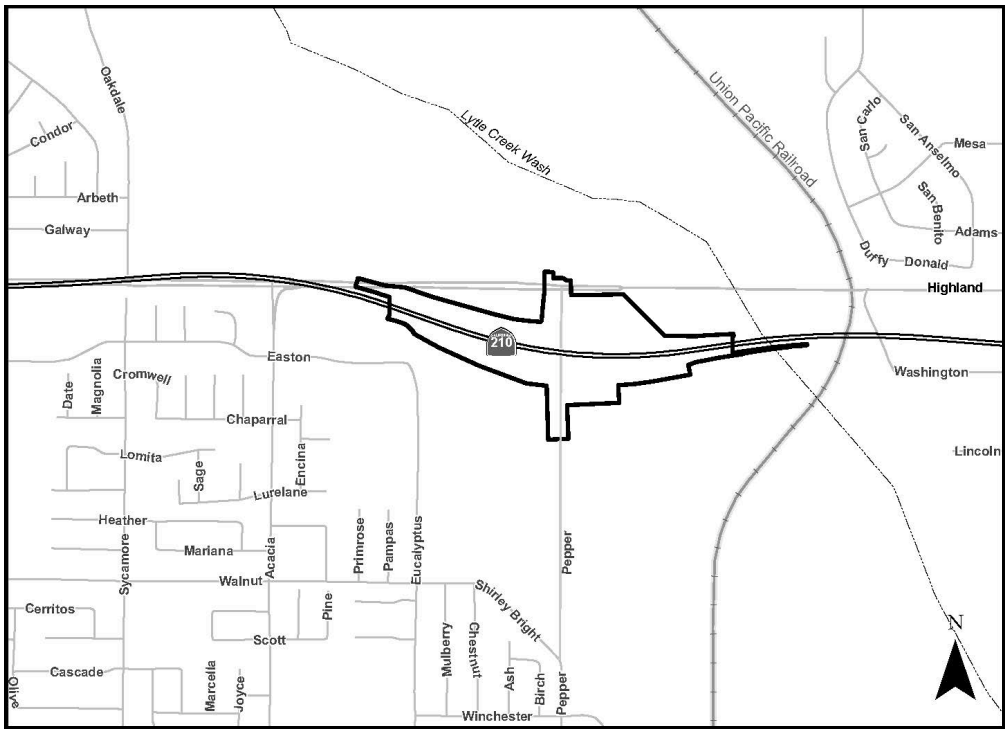
State Route 210/ *NSR*
Pepper Avenue New Interchange Project



Noise Study Report

State Route 210/Pepper Avenue New Interchange Project

City of Rialto, San Bernardino County, California

08-SBD-210 (PM 19.3/20.1)
Project Identification Number: 08-0002-0180
EA 08-443940

January 2014

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Summary

This report presents the results of a traffic noise study conducted for the proposed State Route (SR-) 210/Pepper Avenue New Interchange Project. The San Bernardino Associated Governments (SANBAG), in cooperation with the California Department of Transportation (Caltrans) and the City of Rialto, is proposing to construct the new interchange along SR-210 at Pepper Avenue. The proposed project would construct a new tight diamond interchange at SR-210/Pepper Avenue, between post mile (PM) 19.3 and PM 20.1 in the Cities of Rialto and San Bernardino, California.

The land uses surrounding the project area consist of a park (Frisbie Park), existing residential development, and a tributary of Lytle Creek to the west; and Lytle Creek Wash vegetated with non-native grassland (NNG) and ruderal species, and one abandoned/uninhabitable residence to the east. Towards the eastern edge of the Wash is the Union Pacific Railroad (UPRR) alignment, which traverses the Wash in a generally south-to-north direction atop an elevated concrete causeway. A sand and gravel quarry (Vulcan Materials Company) is located north of SR-210, on the north side of East Highland Avenue. The terrain of the project area is generally uniform, with SR-210 on fill relative to the surrounding project area.

As part of the traffic noise study, one long-term (24 hours or longer) and three short-term (10 minutes) noise measurements were taken at four locations representative of the land uses along the project alignment (specifically, two at Frisbie Park, and the one in undeveloped open area south of the proposed interchange). The measured traffic noise levels were adjusted to the corresponding peak-hour noise levels using the long-term noise data. The adjusted, existing peak-hour traffic noise levels were found to range from 62 A-weighted decibels (dBA), hourly equivalent sound level (Leq[h]), to 70 dBA Leq(h) at representative land uses. Additionally one measurement was conducted for the purpose of quantifying non-project-related noise (i.e., background noise). The background noise levels were found to be less than 10 decibels below SR-210 noise levels and therefore not a substantial influence on project-related noise.

Existing, design year (2036) without-project, and design year (2036) with-project noise levels were modeled using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM), version 2.5. Design Year with Project peak-hour noise levels are predicted to range from 64 dBA Leq(h) to 69 dBA Leq(h) at representative land uses within the project area.

Based upon the results of the traffic noise analysis, it was found that seven modeled receptors (representative of six noise-sensitive [recreation land use] receptors) would approach or exceed the Federal Highway Administration (FHWA)/Caltrans noise abatement criteria (NAC) for Activity Category C land uses with the implementation of the project in both the build and no build condition.

Pursuant to Caltrans and FHWA regulations and guidance, noise abatement is considered for land uses where predicted traffic noise levels in the design year are found to approach or exceed the NAC under build condition noise conditions. For noise-sensitive receivers that were found to have traffic noise levels that approach or exceed the NAC, noise abatement in the form of soundwalls was considered. One soundwall (NB-1) extending from Station 486+03 to Station 507+92 was found to be feasible to construct, and reasonable allowances were calculated.

During construction of the proposed project, noise from construction activities would intermittently dominate the noise environment in the immediate area of construction. Conventional construction equipment is expected to generate maximum noise levels ranging from 75 to 99 decibels (dB) at a distance of 50 feet, while noise from pile driving, which is not anticipated as part of the proposed project, would generate maximum noise levels of approximately 101 dB at a distance of 50 feet. Noise produced by construction equipment would diminish over distance at a rate of about 6 dB per doubling of distance. No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with Caltrans' provisions in Section 14-8.02, "Noise Control" of the 2010 Standard Specifications and applicable local noise standards. Furthermore, implementing the measures specified in Chapter 8 of this report would minimize temporary noise impacts from construction.

Table of Contents

List of Figures

List of Tables

List of Abbreviated Terms

BMP	Best Management Practice
Caltrans	California Department of Transportation
CFR	Code of Federal Regulations
City	City of Rialto
CNEL	Community Noise Equivalent Level
dB	decibels
dBA	A-weighted decibels
ºF	Degrees Fahrenheit
FHWA	Federal Highway Administration
Hz	Hertz
kHz	kilohertz
Ldn	Day-Night Level
Leq	Equivalent Sound Level
Leq[h]	hourly equivalent sound level
Lmax	Maximum Sound Level
Lxx	Percentile-Exceeded Sound Level
mPa	micro-Pascals
MPH	Miles Per Hour
NAC	Noise Abatement Criteria
NADR	Noise Abatement Decision Report
NEPA	National Environmental Policy Act
NN	National Network
NSR	Noise Study Report
Protocol	Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects
RTP	Regional Transportation Plan
SANBAG	San Bernardino Associated Governments
SCAG	Southern California Association of Governments
SPL	sound pressure level
SSP	Standard Special Provision
SR	State Route
STAA	Surface Transportation Assistance Act
TA	Terminal Access
TeNS	the Department's Technical Noise Supplement
TNM	Traffic Noise Model
TNM 2.5	FHWA Traffic Noise Model Version 2.5

Chapter 1. Introduction

The San Bernardino Associated Governments (SANBAG), in cooperation with the California Department of Transportation (Caltrans) and the City of Rialto, is proposing to construct a new tight diamond interchange along SR-210 at Pepper Avenue, between post mile (PM) 19.3 and PM 20.1, in the Cities of Rialto and San Bernardino, California.

1.1. Purpose of the Noise Study Report

The purpose of this noise study report is to evaluate noise impacts and abatement, if necessary, under the requirements of Title 23, Part 772, of the Code of Federal Regulations (CFR), Procedures for Abatement of Highway Traffic Noise. Specifically, 23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. According to 23 CFR 772.3, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with Federal Highway Administration (FHWA) noise standards.

Caltrans' *Traffic Noise Analysis Protocol* (Protocol), dated May 2011, provides Caltrans policy for implementing 23 CFR 772 in California. The Protocol outlines the requirements for preparing noise study reports.

1.2. Project Purpose and Need

The purpose of the proposed SR-210/Pepper Avenue New Interchange project is to:

- Provide improved connectivity to the regional transportation system from the local transportation network; and
- Help achieve the goals of the existing local planning documents regarding access to the regional transportation system.

Pepper Avenue was planned as an interchange when the SR-210 freeway was originally built, and partial right-of-way was reserved for the interchange at that time. The Pepper Avenue Interchange is shown as a future interchange in the City of Rialto's General Plan and Pepper Avenue is also shown in the General Plan as a north/south truck route.

Access between SR-210 and I-10 is restricted at the east end of the City of Rialto due to the orientation of Lytle Creek, a tributary of the Santa Ana River. Lytle Creek runs diagonally across the east end of the City of Rialto, which results in a limited number of north/south roadways to the east of Acacia Avenue and to the north of Baseline Road (refer to Figures 2-1

and 2-2). This limits access for both local traffic attempting to access the regional transportation network, and in particular in trying to access SR-210, and for regional connectivity to the local transportation network particularly in the eastern portion of the Rialto. According to the City of Rialto General Plan (adopted in 2010), due to its location and access to SR-210, I-10, rail lines, and airports, the City is attractive to goods movement businesses. Truck routes have been designated in the City to accommodate the large volumes of truck traffic associated with goods movement. Caltrans has designated two truck route classes based on California legislation: National Network (NN) and Terminal Access (TA) routes. The truck routes in Rialto are defined as TA routes. These routes are portions of state routes or local roads that can accommodate Surface Transportation Assistance Act (STAA) standard trucks. TA routes allow STAA trucks to: 1) travel between NN routes; 2) reach a truck's operating facility, or 3) reach a facility where freight originates, terminates, or is handled in the transportation process.

Within Rialto, Pepper Avenue is designated as a truck route. Pepper Avenue currently does not connect to SR-210, which hinders the ability of the route to accommodate the truck traffic and to meet the defined requirements of TA routes. Pepper Avenue was planned as an interchange when the SR-210 freeway was originally built, and most of the necessary right-of-way was reserved for the interchange at that time. The Pepper Avenue Interchange is shown as a future interchange in the City of Rialto's General Plan, and Pepper Avenue is also shown in the General Plan as a north/south truck route.

The next closest north/south designated truck route is Cedar Avenue/Ayala Drive, which is located approximately 2.5 miles to the west. This results in a less direct access route between SR-210 and I-10 for travelers in Rialto as trucks and other traffic have to follow a more circuitous route to travel between these facilities, increasing the miles traveled for traffic heading east on SR-210.

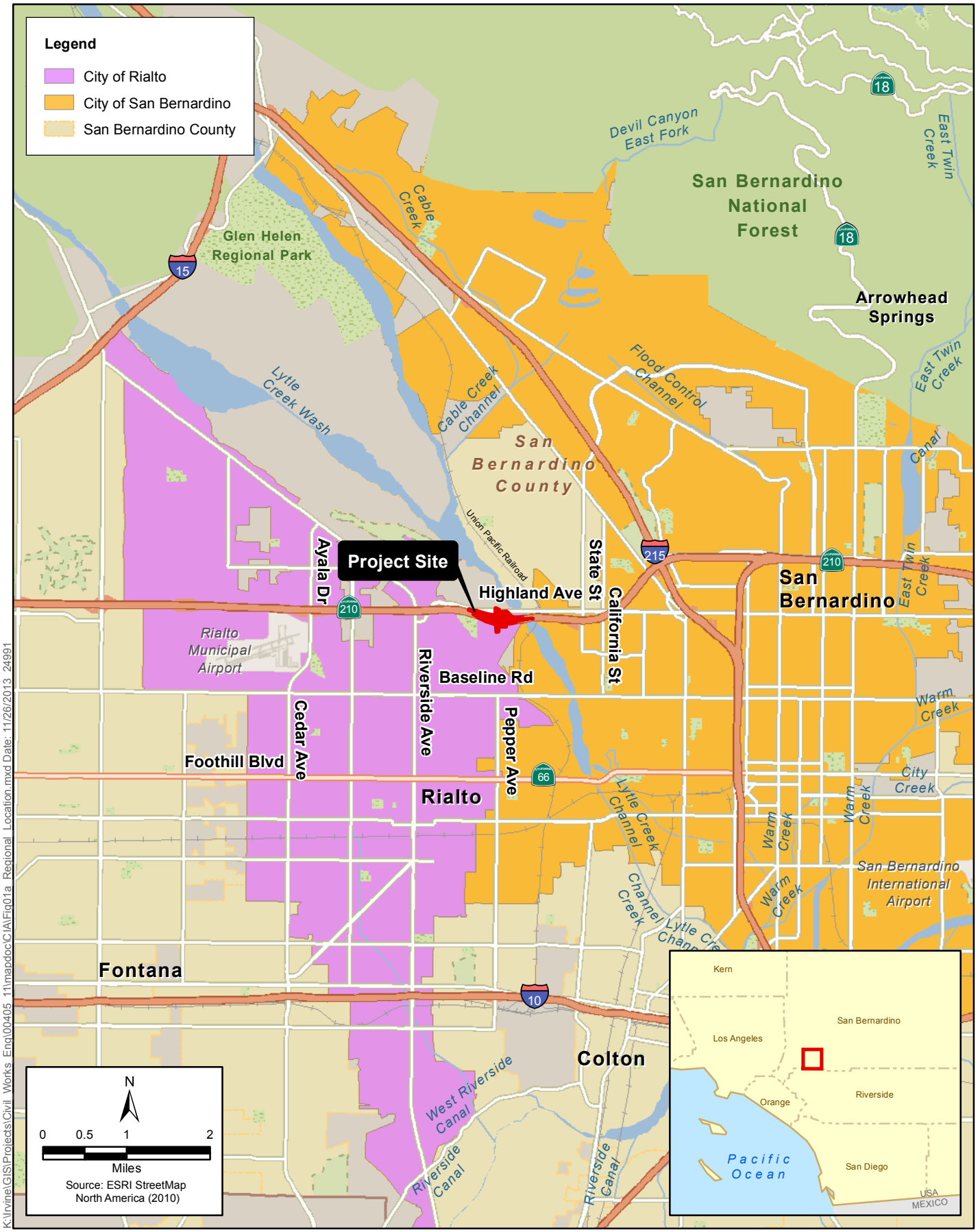

Figure 2-1
Regional Location
State Route 210/Pepper Avenue New Interchange Project

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Figure 2-2
Project Location Map
State Route 210/Pepper Avenue New Interchange Project

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Chapter 2. Project Description

This proposed project is included in the 2013 Federal Transportation Improvement Program (FTIP) as project number 20110110. It is also included in the Southern California Association of Governments' (SCAG) 2012-2035 Regional Transportation Plan (RTP) as project number 4M1007 4M1007 (project identification number 08-0002-0180).

2.1. Project Background

The SR-210/Pepper Avenue New Interchange project is located along SR-210 within the jurisdictional limits of the Cities of Rialto and San Bernardino. The interchange immediately to the west is Riverside Avenue and to the east is State Street/University Parkway. Preliminary engineering was previously completed, and final design was initiated, for the proposed interchange under the SR-210 freeway extension project. In mid-2003, this interchange was removed from the SR-210 freeway extension project since the construction of Pepper Avenue to Highland Avenue, which is a separate local project by the City of Rialto, was not completed. As part of the SR-210 freeway extension project, some grading occurred and partial right-of-way was preserved for a future diamond configuration interchange at SR-210/Pepper Avenue. Pepper Avenue currently extends approximately 2,000 feet north of Baseline Road to Shirley Bright Road. The City of Rialto is now currently constructing the Pepper Avenue Extension as a four-lane roadway from this point up to approximately 1,300 feet south of Highland Avenue. The Caltrans right of way extends south along Pepper Avenue approximately 500 feet south of the proposed eastbound ramps intersection. The 1,300-foot portion of Pepper Avenue within the Caltrans right of way from the City's terminus to Highland Avenue is planned to be constructed by the City as a two-lane roadway (one lane in each direction) until the interchange project is constructed. The City initiated construction of the four-lane extension of Pepper Avenue in July 2012 and expects to complete construction by April 2014. The City is also scheduled to initiate and complete construction of the two-lane gap closure portion of Pepper Avenue by April 2014. Both projects are scheduled to be completed well in advance of the proposed SR-210/Pepper Avenue Interchange project.

2.2. Alternatives

This section describes the proposed action and the design alternatives that were developed to meet the identified need through accomplishing the defined purpose while avoiding or minimizing environmental impacts. For the proposed project, a Build Alternative and a No-Build Alternative are being considered.

2.2.1 Build Alternative

The proposed Build Alternative would construct a new tight diamond interchange along SR-210 at Pepper Avenue (refer to Figure 2-3). The project would provide freeway access ramps at each of the four quadrants of the diamond configuration interchange. The eastbound and westbound off-ramps would widen from one lane where the ramps diverge from SR-210 to two lanes at the intersection with Pepper Avenue where a dedicated left turn lane and a dedicated right turn lane would be provided. The eastbound and westbound on-ramps would each include two lanes at the intersection with Pepper Avenue and would taper to one lane prior to merging onto SR-210. At the ramp intersections with Pepper Avenue, traffic signals would be installed. A traffic signal would also be installed at the Pepper Avenue/Highland Avenue intersection.

Pepper Avenue would be widened from two (constructed as the City's gap closure project) to four through lanes from Highland Avenue to south of the intersection of Pepper Avenue and the eastbound ramps; a distance of approximately 1,300 feet. This portion of Pepper Avenue would ultimately consist of two 12-foot through lanes in each direction with an 8-foot shoulder, curb and gutter, a 6.5-foot parkway, and a 5-foot sidewalk on both sides of the roadway (i.e., next to the 6.5-foot parkway northbound and southbound from the freeway), except within the undercrossing where the sidewalk would be 6.5 feet wide. A dedicated 12-foot left turn lane from northbound Pepper Avenue to the westbound on-ramp and from southbound Pepper Avenue to the eastbound on-ramp would also be constructed. The south end of the interchange project would match the four-lane Pepper Avenue Extension project that is currently under construction by the City of Rialto.

Two retaining walls would be constructed along Pepper Avenue beneath the undercrossing structures at the abutment slopes of the structure. They are anticipated to each be approximately 400 feet long with a 10-foot design height. The retaining walls would include aesthetic design treatments and features consistent with the State Route 210 Corridor Master Plan. Utilities would be adjusted or relocated, as needed, to accommodate the new interchange. Best Management Practice (BMP) features, including modifications to the existing, or the installation of new, water quality control features, would also be part of the project. This is anticipated to include two additional water quality basins, which would be adjacent to the southeast corner of the proposed interchange adjacent to the eastbound on-ramp and the northeast corner of the interchange adjacent to the proposed westbound off-ramp. The water quality basins would be designed and planted so they would blend into the existing sage scrub landscape. Limited additional landscaping appropriate to the setting, and any necessary irrigation, will be installed to preserve and enhance existing landscape character. Also, to the fullest extent practicable, BMPs would be designed to convey both stormwater quantity flows and peak flows.

Some permanent right-of-way acquisition is anticipated for the proposed Build Alternative.

2.2.2 No-Build Alternative

Under the No-Build Alternative, no interchange would be constructed along SR-210 at Pepper Avenue. The No-Build Alternative does not meet the project purpose and need, however, it would not preclude the construction of improvements as part of a future project. Under this alternative, the Pepper Avenue Extension project would be completed; however, the 1,300-foot, two-lane gap closure portion of Pepper Avenue beneath SR-210, connecting Pepper Avenue with Highland Avenue, would operate as a two-lane facility and not be widened to four lanes under this alternative.

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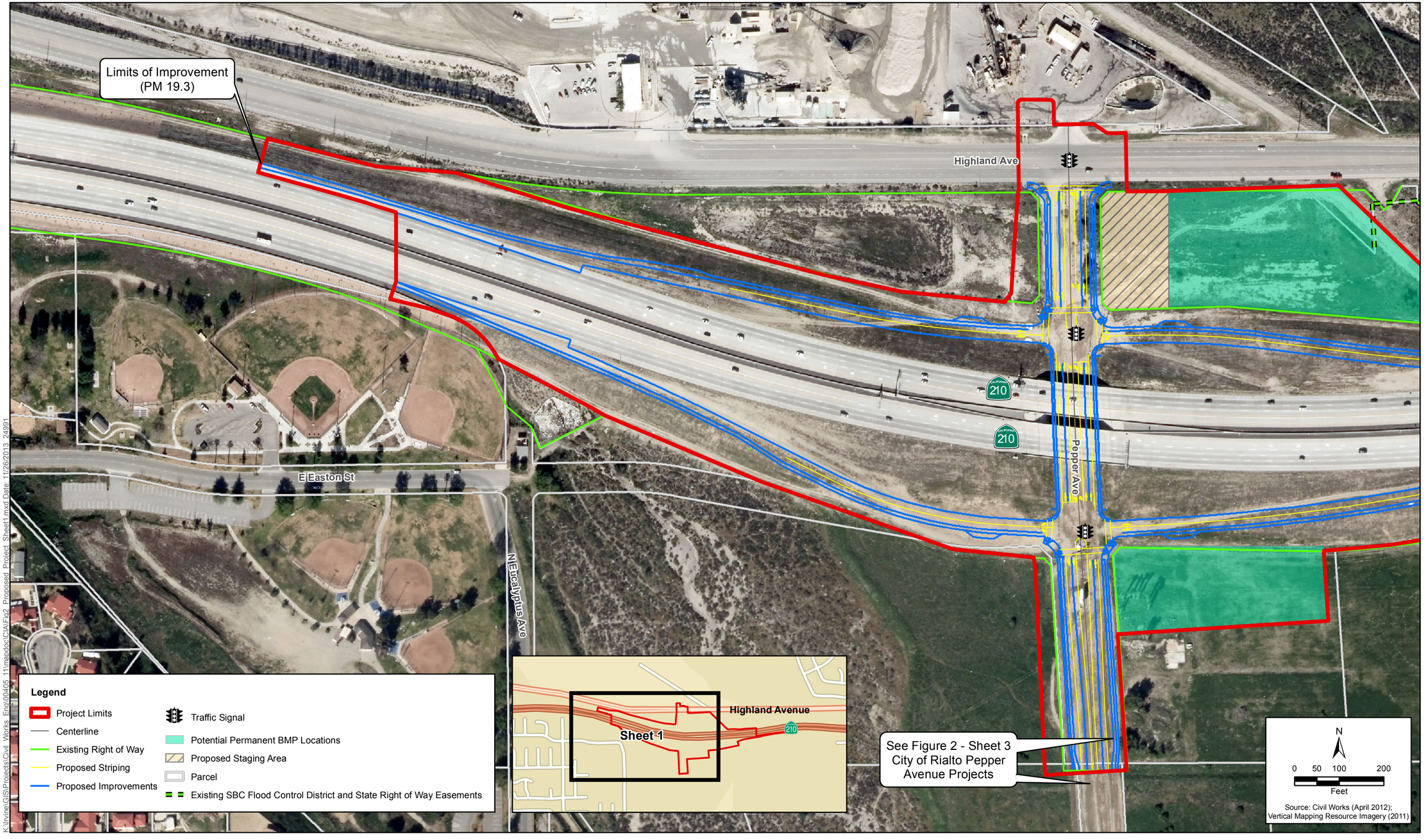

Figure 2-3 - Sheet 1
Proposed Project
State Route 210/Pepper Avenue New Interchange Project

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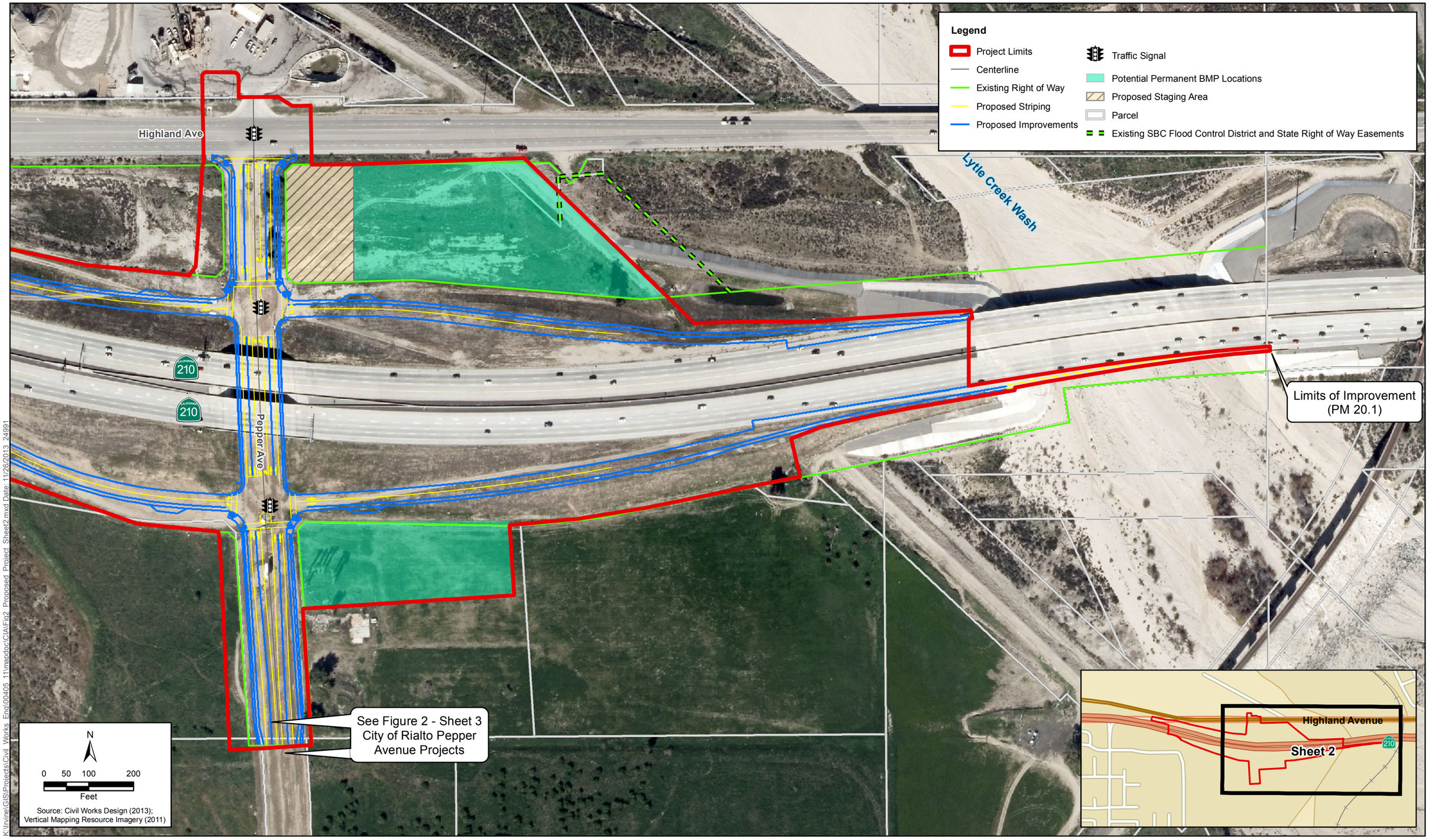

Figure 2-3 - Sheet 2
Proposed Project
State Route 210/Pepper Avenue New Interchange Project

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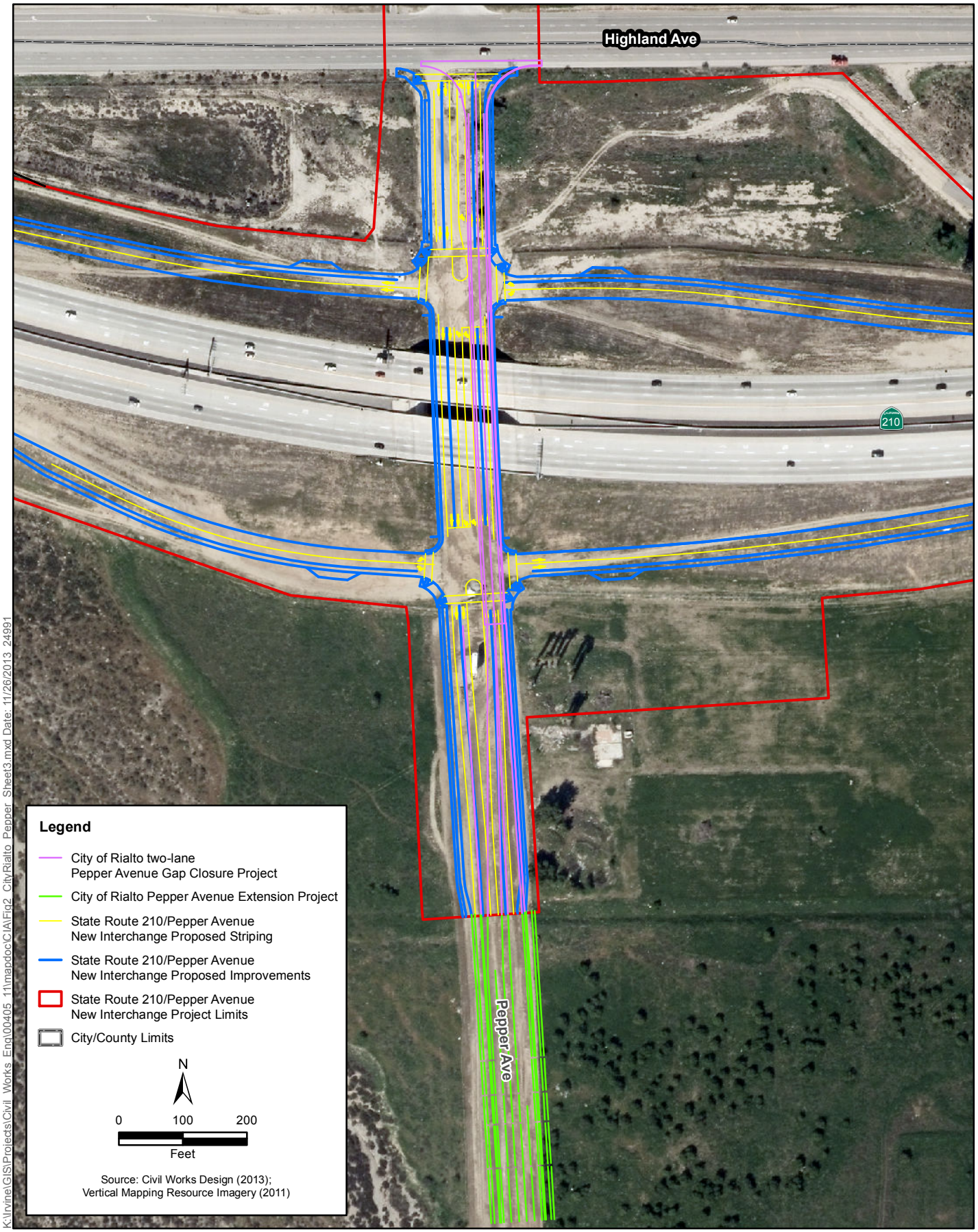

Figure 2-3 - Sheet 3
City of Rialto Pepper Avenue Projects
State Route 210/Pepper Avenue New Interchange Project

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Chapter 3. Fundamentals of Traffic Noise

The following is a brief discussion of fundamental traffic noise concepts. For a detailed discussion, please refer to the Caltrans Technical Noise Supplement (TeNS) (Caltrans 2009), a technical supplement to the Protocol, which is available on the Caltrans web site (<http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf>).

3.1. Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

3.2. Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

3.3. Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

3.4. Addition of Decibels

Because decibels are logarithmic units, SPLs cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

3.5. A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an A-weighted sound level (expressed in units of dBA) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments regarding the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B, C, and D scales), but these scales are rarely used in conjunction with highway traffic noise. Noise levels for traffic noise reports are typically reported in terms of dBA. Table 3-1 describes typical A-weighted noise levels for various noise sources.

Table 3-1. Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawnmower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 miles per hour (mph)		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher (next room)
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: Caltrans 1998.

3.6. Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3 dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained healthy human ear is able to discern 1 dB changes in sound levels when exposed to steady single-frequency (pure-tone) signals in the midfrequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a

5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway), which would result in a 3 dB increase in sound, would generally be perceived as barely detectable.

3.7. Noise Descriptors

Noise in our daily environment fluctuates over time. Various noise descriptors have been developed to describe time-varying noise levels. The noise descriptors most commonly used in traffic noise analysis are listed below.

- **Equivalent Sound Level** (Leq): Leq represents an average of the sound energy occurring over a specified period. In effect, Leq is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level (Leq[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period, and it is the basis for noise abatement criteria (NAC) used by Caltrans and FHWA.

- **Percentile-Exceeded Sound Level** (Lxx): Lxx represents the sound level exceeded for a given percentage of a specified period (e.g., L10 is the sound level exceeded 10 percent of the time, and L90 is the sound level exceeded 90 percent of the time).

- **Maximum Sound Level** (Lmax): Lmax is the highest instantaneous sound level measured during a specified period.

- **Day-Night Level** (Ldn): Ldn is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.

- **Community Noise Equivalent Level** (CNEL): Similar to Ldn, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5 dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

3.8. Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the factors listed below.

3.8.1. Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and, hence, can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

3.8.2. Ground Absorption

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance.

3.8.3. Atmospheric Effects

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can experience lowered noise levels. Sound levels can be increased at large distances from the highway (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

3.8.4. Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver for the specific purpose of noise reduction. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receiver is rarely effective in reducing noise because it does not create a solid barrier.

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Chapter 4. Federal Regulations and State Policies

This section focuses on the requirements of 23 CFR 772.

4.1. Federal Regulations

4.1.1. 23 CFR 772

Provided in 23 CFR 772 are procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772.7, projects are categorized as Type I, Type II, or Type III projects. FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway at a new location, the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment, or an increase in the number of through traffic lanes. A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment. Type III projects are projects that do not meet the classifications of either a Type I or Type II project. Type III projects do not require a noise analysis.

Type I projects include those that create a completely new noise source as well as those that increase the volume or speed of traffic or move the traffic closer to a receiver. Type I projects include those that add an interchange, ramp, auxiliary lane, or truck-climbing lane to an existing highway or widen an existing ramp by a full lane width for its entire length. Projects that are unrelated to increased noise levels, such as striping, lighting, signing, and landscaping projects, are not considered Type I projects.

Under 23 CFR 772.11, noise abatement must be considered for Type I projects if the project is predicted to result in a traffic noise impact. In such cases, 23 CFR 772 requires the project sponsor to consider noise abatement before adoption of the final National Environmental Policy Act (NEPA) document. This process involves identification of noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project as well as noise impacts for which no apparent solution is available.

Traffic noise impacts, as defined in 23 CFR 772.5, occur when the predicted noise level in the design year approaches or exceeds the NAC specified in 23 CFR 772, or a predicted noise level substantially exceeds the existing noise level (a substantial noise increase). However, 23 CFR 772 does not specifically define the terms approach or substantial increase; these criteria are defined in the Protocol, as described below.

Table 4-1 summarizes the NAC corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined according to actual land uses in a given area.

Table 4-1. Activity Categories and Noise Abatement Criteria

Activity Category	NAC, Hourly A-Weighted Noise Level (dBA L_{eq}[h])[1] (Evaluation Location)	Description of Activities
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[2]	67 (Exterior)	Residential.
C[2]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Exterior Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	n/a	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	n/a	Undeveloped lands that are not permitted.

[1] The L_{eq}(h) activity criteria values are for impact determination only and are not design standards for noise abatement measures. All values are A-weighted decibels (dBA).

[2] Includes undeveloped lands permitted for this activity category.

n/a – Not applicable. There is no NAC for this activity category.

In identifying noise impacts, primary consideration is given to exterior areas with frequent human use. In situations where there are no exterior activities or where the exterior activities are far from the roadway or physically shielded in a manner that prevents an impact on exterior activities, the interior criterion (Activity Category D) is used as the basis for determining a noise impact.

4.2. State Regulations and Policies

4.2.1. Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects

The Protocol specifies the policies, procedures, and practices to be used by agencies that sponsor new construction or reconstruction of federal or federal-aid highway projects. The NAC specified in the Protocol are the same as those specified in 23 CFR 772. The Protocol defines a noise increase as substantial when the predicted noise levels with project implementation exceed existing noise levels by 12 dBA. The Protocol also states that a sound level is considered to approach a NAC level when the sound level is within 1 dB of the NAC identified in 23 CFR 772 (e.g., 66 dBA is considered to approach the NAC of 67 dBA but 65 dBA is not).

The TeNS of the Protocol provides detailed technical guidance for the evaluation of highway traffic noise. This includes field measurement methods, noise modeling methods, and report preparation guidance.

4.2.2. Section 216 of the California Streets and Highways Code

Section 216 of the California Streets and Highways Code relates to the noise effects of a proposed freeway project on public and private elementary and secondary schools. Under this code, a noise impact occurs if, as a result of a proposed freeway project, noise levels exceed 52 dBA Leq(h) in the interior of public or private elementary or secondary classrooms, libraries, multipurpose rooms, or spaces. This requirement does not replace the “approach” or “exceed” NAC criterion for FHWA Activity Category D for classroom interiors, but it is a requirement that must be addressed in addition to the requirements of 23 CFR 772.

If a project results in a noise impact under this code, noise abatement must be provided to reduce classroom noise to a level that is at or below 52 dBA Leq(h). If the noise levels generated from freeway and non-freeway sources exceed 52 dBA Leq(h) prior to the construction of the proposed freeway project, then noise abatement must be provided to reduce the noise to the level that existed prior to construction of the project.

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Chapter 5. Study Methods and Procedures

5.1. Methods for Identifying Land Uses and Selecting Noise Measurement and Modeling Receiver Locations

A field investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Land uses in the project area were categorized by land use type; Activity Category, as defined in Table 4-1; and the extent of frequent human use. Although all developed land uses are evaluated in this analysis, as stated in the Protocol, the focus of this impact analysis is on locations of frequent human use that would benefit from a lowered noise level—specifically, locations with defined outdoor activity areas. For this project, the potentially affected noise-sensitive uses with defined outdoor activity areas consist of recreational land uses. Additionally, one noise measurement was conducted at a location representative of the undeveloped lands located on the southeast side of the proposed SR-210/ Pepper Avenue interchange. The noise monitoring and modeling locations are shown in Figure 5-1.

The geometry of the project relative to nearby existing land uses was also identified, and the possibility of planned, programmed, and designed uses occurring on undeveloped land was investigated. The City of Rialto provided a list of 42 capital improvement and development projects that were either recently completed or which are proposed for completion within approximately the next two to three years. Virtually all of these are site-specific rehabilitation or construction projects that do not have the potential to affect noise conditions in the immediate project vicinity or noise study area. Examples of such projects include traffic signalization improvements, City facility rehabilitation and expansion projects, City well replacements, repairs to municipal parking lots, citywide curb/gutter/sidewalk/alley repair and replacement programs, as well as improvements to Rialto Channel. Only one of the 42 projects appears to occur within the project vicinity - the City of Rialto Pepper Avenue Extension project. The planned Pepper Avenue Extension would not introduce any new foreseeable sensitive land uses to the project area. There are no planned, programmed, or designed, sensitive land uses in the vicinity of the project.

Short-term measurement locations were selected to represent the noise-sensitive land uses within the project area. Additionally, one long-term measurement site was selected to capture the diurnal traffic noise level patterns in the project area. Short-term and long-term measurement locations were selected to serve as representative modeling locations. Additional non-measurement locations were selected as modeling locations to gain a more complete understanding of the noise environment in the project area.

5.2. Field Measurement Procedures

A field noise study was conducted in accordance with recommended procedures in TeNS. The following is a summary of the procedures that were used to collect short-term and long-term sound level data.

5.2.1. Short-Term Measurements

Short-term monitoring was conducted at three locations in the project area on March 13, 2012, using a Larson Davis Type 1 (precision grade) sound-level meter. An additional, background noise measurement was conducted on April 10, 2012. The measurements were conducted at Activity Category B[1], C and G land uses. The short-term measurement locations are identified in Figure 5-1. During the short-term measurements, the field staff was present. The Leq values collected during each measurement period (10 minutes in duration) were automatically recorded with digital integrating sound-level meters and subsequently logged manually on field data sheets for each measurement location. Dominant noise sources observed and other relevant measurement conditions were also identified and logged manually on the field data sheets. The calibration of the meter was checked before and after the measurement using a Larson-Davis Model CAL 200 calibrator. Traffic counts were conducted during short-term measurements as well.

Temperature, wind speed, and humidity were recorded manually during the short-term monitoring sessions using a Kestrel 3000 portable weather station. During the short-term measurements, wind speeds typically ranged from 1 to 4 mph. Temperatures ranged from 54°F to 68°F, with relative humidity ranging from 25 to 63 percent.

5.2.2. Long-Term Measurements

Long-term monitoring was conducted at one location (LT1) using a Rion Model NL-21 sound-level meter. The purpose of the measurement was to identify the diurnal traffic noise pattern throughout the typical day/night cycle. The long-term sound level data was collected over a time period of 24 hours, beginning March 13, 2012, and ending March 14, 2012.

Long-term noise monitoring location LT1 is shown in Figure 5-1. LT1 was located just north of the sports fields at Frisbie Park, near the central portion of the park (in an east-west direction). The sound-level meter was located approximately 120 feet from the right-of-way fence separating the property from SR-210. The site was selected in order to document the daily traffic noise pattern, which was dominated by traffic noise on SR-210.

[1] The background noise measurement was conducted in the residential neighborhood south of the project area.

Figure 5-1
Analysis Areas, Noise Monitoring and Modeling Locations and Locations of Evaluated Noise Barriers
State Route 210/Pepper Avenue New Interchange Project

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5.3. Traffic Noise Levels Prediction Methods

Traffic noise levels were predicted using FHWA Traffic Noise Model (TNM), version 2.5. TNM is a computer model based on two FHWA reports: FHWA-PD-96-009 and FHWA-PD-96-010 (FHWA 1998a; FHWA 1998b). Key inputs to the traffic noise model were the locations of roadways, shielding features (e.g., topography and buildings), noise barriers, and receivers as well as ground type. Three-dimensional representations of these inputs were developed using CAD drawings, aerials, and topographic contours provided by the project engineer.

Traffic volume data for the project was provided in July and August 2013 (IBI Group 2013a and IBI Group 2013b). Traffic noise was evaluated under existing conditions, design year (2036) without-project conditions, and design year (2036) with-project conditions. PM traffic volumes were utilized because these were generally slightly higher than AM traffic volumes. Tables A-1 through A-3 in Appendix A summarize the traffic volumes and assumptions used for modeling the existing and design-year conditions with and without the project. The vehicle mix (i.e. percentage of automobiles, medium trucks, and heavy trucks) for existing and design year (2036) with and without-project conditions was derived from the Traffic Impact Analysis Report (TIA) and vetted by IBI Group. Due to the industrial nature of the area, the vehicle mix for the ramps was modeled using the same percentages as the SR-210 mainline.

5.4. Methods for Identifying Traffic Noise Impacts and Consideration of Abatement

Traffic noise impacts occur at receiver locations where predicted design-year noise levels approach or exceed the NAC for the applicable Activity Category, or where substantial noise increases above existing noise levels in the build or no-build condition would occur[2]. Where traffic noise impacts are identified, noise abatement must be considered for reasonableness and feasibility, as required by 23 CFR 772 and the Protocol.

According to the Protocol, abatement measures are considered acoustically feasible if a minimum noise reduction of 5 dB at affected receiver locations is predicted with implementation of the abatement measures. In addition, barriers should be designed to intercept the line of sight from the exhaust stack of a truck to the first tier of receivers, as required by the Caltrans Highway Design Manual, Chapter 1100 (Caltrans 2006; updated 2012). Other factors that affect feasibility include topography, access requirements for driveways and ramps, the presence of local cross streets, utility conflicts, other noise sources in the area, and safety considerations. The overall reasonableness of noise abatement is determined by considering factors such as cost, and

[2] As determined by the Project Development Team.

the opinions of affected property owners and residents. Additionally, the barrier must provide at least 7 dB of noise reduction at one or more benefited receptors. This design goal applies to any receptor and is not limited to impacted receptors.

The Protocol defines the procedure for assessing reasonableness of noise barriers from a cost perspective. A cost-per-residence allowance is calculated for each benefited residence (i.e., residences that receive at least 5 dB of noise reduction from a noise barrier). The allowance currently is $55,000 per benefited residence. Total allowances are calculated by multiplying the cost per residence by the number of benefited residences.

Chapter 6. Existing Noise Environment

6.1. Existing Land Uses

A field investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Sports and recreation areas at Frisbie Park were identified as Activity Category C land uses in the project area.

Although all developed land uses are evaluated in this analysis, as required by the Protocol, noise abatement was considered only for areas of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as recreation areas.

6.2. Noise Measurement Results

The existing noise environment in the project area is characterized below based on the short- and long-term noise monitoring conducted.

6.2.1. Short-Term Monitoring

Table 6-1 summarizes the results of the short-term noise monitoring conducted in the project area. Table 6-1 lists the receptor name, address, land use/Activity Category, measurement start time date and duration, measured Leq, and estimated peak noise hour (using the corresponding long-term noise monitoring data). The short-term monitoring locations are shown in Figure 5-1.

Short-term noise measurements and respective traffic counts ST-1 through ST-3 were conducted in proximity to SR-210 within the project area to analyze the existing SR-210 noise environment and calibrate the TNM model to ensure accuracy. One measurement (ST-4) was conducted to document other sources that contribute to noise levels in the project area (i.e., background noise). Background noise measurement ST-4 was located sufficiently far from SR-210 (approximately 2,300 feet away) such that the freeway did not influence the measured noise levels. The dominant source of noise levels was observed to be local traffic, measured at sound levels of 44 to 45 dBA Leq. These levels are less than 10 dB below the measured noise levels near SR-210; therefore background community noise levels are negligible for the purposes of the subject project's noise impact analysis.

6.2.2. Long-Term Monitoring

Long-term monitoring was conducted at one location (LT1). The purpose of the long-term noise measurement was to determine the changes in noise levels within the project area throughout a typical day. Using the difference, or offset, in the simultaneous noise levels between the short-

Table 6-1. Summary of Short-Term Measurements

Receptor	Address	Land Uses/ Activity Category	Start Date/ Time	Duration (minutes)	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	Peak-Noise-Hour L_{eq}[1]	Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motor-cycles
ST1	Frisbie Park (west end), 1920 Acacia Avenue	Recreation / B	3/13/12 11:30 a.m.	10:00	64.1	70.5	56.3	61.1	63.6	66.2	69.9	EB (Mainline)	2130	48	72	-	-
												EB (HOV)	185	-	-	-	-
												WB (Mainline)	1938	19	84	7	7
												WB (HOV)	169	-	-	-	-
			3/13/12 11:45 a.m.	10:00	64.5	71.1	56.5	60.7	63.4	67.2	70.3	EB (Mainline)	-	-	-	-	-
												EB (HOV)	-	-	-	-	-
												WB (Mainline)	-	-	-	-	-
												WB (HOV)	-	-	-	-	-
ST2	Frisbie Park (central-east portion), 1920 Acacia Avenue	Recreation / B	3/13/12 12:05 p.m.	10:00	62.7	68.8	52.3	58.1	62.1	65.6	69.7	EB (Mainline)	1752	48	120	-	-
												EB (HOV)	152	-	-	-	-
												WB (Mainline)	2154	43	96	-	-
												WB (HOV)	187	-	-	-	-
			3/13/12 12:18	10:00	62.9	70	53.4	58.4	61.9	65.6	69.9	EB (Mainline)	-	-	-	-	-
												EB (HOV)	-	-	-	-	-
												WB (Mainline)	-	-	-	-	-
												WB (HOV)	-	-	-	-	-
ST3	Southeast side of proposed SR-210/Pepper Avenue Interchange	Undeveloped / G	3/13/12 12:55 p.m.	10:00	56.6	64.5	49.9	53.1	55.7	59.2	63.2	EB (Mainline)	2124	36	108	-	19
												EB (HOV)	192	-	-	-	-
												WB (Mainline)	1905	48	96	-	12
												WB (HOV)	166	-	-	-	-

Table 6- 1. Summary of Short-Term measurements Continued

Receptor	Address	Land Uses/ Activity Category	Start Date/ Time	Duration (minutes)	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	Peak-Noise-Hour L_{eq}[1]	Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motor-cycles
ST3	Southeast side of proposed SR-210/Pepper Avenue Interchange	Undeveloped / G	3/13/12 1:07 p.m.	10:00	55.8	63.6	47.9	51.4	54.2	59.1	62.4	EB (Mainline)	-	-	-	-	-
												EB (HOV)	-	-	-	-	-
												WB (Mainline)	-	-	-	-	-
												WB (HOV)	-	-	-	-	-
ST4[2]	1586 Mulberry Avenue	Residential / B	4/10/12 10:10 a.m.	10:00	44.3	57.6	37.3	40.1	43	47.2	50	EB	-	-	-	-	-
												WB	-	-	-	-	-
			4/10/12 10:20 a.m.	10:00	45.1	58.7	39.4	41	44.2	50.3	50.8	EB	-	-	-	-	-
												WB	-	-	-	-	-

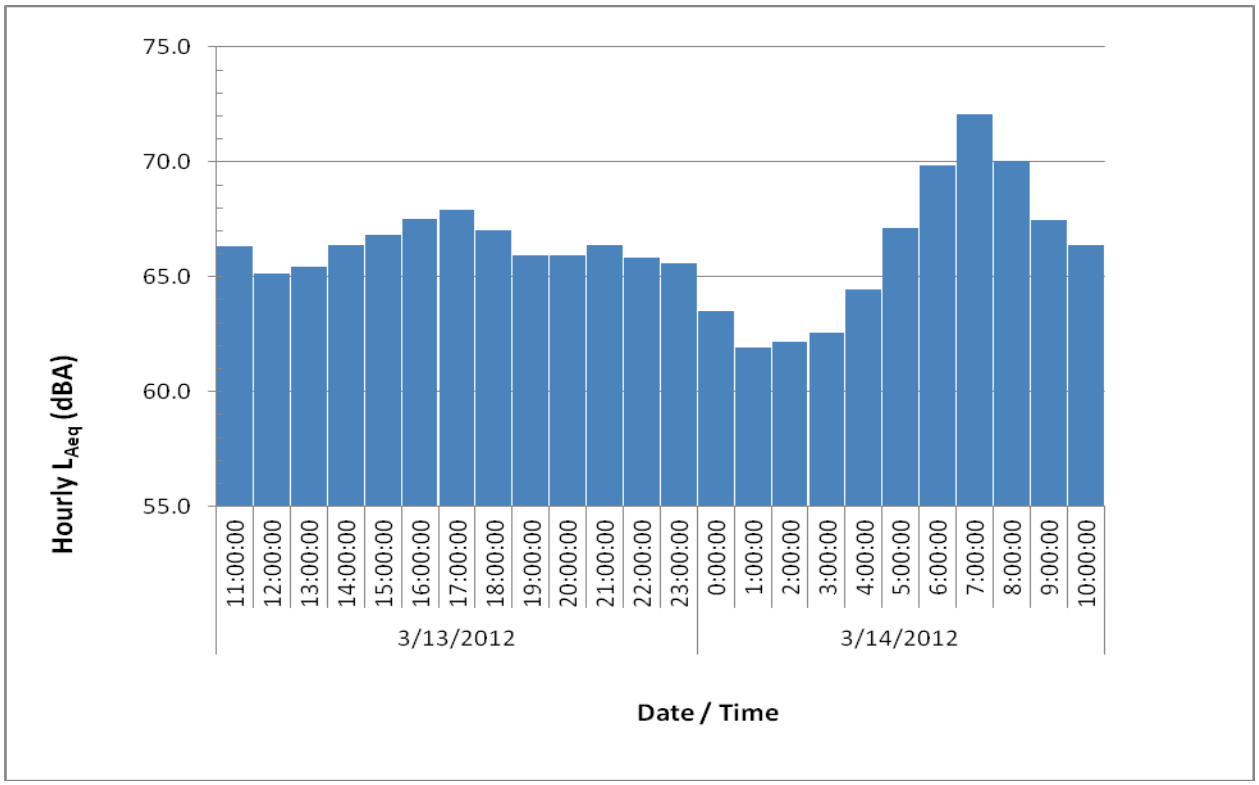
Note: Refer to Figure 5-1 for measurement locations.

[1] Measured existing noise level, adjusted to the peak-noise-hour level using diurnal noise data from LT-1.

[2] No Calibration runs were necessary for ST-4. This receiver location was gathered for the purposes of deriving background noise levels devoid of SR-210

term and long-term data, the long-term measurement at LT1 was used to estimate existing peak-noise-hour levels at the representative short-term receivers. The long-term sound level data were collected from Tuesday, March 13, 2012, to Wednesday, March 14, 2012. The long-term monitoring location is shown in Figure 6-1.

Figure 6-1. Long-Term Monitoring at Location LT1, March 13-14, 2012



LT1: Long-term monitoring site LT1 is located in Frisbie Park, 1920 North Acacia Avenue in the southwestern portion of the project area. The loudest-hour noise level measured was 72.1 dBA Leq(h) during the 7 a.m. – 8 a.m. hour. Table 6-2 and Figure 6-1 summarize the results of the LT-1 data.

6.2.3 Traffic Noise Model Calibration

TNM 2.5 was used to compare measured traffic noise levels to modeled noise levels at field measurement locations using traffic count data collected at the time of the noise measurements. Three sets of traffic counts and three measurements (ST1, ST2, and ST3) were gathered on March 13, 2012 to calibrate the TNM model.

Table 6-2. Summary of Long-Term Monitoring at Location LT-1

Date	Time (hour beginning)	1-Hour L_{eq} (dBA)	Difference from Loudest Hour (dB)
March 13, 2012	11:00:00	66.3	-5.8
	12:00:00	65.1	-7.0
	13:00:00	65.5	-6.6
	14:00:00	66.4	-5.7
	15:00:00	66.8	-5.3
	16:00:00	67.5	-4.6
	17:00:00	67.9	-4.2
	18:00:00	67.0	-5.1
	19:00:00	65.9	-6.2
	20:00:00	65.9	-6.2
	21:00:00	66.4	-5.7
	22:00:00	65.8	-6.3
	23:00:00	65.6	-6.5
March 14, 2012	0:00:00	63.5	-8.6
	1:00:00	61.9	-10.2
	2:00:00	62.2	-9.9
	3:00:00	62.5	-9.6
	4:00:00	64.4	-7.7
	5:00:00	67.1	-5.0
	6:00:00	69.9	-2.2
	7:00:00	**72.1**	**0.0**
	8:00:00	70.1	-2.0
	9:00:00	67.5	-4.6
	10:00:00	66.4	-5.7
Maximum		72	
Minimum		62	

Note: Worst-case noise hour is **bolded**.

TNM Version 2.5 was used to compare measured traffic noise levels to modeled noise levels at field measurement locations using traffic count data collected at the time of the noise measurements. Table 6-3 compares measured and modeled noise levels at each measurement location. Appropriate agreement (less than four decibels) was achieved between the measured and modeled results.

Calibration results that did not agree with measured noise levels within two decibels were adjusted by the use of K-factors for the subsequent modeling of existing and future peak-noise-hour traffic noise. Table 6-3 shows which adjustment factors were applied to each modeling receiver. If the absolute value of the K-factor was less than two dBA, then the TNM modeling result was not adjusted. Modeled existing peak-hour traffic noise levels at all modeling receivers are listed in Appendix B, in Table B-1.

Table 6-3. Comparison of Measured with Modeled Peak-Noise-Hour Sound Levels

Measurement Location	Measured Existing Sound Level (dBA)	Modeled Existing Sound Level (dBA)	Measured minus Modeled (dB)	K-Factor Used
ST1	64.1	65.7	-1.6	0
ST2	62.7	64.4	-1.7	0
ST3	56.6	59.6	-3.0	-3

6.2.4 Existing Modeled Noise Levels

To more accurately model the proposed interchange and the project area, the existing and future alignments were divided into three areas, and this is shown in Figure 5-1:

- Area A, south of SR-210 and adjacent to the eastbound off-ramp of the proposed SR-210/Pepper Avenue interchange. Land uses within Area A include baseball fields, a basketball court, and playground area in Frisbee Park. These land uses all fall within Activity Category C (67 dBA Leq[h]).

- Area B, south of SR-210 and adjacent to the eastbound on-ramp of the proposed SR-210/Pepper Avenue interchange. Area B is completely undeveloped and would fall within Activity Category G.

- Area C, north of Highland Avenue and the proposed SR-210/Pepper Avenue interchange. Land uses within Area C consist of undeveloped areas and industrial areas in the form of an aggregate quarry. Land uses in Area C fall under Activity Category F.

Table B-1 in Appendix B presents the existing modeled noise levels at each receiver (ST1 through ST3 and modeled-only receivers M1 through M8). As shown in Table B-1, existing peak-noise-hour traffic noise levels range from 58 to 68 dBA Leq(h). FHWA/Caltrans NAC is currently approached or exceeded at four (4) of the modeled receptors, which are representative of three (3) noise-sensitive (recreation) uses.

Chapter 7. Future Noise Environment, Impacts, and Considered Abatement

7.1. Future Noise Environment and Impacts

Table B-1 (see Appendix B) summarizes the traffic noise modeling results for existing conditions and design-year conditions with and without the project. Predicted design-year build condition traffic noise levels are compared with existing conditions and design-year no build conditions. The comparison with existing conditions is included in the analysis to identify traffic noise impacts under 23 CFR 772. The comparison of without-project conditions indicates the direct effect of the project.

As stated in the TeNS, modeling results are rounded to the nearest decibel before comparisons are made. In some cases, this can result in relative changes that may not appear intuitive. An example would be a comparison between sound levels of 64.4 and 64.5 dBA. The difference between these two values is 0.1 dB. However, after rounding, the difference is reported as 1 dB.

The results in Table B-1 indicate that predicted traffic noise levels for the design-year (2036) without-project and with-project conditions would approach or exceed the NAC of 67 dBA Leq(h) for Activity Category C (recreation) land uses at seven receivers (M1 through M5, ST1, and ST2), all located within Area A. Within Area A, modeled design-year without project noise levels range from 64 dBA Leq(h) at receivers M6 and M7 to 69 dBA Leq(h) at receiver ST1 and M2. Modeled design-year noise levels range from 64 dBA Leq(h) at receiver M6 to 70 dBA Leq(h) at ST1. Areas B and C do not have land uses classified as noise-sensitive under 23 CFR 772, but the noise analysis includes modeled receivers for these areas in order to document the predicted future with project noise levels there. As shown in Table B-1, Area B (an undeveloped area represented by receiver ST3) would have a future with project peak-hour traffic noise level of 66 dBA Leq(h), and Area C (a sand and gravel mining facility represented by receiver M8) would have a future with project peak-hour traffic noise level of 67 dBA Leq(h).

Traffic noise impacts are predicted to occur at Activity Category C land uses in Area A within the project area, and noise abatement must be considered.

7.2. Preliminary Noise Abatement Analysis

According to 23 CFR 772(13)(c), Federal funding may be used for the following abatement measures.

- Construction of noise barriers, including acquisition of property rights, either within or outside the highway right-of-way. Landscaping is not a viable noise abatement measure.
- Traffic management measures including, but not limited to, traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations.
- Alteration of horizontal and vertical alignments.
- Acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise. This measure may be included in Type I projects only.
- Noise insulation of Activity Category D land use facilities listed in Table 1. Post-installation maintenance and operational costs for noise insulation are not eligible for Federal-aid funding.

Each noise barrier evaluated has been evaluated for feasibility based on achievable noise reduction. For each noise barrier found to be acoustically feasible, reasonable cost allowances were calculated. Worksheets provided in Appendix C summarize the reasonable cost allowance calculations at the design receiver based on the allowance calculation procedure identified in the Protocol. Table B-1 in Appendix B summarizes results at receiver locations for the single noise barrier (Barrier NB-1) located at the Edge of Shoulder (EOS) that has been evaluated in detail for this project.

For any noise barrier to be considered reasonable from a cost perspective, the estimated cost of the noise barrier should be equal to or less than the total cost allowance calculated for the barrier. The cost calculations of the noise barrier should include all items appropriate and necessary for construction of the barrier, such as traffic control, drainage modification, and retaining walls. Construction cost estimates are not provided in this NSR, but are presented in the Noise Abatement Decision Report (NADR). The NADR is a design responsibility and is prepared to compile information from the NSR, other relevant environmental studies, and design considerations into a single, comprehensive document before public review of the project. The NADR is prepared by the project engineer after completion of the NSR and prior to publication of the draft environmental document. The NADR includes noise abatement construction cost estimates that have been prepared and signed by the project engineer based on site-specific conditions. Construction cost estimates are compared to reasonableness allowances in the NADR to identify which wall configurations are reasonable from a cost perspective.

The design of noise barriers presented in this report is preliminary and has been conducted at a level appropriate for environmental review and not for final design of the project. Preliminary information on the physical location, length, and height of noise barriers is provided in this

report. If pertinent parameters change substantially during the final project design, preliminary noise barrier designs may be modified or eliminated from the final project. A final decision on the construction of the noise abatement will be made upon completion of the project design.

The following is a discussion of noise abatement considered for each evaluation area where traffic noise impacts are predicted.

7.2.1. Area A

The traffic noise modeling results in Table B-1 indicate that traffic noise levels at recreation areas within Frisbie Park in Area A are predicted to be in the range of 64 to 69 dBA Leq(h) in the design year build conditions. The results also indicate that the change in traffic noise between existing conditions and the design year is predicted to range from zero dB at receivers M2,M3, M6m ST1 to two dB at receiver M5. Because the predicted noise level in the design year is predicted to approach or exceed the noise abatement criterion (67 dBA Leq[h]), traffic noise impacts are predicted at recreation land uses in this area, and noise abatement must be considered. Receivers M1, ST1, M2, M3, M4, M5 and M6 represent a total of seven benefited receivers in Area A. Detailed modeling analysis was conducted for a barrier located at the edge of shoulder extending from Station 486+03 to Station 507+92, which because of the source-receiver geometry, is the only location at which a noise barrier would be effective. The barrier evaluated is identified as Barrier NB-1 in Figure 5-1. Barrier heights in the range of 6 to 16 feet were evaluated in two-foot increments. Table D-1 in Appendix D summarizes the results of the barrier analysis for each receiver location in Area A. Reasonable allowance calculation sheets for this barrier are provided in Worksheets C-1 through C-3 in Appendix C. Table 7-1 summarizes the calculated noise reductions and reasonable allowances for each feasible barrier height (in this case, barriers ranging from 12 feet to 16 feet in height were determined to be feasible).

Table 7-1. Summary of Reasonableness Determination Data—Area A – Barrier NB-1

Barrier I.D. & Location:	NB-1 - Edge of Shoulder EB Lanes		
Predicted Sound Level without Barrier			
Design Receiver:	M1		
Design Year Noise Level, dBA L_{eq}(h):	69 dBA		
Design Year Noise Level Minus Existing Noise Level:	2 dBA		
Design Year with Barrier	**12-Foot Barrier**	**14-Foot Barrier**	**16-Foot Barrier**
Barrier Noise Reduction	7 dBA	7 dBA	9 dBA
Number of Benefited Residences	6	6	7
Reasonable Allowance Per Benefited Residence	$55,000	$55,000	$55,000
Total Reasonable Allowance	$330,000	$330,000	$385,000

Note: A NADR will be prepared that will identify noise barrier construction cost information and the noise barriers that are reasonable from a cost perspective.

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Chapter 8. Construction Noise

During construction of the project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Construction noise is regulated by Caltrans' provisions in Section 14-8.02, "Noise Control" of the 2010 Standard Specifications and Special Provisions (SSP S5-310). The SSP will be edited specifically for this project during the PS&E phase.

Two types of short-term noise impacts would occur during project construction. The first type would be from construction crew commutes and the transport of construction equipment and materials to the project site and would incrementally raise noise levels on access roads leading to the site. The pieces of heavy equipment for grading and construction activities would be moved on site, would remain for the duration of each construction phase, and would not add to the daily traffic volume in the project vicinity. A high single-event noise exposure potential at a maximum level of 87 dBA Lmax from trucks passing at 50 feet would exist. However, the projected construction traffic would be minimal when compared to existing traffic volumes on SR-210 and other affected streets, and its associated long-term noise level change would not be perceptible. Therefore, construction-related worker commutes and equipment transport noise impacts would be short-term and would not be adverse.

The second type of short-term noise impact would be from construction activities. Construction is performed in distinct 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 and the noise levels as well along the project alignment as construction progresses. Despite the variety in the type and size 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 8-1 lists typical construction equipment noise levels (Lmax) recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor.

Typical noise levels at 50 feet from an active construction area range up to 91 dBA Lmax during the noisiest construction phases. The site preparation phase, which includes grading and paving, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, 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.

Table 8-1. Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels (dBA L_{max} at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA L_{max} at 50 feet)
Pile Drivers	81 to 96	93
Rock Drills	83 to 99	96
Jackhammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	74 to 84	80
Scrapers	83 to 91	87
Haul Trucks	83 to 94	88
Cranes	79 to 86	82
Portable Generators	71 to 87	80
Rollers	75 to 82	80
Dozers	77 to 90	85
Tractors	77 to 82	80
Front-End Loaders	77 to 90	86
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	86
Air Compressors	76 to 89	86
Trucks	81 to 87	86

Source: Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987.
dBA = A-weighted decibels
L_{max} = maximum instantaneous noise level

Construction of the proposed project is expected to require the use of earthmovers, bulldozers, paving machines, water trucks, dump trucks, concrete trucks, rollers, and pickup trucks. Noise associated with the use of construction equipment is estimated between 79 and 89 dBA Lmax at a distance of 50 feet from the active construction area for the grading phase. As seen in Table 8-1, the maximum noise level generated by each earthmover is assumed to be approximately 86 dBA Lmax at 50 feet from the earthmover in operation. Each bulldozer would generate approximately 85 dBA Lmax at 50 feet. The maximum noise level generated by water trucks and pickup trucks is approximately 86 dBA Lmax at 50 feet from these vehicles. Each doubling of the sound source with equal strength increases the noise level by 3 dBA.

Each piece of construction equipment operates as an individual point source. The worst-case composite noise level at the nearest residence during this phase of construction would be 91 dBA Lmax (at a distance of 50 feet from an active construction area).

In addition to the standard construction equipment, the project may require the use of pile drivers, however, the use of pile drivers is not anticipated at this time. As shown in Table 8-1, pile driving generates noise levels of up to 96 dBA Lmax at 50 feet.

No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with applicable local noise standards and Caltrans' provisions in Section 14-8.02, "Noise Control," of the 2010 Standard Specifications and Special Provisions and applicable local noise standards.

Construction noise would be short-term, intermittent, and overshadowed by local traffic noise. Further, implementing the following measure would further minimize the temporary noise impacts from construction:

As directed by Caltrans, the contractor will implement appropriate additional noise mitigation measures, which may include changing the location of stationary construction equipment, turning off idling equipment, rescheduling construction activity, notifying adjacent residents in advance of construction work, and installing acoustic barriers around stationary construction noise sources.

The following Standard Special Provision (SSP) will be edited specifically for this project during the PS&E phase. The content of SSP (14-8.02) is shown below or can be found at the following link:
<http://www.dot.ca.gov/hq/esc/oe/specifications/std_specs/2010_StdSpecs/2010_StdSpecs.pdf>.

SSP-14-8.02
Use with 2010 Standards.

Use for work in a residential or urban area (1) at night or (2) if night or Sunday noise restrictions exist.

14-8. NOISE and VIBRATION
1. General

Section 14-8.02 includes specifications relating to noise control.

Do not exceed 86 dBA L_{Max} at 50 feet from the job site activities from 9 p.m. to 6 a.m.

Equip an internal combustion engine with the manufacturer-recommended muffler. Do not operate an internal combustion engine on the job site without the appropriate muffler.

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Chapter 9. References

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———. 2011. *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.* Division of Environmental Analysis. May. Available:<http://www.dot.ca.gov/hq/env/noise/pub/ca_tnap_may2011.pdf>.

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——— (Menge, Christopher W., Christopher J. Rossano, Grant S. Anderson, Christopher J. Bajdek). 1998b. *FHWA Traffic Noise Model, Version 1.0: Technical Manual. Report No. FHWA-PD-96-010 and DOT-VNTSC-FHWA-98-2*. Cambridge, MA: John A. Volpe National Transportation Systems Center, Acoustics Facility, February.

———. 2004. *FHWA Traffic Noise Model, Version 2.5*. Office of Environment and Planning. Washington, D.C. February.

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Appendix A Traffic Data

This appendix contains tables that present traffic data for the existing conditions, design-year conditions without the project, and design-year conditions with the project.

Table A-1: Street and Ramp Traffic Volumes

ID #*	INTERSECTION		NB			EB			SB			WB		
		SCENARIO	L	T	R	L	T	R	L	T	R	L	T	R
4	Pepper Ave / SR-210 WB On/Off ramps	Existing AM Peak	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		Existing PM Peak	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		2036 No Project AM Peak	0	92	0	0	0	0	0	105	0	0	0	0
		2036 No Project PM Peak	0	130	0	0	0	0	0	151	0	0	0	0
		2036 + Project AM Peak	262	245	0	0	0	0	0	105	127	207	0	241
		2036 + Project PM Peak	257	269	0	0	0	0	0	175	184	364	0	409
5	Pepper Ave / SR-210 EB On/Off ramps	Existing AM Peak	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		Existing PM Peak	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		2036 No Project AM Peak	0	92	0	0	0	0	0	105	0	0	0	0
		2036 No Project PM Peak	0	130	0	0	0	0	0	151	0	0	0	0
		2036 + Project AM Peak	0	394	176	113	0	290	45	267	0	0	0	0
		2036 + Project PM Peak	0	366	128	160	0	353	74	465	0	0	0	0
3	Pepper Ave / Highland Ave	Existing AM Peak	0	0	0	0	211	0	0	0	0	0	242	0
		Existing PM Peak	0	0	0	5	288	0	5	0	5	0	293	5
		2036 No Project AM Peak	62	5	25	5	227	65	5	5	5	35	304	5
		2036 No Project PM Peak	74	5	50	5	284	73	5	5	5	73	420	5
		2036 + Project AM Peak	171	5	311	5	279	79	5	5	5	148	287	5
		2036 + Project PM Peak	298	5	375	5	288	112	5	5	5	241	492	5

Table A-2: Main Lane and HOV Lane Volumes

HOV Lanes	SCENARIO	EB	WB
SR-210, Riverside Avenue to Pepper Avenue	Existing AM Peak	142	274
	Existing PM Peak	564	300
	2036 No Project AM Peak	733	739
	2036 No Project PM Peak	1122	1201
	2036 + Project AM Peak	733	739
	2036 + Project PM Peak	1122	1201
SR-210, Pepper Avenue to State Street	Existing AM Peak	142	274
	Existing PM Peak	564	300
	2036 No Project AM Peak	733	739
	2036 No Project PM Peak	1122	1201
	2036 + Project AM Peak	683	739
	2036 + Project PM Peak	1046	1201
Main Lanes	**SCENARIO**	**EB**	**WB**
SR-210, Riverside Avenue to Pepper Avenue	Existing AM Peak	3161	3300
	Existing PM Peak	4344	3440
	2036 No Project AM Peak	4692	4354
	2036 No Project PM Peak	5296	5629
	2036 + Project AM Peak	4874	4354
	2036 + Project PM Peak	5607	5629
SR-210, Pepper Avenue to State Street	Existing AM Peak	3161	3300
	Existing PM Peak	4344	3440
	2036 No Project AM Peak	4692	4354
	2036 No Project PM Peak	5296	5629
	2036 + Project AM Peak	4692	4413
	2036 + Project PM Peak	5296	5961

Table A-3: TNM Traffic Volume Input

PM Peak

Main Lane and HOV Lane Volumes																			
					SCENARIO			EB	WB										
HOV Lanes													EB	WB				EB	WB
SR-210, HOV Riverside Avenue to Pepper Avenue					Existing	PM Peak		564	300		2036	No Project PM Peak	1122	1201		2036	+ Project PM Peak		1122	1201
							A	**557**	**296**				**1107**	**1185**					**1107**	**1185**
							MT	**7**	**4**				**15**	**16**					**15**	**16**
							HT	**0**	**0**				**0**	**0**					**0**	**0**
							B	**0**	**0**				**0**	**0**					**0**	**0**
							MC	**0**	**0**				**0**	**0**					**0**	**0**
SR-210, HOV Pepper Avenue to State Street					Existing	PM Peak		564	300		2036	No Project PM Peak	1122	1201		2036	+ Project PM Peak		1046	1201
							A	**557**	**296**				**1107**	**1185**					**1032**	**1185**
							MT	**7**	**4**				**15**	**16**					**14**	**16**
							HT	**0**	**0**				**0**	**0**					**0**	**0**
							B	**0**	**0**				**0**	**0**					**0**	**0**
							MC	**0**	**0**				**0**	**0**					**0**	**0**
					SCENARIO			EB	WB										
Main Lanes																			
SR-210, Main Lanes -Riverside Avenue to Pepper Avenue					Existing	PM Peak		4344	3440		2036	No Project PM Peak	5296	5629		2036	+ Project PM Peak		5607	5629
							A	**4141**	**3279**				**5048**	**5366**					**5345**	**5366**
							MT	**57**	**45**				**69**	**73**					**73**	**73**
							HT	**147**	**116**				**179**	**190**					**189**	**190**
							B	**0**	**0**				**0**	**0**					**0**	**0**
							MC	**0**	**0**				**0**	**0**					**0**	**0**
SR-210, Lane 1 -Riverside Avenue to Pepper Avenue					Existing	PM Peak					2036	No Project PM Peak				2036	+ Project PM Peak			
							A	**1380**	**1093**				**1683**	**1789**					**1782**	**1789**
							MT	**19**	**15**				**23**	**24**					**24**	**24**
							HT	**0**	**0**				**0**	**0**					**0**	**0**
							B	**0**	**0**				**0**	**0**					**0**	**0**
							MC	**0**	**0**				**0**	**0**					**0**	**0**
SR-210, Lanes 2 and 3 -Riverside Avenue to Pepper Avenue					Existing	PM Peak					2036	No Project PM Peak				2036	+ Project PM Peak			
							A	**2760**	**2186**				**3365**	**3577**					**3563**	**3577**
							MT	**38**	**30**				**46**	**49**					**49**	**49**
							HT	**147**	**116**				**179**	**190**					**189**	**190**
							B	**0**	**0**				**0**	**0**					**0**	**0**
							MC	**0**	**0**				**0**	**0**					**0**	**0**
SR-210, Main Lanes - Pepper Avenue to State Street					Existing	PM Peak		4344	3440		2036	No Project PM Peak	5296	5629		2036	+ Project PM Peak		5296	5961
							A	**4141**	**3279**				**5048**	**5366**					**5048**	**5682**
							MT	**57**	**45**				**69**	**73**					**69**	**78**
							HT	**147**	**116**				**179**	**190**					**179**	**201**
							B	**0**	**0**				**0**	**0**					**0**	**0**
							MC	**0**	**0**				**0**	**0**					**0**	**0**
SR-210, Lane 1 - Pepper Avenue to State Street					Existing	PM Peak					2036	No Project PM Peak				2036	+ Project PM Peak			
							A	**1380**	**1093**				**1683**	**1789**					**1683**	**1894**
							MT	**19**	**15**				**23**	**24**					**23**	**26**
							HT	**0**	**0**				**0**	**1**					**0**	**0**
							B	**0**	**0**				**0**	**0**					**0**	**0**
							MC	**0**	**0**				**0**	**0**					**0**	**0**
SR-210, Lanes 2 and 3 - Pepper Avenue to State Street					Existing	PM Peak					2036	No Project PM Peak				2036	+ Project PM Peak			
							A	**2760**	**2186**				**3365**	**3577**					**3365**	**3788**
							MT	**38**	**30**				**46**	**49**					**46**	**52**
							HT	**147**	**116**				**179**	**190**					**179**	**201**
							B	**0**	**0**				**0**	**0**					**0**	**0**
							MC	**0**	**0**				**0**	**0**					**0**	**0**
Pepper Ave / SR-210 WB On Ramp (Existing and FNP volumes are zero)								West Leg WB												
					2036	+ Project PM Peak		441												

Table A-3: TNM Traffic Volume Input

PM Peak

							A	**420**											
							MT	**6**											
							HT	**15**											
							B	**0**											
							MC	**0**											
Pepper Ave / SR-210 WB Off Ramp (Existing and FNP volumes are zero)								East Leg WB											
					2036	+ Project PM Peak		773											
							A	**737**											
							MT	**10**											
							HT	**26**											
							B	**0**											
							MC	**0**											
Pepper Ave / SR-210 EB On Ramp (Existing and FNP volumes are zero)								East Leg EB											
					2036	+ Project PM Peak		202											
							A	**193**											
							MT	**3**											
							HT	**7**											
							B	**0**											
							MC	**0**											
Pepper Ave / SR-210 EB Off Ramp (Existing and FNP volumes are zero)								West Leg EB											
					2036	+ Project PM Peak		513											
							A	**489**											
							MT	**7**											
							HT	**17**											
							B	**0**											
							MC	**0**											
								NB	SB				NB	SB				NB	SB
Pepper Avenue N. of I-210					Existing	PM Peak		10	10		2036	No Project PM Peak	130	151		2036	+ Project PM Peak	526	539
							A	**10**	**10**				**124**	**144**				**501**	**514**
							MT	**0**	**0**				**2**	**2**				**7**	**7**
							HT	**0**	**0**				**4**	**5**				**18**	**18**
							B	**0**	**0**				**0**	**0**				**0**	**0**
							MC	**0**	**0**				**0**	**0**				**0**	**0**
								NB	SB										
Pepper Avenue S. of I-210					Existing	PM Peak		0	0		2036	No Project PM Peak	130	151		2036	+ Project PM Peak	494	818
							A	**0**	**0**				**124**	**144**				**471**	**780**
							MT	**0**	**0**				**2**	**2**				**6**	**11**
							HT	**0**	**0**				**4**	**5**				**17**	**28**
							B	**0**	**0**				**0**	**0**				**0**	**0**
							MC	**0**	**0**				**0**	**0**				**0**	**0**
								EB	WB				EB	WB				EB	WB
Highland Avenue W. of Pepper Avenue					Existing	PM Peak		293	298		2036	No Project PM Peak	362	499		2036	+ Project PM Peak	405	795
							A	**279**	**284**				**345**	**476**				**386**	**758**
							MT	**4**	**4**				**5**	**6**				**5**	**10**
							HT	**10**	**10**				**12**	**17**				**14**	**27**
							B	**0**	**0**				**0**	**0**				**0**	**0**
							MC	**0**	**0**				**0**	**0**				**0**	**0**
								EB	WB										
Highland Avenue E. of Pepper Avenue					Existing	PM Peak		293	298		2036	No Project PM Peak	339	498		2036	+ Project PM Peak	668	738
							A	**279**	**284**				**323**	**475**				**637**	**703**
							MT	**4**	**4**				**4**	**6**				**9**	**10**
							HT	**10**	**10**				**11**	**17**				**23**	**25**
							B	**0**	**0**				**0**	**0**				**0**	**0**
							MC	**0**	**0**				**0**	**0**				**0**	**0**

Appendix B Predicted Future Noise Levels and Noise Barrier Analysis

Table B-1 summarizes the traffic noise modeling results for existing and design-year conditions with and without the project. Table B-1 also compares the predicted noise reductions by barrier height for each noise barrier analyzed.

Table B-1. Traffic Noise Levels for Existing, Future No Build, Future Build

Receiver I.D.	Area	Barrier I.D.	Land Use / Activity Category	Number of Dwelling Units or Equivalent	Address	Existing Noise Level $L_{eq}(h)$, dBA	SR 210 / Pepper Avenue New Interchange Project Future Worst Hour Noise Levels - $L_{eq}(h)$, dBA																						
							Design Year Noise Level without Project, Leq(h), dBA	Design Year Noise Level with Project, Leq(h), dBA	Design Year Noise Level without Project minus Existing Conditions Leq(h), dBA	Design Year Noise Level with Project minus No Project Conditions Leq(h), dBA	Activity Category (NAC)	Impact Type (None, or A/E)	Noise Prediction with Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receivers (NBR)																
													6 feet			8 feet			10 feet			12 feet			14 feet			16 feet		
													$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR
M1	**A**	**NB-1**	**Recreational / C**	**1**	**Frisbie Park 1920 Acacia Avenue**	**67**	**68**	**69**	**1**	**1**	**C(67)**	**A/E**	**66**	**3**	**0**	**65**	**4**	**0**	**64**	**5**	**1**	**62** [a]	**7**	**1**	**62**	**7**	**1**	**61**	**8**	**1**
ST1	**A**	**NB-1**	**Recreational / C**	**1**	**Frisbie Park 1920 Acacia Avenue**	**68**	**69**	**69**	**1**	**0**	**C(67)**	**A/E**	**67**	**2**	**0**	**66**	**3**	**0**	**64**	**5**	**1**	**63** [a]	**6**	**1**	**62**	**7**	**1**	**61**	**8**	**1**
M2	**A**	**NB-1**	**Recreational / C**	**1**	**Frisbie Park 1920 Acacia Avenue**	**67**	**69**	**69**	**2**	**0**	**C(67)**	**A/E**	**67**	**2**	**0**	**65**	**4**	**0**	**65**	**4**	**0**	**64**	**5**	**1**	**62** [a]	**7**	**1**	**61**	**8**	**1**
M3	**A**	**NB-1**	**Recreational / C**	**1**	**Frisbie Park 1920 Acacia Avenue**	**66**	**67**	**67**	**1**	**0**	**C(67)**	**A/E**	**65**	**2**	**0**	**64**	**3**	**0**	**63**	**4**	**0**	**62** [a]	**5**	**1**	**61**	**6**	**1**	**60**	**7**	**1**
M4	**A**	**NB-1**	**Recreational / C**	**1**	**Frisbie Park 1920 Acacia Avenue**	**65**	**66**	**67**	**1**	**1**	**C(67)**	**A/E**	**65**	**2**	**0**	**64**	**3**	**0**	**63**	**4**	**0**	**61** [a]	**6**	**1**	**61**	**6**	**1**	**60**	**7**	**1**
ST2	**A**	**NB-1**	**Recreational / C**	**0**	**Frisbie Park 1920 Acacia Avenue**	**66**	**67**	**68**	**1**	**1**	**C(67)**	**A/E**	**67**	**1**	**0**	**65**	**3**	**0**	**63** [a]	**5**	**0**	**63**	**5**	**0**	**62**	**6**	**0**	**61**	**7**	**0**
M5	**A**	**NB-1**	**Recreational / C**	**1**	**Frisbie Park 1920 Acacia Avenue**	**65**	**66**	**68**	**1**	**2**	**C(67)**	**A/E**	**66**	**2**	**0**	**64**	**4**	**0**	**63** [a]	**5**	**1**	**62**	**6**	**1**	**61**	**7**	**1**	**61**	**7**	**1**
M6	A	NB-1	Recreational / C	1	Frisbie Park 1920 Acacia Avenue	62	64	64	2	0	C(67)	None	**63**	1	0	**62**	2	0	**61**	3	0	**60**	4	0	**60** [a]	4	0	**59**	5	1
M7	A	n/a	Open Space / G	0	Southwest quadrant of proposed SR 210 / Pepper Avenue Interchange	62	64	65	2	1	n/a	None	**0**	--	--	**0**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ST3	B	n/a	Open Space / G	0	Southeast quadrant of proposed SR 210 / Pepper Avenue Interchange	58	60	66	2	6	n/a	None	**0**	--	--	**0**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
M8	C	n/a	Industrial / F	0	North of Highland Avenue at Pepper Avenue (20554 East Highland Avenue)	64	66	67	2	1	n/a	None	**0**	--	--	**0**	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: A/E= Future noise conditions approach or exceed the Noise Abatement Criteria.

[a] Minimum height needed to break the line of sight between 11.5 foot truck stack and first row receivers.

Appendix C Noise Barrier Reasonableness Analysis Worksheets

WORKSHEET C- 1
CALCULATION OF REASONABLE ALLOWANCE

PROJECT: SR-210 / PEPPER AVENUE INTERCHANGE PROJECT	PROJECT LOCATION: RIALTO, SAN BERNARDINO COUNTY		Date: 10/2013
NOISE BARRIER I.D. & LOCATION:	**NB-1, AREA A, EDGE OF SHOULDER WALL, 12 FEET**		
Design Receiver:	M1		
Base Allowance (2011 Dollars):			$55,000
1) Absolute Noise Levels	69 dBA		
2) "Build" VS Existing Noise Levels	2 dBA		
3) Achievable Noise Reduction	7 dBA		
Number of Benefited Residences			**6**
Total Unmodified Reasonableness Allowance			**$330,000**

WORKSHEET C- 2
CALCULATION OF REASONABLE ALLOWANCE

PROJECT: SR-210 / PEPPER AVENUE INTERCHANGE PROJECT	PROJECT LOCATION: RIALTO, SAN BERNARDINO COUNTY		Date: 10/2013
NOISE BARRIER I.D. & LOCATION:	**NB-1, AREA A, EDGE OF SHOULDER WALL, 14 FEET**		
Critical Receiver:	M1		
Base Allowance (2011 Dollars):			$55,000
1) Absolute Noise Levels	69 dBA		
2) "Build" VS Existing Noise Levels	2 dBA		
3) Achievable Noise Reduction	7 dBA		
Number of Benefited Residences			**6**
Total Unmodified Reasonableness Allowance			**$330,000**

WORKSHEET C- 3
CALCULATION OF REASONABLE ALLOWANCE

PROJECT: SR-210 / PEPPER AVENUE INTERCHANGE PROJECT	PROJECT LOCATION: RIALTO, SAN BERNARDINO COUNTY		Date: 10/2013
NOISE BARRIER I.D. & LOCATION:	**NB-1, AREA A, EDGE OF SHOULDER WALL, 16 FEET**		
Critical Receiver:	M1		
Base Allowance (2011 Dollars):			$55,000
1) Absolute Noise Levels	69 dBA		
2) "Build" VS Existing Noise Levels	2 dBA		
3) Achievable Noise Reduction	9 dBA		
Number of Benefited Residences			**7**
Total Unmodified Reasonableness Allowance			**$385,000**

Appendix D Noise Barrier Analysis

Table D-1. Analysis of Barrier NB-1

	Position								Total Number of Benefited Receivers
	M1	ST1	M2	M3	M4	ST2	M5	M6	
Number of Units Represented	1	1	1	1	1	0	1	1	--
Existing Traffic Noise Level (dBA L_{eq}[h])	**67**	**68**	**67**	66	65	**66**	65	62	--
Future with Project Traffic Noise Level (dBA Leq[h])	**69**	**69**	**69**	**67**	**67**	**68**	**68**	64	--
Future with Project - Existing Traffic Noise Level (dBA Leq[h])	2	1	2	1	2	2	3	2	--
6-Foot Barrier[b]									
Future with Project Traffic Noise Level (dBA Leq[h])	**66**	**67**	**67**	65	65	**67**	66	63	--
Predicted Noise Reduction (dB)	3	2	2	2	2	1	2	1	--
Number of Benefited Receivers	0	0	0	0	0	0	0	0	0
8-Foot Barrier[b]									
Future with Project Traffic Noise Level (dBA Leq[h])	65	**66**	65	64	64	65	64	62	--
Predicted Noise Reduction (dB)	4	3	4	3	3	3	4	2	--
Number of Benefited Receivers	0	0	0	0	0	0	0	0	0
10-Foot Barrier[b]									
Future with Project Traffic Noise Level (dBA Leq[h])	64	64	65	63	63	63	63	61	--
Predicted Noise Reduction (dB)	5	5	4	4	4	5	5	3	--
Number of Benefited Receivers	1	1	0	0	0	0	1	0	3
12-Foot Barrier[b]									
Future with Project Traffic Noise Level (dBA Leq[h])	62	63	64	62	61	63	62	60	--
Predicted Noise Reduction (dB)	7	6	5	5	6	5	6	4	--
Number of Benefited Receivers	1	1	1	1	1	0	1	0	6
14-Foot Barrier[b]									
Future with Project Traffic Noise Level (dBA Leq[h])	62	62	62	61	61	62	61	60	--
Predicted Noise Reduction (dB)	7	7	7	6	6	6	7	4	--
Number of Benefited Receivers	1	1	1	1	1	0	1	0	6
16-Foot Barrier[b]									
Future with Project Traffic Noise Level (dBA Leq[h])	61	61	61	60	60	61	61	59	--
Predicted Noise Reduction (dB)	8	8	8	7	7	7	7	5	--
Number of Benefited Receivers	1	1	1	1	1	0	1	1	7

[a] Traffic noise levels that approach or exceed 67 dBA L_{eq}(h) are shown in bold.

b Noise barriers that block the line-of-sight from the receptor to truck exhaust stacks are shaded in yellow for receptors exceeding NAC and in pink for receptors not exceeding NAC.

Appendix E Supplemental Data

E-1 List of Field Instrumentation and Calibration Records

E-2 Field Data Sheets

E-3 Field Photos

E-4 TNM® Files: Input/Output Sheets and Model Files

Appendix E-1

List of Field Instrumentation and Calibration Records

List of Field Instrumentation

- **Sound Level Meter** (for short-term noise measurements)
  - Larson Davis Model 812 Type 1 Integrating Sound Level Meter, Serial Number 0432
  - Rion NL-21Type 2 Integrating Sound Level Meter, Serial Number 0776887
- **Acoustical Calibrators**
  - Larson Davis Model Cal 200 (114 dB SPL @ 1000 Hz), Serial Number 6644
- **Meteorology Instrumentation**
  - Kestrel Model K3000 Digital Hygrometer/Thermometer/Anemometer, Serial Number 475332

Figures (following pages)

- Larson Davis 812 (S/N 0432) Calibration Certificate
- Larson Davis 828 Preamplifier (S/N 1368) Calibration Certificate
- Rion NL-21 (S/N 0776887) Calibration Certificate
- Larson Davis Cal 200 (S/N 6644) Calibration Certificate

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC and APLAC signatory)

NVLAP®
NVLAP Lab Code: 200625-0

Calibration Certificate No.24596

Instrument:	**Sound Level Meter**	*Date Calibrated:* **9/7/2011**	*Cal Due:*
Model:	**812**	*Status:*	**Received** / **Sent**
Manufacturer:	**Larson Davis**	*In tolerance:*	X / X
Serial number:	**0432**	*Out of tolerance:*	
Tested with:	**Microphone 2559 s/n 2496**	*See comments:*	
	Preamplifier PRM828 s/n 1368	*Contains non-accredited tests:*	**__Yes X No**
Type (class):	**1**	*Calibration service:*	**__ Basic X Standard**
Customer:	**ICF Jones & Stokes**	*Address:*	**1 Ada Suite 100, Irvine, CA 92618**
Tel/Fax:	**949-333-6650 / 949-333-6601**		

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/7/2005
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	25747	Jul 1, 2011	Scantek, Inc./ NVLAP	Jul 1, 2012
DS-360-SRS	Function Generator	61646	Nov 13, 2009	ACR Env. / A2LA	Nov 13, 2011
34401A-Agilent Technologies	Digital Multimeter	MY41022043	Nov 17, 2010	ACR Env. / A2LA	Nov 17, 2011
DPI 141-Druck	Pressure Indicator	790/00-04	Dec 13, 2010	ACR Env. / A2LA	Dec 13, 2012
HMP233-Vaisala Oyj	Humidity & Temp. Transmitter	V3820001	Jul 29, 2011	ACR Env. / A2LA	Jul 29, 2012
PC Program 1019 Norsonic	Calibration software	v.5.0	Validated July 2009	-	-
1251-Norsonic	Calibrator	30878	Dec 7, 2010	Scantek, Inc./ NVLAP	Dec 7, 2011

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric Pressure (kPa)	Relative Humidity (%)
22.5 °C	100.055 kPa	58.3 %RH

Calibrated by	Kristen van Otterloo	**Checked by**	Mariana Buzduga
Signature	Kristen van Otterloo	Signature	
Date	9/7/2011	Date	9/9/2011

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC and APLAC signatory)

NVLAP®
NVLAP Lab Code: 200625-0

Calibration Certificate No.24598

Instrument:	**Sound Level Meter**
Model:	**NL21**
Manufacturer:	**Rion**
Serial number:	**00776887**
Tested with:	**Microphone UC52 s/n 113476** **Preamplifier NH21 s/n 23983**
Type (class):	**2**
Customer:	**ICF Jones & Stokes**
Tel/Fax:	**949-333-6650 / 949-333-6601**

Date Calibrated: **9/6/2011** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __ **Yes** _X_ **No**
Calibration service: __ **Basic** _X_ **Standard**

Address: **1 Ada, Suite 100**
Irvine, CA 92618

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/7/2005
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31061	Jul 14, 2011	Scantek, Inc./ NVLAP	Jul 14, 2012
DS-360-SRS	Function Generator	88077	Aug 17, 2010	ACR Env./ A2LA	Aug 17, 2012
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Aug 9, 2011	Tektronix/ AClass	Aug 9, 2012
HM30-Thommen	Meteo Station	1040170/39633	Jun 26, 2010	ACR Env./ A2LA	Dec 26, 2011
PC Program 1019 Norsonic	Calibration software	v.5.0	Validated July 2009	-	-
1251-Norsonic	Calibrator	30878	Dec 7, 2010	Scantek, Inc./ NVLAP	Dec 7, 2011
4226-Bruel&Kjaer	Multifunction calibrator	2305103	Apr 13, 2011	Scantek, Inc./ NVLAP	Apr 13, 2012

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.9 °C	100.06 kPa	60.9 %RH

Calibrated by	Kristen van Otterloo	**Checked by**	Mariana Buzduga
Signature	Kristen van Otterloo	Signature	
Date	9/7/2011	Date	9/7/2011

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC and APLAC signatory)

NVLAP Lab Code: 200625-0

Calibration Certificate No.24599

Instrument:	**Acoustical Calibrator**	*Date Calibrated:* **9/6/2011**	*Cal Due:*
Model:	**CAL200**	*Status:*	**Received** / **Sent**
Manufacturer:	**Larson Davis**	*In tolerance:*	**X** / **X**
Serial number:	**6644**	*Out of tolerance:*	
Class (IEC 60942):	**1**	*See comments:*	
Barometer type:		*Contains non-accredited tests:*	**__Yes _X_ No**
Barometer s/n:			

Customer:	**ICF Jones & Stokes**	*Address:*	**1 Ada Suite 100,**
Tel/Fax:	**949-333-6650 / 949-333-6601**		**Irvine, CA 92618**

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	25747	Jul 1, 2011	Scantek, Inc./ NVLAP	Jul 1, 2012
DS-360-SRS	Function Generator	61646	Nov 13, 2009	ACR Env. / A2LA	Nov 13, 2011
34401A-Agilent Technologies	Digital Multimeter	MY41022043	Nov 17, 2010	ACR Env. / A2LA	Nov 17, 2011
DPI 141-Druck	Pressure Indicator	790/00-04	Dec 13, 2010	ACR Env. / A2LA	Dec 13, 2012
8903A-HP	Audio Analyzer	2514A05691	Dec 1, 2010	ACR Env./ A2LA	Dec 1, 2013
HMP233-Vaisala Oyj	Humidity & Temp. Transmitter	V3820001	Jul 29, 2011	Vaisala / A2LA	Jul 29, 2012
PC Program 1018 Norsonic	Calibration software	v.5.0	Validated July 2009	-	
1253-Norsonic	Calibrator	28326	Dec 6, 2010	Scantek, Inc./ NVLAP	Dec 6, 2011
1203-Norsonic	Preamplifier	14059	Jan 5, 2011	Scantek, Inc./ NVLAP	Jan 5, 2012
4180-Brüel&Kjær	Microphone	2246115	Dec 14, 2009	NPL (UK) / UKAS	Dec 14, 2011

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by	Kristen van Otterloo	Checked by	Mariana Buzduga
Signature	Kristen van Otterloo	Signature	
Date	9/6/2011	Date	9/7/2011

Appendix E-2

Field Data Sheets

FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Pepper Avenue** /210 PROJ. #

SITE IDENTIFICATION: ST-1 OBSERVER(S): Mike Greene/Peter Hardie
ADDRESS: W. END OF FAISBIE PARK
START DATE / TIME: 3/13/12 @ 11:25 END DATE / TIME: 3/13/12

METEROLOGICAL CONDITIONS:
TEMP: 54 °F HUMIDITY: 63 %R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 1-3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #: 0432
CALIBRATOR: CAL 250 SERIAL #: 6695
CALIBRATION CHECK: PRE-TEST 114.0 dBA SPL POST-TEST 114.0 dBA SPL WINDSCREEN

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
1	11:30	11:40	69.1	70.5	56.3	61.1	63.6	66.2			
2	11:45	11:51	69.5	71.1	56.5	60.7	63.9	67.2			

COMMENTS:

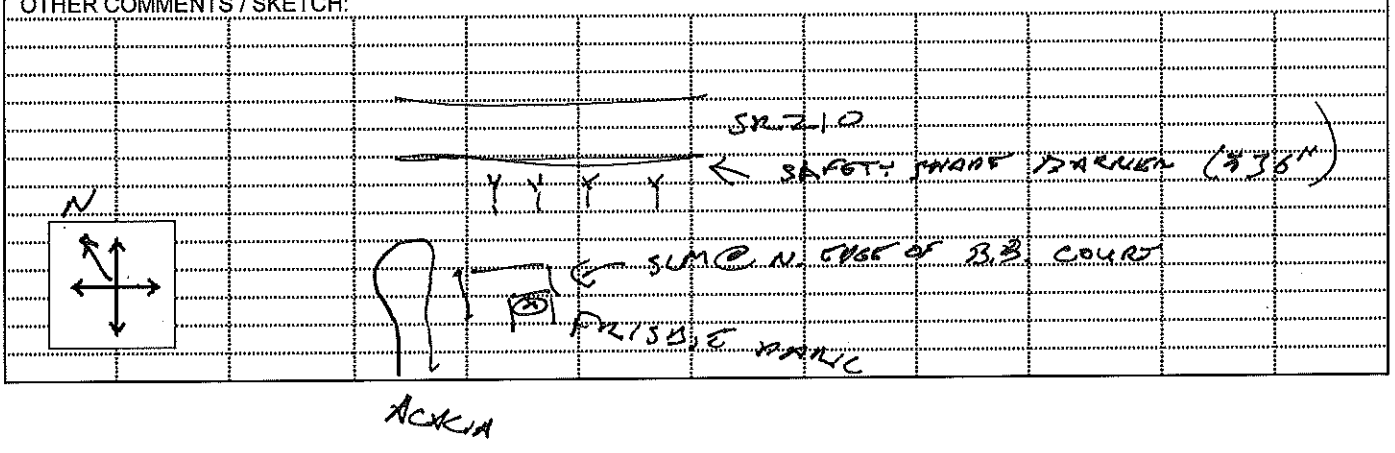
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: SR210
TRAFFIC COUNT DURATION: -MIN

	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:						
MED. TRUCKS:						
HVY TRUCKS:						
BUSES:						
MOTORCYCLES:						

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Pepper Avenue** PROJ. #

SITE IDENTIFICATION: SITE 2 OBSERVER(S): Mike Greene/Peter Hardie
ADDRESS: FAIRBIE PARK
START DATE / TIME: 3/13/12 END DATE / TIME: 3/13/12

METEROLOGICAL CONDITIONS:
TEMP: 60 °F HUMIDITY: 52 %R.H. WIND: CALM (LIGHT) MODERATE VARIABLE
WINDSPEED: 2-5 MPH DIR: N NE E SE S (SW) W NW STEADY GUSTY
SKY: SUNNY CLEAR (OVRCST) PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: (2) SERIAL #: 0532
CALIBRATOR: CAL200 SERIAL #: 6695
CALIBRATION CHECK: PRE-TEST 114.0 dBA SPL POST-TEST 114.1 dBA SPL WINDSCREEN ✓

SETTINGS: ~~A-WEIGHTED~~ ~~SLOW~~ FAST FRONTAL ~~RANDOM~~ ~~ANSI~~ OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
1	12:05	12:15	62.7	68.8	52.3	58.1	62.1	65.6			
2	12:18	12:28	62.9	70.0	53.1	58.4	61.9	65.6			

COMMENTS:

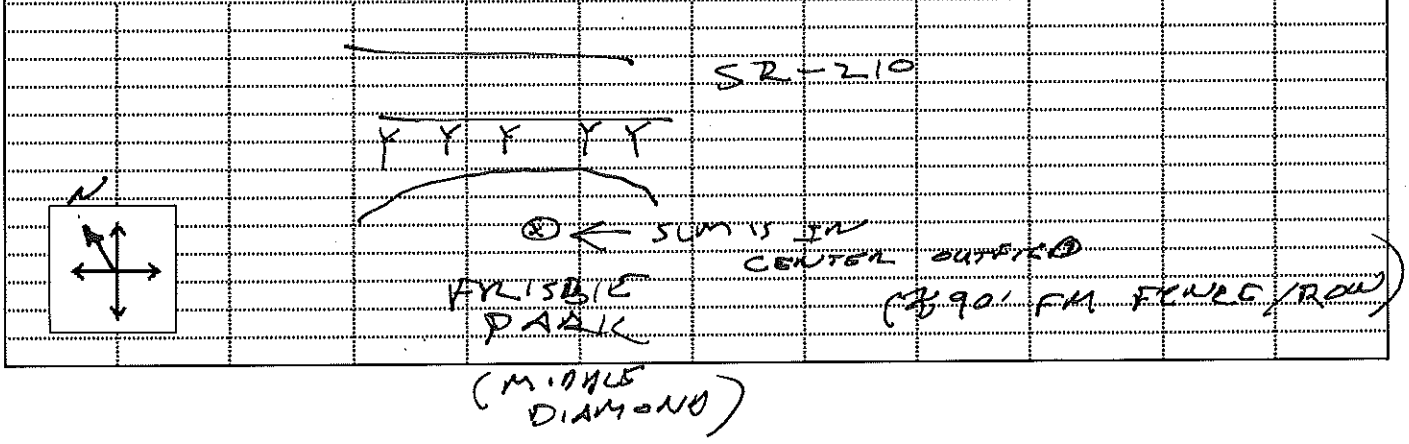
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: SR-210
TRAFFIC COUNT DURATION: ____-MIN

	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:						
MED. TRUCKS:						
HVY TRUCKS:						
BUSES:						
MOTORCYCLES:						

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: HARD (SOFT) MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Pepper Avenue** 1210 PROJ. # _____

SITE IDENTIFICATION: ST-3 OBSERVER(S): Mike Greene/Peter Hardie

ADDRESS: 3/13/12 @ PEPPER 1210 RD

START DATE / TIME: _____ INT'G, NEAR ABANDONED HOUSE RUINS (?) END DATE / TIME: 3/13/12

METEROLOGICAL CONDITIONS:

TEMP: 66 °F HUMIDITY: 42 %R.H. WIND: **CALM LIGHT MODERATE VARIABLE**

WINDSPEED: 1-4 MPH DIR: **N NE E SE S SW W NW** **STEADY GUSTY**

SKY: **SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:**

ACOUSTIC MEASUREMENTS:

INSTRUMENT: LO 812 TYPE: 1 2 SERIAL #: 0532

CALIBRATOR: CAL 200 SERIAL #: 4645

CALIBRATION CHECK: PRE-TEST 114.0 dBA SPL POST-TEST 114.2 dBA SPL WINDSCREEN ✓

SETTINGS: ~~A-WEIGHTED~~ ~~SLOW~~ FAST FRONTAL ~~RANDOM~~ ~~ANSI~~ OTHER: _____

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
1	12:45	12:55	56.6	63.5	49.9	53.1	55.7	59.2			
2	12:57	1:07	55.8	63.6	47.9	51.4	54.2	57.1			

COMMENTS:

SOURCE INFO AND TRAFFIC COUNTS:

PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:** _____

ROADWAY TYPE: _____

TRAFFIC COUNT DURATION: ____-MIN

	#1 COUNT NB / EB	#1 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: **RADAR / DRIVING / OBSERVER**

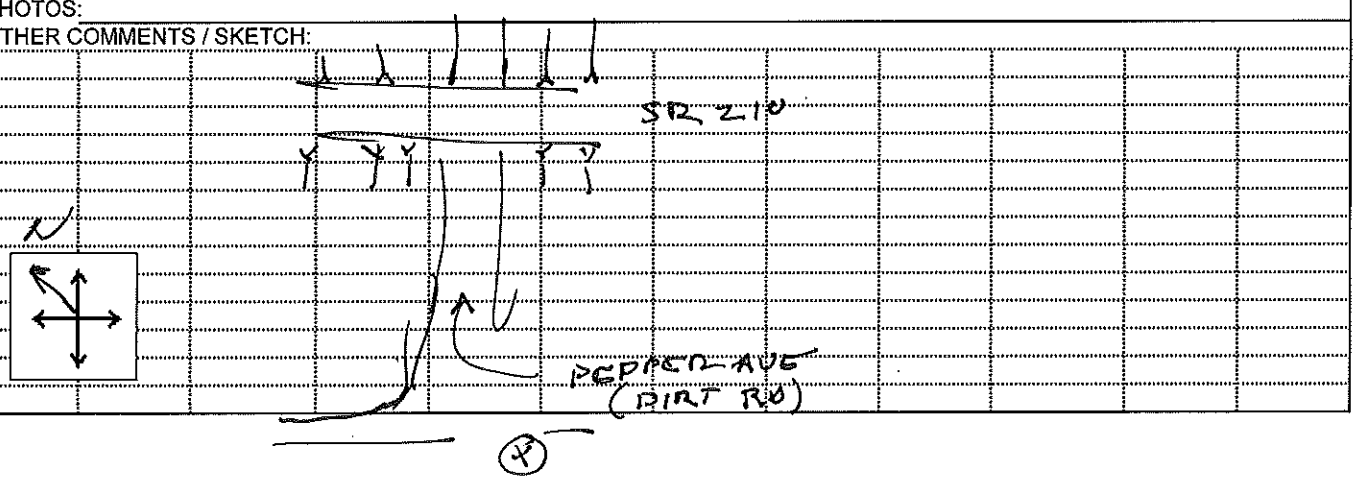
OTHER SOURCES: **DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:**

DESCRIPTION / SKETCH:

TERRAIN: **HARD SOFT MIXED FLAT OTHER:** _____

PHOTOS:

OTHER COMMENTS / SKETCH:



(3)

FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: REPPEN / SR-210 PROJ. #

SITE IDENTIFICATION: ST-4 OBSERVER(S): Mike Greene/Peter Hardie
ADDRESS: 13586 MULBERRY AVE (@ WALNUT)
START DATE / TIME: 4/10/12@ 10:10 END DATE / TIME: 4/10/12@ 10:30

METEROLOGICAL CONDITIONS:
TEMP: 68 °F HUMIDITY: 25 %R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 1-3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD-812 TYPE: 1 2 SERIAL #: 0432
CALIBRATOR: CAL 200 SERIAL #: 6644
CALIBRATION CHECK: PRE-TEST 114.0 dBA SPL POST-TEST 114.0 dBA SPL WINDSCREEN Y

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
1	10:10	10:20	44.3	57.6	37.3	40.1	43.0	47.2			
2	10:20	10:30	45.1	58.7	39.9	41.0	44.2	50.3			

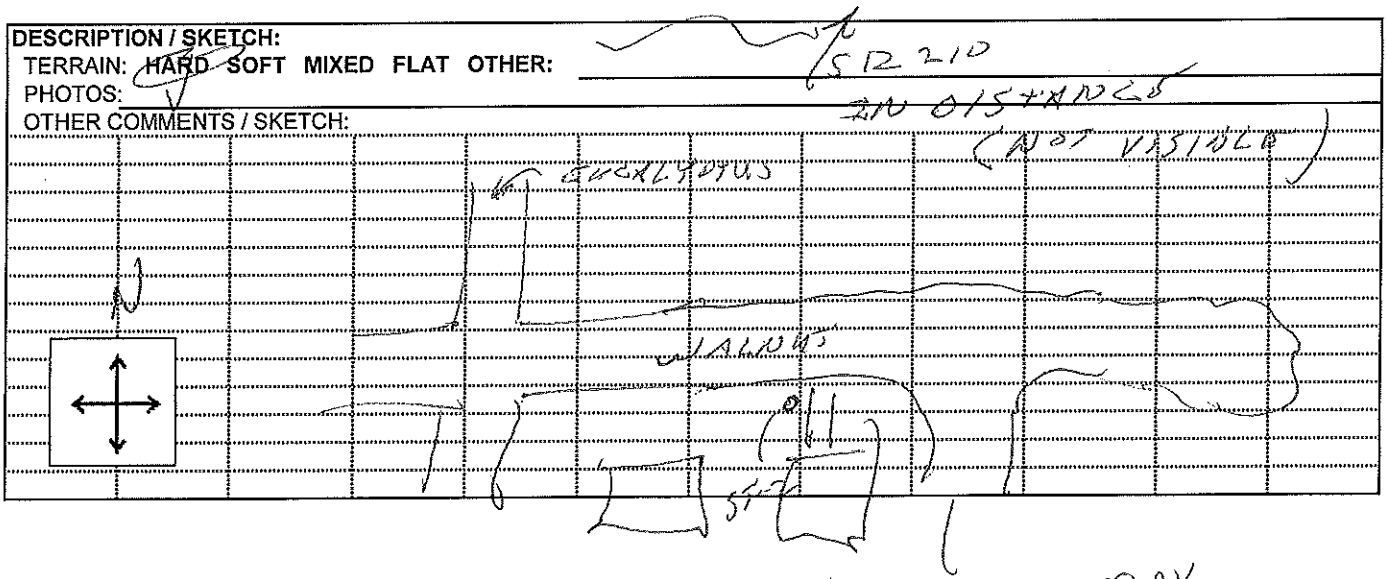
COMMENTS: SR-210 NOT A FACTOR

SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: DIST. CONSTRUCTION
ROADWAY TYPE: ON EUCALYPTUS
TRAFFIC COUNT DURATION: -MIN SPEED #2 COUNT SPEED

	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER
OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Pepper Avenue** / SR-210 PROJ. #

SITE IDENTIFICATION: LT-1 OBSERVER(S): Mike Greene/Peter Hardie
ADDRESS: TREE @ FAIRBIE PARK
START DATE / TIME: 9/13/12 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: °F HUMIDITY: %R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: SUNNY CLEAR (OVRCST) PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: RION NL-21 TYPE: 1 (2) SERIAL #: 01276887
CALIBRATOR: CAL 200 SERIAL #: 6645
CALIBRATION CHECK: PRE-TEST 114.0 dBA SPL POST-TEST dBA SPL WINDSCREEN ✓

SETTINGS: (A-WEIGHTED) (SLOW) FAST FRONTAL (RANDOM) ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
1	11.00										

COMMENTS:

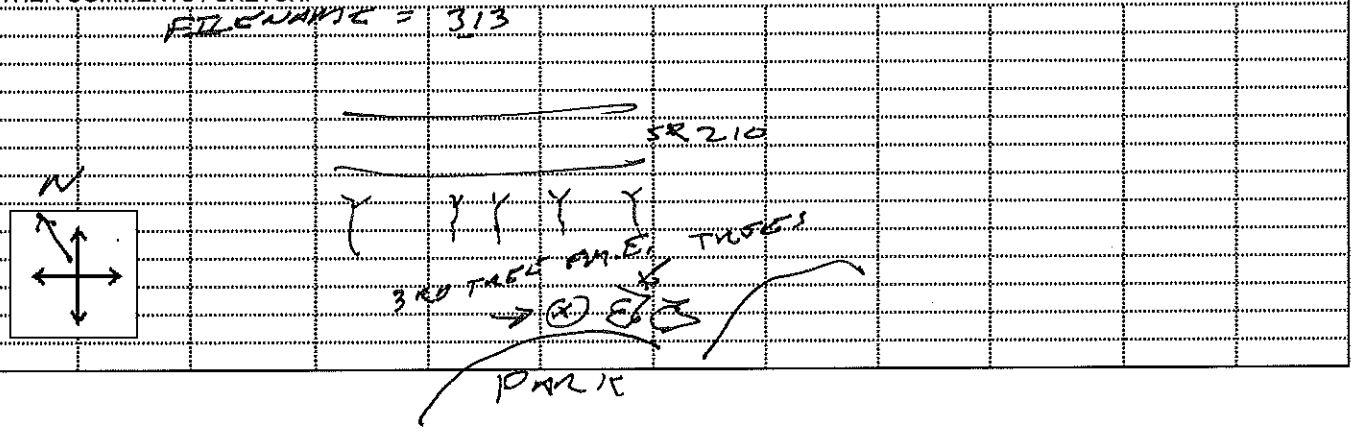
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: SR210
TRAFFIC COUNT DURATION: -MIN

	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:						
MED. TRUCKS:						
HVY TRUCKS:						
BUSES:						
MOTORCYCLES:						

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / (BIRDS) / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT (MIXED) FLAT OTHER:
PHOTOS: ✓ E, S, W
OTHER COMMENTS / SKETCH:



Appendix E-3

Field Measurement Photographs

LT1 looking northwest

ST1 looking northeast

ST2 looking north

ST2 looking south

ST3 looking northeast

ST4 looking southeast

ST4 looking northwest

Appendix E-4

TNM® Files: Input/Output Sheets and Model Files (files included on CD; printouts to be included in final noise study)

ICF Jones & Stokes 28 January 2014
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: Pepper Avenue Interchange Ex PM Pk

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	%		
NB Pepper Ave S of 210	50.0	point1	1	6,905,860.0	1,760,319.0	1,293.80				Average	
		point2	2	6,905,846.5	1,760,534.2	1,291.20				Average	
		point3	3	6,905,826.5	1,760,914.9	1,288.00				Average	
		point4	4	6,905,815.5	1,761,113.1	1,287.50					
NB Pepper Ave N of 210	50.0	point5	5	6,905,808.0	1,761,342.4	1,295.50				Average	
		point6	6	6,905,794.0	1,761,745.6	1,297.50					
SB Pepper Ave N of 210	50.0	point7	7	6,905,751.5	1,761,749.5	1,295.40				Average	
		point8	8	6,905,760.5	1,761,346.5	1,297.00					
SB Pepper Ave S of 210	50.0	point12	12	6,905,767.5	1,761,115.0	1,293.90				Average	
		point11	11	6,905,778.5	1,760,930.5	1,292.10				Average	
		point10	10	6,905,811.0	1,760,521.9	1,292.10				Average	
		point9	9	6,905,824.0	1,760,315.5	1,289.00					
WB Highland Avenue e of Pepper Ave	50.0	point13	13	6,907,833.5	1,761,848.1	1,281.30				Average	
		point14	14	6,905,775.5	1,761,830.9	1,297.40					
EB Highland Avenue w of Pepper Ave	50.0	point23	23	6,903,130.5	1,762,147.1	1,350.00				Average	
		point24	24	6,903,327.5	1,762,101.6	1,341.60				Average	
		point25	25	6,903,618.5	1,762,027.2	1,329.30				Average	
		point26	26	6,903,909.0	1,761,953.4	1,320.70				Average	
		point27	27	6,904,201.0	1,761,878.9	1,316.60				Average	
		point28	28	6,904,494.0	1,761,814.1	1,314.20				Average	
		point31	31	6,904,827.0	1,761,780.4	1,310.50				Average	
		point33	33	6,905,774.5	1,761,784.8	1,297.50					
WB SR210 HOV	30.0	point54	54	6,908,001.5	1,761,423.1	1,282.50				Average	
		point53	53	6,907,701.5	1,761,397.1	1,287.50				Average	
		point52	52	6,907,404.0	1,761,357.4	1,292.80				Average	

		point51	51	6,907,106.5	1,761,310.6	1,297.00				Average	
		point50	50	6,906,813.0	1,761,266.2	1,302.40				Average	
		point49	49	6,906,515.5	1,761,238.2	1,307.30				Average	
		point48	48	6,906,216.0	1,761,231.6	1,311.40				Average	
		point47	47	6,905,918.0	1,761,243.1	1,315.30				Average	
		point46	46	6,905,622.0	1,761,277.1	1,319.10				Average	
		point45	45	6,905,330.5	1,761,331.0	1,322.20				Average	
		point44	44	6,905,039.5	1,761,401.1	1,325.00				Average	
		point43	43	6,904,754.0	1,761,491.2	1,327.50				Average	
		point42	42	6,904,469.0	1,761,584.4	1,330.50				Average	
		point41	41	6,904,186.0	1,761,677.0	1,334.00				Average	
		point40	40	6,903,893.5	1,761,755.8	1,336.50				Average	
		point39	39	6,903,599.0	1,761,819.2	1,339.80				Average	
		point38	38	6,903,300.5	1,761,862.8	1,343.50				Average	
		point37	37	6,902,999.5	1,761,889.1	1,346.50				Average	
		point36	36	6,902,697.0	1,761,895.5	1,349.50				Average	
		point35	35	6,902,396.5	1,761,884.1	1,354.50					
WB SR210 Lane 1	22.0	point74	74	6,908,001.0	1,761,437.8	1,282.70				Average	
		point73	73	6,907,700.0	1,761,411.8	1,287.90				Average	
		point72	72	6,907,402.0	1,761,373.9	1,293.00				Average	
		point71	71	6,907,110.5	1,761,325.6	1,296.80				Average	
		point70	70	6,906,817.0	1,761,281.2	1,302.10				Average	
		point69	69	6,906,514.0	1,761,253.9	1,306.80				Average	
		point68	68	6,906,220.0	1,761,246.6	1,311.00				Average	
		point67	67	6,905,922.0	1,761,258.1	1,315.20				Average	
		point66	66	6,905,626.0	1,761,292.1	1,318.80				Average	
		point65	65	6,905,334.0	1,761,343.4	1,321.90				Average	
		point64	64	6,905,043.5	1,761,416.1	1,324.60				Average	
		point63	63	6,904,757.5	1,761,505.6	1,327.30				Average	
		point62	62	6,904,473.0	1,761,598.8	1,330.40				Average	
		point61	61	6,904,189.0	1,761,690.4	1,334.20				Average	
		point60	60	6,903,897.5	1,761,770.9	1,336.80				Average	
		point59	59	6,903,603.0	1,761,834.2	1,340.00				Average	
		point58	58	6,903,304.5	1,761,877.8	1,343.80				Average	
		point57	57	6,903,003.5	1,761,904.1	1,346.80				Average	
		point56	56	6,902,701.0	1,761,911.9	1,349.80				Average	
		point55	55	6,902,395.0	1,761,900.0	1,354.80					
WB SR210 Lanes 2_3	42.0	point94	94	6,908,000.5	1,761,456.4	1,283.00				Average	
		point93	93	6,907,700.5	1,761,430.4	1,288.20				Average	

		point92	92	6,907,397.0	1,761,391.1	1,293.00				Average	
		point91	91	6,907,105.5	1,761,344.2	1,296.50				Average	
		point90	90	6,906,808.0	1,761,299.5	1,301.80				Average	
		point89	89	6,906,509.0	1,761,272.0	1,306.40				Average	
		point88	88	6,906,215.0	1,761,264.9	1,310.60				Average	
		point87	87	6,905,921.0	1,761,277.8	1,314.70				Average	
		point86	86	6,905,627.0	1,761,310.0	1,318.40				Average	
		point85	85	6,905,338.0	1,761,361.1	1,321.40				Average	
		point84	84	6,905,049.5	1,761,433.2	1,324.30				Average	
		point83	83	6,904,752.5	1,761,523.9	1,327.00				Average	
		point82	82	6,904,481.0	1,761,614.9	1,330.20				Average	
		point81	81	6,904,194.5	1,761,708.0	1,334.40				Average	
		point80	80	6,903,900.0	1,761,789.1	1,337.10				Average	
		point79	79	6,903,605.0	1,761,851.8	1,340.30				Average	
		point78	78	6,903,306.5	1,761,896.5	1,344.10				Average	
		point77	77	6,903,005.5	1,761,923.9	1,347.10				Average	
		point76	76	6,902,703.0	1,761,931.6	1,350.10				Average	
		point75	75	6,902,395.0	1,761,923.6	1,353.10					
EB SR210 HOV	30.0	point95	95	6,902,398.5	1,761,829.9	1,355.30				Average	
		point96	96	6,902,699.0	1,761,841.2	1,350.30				Average	
		point97	97	6,902,998.0	1,761,833.2	1,346.30				Average	
		point98	98	6,903,293.0	1,761,807.4	1,342.50				Average	
		point99	99	6,903,588.0	1,761,764.1	1,338.90				Average	
		point100	100	6,903,880.0	1,761,701.0	1,335.40				Average	
		point101	101	6,904,168.5	1,761,621.6	1,332.40				Average	
		point102	102	6,904,453.0	1,761,528.6	1,329.90				Average	
		point103	103	6,904,739.5	1,761,434.9	1,328.30				Average	
		point104	104	6,905,028.0	1,761,345.2	1,326.10				Average	
		point105	105	6,905,318.0	1,761,271.8	1,323.30				Average	
		point106	106	6,905,614.5	1,761,218.6	1,320.20				Average	
		point107	107	6,905,916.0	1,761,186.2	1,316.50				Average	
		point108	108	6,906,217.0	1,761,173.6	1,312.40				Average	
		point109	109	6,906,518.5	1,761,180.2	1,308.50				Average	
		point110	110	6,906,823.0	1,761,210.4	1,303.20				Average	
		point111	111	6,907,117.0	1,761,255.1	1,297.60				Average	
		point112	112	6,907,412.5	1,761,302.5	1,292.10				Average	
		point113	113	6,907,710.0	1,761,346.8	1,286.00				Average	
		point114	114	6,908,007.5	1,761,381.6	1,281.60					
EB SR210 Lane 1	22.0	point115	115	6,902,395.5	1,761,818.1	1,355.00				Average	

		point116	116	6,902,699.0	1,761,829.6	1,350.00				Average	
		point117	117	6,902,995.0	1,761,821.5	1,346.00				Average	
		point118	118	6,903,290.0	1,761,795.6	1,342.20				Average	
		point119	119	6,903,591.0	1,761,751.4	1,338.70				Average	
		point120	120	6,903,876.5	1,761,689.2	1,335.10				Average	
		point121	121	6,904,164.0	1,761,609.5	1,332.20				Average	
		point122	122	6,904,447.5	1,761,514.2	1,329.60				Average	
		point123	123	6,904,734.5	1,761,420.5	1,328.20				Average	
		point124	124	6,905,022.5	1,761,330.8	1,326.30				Average	
		point125	125	6,905,315.5	1,761,258.2	1,323.70				Average	
		point126	126	6,905,614.5	1,761,204.6	1,320.40				Average	
		point127	127	6,905,916.5	1,761,171.5	1,316.80				Average	
		point128	128	6,906,217.0	1,761,159.2	1,312.50				Average	
		point129	129	6,906,518.5	1,761,166.2	1,308.60				Average	
		point130	130	6,906,823.5	1,761,194.2	1,303.80				Average	
		point131	131	6,907,123.0	1,761,240.2	1,297.50				Average	
		point132	132	6,907,419.5	1,761,287.8	1,291.70				Average	
		point133	133	6,907,712.5	1,761,332.0	1,286.10				Average	
		point134	134	6,908,008.0	1,761,366.6	1,280.90					
EB SR210 Lanes 2_3	40.0	point135	135	6,902,396.0	1,761,798.4	1,354.30				Average	
		point136	136	6,902,700.0	1,761,809.9	1,349.30				Average	
		point137	137	6,902,991.5	1,761,800.9	1,345.30				Average	
		point138	138	6,903,290.5	1,761,773.9	1,341.50				Average	
		point139	139	6,903,586.5	1,761,729.5	1,337.90				Average	
		point140	140	6,903,872.5	1,761,668.4	1,334.80				Average	
		point141	141	6,904,157.5	1,761,589.8	1,331.80				Average	
		point142	142	6,904,440.5	1,761,497.8	1,329.40				Average	
		point143	143	6,904,728.0	1,761,403.4	1,328.30				Average	
		point144	144	6,905,017.0	1,761,313.2	1,326.80				Average	
		point145	145	6,905,310.5	1,761,241.0	1,324.10				Average	
		point146	146	6,905,611.5	1,761,187.1	1,320.80				Average	
		point147	147	6,905,916.5	1,761,154.0	1,316.90				Average	
		point148	148	6,906,216.5	1,761,141.2	1,313.00				Average	
		point149	149	6,906,518.0	1,761,149.0	1,309.00				Average	
		point150	150	6,906,823.5	1,761,177.2	1,304.30				Average	
		point151	151	6,907,123.0	1,761,222.2	1,297.50				Average	
		point152	152	6,907,419.5	1,761,269.2	1,291.30				Average	
		point153	153	6,907,712.0	1,761,313.4	1,285.80				Average	
		point154	154	6,908,007.5	1,761,347.2	1,280.80					

EB Highland Avenue e of Pepper Ave	50.0	point156	156	6,905,774.5	1,761,784.8	1,297.50				Average	
		point155	155	6,906,137.5	1,761,787.9	1,291.00				Average	
		point34	34	6,907,831.5	1,761,789.6	1,280.90					
WB Highland Avenue w of Pepper Ave-2	50.0	point157	157	6,905,775.5	1,761,830.9	1,297.40				Average	
		point16	16	6,904,812.5	1,761,827.8	1,308.50				Average	
		point17	17	6,904,500.5	1,761,859.0	1,312.50				Average	
		point18	18	6,904,207.5	1,761,924.8	1,315.50				Average	
		point19	19	6,903,915.5	1,761,998.9	1,320.80				Average	
		point20	20	6,903,625.0	1,762,072.9	1,329.90				Average	
		point21	21	6,903,334.0	1,762,146.8	1,342.50				Average	
		point22	22	6,903,137.0	1,762,192.2	1,352.00					

ICF Jones & Stokes **28 January 2014**
M Greene **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **<Project Name?>**
RUN: **Pepper Avenue Interchange Ex PM Pk**

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
NB Pepper Ave S of 210	point1	1	0	0	0	0	0	0	0	0	0	0
	point2	2	0	0	0	0	0	0	0	0	0	0
	point3	3	0	0	0	0	0	0	0	0	0	0
	point4	4										
NB Pepper Ave N of 210	point5	5	10	25	0	0	0	0	0	0	0	0
	point6	6										
SB Pepper Ave N of 210	point7	7	10	25	0	0	0	0	0	0	0	0
	point8	8										
SB Pepper Ave S of 210	point12	12	0	0	0	0	0	0	0	0	0	0
	point11	11	0	0	0	0	0	0	0	0	0	0
	point10	10	0	0	0	0	0	0	0	0	0	0
	point9	9										
WB Highland Avenue e of Pepper Ave	point13	13	284	45	4	45	10	45	0	0	0	0
	point14	14										
EB Highland Avenue w of Pepper Ave	point23	23	279	45	4	45	10	45	0	0	0	0
	point24	24	279	45	4	45	10	45	0	0	0	0
	point25	25	279	45	4	45	10	45	0	0	0	0
	point26	26	279	45	4	45	10	45	0	0	0	0
	point27	27	279	45	4	45	10	45	0	0	0	0
	point28	28	279	45	4	45	10	45	0	0	0	0
	point31	31	279	45	4	45	10	45	0	0	0	0
	point33	33										
WB SR210 HOV	point54	54	296	65	4	65	0	0	0	0	0	0

	point53	53	296	65	4	65	0	0	0	0	0	0
	point52	52	296	65	4	65	0	0	0	0	0	0
	point51	51	296	65	4	65	0	0	0	0	0	0
	point50	50	296	65	4	65	0	0	0	0	0	0
	point49	49	296	65	4	65	0	0	0	0	0	0
	point48	48	296	65	4	65	0	0	0	0	0	0
	point47	47	296	65	4	65	0	0	0	0	0	0
	point46	46	296	65	4	65	0	0	0	0	0	0
	point45	45	296	65	4	65	0	0	0	0	0	0
	point44	44	296	65	4	65	0	0	0	0	0	0
	point43	43	296	65	4	65	0	0	0	0	0	0
	point42	42	296	65	4	65	0	0	0	0	0	0
	point41	41	296	65	4	65	0	0	0	0	0	0
	point40	40	296	65	4	65	0	0	0	0	0	0
	point39	39	296	65	4	65	0	0	0	0	0	0
	point38	38	296	65	4	65	0	0	0	0	0	0
	point37	37	296	65	4	65	0	0	0	0	0	0
	point36	36	296	65	4	65	0	0	0	0	0	0
	point35	35										
WB SR210 Lane 1	point74	74	1093	65	15	65	0	0	0	0	0	0
	point73	73	1093	65	15	65	0	0	0	0	0	0
	point72	72	1093	65	15	65	0	0	0	0	0	0
	point71	71	1093	65	15	65	0	0	0	0	0	0
	point70	70	1093	65	15	65	0	0	0	0	0	0
	point69	69	1093	65	15	65	0	0	0	0	0	0
	point68	68	1093	65	15	65	0	0	0	0	0	0
	point67	67	1093	65	15	65	0	0	0	0	0	0
	point66	66	1093	65	15	65	0	0	0	0	0	0
	point65	65	1093	65	15	65	0	0	0	0	0	0
	point64	64	1093	65	15	65	0	0	0	0	0	0
	point63	63	1093	65	15	65	0	0	0	0	0	0
	point62	62	1093	65	0	65	0	0	0	0	0	0
	point61	61	1093	65	15	65	0	0	0	0	0	0
	point60	60	1093	65	15	65	0	0	0	0	0	0
	point59	59	1093	65	15	65	0	0	0	0	0	0
	point58	58	1093	65	15	65	0	0	0	0	0	0

	point57	57	1093	65	15	65	0	0	0	0	0	0
	point56	56	1093	65	15	65	0	0	0	0	0	0
	point55	55										
WB SR210 Lanes 2_3	point94	94	2186	65	30	65	116	55	0	0	0	0
	point93	93	2186	65	30	65	116	55	0	0	0	0
	point92	92	2186	65	30	65	116	55	0	0	0	0
	point91	91	2186	65	30	65	116	55	0	0	0	0
	point90	90	2186	65	30	65	116	55	0	0	0	0
	point89	89	2186	65	30	65	116	55	0	0	0	0
	point88	88	2186	65	30	65	116	55	0	0	0	0
	point87	87	2186	65	30	65	116	55	0	0	0	0
	point86	86	2186	65	30	65	116	55	0	0	0	0
	point85	85	2186	65	30	65	116	55	0	0	0	0
	point84	84	2186	65	30	65	116	55	0	0	0	0
	point83	83	2186	65	30	65	116	55	0	0	0	0
	point82	82	2186	65	30	65	116	55	0	0	0	0
	point81	81	2186	65	30	65	116	55	0	0	0	0
	point80	80	2186	65	30	65	116	55	0	0	0	0
	point79	79	2186	65	30	65	116	55	0	0	0	0
	point78	78	2186	65	30	65	116	55	0	0	0	0
	point77	77	2186	65	30	65	116	55	0	0	0	0
	point76	76	2186	65	30	65	116	55	0	0	0	0
	point75	75										
EB SR210 HOV	point95	95	557	65	7	65	0	0	0	0	0	0
	point96	96	557	65	7	65	0	0	0	0	0	0
	point97	97	557	65	7	65	0	0	0	0	0	0
	point98	98	557	65	7	65	0	0	0	0	0	0
	point99	99	557	65	7	65	0	0	0	0	0	0
	point100	100	557	65	7	65	0	0	0	0	0	0
	point101	101	557	65	7	65	0	0	0	0	0	0
	point102	102	557	65	7	65	0	0	0	0	0	0
	point103	103	557	65	7	65	0	0	0	0	0	0
	point104	104	557	65	7	65	0	0	0	0	0	0
	point105	105	557	65	7	65	0	0	0	0	0	0
	point106	106	557	65	7	65	0	0	0	0	0	0
	point107	107	557	65	7	65	0	0	0	0	0	0

	point108	108	557	65	7	65	0	0	0	0	0	0
	point109	109	557	65	7	65	0	0	0	0	0	0
	point110	110	557	65	7	65	0	0	0	0	0	0
	point111	111	557	65	7	65	0	0	0	0	0	0
	point112	112	557	65	7	65	0	0	0	0	0	0
	point113	113	557	65	7	65	0	0	0	0	0	0
	point114	114										
EB SR210 Lane 1	point115	115	1380	65	19	65	0	0	0	0	0	0
	point116	116	1380	65	19	65	0	0	0	0	0	0
	point117	117	1380	65	19	65	0	0	0	0	0	0
	point118	118	1380	65	19	65	0	0	0	0	0	0
	point119	119	1380	65	19	65	0	0	0	0	0	0
	point120	120	1380	65	19	65	0	0	0	0	0	0
	point121	121	1380	65	19	65	0	0	0	0	0	0
	point122	122	1380	65	19	65	0	0	0	0	0	0
	point123	123	1380	65	19	65	0	0	0	0	0	0
	point124	124	1380	65	19	65	0	0	0	0	0	0
	point125	125	1380	65	19	65	0	0	0	0	0	0
	point126	126	1380	65	19	65	0	0	0	0	0	0
	point127	127	1380	65	19	65	0	0	0	0	0	0
	point128	128	1380	65	19	65	0	0	0	0	0	0
	point129	129	1380	65	19	65	0	0	0	0	0	0
	point130	130	1380	65	19	65	0	0	0	0	0	0
	point131	131	1380	65	19	65	0	0	0	0	0	0
	point132	132	1380	65	19	65	0	0	0	0	0	0
	point133	133	1380	65	19	65	0	0	0	0	0	0
	point134	134										
EB SR210 Lanes 2_3	point135	135	2760	65	38	65	147	55	0	0	0	0
	point136	136	2760	65	38	65	147	55	0	0	0	0
	point137	137	2760	65	38	65	147	55	0	0	0	0
	point138	138	2760	65	38	65	147	55	0	0	0	0
	point139	139	2760	65	38	65	147	55	0	0	0	0
	point140	140	2760	65	38	65	147	55	0	0	0	0
	point141	141	2760	65	38	65	147	55	0	0	0	0
	point142	142	2760	65	38	65	147	55	0	0	0	0
	point143	143	2760	65	38	65	147	55	0	0	0	0

	point144	144	2760	65	38	65	147	55	0	0	0	0
	point145	145	2760	65	38	65	147	55	0	0	0	0
	point146	146	2760	65	38	65	147	55	0	0	0	0
	point147	147	2760	65	38	65	147	55	0	0	0	0
	point148	148	2760	65	38	65	147	55	0	0	0	0
	point149	149	2760	65	38	65	147	55	0	0	0	0
	point150	150	2760	65	38	65	147	55	0	0	0	0
	point151	151	2760	65	38	65	147	55	0	0	0	0
	point152	152	2760	65	38	65	147	55	0	0	0	0
	point153	153	2760	65	38	65	147	55	0	0	0	0
	point154	154										
EB Highland Avenue e of Pepper Ave	point156	156	279	45	4	45	10	45	0	0	0	0
	point155	155	279	45	4	45	10	45	0	0	0	0
	point34	34										
WB Highland Avenue w of Pepper Ave-2	point157	157	284	45	4	45	10	45	0	0	0	0
	point16	16	284	45	4	45	10	45	0	0	0	0
	point17	17	284	45	4	45	10	45	0	0	0	0
	point18	18	284	45	4	45	10	45	0	0	0	0
	point19	19	284	45	4	45	10	45	0	0	0	0
	point20	20	284	45	4	45	10	45	0	0	0	0
	point21	21	284	45	4	45	10	45	0	0	0	0
	point22	22										

ICF Jones & Stokes 28 January 2014
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: Pepper Avenue Interchange Ex PM Pk

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M1	1	1	6,903,306.5	1,761,509.6	1,333.50	5.00	0.00	66	10.0	8.0	Y
ST1	2	1	6,903,360.5	1,761,553.6	1,331.80	5.00	0.00	66	10.0	8.0	Y
M2	3	1	6,903,531.0	1,761,401.0	1,338.20	5.00	0.00	66	10.0	8.0	Y
M3	4	1	6,903,705.0	1,761,360.8	1,325.20	5.00	0.00	66	10.0	8.0	Y
M4	5	1	6,904,128.5	1,761,279.8	1,314.60	5.00	0.00	66	10.0	8.0	Y
ST2	6	1	6,904,115.0	1,761,431.6	1,314.80	5.00	0.00	66	10.0	8.0	Y
M5	8	1	6,904,375.5	1,761,325.5	1,310.50	5.00	0.00	66	10.0	8.0	Y
M6	9	1	6,904,343.0	1,761,017.9	1,310.80	5.00	0.00	66	10.0	8.0	Y
M7	11	1	6,905,541.5	1,760,845.0	1,294.50	5.00	0.00	66	10.0	8.0	Y
M8	13	1	6,905,660.5	1,761,957.8	1,301.30	5.00	0.00	66	10.0	8.0	Y
ST3	15	1	6,905,885.5	1,760,730.4	1,289.90	5.00	0.00	66	10.0	8.0	Y

ICF Jones & Stokes **28 January 2014**
M Greene **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **Pepper Avenue Interchange Ex PM Pk**

Barrier									**Points**										
Name	**Type**	**Height**		**If Wall**	**If Berm**			**Add'tnl**	**Name**	**No.**	**Coordinates (bottom)**			**Height**	**Segment**				
		Min	**Max**	**$ per**	**$ per**	**Top**	**Run:Rise**	**$ per**			**X**	**Y**	**Z**	**at**	**Seg Ht Perturbs**			**On**	**Important**
				Unit	**Unit**	**Width**		**Unit**						**Point**	**Incre-**	**#Up**	**#Dn**	**Struct?**	**Reflec-**
				Area	**Vol.**			**Length**							**ment**				**tions?**
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Existing Unfinished Onramp E of Pepper	W	0.00	99.99	0.00				0.00	point33	33	6,905,881.0	1,760,970.8	1,292.00	0.00	0.00	0	0		
									point34	34	6,905,955.5	1,760,978.8	1,292.50	0.00	0.00	0	0		
									point35	35	6,906,054.0	1,760,997.9	1,293.80	0.00	0.00	0	0		
									point36	36	6,906,147.5	1,761,017.6	1,297.60	0.00	0.00	0	0		
									point37	37	6,906,253.0	1,761,036.8	1,302.80	0.00	0.00	0	0		
									point38	38	6,906,318.0	1,761,047.4	1,305.80	0.00	0.00	0	0		
									point39	39	6,906,395.5	1,761,060.1	1,307.80	0.00	0.00	0	0		
									point40	40	6,906,461.5	1,761,067.4	1,308.90	0.00	0.00	0	0		
									point41	41	6,906,546.0	1,761,084.2	1,308.20	0.00	0.00	0	0		
									point42	42	6,906,646.0	1,761,100.6	1,307.30	0.00	0.00	0	0		
									point43	43	6,906,762.5	1,761,124.4	1,306.00	0.00	0.00	0	0		
									point44	44	6,906,827.5	1,761,152.8	1,304.90	0.00					
Cenerline Jersey Barrier	W	0.00	99.99	0.00				0.00	point86	86	6,902,399.0	1,761,861.4	1,357.00	3.00	0.00	0	0		
									point87	87	6,902,699.5	1,761,870.0	1,352.00	3.00	0.00	0	0		
									point88	88	6,902,998.5	1,761,862.0	1,348.00	3.00	0.00	0	0		
									point89	89	6,903,298.0	1,761,835.6	1,343.20	3.00	0.00	0	0		
									point90	90	6,903,593.5	1,761,790.9	1,339.50	3.00	0.00	0	0		
									point91	91	6,903,887.5	1,761,728.4	1,336.10	3.00	0.00	0	0		
									point92	92	6,904,176.5	1,761,648.8	1,333.20	3.00	0.00	0	0		
									point93	93	6,904,462.5	1,761,556.0	1,330.30	3.00	0.00	0	0		
									point94	94	6,904,747.0	1,761,462.8	1,328.20	3.00	0.00	0	0		
									point95	95	6,905,033.0	1,761,372.6	1,325.50	3.00	0.00	0	0		
									point96	96	6,905,324.5	1,761,301.1	1,322.60	3.00	0.00	0	0		
									point97	97	6,905,619.5	1,761,248.2	1,319.50	3.00	0.00	0	0		
									point98	98	6,905,918.0	1,761,215.8	1,316.00	3.00	0.00	0	0		
									point99	99	6,906,217.0	1,761,203.1	1,311.70	3.00	0.00	0	0		
									point100	100	6,906,517.5	1,761,210.6	1,307.60	3.00	0.00	0	0		
									point101	101	6,906,816.0	1,761,237.5	1,302.80	3.00	0.00	0	0		
									point102	102	6,907,112.5	1,761,282.8	1,297.30	3.00	0.00	0	0		
									point103	103	6,907,409.0	1,761,330.1	1,292.30	3.00	0.00	0	0		
									point104	104	6,907,705.5	1,761,372.6	1,287.10	3.00	0.00	0	0		
									point105	105	6,908,004.0	1,761,403.4	1,282.00	3.00					
EOS EB	W	0.00	99.99	0.00				0.00	point1	1	6,902,401.5	1,761,764.8	1,354.00	3.00	0.00	0	0		
									point2	2	6,902,702.5	1,761,772.8	1,349.00	3.00	0.00	0	0		
									point3	3	6,902,994.5	1,761,766.6	1,345.00	3.00	0.00	0	0		

									point7	7	6,903,281.5	1,761,739.5	1,341.00	3.00	0.00	0	0		
									point8	8	6,903,581.5	1,761,694.2	1,337.30	3.00	0.00	0	0		
									point9	9	6,903,875.5	1,761,632.1	1,333.00	3.00	0.00	0	0		
									point10	10	6,904,165.0	1,761,551.2	1,331.00	3.00	0.00	0	0		
									point11	11	6,904,263.0	1,761,519.5	1,329.70	3.00	0.00	0	0		
									point12	12	6,904,405.5	1,761,459.0	1,329.00	3.00	0.00	0	0		
									point13	13	6,904,437.5	1,761,459.4	1,328.80	0.00	0.00	0	0		
									point15	15	6,904,530.0	1,761,427.4	1,328.50	0.00	0.00	0	0		
									point16	16	6,904,679.0	1,761,368.5	1,328.00	0.00	0.00	0	0		
									point17	17	6,904,691.5	1,761,363.6	1,327.90	0.00	0.00	0	0		
									point18	18	6,904,766.5	1,761,339.5	1,327.80	0.00	0.00	0	0		
									point19	19	6,904,801.5	1,761,322.9	1,327.50	0.00	0.00	0	0		
									point20	20	6,904,914.0	1,761,274.2	1,325.80	0.00	0.00	0	0		
									point21	21	6,904,988.0	1,761,242.1	1,324.30	0.00	0.00	0	0		
									point22	22	6,905,010.0	1,761,230.9	1,323.50	0.00	0.00	0	0		
									point23	23	6,905,027.5	1,761,220.5	1,322.50	0.00	0.00	0	0		
									point24	24	6,905,078.5	1,761,194.2	1,319.80	0.00	0.00	0	0		
									point25	25	6,905,135.0	1,761,167.8	1,317.00	0.00	0.00	0	0		
									point26	26	6,905,169.5	1,761,150.1	1,315.20	0.00	0.00	0	0		
									point27	27	6,905,204.5	1,761,131.4	1,313.00	0.00	0.00	0	0		
									point28	28	6,905,255.5	1,761,107.1	1,309.80	0.00	0.00	0	0		
									point29	29	6,905,275.0	1,761,097.0	1,308.30	0.00	0.00	0	0		
									point30	30	6,905,335.5	1,761,057.8	1,303.90	0.00	0.00	0	0		
									point31	31	6,905,349.0	1,761,050.9	1,302.50	0.00	0.00	0	0		
									point32	32	6,905,355.5	1,761,050.2	1,302.00	0.00					
EOS EB 2	W	0.00	99.99	0.00				0.00	point45	45	6,904,437.0	1,761,474.2	1,329.00	0.00	0.00	0	0		
									point46	46	6,904,722.5	1,761,381.0	1,328.70	0.00	0.00	0	0		
									point48	48	6,905,005.5	1,761,292.1	1,327.20	0.00	0.00	0	0		
									point49	49	6,905,305.5	1,761,218.5	1,324.50	0.00	0.00	0	0		
									point50	50	6,905,601.5	1,761,165.9	1,321.30	3.00	0.00	0	0		
									point52	52	6,905,915.5	1,761,131.4	1,317.70	3.00	0.00	0	0		
									point53	53	6,906,217.5	1,761,118.4	1,314.00	0.00	0.00	0	0		
									point54	54	6,906,521.5	1,761,125.6	1,309.40	0.00	0.00	0	0		
									point55	55	6,906,826.5	1,761,153.9	1,305.00	0.00	0.00	0	0		
									point56	56	6,907,126.0	1,761,198.4	1,297.90	0.00	0.00	0	0		
									point58	58	6,907,319.5	1,761,230.8	1,293.00	0.00	0.00	0	0		
									point59	59	6,907,433.0	1,761,238.6	1,291.00	0.00	0.00	0	0		
									point60	60	6,907,493.5	1,761,249.8	1,289.00	0.00	0.00	0	0		
									point61	61	6,907,595.0	1,761,267.5	1,286.80	0.00	0.00	0	0		
									point62	62	6,907,734.5	1,761,289.6	1,284.00	0.00	0.00	0	0		
									point63	63	6,907,884.5	1,761,310.4	1,281.90	0.00	0.00	0	0		
									point64	64	6,907,998.5	1,761,323.2	1,280.50	0.00					
EOS WB	W	0.00	99.99	0.00				0.00	point65	65	6,907,990.0	1,761,479.1	1,282.50	0.00	0.00	0	0		
									point66	66	6,907,707.5	1,761,453.1	1,288.00	0.00	0.00	0	0		
									point67	67	6,907,404.0	1,761,415.6	1,293.20	0.00	0.00	0	0		
									point68	68	6,907,113.0	1,761,369.4	1,296.50	0.00	0.00	0	0		
									point69	69	6,906,816.0	1,761,323.1	1,301.30	0.00	0.00	0	0		
									point70	70	6,906,519.0	1,761,295.1	1,306.00	0.00	0.00	0	0		
									point71	71	6,906,221.5	1,761,287.8	1,310.40	0.00	0.00	0	0		

									point72	72	6,905,926.5	1,761,302.6	1,314.50	3.00	0.00	0	0		
									point73	73	6,905,703.5	1,761,325.6	1,316.80	3.00	0.00	0	0		
									point74	74	6,905,367.5	1,761,377.4	1,321.00	0.00	0.00	0	0		
									point75	75	6,905,044.0	1,761,462.2	1,324.10	0.00	0.00	0	0		
									point76	76	6,904,760.5	1,761,548.8	1,326.60	0.00	0.00	0	0		
									point77	77	6,904,485.5	1,761,639.0	1,330.20	0.00	0.00	0	0		
									point78	78	6,904,199.5	1,761,741.5	1,334.80	0.00	0.00	0	0		
									point80	80	6,903,906.0	1,761,824.0	1,338.00	0.00	0.00	0	0		
									point81	81	6,903,611.5	1,761,885.2	1,341.50	0.00	0.00	0	0		
									point82	82	6,903,313.0	1,761,930.8	1,345.10	0.00	0.00	0	0		
									point83	83	6,903,012.0	1,761,958.2	1,347.50	0.00	0.00	0	0		
									point84	84	6,902,709.5	1,761,966.0	1,350.50	0.00	0.00	0	0		
									point85	85	6,902,401.5	1,761,958.0	1,353.50	0.00					

ICF Jones & Stokes			**28 January 2014**	
M Greene			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**<Project Name?>**			
RUN:	**Pepper Avenue Interchange Ex PM Pk**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	6,903,125.5	1,761,717.9	1,332.00
	2	6,903,287.0	1,761,703.1	1,329.00
	3	6,903,441.5	1,761,684.4	1,326.00
	4	6,903,624.0	1,761,651.8	1,324.00
	5	6,903,788.0	1,761,622.4	1,321.00
	6	6,903,978.5	1,761,575.4	1,318.00
	7	6,904,144.5	1,761,526.1	1,316.00
	8	6,904,214.5	1,761,502.9	1,314.00
	9	6,904,343.5	1,761,450.4	1,312.00
	10	6,904,404.0	1,761,427.4	1,311.00
	11	6,904,430.0	1,761,415.5	1,310.00
	12	6,904,487.0	1,761,363.6	1,309.00
	13	6,904,529.5	1,761,283.2	1,307.00
	14	6,904,574.5	1,761,238.9	1,305.00
Terrain Line2	15	6,904,574.5	1,761,238.9	1,305.00
	16	6,904,622.0	1,761,285.0	1,312.00
	17	6,904,704.0	1,761,241.2	1,299.00
	18	6,904,754.0	1,761,245.2	1,299.80
	19	6,905,019.0	1,761,142.5	1,295.00
	20	6,905,124.5	1,761,101.8	1,294.00
	21	6,905,217.5	1,761,076.6	1,298.00
	22	6,905,368.0	1,761,030.0	1,300.00
	23	6,905,730.0	1,761,015.2	1,294.50
Terrain Line3	24	6,905,730.0	1,761,015.2	1,294.50

	25	6,905,741.0	1,761,037.2	1,295.00
	26	6,905,739.5	1,761,142.9	1,295.00
Terrain Line4	27	6,905,842.0	1,761,132.4	1,295.00
	28	6,905,849.5	1,761,012.2	1,293.00
	29	6,905,881.0	1,760,970.8	1,292.00
Terrain Line5	30	6,905,908.0	1,760,958.6	1,292.00
	31	6,906,001.5	1,760,949.8	1,290.00
	32	6,906,153.5	1,760,968.9	1,290.00
	33	6,906,396.5	1,760,944.2	1,284.90
	34	6,906,886.0	1,761,055.8	1,284.00
	35	6,906,964.5	1,761,065.2	1,285.00
	36	6,907,043.0	1,761,093.4	1,280.00
	37	6,907,084.0	1,761,093.9	1,282.00
	38	6,907,079.0	1,761,117.2	1,282.00
	39	6,907,184.5	1,761,151.6	1,280.00
	40	6,907,411.0	1,761,208.8	1,280.00
Terrain Line6	41	6,905,851.0	1,761,384.4	1,296.50
	42	6,906,103.5	1,761,429.6	1,295.80
	43	6,906,351.5	1,761,446.4	1,292.00
	44	6,906,672.0	1,761,393.2	1,289.00
	45	6,906,710.0	1,761,412.8	1,292.00
	46	6,906,779.5	1,761,426.9	1,281.00
	47	6,906,970.0	1,761,429.6	1,280.00
	48	6,907,108.0	1,761,422.5	1,293.00
	49	6,907,234.0	1,761,447.2	1,292.00
	50	6,907,389.5	1,761,459.6	1,284.00
Terrain Line7	51	6,903,899.5	1,761,861.5	1,321.00
	52	6,904,189.5	1,761,790.8	1,318.00
	53	6,904,483.5	1,761,726.8	1,313.00
	54	6,904,772.0	1,761,642.1	1,310.00
	55	6,905,161.5	1,761,545.8	1,305.00
	56	6,905,426.5	1,761,463.5	1,301.00
	57	6,905,716.0	1,761,389.1	1,298.00
Terrain Line8	64	6,903,005.5	1,761,998.9	1,333.00
	61	6,903,306.5	1,761,971.4	1,331.00
	62	6,903,605.0	1,761,925.9	1,330.00

	63	6,903,899.5	1,761,861.5	1,321.00

ICF Jones & Stokes
M Greene
28 January 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Pepper Avenue Interchange Ex PM Pk
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 LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M1	1	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
ST1	2	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
M2	3	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
M3	4	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
M4	5	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
ST2	6	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
M5	8	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
M6	9	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
M7	11	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
M8	13	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
ST3	15	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	11	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICF Jones & Stokes 28 January 2014
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: Pepper Avenue Intg FNP PM Pk

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	%		
NB Pepper Ave S of 210	50.0	point1	1	6,905,860.0	1,760,319.0	1,293.80				Average	
		point2	2	6,905,846.5	1,760,534.2	1,291.20				Average	
		point3	3	6,905,826.5	1,760,914.9	1,288.00				Average	
		point4	4	6,905,815.5	1,761,113.1	1,287.50					
NB Pepper Ave N of 210	50.0	point5	5	6,905,808.0	1,761,342.4	1,295.50				Average	
		point6	6	6,905,794.0	1,761,745.6	1,297.50					
SB Pepper Ave N of 210	50.0	point7	7	6,905,751.5	1,761,749.5	1,295.40				Average	
		point8	8	6,905,760.5	1,761,346.5	1,297.00					
SB Pepper Ave S of 210	50.0	point12	12	6,905,767.5	1,761,115.0	1,293.90				Average	
		point11	11	6,905,778.5	1,760,930.5	1,292.10				Average	
		point10	10	6,905,811.0	1,760,521.9	1,292.10				Average	
		point9	9	6,905,824.0	1,760,315.5	1,289.00					
WB Highland Avenue e of Pepper Ave	50.0	point13	13	6,907,833.5	1,761,848.1	1,281.30				Average	
		point14	14	6,905,775.5	1,761,830.9	1,297.40					
EB Highland Avenue w of Pepper Ave	50.0	point23	23	6,903,130.5	1,762,147.1	1,350.00				Average	
		point24	24	6,903,327.5	1,762,101.6	1,341.60				Average	
		point25	25	6,903,618.5	1,762,027.2	1,329.30				Average	
		point26	26	6,903,909.0	1,761,953.4	1,320.70				Average	
		point27	27	6,904,201.0	1,761,878.9	1,316.60				Average	
		point28	28	6,904,494.0	1,761,814.1	1,314.20				Average	
		point31	31	6,904,827.0	1,761,780.4	1,310.50				Average	
		point33	33	6,905,774.5	1,761,784.8	1,297.50					
WB SR210 HOV	30.0	point54	54	6,908,001.5	1,761,423.1	1,282.50				Average	
		point53	53	6,907,701.5	1,761,397.1	1,287.50				Average	
		point52	52	6,907,404.0	1,761,357.4	1,292.80				Average	

		point51	51	6,907,106.5	1,761,310.6	1,297.00				Average	
		point50	50	6,906,813.0	1,761,266.2	1,302.40				Average	
		point49	49	6,906,515.5	1,761,238.2	1,307.30				Average	
		point48	48	6,906,216.0	1,761,231.6	1,311.40				Average	
		point47	47	6,905,918.0	1,761,243.1	1,315.30				Average	
		point46	46	6,905,622.0	1,761,277.1	1,319.10				Average	
		point45	45	6,905,330.5	1,761,331.0	1,322.20				Average	
		point44	44	6,905,039.5	1,761,401.1	1,325.00				Average	
		point43	43	6,904,754.0	1,761,491.2	1,327.50				Average	
		point42	42	6,904,469.0	1,761,584.4	1,330.50				Average	
		point41	41	6,904,186.0	1,761,677.0	1,334.00				Average	
		point40	40	6,903,893.5	1,761,755.8	1,336.50				Average	
		point39	39	6,903,599.0	1,761,819.2	1,339.80				Average	
		point38	38	6,903,300.5	1,761,862.8	1,343.50				Average	
		point37	37	6,902,999.5	1,761,889.1	1,346.50				Average	
		point36	36	6,902,697.0	1,761,895.5	1,349.50				Average	
		point35	35	6,902,396.5	1,761,884.1	1,354.50					
WB SR210 Lane 1	22.0	point74	74	6,908,001.0	1,761,437.8	1,282.70				Average	
		point73	73	6,907,700.0	1,761,411.8	1,287.90				Average	
		point72	72	6,907,402.0	1,761,373.9	1,293.00				Average	
		point71	71	6,907,110.5	1,761,325.6	1,296.80				Average	
		point70	70	6,906,817.0	1,761,281.2	1,302.10				Average	
		point69	69	6,906,514.0	1,761,253.9	1,306.80				Average	
		point68	68	6,906,220.0	1,761,246.6	1,311.00				Average	
		point67	67	6,905,922.0	1,761,258.1	1,315.20				Average	
		point66	66	6,905,626.0	1,761,292.1	1,318.80				Average	
		point65	65	6,905,334.0	1,761,343.4	1,321.90				Average	
		point64	64	6,905,043.5	1,761,416.1	1,324.60				Average	
		point63	63	6,904,757.5	1,761,505.6	1,327.30				Average	
		point62	62	6,904,473.0	1,761,598.8	1,330.40				Average	
		point61	61	6,904,189.0	1,761,690.4	1,334.20				Average	
		point60	60	6,903,897.5	1,761,770.9	1,336.80				Average	
		point59	59	6,903,603.0	1,761,834.2	1,340.00				Average	
		point58	58	6,903,304.5	1,761,877.8	1,343.80				Average	
		point57	57	6,903,003.5	1,761,904.1	1,346.80				Average	
		point56	56	6,902,701.0	1,761,911.9	1,349.80				Average	
		point55	55	6,902,395.0	1,761,900.0	1,354.80					
WB SR210 Lanes 2_3	42.0	point94	94	6,908,000.5	1,761,456.4	1,283.00				Average	
		point93	93	6,907,700.5	1,761,430.4	1,288.20				Average	

		point92	92	6,907,397.0	1,761,391.1	1,293.00				Average	
		point91	91	6,907,105.5	1,761,344.2	1,296.50				Average	
		point90	90	6,906,808.0	1,761,299.5	1,301.80				Average	
		point89	89	6,906,509.0	1,761,272.0	1,306.40				Average	
		point88	88	6,906,215.0	1,761,264.9	1,310.60				Average	
		point87	87	6,905,921.0	1,761,277.8	1,314.70				Average	
		point86	86	6,905,627.0	1,761,310.0	1,318.40				Average	
		point85	85	6,905,338.0	1,761,361.1	1,321.40				Average	
		point84	84	6,905,049.5	1,761,433.2	1,324.30				Average	
		point83	83	6,904,752.5	1,761,523.9	1,327.00				Average	
		point82	82	6,904,481.0	1,761,614.9	1,330.20				Average	
		point81	81	6,904,194.5	1,761,708.0	1,334.40				Average	
		point80	80	6,903,900.0	1,761,789.1	1,337.10				Average	
		point79	79	6,903,605.0	1,761,851.8	1,340.30				Average	
		point78	78	6,903,306.5	1,761,896.5	1,344.10				Average	
		point77	77	6,903,005.5	1,761,923.9	1,347.10				Average	
		point76	76	6,902,703.0	1,761,931.6	1,350.10				Average	
		point75	75	6,902,395.0	1,761,923.6	1,353.10					
EB SR210 HOV	30.0	point95	95	6,902,398.5	1,761,829.9	1,355.30				Average	
		point96	96	6,902,699.0	1,761,841.2	1,350.30				Average	
		point97	97	6,902,998.0	1,761,833.2	1,346.30				Average	
		point98	98	6,903,293.0	1,761,807.4	1,342.50				Average	
		point99	99	6,903,588.0	1,761,764.1	1,338.90				Average	
		point100	100	6,903,880.0	1,761,701.0	1,335.40				Average	
		point101	101	6,904,168.5	1,761,621.6	1,332.40				Average	
		point102	102	6,904,453.0	1,761,528.6	1,329.90				Average	
		point103	103	6,904,739.5	1,761,434.9	1,328.30				Average	
		point104	104	6,905,028.0	1,761,345.2	1,326.10				Average	
		point105	105	6,905,318.0	1,761,271.8	1,323.30				Average	
		point106	106	6,905,614.5	1,761,218.6	1,320.20				Average	
		point107	107	6,905,916.0	1,761,186.2	1,316.50				Average	
		point108	108	6,906,217.0	1,761,173.6	1,312.40				Average	
		point109	109	6,906,518.5	1,761,180.2	1,308.50				Average	
		point110	110	6,906,823.0	1,761,210.4	1,303.20				Average	
		point111	111	6,907,117.0	1,761,255.1	1,297.60				Average	
		point112	112	6,907,412.5	1,761,302.5	1,292.10				Average	
		point113	113	6,907,710.0	1,761,346.8	1,286.00				Average	
		point114	114	6,908,007.5	1,761,381.6	1,281.60					
EB SR210 Lane 1	22.0	point115	115	6,902,395.5	1,761,818.1	1,355.00				Average	

		point116	116	6,902,699.0	1,761,829.6	1,350.00				Average	
		point117	117	6,902,995.0	1,761,821.5	1,346.00				Average	
		point118	118	6,903,290.0	1,761,795.6	1,342.20				Average	
		point119	119	6,903,591.0	1,761,751.4	1,338.70				Average	
		point120	120	6,903,876.5	1,761,689.2	1,335.10				Average	
		point121	121	6,904,164.0	1,761,609.5	1,332.20				Average	
		point122	122	6,904,447.5	1,761,514.2	1,329.60				Average	
		point123	123	6,904,734.5	1,761,420.5	1,328.20				Average	
		point124	124	6,905,022.5	1,761,330.8	1,326.30				Average	
		point125	125	6,905,315.5	1,761,258.2	1,323.70				Average	
		point126	126	6,905,614.5	1,761,204.6	1,320.40				Average	
		point127	127	6,905,916.5	1,761,171.5	1,316.80				Average	
		point128	128	6,906,217.0	1,761,159.2	1,312.50				Average	
		point129	129	6,906,518.5	1,761,166.2	1,308.60				Average	
		point130	130	6,906,823.5	1,761,194.2	1,303.80				Average	
		point131	131	6,907,123.0	1,761,240.2	1,297.50				Average	
		point132	132	6,907,419.5	1,761,287.8	1,291.70				Average	
		point133	133	6,907,712.5	1,761,332.0	1,286.10				Average	
		point134	134	6,908,008.0	1,761,366.6	1,280.90					
EB SR210 Lanes 2_3	40.0	point135	135	6,902,396.0	1,761,798.4	1,354.30				Average	
		point136	136	6,902,700.0	1,761,809.9	1,349.30				Average	
		point137	137	6,902,991.5	1,761,800.9	1,345.30				Average	
		point138	138	6,903,290.5	1,761,773.9	1,341.50				Average	
		point139	139	6,903,586.5	1,761,729.5	1,337.90				Average	
		point140	140	6,903,872.5	1,761,668.4	1,334.80				Average	
		point141	141	6,904,157.5	1,761,589.8	1,331.80				Average	
		point142	142	6,904,440.5	1,761,497.8	1,329.40				Average	
		point143	143	6,904,728.0	1,761,403.4	1,328.30				Average	
		point144	144	6,905,017.0	1,761,313.2	1,326.80				Average	
		point145	145	6,905,310.5	1,761,241.0	1,324.10				Average	
		point146	146	6,905,611.5	1,761,187.1	1,320.80				Average	
		point147	147	6,905,916.5	1,761,154.0	1,316.90				Average	
		point148	148	6,906,216.5	1,761,141.2	1,313.00				Average	
		point149	149	6,906,518.0	1,761,149.0	1,309.00				Average	
		point150	150	6,906,823.5	1,761,177.2	1,304.30				Average	
		point151	151	6,907,123.0	1,761,222.2	1,297.50				Average	
		point152	152	6,907,419.5	1,761,269.2	1,291.30				Average	
		point153	153	6,907,712.0	1,761,313.4	1,285.80				Average	
		point154	154	6,908,007.5	1,761,347.2	1,280.80					

EB Highland Avenue e of Pepper Ave	50.0	point156	156	6,905,774.5	1,761,784.8	1,297.50				Average	
		point155	155	6,906,137.5	1,761,787.9	1,291.00				Average	
		point34	34	6,907,831.5	1,761,789.6	1,280.90					
WB Highland Avenue w of Pepper Ave-2	50.0	point157	157	6,905,775.5	1,761,830.9	1,297.40				Average	
		point16	16	6,904,812.5	1,761,827.8	1,308.50				Average	
		point17	17	6,904,500.5	1,761,859.0	1,312.50				Average	
		point18	18	6,904,207.5	1,761,924.8	1,315.50				Average	
		point19	19	6,903,915.5	1,761,998.9	1,320.80				Average	
		point20	20	6,903,625.0	1,762,072.9	1,329.90				Average	
		point21	21	6,903,334.0	1,762,146.8	1,342.50				Average	
		point22	22	6,903,137.0	1,762,192.2	1,352.00					

ICF Jones & Stokes **28 January 2014**
M Greene **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **<Project Name?>**
RUN: **Pepper Avenue Intg FNP PM Pk**

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
NB Pepper Ave S of 210	point1	1	124	25	2	25	4	25	0	0	0	0
	point2	2	124	25	2	25	4	25	0	0	0	0
	point3	3	124	25	2	25	4	25	0	0	0	0
	point4	4										
NB Pepper Ave N of 210	point5	5	124	25	2	25	4	25	0	0	0	0
	point6	6										
SB Pepper Ave N of 210	point7	7	144	25	2	25	5	25	0	0	0	0
	point8	8										
SB Pepper Ave S of 210	point12	12	144	25	2	25	5	25	0	0	0	0
	point11	11	144	25	2	25	5	25	0	0	0	0
	point10	10	144	25	2	25	5	25	0	0	0	0
	point9	9										
WB Highland Avenue e of Pepper Ave	point13	13	475	45	6	45	17	45	0	0	0	0
	point14	14										
EB Highland Avenue w of Pepper Ave	point23	23	345	45	5	45	12	45	0	0	0	0
	point24	24	345	45	5	45	12	45	0	0	0	0
	point25	25	345	45	5	45	12	45	0	0	0	0
	point26	26	345	45	5	45	12	45	0	0	0	0
	point27	27	345	45	5	45	12	45	0	0	0	0
	point28	28	345	45	5	45	12	45	0	0	0	0
	point31	31	345	45	5	45	12	45	0	0	0	0
	point33	33										
WB SR210 HOV	point54	54	1185	65	16	65	0	0	0	0	0	0

	point53	53	1185	65	16	65	0	0	0	0	0	0
	point52	52	1185	65	16	65	0	0	0	0	0	0
	point51	51	1185	65	16	65	0	0	0	0	0	0
	point50	50	1185	65	16	65	0	0	0	0	0	0
	point49	49	1185	65	16	65	0	0	0	0	0	0
	point48	48	1185	65	16	65	0	0	0	0	0	0
	point47	47	1185	65	16	65	0	0	0	0	0	0
	point46	46	1185	65	16	65	0	0	0	0	0	0
	point45	45	1185	65	16	65	0	0	0	0	0	0
	point44	44	1185	65	16	65	0	0	0	0	0	0
	point43	43	1185	65	16	65	0	0	0	0	0	0
	point42	42	1185	65	16	65	0	0	0	0	0	0
	point41	41	1185	65	16	65	0	0	0	0	0	0
	point40	40	1185	65	16	65	0	0	0	0	0	0
	point39	39	1185	65	16	65	0	0	0	0	0	0
	point38	38	1185	65	16	65	0	0	0	0	0	0
	point37	37	1185	65	16	65	0	0	0	0	0	0
	point36	36	1185	65	16	65	0	0	0	0	0	0
	point35	35										
WB SR210 Lane 1	point74	74	1789	65	24	65	0	0	0	0	0	0
	point73	73	1789	65	24	65	0	0	0	0	0	0
	point72	72	1789	65	24	65	0	0	0	0	0	0
	point71	71	1789	65	24	65	0	0	0	0	0	0
	point70	70	1789	65	24	65	0	0	0	0	0	0
	point69	69	1789	65	24	65	0	0	0	0	0	0
	point68	68	1789	65	24	65	0	0	0	0	0	0
	point67	67	1789	65	24	65	0	0	0	0	0	0
	point66	66	1789	65	24	65	0	0	0	0	0	0
	point65	65	1789	65	24	65	0	0	0	0	0	0
	point64	64	1789	65	24	65	0	0	0	0	0	0
	point63	63	1789	65	24	65	0	0	0	0	0	0
	point62	62	1789	65	24	65	0	0	0	0	0	0
	point61	61	1789	65	24	65	0	0	0	0	0	0
	point60	60	1789	65	24	65	0	0	0	0	0	0
	point59	59	1789	65	24	65	0	0	0	0	0	0
	point58	58	1789	65	24	65	0	0	0	0	0	0

	point57	57	1789	65	24	65	0	0	0	0	0	0
	point56	56	1789	65	24	65	0	0	0	0	0	0
	point55	55										
WB SR210 Lanes 2_3	point94	94	3577	65	49	65	190	55	0	0	0	0
	point93	93	3577	65	49	65	190	55	0	0	0	0
	point92	92	3577	65	49	65	190	55	0	0	0	0
	point91	91	3577	65	49	65	190	55	0	0	0	0
	point90	90	3577	65	49	65	190	55	0	0	0	0
	point89	89	3577	65	49	65	190	55	0	0	0	0
	point88	88	3577	65	49	65	190	55	0	0	0	0
	point87	87	3577	65	49	65	190	55	0	0	0	0
	point86	86	3577	65	49	65	190	55	0	0	0	0
	point85	85	3577	65	49	65	190	55	0	0	0	0
	point84	84	3577	65	49	65	190	55	0	0	0	0
	point83	83	3577	65	49	65	190	55	0	0	0	0
	point82	82	3577	65	49	65	190	55	0	0	0	0
	point81	81	3577	65	49	65	190	55	0	0	0	0
	point80	80	3577	65	49	65	190	55	0	0	0	0
	point79	79	3577	65	49	65	190	55	0	0	0	0
	point78	78	3577	65	49	65	190	55	0	0	0	0
	point77	77	3577	65	49	65	190	55	0	0	0	0
	point76	76	3577	65	49	65	190	55	0	0	0	0
	point75	75										
EB SR210 HOV	point95	95	1107	65	15	65	0	0	0	0	0	0
	point96	96	1107	65	15	65	0	0	0	0	0	0
	point97	97	1107	65	15	65	0	0	0	0	0	0
	point98	98	1107	65	15	65	0	0	0	0	0	0
	point99	99	1107	65	15	65	0	0	0	0	0	0
	point100	100	1107	65	15	65	0	0	0	0	0	0
	point101	101	1107	65	15	65	0	0	0	0	0	0
	point102	102	1107	65	15	65	0	0	0	0	0	0
	point103	103	1107	65	15	65	0	0	0	0	0	0
	point104	104	1107	65	15	65	0	0	0	0	0	0
	point105	105	1107	65	15	65	0	0	0	0	0	0
	point106	106	1107	65	15	65	0	0	0	0	0	0
	point107	107	1107	65	15	65	0	0	0	0	0	0

	point108	108	1107	65	15	65	0	0	0	0	0	0
	point109	109	1107	65	15	65	0	0	0	0	0	0
	point110	110	1107	65	15	65	0	0	0	0	0	0
	point111	111	1107	65	15	65	0	0	0	0	0	0
	point112	112	1107	65	15	65	0	0	0	0	0	0
	point113	113	1107	65	15	65	0	0	0	0	0	0
	point114	114										
EB SR210 Lane 1	point115	115	1683	65	23	65	0	0	0	0	0	0
	point116	116	1683	65	23	65	0	0	0	0	0	0
	point117	117	1683	65	23	65	0	0	0	0	0	0
	point118	118	1683	65	23	65	0	0	0	0	0	0
	point119	119	1683	65	23	65	0	0	0	0	0	0
	point120	120	1683	65	23	65	0	0	0	0	0	0
	point121	121	0 3	65	23	65	0	0	0	0	0	0
	point122	122	1683	65	23	65	0	0	0	0	0	0
	point123	123	1683	65	23	65	0	0	0	0	0	0
	point124	124	1683	65	23	65	0	0	0	0	0	0
	point125	125	1683	65	23	65	0	0	0	0	0	0
	point126	126	1683	65	23	65	0	0	0	0	0	0
	point127	127	1683	65	23	65	0	0	0	0	0	0
	point128	128	1683	65	23	65	0	0	0	0	0	0
	point129	129	1683	65	23	65	0	0	0	0	0	0
	point130	130	1683	65	23	65	0	0	0	0	0	0
	point131	131	1683	65	23	65	0	0	0	0	0	0
	point132	132	1683	65	23	65	0	0	0	0	0	0
	point133	133	1683	65	23	65	0	0	0	0	0	0
	point134	134										
EB SR210 Lanes 2_3	point135	135	3365	65	46	65	179	55	0	0	0	0
	point136	136	3365	65	46	65	179	55	0	0	0	0
	point137	137	3365	65	46	65	179	55	0	0	0	0
	point138	138	3365	65	46	65	179	55	0	0	0	0
	point139	139	3365	65	46	65	179	55	0	0	0	0
	point140	140	3365	65	46	65	179	55	0	0	0	0
	point141	141	3365	65	46	65	179	55	0	0	0	0
	point142	142	3365	65	46	65	179	55	0	0	0	0
	point143	143	3365	65	46	65	179	55	0	0	0	0

	point144	144	3365	65	46	65	179	55	0	0	0	0
	point145	145	3365	65	46	65	179	55	0	0	0	0
	point146	146	3365	65	46	65	179	55	0	0	0	0
	point147	147	3365	65	46	65	179	55	0	0	0	0
	point148	148	3365	65	46	65	179	55	0	0	0	0
	point149	149	3365	65	46	65	179	55	0	0	0	0
	point150	150	3365	65	46	65	179	55	0	0	0	0
	point151	151	3365	65	46	65	179	55	0	0	0	0
	point152	152	3365	65	46	65	179	55	0	0	0	0
	point153	153	3365	65	46	65	179	55	0	0	0	0
	point154	154										
EB Highland Avenue e of Pepper Ave	point156	156	323	45	4	45	11	45	0	0	0	0
	point155	155	323	45	4	45	11	45	0	0	0	0
	point34	34										
WB Highland Avenue w of Pepper Ave-2	point157	157	476	45	6	45	17	45	0	0	0	0
	point16	16	476	45	6	45	17	45	0	0	0	0
	point17	17	476	45	6	45	17	45	0	0	0	0
	point18	18	476	45	6	45	17	45	0	0	0	0
	point19	19	476	45	6	45	17	45	0	0	0	0
	point20	20	476	45	6	45	17	45	0	0	0	0
	point21	21	476	45	6	45	17	45	0	0	0	0
	point22	22										

ICF Jones & Stokes 28 January 2014
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: Pepper Avenue Intg FNP PM Pk

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M1	1	1	6,903,306.5	1,761,509.6	1,333.50	5.00	0.00	66	10.0	8.0	Y
ST1	2	1	6,903,360.5	1,761,553.6	1,331.80	5.00	0.00	66	10.0	8.0	Y
M2	3	1	6,903,531.0	1,761,401.0	1,338.20	5.00	0.00	66	10.0	8.0	Y
M3	4	1	6,903,705.0	1,761,360.8	1,325.20	5.00	0.00	66	10.0	8.0	Y
M4	5	1	6,904,128.5	1,761,279.8	1,314.60	5.00	0.00	66	10.0	8.0	Y
ST2	6	1	6,904,115.0	1,761,431.6	1,314.80	5.00	0.00	66	10.0	8.0	Y
M5	8	1	6,904,375.5	1,761,325.5	1,310.50	5.00	0.00	66	10.0	8.0	Y
M6	9	1	6,904,343.0	1,761,017.9	1,310.80	5.00	0.00	66	10.0	8.0	Y
M7	11	1	6,905,541.5	1,760,845.0	1,294.50	5.00	0.00	66	10.0	8.0	Y
M8	13	1	6,905,660.5	1,761,957.8	1,301.30	5.00	0.00	66	10.0	8.0	Y
ST3	15	1	6,905,885.5	1,760,730.4	1,289.90	5.00	0.00	66	10.0	8.0	Y

ICF Jones & Stokes **28 January 2014**
M Greene **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **Pepper Avenue Intg FNP PM Pk**

Barrier									**Points**										
Name	**Type**	**Height**		**If Wall**	**If Berm**			**Add'tnl**	**Name**	**No.**	**Coordinates (bottom)**			**Height**	**Segment**				
		Min	**Max**	**$ per**	**$ per**	**Top**	**Run:Rise**	**$ per**			**X**	**Y**	**Z**	**at**	**Seg Ht Perturbs**			**On**	**Important**
				Unit	**Unit**	**Width**		**Unit**						**Point**	**Incre-**	**#Up**	**#Dn**	**Struct?**	**Reflec-**
				Area	**Vol.**			**Length**							**ment**				**tions?**
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Existing Unfinished Onramp E of Pepper	W	0.00	99.99	0.00				0.00	point33	33	6,905,881.0	1,760,970.8	1,292.00	0.00	0.00	0	0		
									point34	34	6,905,955.5	1,760,978.8	1,292.50	0.00	0.00	0	0		
									point35	35	6,906,054.0	1,760,997.9	1,293.80	0.00	0.00	0	0		
									point36	36	6,906,147.5	1,761,017.6	1,297.60	0.00	0.00	0	0		
									point37	37	6,906,253.0	1,761,036.8	1,302.80	0.00	0.00	0	0		
									point38	38	6,906,318.0	1,761,047.4	1,305.80	0.00	0.00	0	0		
									point39	39	6,906,395.5	1,761,060.1	1,307.80	0.00	0.00	0	0		
									point40	40	6,906,461.5	1,761,067.4	1,308.90	0.00	0.00	0	0		
									point41	41	6,906,546.0	1,761,084.2	1,308.20	0.00	0.00	0	0		
									point42	42	6,906,646.0	1,761,100.6	1,307.30	0.00	0.00	0	0		
									point43	43	6,906,762.5	1,761,124.4	1,306.00	0.00	0.00	0	0		
									point44	44	6,906,827.5	1,761,152.8	1,304.90	0.00					
Cenerline Jersey Barrier	W	0.00	99.99	0.00				0.00	point86	86	6,902,399.0	1,761,861.4	1,357.00	3.00	0.00	0	0		
									point87	87	6,902,699.5	1,761,870.0	1,352.00	3.00	0.00	0	0		
									point88	88	6,902,998.5	1,761,862.0	1,348.00	3.00	0.00	0	0		
									point89	89	6,903,298.0	1,761,835.6	1,343.20	3.00	0.00	0	0		
									point90	90	6,903,593.5	1,761,790.9	1,339.50	3.00	0.00	0	0		
									point91	91	6,903,887.5	1,761,728.4	1,336.10	3.00	0.00	0	0		
									point92	92	6,904,176.5	1,761,648.8	1,333.20	3.00	0.00	0	0		
									point93	93	6,904,462.5	1,761,556.0	1,330.30	3.00	0.00	0	0		
									point94	94	6,904,747.0	1,761,462.8	1,328.20	3.00	0.00	0	0		
									point95	95	6,905,033.0	1,761,372.6	1,325.50	3.00	0.00	0	0		
									point96	96	6,905,324.5	1,761,301.1	1,322.60	3.00	0.00	0	0		
									point97	97	6,905,619.5	1,761,248.2	1,319.50	3.00	0.00	0	0		
									point98	98	6,905,918.0	1,761,215.8	1,316.00	3.00	0.00	0	0		
									point99	99	6,906,217.0	1,761,203.1	1,311.70	3.00	0.00	0	0		
									point100	100	6,906,517.5	1,761,210.6	1,307.60	3.00	0.00	0	0		
									point101	101	6,906,816.0	1,761,237.5	1,302.80	3.00	0.00	0	0		
									point102	102	6,907,112.5	1,761,282.8	1,297.30	3.00	0.00	0	0		
									point103	103	6,907,409.0	1,761,330.1	1,292.30	3.00	0.00	0	0		
									point104	104	6,907,705.5	1,761,372.6	1,287.10	3.00	0.00	0	0		
									point105	105	6,908,004.0	1,761,403.4	1,282.00	3.00					
EOS EB	W	0.00	99.99	0.00				0.00	point1	1	6,902,401.5	1,761,764.8	1,354.00	3.00	0.00	0	0		
									point2	2	6,902,702.5	1,761,772.8	1,349.00	3.00	0.00	0	0		
									point3	3	6,902,994.5	1,761,766.6	1,345.00	3.00	0.00	0	0		

									point7	7	6,903,281.5	1,761,739.5	1,341.00	3.00	0.00	0	0		
									point8	8	6,903,581.5	1,761,694.2	1,337.30	3.00	0.00	0	0		
									point9	9	6,903,875.5	1,761,632.1	1,333.00	3.00	0.00	0	0		
									point10	10	6,904,165.0	1,761,551.2	1,331.00	3.00	0.00	0	0		
									point11	11	6,904,263.0	1,761,519.5	1,329.70	3.00	0.00	0	0		
									point12	12	6,904,405.5	1,761,459.0	1,329.00	3.00	0.00	0	0		
									point13	13	6,904,437.5	1,761,459.4	1,328.80	0.00	0.00	0	0		
									point15	15	6,904,530.0	1,761,427.4	1,328.50	0.00	0.00	0	0		
									point16	16	6,904,679.0	1,761,368.5	1,328.00	0.00	0.00	0	0		
									point17	17	6,904,691.5	1,761,363.6	1,327.90	0.00	0.00	0	0		
									point18	18	6,904,766.5	1,761,339.5	1,327.80	0.00	0.00	0	0		
									point19	19	6,904,801.5	1,761,322.9	1,327.50	0.00	0.00	0	0		
									point20	20	6,904,914.0	1,761,274.2	1,325.80	0.00	0.00	0	0		
									point21	21	6,904,988.0	1,761,242.1	1,324.30	0.00	0.00	0	0		
									point22	22	6,905,010.0	1,761,230.9	1,323.50	0.00	0.00	0	0		
									point23	23	6,905,027.5	1,761,220.5	1,322.50	0.00	0.00	0	0		
									point24	24	6,905,078.5	1,761,194.2	1,319.80	0.00	0.00	0	0		
									point25	25	6,905,135.0	1,761,167.8	1,317.00	0.00	0.00	0	0		
									point26	26	6,905,169.5	1,761,150.1	1,315.20	0.00	0.00	0	0		
									point27	27	6,905,204.5	1,761,131.4	1,313.00	0.00	0.00	0	0		
									point28	28	6,905,255.5	1,761,107.1	1,309.80	0.00	0.00	0	0		
									point29	29	6,905,275.0	1,761,097.0	1,308.30	0.00	0.00	0	0		
									point30	30	6,905,335.5	1,761,057.8	1,303.90	0.00	0.00	0	0		
									point31	31	6,905,349.0	1,761,050.9	1,302.50	0.00	0.00	0	0		
									point32	32	6,905,355.5	1,761,050.2	1,302.00	0.00					
EOS EB 2	W	0.00	99.99	0.00				0.00	point45	45	6,904,437.0	1,761,474.2	1,329.00	0.00	0.00	0	0		
									point46	46	6,904,722.5	1,761,381.0	1,328.70	0.00	0.00	0	0		
									point48	48	6,905,005.5	1,761,292.1	1,327.20	0.00	0.00	0	0		
									point49	49	6,905,305.5	1,761,218.5	1,324.50	0.00	0.00	0	0		
									point50	50	6,905,601.5	1,761,165.9	1,321.30	3.00	0.00	0	0		
									point52	52	6,905,915.5	1,761,131.4	1,317.70	3.00	0.00	0	0		
									point53	53	6,906,217.5	1,761,118.4	1,314.00	0.00	0.00	0	0		
									point54	54	6,906,521.5	1,761,125.6	1,309.40	0.00	0.00	0	0		
									point55	55	6,906,826.5	1,761,153.9	1,305.00	0.00	0.00	0	0		
									point56	56	6,907,126.0	1,761,198.4	1,297.90	0.00	0.00	0	0		
									point58	58	6,907,319.5	1,761,230.8	1,293.00	0.00	0.00	0	0		
									point59	59	6,907,433.0	1,761,238.6	1,291.00	0.00	0.00	0	0		
									point60	60	6,907,493.5	1,761,249.8	1,289.00	0.00	0.00	0	0		
									point61	61	6,907,595.0	1,761,267.5	1,286.80	0.00	0.00	0	0		
									point62	62	6,907,734.5	1,761,289.6	1,284.00	0.00	0.00	0	0		
									point63	63	6,907,884.5	1,761,310.4	1,281.90	0.00	0.00	0	0		
									point64	64	6,907,998.5	1,761,323.2	1,280.50	0.00					
EOS WB	W	0.00	99.99	0.00				0.00	point65	65	6,907,990.0	1,761,479.1	1,282.50	0.00	0.00	0	0		
									point66	66	6,907,707.5	1,761,453.1	1,288.00	0.00	0.00	0	0		
									point67	67	6,907,404.0	1,761,415.6	1,293.20	0.00	0.00	0	0		
									point68	68	6,907,113.0	1,761,369.4	1,296.50	0.00	0.00	0	0		
									point69	69	6,906,816.0	1,761,323.1	1,301.30	0.00	0.00	0	0		
									point70	70	6,906,519.0	1,761,295.1	1,306.00	0.00	0.00	0	0		
									point71	71	6,906,221.5	1,761,287.8	1,310.40	0.00	0.00	0	0		

									point72	72	6,905,926.5	1,761,302.6	1,314.50	3.00	0.00	0	0		
									point73	73	6,905,703.5	1,761,325.6	1,316.80	3.00	0.00	0	0		
									point74	74	6,905,367.5	1,761,377.4	1,321.00	0.00	0.00	0	0		
									point75	75	6,905,044.0	1,761,462.2	1,324.10	0.00	0.00	0	0		
									point76	76	6,904,760.5	1,761,548.8	1,326.60	0.00	0.00	0	0		
									point77	77	6,904,485.5	1,761,639.0	1,330.20	0.00	0.00	0	0		
									point78	78	6,904,199.5	1,761,741.5	1,334.80	0.00	0.00	0	0		
									point80	80	6,903,906.0	1,761,824.0	1,338.00	0.00	0.00	0	0		
									point81	81	6,903,611.5	1,761,885.2	1,341.50	0.00	0.00	0	0		
									point82	82	6,903,313.0	1,761,930.8	1,345.10	0.00	0.00	0	0		
									point83	83	6,903,012.0	1,761,958.2	1,347.50	0.00	0.00	0	0		
									point84	84	6,902,709.5	1,761,966.0	1,350.50	0.00	0.00	0	0		
									point85	85	6,902,401.5	1,761,958.0	1,353.50	0.00					

ICF Jones & Stokes			28 January 2014	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	<Project Name?>			
RUN:	Pepper Avenue Intg FNP PM Pk			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	6,903,125.5	1,761,717.9	1,332.00
	2	6,903,287.0	1,761,703.1	1,329.00
	3	6,903,441.5	1,761,684.4	1,326.00
	4	6,903,624.0	1,761,651.8	1,324.00
	5	6,903,788.0	1,761,622.4	1,321.00
	6	6,903,978.5	1,761,575.4	1,318.00
	7	6,904,144.5	1,761,526.1	1,316.00
	8	6,904,214.5	1,761,502.9	1,314.00
	9	6,904,343.5	1,761,450.4	1,312.00
	10	6,904,404.0	1,761,427.4	1,311.00
	11	6,904,430.0	1,761,415.5	1,310.00
	12	6,904,487.0	1,761,363.6	1,309.00
	13	6,904,529.5	1,761,283.2	1,307.00
	14	6,904,574.5	1,761,238.9	1,305.00
Terrain Line2	15	6,904,574.5	1,761,238.9	1,305.00
	16	6,904,622.0	1,761,285.0	1,312.00
	17	6,904,704.0	1,761,241.2	1,299.00
	18	6,904,754.0	1,761,245.2	1,299.80
	19	6,905,019.0	1,761,142.5	1,295.00
	20	6,905,124.5	1,761,101.8	1,294.00
	21	6,905,217.5	1,761,076.6	1,298.00
	22	6,905,368.0	1,761,030.0	1,300.00
	23	6,905,730.0	1,761,015.2	1,294.50
Terrain Line3	24	6,905,730.0	1,761,015.2	1,294.50

	25	6,905,741.0	1,761,037.2	1,295.00
	26	6,905,739.5	1,761,142.9	1,295.00
Terrain Line4	27	6,905,842.0	1,761,132.4	1,295.00
	28	6,905,849.5	1,761,012.2	1,293.00
	29	6,905,881.0	1,760,970.8	1,292.00
Terrain Line5	30	6,905,908.0	1,760,958.6	1,292.00
	31	6,906,001.5	1,760,949.8	1,290.00
	32	6,906,153.5	1,760,968.9	1,290.00
	33	6,906,396.5	1,760,944.2	1,284.90
	34	6,906,886.0	1,761,055.8	1,284.00
	35	6,906,964.5	1,761,065.2	1,285.00
	36	6,907,043.0	1,761,093.4	1,280.00
	37	6,907,084.0	1,761,093.9	1,282.00
	38	6,907,079.0	1,761,117.2	1,282.00
	39	6,907,184.5	1,761,151.6	1,280.00
	40	6,907,411.0	1,761,208.8	1,280.00
Terrain Line6	41	6,905,851.0	1,761,384.4	1,296.50
	42	6,906,103.5	1,761,429.6	1,295.80
	43	6,906,351.5	1,761,446.4	1,292.00
	44	6,906,672.0	1,761,393.2	1,289.00
	45	6,906,710.0	1,761,412.8	1,292.00
	46	6,906,779.5	1,761,426.9	1,281.00
	47	6,906,970.0	1,761,429.6	1,280.00
	48	6,907,108.0	1,761,422.5	1,293.00
	49	6,907,234.0	1,761,447.2	1,292.00
	50	6,907,389.5	1,761,459.6	1,284.00
Terrain Line7	51	6,903,899.5	1,761,861.5	1,321.00
	52	6,904,189.5	1,761,790.8	1,318.00
	53	6,904,483.5	1,761,726.8	1,313.00
	54	6,904,772.0	1,761,642.1	1,310.00
	55	6,905,161.5	1,761,545.8	1,305.00
	56	6,905,426.5	1,761,463.5	1,301.00
	57	6,905,716.0	1,761,389.1	1,298.00
Terrain Line8	64	6,903,005.5	1,761,998.9	1,333.00
	61	6,903,306.5	1,761,971.4	1,331.00
	62	6,903,605.0	1,761,925.9	1,330.00

	63	6,903,899.5	1,761,861.5	1,321.00

ICF Jones & Stokes
M Greene
28 January 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Pepper Avenue Intg FNP PM Pk
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 LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M1	1	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
ST1	2	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
M2	3	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
M3	4	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
M4	5	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
ST2	6	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
M5	8	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
M6	9	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
M7	11	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
M8	13	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
ST3	15	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	11	0.0	0.0	0.0
All Impacted	7	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICF Jones & Stokes 28 January 2014
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: Pepper Avenue Interchange w Prj PM Pk

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	%		
NB Pepper Ave S of 210	50.0	point1	1	6,905,860.0	1,760,319.0	1,286.00				Average	
		point2	2	6,905,846.5	1,760,534.2	1,286.00				Average	
		point3	3	6,905,826.5	1,760,914.9	1,289.00				Average	
		point4	4	6,905,815.5	1,761,113.1	1,291.50					
NB Pepper Ave N of 210	50.0	point5	5	6,905,808.0	1,761,342.4	1,294.00				Average	
		point6	6	6,905,794.0	1,761,745.6	1,296.00					
SB Pepper Ave N of 210	50.0	point7	7	6,905,751.5	1,761,749.5	1,294.00				Average	
		point8	8	6,905,760.5	1,761,346.5	1,296.00					
SB Pepper Ave S of 210	50.0	point12	12	6,905,767.5	1,761,115.0	1,291.50				Average	
		point11	11	6,905,778.5	1,760,930.5	1,289.00				Average	
		point10	10	6,905,811.0	1,760,521.9	1,286.00				Average	
		point9	9	6,905,824.0	1,760,315.5	1,286.00					
WB Highland Avenue e of Pepper Ave	50.0	point13	13	6,907,833.5	1,761,848.1	1,281.30				Average	
		point14	14	6,905,775.5	1,761,830.9	1,297.40					
EB Highland Avenue w of Pepper Ave	50.0	point23	23	6,903,130.5	1,762,147.1	1,350.00				Average	
		point24	24	6,903,327.5	1,762,101.6	1,341.60				Average	
		point25	25	6,903,618.5	1,762,027.2	1,329.30				Average	
		point26	26	6,903,909.0	1,761,953.4	1,320.70				Average	
		point27	27	6,904,201.0	1,761,878.9	1,316.60				Average	
		point28	28	6,904,494.0	1,761,814.1	1,314.20				Average	
		point31	31	6,904,827.0	1,761,780.4	1,310.50				Average	
		point33	33	6,905,774.5	1,761,784.8	1,297.50					
WB SR210 HOV	30.0	point54	54	6,908,001.5	1,761,423.1	1,282.50				Average	
		point53	53	6,907,701.5	1,761,397.1	1,287.50				Average	
		point52	52	6,907,404.0	1,761,357.4	1,292.80				Average	

		point51	51	6,907,106.5	1,761,310.6	1,297.00				Average	
		point50	50	6,906,813.0	1,761,266.2	1,302.40				Average	
		point49	49	6,906,515.5	1,761,238.2	1,307.30				Average	
		point48	48	6,906,216.0	1,761,231.6	1,311.40				Average	
		point47	47	6,905,918.0	1,761,243.1	1,315.30				Average	
		point46	46	6,905,622.0	1,761,277.1	1,319.10				Average	
		point45	45	6,905,330.5	1,761,331.0	1,322.20				Average	
		point44	44	6,905,039.5	1,761,401.1	1,325.00				Average	
		point43	43	6,904,754.0	1,761,491.2	1,327.50				Average	
		point42	42	6,904,469.0	1,761,584.4	1,330.50				Average	
		point41	41	6,904,186.0	1,761,677.0	1,334.00				Average	
		point40	40	6,903,893.5	1,761,755.8	1,336.50				Average	
		point39	39	6,903,599.0	1,761,819.2	1,339.80				Average	
		point38	38	6,903,300.5	1,761,862.8	1,343.50				Average	
		point37	37	6,902,999.5	1,761,889.1	1,346.50				Average	
		point36	36	6,902,697.0	1,761,895.5	1,349.50				Average	
		point35	35	6,902,396.5	1,761,884.1	1,354.50					
WB SR210 Lane 1	22.0	point74	74	6,908,001.0	1,761,437.8	1,282.70				Average	
		point73	73	6,907,700.0	1,761,411.8	1,287.90				Average	
		point72	72	6,907,402.0	1,761,373.9	1,293.00				Average	
		point71	71	6,907,110.5	1,761,325.6	1,296.80				Average	
		point70	70	6,906,817.0	1,761,281.2	1,302.10				Average	
		point69	69	6,906,514.0	1,761,253.9	1,306.80				Average	
		point68	68	6,906,220.0	1,761,246.6	1,311.00				Average	
		point67	67	6,905,922.0	1,761,258.1	1,315.20					
EB SR210 HOV	30.0	point95	95	6,902,398.5	1,761,829.9	1,355.30				Average	
		point96	96	6,902,699.0	1,761,841.2	1,350.30				Average	
		point97	97	6,902,998.0	1,761,833.2	1,346.30				Average	
		point98	98	6,903,293.0	1,761,807.4	1,342.50				Average	
		point99	99	6,903,588.0	1,761,764.1	1,338.90				Average	
		point100	100	6,903,880.0	1,761,701.0	1,335.40				Average	
		point101	101	6,904,168.5	1,761,621.6	1,332.40				Average	
		point102	102	6,904,453.0	1,761,528.6	1,329.90				Average	
		point103	103	6,904,739.5	1,761,434.9	1,328.30				Average	
		point104	104	6,905,028.0	1,761,345.2	1,326.10				Average	
		point105	105	6,905,318.0	1,761,271.8	1,323.30				Average	
		point106	106	6,905,614.5	1,761,218.6	1,320.20				Average	
		point107	107	6,905,916.0	1,761,186.2	1,316.50				Average	
		point108	108	6,906,217.0	1,761,173.6	1,312.40				Average	

		point109	109	6,906,518.5	1,761,180.2	1,308.50				Average	
		point110	110	6,906,823.0	1,761,210.4	1,303.20				Average	
		point111	111	6,907,117.0	1,761,255.1	1,297.60				Average	
		point112	112	6,907,412.5	1,761,302.5	1,292.10				Average	
		point113	113	6,907,710.0	1,761,346.8	1,286.00				Average	
		point114	114	6,908,007.5	1,761,381.6	1,281.60					
EB SR210 Lane 1	22.0	point115	115	6,902,395.5	1,761,818.1	1,355.00				Average	
		point116	116	6,902,699.0	1,761,829.6	1,350.00				Average	
		point117	117	6,902,995.0	1,761,821.5	1,346.00				Average	
		point118	118	6,903,290.0	1,761,795.6	1,342.20				Average	
		point119	119	6,903,591.0	1,761,751.4	1,338.70				Average	
		point120	120	6,903,876.5	1,761,689.2	1,335.10				Average	
		point121	121	6,904,164.0	1,761,609.5	1,332.20				Average	
		point122	122	6,904,447.5	1,761,514.2	1,329.60				Average	
		point123	123	6,904,734.5	1,761,420.5	1,328.20				Average	
		point124	124	6,905,022.5	1,761,330.8	1,326.30				Average	
		point125	125	6,905,315.5	1,761,258.2	1,323.70				Average	
		point126	126	6,905,614.5	1,761,204.6	1,320.40				Average	
		point127	127	6,905,916.5	1,761,171.5	1,316.80					
EB Highland Avenue e of Pepper Ave	50.0	point156	156	6,905,774.5	1,761,784.8	1,297.50				Average	
		point155	155	6,906,137.5	1,761,787.9	1,291.00				Average	
		point34	34	6,907,831.5	1,761,789.6	1,280.90					
WB Highland Avenue w of Pepper Ave-2	50.0	point157	157	6,905,775.5	1,761,830.9	1,297.40				Average	
		point16	16	6,904,812.5	1,761,827.8	1,308.50				Average	
		point17	17	6,904,500.5	1,761,859.0	1,312.50				Average	
		point18	18	6,904,207.5	1,761,924.8	1,315.50				Average	
		point19	19	6,903,915.5	1,761,998.9	1,320.80				Average	
		point20	20	6,903,625.0	1,762,072.9	1,329.90				Average	
		point21	21	6,903,334.0	1,762,146.8	1,342.50				Average	
		point22	22	6,903,137.0	1,762,192.2	1,352.00					
EB Offramp	24.0	point159	159	6,903,588.0	1,761,727.1	1,337.80				Average	
		point172	172	6,903,872.5	1,761,655.2	1,334.50				Average	
		point171	171	6,904,156.0	1,761,575.5	1,331.50				Average	
		point170	170	6,904,248.0	1,761,545.1	1,330.50				Average	
		point169	169	6,904,435.5	1,761,477.0	1,329.60				Average	
		point168	168	6,904,618.5	1,761,399.4	1,328.00				Average	
		point167	167	6,904,893.5	1,761,276.9	1,322.00				Average	
		point166	166	6,905,070.5	1,761,186.1	1,315.00				Average	
		point165	165	6,905,248.0	1,761,095.4	1,304.00				Average	

		point164	164	6,905,343.0	1,761,055.4	1,294.00				Average	
		point163	163	6,905,437.5	1,761,026.5	1,289.00				Average	
		point162	162	6,905,538.5	1,761,006.2	1,287.00				Average	
		point161	161	6,905,639.5	1,760,996.6	1,287.30				Average	
		point160	160	6,905,678.5	1,760,994.5	1,288.10				Average	
		point158	158	6,905,743.0	1,760,988.9	1,289.70					
EB Onramp	24.0	point173	173	6,905,863.5	1,760,990.2	1,288.00	Onramp	10.00	100	Average	
		point175	175	6,905,944.5	1,760,995.2	1,287.00				Average	
		point176	176	6,906,145.0	1,761,008.8	1,292.00				Average	
		point177	177	6,906,345.5	1,761,030.8	1,298.00				Average	
		point178	178	6,906,544.0	1,761,061.9	1,303.00				Average	
		point179	179	6,906,739.0	1,761,104.9	1,303.00				Average	
		point180	180	6,907,029.0	1,761,176.5	1,300.00				Average	
		point181	181	6,907,224.5	1,761,217.5	1,295.00				Average	
		point182	182	6,907,421.5	1,761,256.8	1,290.60				Average	
		point183	183	6,907,616.5	1,761,290.8	1,287.50				Average	
		point174	174	6,907,713.0	1,761,306.1	1,285.50					
WB Offramp	24.0	point184	184	6,907,702.5	1,761,432.0	1,288.40				Average	
		point186	186	6,907,370.5	1,761,393.6	1,293.50				Average	
		point187	187	6,907,098.5	1,761,371.8	1,298.00				Average	
		point188	188	6,906,900.5	1,761,355.8	1,300.00				Average	
		point189	189	6,906,701.0	1,761,354.0	1,300.50				Average	
		point190	190	6,906,595.5	1,761,365.9	1,299.50				Average	
		point191	191	6,906,402.5	1,761,384.2	1,297.00				Average	
		point192	192	6,906,207.5	1,761,409.8	1,296.00				Average	
		point193	193	6,906,003.5	1,761,423.1	1,292.00				Average	
		point185	185	6,905,846.0	1,761,419.9	1,293.00					
WB Onramp	24.0	point194	194	6,905,731.0	1,761,425.5	1,293.50	Onramp	10.00	100	Average	
		point196	196	6,905,643.0	1,761,426.1	1,292.30				Average	
		point197	197	6,905,463.5	1,761,441.1	1,296.60				Average	
		point198	198	6,905,170.0	1,761,494.6	1,310.00				Average	
		point199	199	6,904,975.0	1,761,535.4	1,317.00				Average	
		point200	200	6,904,680.0	1,761,594.2	1,326.00				Average	
		point201	201	6,904,486.0	1,761,638.4	1,330.00				Average	
		point202	202	6,904,196.5	1,761,716.0	1,334.00				Average	
		point203	203	6,903,904.5	1,761,792.8	1,336.80					
EB SR210 Lane 1-2	22.0	point205	205	6,905,916.5	1,761,171.5	1,316.80				Average	
		point128	128	6,906,217.0	1,761,159.2	1,312.50				Average	
		point129	129	6,906,518.5	1,761,166.2	1,308.60				Average	

		point130	130	6,906,823.5	1,761,194.2	1,303.80				Average	
		point131	131	6,907,123.0	1,761,240.2	1,297.50				Average	
		point132	132	6,907,419.5	1,761,287.8	1,291.70				Average	
		point133	133	6,907,712.5	1,761,332.0	1,286.10				Average	
		point134	134	6,908,008.0	1,761,366.6	1,280.90					
WB SR210 Lane 1-2	22.0	point206	206	6,905,922.0	1,761,258.1	1,315.20				Average	
		point66	66	6,905,626.0	1,761,292.1	1,318.80				Average	
		point65	65	6,905,334.0	1,761,343.4	1,321.90				Average	
		point64	64	6,905,043.5	1,761,416.1	1,324.60				Average	
		point63	63	6,904,757.5	1,761,505.6	1,327.30				Average	
		point62	62	6,904,473.0	1,761,598.8	1,330.40				Average	
		point61	61	6,904,189.0	1,761,690.4	1,334.20				Average	
		point60	60	6,903,897.5	1,761,770.9	1,336.80				Average	
		point59	59	6,903,603.0	1,761,834.2	1,340.00				Average	
		point58	58	6,903,304.5	1,761,877.8	1,343.80				Average	
		point57	57	6,903,003.5	1,761,904.1	1,346.80				Average	
		point56	56	6,902,701.0	1,761,911.9	1,349.80				Average	
		point55	55	6,902,395.0	1,761,900.0	1,354.80					
WB SR210 Lanes 2_3	42.0	point94	94	6,908,000.5	1,761,456.4	1,283.00				Average	
		point210	210	6,907,700.5	1,761,430.4	1,288.20				Average	
		point92	92	6,907,397.0	1,761,391.1	1,293.00				Average	
		point91	91	6,907,105.5	1,761,344.2	1,296.50				Average	
		point90	90	6,906,808.0	1,761,299.5	1,301.80				Average	
		point89	89	6,906,509.0	1,761,272.0	1,306.40				Average	
		point88	88	6,906,215.0	1,761,264.9	1,310.60				Average	
		point207	207	6,905,921.0	1,761,277.8	1,314.70					
WB SR210 Lanes 2_3-2	42.0	point213	213	6,905,921.0	1,761,277.8	1,314.70				Average	
		point86	86	6,905,627.0	1,761,310.0	1,318.40				Average	
		point85	85	6,905,338.0	1,761,361.1	1,321.40				Average	
		point84	84	6,905,049.5	1,761,433.2	1,324.30				Average	
		point83	83	6,904,752.5	1,761,523.9	1,327.00				Average	
		point82	82	6,904,481.0	1,761,614.9	1,330.20				Average	
		point81	81	6,904,194.5	1,761,708.0	1,334.40				Average	
		point211	211	6,903,900.0	1,761,789.1	1,337.10				Average	
		point79	79	6,903,605.0	1,761,851.8	1,340.30				Average	
		point78	78	6,903,306.5	1,761,896.5	1,344.10				Average	
		point77	77	6,903,005.5	1,761,923.9	1,347.10				Average	
		point76	76	6,902,703.0	1,761,931.6	1,350.10				Average	
		point75	75	6,902,395.0	1,761,923.6	1,353.10					

EB SR210 Lanes 2_3	40.0	point135	135	6,902,396.0	1,761,798.4	1,354.30				Average	
		point136	136	6,902,700.0	1,761,809.9	1,349.30				Average	
		point137	137	6,902,991.5	1,761,800.9	1,345.30				Average	
		point138	138	6,903,290.5	1,761,773.9	1,341.50				Average	
		point208	208	6,903,586.5	1,761,729.5	1,337.90				Average	
		point140	140	6,903,872.5	1,761,668.4	1,334.80				Average	
		point141	141	6,904,157.5	1,761,589.8	1,331.80				Average	
		point142	142	6,904,440.5	1,761,497.8	1,329.40				Average	
		point143	143	6,904,728.0	1,761,403.4	1,328.30				Average	
		point144	144	6,905,017.0	1,761,313.2	1,326.80				Average	
		point145	145	6,905,310.5	1,761,241.0	1,324.10				Average	
		point146	146	6,905,611.5	1,761,187.1	1,320.80				Average	
		point204	204	6,905,916.5	1,761,154.0	1,316.90					
EB SR210 Lanes 2_3-2	40.0	point214	214	6,905,916.5	1,761,154.0	1,316.90				Average	
		point148	148	6,906,216.5	1,761,141.2	1,313.00				Average	
		point149	149	6,906,518.0	1,761,149.0	1,309.00				Average	
		point150	150	6,906,823.5	1,761,177.2	1,304.30				Average	
		point151	151	6,907,123.0	1,761,222.2	1,297.50				Average	
		point152	152	6,907,419.5	1,761,269.2	1,291.30				Average	
		point209	209	6,907,712.0	1,761,313.4	1,285.80				Average	
		point154	154	6,908,007.5	1,761,347.2	1,280.80					

ICF Jones & Stokes **28 January 2014**
M Greene **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **<Project Name?>**
RUN: **Pepper Avenue Interchange w Prj PM Pk**

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
NB Pepper Ave S of 210	point1	1	471	45	6	45	17	45	0	0	0	0
	point2	2	471	45	6	45	17	45	0	0	0	0
	point3	3	471	45	6	45	17	45	0	0	0	0
	point4	4										
NB Pepper Ave N of 210	point5	5	501	45	7	45	18	45	0	0	0	0
	point6	6										
SB Pepper Ave N of 210	point7	7	514	45	7	45	18	45	0	0	0	0
	point8	8										
SB Pepper Ave S of 210	point12	12	780	45	11	45	28	45	0	0	0	0
	point11	11	780	45	11	45	28	45	0	0	0	0
	point10	10	780	45	11	45	28	45	0	0	0	0
	point9	9										
WB Highland Avenue e of Pepper Ave	point13	13	703	45	10	45	25	45	0	0	0	0
	point14	14										
EB Highland Avenue w of Pepper Ave	point23	23	386	45	5	45	14	45	0	0	0	0
	point24	24	386	45	5	45	14	45	0	0	0	0
	point25	25	386	45	5	45	14	45	0	0	0	0
	point26	26	386	45	5	45	14	45	0	0	0	0
	point27	27	386	45	5	45	14	45	0	0	0	0
	point28	28	386	45	5	45	14	45	0	0	0	0
	point31	31	386	45	5	45	14	45	0	0	0	0
	point33	33										
WB SR210 HOV	point54	54	1185	65	16	65	0	0	0	0	0	0

	point53	53	1185	65	16	65	0	0	0	0	0	0
	point52	52	1185	65	16	65	0	0	0	0	0	0
	point51	51	1185	65	16	65	0	0	0	0	0	0
	point50	50	1185	65	16	65	0	0	0	0	0	0
	point49	49	1185	65	16	65	0	0	0	0	0	0
	point48	48	1185	65	16	65	0	0	0	0	0	0
	point47	47	1185	65	16	65	0	0	0	0	0	0
	point46	46	1185	65	16	65	0	0	0	0	0	0
	point45	45	1185	65	16	65	0	0	0	0	0	0
	point44	44	1185	65	16	65	0	0	0	0	0	0
	point43	43	1185	65	16	65	0	0	0	0	0	0
	point42	42	1185	65	16	65	0	0	0	0	0	0
	point41	41	1185	65	16	65	0	0	0	0	0	0
	point40	40	1185	65	16	65	0	0	0	0	0	0
	point39	39	1185	65	16	65	0	0	0	0	0	0
	point38	38	1185	65	16	65	0	0	0	0	0	0
	point37	37	1185	65	16	65	0	0	0	0	0	0
	point36	36	1185	65	16	65	0	0	0	0	0	0
	point35	35										
WB SR210 Lane 1	point74	74	1894	65	26	65	0	0	0	0	0	0
	point73	73	1894	65	26	65	0	0	0	0	0	0
	point72	72	1894	65	26	65	0	0	0	0	0	0
	point71	71	1894	65	26	65	0	0	0	0	0	0
	point70	70	1894	65	26	65	0	0	0	0	0	0
	point69	69	1894	65	26	65	0	0	0	0	0	0
	point68	68	1894	65	26	65	0	0	0	0	0	0
	point67	67										
EB SR210 HOV	point95	95	1107	65	15	65	0	0	0	0	0	0
	point96	96	1107	65	15	65	0	0	0	0	0	0
	point97	97	1107	65	15	65	0	0	0	0	0	0
	point98	98	1107	65	15	65	0	0	0	0	0	0
	point99	99	1107	65	15	65	0	0	0	0	0	0
	point100	100	1107	65	15	65	0	0	0	0	0	0
	point101	101	1107	65	15	65	0	0	0	0	0	0
	point102	102	1107	65	15	65	0	0	0	0	0	0
	point103	103	1107	65	15	65	0	0	0	0	0	0

	point104	104	1107	65	15	65	0	0	0	0	0	0
	point105	105	1107	65	15	65	0	0	0	0	0	0
	point106	106	1107	65	15	65	0	0	0	0	0	0
	point107	107	1107	65	15	65	0	0	0	0	0	0
	point108	108	1107	65	15	65	0	0	0	0	0	0
	point109	109	1107	65	15	65	0	0	0	0	0	0
	point110	110	1107	65	15	65	0	0	0	0	0	0
	point111	111	1107	65	15	65	0	0	0	0	0	0
	point112	112	1107	65	15	65	0	0	0	0	0	0
	point113	113	1107	65	15	65	0	0	0	0	0	0
	point114	114										
EB SR210 Lane 1	point115	115	1782	65	24	65	0	0	0	0	0	0
	point116	116	1782	65	24	65	0	0	0	0	0	0
	point117	117	1782	65	24	65	0	0	0	0	0	0
	point118	118	1782	65	24	65	0	0	0	0	0	0
	point119	119	1782	65	24	65	0	0	0	0	0	0
	point120	120	1782	65	24	65	0	0	0	0	0	0
	point121	121	1782	65	24	65	0	0	0	0	0	0
	point122	122	1782	65	24	65	0	0	0	0	0	0
	point123	123	1782	65	24	65	0	0	0	0	0	0
	point124	124	1782	65	24	65	0	0	0	0	0	0
	point125	125	1782	65	24	65	0	0	0	0	0	0
	point126	126	1782	65	24	65	0	0	0	0	0	0
	point127	127										
EB Highland Avenue e of Pepper Ave	point156	156	637	45	9	45	23	45	0	0	0	0
	point155	155	637	45	9	45	23	45	0	0	0	0
	point34	34										
WB Highland Avenue w of Pepper Ave-2	point157	157	758	45	10	45	27	45	0	0	0	0
	point16	16	758	45	10	45	27	45	0	0	0	0
	point17	17	758	45	10	45	27	45	0	0	0	0
	point18	18	758	45	10	45	27	45	0	0	0	0
	point19	19	758	45	10	45	27	45	0	0	0	0
	point20	20	758	45	10	45	27	45	0	0	0	0
	point21	21	758	45	10	45	27	45	0	0	0	0
	point22	22										
EB Offramp	point159	159	489	65	7	65	17	60	0	0	0	0

	point172	172	489	65	7	65	17	60	0	0	0	0
	point171	171	489	65	7	65	17	60	0	0	0	0
	point170	170	489	65	7	65	17	60	0	0	0	0
	point169	169	489	65	7	65	17	60	0	0	0	0
	point168	168	489	60	7	60	17	55	0	0	0	0
	point167	167	489	55	7	55	17	0	0	0	0	0
	point166	166	489	55	7	55	17	50	0	0	0	0
	point165	165	489	45	7	45	17	40	0	0	0	0
	point164	164	489	45	7	45	17	40	0	0	0	0
	point163	163	489	35	7	35	17	30	0	0	0	0
	point162	162	489	35	7	35	17	30	0	0	0	0
	point161	161	489	25	7	25	17	20	0	0	0	0
	point160	160	489	25	7	25	17	20	0	0	0	0
	point158	158										
EB Onramp	point173	173	193	65	3	65	7	60	0	0	0	0
	point175	175	193	65	3	65	7	60	0	0	0	0
	point176	176	193	65	3	65	7	60	0	0	0	0
	point177	177	193	65	3	65	7	60	0	0	0	0
	point178	178	193	65	3	65	7	60	0	0	0	0
	point179	179	193	65	3	65	7	60	0	0	0	0
	point180	180	193	65	3	65	7	60	0	0	0	0
	point181	181	193	65	3	65	7	60	0	0	0	0
	point182	182	193	65	3	65	7	60	0	0	0	0
	point183	183	193	65	3	65	7	60	0	0	0	0
	point174	174										
WB Offramp	point184	184	737	65	10	65	26	60	0	0	0	0
	point186	186	737	65	10	65	26	60	0	0	0	0
	point187	187	737	65	10	65	26	60	0	0	0	0
	point188	188	737	60	10	60	26	55	0	0	0	0
	point189	189	737	60	10	60	26	55	0	0	0	0
	point190	190	737	60	10	60	26	55	0	0	0	0
	point191	191	737	50	10	50	26	45	0	0	0	0
	point192	192	737	35	10	35	26	30	0	0	0	0
	point193	193	737	25	10	25	26	20	0	0	0	0
	point185	185										
WB Onramp	point194	194	420	65	6	65	15	60	0	0	0	0

	point196	196	420	65	6	65	15	60	0	0	0	0
	point197	197	420	65	6	65	15	60	0	0	0	0
	point198	198	420	65	6	65	15	60	0	0	0	0
	point199	199	420	65	6	65	15	60	0	0	0	0
	point200	200	420	65	6	65	15	60	0	0	0	0
	point201	201	420	65	6	65	15	60	0	0	0	0
	point202	202	420	65	6	65	15	60	0	0	0	0
	point203	203										
EB SR210 Lane 1-2	point205	205	1683	65	23	65	0	0	0	0	0	0
	point128	128	1683	65	23	65	0	0	0	0	0	0
	point129	129	1683	65	23	65	0	0	0	0	0	0
	point130	130	1683	65	23	65	0	0	0	0	0	0
	point131	131	1683	65	23	65	0	0	0	0	0	0
	point132	132	1683	65	23	65	0	0	0	0	0	0
	point133	133	1683	65	23	65	0	0	0	0	0	0
	point134	134										
WB SR210 Lane 1-2	point206	206	1789	65	24	65	0	0	0	0	0	0
	point66	66	1789	65	24	65	0	0	0	0	0	0
	point65	65	1789	65	24	65	0	0	0	0	0	0
	point64	64	1789	65	24	65	0	0	0	0	0	0
	point63	63	1789	65	24	65	0	0	0	0	0	0
	point62	62	1789	65	24	65	0	0	0	0	0	0
	point61	61	1789	65	24	65	0	0	0	0	0	0
	point60	60	1789	65	24	65	0	0	0	0	0	0
	point59	59	1789	65	24	65	0	0	0	0	0	0
	point58	58	1789	65	24	65	0	0	0	0	0	0
	point57	57	1789	65	24	65	0	0	0	0	0	0
	point56	56	1789	65	24	65	0	0	0	0	0	0
	point55	55										
WB SR210 Lanes 2_3	point94	94	3788	65	52	65	201	55	0	0	0	0
	point210	210	3788	65	52	65	201	55	0	0	0	0
	point92	92	3788	65	52	65	201	55	0	0	0	0
	point91	91	3788	65	52	65	201	55	0	0	0	0
	point90	90	3788	65	52	65	201	55	0	0	0	0
	point89	89	3788	65	52	65	201	55	0	0	0	0
	point88	88	3788	65	52	65	201	55	0	0	0	0

	point207	207										
WB SR210 Lanes 2_3-2	point213	213	3577	65	49	65	190	55	0	0	0	0
	point86	86	3577	65	49	65	190	55	0	0	0	0
	point85	85	3577	65	49	65	190	55	0	0	0	0
	point84	84	3577	65	49	65	190	55	0	0	0	0
	point83	83	3577	65	49	65	190	55	0	0	0	0
	point82	82	3577	65	49	65	190	55	0	0	0	0
	point81	81	3577	65	49	65	190	55	0	0	0	0
	point211	211	3577	65	49	65	190	55	0	0	0	0
	point79	79	3577	65	49	65	190	55	0	0	0	0
	point78	78	3577	65	49	65	190	55	0	0	0	0
	point77	77	3577	65	49	65	190	55	0	0	0	0
	point76	76	3577	65	49	65	190	55	0	0	0	0
	point75	75										
EB SR210 Lanes 2_3	point135	135	3563	65	49	65	189	55	0	0	0	0
	point136	136	3563	65	49	65	189	55	0	0	0	0
	point137	137	3563	65	49	65	189	55	0	0	0	0
	point138	138	3563	65	49	65	189	55	0	0	0	0
	point208	208	3563	65	49	65	189	55	0	0	0	0
	point140	140	3563	65	49	65	189	55	0	0	0	0
	point141	141	3563	65	49	65	189	55	0	0	0	0
	point142	142	3563	65	49	65	189	55	0	0	0	0
	point143	143	3563	65	49	65	189	55	0	0	0	0
	point144	144	3563	65	49	65	189	55	0	0	0	0
	point145	145	3563	65	49	65	189	55	0	0	0	0
	point146	146	3563	65	49	65	189	55	0	0	0	0
	point204	204										
EB SR210 Lanes 2_3-2	point214	214	3365	65	46	65	179	55	0	0	0	0
	point148	148	3365	65	46	65	179	55	0	0	0	0
	point149	149	3365	65	46	65	179	55	0	0	0	0
	point150	150	3365	65	46	65	179	55	0	0	0	0
	point151	151	3365	65	46	65	179	55	0	0	0	0
	point152	152	3365	65	46	65	179	55	0	0	0	0
	point209	209	3365	65	46	65	179	55	0	0	0	0
	point154	154										

ICF Jones & Stokes 28 January 2014
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: Pepper Avenue Interchange w Prj PM Pk

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M1	1	1	6,903,306.5	1,761,509.6	1,333.50	5.00	0.00	66	10.0	8.0	Y
ST1	2	1	6,903,360.5	1,761,553.6	1,331.80	5.00	0.00	66	10.0	8.0	Y
M2	3	1	6,903,531.0	1,761,401.0	1,338.20	5.00	0.00	66	10.0	8.0	Y
M3	4	1	6,903,705.0	1,761,360.8	1,325.20	5.00	0.00	66	10.0	8.0	Y
M4	5	1	6,904,128.5	1,761,279.8	1,314.60	5.00	0.00	66	10.0	8.0	Y
ST2	6	1	6,904,115.0	1,761,431.6	1,314.80	5.00	0.00	66	10.0	8.0	Y
M5	8	1	6,904,375.5	1,761,325.5	1,310.50	5.00	0.00	66	10.0	8.0	Y
M6	9	1	6,904,343.0	1,761,017.9	1,310.80	5.00	0.00	66	10.0	8.0	Y
M7	11	1	6,905,541.5	1,760,845.0	1,294.50	5.00	0.00	66	10.0	8.0	Y
M8	13	1	6,905,660.5	1,761,957.8	1,301.30	5.00	0.00	66	10.0	8.0	Y
ST3	15	1	6,905,885.5	1,760,730.4	1,289.90	5.00	0.00	66	10.0	8.0	Y

ICF Jones & Stokes **28 January 2014**
M Greene **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **Pepper Avenue Interchange w Prj PM Pk**

Barrier									**Points**										
Name	**Type**	**Height**		**If Wall**	**If Berm**			**Add'tnl**	**Name**	**No.**	**Coordinates (bottom)**			**Height**	**Segment**				
		Min	**Max**	**$ per**	**$ per**	**Top**	**Run:Rise**	**$ per**			**X**	**Y**	**Z**	**at**	**Seg Ht Perturbs**			**On**	**Important**
				Unit	**Unit**	**Width**		**Unit**						**Point**	**Incre-**	**#Up**	**#Dn**	**Struct?**	**Reflec-**
				Area	**Vol.**			**Length**							**ment**				**tions?**
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Cenerline Jersey Barrier	W	0.00	99.99	0.00				0.00	point86	86	6,902,399.0	1,761,861.4	1,357.00	3.00	0.00	0	0		
									point87	87	6,902,699.5	1,761,870.0	1,352.00	3.00	0.00	0	0		
									point88	88	6,902,998.5	1,761,862.0	1,348.00	3.00	0.00	0	0		
									point89	89	6,903,298.0	1,761,835.6	1,343.20	3.00	0.00	0	0		
									point90	90	6,903,593.5	1,761,790.9	1,339.50	3.00	0.00	0	0		
									point91	91	6,903,887.5	1,761,728.4	1,336.10	3.00	0.00	0	0		
									point92	92	6,904,176.5	1,761,648.8	1,333.20	3.00	0.00	0	0		
									point93	93	6,904,462.5	1,761,556.0	1,330.30	3.00	0.00	0	0		
									point94	94	6,904,747.0	1,761,462.8	1,328.20	3.00	0.00	0	0		
									point95	95	6,905,033.0	1,761,372.6	1,325.50	3.00	0.00	0	0		
									point96	96	6,905,324.5	1,761,301.1	1,322.60	3.00	0.00	0	0		
									point97	97	6,905,619.5	1,761,248.2	1,319.50	3.00	0.00	0	0		
									point98	98	6,905,918.0	1,761,215.8	1,316.00	3.00	0.00	0	0		
									point99	99	6,906,217.0	1,761,203.1	1,311.70	3.00	0.00	0	0		
									point100	100	6,906,517.5	1,761,210.6	1,307.60	3.00	0.00	0	0		
									point101	101	6,906,816.0	1,761,237.5	1,302.80	3.00	0.00	0	0		
									point102	102	6,907,112.5	1,761,282.8	1,297.30	3.00	0.00	0	0		
									point103	103	6,907,409.0	1,761,330.1	1,292.30	3.00	0.00	0	0		
									point104	104	6,907,705.5	1,761,372.6	1,287.10	3.00	0.00	0	0		
									point105	105	6,908,004.0	1,761,403.4	1,282.00	3.00					
EOS WB	W	0.00	99.99	0.00				0.00	point65	65	6,907,990.0	1,761,479.1	1,282.50	0.00	0.00	0	0		
									point66	66	6,907,707.5	1,761,453.1	1,288.00	0.00	0.00	0	0		
									point67	67	6,907,404.0	1,761,415.6	1,293.20	0.00					
EOS EB 2	W	0.00	99.99	0.00				0.00	point107	107	6,904,722.5	1,761,381.0	1,328.70	0.00	0.00	0	0		
									point48	48	6,905,005.5	1,761,292.1	1,327.20	0.00	0.00	0	0		
									point49	49	6,905,305.5	1,761,218.5	1,324.50	0.00	0.00	0	0		
									point50	50	6,905,601.5	1,761,165.9	1,321.30	3.00	0.00	0	0		
									point52	52	6,905,915.5	1,761,131.4	1,317.70	3.00	0.00	0	0		
									point53	53	6,906,217.5	1,761,118.4	1,314.00	0.00	0.00	0	0		
									point54	54	6,906,521.5	1,761,125.6	1,309.40	0.00	0.00	0	0		
									point55	55	6,906,826.5	1,761,153.9	1,305.00	0.00					
EOS EB 3	W	0.00	99.99	0.00				0.00	point109	109	6,907,433.0	1,761,238.6	1,291.00	0.00	0.00	0	0		
									point60	60	6,907,493.5	1,761,249.8	1,289.00	0.00	0.00	0	0		
									point61	61	6,907,595.0	1,761,267.5	1,286.80	0.00	0.00	0	0		
									point62	62	6,907,734.5	1,761,289.6	1,284.00	0.00	0.00	0	0		

									point63	63	6,907,884.5	1,761,310.4	1,281.90	0.00	0.00	0	0		
									point64	64	6,907,998.5	1,761,323.2	1,280.50	0.00					
EOS WB-3	W	0.00	99.99	0.00				0.00	point111	111	6,906,816.0	1,761,323.1	1,301.30	0.00	0.00	0	0		
									point70	70	6,906,519.0	1,761,295.1	1,306.00	0.00	0.00	0	0		
									point71	71	6,906,221.5	1,761,287.8	1,310.40	0.00	0.00	0	0		
									point72	72	6,905,926.5	1,761,302.6	1,314.50	3.00	0.00	0	0		
									point73	73	6,905,703.5	1,761,325.6	1,316.80	3.00	0.00	0	0		
									point74	74	6,905,367.5	1,761,377.4	1,321.00	0.00					
EOS WB-1	W	0.00	99.99	0.00				0.00	point114	114	6,904,243.5	1,761,731.2	1,334.10	0.00	0.00	0	0		
									point113	113	6,903,906.0	1,761,824.0	1,338.00	0.00	0.00	0	0		
									point81	81	6,903,611.5	1,761,885.2	1,341.50	0.00	0.00	0	0		
									point82	82	6,903,313.0	1,761,930.8	1,345.10	0.00	0.00	0	0		
									point83	83	6,903,012.0	1,761,958.2	1,347.50	0.00	0.00	0	0		
									point84	84	6,902,709.5	1,761,966.0	1,350.50	0.00	0.00	0	0		
									point85	85	6,902,401.5	1,761,958.0	1,353.50	0.00					
EOS EB	W	0.00	99.99	0.00				0.00	point1	1	6,902,401.5	1,761,764.8	1,354.00	3.00	0.00	0	0		
									point2	2	6,902,702.5	1,761,772.8	1,349.00	3.00	0.00	0	0		
									point3	3	6,902,994.5	1,761,766.6	1,345.00	3.00	0.00	0	0		
									point7	7	6,903,281.5	1,761,739.5	1,341.00	3.00	0.00	0	0		
									point8	8	6,903,581.5	1,761,694.2	1,337.30	3.00	0.00	0	0		
									point9	9	6,903,875.5	1,761,632.1	1,333.00	3.00	0.00	0	0		
									point10	10	6,904,165.0	1,761,551.2	1,331.00	3.00	0.00	0	0		
									point11	11	6,904,263.0	1,761,519.5	1,329.70	3.00	0.00	0	0		
									point119	119	6,904,419.5	1,761,463.0	1,329.00	0.00	0.00	0	0		
									point120	120	6,904,520.5	1,761,420.2	1,328.00	0.00	0.00	0	0		
									point121	121	6,904,759.0	1,761,318.8	1,324.50	0.00	0.00	0	0		
									point127	127	6,904,885.5	1,761,262.4	1,321.50	0.00	0.00	0	0		
									point125	125	6,905,058.0	1,761,173.8	1,314.50	0.00	0.00	0	0		
									point123	123	6,905,246.5	1,761,070.2	1,303.50	0.00					

ICF Jones & Stokes			28 January 2014	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	<Project Name?>			
RUN:	Pepper Avenue Interchange w Prj PM Pk			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	6,903,125.5	1,761,717.9	1,332.00
	2	6,903,287.0	1,761,703.1	1,329.00
	3	6,903,441.5	1,761,684.4	1,326.00
	4	6,903,624.0	1,761,651.8	1,324.00
	5	6,903,788.0	1,761,622.4	1,321.00
	6	6,903,978.5	1,761,575.4	1,318.00
	7	6,904,144.5	1,761,526.1	1,316.00
	8	6,904,214.5	1,761,502.9	1,314.00
	9	6,904,343.5	1,761,450.4	1,312.00
	10	6,904,404.0	1,761,427.4	1,311.00
	11	6,904,430.0	1,761,415.5	1,310.00
	12	6,904,487.0	1,761,363.6	1,309.00
	13	6,904,529.5	1,761,283.2	1,307.00
	14	6,904,574.5	1,761,238.9	1,305.00
Terrain Line2	15	6,904,574.5	1,761,238.9	1,305.00
	16	6,904,622.0	1,761,285.0	1,312.00
	17	6,904,704.0	1,761,241.2	1,299.00
	18	6,904,754.0	1,761,245.2	1,299.80
Terrain Line4	27	6,905,842.0	1,761,132.4	1,295.00
	28	6,905,848.0	1,761,030.9	1,293.00
Terrain Line7	51	6,903,899.5	1,761,861.5	1,321.00
	52	6,904,189.5	1,761,790.8	1,318.00
	53	6,904,483.5	1,761,726.8	1,313.00
	54	6,904,772.0	1,761,642.1	1,310.00

	55	6,905,161.5	1,761,545.8	1,305.00
Terrain Line8	64	6,903,005.5	1,761,998.9	1,333.00
	61	6,903,306.5	1,761,971.4	1,331.00
	62	6,903,605.0	1,761,925.9	1,330.00
	63	6,903,899.5	1,761,861.5	1,321.00
Inside Cut-Fill	85	6,904,654.0	1,761,398.4	1,328.40
	87	6,904,906.0	1,761,313.6	1,328.00
	88	6,905,006.0	1,761,276.9	1,326.30
	89	6,905,099.0	1,761,229.6	1,322.50
	90	6,905,357.5	1,761,086.1	1,304.50
	91	6,905,539.5	1,761,059.0	1,300.30
	92	6,905,643.0	1,761,071.8	1,303.50
	93	6,905,694.5	1,761,063.0	1,301.50
	86	6,905,734.0	1,761,034.2	1,296.00
Outside Cut-Fill SE	94	6,905,895.5	1,760,948.6	1,292.00
	96	6,905,982.0	1,760,960.6	1,291.80
	97	6,905,993.0	1,760,955.6	1,290.40
	98	6,906,051.0	1,760,956.1	1,290.20
	99	6,906,072.5	1,760,972.0	1,290.30
	100	6,906,109.0	1,760,976.5	1,292.00
	101	6,906,143.5	1,760,984.6	1,287.30
	102	6,906,252.5	1,760,957.5	1,285.20
	103	6,906,396.5	1,760,954.8	1,285.80
	104	6,906,406.0	1,760,958.8	1,287.00
	105	6,906,409.0	1,760,970.2	1,300.40
	106	6,906,401.5	1,761,014.1	1,302.00
	107	6,906,475.0	1,761,015.6	1,302.00
	108	6,906,552.0	1,761,023.9	1,302.50
	109	6,906,632.0	1,761,041.9	1,302.50
	110	6,906,659.0	1,761,051.2	1,303.00
	111	6,906,766.5	1,761,077.6	1,303.00
	112	6,906,784.5	1,761,087.6	1,306.00
	113	6,906,842.5	1,761,097.1	1,304.80
	95	6,906,900.0	1,761,109.6	1,303.70
Terrain Line16-2	126	6,906,396.5	1,760,944.2	1,284.90
	120	6,906,886.0	1,761,055.8	1,284.00

	121	6,906,964.5	1,761,065.2	1,285.00
	122	6,907,043.0	1,761,093.4	1,280.00
	123	6,907,084.0	1,761,093.9	1,282.00
	124	6,907,079.0	1,761,117.2	1,282.00
	125	6,907,184.5	1,761,151.6	1,280.00
	116	6,907,411.0	1,761,208.8	1,280.00
Inside Cut-Fill SE	127	6,905,857.0	1,761,033.0	1,295.00
	129	6,906,004.0	1,761,056.9	1,302.00
	130	6,906,042.5	1,761,064.8	1,303.50
	131	6,906,131.0	1,761,087.9	1,308.00
	132	6,906,232.5	1,761,101.2	1,312.00
	133	6,906,548.0	1,761,102.2	1,308.50
	128	6,906,730.5	1,761,126.5	1,306.20
Terrain Line3-2	136	6,905,741.0	1,761,037.2	1,295.00
	26	6,905,739.5	1,761,142.9	1,295.00
Terrain Line22	137	6,907,118.0	1,761,391.0	1,295.60
	139	6,907,006.0	1,761,382.8	1,296.80
	140	6,906,896.0	1,761,386.2	1,297.50
	141	6,906,833.0	1,761,384.1	1,298.20
	142	6,906,764.0	1,761,383.2	1,298.30
	143	6,906,744.0	1,761,372.8	1,299.10
	144	6,906,720.5	1,761,387.5	1,295.80
	145	6,906,695.5	1,761,422.6	1,291.00
	146	6,906,665.0	1,761,434.5	1,283.50
	147	6,906,650.5	1,761,437.4	1,285.00
	148	6,906,633.5	1,761,435.0	1,285.30
	149	6,906,604.0	1,761,435.0	1,286.50
	150	6,906,593.0	1,761,430.4	1,286.90
	151	6,906,580.0	1,761,390.2	1,299.50
	152	6,906,447.0	1,761,412.5	1,299.00
	153	6,906,404.0	1,761,422.4	1,298.50
	154	6,906,303.5	1,761,435.1	1,298.50
	155	6,906,202.0	1,761,435.9	1,296.00
	156	6,906,175.5	1,761,456.2	1,292.00
	157	6,906,057.5	1,761,453.0	1,293.50
	158	6,906,035.5	1,761,461.8	1,293.00

	159	6,906,003.0	1,761,457.9	1,293.50
	160	6,905,984.0	1,761,462.9	1,293.80
	161	6,905,969.0	1,761,453.9	1,294.30
	162	6,905,959.0	1,761,452.0	1,294.50
	163	6,905,902.5	1,761,455.1	1,295.80
	138	6,905,868.5	1,761,464.1	1,296.50
Terrain Line6-2	164	6,906,710.0	1,761,412.8	1,292.00
	46	6,906,779.5	1,761,426.9	1,281.00
	47	6,906,970.0	1,761,429.6	1,280.00
	48	6,907,108.0	1,761,422.5	1,293.00
	49	6,907,234.0	1,761,447.2	1,292.00
	50	6,907,389.5	1,761,459.6	1,284.00
Inside Cut-Fill NW	165	6,906,899.5	1,761,337.4	1,300.00
	167	6,906,641.0	1,761,326.1	1,303.00
	168	6,906,548.5	1,761,324.8	1,304.50
	169	6,906,394.0	1,761,327.2	1,306.30
	170	6,906,295.0	1,761,341.9	1,306.20
	171	6,906,197.5	1,761,350.8	1,305.00
	172	6,906,102.0	1,761,368.2	1,303.00
	173	6,906,038.0	1,761,371.2	1,301.80
	174	6,906,006.0	1,761,360.0	1,301.80
	175	6,905,945.0	1,761,381.6	1,297.50
	176	6,905,869.5	1,761,382.2	1,297.20
	166	6,905,846.5	1,761,377.6	1,296.00
Outside Cut-Fill NW	177	6,905,703.5	1,761,496.1	1,297.20
	179	6,905,673.0	1,761,474.4	1,298.30
	180	6,905,596.0	1,761,474.8	1,299.80
	181	6,905,579.0	1,761,484.2	1,299.80
	182	6,905,536.0	1,761,486.5	1,300.20
	183	6,905,513.0	1,761,485.2	1,300.30
	184	6,905,370.5	1,761,494.1	1,301.80
	185	6,905,320.5	1,761,490.0	1,305.40
	186	6,905,270.5	1,761,509.9	1,305.70
	187	6,904,784.5	1,761,603.0	1,323.00
	188	6,904,682.5	1,761,627.2	1,326.00
	189	6,904,491.0	1,761,661.9	1,329.50

	190	6,904,367.5	1,761,693.8	1,332.50
	178	6,904,243.5	1,761,731.2	1,334.10
Terrain Line27	192	6,905,722.0	1,761,379.9	1,298.50
	194	6,905,697.0	1,761,359.6	1,303.50
	195	6,905,546.5	1,761,361.8	1,315.00
	196	6,905,356.0	1,761,381.6	1,321.00
	197	6,905,199.5	1,761,417.8	1,322.50
	198	6,905,061.0	1,761,452.5	1,323.00
	199	6,904,862.0	1,761,514.2	1,325.80
	193	6,904,715.5	1,761,562.0	1,327.00
Outside Cut-Fill-SW	200	6,904,759.0	1,761,318.8	1,324.50
	69	6,904,771.5	1,761,243.9	1,299.50
	70	6,904,965.5	1,761,166.2	1,295.50
	71	6,905,134.0	1,761,087.0	1,292.50
	72	6,905,234.0	1,761,057.8	1,297.80
	73	6,905,329.0	1,761,019.9	1,297.90
	74	6,905,419.0	1,761,007.6	1,297.90
	75	6,905,431.0	1,761,001.8	1,297.50
	76	6,905,473.0	1,760,994.1	1,296.00
	77	6,905,538.5	1,760,976.8	1,295.20
	78	6,905,556.5	1,760,954.8	1,295.10
	79	6,905,603.5	1,760,945.8	1,294.50
	80	6,905,628.0	1,760,953.8	1,294.20
	81	6,905,710.5	1,760,941.2	1,293.60
	82	6,905,730.5	1,760,925.8	1,293.70
	83	6,905,735.5	1,760,913.8	1,293.90
	66	6,905,741.5	1,760,826.2	1,293.90

ICF Jones & Stokes
M Greene
28 January 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Pepper Avenue Interchange w Prj PM Pk
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 LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M1	1	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
ST1	2	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
M2	3	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
M3	4	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
M4	5	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
ST2	6	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
M5	8	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
M6	9	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
M7	11	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
M8	13	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
ST3	15	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	11	0.0	0.0	0.0
All Impacted	9	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix E-5

Preparers Qualifications

David Buehler, P.E., INCE, Bd. Cert.	ICF Jones & Stokes—Project Manager, Senior Noise Specialist Education: B.S., Civil Engineering, California State University, Sacramento, 1980; Licensed Professional Civil Engineer in California. Board Certified Member of the Institute of Noise Control Engineering.
Mike Greene, INCE Cert	ICF Jones & Stokes— Senior Noise Specialist Education: B.S, Applied Mechanics, University of California San Diego, San Diego CA 1985.
Peter Hardie	ICF Jones & Stokes—Noise Analyst Education: B.A., Environmental Science, Rollins College, Orlando Florida 1995; Graduate Study, University of California, Santa Barbara, Master's in Environmental Science and Management.

Appendix F Traffic Impact Analysis

See included CD