no further barrier calculations are necessary and this shall be selected as the required wall height. However, if the resulting barrier height is calculated to be greater than six feet, it shall be re-calculated using a receiver height of three feet. The resulting re-calculated wall height shall be then selected as the required wall height.

4.2 EXISTING CONDITIONS

Noise Measurements

In order to determine the ambient noise levels within the project area, noise measurements were taken by RBF Consulting, a Michael Baker International Company (RBF Baker) on April 14, 2015; refer to Table 5, *Noise Measurements*. The noise measurement sites were representative of

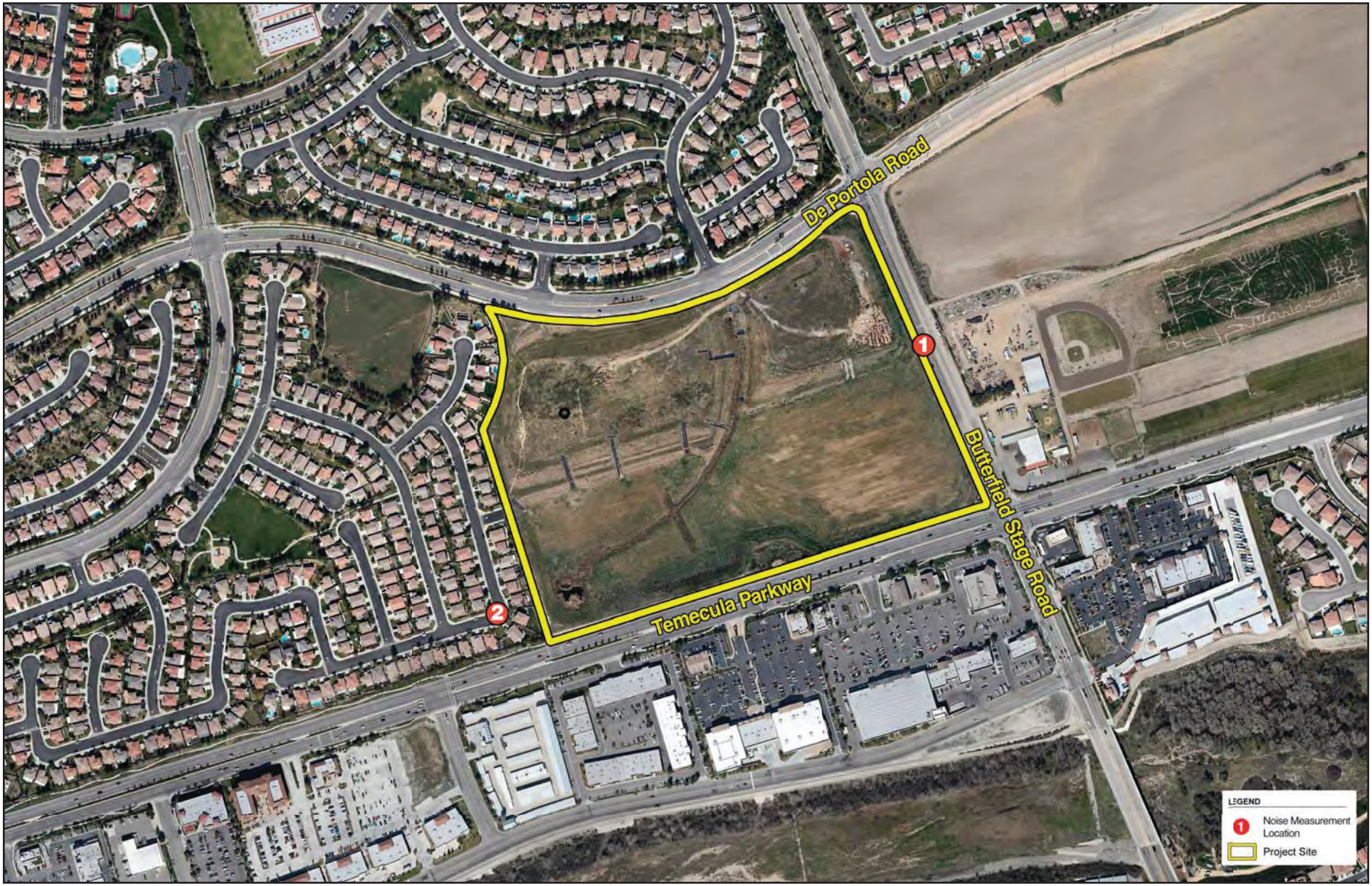
typical existing noise exposure at the project site; refer to Exhibit 5, *Noise Measurement Locations*. Ten-minute measurements were taken at each site, between 3:00 PM and 4:00 PM. In addition to noise measurements, traffic counts were conducted simultaneously to further understand the impact of mobile noise in the vicinity of the project site. Meteorological conditions were clear skies, cool temperatures, with light wind speeds (> 5 miles per hour), and low humidity. Measured noise levels during the daytime measurements ranged from 58.7 to 74.3 dBA L_{eq}.

Table 5
Noise Measurements

Site No.	Location	Time	Duration	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Peak (dBA)
1	Project site boundary along Butterfield Stage Road.	3:16 PM	10 Minutes	74.3	45.4	84.1	102.9
2	Residential community to the west of the project site.	3:36 PM	10 Minutes	58.7	45.0	69.7	95.3

Source: RBF Baker field measurements, April 14, 2015.

Noise monitoring equipment used for the ambient noise survey consisted of a Br el & Kjær Hand-held Analyzer Type 2250 equipped with a 4189 microphone. The monitoring equipment complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. The results of the field measurements are indicated in Appendix A, *Noise Measurement Data*. The measured noise levels and corresponding traffic counts were used to calibrate the noise models.



Source: Google Earth, 2015.

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Noise Measurement Locations

Exhibit 5

5.0 ACOUSTICAL ANALYSIS

PREDICTED TRAFFIC NOISE LEVELS

RD-77-108 Noise Prediction Model

The County's General Plan sets an exterior noise standard of 65 dBA for single-family residential uses. Noise modeling was conducted to determine noise perceived at the first row of proposed residential units along surrounding roadways that would affect the project site.

The majority of the existing noise at the project site is generated from mobile sources along De Portola Road, Butterfield Stage Road, and Temecula Parkway. Utilizing RD-77-108, existing mobile noise was modeled based on the County's General Plan, ADT LOS "C" design capacities. Based on the County's General Plan, ADT LOS "C" design capacities for the three modeled roadways surrounding the project site are 28,700 ADT for De Portola Road and Butterfield Stage Road, and 43,100 ADT for Temecula Parkway. Vehicle fleet mixes provided in the County's noise modeling guidelines were assumed and are summarized above in Section 4.1.

As shown in Table 6, *Modeled Mobile Noise Levels*, existing mobile noise sources in the vicinity of the project site range from 66.8 to 67.1 dBA, and exceed the County's daytime exterior noise standard of 65 dBA. Therefore, TNM 2.5 was utilized to determine the appropriate sound wall height required to prevent mobile noise levels from exceeding the County's daytime exterior noise standard at proposed residential units within TTM 36483.

Table 6
Modeled Mobile Noise Levels

Roadway Segment	Existing Conditions				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
De Portola Road					
West of Butterfield Stage Road	28,700	67.1	558	177	56
Butterfield Stage Road					
Between De Portola Road and Temecula Parkway	28,700	66.8	559	177	56
Temecula Parkway					
West of Butterfield Stage Road	43,100	68.4	839	265	84

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level

Traffic Noise Model

Roadways and sensitive receptors were digitized in TNM 2.5 based on the lot layouts within TTM 36483 (refer to Exhibit 6, *Modeled Receptor Locations*). The model also accounted for the elevation differences between the roadway and each receptor, noise shielding by residential building rows within TTM 36483, and the proposed sound wall at varying elevations.

Pursuant to the County's noise modeling guidelines, TNM 2.5 was initially modeled using a sound wall elevation of six feet and a sensitive receptor height of five feet. As indicated in Table 7, *Exterior Mobile Noise Levels for Five Foot Sensitive Receptors*, mobile noise levels generated from traffic along De Portola Road, Butterfield Stage Road, and Temecula Parkway would range from 54.3 to 71.1 dBA, and exceed the County's daytime exterior noise standard of 65 dBA at sensitive receptors 11 through 31 and 35 through 42 with a six foot sound wall. Noise levels would be lower at the receptors closer to the interior, as they would be further away from the roadways and would also be shielded by the first row of homes.

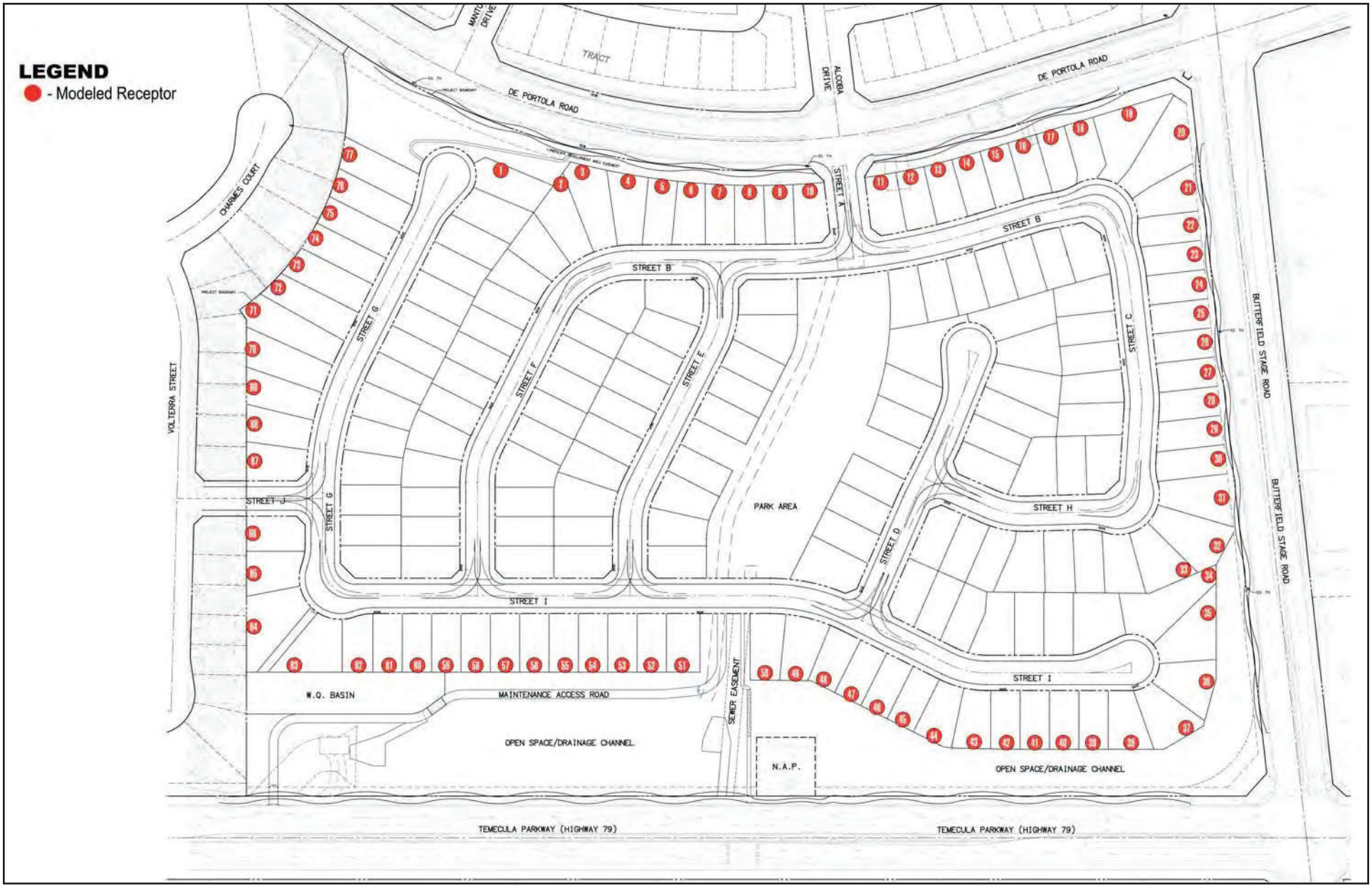
Table 7
Exterior Mobile Noise Levels for Five Foot Sensitive Receptors

Location	Receptor No.	Exterior Noise Levels (dBA Ldn)	Exceed County Exterior Noise Standard of 65 dBA
Along De Portal Road	1	61.0	*No*
	2	61.6	*No*
	3	61.0	*No*
	4	61.1	*No*
	5	61.4	*No*
	6	61.4	*No*
	7	60.6	*No*
	8	60.2	*No*
	9	60.3	*No*
	10	60.3	*No*
	11	67.2	*Yes*
	12	66.7	*Yes*
	13	65.5	*Yes*
	14	65.3	*Yes*
	15	66.7	*Yes*
	16	67.1	*Yes*
	17	68.9	*Yes*
	18	69.2	*Yes*
Intersection of De Portola Road and Butterfield Stage Road	19	68.8	*Yes*
	20	71.1	*Yes*
Along Butterfield Stage Road	21	69.9	*Yes*
	22	69.4	*Yes*
	23	69.2	*Yes*
	24	69.2	*Yes*
	25	68.7	*Yes*
	26	67.1	*Yes*
	27	66.8	*Yes*
	28	66.1	*Yes*
	29	65.9	*Yes*

Table 7 (continued)
Exterior Mobile Noise Levels for Five Foot Sensitive Receptors

Location	Receptor No.	Exterior Noise Levels (dBA Ldn)	Exceed County Exterior Noise Standard of 65 dBA
	30	65.6	*Yes*
	31	65.1	*Yes*
	32	64.3	*No*
	33	64.7	*No*
	34	64.5	*No*
	35	66.3	*Yes*
Intersection of Butterfield Stage Road and Temecula Parkway	36	67.0	*Yes*
	37	70.5	*Yes*
Along Temecula Parkway	38	71.3	*Yes*
	39	71.2	*Yes*
	40	68.0	*Yes*
	41	65.9	*Yes*
	42	65.0	*Yes*
	43	64.4	*No*
	44	64.5	*No*
	45	63.9	*No*
	46	63.3	*No*
	47	62.6	*No*
	48	62.1	*No*
	49	61.2	*No*
	50	60.4	*No*
	51	57.1	*No*
	52	56.5	*No*
	53	56.7	*No*
	54	56.8	*No*
	55	56.4	*No*
	56	57.1	*No*
	57	57.2	*No*
	58	57.0	*No*
	59	57.1	*No*
	60	56.3	*No*
	61	55.6	*No*
	62	54.6	*No*
	63	54.3	*No*
Along Western Boundary of Project Site	64	57.1	*No*
	65	56.3	*No*
	66	55.2	*No*
	67	54.7	*No*
	68	54.4	*No*
	69	54.3	*No*
	70	54.4	*No*
	71	54.6	*No*
	72	54.9	*No*
	73	55.4	*No*
	74	56.1	*No*
	75	56.9	*No*
	76	58.1	*No*
	77	59.6	*No*

Notes:
1. Refer to Exhibit 6, *Modeled Receptor Locations*, for receptor locations and Appendix B, *Modeling Data*, for detailed modeling outputs.



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Modeled Receptor Locations

Exhibit 6

As depicted in Table 7, a six foot sound wall would not sufficiently reduce noise levels to within the County's daytime exterior noise standard at all sensitive receptors within TTM 36489. TNM 2.5 was remodeled for sensitive receptors 11 through 31 and 35 through 42 using sound wall elevations of seven and eight feet in height, and a sensitive receptor height of three feet per the County's noise modeling guidelines. As indicated in Table 8, *Exterior Mobile Noise Levels for Three Foot Sensitive Receptors*, noise levels generated from traffic along De Portola Road, Butterfield Stage Road, and Temecula Parkway would be within the County's exterior noise standard of 65 dBA at all proposed residential developments within TTM 36483 with an eight foot sound wall.

Table 8
Exterior Mobile Noise Levels for Three Foot Sensitive Receptors

Location	Receptor No.	Sound Wall Height			
		7 Feet		8 Feet	
		Exterior Noise Levels (dBA Ldn)	Exceed County Exterior Noise Standard of 65 dBA	Exterior Noise Levels (dBA Ldn)	Exceed County Exterior Noise Standard of 65 dBA
Along De Portal Road	11	62.8	***No***	61.9	***No***
	12	62.5	***No***	61.7	***No***
	13	62.2	***No***	61.5	***No***
	14	62.2	***No***	61.5	***No***
	15	62.6	***No***	61.9	***No***
	16	63.0	***No***	62.3	***No***
	17	64.2	***No***	63.3	***No***
	18	64.5	***No***	63.7	***No***
Intersection of De Portola Road and Butterfield Stage Road	19	65.8	***Yes***	64.4	***No***
	20	66.2	***Yes***	65.0	***No***
Along Butterfield Stage Road	21	65.6	***Yes***	64.8	***No***
	22	65.2	***Yes***	64.3	***No***
	23	64.9	***No***	64.1	***No***
	24	64.6	***No***	63.9	***No***
	25	64.3	***No***	63.6	***No***
	26	64.1	***No***	63.4	***No***
	27	63.8	***No***	63.2	***No***
	28	63.5	***No***	62.9	***No***
	29	63.4	***No***	62.8	***No***
	30	63.3	***No***	62.7	***No***
	31	63.0	***No***	62.5	***No***
	35	62.6	***No***	62	***No***
Intersection of Butterfield Stage Road and Temecula Parkway	36	63.5	***No***	62.8	***No***
	37	65.0	***Yes***	63.6	***No***
Along Temecula Parkway	38	65.0	***Yes***	63.8	***No***
	39	64.1	***No***	63	***No***
	40	63.5	***No***	62.6	***No***
	41	62.5	***No***	61.7	***No***
	42	62.1	***No***	61.4	***No***

dBA = A-weighted decibel; Ldn = day/night average

Notes:
1. Refer to Exhibit 6, *Modeled Receptor Locations*, for receptor locations. Refer to Appendix B, *Modeling Data*, for detailed modeling outputs.

6.0 CONCLUSION

This acoustical analysis assessed the potential mobile noise impacts for sensitive receptors within TTM 36483 of the proposed Paseo Del Sol project. Existing mobile noise levels were modeled utilizing FHWA's RD-77-108 model, and were projected to range from 66.8 to 67.1 dBA along De Portola Road, Butterfield Stage Road, and Temecula Parkway. In order to reduce mobile noise levels at the project site to within the County's daytime exterior noise standard of 65 dBA for single-family residences, the project proposes a sound wall to be constructed along the northern, eastern, and southern boundaries of the project site. FHWA's TNM 2.5 model was utilized to determine the appropriate sound wall height required to prevent mobile noise from exceeding the County's daytime exterior noise standard. As summarized in Table 9, *Minimum Sound Wall Height Requirements*, modeled results indicate that minimum sound wall heights of six, seven, and eight feet are required along the northern, eastern, and southern boundaries of the project site to ensure proposed residential units within TTM 36483 are not exposed to sound levels in excess of the County's daytime exterior noise standards for single-family residences. Refer to Exhibit 7, *Minimum Sound Wall Height Requirements* for a depiction of the required sound wall.

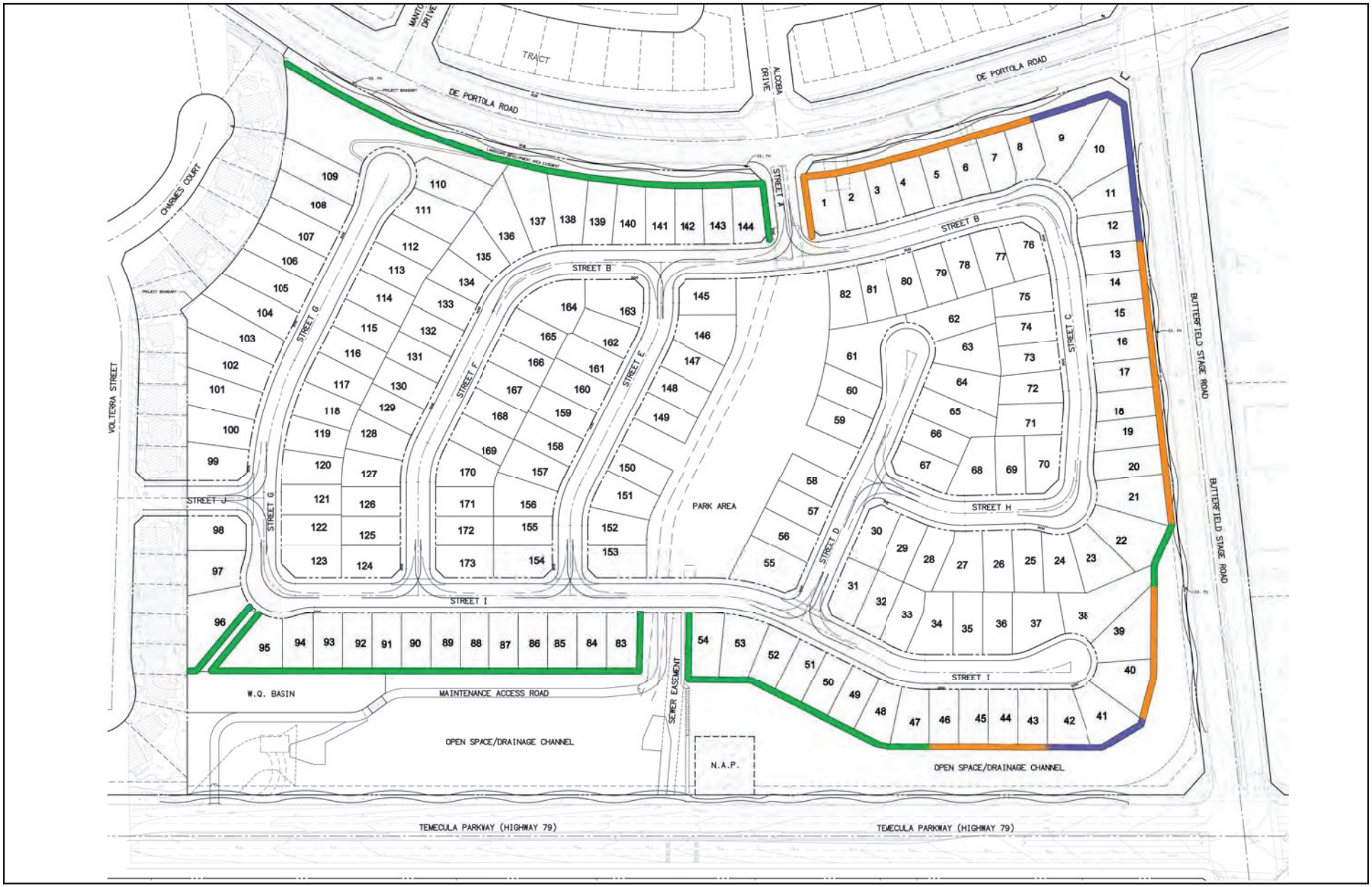
Table 9
Sound Wall Height Requirements

Location	Receptor No.	Minimum Sound Wall Height Required (Feet)
Along De Portal Road	1	6
	2	6
	3	6
	4	6
	5	6
	6	6
	7	6
	8	6
	9	6
	10	6
	11	7
	12	7
	13	7
	14	7
	15	7
	16	7
	17	7
	18	7
Intersection of De Portola Road and Butterfield Stage Road	19	8
	20	8
Along Butterfield Stage Road	21	8
	22	8
	23	7
	24	7
	25	7
	26	7
	27	7
	28	7

Table 9 [continued]
Sound Wall Height Requirements

Location	Receptor No.	Minimum Sound Wall Height Required (Feet)
Along Butterfield Stage Road [continued]	29	7
	30	7
	31	7
	32	6
	33	6
	34	6
	35	7
Intersection of Butterfield Stage Road and Temecula Parkway	36	7
	37	8
Along Temecula Parkway	38	8
	39	7
	40	7
	41	7
	42	7
	43	6
	44	6
	45	6
	46	6
	47	6
	48	6
	49	6
	50	6
	51	6
	52	6
	53	6
	54	6
	55	6
	56	6
	57	6
	58	6
	59	6
	60	6
	61	6
	62	6
	63	6
Along Western Boundary of Project Site	64	6
	65	6
	66	6
	67	6
	68	6
	69	6
	70	6
	71	6
	72	6
	73	6
	74	6
	75	6
	76	6
	77	6

Notes:
1. Refer to Exhibit 6, *Modeled Receptor Locations*, for receptor locations. Refer to Appendix B, *Modeling Data*, for detailed modeling outputs.



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ACOUSTICAL ASSESSMENT

PASEO DEL SOL TENTATIVE TRACT NO. 36483

Sound Wall Height Requirements

Exhibit 7

7.0 REFERENCES

7.1 LIST OF PREPARERS

RBF Consulting
14725 Alton Parkway
Irvine, Ca 92618
(949) 855-3612

Eddie Torres, INCE, Environmental Sciences Manager
Achilles Malisos, Manager of Air and Noise Studies
Adam Furman, Environmental Analyst

7.2 DOCUMENTS

1. County of Riverside Department of Environmental Health, *Requirements for Determining and Mitigating Traffic Noise Impacts to Residential Structures*, April 15, 2015.
2. County of Riverside General Plan, *Noise Element*, December 9, 2014.
3. County of Riverside Ordinance No. 847, *Regulating Noise*, Amended July 19, 2007.
4. Cyril Harris, *Handbook of Noise Control*, *Second Edition*, 1979.
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7. RBF Consulting, a Michael Baker International Company, *Villages at Paseo Del Sol Site Plan*, *TTM* [illegible].
8. U.S. Department of Transportation Federal Highway Administration, *TNM Version* [illegible] *Addendum to Validation of FHWA* [illegible] *Traffic Noise Model TNM*, *Phase I*, July 2004.
9. U.S. Department of Housing and Urban Development, *The Noise Guidebook*, March 2009.
10. U.S. Environmental Protection Agency, *Protecti*[illegible]*e Noise Le*[illegible]*els* *EPA* [illegible], November 1979.

7.3 SOFTWARE/WEBSITES

FHWA Highway Traffic Noise Prediction Model, *Traffic Noise Model* [illegible] *version* [illegible] *addendum*, *FHWA PD* [illegible], April 2004.

FHWA Traffic Noise Model, *RD* [illegible].

APPENDIX

APPENDIX A: NOISE MEASUREMENT DATA

Site Number: 1			
Recorded By: Adam Furman			
Job Number: 146071			
Date: 4/14/15			
Time: 3:16 pm			
Location: Butterfield Stage Road			
Source of Peak Noise: Vehicles			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
74.3	45.4	84.1	102.9

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Brüel & Kjær**	**2250**	**2548189**	**7/12/2013**	
	Microphone	**Brüel & Kjær**	**4189**	**2543364**	**7/12/2013**	
	Preamp	**Brüel & Kjær**	**ZC 0032**	**4265**	**7/12/2013**	
	Calibrator	**Brüel & Kjær**	**4231**	**2545667**	**7/12/2013**	

Weather Data			
Est.	**Duration:** 10minutes		**Sky:**
	Note: dBA Offset = 0.02		**Sensor Height (ft):** 5 ft
	Wind Ave Speed (mph / m/s)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (inches)**
	7.2	81.3	29.89

Photo of Measurement Location

2250

Instrument:		2250
Application:		BZ7225 Version 4.3.2
Start Time:		04/14/2015 15:16:04
End Time:		04/14/2015 15:20:57
Elapsed Time:		00:04:53
Bandwidth:		Broadband
Max Input Level:		138.46

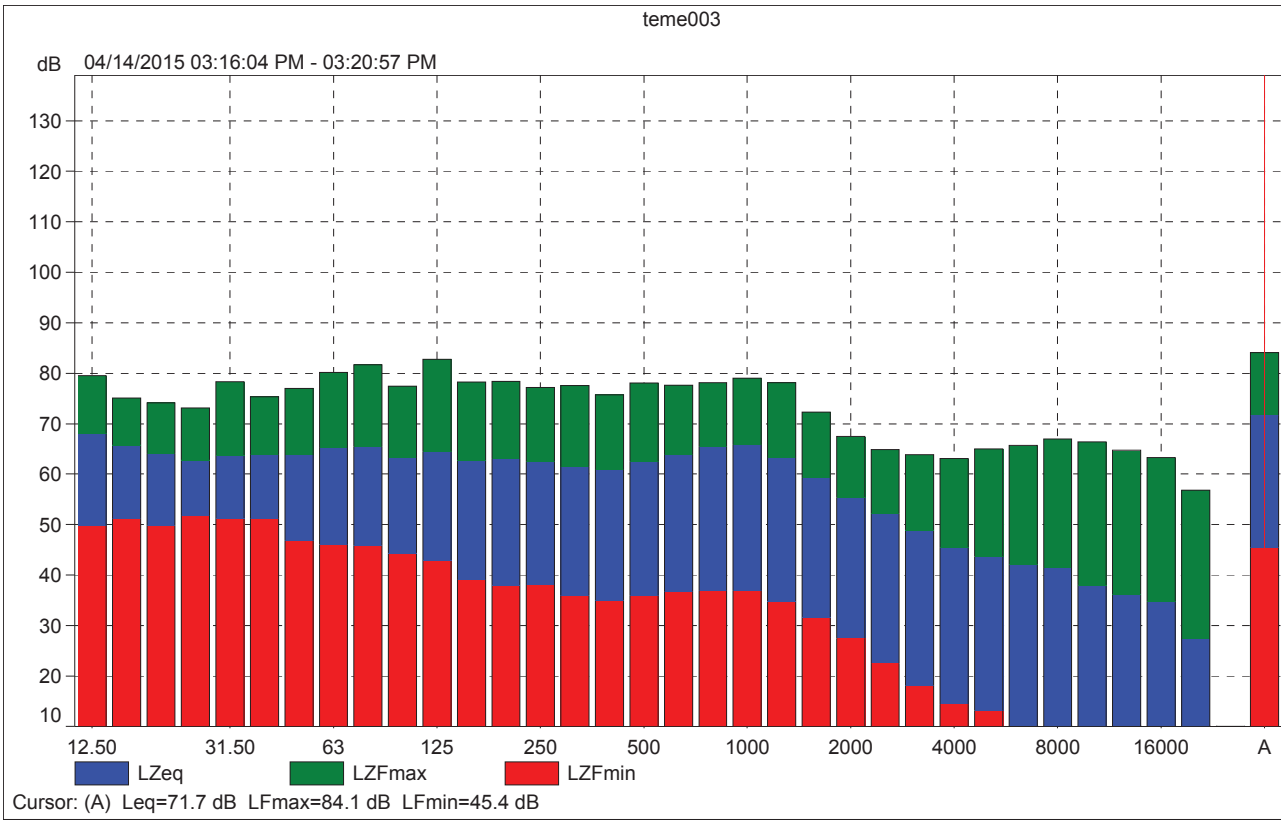
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	Z

Instrument Serial Number:		2548189
Microphone Serial Number:		2543364
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		04/08/2015 11:37:18
Calibration Type:		External reference
Sensitivity:		66.5684342384338 mV/Pa

teme003

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	71.7	84.1	45.4
Time	03:16:04 PM	03:20:57 PM	0:04:53				
Date	04/14/2015	04/14/2015					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dB 04/14/2015 03:16:04 PM - 03:20:57 PM
130
120
110
100
90
80
70
60
50
40
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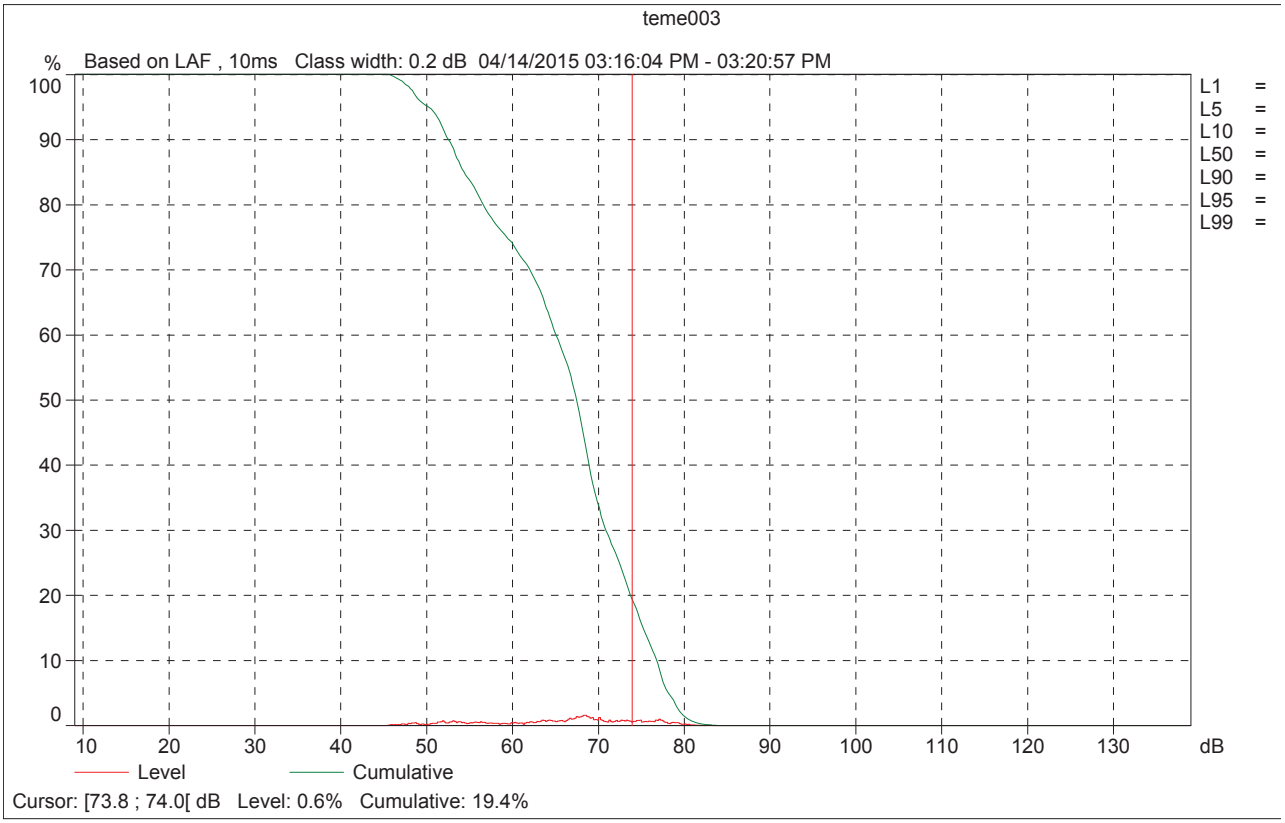
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=71.7 dB LFmax=84.1 dB LFmin=45.4 dB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% Based on LAF , 10ms Class width: 0.2 dB 04/14/2015 03:16:04 PM - 03:20:57 PM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
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130
dB
L1 =
L5 =
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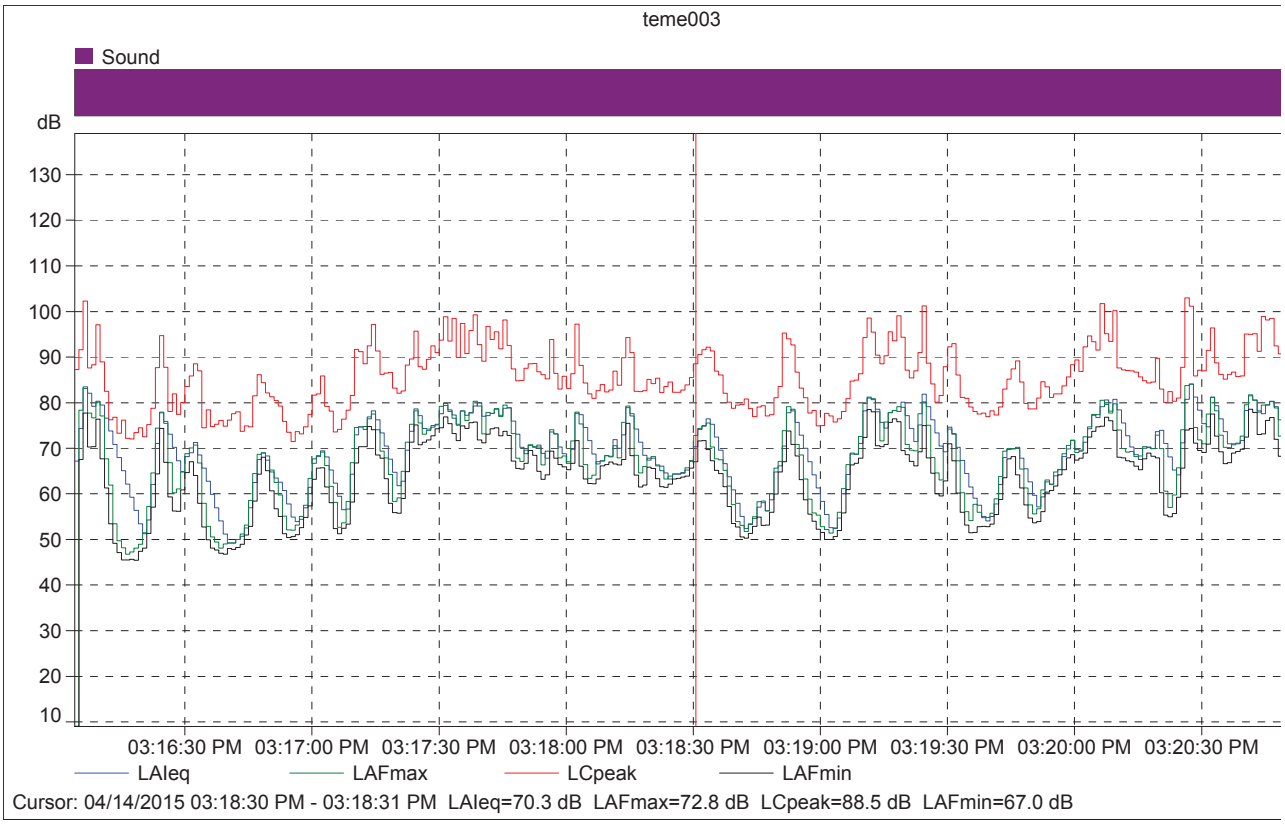

teme003

	Start time	Elapsed time	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			70.3	72.8	67.0
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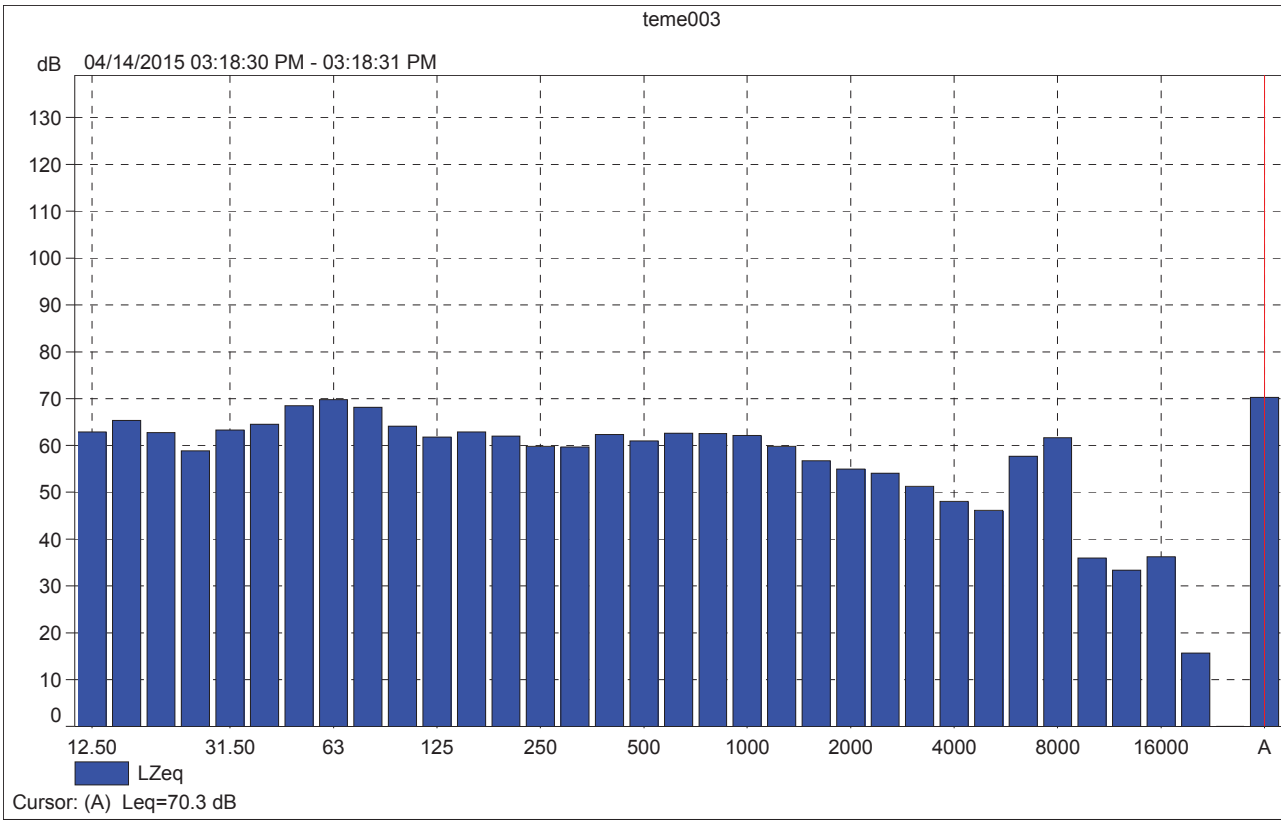
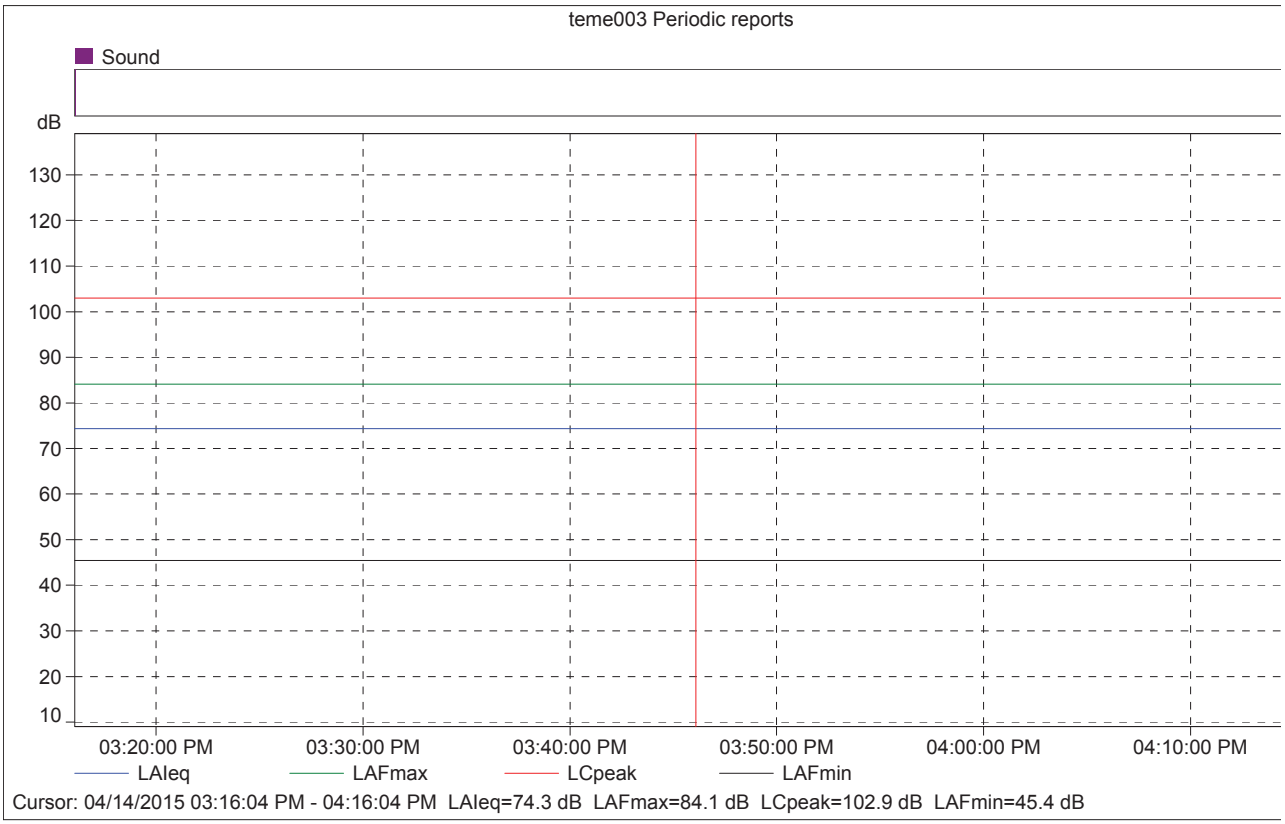
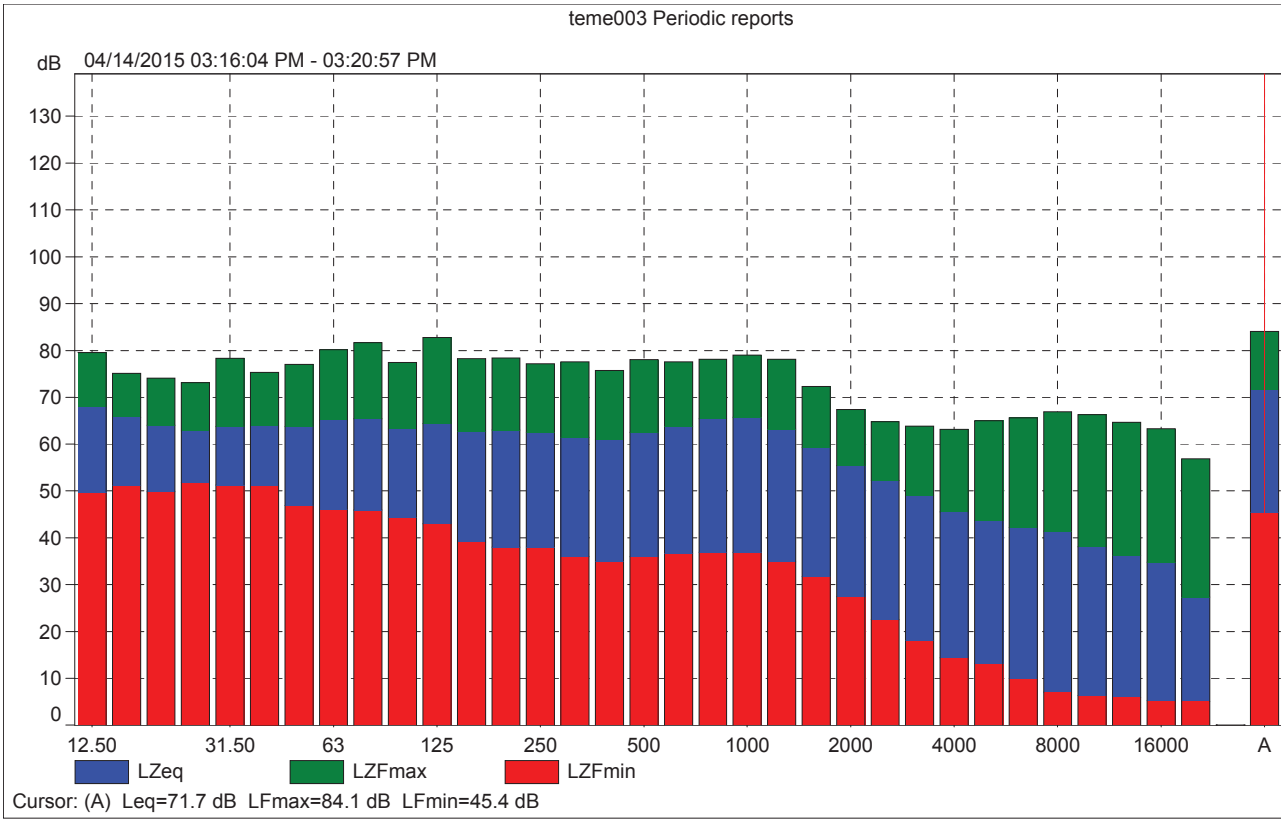
Date	04/14/2015				

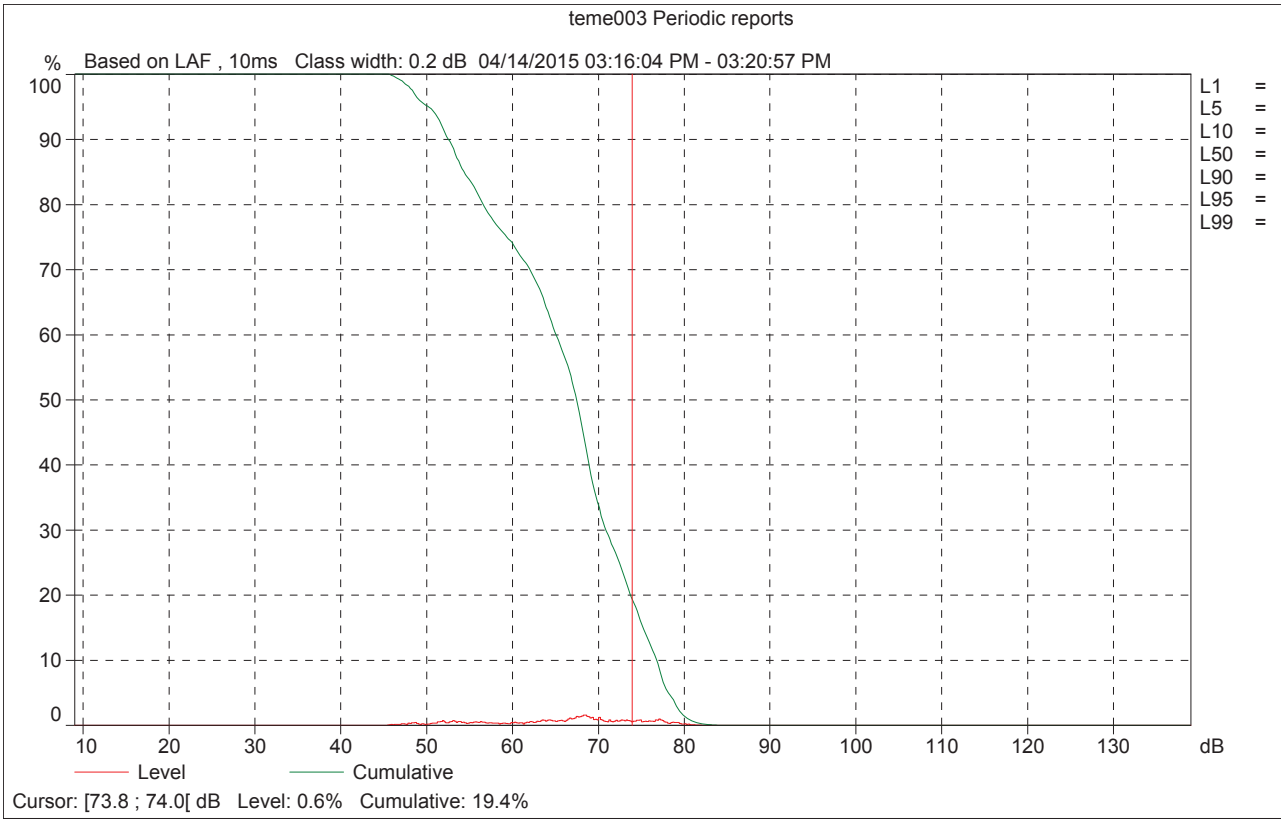

teme003
dB
04/14/2015 03:18:30 PM - 03:18:31 PM
130
120
110
100
90
80
70
60
50
40
30
20
10
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
LZeq
Cursor: (A) Leq=70.3 dB


teme003 Periodic reports
Sound
dB
130
120
110
100
90
80
70
60
50
40
30
20
10
03:20:00 PM
03:30:00 PM
03:40:00 PM
03:50:00 PM
04:00:00 PM
04:10:00 PM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 04/14/2015 03:16:04 PM - 04:16:04 PM LAIeq=74.3 dB LAFmax=84.1 dB LCpeak=102.9 dB LAFmin=45.4 dB

teme003 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	74.3	84.1	45.4
Time	03:16:04 PM	0:04:53				
Date	04/14/2015					




teme003 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 04/14/2015 03:16:04 PM - 03:20:57 PM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
dB
L1 =
L5 =
L10 =
L50 =
L90 =
L95 =
L99 =
Level
Cumulative
Cursor: [73.8 ; 74.0[dB Level: 0.6% Cumulative: 19.4%

Site Number: 2			
Recorded By: Adam Furman			
Job Number: 146071			
Date: 4/14/15			
Time: 3:36 pm			
Location: Residential development to the west of the project site			
Source of Peak Noise: Vehicles			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
58.7	45.0	69.7	95.3

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Brüel & Kjær**	**2250**	**2548189**	**7/12/2013**	
	Microphone	**Brüel & Kjær**	**4189**	**2543364**	**7/12/2013**	
	Preamp	**Brüel & Kjær**	**ZC 0032**	**4265**	**7/12/2013**	
	Calibrator	**Brüel & Kjær**	**4231**	**2545667**	**7/12/2013**	

Weather Data			
Est.	**Duration:** 10minutes		**Sky:**
	Note: dBA Offset = 0.02		**Sensor Height (ft):** 5 ft
	Wind Ave Speed (mph / m/s)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (inches)**
	6.3	82.4	29.89

Photo of Measurement Location

2250

Instrument:		2250
Application:		BZ7225 Version 4.3.2
Start Time:		04/14/2015 15:36:08
End Time:		04/14/2015 15:46:08
Elapsed Time:		00:10:00
Bandwidth:		Broadband
Max Input Level:		138.46

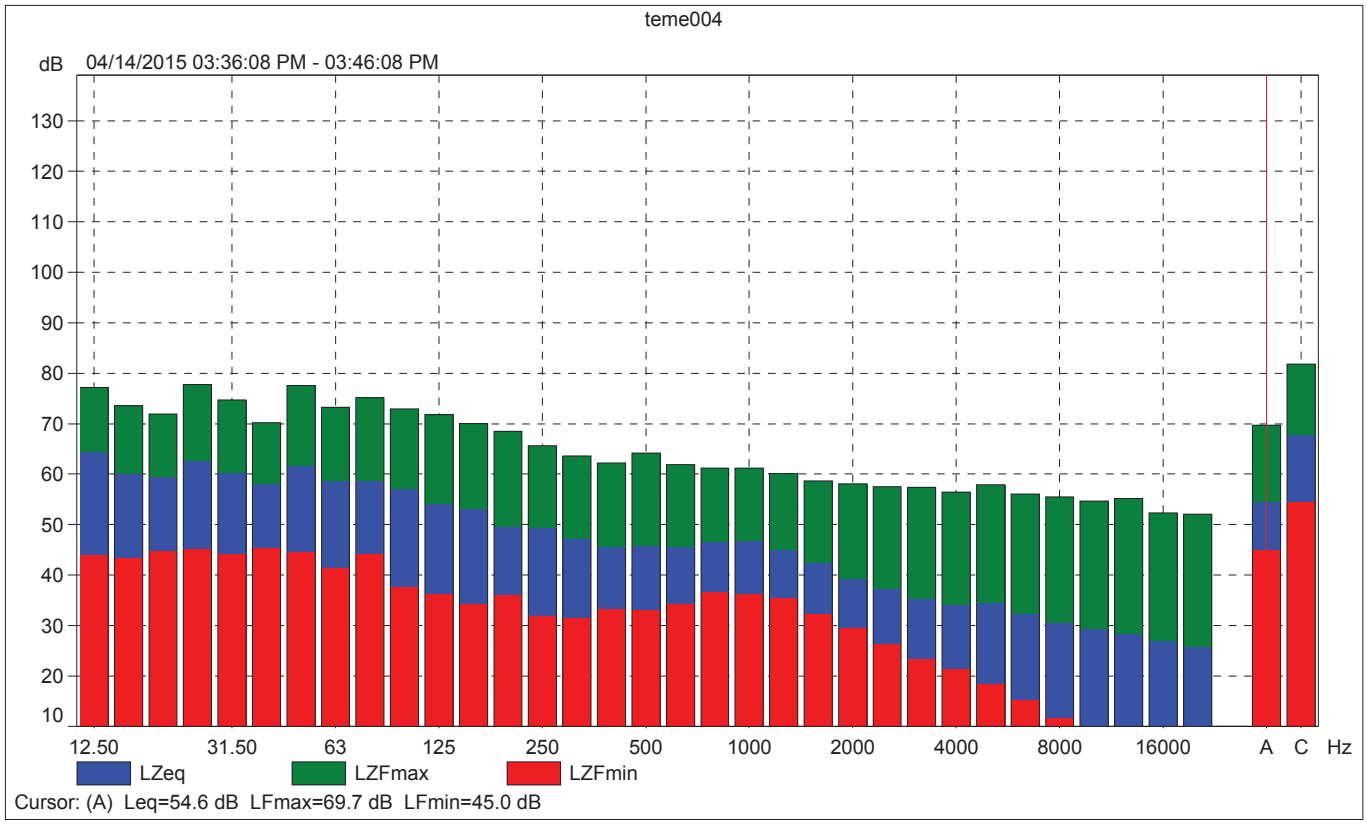
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	Z

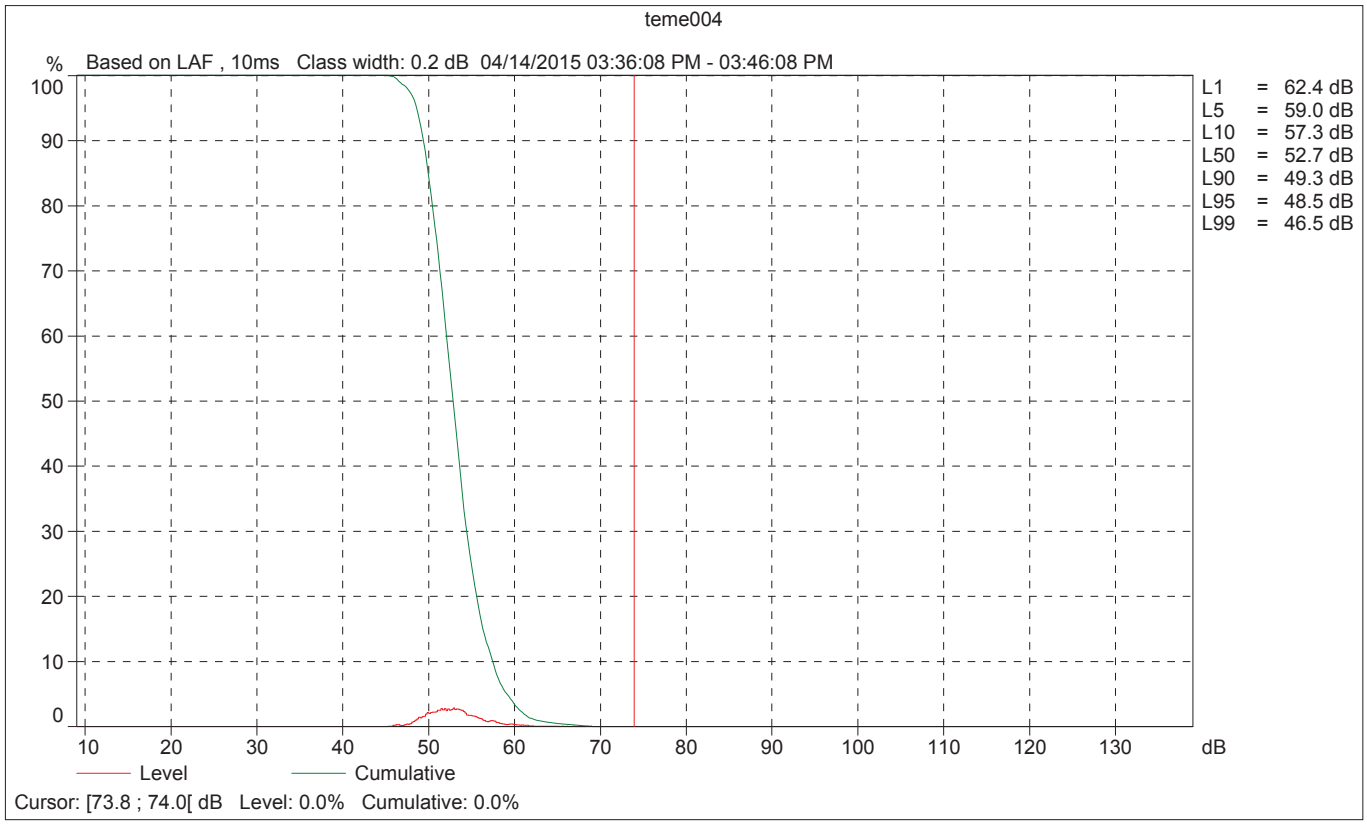
Instrument Serial Number:		2548189
Microphone Serial Number:		2543364
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

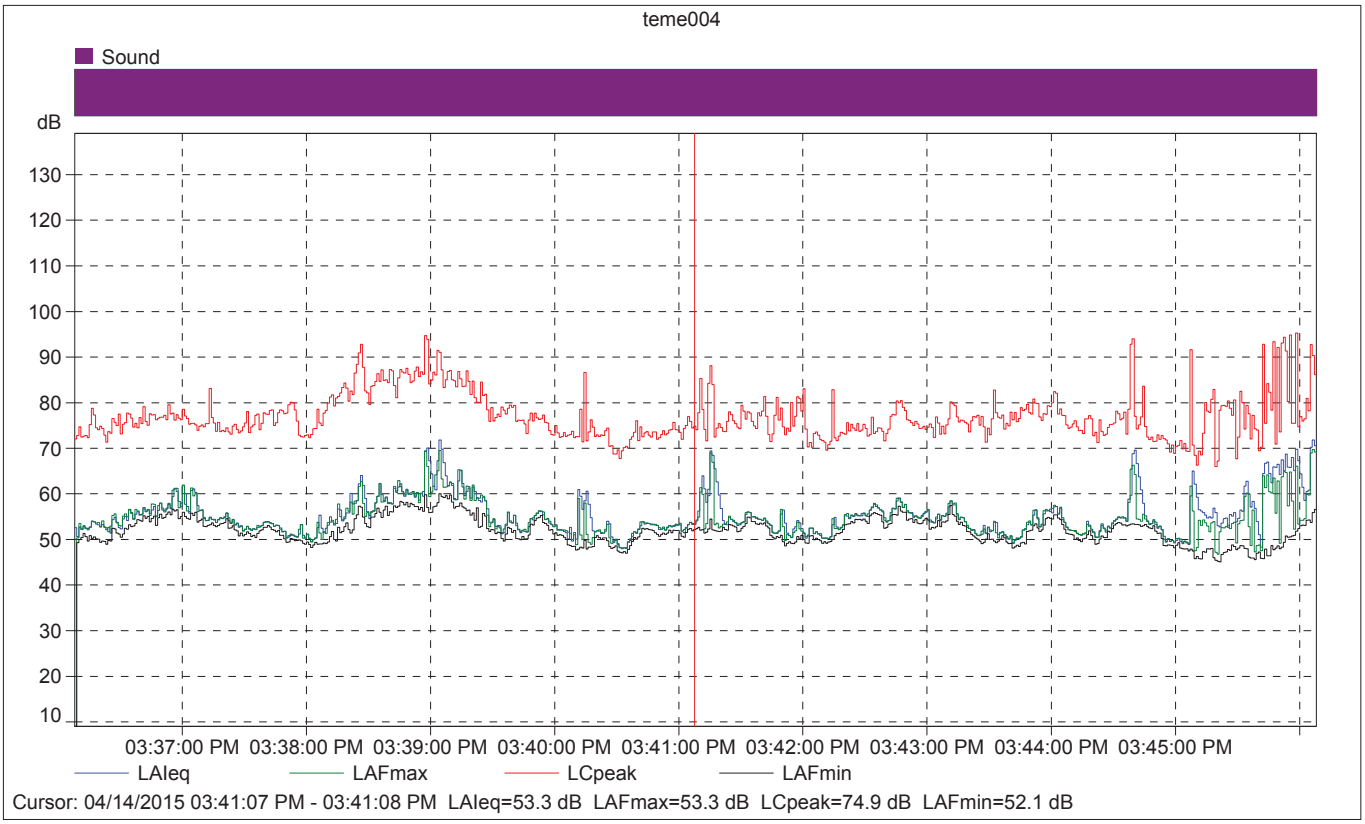
Calibration Time:		04/08/2015 11:37:18
Calibration Type:		External reference
Sensitivity:		66.5684342384338 mV/Pa

teme004

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	54.6	69.7	45.0
Time	03:36:08 PM	03:46:08 PM	0:10:00				
Date	04/14/2015	04/14/2015					

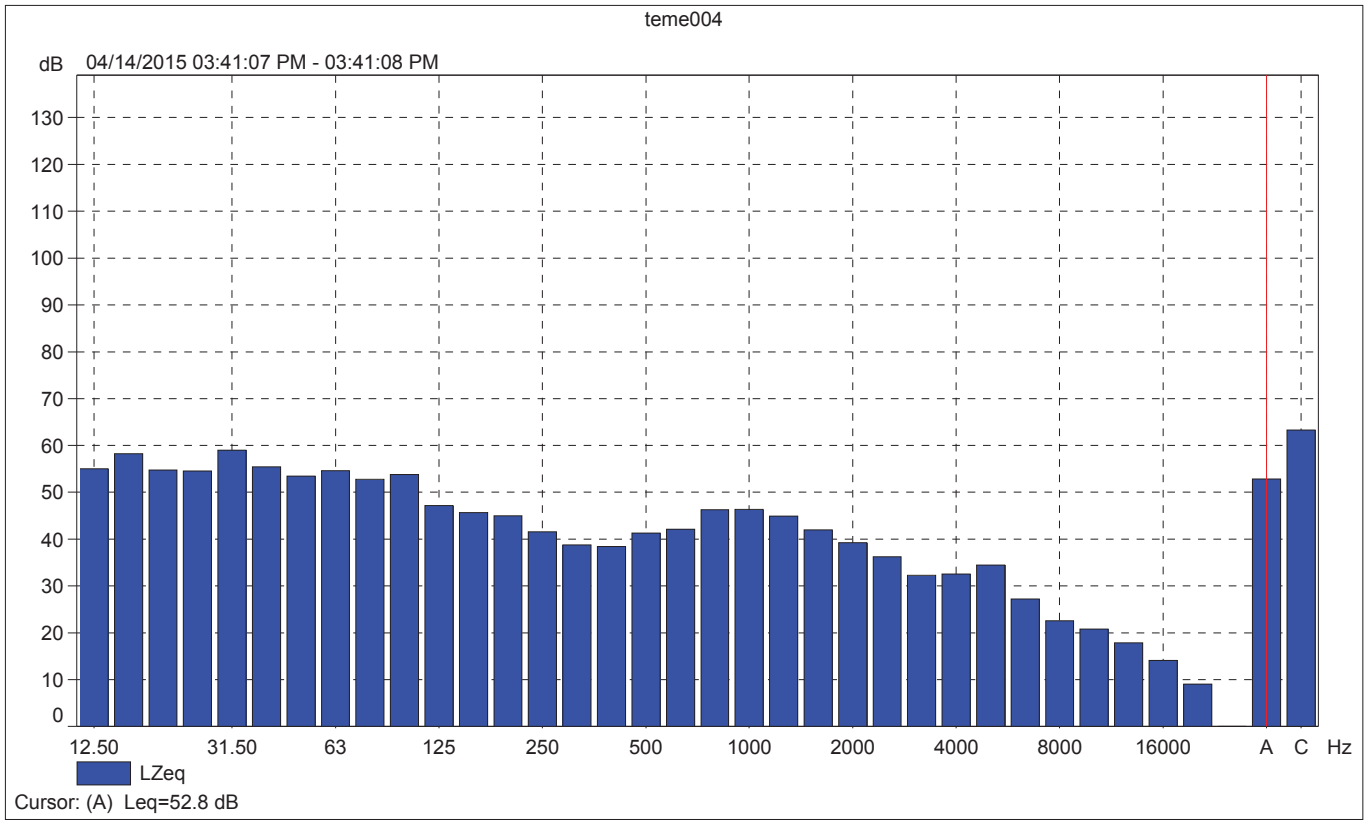

teme004
dB 04/14/2015 03:36:08 PM - 03:46:08 PM
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=54.6 dB LFmax=69.7 dB LFmin=45.0 dB

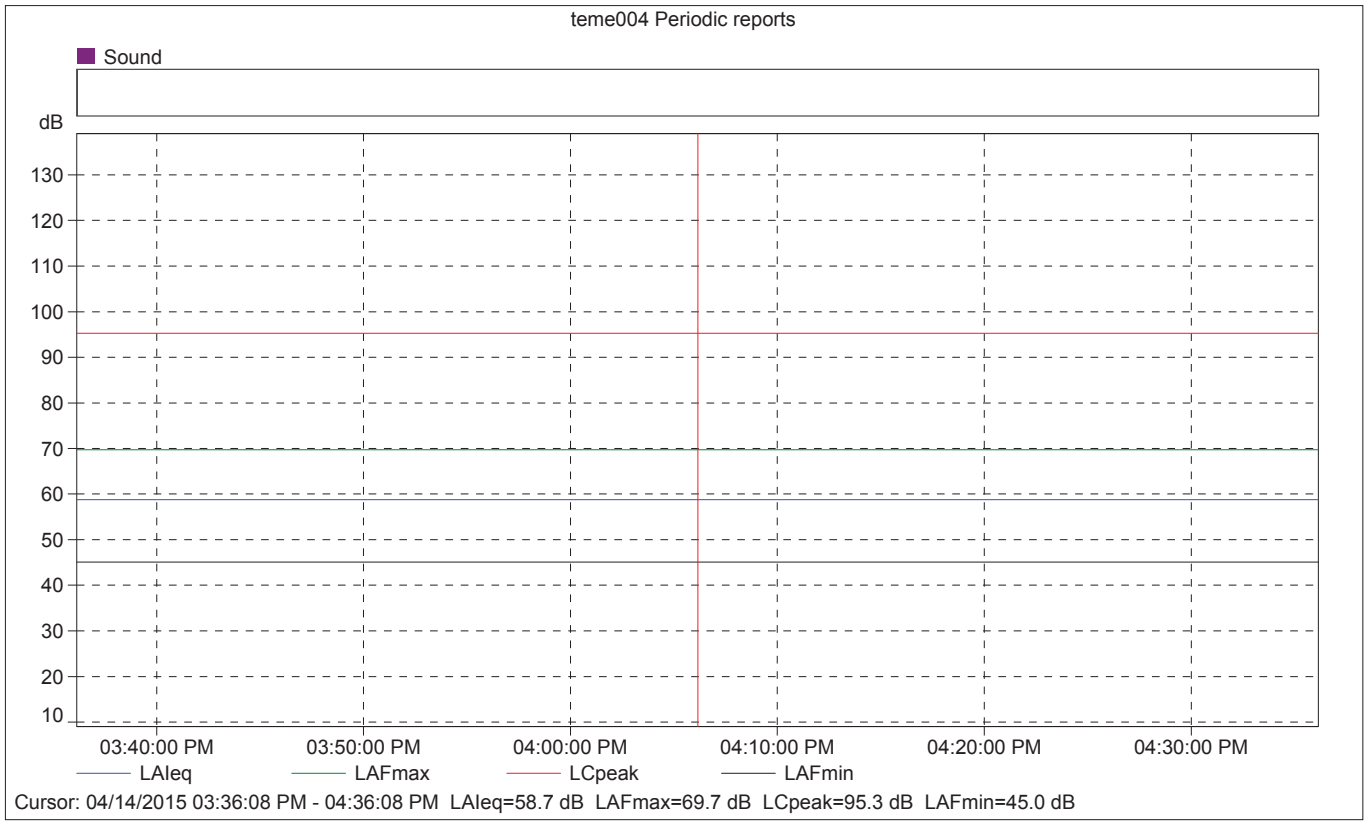

teme004
% Based on LAF , 10ms Class width: 0.2 dB 04/14/2015 03:36:08 PM - 03:46:08 PM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
dB
L1 = 62.4 dB
L5 = 59.0 dB
L10 = 57.3 dB
L50 = 52.7 dB
L90 = 49.3 dB
L95 = 48.5 dB
L99 = 46.5 dB
Level
Cumulative
Cursor: [73.8 ; 74.0[dB Level: 0.0% Cumulative: 0.0%



teme004

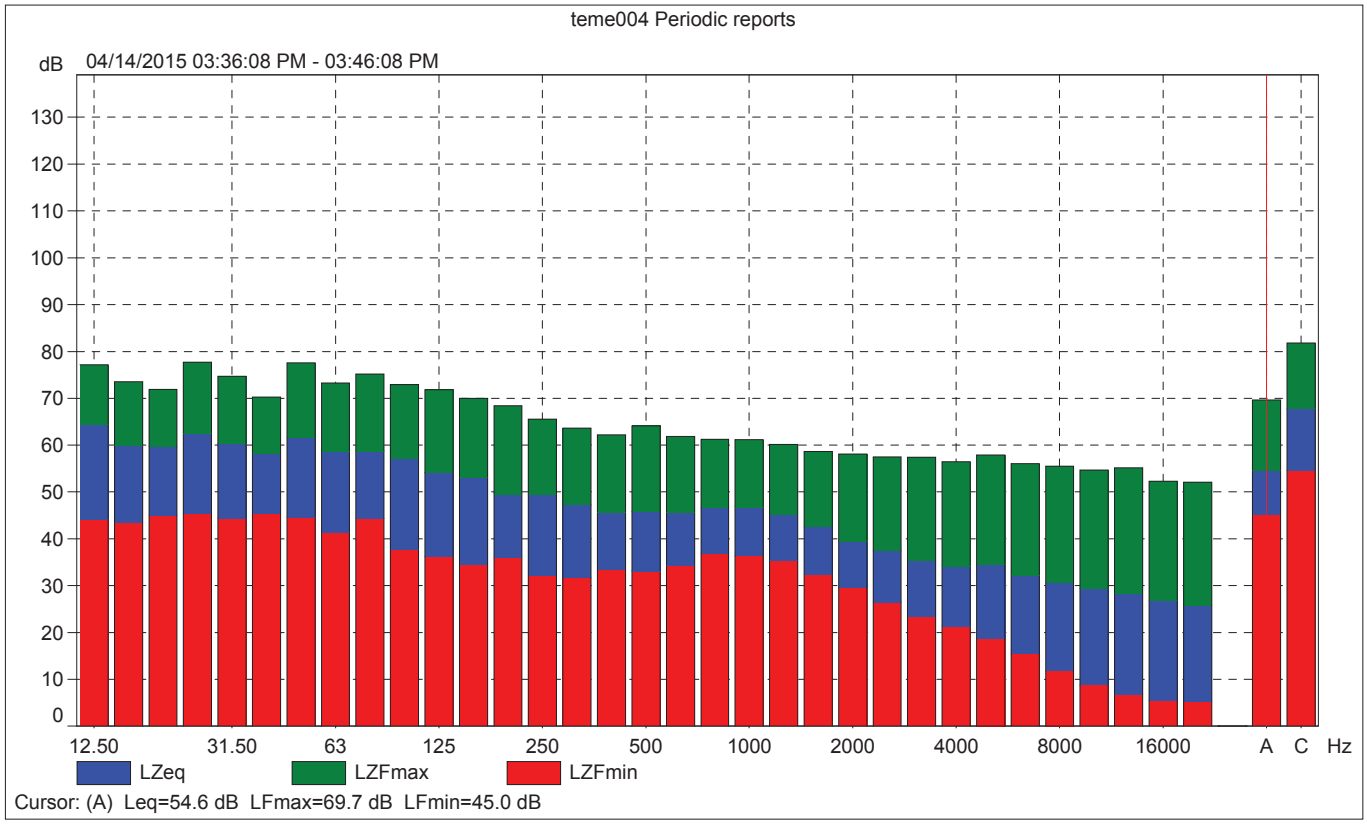
	Start time	Elapsed time	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			53.3	53.3	52.1
Time	03:41:07 PM	0:00:01			
Date	04/14/2015				


teme004
dB
04/14/2015 03:41:07 PM - 03:41:08 PM
130
120
110
100
90
80
70
60
50
40
30
20
10
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
Cursor: (A) Leq=52.8 dB


teme004 Periodic reports
Sound
dB
130
120
110
100
90
80
70
60
50
40
30
20
10
03:40:00 PM
03:50:00 PM
04:00:00 PM
04:10:00 PM
04:20:00 PM
04:30:00 PM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 04/14/2015 03:36:08 PM - 04:36:08 PM LAIeq=58.7 dB LAFmax=69.7 dB LCpeak=95.3 dB LAFmin=45.0 dB

teme004 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	58.7	69.7	45.0
Time	03:36:08 PM	0:10:00				
Date	04/14/2015					




teme004 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 04/14/2015 03:36:08 PM - 03:46:08 PM
100
90
80
70
60
50
40
30
20
10
0
10 20 30 40 50 60 70 80 90 100 110 120 130 dB
L1 = 62.4 dB
L5 = 59.0 dB
L10 = 57.3 dB
L50 = 52.7 dB
L90 = 49.3 dB
L95 = 48.5 dB
L99 = 46.5 dB
Level
Cumulative
Cursor: [73.8 ; 74.0[dB Level: 0.0% Cumulative: 0.0%

APPENDIX B: MODELING DATA

Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Paseo Del Sol	Scenario:	Other
Analyst:	Adam Furman	Job #:	146071
Roadway:	De Portola		
Road Segment:	West of Butterfield		

PROJECT DATA			
Centerline Dist to Barrier	**0**		
Barrier (0=wall, 1= berm):	**0**		
Receiver Barrier Dist:	**0**		
Centerline Dist. To Observer:	**100**		
Barrier Near Lane CL Dist:	**0**		
Barrier Far lane CL Dist:	**0**		
Pad Elevation:	**0.5**		
Road Elevation:	**0**		
Observer Height (above grade):	**0**		
Barrier Height:	**0**		
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA	
Road Grade:	0
Average Daily Traffic:	28,700
Peak Hour Traffic:	**2870**
Vehicle Speed:	40
Centerline Separation:	18

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.695	0.129	0.096	0.92
Med. Truck	0.0144	0.0006	0.015	0.03
Heavy Truck	0.024	0.001	0.025	0.05

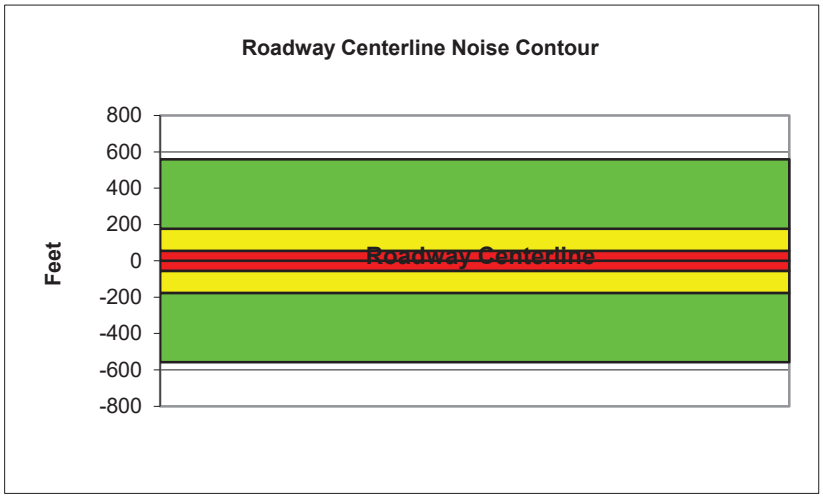
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	56.4	64.4	63.1	57.0	65.5	66.1
Medium Trucks:	65.3	41.7	33.9	43.1	49.2	49.3
Heavy Trucks:	70.2	51.0	43.2	52.3	59.8	59.9
Vehicle Noise:	**72.5**	**64.7**	**63.2**	**58.8**	**66.6**	**67.1**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR	
Unmitigated	
60 dBA	558
65 dBA	177
70 dBA	56
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Paseo Del Sol	Scenario:	Other
Analyst:	Adam Furman	Job #:	146071
Roadway:	Butterfield		
Road Segment:	South of Portola		

PROJECT DATA			
Centerline Dist to Barrier	**0**		
Barrier (0=wall, 1= berm):	**0**		
Receiver Barrier Dist:	**0**		
Centerline Dist. To Observer:	**100**		
Barrier Near Lane CL Dist:	**0**		
Barrier Far lane CL Dist:	**0**		
Pad Elevation:	**0.5**		
Road Elevation:	**0**		
Observer Height (above grade):	**0**		
Barrier Height:	**0**		
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA	
Road Grade:	0
Average Daily Traffic:	28,700
Peak Hour Traffic:	**2870**
Vehicle Speed:	40
Centerline Separation:	35

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.695	0.129	0.096	0.92
Med. Truck	0.0144	0.0006	0.015	0.03
Heavy Truck	0.024	0.001	0.025	0.05

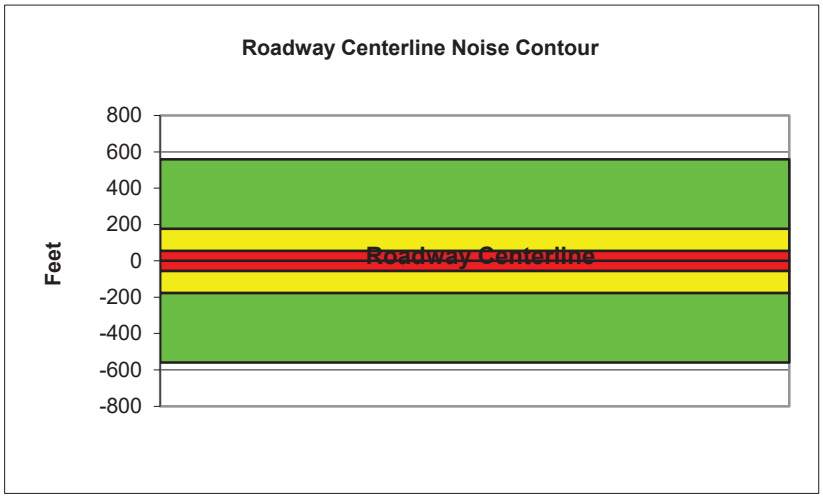
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	56.1	64.1	62.8	56.7	65.2	65.8
Medium Trucks:	65.0	41.4	33.6	42.8	48.9	49.0
Heavy Trucks:	69.9	50.7	42.9	52.1	59.5	59.6
Vehicle Noise:	**72.3**	**64.4**	**62.9**	**58.5**	**66.3**	**66.8**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR	
Unmitigated	
60 dBA	559
65 dBA	177
70 dBA	56
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Paseo Del Sol	Scenario:	Other
Analyst:	Adam Furman	Job #:	146071
Roadway:	Temecula		
Road Segment:	West of Butterfield		

PROJECT DATA			
Centerline Dist to Barrier	**0**		
Barrier (0=wall, 1= berm):	**0**		
Receiver Barrier Dist:	**0**		
Centerline Dist. To Observer:	**100**		
Barrier Near Lane CL Dist:	**0**		
Barrier Far lane CL Dist:	**0**		
Pad Elevation:	**0.5**		
Road Elevation:	**0**		
Observer Height (above grade):	**0**		
Barrier Height:	**0**		
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA	
Road Grade:	0
Average Daily Traffic:	43,100
Peak Hour Traffic:	**4310**
Vehicle Speed:	40
Centerline Separation:	45

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.695	0.129	0.096	0.92
Med. Truck	0.0144	0.0006	0.015	0.03
Heavy Truck	0.024	0.001	0.025	0.05

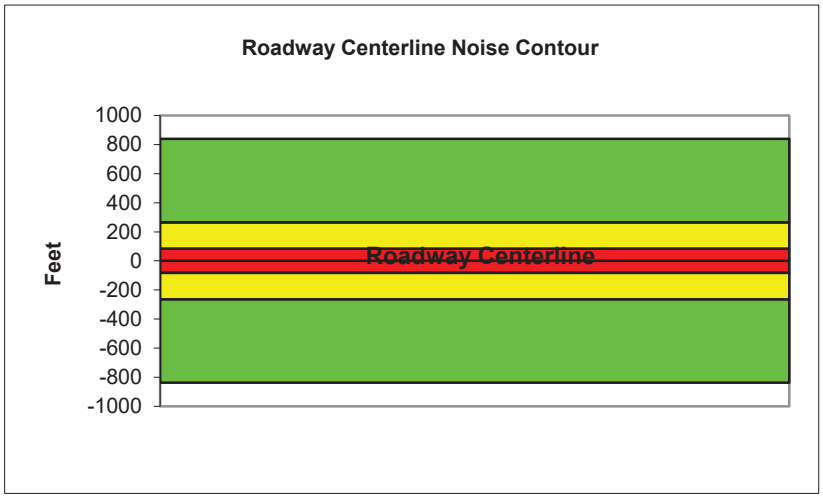
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.7	65.8	64.4	58.4	66.8	67.4
Medium Trucks:	66.6	43.0	35.2	44.4	50.5	50.6
Heavy Trucks:	71.5	52.3	44.5	53.7	61.2	61.2
Vehicle Noise:	**73.9**	**66.0**	**64.5**	**60.1**	**67.9**	**68.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR	
Unmitigated	
60 dBA	839
65 dBA	265
70 dBA	84
Mitigated	
60 dBA	
65 dBA	
70 dBA	



RBF Baker 16 April 2015
Adam Furman TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: Paseo Del Sol PA4
RUN: Maximum Capacity Design

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Northwest Barrier	W	0.00	99.99	0.00				0.00	point1	1	6,307,118.5	2,122,352.8	1,122.00	6.00	1.00	10	0		
									point2	2	6,307,339.0	2,122,314.0	1,122.00	6.00	1.00	10	0		
									point3	3	6,307,537.0	2,122,304.5	1,124.00	6.00	1.00	10	0		
									point4	4	6,307,618.0	2,122,309.2	1,125.00	6.00	1.00	10	0		
									point5	5	6,307,683.0	2,122,317.0	1,125.00	6.00	1.00	10	0		
									point6	6	6,307,746.5	2,122,329.0	1,123.00	6.00	1.00	10	0		
									point7	7	6,307,822.0	2,122,347.2	1,123.00	6.00	1.00	10	0		
									point8	8	6,307,921.0	2,122,378.0	1,122.00	6.00	1.00	10	0		
									point9	9	6,307,967.0	2,122,395.5	1,121.00	6.00	1.00	10	0		
									point10	10	6,308,005.0	2,122,306.0	1,121.00	6.00					
Eastern Barrier	W	0.00	99.99	0.00				0.00	point23	23	6,308,062.0	2,122,333.5	1,119.00	6.00	1.00	8	0		
									point24	24	6,308,018.5	2,122,422.0	1,119.00	6.00	1.00	8	0		
									point25	25	6,308,076.0	2,122,447.8	1,119.00	6.00	1.00	8	0		
									point26	26	6,308,127.5	2,122,476.2	1,120.00	6.00	1.00	8	0		
									point27	27	6,308,199.5	2,122,521.2	1,120.00	6.00	1.00	8	0		
									point28	28	6,308,364.5	2,122,632.8	1,120.00	6.00	1.00	8	0		
									point29	29	6,308,485.5	2,122,713.2	1,120.00	6.00	1.00	8	0		
									point30	30	6,308,536.0	2,122,695.5	1,119.00	6.00	1.00	8	0		
									point31	31	6,308,812.0	2,122,024.5	1,118.00	6.00	1.00	8	0		
									point32	32	6,308,797.0	2,121,957.8	1,116.00	6.00	1.00	8	0		
									point33	33	6,308,853.0	2,121,776.8	1,115.00	6.00	1.00	8	0		
									point36	36	6,308,854.0	2,121,732.5	1,115.00	6.00	1.00	8	0		
									point35	35	6,308,853.0	2,121,691.0	1,115.00	6.00	1.00	8	0		
									point37	37	6,308,849.0	2,121,681.0	1,115.00	6.00	1.00	8	0		
									point38	38	6,308,801.5	2,121,625.2	1,112.00	6.00	1.00	8	0		
									point29	39	6,308,447.5	2,121,520.5	1,111.00	6.00	1.00	8	0		
									point40	40	6,308,183.5	2,121,564.0	1,109.00	6.00	1.00	8	0		
									point41	41	6,308,081.0	2,121,532.8	1,109.00	6.00	1.00	8	0		
									point42	42	6,308,044.5	2,121,649.8	1,109.00	6.00					
South Barrier	W	0.00	99.99	0.00				0.00	point45	45	6,307,976.5	2,121,629.0	1,109.00	6.00	1.00	10	0		
									point46	46	6,308,008.0	2,121,526.5	1,109.00	6.00	1.00	10	0		
									point47	47	6,307,285.5	2,121,311.8	1,110.00	6.00	1.00	10	0		
									point48	48	6,307,343.5	2,121,444.0	1,106.00	6.00					
Southwest Barrier	W	0.00	99.99	0.00				0.00	point53	53	6,307,335.0	2,121,447.5	1,105.00	6.00	1.00	10	0		
									point54	54	6,307,276.5	2,121,310.8	1,105.00	6.00	1.00	10	0		

									point55	55	6,307,258.0	2,121,306.5	1,105.00	6.00						

RBF Baker 16 April 2015
Adam Furman TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Paseo Del Sol PA4
RUN: Maximum Capacity Design

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing Lden	Impact Criteria Lden	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
1	2	1	6,307,454.0	2,122,255.8	1,122.00	3.00	0.00	66	10.0	8.0	Y
2	3	1	6,307,535.0	2,122,265.0	1,124.30	3.00	0.00	66	10.0	8.0	Y
3	4	1	6,307,575.5	2,122,296.2	1,125.30	3.00	0.00	66	10.0	8.0	Y
4	5	1	6,307,640.0	2,122,301.8	1,126.10	3.00	0.00	66	10.0	8.0	Y
5	6	1	6,307,699.0	2,122,311.0	1,126.10	3.00	0.00	66	10.0	8.0	Y
6	7	1	6,307,745.0	2,122,320.2	1,124.80	3.00	0.00	66	10.0	8.0	Y
7	8	1	6,307,796.5	2,122,331.2	1,123.30	3.00	0.00	66	10.0	8.0	Y
8	9	1	6,307,844.0	2,122,344.2	1,122.70	3.00	0.00	66	10.0	8.0	Y
9	10	1	6,307,892.0	2,122,357.0	1,122.00	3.00	0.00	66	10.0	8.0	Y
10	11	1	6,307,947.0	2,122,377.2	1,121.30	3.00	0.00	66	10.0	8.0	Y
11	12	1	6,308,050.0	2,122,421.5	1,119.00	3.00	0.00	66	10.0	8.0	Y
12	13	1	6,308,100.0	2,122,445.2	1,119.30	3.00	0.00	66	10.0	8.0	Y
13	14	1	6,308,147.5	2,122,471.0	1,119.50	3.00	0.00	66	10.0	8.0	Y
14	15	1	6,308,188.0	2,122,498.8	1,119.70	3.00	0.00	66	10.0	8.0	Y
15	16	1	6,308,230.5	2,122,522.5	1,120.00	3.00	0.00	66	10.0	8.0	Y
16	17	1	6,308,274.5	2,122,553.8	1,120.30	3.00	0.00	66	10.0	8.0	Y
17	18	1	6,308,315.0	2,122,579.8	1,121.50	3.00	0.00	66	10.0	8.0	Y
18	19	1	6,308,363.0	2,122,612.8	1,121.50	3.00	0.00	66	10.0	8.0	Y
19	20	1	6,308,477.0	2,122,690.8	1,120.00	3.00	0.00	66	10.0	8.0	Y
20	21	1	6,308,541.5	2,122,665.0	1,120.00	3.00	0.00	66	10.0	8.0	Y
21	22	1	6,308,576.5	2,122,565.5	1,119.80	3.00	0.00	66	10.0	8.0	Y
22	23	1	6,308,600.0	2,122,504.8	1,119.50	3.00	0.00	66	10.0	8.0	Y

23	24	1	6,308,618.5	2,122,458.8	1,119.30	3.00	0.00	66	10.0	8.0	Y
24	25	1	6,308,640.5	2,122,411.0	1,119.00	3.00	0.00	66	10.0	8.0	Y
25	26	1	6,308,657.0	2,122,363.2	1,118.70	3.00	0.00	66	10.0	8.0	Y
26	27	1	6,308,677.5	2,122,319.0	1,118.30	3.00	0.00	66	10.0	8.0	Y
27	28	1	6,308,694.0	2,122,271.2	1,118.00	3.00	0.00	66	10.0	8.0	Y
28	29	1	6,308,712.5	2,122,229.0	1,117.50	3.00	0.00	66	10.0	8.0	Y
29	30	1	6,308,731.0	2,122,179.2	1,117.30	3.00	0.00	66	10.0	8.0	Y
30	31	1	6,308,749.0	2,122,131.5	1,117.00	3.00	0.00	66	10.0	8.0	Y
31	32	1	6,308,780.5	2,122,074.5	1,116.50	3.00	0.00	66	10.0	8.0	Y
32	33	1	6,308,782.5	2,121,993.5	1,115.50	3.00	0.00	66	10.0	8.0	Y
33	34	1	6,308,734.5	2,121,934.5	1,115.30	3.00	0.00	66	10.0	8.0	Y
34	35	1	6,308,780.5	2,121,927.2	1,115.00	3.00	0.00	66	10.0	8.0	Y
35	36	1	6,308,810.0	2,121,851.8	1,115.50	3.00	0.00	66	10.0	8.0	Y
36	37	1	6,308,834.0	2,121,750.8	1,115.30	3.00	0.00	66	10.0	8.0	Y
37	38	1	6,308,811.5	2,121,664.2	1,115.00	3.00	0.00	66	10.0	8.0	Y
38	39	1	6,308,734.5	2,121,625.5	1,114.30	3.00	0.00	66	10.0	8.0	Y
39	40	1	6,308,677.5	2,121,605.2	1,113.50	3.00	0.00	66	10.0	8.0	Y
40	41	1	6,308,626.0	2,121,594.2	1,112.80	3.00	0.00	66	10.0	8.0	Y
41	42	1	6,308,580.0	2,121,583.2	1,111.50	3.00	0.00	66	10.0	8.0	Y
42	43	1	6,308,526.5	2,121,566.8	1,111.00	3.00	0.00	66	10.0	8.0	Y
43	44	1	6,308,475.0	2,121,548.2	1,110.70	3.00	0.00	66	10.0	8.0	Y
44	45	1	6,308,410.5	2,121,542.8	1,110.60	3.00	0.00	66	10.0	8.0	Y
45	46	1	6,308,353.5	2,121,552.0	1,110.30	3.00	0.00	66	10.0	8.0	Y
46	47	1	6,308,304.0	2,121,563.0	1,110.00	3.00	0.00	66	10.0	8.0	Y
47	48	1	6,308,258.0	2,121,568.5	1,109.70	3.00	0.00	66	10.0	8.0	Y
48	49	1	6,308,204.5	2,121,579.5	1,109.40	3.00	0.00	66	10.0	8.0	Y
49	50	1	6,308,155.0	2,121,572.2	1,109.00	3.00	0.00	66	10.0	8.0	Y
50	51	1	6,308,111.0	2,121,563.0	1,108.50	3.00	0.00	66	10.0	8.0	Y
51	52	1	6,307,973.5	2,121,532.2	1,109.20	3.00	0.00	66	10.0	8.0	Y
52	53	1	6,307,915.0	2,121,514.0	1,108.70	3.00	0.00	66	10.0	8.0	Y
53	54	1	6,307,869.0	2,121,501.0	1,109.10	3.00	0.00	66	10.0	8.0	Y
54	55	1	6,307,824.5	2,121,488.2	1,109.40	3.00	0.00	66	10.0	8.0	Y
55	56	1	6,307,771.5	2,121,469.8	1,109.70	3.00	0.00	66	10.0	8.0	Y
56	57	1	6,307,725.5	2,121,460.5	1,110.00	3.00	0.00	66	10.0	8.0	Y
57	58	1	6,307,681.0	2,121,447.8	1,110.30	3.00	0.00	66	10.0	8.0	Y
58	59	1	6,307,629.5	2,121,429.2	1,110.60	3.00	0.00	66	10.0	8.0	Y

59	60	1	6,307,572.5	2,121,416.5	1,110.30	3.00	0.00	66	10.0	8.0	Y
60	61	1	6,307,530.5	2,121,399.8	1,110.00	3.00	0.00	66	10.0	8.0	Y
61	62	1	6,307,484.5	2,121,387.0	1,108.80	3.00	0.00	66	10.0	8.0	Y
62	63	1	6,307,438.5	2,121,372.2	1,107.30	3.00	0.00	66	10.0	8.0	Y
63	64	1	6,307,355.5	2,121,350.2	1,106.20	3.00	0.00	66	10.0	8.0	Y
64	65	1	6,307,254.5	2,121,381.5	1,105.30	3.00	0.00	66	10.0	8.0	Y
65	66	1	6,307,223.0	2,121,473.5	1,105.30	3.00	0.00	66	10.0	8.0	Y
66	67	1	6,307,201.0	2,121,547.0	1,105.80	3.00	0.00	66	10.0	8.0	Y
67	68	1	6,307,171.5	2,121,657.5	1,107.80	3.00	0.00	66	10.0	8.0	Y
68	69	1	6,307,149.5	2,121,721.8	1,109.40	3.00	0.00	66	10.0	8.0	Y
69	70	1	6,307,136.5	2,121,778.8	1,111.30	3.00	0.00	66	10.0	8.0	Y
70	71	1	6,307,112.5	2,121,845.0	1,113.00	3.00	0.00	66	10.0	8.0	Y
71	72	1	6,307,114.5	2,121,902.0	1,114.00	3.00	0.00	66	10.0	8.0	Y
72	73	1	6,307,127.5	2,121,949.8	1,115.40	3.00	0.00	66	10.0	8.0	Y
73	74	1	6,307,147.5	2,122,005.0	1,116.90	3.00	0.00	66	10.0	8.0	Y
74	75	1	6,307,166.0	2,122,056.5	1,118.00	3.00	0.00	66	10.0	8.0	Y
75	76	1	6,307,173.5	2,122,102.5	1,118.80	3.00	0.00	66	10.0	8.0	Y
76	77	1	6,307,177.0	2,122,154.0	1,120.00	3.00	0.00	66	10.0	8.0	Y
77	78	1	6,307,177.0	2,122,205.5	1,121.20	3.00	0.00	66	10.0	8.0	Y

RBF Baker 16 April 2015
Adam Furman TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Paseo Del Sol PA4
RUN: Maximum Capacity Design

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Temecula Parkway EB	44.0	point1	1	6,305,941.0	2,120,589.5	1,100.00				Average	
		point2	2	6,309,068.5	2,121,540.5	1,113.00				Average	
		point3	3	6,309,084.0	2,121,545.0	1,113.00				Average	
		point4	4	6,310,567.5	2,122,008.2	1,118.00					
Butterfield SB	35.0	point5	5	6,308,272.5	2,123,449.5	1,120.00				Average	
		point6	6	6,308,525.0	2,122,843.0	1,119.00				Average	
		point7	7	6,308,532.0	2,122,827.2	1,119.00				Average	
		point8	8	6,309,057.0	2,121,571.0	1,113.00				Average	
		point10	10	6,309,068.5	2,121,540.5	1,113.00				Average	
		point9	9	6,309,318.5	2,120,879.2	1,113.00					
Butterfield NB	12.0	point11	11	6,309,352.5	2,120,899.5	1,113.00				Average	
		point12	12	6,309,084.0	2,121,545.0	1,113.00				Average	
		point13	13	6,309,070.5	2,121,576.5	1,115.00				Average	
		point14	14	6,308,549.5	2,122,838.0	1,119.00				Average	
		point15	15	6,308,542.5	2,122,854.0	1,120.00				Average	
		point16	16	6,308,296.0	2,123,444.5	1,120.00					
Portola EB	27.0	point18	18	6,307,065.5	2,122,454.2	1,128.00				Average	
		point19	19	6,307,280.0	2,122,392.8	1,126.00				Average	
		point20	20	6,307,482.0	2,122,368.2	1,125.00				Average	
		point21	21	6,307,698.0	2,122,387.2	1,125.00				Average	
		point22	22	6,307,962.0	2,122,459.2	1,120.00				Average	
		point23	23	6,308,532.0	2,122,827.2	1,119.00				Average	
		point24	24	6,308,549.5	2,122,838.0	1,119.00				Average	
		point25	25	6,308,881.0	2,123,042.8	1,119.00					
Portola WB	27.0	point27	27	6,308,860.5	2,123,057.0	1,119.00				Average	

		point29	29	6,308,542.5	2,122,854.0	1,120.00				Average	
		point30	30	6,308,525.0	2,122,843.0	1,119.00				Average	
		point31	31	6,308,291.0	2,122,688.8	1,120.00				Average	
		point32	32	6,308,003.0	2,122,500.0	1,124.00				Average	
		point33	33	6,307,954.0	2,122,469.8	1,125.00				Average	
		point34	34	6,307,695.5	2,122,394.0	1,126.00				Average	
		point35	35	6,307,481.0	2,122,376.0	1,128.00				Average	
		point36	36	6,307,289.0	2,122,397.8	1,128.00				Average	
		point37	37	6,307,072.0	2,122,464.2	1,128.00					
Temecula Parkway WB	44.0	point40	40	6,310,550.5	2,122,019.8	1,118.00				Average	
		point41	41	6,309,070.5	2,121,576.5	1,115.00				Average	
		point42	42	6,309,057.0	2,121,571.0	1,113.00				Average	
		point44	44	6,307,219.0	2,121,025.2	1,110.00					

RBF Baker
Adam Furman

16 April 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Paseo Del Sol PA4
RUN: Maximum Capacity Design
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing Lden	No Barrier Lden		Increase over existing		Type Impact	With Barrier Calculated Lden	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1	2	1	0.0	67.5	66	67.5	10	Snd Lvl	64.4	3.1	8	-4.9
2	3	1	0.0	69.7	66	69.7	10	Snd Lvl	65.1	4.6	8	-3.4
3	4	1	0.0	72.2	66	72.2	10	Snd Lvl	64.3	7.9	8	-0.1
4	5	1	0.0	72.2	66	72.2	10	Snd Lvl	64.4	7.8	8	-0.2
5	6	1	0.0	72.4	66	72.4	10	Snd Lvl	65.2	7.2	8	-0.8
6	7	1	0.0	72.4	66	72.4	10	Snd Lvl	65.4	7.0	8	-1.0
7	8	1	0.0	72.1	66	72.1	10	Snd Lvl	63.5	8.6	8	0.6
8	9	1	0.0	72.1	66	72.1	10	Snd Lvl	63.0	9.1	8	1.1
9	10	1	0.0	71.9	66	71.9	10	Snd Lvl	63.0	8.9	8	0.9
10	11	1	0.0	72.1	66	72.1	10	Snd Lvl	63.1	9.0	8	1.0
11	12	1	0.0	70.7	66	70.7	10	Snd Lvl	63.8	6.9	8	-1.1
12	13	1	0.0	70.3	66	70.3	10	Snd Lvl	63.5	6.8	8	-1.2
13	14	1	0.0	69.9	66	69.9	10	Snd Lvl	63.0	6.9	8	-1.1
14	15	1	0.0	70.2	66	70.2	10	Snd Lvl	63.0	7.2	8	-0.8
15	16	1	0.0	69.9	66	69.9	10	Snd Lvl	63.5	6.4	8	-1.6
16	17	1	0.0	70.2	66	70.2	10	Snd Lvl	63.9	6.3	8	-1.7
17	18	1	0.0	71.0	66	71.0	10	Snd Lvl	65.4	5.6	8	-2.4
18	19	1	0.0	71.3	66	71.3	10	Snd Lvl	65.7	5.6	8	-2.4
19	20	1	0.0	72.9	66	72.9	10	Snd Lvl	66.6	6.3	8	-1.7
20	21	1	0.0	73.9	66	73.9	10	Snd Lvl	67.3	6.6	8	-1.4
21	22	1	0.0	73.0	66	73.0	10	Snd Lvl	66.6	6.4	8	-1.6
22	23	1	0.0	72.8	66	72.8	10	Snd Lvl	66.1	6.7	8	-1.3
23	24	1	0.0	72.7	66	72.7	10	Snd Lvl	65.8	6.9	8	-1.1
24	25	1	0.0	72.9	66	72.9	10	Snd Lvl	65.5	7.4	8	-0.6

25	26	1	0.0	72.6	66	72.6	10	Snd Lvl	65.2	7.4	8	-0.6
26	27	1	0.0	72.7	66	72.7	10	Snd Lvl	64.9	7.8	8	-0.2
27	28	1	0.0	72.4	66	72.4	10	Snd Lvl	64.7	7.7	8	-0.3
28	29	1	0.0	72.4	66	72.4	10	Snd Lvl	64.3	8.1	8	0.1
29	30	1	0.0	72.3	66	72.3	10	Snd Lvl	64.2	8.1	8	0.1
30	31	1	0.0	72.2	66	72.2	10	Snd Lvl	64.0	8.2	8	0.2
31	32	1	0.0	72.7	66	72.7	10	Snd Lvl	63.7	9.0	8	1.0
32	33	1	0.0	69.6	66	69.6	10	Snd Lvl	62.9	6.7	8	-1.3
33	34	1	0.0	65.7	66	65.7	10	----	63.6	2.1	8	-5.9
34	35	1	0.0	68.2	66	68.2	10	Snd Lvl	62.7	5.5	8	-2.5
35	36	1	0.0	69.3	66	69.3	10	Snd Lvl	63.4	5.9	8	-2.1
36	37	1	0.0	69.6	66	69.6	10	Snd Lvl	64.3	5.3	8	-2.7
37	38	1	0.0	71.0	66	71.0	10	Snd Lvl	66.2	4.8	8	-3.2
38	39	1	0.0	71.1	66	71.1	10	Snd Lvl	67.2	3.9	8	-4.1
39	40	1	0.0	71.0	66	71.0	10	Snd Lvl	65.3	5.7	8	-2.3
40	41	1	0.0	70.6	66	70.6	10	Snd Lvl	64.5	6.1	8	-1.9
41	42	1	0.0	69.9	66	69.9	10	Snd Lvl	63.3	6.6	8	-1.4
42	43	1	0.0	69.5	66	69.5	10	Snd Lvl	62.9	6.6	8	-1.4
43	44	1	0.0	69.4	66	69.4	10	Snd Lvl	62.5	6.9	8	-1.1
44	45	1	0.0	68.7	66	68.7	10	Snd Lvl	62.2	6.5	8	-1.5
45	46	1	0.0	67.5	66	67.5	10	Snd Lvl	61.5	6.0	8	-2.0
46	47	1	0.0	66.2	66	66.2	10	Snd Lvl	61.0	5.2	8	-2.8
47	48	1	0.0	65.3	66	65.3	10	----	60.3	5.0	8	-3.0
48	49	1	0.0	64.2	66	64.2	10	----	59.9	4.3	8	-3.7
49	50	1	0.0	63.9	66	63.9	10	----	59.2	4.7	8	-3.3
50	51	1	0.0	63.6	66	63.6	10	----	58.7	4.9	8	-3.1
51	52	1	0.0	63.6	66	63.6	10	----	58.7	4.9	8	-3.1
52	53	1	0.0	63.6	66	63.6	10	----	58.1	5.5	8	-2.5
53	54	1	0.0	63.6	66	63.6	10	----	58.4	5.2	8	-2.8
54	55	1	0.0	63.7	66	63.7	10	----	58.6	5.1	8	-2.9
55	56	1	0.0	63.8	66	63.8	10	----	58.6	5.2	8	-2.8
56	57	1	0.0	63.8	66	63.8	10	----	59.0	4.8	8	-3.2
57	58	1	0.0	63.8	66	63.8	10	----	59.2	4.6	8	-3.4
58	59	1	0.0	64.0	66	64.0	10	----	59.3	4.7	8	-3.3
59	60	1	0.0	63.8	66	63.8	10	----	59.0	4.8	8	-3.2
60	61	1	0.0	64.0	66	64.0	10	----	58.4	5.6	8	-2.4
61	62	1	0.0	62.9	66	62.9	10	----	57.4	5.5	8	-2.5
62	63	1	0.0	62.0	66	62.0	10	----	56.2	5.8	8	-2.2
63	64	1	0.0	59.8	66	59.8	10	----	55.3	4.5	8	-3.5
64	65	1	0.0	59.4	66	59.4	10	----	57.3	2.1	8	-5.9
65	66	1	0.0	56.7	66	56.7	10	----	55.8	0.9	8	-7.1

66	67	1	0.0	55.5	66	55.5	10	----	55.1	0.4	8	-7.6
67	68	1	0.0	54.7	66	54.7	10	----	54.6	0.1	8	-7.9
68	69	1	0.0	54.1	66	54.1	10	----	54.2	-0.1	8	-8.1
69	70	1	0.0	54.1	66	54.1	10	----	54.0	0.1	8	-7.9
70	71	1	0.0	54.3	66	54.3	10	----	54.2	0.1	8	-7.9
71	72	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
72	73	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
73	74	1	0.0	55.3	66	55.3	10	----	55.3	0.0	8	-8.0
74	75	1	0.0	56.0	66	56.0	10	----	56.0	0.0	8	-8.0
75	76	1	0.0	57.0	66	57.0	10	----	57.0	0.0	8	-8.0
76	77	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
77	78	1	0.0	61.0	66	61.0	10	----	60.5	0.5	8	-7.5

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	77	-0.1	5.1	9.1
All Impacted	45	3.1	6.7	9.1
All that meet NR Goal	8	8.1	8.6	9.1

RBF Baker 16 April 2015
Adam Furman TNM 2.5

INPUT: TRAFFIC FOR Lden
PROJECT/CONTRACT: Paseo Del Sol PA4
RUN: Maximum Capacity Design

Roadway Name	Points Name	No.	Segment ADT	Autos				MTrucks				HTrucks				Buses				Motorcycles			
				%D	%E	%N	S	%D	%E	%N	S	%D	%E	%N	S	%D	%E	%N	S	%D	%E	%N	S
			veh/24hrs	%	%	%	mph	%	%	%	mph	%	%	%	mph	%	%	%	mph	%	%	%	mph
Temecula Parkway EB	point1	1	21550	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point2	2	21550	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point3	3	21550	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point4	4																					
Butterfield SB	point5	5	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point6	6	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point7	7	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point8	8	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point10	10	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point9	9																					
Butterfield NB	point11	11	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point12	12	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point13	13	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point14	14	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point15	15	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point16	16																					
Portola EB	point18	18	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point19	19	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point20	20	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point21	21	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point22	22	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point23	23	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point24	24	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point25	25																					
Portola WB	point27	27	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point29	29	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point30	30	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point31	31	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point32	32	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point33	33	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0

	point34	34	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point35	35	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point36	36	14350	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point37	37																					
Temecula Parkway WB	point40	40	21550	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point41	41	21550	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point42	42	21550	92	92	92	40	3	3	3	40	5	5	5	40	0	0	0	0	0	0	0	0
	point44	44																					

Michael Baker
INTERNATIONAL

We Make a Difference

MEMORANDUM

To: Steven T. Uhlman, CIH, Riverside County Department of Environmental Health

From: Achilles Malisos, Michael Baker International

Date: November 12, 2015

Subject: Paseo del Sol Tentative Tract #36483 Acoustical Assessment – Supplemental Information

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In October 2015, Michael Baker International (Michael Baker) prepared an Acoustical Assessment that evaluated potential mobile noise impacts to sensitive uses proposed by the Paseo del Sol Tentative Tract Map No. 36483 (TTM 36483), located in the City of Temecula, California. Mobile noise impacts were assessed in accordance with applicable laws, ordinances, and guidelines established by the County of Riverside Department of Environmental Health. The analysis identified soundwall locations and heights necessary In order to reduce mobile noise levels at the project site to within the County's daytime exterior noise standard of 65 dBA for single-family residences. Modeled results indicated that minimum sound wall heights of six, seven, and eight feet were required to ensure proposed residential units within TTM 36483 are not exposed to sound levels in excess of the County's daytime exterior noise standards for single-family residences.

Since completion of the June 2015 Acoustical Assessment and County approval on July 2, 2015, the project has undergone minor modifications. The modifications involve the removal of an emergency fire access (adjacent to Lot 37) to add in a pedestrian walkway, the addition of a second entrance from De Portola Road, the addition of an entrance median on the Eastern Entrance, and increased the landscape zone on Butterfield Stage Road.

Michael Baker has reviewed the minor modifications to the Tentative Tract No. 36483 and determined that the conclusions of the June 2015 Acoustical Assessment would remain unchanged. The minor modifications to the emergency fire access, eastern access, and entrance to De Portola Road would require modifications to the recommended soundwalls. However, as depicted in the revised Exhibit 7, *Sound Wall Height Requirements*, these minor modifications would not affect the overall location or height of the perimeter soundwalls. Therefore, with implementation of the soundwalls depicted on the revised Exhibit 7, residential units within TTM 36483 would not be exposed to sound levels in excess of the County's daytime exterior noise standards for single-family residences.

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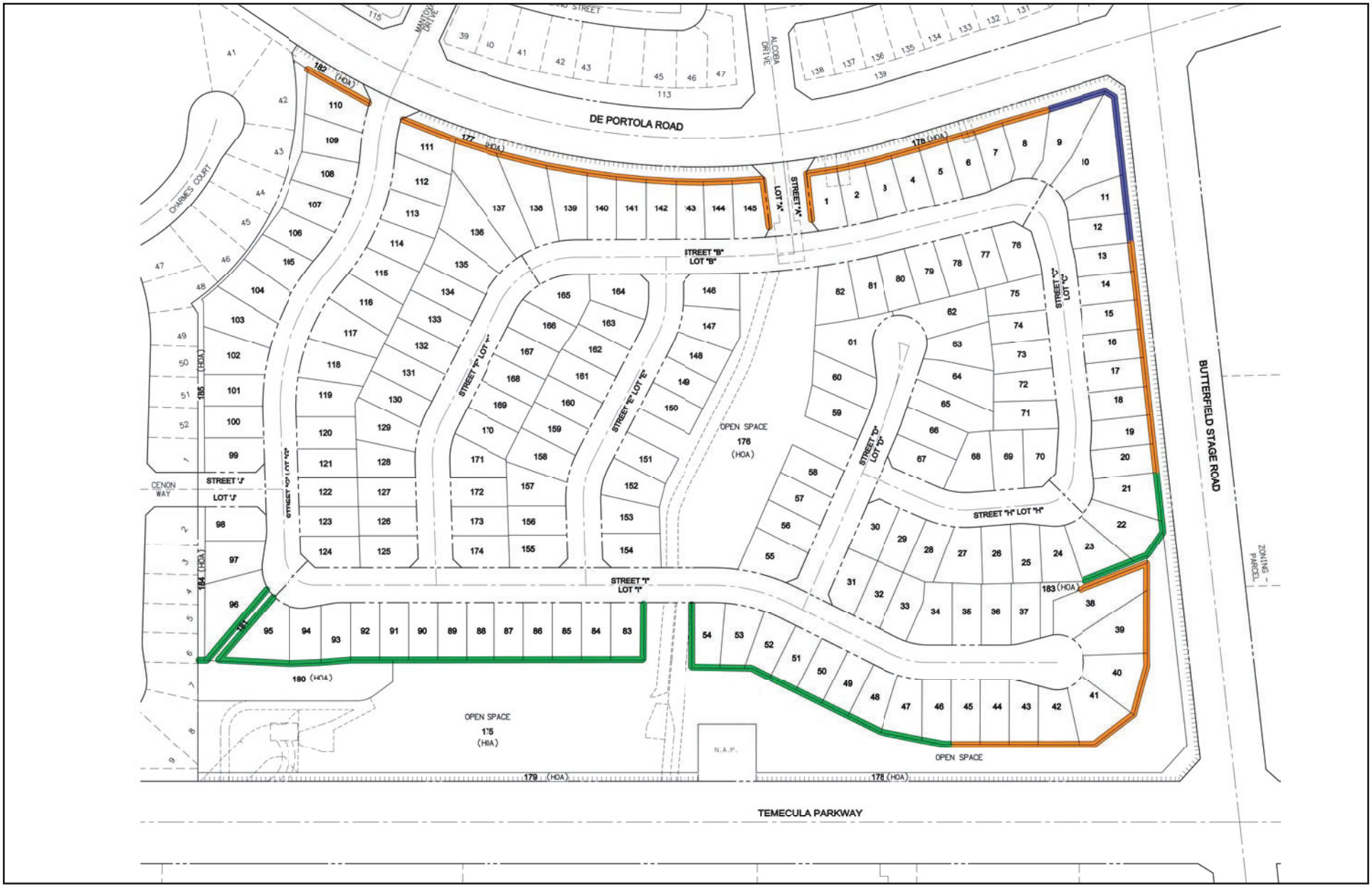

– 6-foot Sound Wall
– 7-foot Sound Wall
– 8-foot Sound Wall

NOT TO SCALE

Michael Baker INTERNATIONAL

11/15 • JN 146071

ACOUSTICAL ASSESSMENT
PASEO DEL SOL TENTATIVE TRACT NO. 36483

Sound Wall Height Requirements

Exhibit 7