SR 65 Capacity and Operational Improvements Project

Noise Study Report

State Route 65, Cities of Roseville, Rocklin, and Lincoln, Placer County
03-PLA-65 PM R6.2 to R12.8

EA 03-1F170

January 2016

CALIFORNIA DEPARTMENT OF TRANSPORTATION

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Summary

The California Department of Transportation (Caltrans), in cooperation with the Placer County Transportation Planning Agency (PCTPA), Placer County, and the Cities of Roseville, Rocklin, and Lincoln, proposes to widen State Route (SR) 65 from north of Galleria Boulevard/Stanford Ranch Road to Lincoln Boulevard (6.6 miles, from post miles 6.2 to 12.8). This SR 65 Capacity and Operational Improvements Project (project) is intended to relieve traffic congestion, add mainline capacity for planned and anticipated growth along the corridor, and improve operations and safety. This report has been prepared to comply with Title 23, Part 772, of the Code of Federal Regulations, "Procedures for Abatement of Highway Traffic Noise and Construction Noise," and California Department of Transportation noise analysis policy, as described in the *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol) (California Department of Transportation 2011).

As stated in the Protocol, noise abatement is considered only where frequent human use occurs and where a reduced noise level would be beneficial. In general, an area of frequent human use is an area where people are exposed to traffic noise for an extended period of time on a regular basis. Accordingly, an impact assessment focuses on locations with defined outdoor activity areas, such as residential backyards, common-use areas at multifamily residences, or active sporting areas.

The project area consists of residential subdivisions (Activity Category B), a place of worship (Activity Category C), schools (Activity Category C), a jail (institutional use; Activity Category C), a hospital (Activity Category C), a hotel (Activity Category E), several commercial uses that include no apparent outdoor areas of frequent human use (Activity Category F), and undeveloped land (Activity Category G). The residential subdivisions in the study area are generally set back from SR 65 and buffered by commercial use and undeveloped land.

The Federal Highway Administration (FHWA) Traffic Noise Prediction Model Version 2.5 was used in this analysis to evaluate traffic noise conditions for existing (2012) and design-year (2040) conditions. Existing traffic noise levels, expressed in terms of the A-weighted equivalent sound level (dBA L_{eq}[h]), were found to range from 47 to 73 dBA L_{eq}(h) at modeled receiver locations. Predicted worst-case traffic noise levels range from 51 to 76 dBA L_{eq}(h) for design-year no-build conditions and 52 to 77 dBA L_{eq}(h) for design year build conditions.

Traffic noise levels are predicted to approach or exceed the noise abatement criteria (NAC) for six Activity Category C land uses. However, there are no areas of frequent outdoor human use associated with these locations. Traffic noise levels are not predicted to approach or exceed the NAC at Activity Category B or E land uses. The highest increase in noise levels is predicted to be 6 dB, which would not be considered a substantial increase in noise levels. Design-year traffic noise levels are not predicted to result in traffic noise impacts at areas of frequent human use; therefore, noise abatement was not considered for this project.

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 80 to 90 dB at a distance of 50 feet. 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 Caltrans Standard Specifications and applicable local noise standards.

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List of Abbreviated Terms

μPa	micro-Pascals
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	community noise equivalent level
dB	decibels
dBA L_{eq}[h]	A-weighted equivalent sound level
FHWA	Federal Highway Administration
Hz	hertz
IS	initial study
kHz	kilohertz
L_{dn}	day-night level
L_{eq}	equivalent sound level
L_{eq}[h]	1-hour A-weighted equivalent sound level
L_{max}	maximum sound level
L_{xx}	percentile-exceeded sound level
MND	Mitigated Negative Declaration
mph	miles per hour
NAC	noise abatement criteria
NEPA	National Environmental Policy Act
NSR	noise study report
PDT	Project Development Team
Protocol	Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects
SPL	sound pressure level
SR 65	State Route 65
TeNS	Caltrans' Technical Noise Supplement
TNM 2.5	FHWA Traffic Noise Model Version 2.5

Chapter 1 Introduction

1.1 Introduction

The California Department of Transportation (Caltrans), in cooperation with the Placer County Transportation Planning Agency (PCTPA), Placer County, and the Cities of Roseville, Rocklin, and Lincoln, proposes to widen State Route (SR) 65 from north of Galleria Boulevard/Stanford Ranch Road to Lincoln Boulevard (6.6 miles, from post miles 6.2 to 12.8).

This SR 65 Capacity and Operational Improvements Project (project) has been assigned the Project Development Processing Category 4A for widening the existing freeway without requiring a revised freeway agreement. The project is subject to both federal and state environmental review requirements. Caltrans is the lead agency under the National Environmental Policy Act and under the California Environmental Quality Act. The proposed project is included in the Sacramento Area Council of Governments' (SACOG) *Draft 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy* (MTP/SCS) (SACOG 2015), expected to be finalized and adopted by early spring of 2016. Engineering for the project is programmed in the SACOG *2015/2018 Metropolitan Transportation Improvement Program* (MTIP) (SACOG 2014).

The purpose of this Noise Study Report (NSR) is to evaluate noise impacts and abatement under the requirements of Title 23, Part 772, of the Code of Federal Regulations (CFR), "Procedures for Abatement of Highway Traffic Noise," related to construction and operation of the project. 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 for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol), dated May 2011, provides Caltrans policy for implementing 23 CFR 772 in California. The Protocol outlines the requirements for preparing NSRs.

1.2 Project Background

SR 65 begins at its junction with Interstate 80 (I-80) and is an important interregional route serving both local and regional traffic. SR 65 generally runs north/south and is a major connector for both automobile and truck traffic originating from the I-80 corridor in the Roseville/Rocklin area to the SR 70/99 corridor in the Marysville/Yuba City area (Figure 1-1). SR 65 is a vital economic link from residential areas to shopping and employment centers in southern Placer County. It is also an important route for transporting aggregate, lumber, and other commodities. SR 65 is characterized by significant growth in the industrial, commercial, and residential

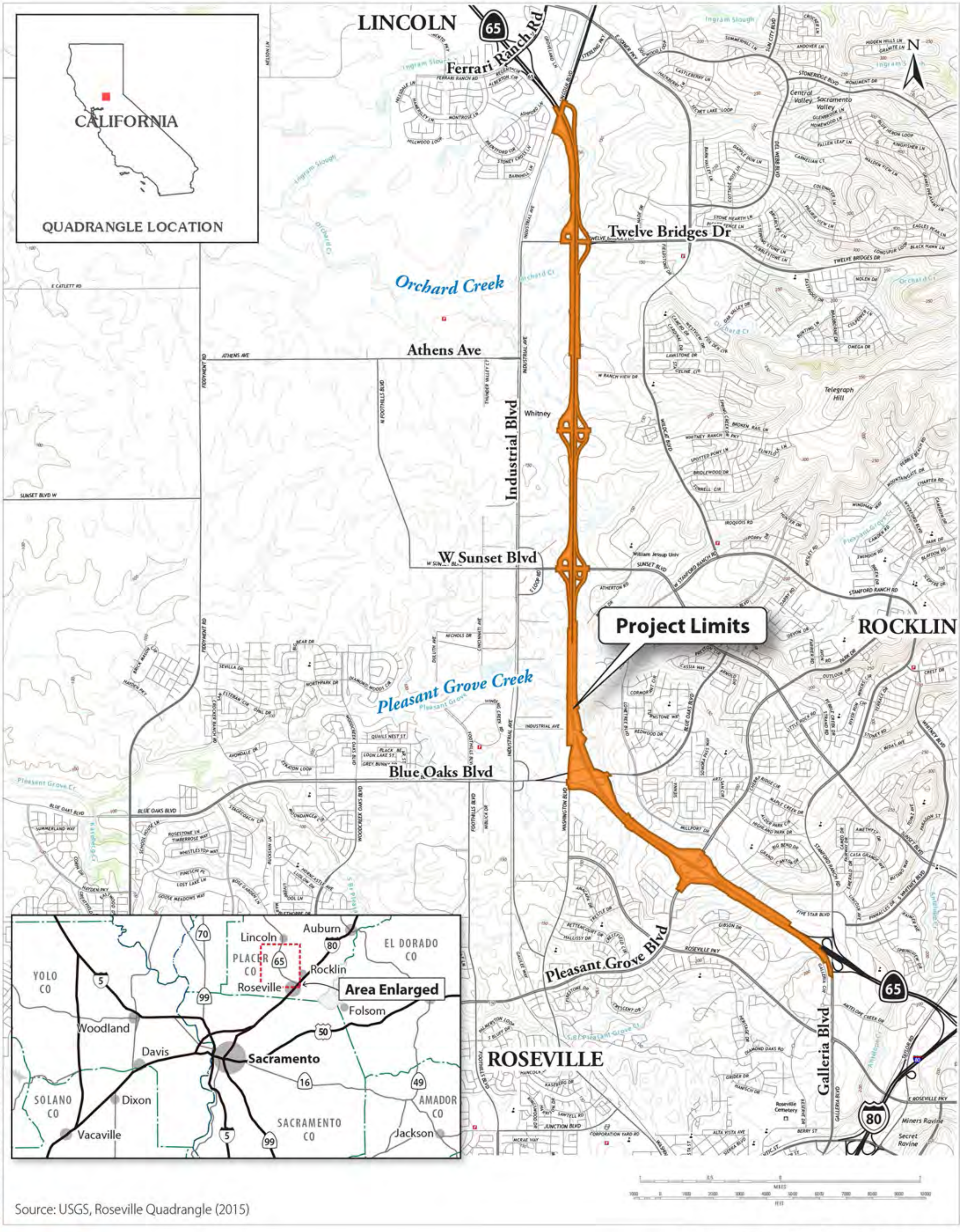

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Figure 1-1 - Project Vicinity

State Route 65 Capacity and Operational Improvements
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sectors. The southern Placer County region is one of the fastest growing areas in California, both in terms of housing and economic development.

SR 65 was constructed as a two-lane expressway in 1971. The Roseville Bypass from I-80 to Blue Oaks Boulevard was constructed in 1985. SR 65 from Blue Oaks Boulevard to Twelve Bridges Drive was widened to a four-lane facility in 1999. In 2009, the Caltrans Corridor System Management Plan for SR 65 identified major mobility challenges, including highway and roadway traffic congestion, lack of roadway capacity, and inadequate transit funding. A Supplemental Traffic Report was completed in June 2012 by Caltrans District 3 Office of Freeway Operations. The report indicated that the segment of SR 65 from Galleria Boulevard/Stanford Ranch Road to Lincoln Boulevard was experiencing operational problems caused by high peak-period traffic volumes, vehicle hours of delay, average speeds, travel time, and other traffic performance measures that were deteriorating as a result of increasing growth in the surrounding areas. In 2013, a Project Study Report-Project Development Support for Capital Support was approved for adding one vehicle lane in each direction in the median of SR 65 from 0.5 mile north of Galleria Boulevard/Stanford Ranch Road to Lincoln Boulevard.

PCTPA has identified the proposed project as a high-priority regional network project in its 2035 Regional Transportation Plan. This project is included in the South Placer Regional Transportation Authority Regional Traffic Congestion and Air Quality Mitigation Fee Program.

1.3 Related Projects

Related projects in the project area that require coordination with the proposed project include the following.

I-80/SR 65 Interchange Improvements Project. This proposed project consists of various modifications to I-80, SR 65, and the interchange at their junction. This project will terminate north of the Galleria Boulevard/Stanford Ranch Road interchange on SR 65, tying into the southern limits of the proposed SR 65 Capacity and Operational Improvements project. The proposed improvements to the I-80/SR 65 interchange include adding a high-occupancy vehicle (HOV) direct connector from I-80 eastbound to SR 65 northbound and SR 65 southbound to I-80 westbound, replacing eastbound I-80 to northbound SR 65 loop connector with a flyover connector, widening the East Roseville Viaduct, replacing the Taylor Road overcrossing, and widening southbound SR 65 to westbound I-80, westbound I-80 to northbound SR 65, and southbound SR 65 to eastbound I-80 connectors with associated auxiliary lanes and ramp realignments. The interchange project will be constructed in phases and coordination with SR 65 Capacity and Operational Improvements Project is required.

Whitney Ranch Parkway Interim Phase Project. This project is located in the City of Rocklin and Placer County along SR 65 between Sunset Boulevard and Twelve Bridges Drive. The project will provide a direct connection to Whitney Ranch Parkway from SR 65 to serve the communities of Rocklin and western Placer County. The interim phase will construct the SR 65/Whitney Ranch Parkway interchange and will include a three-lane SR 65 overcrossing, two-lane connection to the Whitney Ranch Parkway/University Avenue intersection, northbound SR 65 on and off-ramps, and a southbound SR 65 loop on-ramp. The project also would construct additional improvements along SR 65 including an auxiliary lane south of the new interchange to conform to the auxiliary lanes constructed with the SR 65/Sunset Boulevard interchange and provisions for ramp metering and an HOV preferential lane for each SR 65 on-ramp. The construction contract for this project was recently awarded and construction is underway. The project is estimated to be completed by 2016.

Placer Parkway Phase I Project. This project is Phase I of the Placer Parkway project. Phase I proposes to extend freeway access at SR 65 by building a new roadway connection west to Foothills Boulevard North. The Phase I project will modify the Whitney Ranch Interchange into an L-9 partial cloverleaf interchange by adding a diagonal southbound off-ramp and on-ramp as well as an eastbound Placer Parkway to northbound SR 65 loop on-ramp. The project will also widen the SR 65 overcrossing from a three-lane structure to a six-lane facility and extend Placer Parkway to the west as a four-lane facility. Ultimately, the Placer Parkway project would construct a new transportation facility connecting SR 65 in the Lincoln/Roseville/Rocklin area to SR 99 in Sutter County.

Northbound SR 65 Carpool Lane. A new lane on SR 65 northbound from the Galleria Boulevard/Stanford Ranch Road interchange to the Blue Oaks Boulevard interchange is planned as a future project and will be included in the next MTP update. For the purposes of this project, the new lane was assumed as a carpool/HOV lane and would connect to the carpool/HOV lanes proposed in the I-80/SR 65 interchange project.

1.4 Purpose and Need

1.4.1 Need

Recurring morning and evening peak-period demand exceeds the current design capacity along SR 65, creating traffic operations and safety issues. These issues result in high delays and wasted fuel, all of which will be exacerbated by anticipated increases in traffic from future population and employment growth.

Projected growth along the SR 65 corridor in Roseville, Lincoln, Rocklin, and south Placer County will result in additional mainline congestion. SR 65 connects major regional routes and must operate efficiently in order to serve commuter traffic, goods movement, and regional traffic in south Placer County.

1.4.2 Purpose

The primary purpose of the proposed project is to relieve existing mainline congestion by adding to mainline capacity. Additional capacity will also address planned and anticipated growth along the corridor and takes the regional mobility and economic development goals of the PCTPA into consideration. The project is expected to improve traffic operations and safety in this segment of the highway.

Chapter 2 Proposed Project

2.1 Project Alternatives

Two build alternatives and a no-build alternative are being considered for this project. The assessment of alternatives is based on 2040 design-year conditions. No decision on a preferred alternative will be made until all alternatives have been fully evaluated.

2.1.1 No-Build Alternative

SR 65 within the project limits would maintain the existing lane configuration and no SR 65 mainline widening would be constructed. However, several related transportation capacity expansion projects are planned in the study area under construction year (2020) and design year (2040) conditions.

2.1.2 Build Alternatives

Both build alternatives described in this section would allow for inside highway widening as future projects along SR 65 from north of the Blue Oaks Boulevard interchange to Lincoln Boulevard. Both alternatives would accommodate the I-80/SR 65 project and take into consideration the carpool/HOV lane restrictions and weaving volumes from the carpool/HOV lanes proposed by the I-80/SR 65 project.

2.1.2.1 Carpool Lane Alternative

This alternative adds a 12-foot carpool/HOV lane on southbound SR 65 in the median from north of Galleria Boulevard/Stanford Ranch Road interchange to Blue Oaks Boulevard interchange. The carpool/HOV lane would connect to the carpool/HOV lanes proposed as part of the I-80/SR 65 interchange project.

This alternative would also add one 12-foot general purpose lane in each direction of SR 65 from the Galleria Boulevard interchange to the Pleasant Grove Boulevard interchange; and an auxiliary lane in each direction of SR 65 from the Galleria Boulevard interchange to the Pleasant Grove Boulevard interchange, from the Blue Oaks Boulevard interchange to the Sunset Boulevard interchange, and from the Placer Parkway interchange to the Twelve Bridges Drive interchange.

Following the recommendation from the value analysis (VA) study, this alternative would also include ramp metering modifications for the slip on-ramps to a 2+1 configuration (2 metered lanes plus 1 carpool preferential lane) and a 1+1 (1 metered lane plus 1 carpool preferential lane) for loop on-ramps along SR 65 from the Galleria Boulevard interchange to Lincoln Boulevard. The southbound Pleasant Grove Boulevard slip and loop on-ramps, Blue Oaks Boulevard slip and loop on-ramps, and Lincoln Boulevard slip on-ramp would be modified to include these ramp metering changes.

2.1.2.2 General Purpose Lane Alternative

This alternative would add a 12-foot general purpose lane on SR 65 southbound from north of the Galleria Boulevard/Stanford Ranch Road interchange to the Blue Oaks Boulevard interchange, and another lane northbound from the Galleria Boulevard interchange to the Pleasant Grove Boulevard interchange. For added capacity on southbound SR 65, as recommended by the VA study, this alternative also includes an additional general purpose lane from the Galleria Boulevard interchange to the Pleasant Grove Boulevard interchange. This alternative also includes extending or adding auxiliary lanes and modifying slip and loop on-ramps for ramp metering as described in the Carpool Lane Alternative.

2.1.3 Alternatives Considered and Rejected

2.1.3.1 Mix Flow to Bus/Carpool Conversion (“Take-a-lane”) Alternative

This alternative converts an existing lane for carpool/HOV use within the project limits. This alternative is reviewed and rejected for not being in line with the primary purpose of relieving congestion and for its infeasibility on an existing four-lane highway (two lanes in each direction).

2.2 Common Design Details of the Build Alternatives

The two build alternatives include the following components.

2.2.1 Highway Widening

Median widening for additional general purpose or carpool lanes consists of removing existing inside shoulders and paving the median and giving it a standard cross slope. From Galleria Boulevard to Blue Oaks Boulevard, median widening includes removing the existing barrier, paving the entire median, and installing concrete barrier at the center divide. The existing drainage systems, which currently collect the runoff within the median and carry it into the existing cross culverts, would be abandoned, removed, or modified.

The paved median would generate new impervious area for the runoff to sheet flow across the travel way to the outside shoulder. On areas with fill material, runoff would be collected by the toe ditch or gutter and carried to the existing channel or waterway. On cut material, runoff would be channelized by the asphalt concrete dike on the edge of the roadway shoulder and discharged to the ditch or toe gutter through an overside drain. At shoulder cut locations, the water spread would be checked to see if drainage inlets are needed to avoid water spread encroaching into the freeway edge of travel way. The new roadway drainage system would connect the inlets and pipe down the ditch or toe gutter. Most of the existing ditch or toe gutter would remain to collect runoff, except for segments affected by outside widening for auxiliary lanes; those segments would be replaced or reconstructed. To minimize downstream effects, the proposed project would maintain the existing drainage pattern, which ultimately drains toward two waterways—Pleasant Grove Creek and Orchard Creek.

The median widening along southbound SR 65 would provide standard 10-foot inside shoulders. Along northbound SR 65, the inside paving is limited to a hot mix asphalt overlay for roadway cross-slope correction. The inside shoulder on northbound SR 65 would retain its nonstandard width of 5 feet. Justification for the nonstandard inside shoulder width would be documented in the exceptions to Caltrans' mandatory design standards.

Auxiliary lanes would be constructed by widening the existing pavement to the outside, including the replacement of existing outside shoulder with standard cross slope and side slopes of 4:1 or flatter for the fill for most of the corridor, to meet the minimum requirements specified in the Caltrans *Highway Design Manual* (Caltrans 2015). Segments along the corridor between Stanford Ranch Road and Pleasant Grove Boulevard and between the Whitney Ranch Parkway and Twelve Bridges Drive interchanges would require side slope of 3:1 or steeper, with a 30-foot clear recovery zone to avoid encroaching beyond existing right of way and wetlands or overfilling existing drainage ways. These areas along the corridor would require exceptions to Caltrans advisory design standards.

A tie-back wall would be needed at the Pleasant Grove Boulevard interchange to accommodate the highway and ramp widening. A segment on southbound SR 65 between the Whitney Ranch Parkway and Twelve Bridges Drive interchanges would require a cut slope of 3:1 to avoid encroaching into existing right of way; slopes at 3:1 or flatter are considered traversable, but would need approval from Caltrans Landscape.

2.2.2 Pleasant Grove Creek Bridge Widening

Both the northbound and southbound bridges over Pleasant Grove Creek would be widened to accommodate the auxiliary lanes. The widened bridge structures would be similar structure types to the existing bridges, which are reinforced concrete slab bridges with piles. Pile driving within the creek is anticipated.

2.2.3 Utility Relocation

Overhead electric facilities run parallel along northbound SR 65 outside of State right of way. At Pleasant Grove Creek, the overhead line turns east-west and crosses over SR 65. The overhead electric hangs over both the Pleasant Grove Creek bridges that are proposed for widening. The proximity of the overhead line may conflict with bridge foundation activities during construction. The overhead line may therefore need to be temporarily relocated outside of the creek area to accommodate widening the Pleasant Grove Creek bridges.

2.2.4 Cross Culvert Extension

A number of culverts cross the SR 65 corridor. Most of the cross culverts would not be affected by the proposed project because they are of adequate length. A few of the culverts are short and would need to be extended to accommodate the proposed auxiliary lanes along the corridor. The following culverts would be extended.

- Double 72-inch reinforced concrete pipe between Galleria Boulevard and Pleasant Grove Boulevard.
- Double 10-foot x 5-foot reinforced concrete box culvert between Blue Oaks Boulevard and Sunset Boulevard.
- 7-foot x 5-foot reinforced concrete box culvert between Placer Parkway and Twelve Bridges Drive.

2.2.5 Staging/Laydown Areas

No specific staging/laydown areas have been identified. However, the contractor may utilize areas within the existing median and areas between the main line and interchange on- and off-ramps for staging or laydown.

2.2.6 Construction Equipment and Techniques

Equipment that would be used for construction includes graders, excavators, drilling rigs, cranes, pavers, compactors, and various types of construction vehicles. Project design and construction would incorporate the following standard construction measures.

- A preliminary site-specific geotechnical report and initial site assessment will be prepared and will be incorporated into the project’s final design. If contaminated soil or groundwater, or suspected contamination, is encountered during construction, work will be halted in the area and the type and extent of the contamination identified. A qualified professional, in consultation with Caltrans, will then develop an appropriate method to remediate the contamination.
- A site-specific storm water pollution prevention plan will be prepared for the construction.
- Fugitive dust emissions during construction will be minimized by applying water frequently from water trucks. Fugitive dust emissions from wind erosion of inactive areas disturbed by construction activities will also be controlled by applying water. Chemical dust suppressants will not be used unless approved for direct application to surface waters.
- The contractor will be required to install temporary Best Management Practices (BMPs) to control any runoff or erosion from the project site, into the surrounding waterways. These temporary BMPs will be installed prior to any construction operations and will be in place for the duration of the contract. Removing these BMPs will be the final operation, along with the project site cleanup.

2.2.7 Construction Access

Temporary construction easements may be required for the contractor to access construction areas. Access to construction areas would be from the interchanges at Pleasant Grove Boulevard, Blue Oaks Boulevard, Sunset Boulevard, Placer Parkway/Whitney Ranch Parkway, Twelve Bridges Drive, and Lincoln Boulevard. Two lanes in each direction on SR 65 are anticipated to remain open to traffic for the majority of project's duration.

2.3 Permits and Approvals Needed

The following permits would likely be required for the project.

Table 1. Permits and Approvals Needed

Agency	Permit/Approval	Status
U.S. Army Corps of Engineers	Section 404 authorization for fill of waters of the United States	Not yet initiated
U.S. Fish and Wildlife Service	Coordination and Section 7 consultation regarding threatened and endangered species	Not yet initiated
Central Valley Regional Water Quality Control Board	Section 401 Water Quality Certification and coverage under the existing Caltrans National Pollutant Discharge Elimination System Permit (Order No. 00-06-DWQ)	Not yet initiated
Placer County Air Pollution Control District	Formal notification prior to construction	Not yet initiated

Chapter 3 Fundamentals of Traffic Noise

The following is a brief discussion of fundamental traffic noise concepts. For a detailed discussion, please refer to Caltrans' *Technical Noise Supplement* (TeNS) (Caltrans 2013), a technical supplement to the Protocol, which is available on Caltrans Web site (http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.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 (20 kHz).

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 (µPa). One µPa 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 µPa. Because of this huge range of values, sound is rarely expressed in terms of µPa. 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 µPa.

3.4 Addition of Decibels

Because decibels are logarithmic units, SPL 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 of 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 A-weighted decibels or 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 1000 feet		
	—100—	
Gas lawn mower at 3 feet		
	—90—	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	—80—	Garbage disposal at 3 feet
Noisy urban area, daytime		

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Gas lawn mower, 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 hall (background)
	—20—	
		Broadcast/recording studio
	—10—	
Lowest threshold of human hearing	—0—	Lowest threshold of human hearing

Source: Caltrans 2013.

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 than 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) that 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 following are the noise descriptors most commonly used in traffic noise analysis.

- **Equivalent Sound Level (L_{eq}):** L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} 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 (L_{eq}[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period, and is the basis for noise abatement criteria (NAC) used by Caltrans and FHWA.

- **Percentile-Exceeded Sound Level (L_{xx}):** L_{xx} represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10% of the time, and L_{90} is the sound level exceeded 90% of the time).
- **Maximum Sound Level (L_{max}):** L_{max} is the highest instantaneous sound level measured during a specified period.
- **Day-Night Level (L_{dn}):** L_{dn} 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 L_{dn}, 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 following factors.

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., those sites with an absorptive ground surface between the source and the receiver, such as 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 have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway 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 specifically to reduce noise. 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.

Chapter 4 Federal Regulations and State Policies

This report focuses on the requirements of 23 CFR 772, discussed below.

4.1 Federal Regulations

4.1.1 23 CFR 772

23 CFR 772 provides 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 on a new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment of the highway. The following projects are also considered to be Type I projects:

- The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a high-occupancy vehicle (HOV) lane, high-occupancy toll (HOT) lane, bus lane, or truck climbing lane.
- The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane.
- The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange.
- Restriping existing pavement for the purpose of adding a through traffic lane or an auxiliary lane.
- The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot, or toll plaza.

If a project is determined to be a Type I project under this definition, the entire project area as defined in the environmental document is a Type I project.

A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment. A Type III project is a project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis. The proposed project is considered to be a Type I because the project alternatives involve addition of through lanes, which are capacity-increasing improvements.

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 that the project sponsor "consider" noise abatement before adoption of the final NEPA document. This process involves identification of noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project, and of 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 *substantial increase* or *approach*; these criteria are defined in the Protocol, as described below.

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

Table 4-1. Activity Categories and Noise Abatement Criteria (23 CFR 772)

Activity Category	Activity $L_{eq}[h]$[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.
B2	67	Exterior	Residential.
C2	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	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F			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			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).

4.1.2 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 Protocol defines a noise increase as *substantial* when the predicted noise levels with project implementation exceed existing noise levels by 12 dBA or more. The Protocol also states that a sound level is considered to *approach* an 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 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 State Regulations and Policies

4.2.1 California Environmental Quality Act (CEQA)

Noise analysis under the California Environmental Quality Act (CEQA) may be required regardless of whether or not the project is a Type I project. The CEQA noise analysis is completely independent of the 23 CFR 772 analysis done for NEPA. Under CEQA, the baseline noise level is compared to the build noise level. The assessment entails looking at the setting of the noise impact and then how large or perceptible any noise increase would be in the given area. Key considerations include: the uniqueness of the setting, the sensitive nature of the noise receptors, the magnitude of the noise increase, the number of residences affected, and the absolute noise level.

The significance of noise impacts under CEQA are addressed in the environmental document rather than the NSR. Even though the NSR does not specifically evaluate the significance of noise impacts under CEQA, it must contain the technical information that is needed to make that determination in the environmental document.

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 L_{eq}(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 L_{eq}(h). If the noise levels generated from freeway and roadway sources exceed 52 dBA L_{eq}(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.

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, by Activity Category as defined in Table 4-1, and by the extent of frequent human use. As stated in the Protocol, noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. Although all developed land uses are evaluated in this analysis, the focus is on locations of frequent human use. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common use areas at multi-family residences. The geometry of the project relative to nearby existing and planned land uses was also identified.

Short-term measurement locations were selected to characterize the ambient noise environment at various locations near the proposed project alignment(s). Short-term measurement locations were also selected to be used as representative modeling locations.

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 11 locations on Tuesday, October 27 and Wednesday, October 28, 2015, using Larson-Davis Model 831 and Model LxT Precision Type 1 sound level meters. The short-term measurement locations are identified in Figure 5-1. Short-term measurements were attended by field staff to count traffic and record observations concurrent with each measurement. The L_{eq} values calculated by the sound level meter during each measurement period (15 minutes in duration) were logged manually on field data sheets for each measurement location. Dominant noise sources observed and other relevant measurement conditions were identified and logged on field data sheets. The calibration of meters was checked before and after the measurement, using a Larson-Davis Model CAL 200 calibrator.

Temperature, wind speed, and humidity were recorded manually during each short-term measurement using a Kestrel 3000 portable weather station. During the short-term measurements, skies varied from overcast to partly sunny, with average wind speeds of 3 mph, and temperatures ranging from 64°F to 81°F.

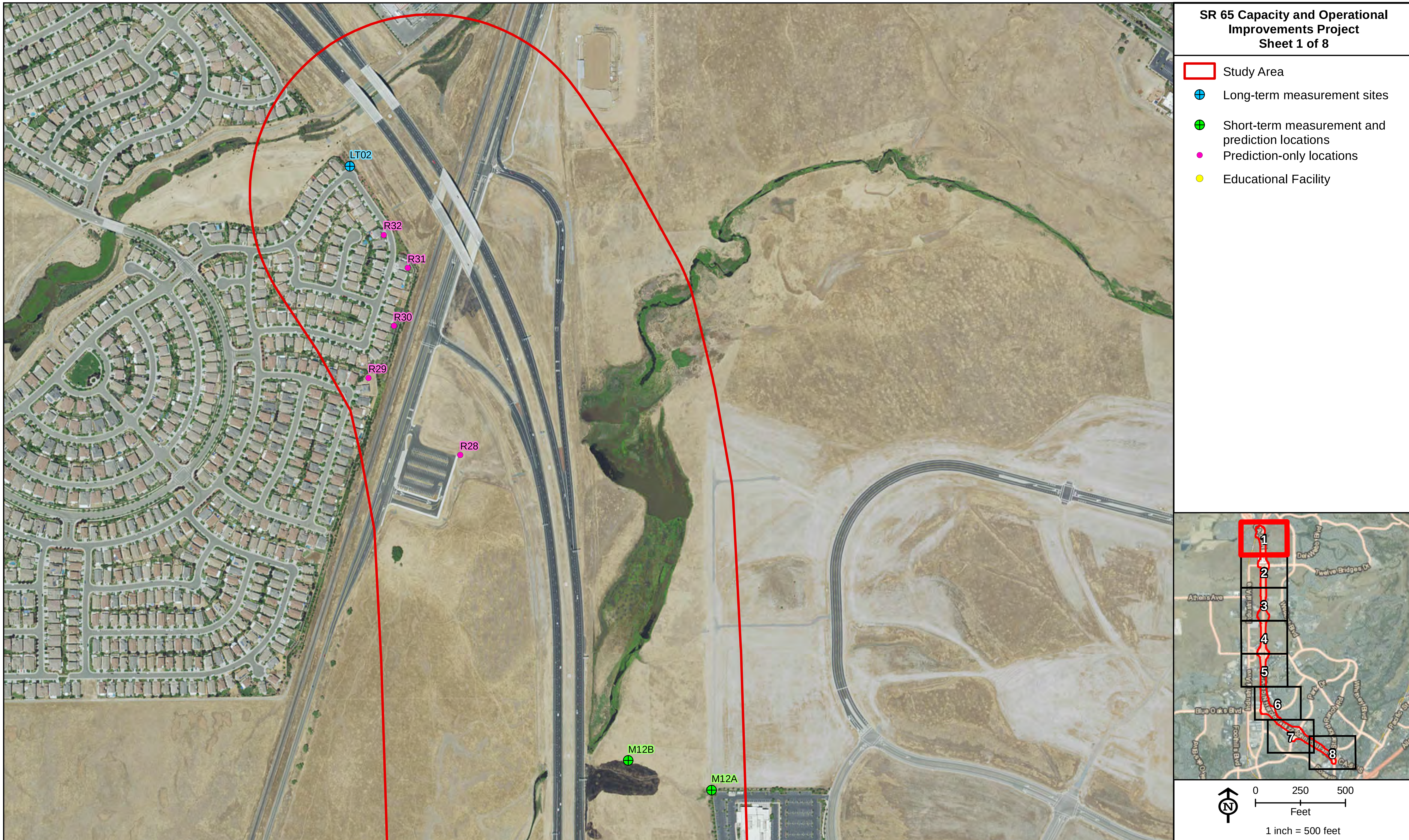

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Figure 5-1
Noise Measurement and Prediction Locations

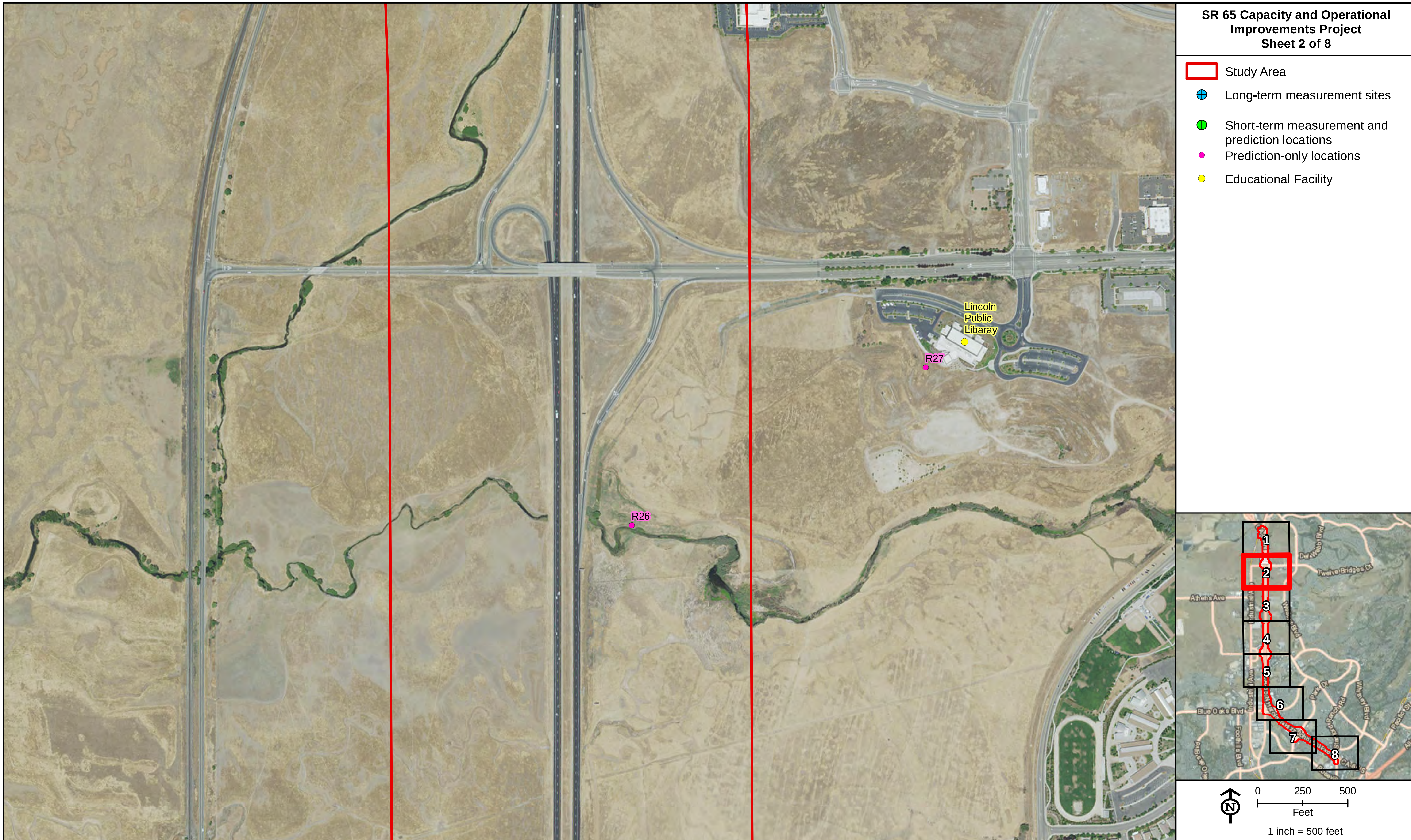

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Figure 5-1
Noise Measurement and Prediction Locations

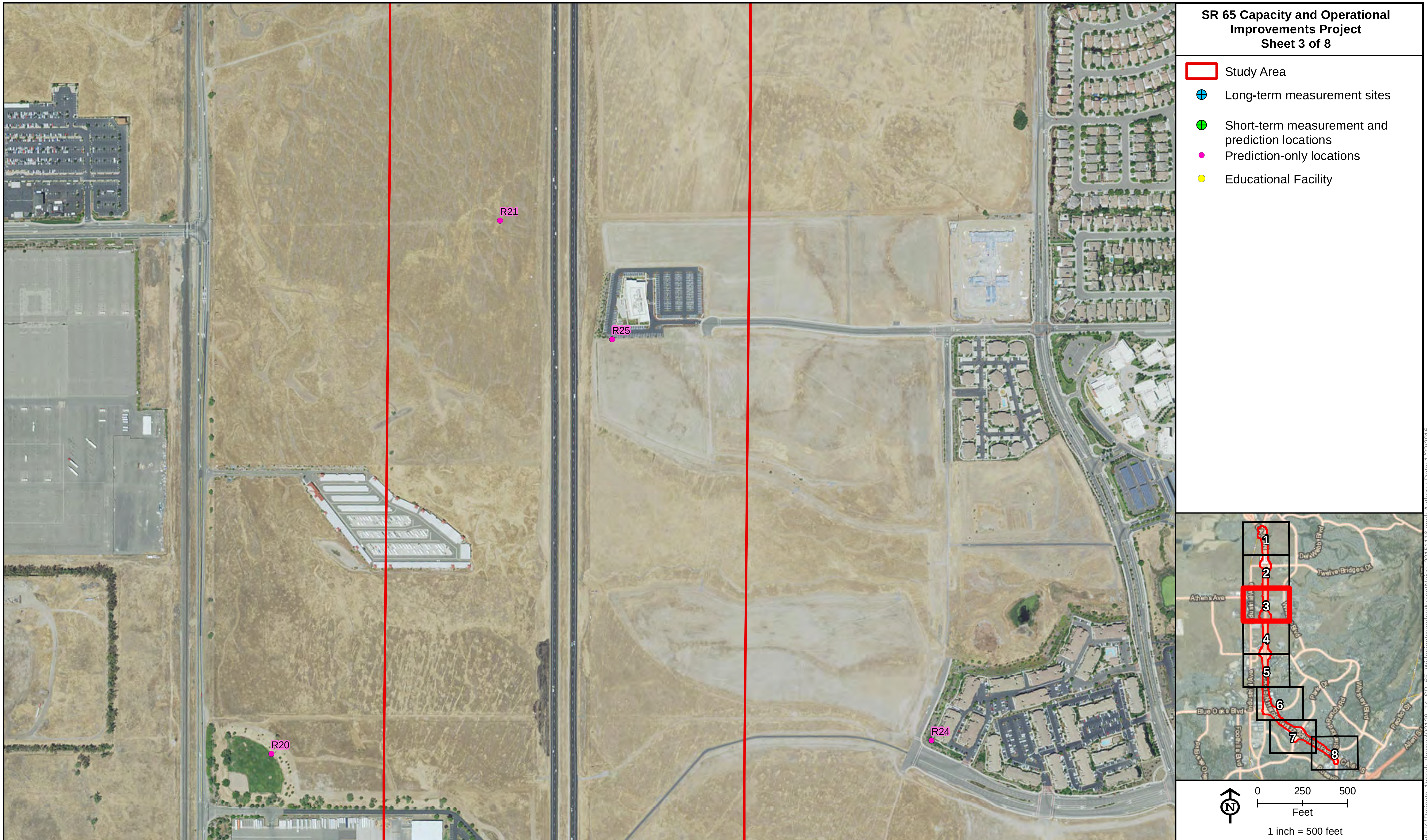

Figure 5-1
Noise Measurement and Prediction Locations

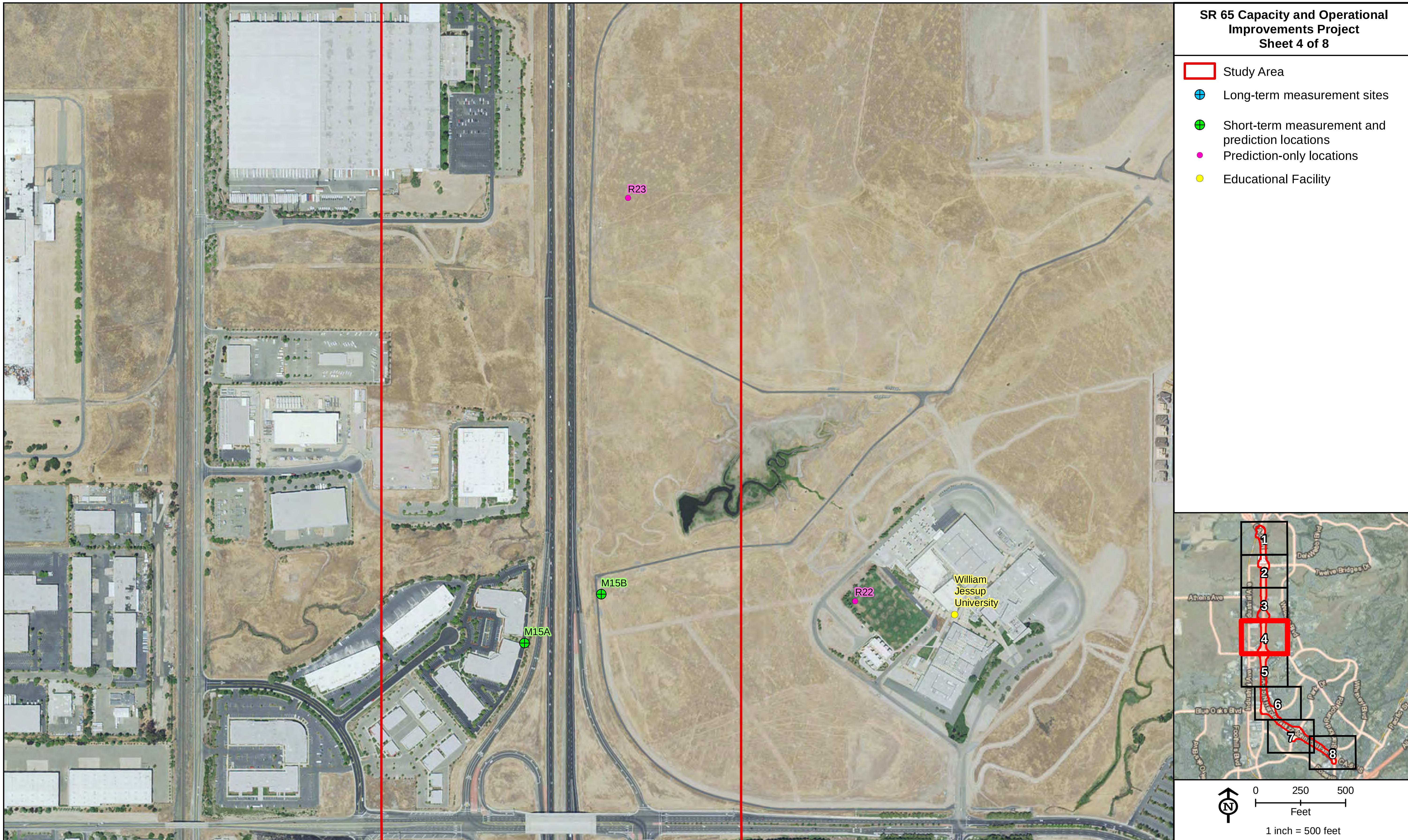

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Figure 5-1
Noise Measurement and Prediction Locations

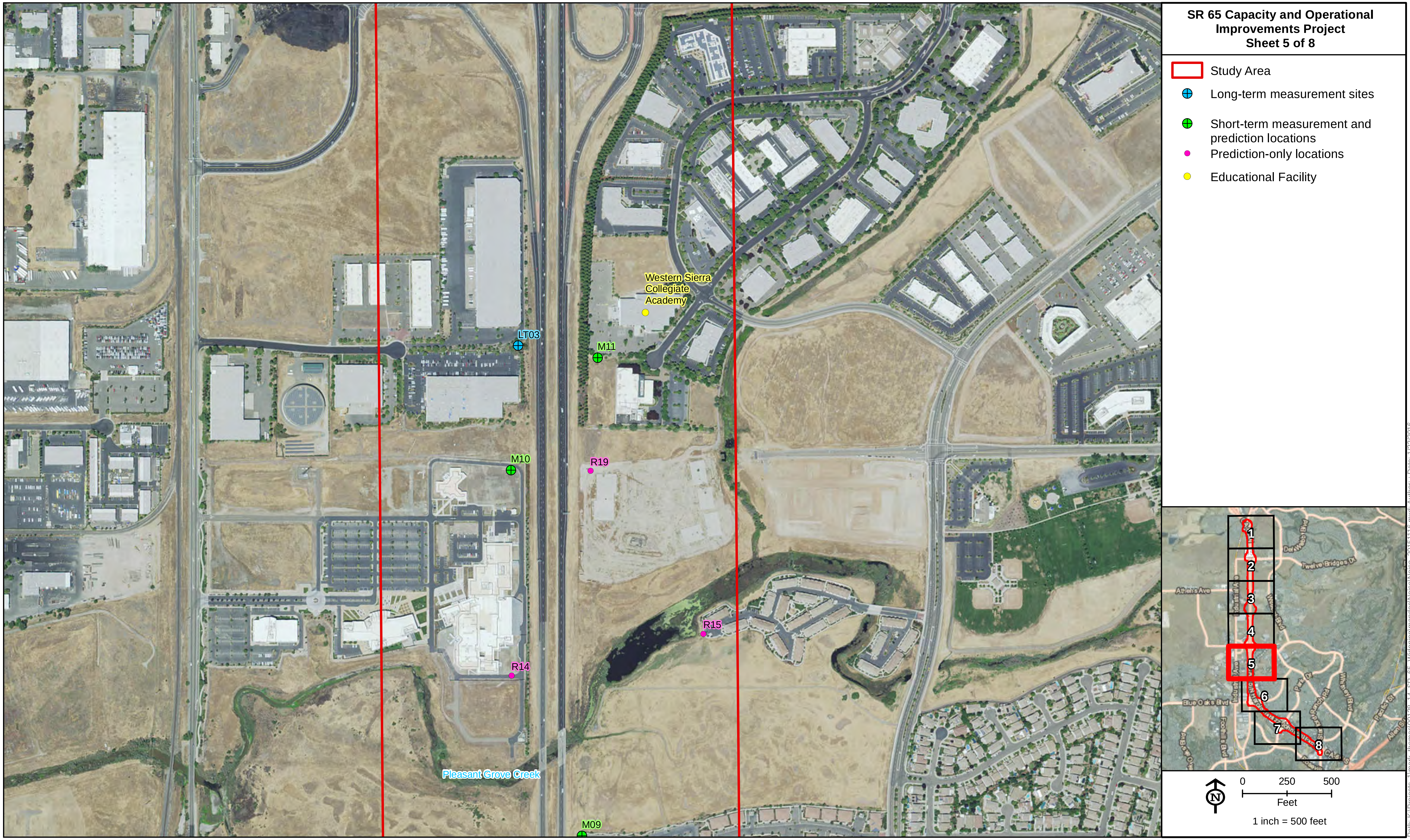
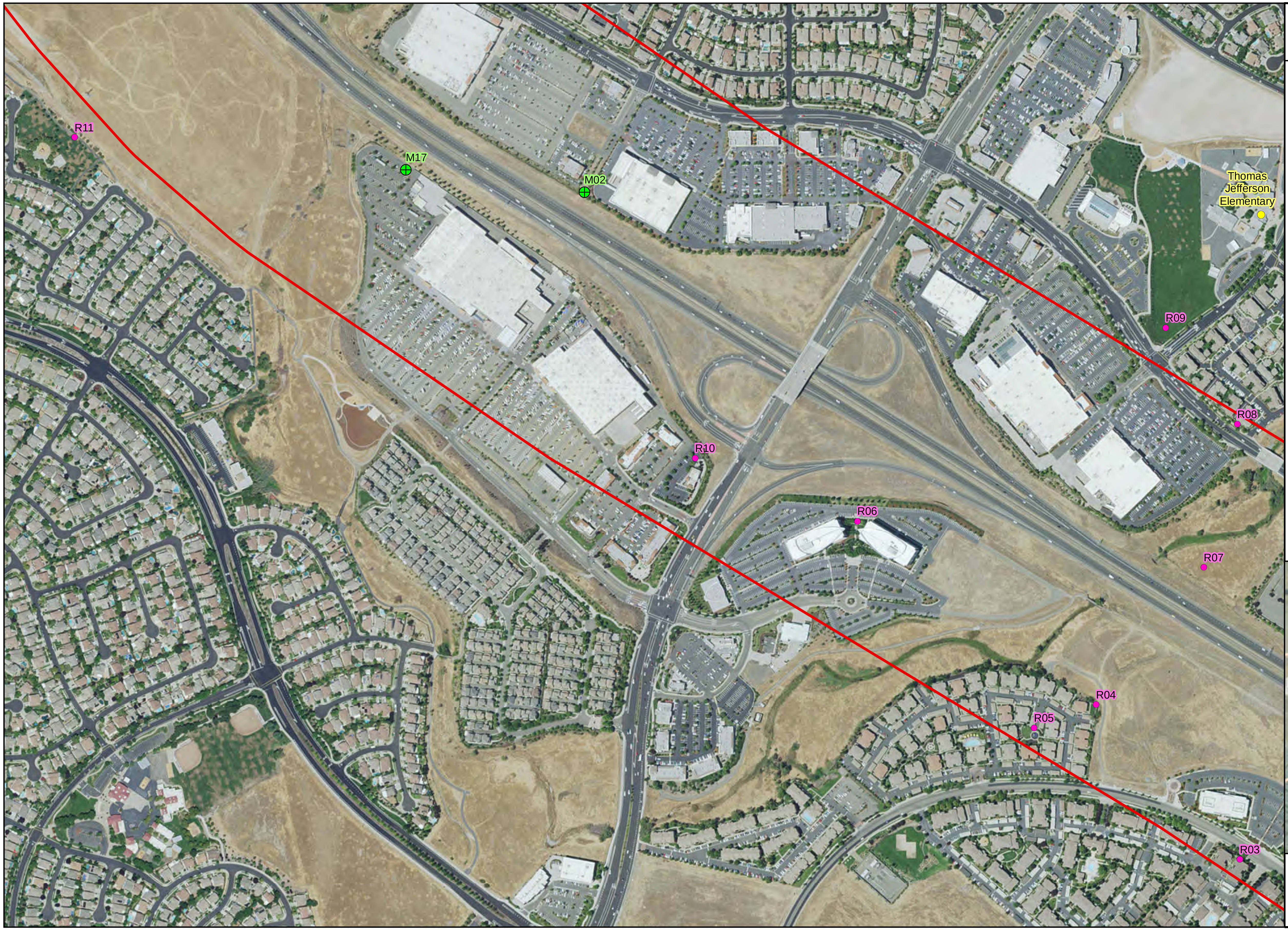


Figure 5-1
Noise Measurement and Prediction Locations

Figure 5-1
Noise Measurement and Prediction Locations

SR 65 Capacity and Operational Improvements Project
Sheet 7 of 8

- Study Area
- Long-term measurement sites
- Short-term measurement and prediction locations
- Prediction-only locations
- Educational Facility



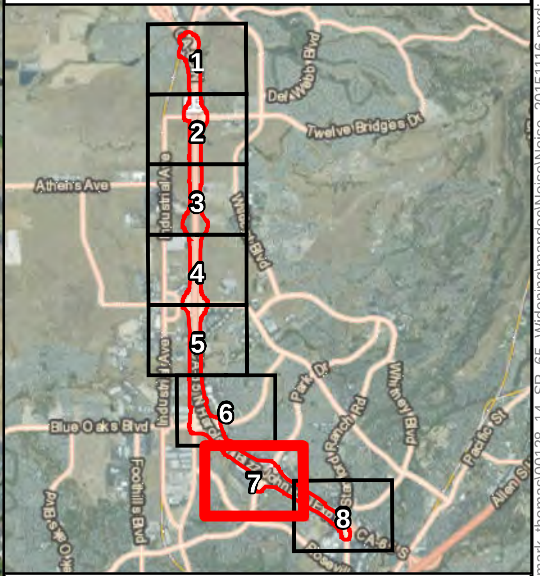


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Figure 5-1
Noise Measurement and Prediction Locations

SR 65 Capacity and Operational Improvements Project
Sheet 8 of 8

- Study Area
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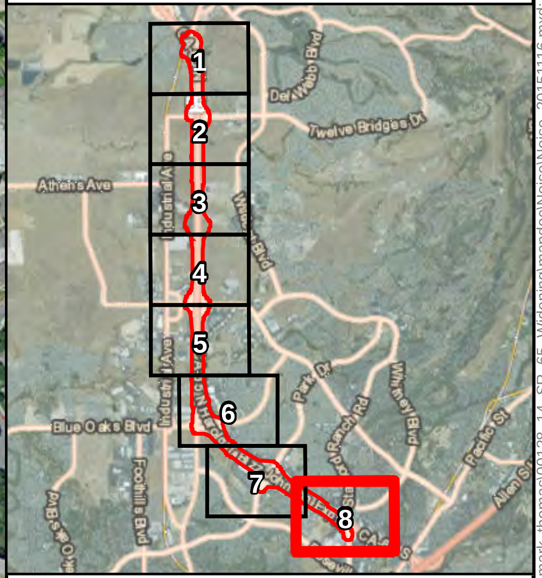

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Figure 5-1
Noise Measurement and Prediction Locations

5.2.2 Long-Term Measurements

Long-term monitoring was conducted at three locations (LT-1, LT-2 and LT-3) in the project area (Figure 5-1) using Piccolo Type 2 sound level meters. The purpose of these measurements was to quantify the daily trend in noise levels throughout a 24-hour period and identify the peak traffic noise hour or “loudest” hour. The results of these measurements were used to describe variations in sound levels throughout the day, rather than absolute sound levels at a specific receptor of concern. The long-term sound level data were collected between Tuesday, October 27 and Thursday, October 29, 2015. Field notes are included in Appendix C.

5.3 Traffic Noise Levels Prediction Methods

Traffic noise levels were predicted using the FHWA Traffic Noise Model Version 2.5 (TNM 2.5). TNM 2.5 is a computer model based on two FHWA reports: FHWA-PD-96-009 and FHWA-PD-96-010 (FHWA 1998a, 1998b). Three-dimensional representations of roadways, shielding features (e.g., topography and buildings), noise barriers, ground type, and receivers were developed using CAD drawings, aerials, and topographic contours provided by Mark Thomas, Inc. and input into the traffic noise model.

Traffic noise was evaluated under existing conditions (year 2012), design-year (2040) no-project conditions, and design-year conditions under two build alternatives. Loudest-hour traffic volumes, vehicle classification percentages, and traffic speeds under existing and design-year were provided by Fehr & Peers for input into the traffic noise model (Fehr & Peers 2015). The highest average traffic volumes on SR 65 are predicted to occur during PM hours; therefore PM peak hour traffic volumes were used in the model. Tables in Appendix A (Traffic Data) summarize traffic volumes used for modeling existing and design-year conditions. Because traffic noise is generally loudest when roads operate at maximum vehicle capacity and free-flow traffic conditions, a maximum volume of 1,900 vehicles per hour per lane traveling at the posted speed was used to characterize worst-hour noise conditions for the SR 65 mainline.

To validate the accuracy of the model, TNM 2.5 was used to compare measured traffic noise levels to modeled noise levels at field measurement locations. For each receiver, traffic volumes counted during the short-term measurement periods were normalized to 1-hour volumes. These normalized volumes were assigned to the corresponding project area roadways to simulate the noise source strength at the roadways during the actual measurement period. Modeled and measured sound levels were then compared to determine the accuracy of the model and re-calibrate if necessary.

5.4 Methods for Identifying Traffic Noise Impacts and Consideration of Abatement

Traffic noise impacts are considered to occur at receptor locations where predicted design-year noise levels are 12 dB or more greater than existing noise levels, or where predicted design-year noise levels approach or exceed the NAC for the applicable activity category. 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 impacted receptor 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 receptors, as required by the *Highway Design Manual*, Chapter 1100. Other factors that affect feasibility include topography, access requirements for driveways and ramps, 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 the following three factors:

- The noise reduction design goal.
- The cost of noise abatement.
- The viewpoints of benefited receptors (including property owners and residents of the benefited receptors).

The Caltrans' acoustical design goal is that a barrier must be predicted to provide at least 7 dB of noise reduction at one benefited receptor. 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. Based on 2015 construction costs, an allowance of $71,000 is provided for each benefited receptor (i.e., receptors that receive at least 5 dB of noise reduction from a noise barrier). The total allowance for each barrier is calculated by multiplying the number of benefited receptors by $71,000. The allowance should be adjusted annually based on the published Caltrans Construction Price Index (CPI) and a base 2011 allowance of $55,000. If the estimated construction cost of a barrier is less than the total calculated allowance for the barrier, the barrier is considered reasonable from a cost perspective. The viewpoints of benefits receptors are determined by a survey that is typically conducted after completion of the noise study report. The process for conducting the survey is described in detail in the Protocol.

The noise study report identifies traffic noise impacts and evaluates noise abatement for acoustical feasibility where applicable. Where applicable, it also reports information that will be used in the reasonableness analysis, including if the 7 dB design goal reduction in noise can be achieved, and the abatement allowances. The noise study report does not make any conclusions regarding reasonableness. The feasibility and reasonableness of noise abatement is reported in a Noise Abatement Decision Report, if needed.

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. As required by the Protocol, although all types of land use are evaluated in this analysis, noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level.

The project area consists of residential subdivisions (Activity Category B), a place of worship (Activity Category C), schools (Activity Category C), a jail (institutional use) (Activity Category C), a hospital (Activity Category C), a hotel (Activity Category E), several commercial uses that include no apparent outdoor areas of frequent human use (Activity Category F), and undeveloped land (Activity Category G). The residential subdivisions in the study area are generally set back from SR 65 and buffered by commercial use and undeveloped land.

6.2 Noise Measurement Results

The existing noise environment in the project area is characterized based on short-term noise monitoring that was conducted as described in Chapter 5. Table 6-1 summarizes the results of the short-term noise monitoring. Locations of short-term measurement sites are shown in Figure 5-1.

Table 6-1. Summary of Short-Term Measurements

Site	Location	Primary Source	Time	Duration of Measurement (minutes)	Measured L_{eq} (dBA)
M02	Fairway Drive	SR 65	10/27/15 2:30 p.m.	15	73.4
M04	Fairway Drive	SR 65	10/28/15 9:43 a.m.	15	64.3
M08	Adams Drive	SR 65	10/28/15 10:48 a.m.	15	58.9
M09	Adams Drive	SR 65	10/28/15 10:48 a.m.	15	65.1
M10	Industrial Avenue	SR 65	10/28/15 11:46 a.m.	15	64.7
M11	Atherton Road	SR 65	10/28/15 11:46 a.m.	15	65.1
M12A	Dresden Drive	SR 65	10/28/15 3:21 p.m.	15	57.9
M12B	Dresden Drive	SR 65	10/28/15 3:21 p.m.	15	63.6
M15A	Technology Way	SR 65	10/28/15 2:15 p.m.	15	66.7
M15B	Atherton Road	SR 65	10/28/15 2:15 p.m.	15	64.4
M17	Highland Pointe Drive	SR 65	10/28/15 9:42 a.m.	15	71.8

6.3 Long-Term Measurements

Long-term monitoring was conducted at three locations. The purpose of long-term noise measurements was to determine the changes in noise levels within the project area throughout a typical day and to identify the worst noise hour. The data is presented for documentation purposes and is not used in the prediction analysis. Long-term sound level data was collected from Tuesday October 27 to Thursday October 29, 2015.

Long-term monitoring site LT-1 (shown on Figure 5-1) was mounted on a lighting pole at Staybridge Suites hotel in Rocklin. There was a clear line of sight to SR 65 at this location. The worst-hour noise level measured was 71.6 dBA L_{eq}(h) during the 7:00 a.m. hour. Hourly noise levels and offsets between the worst-hour noise and each of the 24 hours of the measurement period are shown in Table 6-2.

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

Date	Time (hour beginning)	1-Hour Leq (dBA)	Difference from Worst-Hour Noise (dB)
October 28, 2015	0:00:00	63.9	-7.7
	1:00:00	62.6	-9
	2:00:00	61.4	-10.2
	3:00:00	62.2	-9.4
	4:00:00	64.4	-7.2
	5:00:00	68.1	-3.5
	6:00:00	70.8	-0.8
	7:00:00	**71.6**	**0**
	8:00:00	71.1	-0.5
	9:00:00	70.1	-1.5
	10:00:00	68.6	-3
	11:00:00	71.4	-0.2
	12:00:00	70.5	-1.1
	13:00:00	69	-2.6
	14:00:00	68.6	-3
	15:00:00	68.8	-2.8
	16:00:00	66.8	-4.8
	17:00:00	68	-3.6
	18:00:00	70.4	-1.2
	19:00:00	70	-1.6
	20:00:00	69.6	-2
	21:00:00	69.1	-2.5
	22:00:00	67.4	-4.2
	23:00:00	66.2	-5.4
Maximum		71.6	
Minimum		61.4	

Note: Worst-hour noise is shown in **bold**.
dBA Leq[h] = A-weighted equivalent sound level; dB = decibels

Long-term monitoring site LT-2 (shown on Figure 5-1) was mounted on a fence in a residential subdivision on Ashford Lane in Lincoln. There was no line of sight to SR 65 at this location, as the freeway is elevated and includes a soundwall with a height of 8 to 10 feet. The worst-hour noise level measured was 62.3 dBA L_{eq}(h) during the 5:00 p.m. hour. Hourly noise levels and offsets between the worst-hour noise and each of the 24 hours of the measurement period are shown in Table 6-3.

Table 6-3. Summary of Long-Term Measurements at Location LT-2

Date	Time (hour beginning)	1-Hour Leq (dBA)	Difference from Worst-Hour Noise (dB)
October 28, 2015	0:00:00	56.5	-5.8
	1:00:00	59	-3.3
	2:00:00	51.7	-10.6
	3:00:00	48.2	-14.1
	4:00:00	51.2	-11.1
	5:00:00	59.7	-2.6
	6:00:00	58.4	-3.9
	7:00:00	61.6	-0.7
	8:00:00	59.9	-2.4
	9:00:00	58.7	-3.6
	10:00:00	57.1	-5.2
	11:00:00	61.3	-1
	12:00:00	55.7	-6.6
	13:00:00	55.2	-7.1
	14:00:00	57.2	-5.1
	15:00:00	59	-3.3
	16:00:00	56.9	-5.4
	17:00:00	**62.3**	**0**
	18:00:00	58.1	-4.2
	19:00:00	57.2	-5.1
	20:00:00	56.4	-5.9
	21:00:00	59	-3.3
	22:00:00	56.8	-5.5
	23:00:00	59	-3.3
Maximum		62.3	
Minimum		48.2	
Note: Worst-hour noise is shown in **bold**. dBA Leq[h] = A-weighted equivalent sound level; dB = decibels			

Long-term monitoring site LT-3 (shown on Figure 5-1) was mounted on a lighting pole at the end of Tinker Road in a commercial area in Rocklin. There was a clear line of sight to SR 65 at this location. The worst-hour noise level measured was 66.8 dBA L_{eq}(h) during the 7:00 a.m. and 8:00 a.m. hours. Hourly noise levels and offsets between the worst-hour noise and each of the 24 hours of the measurement period are shown in Table 6-4.

Table 6-4. Summary of Long-Term Measurements at Location LT-3

Date	Time (hour beginning)	1-Hour Leq (dBA)	Difference from Worst-Hour Noise (dB)
October 28, 2015	0:00:00	58	-8.8
	1:00:00	56.6	-10.2
	2:00:00	56.3	-10.5
	3:00:00	56.6	-10.2
	4:00:00	59.5	-7.3
	5:00:00	62.7	-4.1
	6:00:00	65.6	-1.2
	7:00:00	**66.8**	**0**
	8:00:00	**66.8**	**0**
	9:00:00	66.1	-0.7
	10:00:00	65.2	-1.6
	11:00:00	64.8	-2
	12:00:00	65.1	-1.7
	13:00:00	64.2	-2.6
	14:00:00	63.9	-2.9
	15:00:00	64.2	-2.6
	16:00:00	64.6	-2.2
	17:00:00	65.4	-1.4
	18:00:00	65.2	-1.6
	19:00:00	64	-2.8
	20:00:00	63.4	-3.4
	21:00:00	62.7	-4.1
	22:00:00	61.3	-5.5
	23:00:00	60.2	-6.6
Maximum		66.8	
Minimum		56.3	
Note: Worst-hour noise is shown in **bold**. dBA Leq[h] = A-weighted equivalent sound level; dB = decibels			

6.4 Noise Model Calibration

TNM 2.5 was used in this analysis to compare measured traffic noise levels to modeled noise levels at field measurement site locations. Traffic counts were conducted simultaneously with noise measurements and input into the model for calibration. Traffic volumes were classified into three vehicle types: (1) light-duty autos and trucks, (2) medium-duty trucks (typically trucks with two axles and more than four wheels), and (3) heavy-duty trucks (typically trucks with more than two axles).

For each receiver, traffic volumes counted during the short-term measurement periods were normalized to 1-hour volumes. These normalized volumes were assigned to the corresponding project roadways to simulate the noise source strength of the roadways during the actual measurement period. Table 6-5 compares measured and modeled noise levels at each measurement position. In general, modeled sound level predictions using counted traffic are considered to be in reasonable agreement if they are within 3 dB of measured sound levels. Modeled sound levels for 9 of 11 measurement locations were found to be in the range of minus-2 to plus-3 dB, which is in close agreement with measured sound levels. For two receivers, predicted levels were 4 to 5 dB higher than measured levels. Therefore a minus-4 adjustment factor was used in the model for these two sites. No adjustment factor was applied to the other sites.

The comparison between measured and predicted sound levels and associated calibration factors is shown in Table 6-5.

Table 6-5. Comparison of Measured to Predicted Sound Levels in the TNM Model

Site	Measured Sound Level (dBA)	Predicted Sound Level (dBA)	Predicted minus Measured (dB)	Adjustment Factor Applied to the TNM Model (dB)
M02	73.4	72.1	-1.3	0
M04	64.3	61.9	-2.4	0
M08	58.9	57.1	-1.8	0
M09	65.1	66.4	+1.3	0
M10	64.7	65.7	+1.0	0
M11	65.1	68	+2.9	0
M12A	57.9	59.2	+1.3	0
M12B	63.6	65.5	+1.9	0
M15A	66.7	71.3	+4.6	-4.0
M15B	64.4	68.6	+4.2	-4.0
M17	71.8	71.6	-0.2	0

6.5 Existing Modeled Noise Levels

Predicted traffic noise levels under existing conditions are shown in Table B-1 of Appendix B. As shown in Table B-1, existing worst-hour traffic noise levels range from 47 to 73 dBA L_{eq}(h) for all receivers. Existing worst-hour traffic noise levels at residential land uses, or Activity Category B land uses, range from 47 to 60 dBA L_{eq}(h).

Chapter 7 Future Noise Environment, Impacts, and Considered Abatement

7.1 Future Noise Environment and Impacts

Results tables in Appendix B summarize the traffic noise modeling results for existing conditions and design-year conditions with and without the project. Predicted design-year traffic noise levels with the project are compared with existing conditions as well as design-year no-project conditions. The comparison with existing conditions is included in the analysis to identify traffic noise impacts under 23 CFR 772. The comparison with no-project conditions indicates the direct effect of the proposed project.

Predicted traffic noise level ranges by land use category under existing and future conditions are shown in Table 7-1.

Table 7-1. Predicted Traffic Noise Levels by Land Use Category, Existing and Future Conditions.

Noise Activity Category	Activity Leq(h)	Existing Conditions Traffic Noise Levels, dBA Leq(h)	Future No-Build Conditions Traffic Noise Levels, dBA Leq(h)	Future Build Conditions Traffic Noise Levels, dBA Leq(h)
A	57 (exterior)	N/A	N/A	N/A
B	67 (exterior)	47 to 60	51 to 62	52 to 64
C	67 (exterior)	46 to 72	48 to 73	50 to 76
D	52 (interior)	N/A	N/A	N/A
E	72 (exterior)	63	66	67
F	N/A	57 to 73	58 to 76	59 to 77
G	N/A	54 to 69	56 to 72	57 to 74

Predicted traffic noise levels under design-year conditions are also shown in Table B-1 for Alternative 1, and Table B-2 for Alternative 2. In general, the difference in traffic volume between alternatives was 2% or less, and geometric differences were minor, so noise levels were nearly the same between alternatives (only 2 receivers differed by 1 dB between alternatives). Predicted worst-case traffic noise levels for design-year no-build conditions range from 48 to 76 dBA L_{eq}(h) for all land uses, with noise levels of up to 62 dBA at Activity Category B land uses (residential). Predicted worst-case traffic noise levels for design-year build conditions range from 50 to 77 dBA L_{eq}(h) for all land uses, with noise levels of up to 64 dBA at Activity Category B land uses. Therefore traffic noise levels are not predicted to approach or exceed the NAC at Activity Category B land uses.

Noise levels are predicted to approach or exceed the NAC of 67 dBA L_{eq}(h) for several Activity Category C land uses adjacent to SR 65: the Placer County Jail (institutional use), Placer Center for Health, the Western Sierra Collegiate Academy, Rocklin Academy Gateway, and Creekside Church. Traffic noise impacts are therefore predicted to occur at these Activity Category C land uses. Noise levels are not predicted to approach or exceed the NAC for Activity Category E land uses (a hotel and an outdoor area at a corporate park). There are no NAC for several Activity

Category F and G land uses in the project area. Predicted traffic noise levels for Activity Category F and G locations are reported in Appendix B for informational purposes.

Traffic noise levels are predicted to increase by a maximum of 6 dB. This is less than the substantial increase threshold of 12 dB, so no impacts from substantial increase are predicted to occur under design-year build conditions.

7.2 Preliminary Noise Abatement Analysis

In accordance with 23 CFR 772, noise abatement must be considered where traffic noise impacts are predicted to occur. However, noise abatement is considered only for areas of frequent human use that would benefit from a lower noise level. As discussed in Section 7.1, traffic noise impacts are predicted to occur at Activity Category C land uses in the project area. However, there are no outdoor areas of frequent human use associated with any of these locations. Therefore, noise abatement was not considered at these Activity Category C land uses.

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 activities include demolition of existing pavement, building of new structures, and implementation of detours. Equipment operations associated with demolition and building activities will be a source of noise. Implementation of detours may increase noise in some areas as a result of temporarily diverted traffic. Construction noise is controlled by Caltrans Standard Specifications Section 14-8.02 NOISE CONTROL which states:

- Do not exceed 86 dBA 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.

Table 8-1 summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. Construction equipment is expected to generate noise levels ranging from 80 to 90 dB at a distance of 50 feet, which would be reduced over distance at a rate of about 6 dB per doubling of distance.

Table 8-1. Construction Equipment Noise

Equipment	Maximum Noise Level (dBA at 50 feet)
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Pneumatic Tools	85
Concrete Pump	82
Source: Federal Transit Administration 2006.	

No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with Caltrans Standard Specifications Section 14-8.02 and applicable local noise standards. Construction noise would be short-term, intermittent, and overshadowed by local traffic noise. Although not required, implementing the following measures would minimize the temporary noise impacts from construction.

- All equipment will have sound-control devices that are no less effective than those provided on the original equipment. No equipment will have an unmuffled exhaust.
- As directed by Caltrans, the contractor will implement appropriate additional noise mitigation measures, including 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.

Chapter 9 References

9.1 Printed References

California Department of Transportation (Caltrans). 2011. *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.* August. Sacramento, CA.

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Appendix A Traffic Data

Table A-1. Existing Peak Hour Traffic Volumes

Roadway	Segment	Number of Lanes	Total Volume PM Peak Hour Volume	Auto		Medium Trucks		Heavy Trucks		Speed
				%	Volume	%	Volume	%	Volume	(A/HT)
State Route 65 NB	Stanford Ranch Road to Pleasant Grove Boulevard	2	3,800	96%	3,648	0%	0	4%	152	65/65
State Route 65 NB	Pleasant Grove Boulevard to Blue Oaks Boulevard	2	3,674	96%	3,527	0%	0	4%	147	65/65
State Route 65 NB	Blue Oaks Boulevard to Sunset Boulevard	2	2,980	96%	2,861	0%	0	4%	119	65/65
State Route 65 NB	Sunset Boulevard to Twelve Bridges Drive	2	2,629	96%	2,524	0%	0	4%	105	65/65
State Route 65 NB	Twelve Bridges Boulevard to Lincoln Boulevard	2	2,355	96%	2,261	0%	0	4%	94	65/65
State Route 65 SB	Lincoln Boulevard to Twelve Bridges Boulevard	2	1,717	96%	1,648	0%	0	4%	69	65/65
State Route 65 SB	Twelve Bridges Boulevard to Sunset Boulevard	2	1,891	96%	1,815	0%	0	4%	76	65/65
State Route 65 SB	Sunset Boulevard to Blue Oaks Boulevard	2	2,752	96%	2,642	0%	0	4%	110	65/65
State Route 65 SB	Blue Oaks Boulevard to Pleasant Grove Boulevard	2	3,510	96%	3,370	0%	0	4%	140	65/65
State Route 65 SB	Pleasant Grove Boulevard to Stanford Ranch Road	2	3,800	96%	3,648	0%	0	4%	152	65/65
Pleasant Grove Boulevard	Offramp from SR 65 NB	1	1,010	96%	970	0%	0	4%	40	40/40
Pleasant Grove Boulevard	Onramp to SR 65 SB	1	584	96%	561	0%	0	4%	23	40/40
Pleasant Grove Boulevard	Onramp to SR 65 NB	1	546	96%	524	0%	0	4%	22	40/40
Pleasant Grove Boulevard	Onramp to SR 65 SB	1	299	96%	287	0%	0	4%	12	40/40
Pleasant Grove Boulevard	Offramp from SR 65 SB	1	564	96%	541	0%	0	4%	23	40/40
Blue Oaks Boulevard	Onramp to SR 65 NB	1	479	96%	460	0%	0	4%	19	40/40
Blue Oaks Boulevard	Offramp from SR 65 NB	1	1,173	96%	1,126	0%	0	4%	47	40/40
Sunset Boulevard	Offramp from SR 65 NB	1	689	96%	661	0%	0	4%	28	40/40
Sunset Boulevard	Onramp to SR 65 SB	1	268	96%	257	0%	0	4%	11	40/40
Sunset Boulevard	Onramp to SR 65 NB	1	70	97%	68	0%	0	3%	2	40/40
Sunset Boulevard	Onramp to SR 65 SB	1	506	96%	486	0%	0	4%	20	40/40
Sunset Boulevard	Onramp to SR 65 NB	1	268	96%	257	0%	0	4%	11	40/40
Sunset Boulevard	Offramp from SR 65 SB	1	244	96%	234	0%	0	4%	10	40/40
Twelve Bridges Drive	Offramp from SR 65 NB	1	567	96%	544	0%	0	4%	23	40/40
Twelve Bridges Drive	Onramp to SR 65 SB	1	381	96%	366	0%	0	4%	15	40/40
Twelve Bridges Drive	Onramp to SR 65 NB	1	293	96%	281	0%	0	4%	12	40/40
Twelve Bridges Drive	Offramp from SR 65 SB	1	207	96%	199	0%	0	4%	8	40/40
Lincoln Boulevard	Offramp from SR 65 NB	1	940	96%	902	0%	0	4%	38	40/40
Lincoln Boulevard	Onramp to SR 65 SB	1	634	96%	609	0%	0	4%	25	40/40

Table A-2. Alternative 1: HOV Lanes (2040) Peak Hour Traffic Volumes

Roadway	Segment	Number of Lanes	Total Volume PM Peak Hour Volume	Auto		Medium Trucks		Heavy Trucks		Speed (A/HT)
				%	Volume	%	Volume	%	Volume	
State Route 65 NB	Stanford Ranch Road to Pleasant Grove Boulevard	3	7,600	96%	7,296	0%	0	4%	304	65/65
State Route 65 NB	Pleasant Grove Boulevard to Blue Oaks Boulevard	3	7,600	96%	7,296	0%	0	4%	304	65/65
State Route 65 NB	Blue Oaks Boulevard to Sunset Boulevard	3	7,110	96%	6,826	0%	0	4%	284	65/65
State Route 65 NB	Sunset Boulevard to Placer Parkway	3	6,590	96%	6,326	0%	0	4%	264	65/65
State Route 65 NB	Placer Parkway to Twelve Bridges Drive	3	6,430	96%	6,173	0%	0	4%	257	65/65
State Route 65 NB	Twelve Bridges Boulevard to Lincoln Boulevard	3	6,390	96%	6,134	0%	0	4%	256	65/65
State Route 65 SB	Lincoln Boulevard to Twelve Bridges Boulevard	3	4,630	96%	4,445	0%	0	4%	185	65/65
State Route 65 SB	Twelve Bridges Boulevard to Placer Parkway	3	4,640	96%	4,454	0%	0	4%	186	65/65
State Route 65 SB	Placer Parkway to Sunset Boulevard	3	4,770	96%	4,579	0%	0	4%	191	65/65
State Route 65 SB	Sunset Boulevard to Blue Oaks Boulevard	3	6,470	96%	6,211	0%	0	4%	259	65/65
State Route 65 SB	Blue Oaks Boulevard to Pleasant Grove Boulevard	3	7,600	96%	7,296	0%	0	4%	304	65/65
State Route 65 SB	Pleasant Grove Boulevard to Stanford Ranch Road	3	7,600	96%	7,296	0%	0	4%	304	65/65
State Route 65 NB HOV Lane	Stanford Ranch Road to Pleasant Grove Boulevard	1	1,830	100%	1,830	0%	0	0%	0	65
State Route 65 NB HOV Lane	Pleasant Grove Boulevard to Blue Oaks Boulevard	1	1,620	100%	1,620	0%	0	0%	0	65
State Route 65 NB HOV Lane	Blue Oaks Boulevard to Sunset Boulevard	1	1,280	100%	1,280	0%	0	0%	0	65
State Route 65 NB HOV Lane	Sunset Boulevard to Placer Parkway	1	1,050	100%	1,050	0%	0	0%	0	65
State Route 65 NB HOV Lane	Placer Parkway to Twelve Bridges Drive	1	950	100%	950	0%	0	0%	0	65
State Route 65 NB HOV Lane	Twelve Bridges Boulevard to Lincoln Boulevard	1	960	100%	960	0%	0	0%	0	65
State Route 65 SB HOV Lane	Lincoln Boulevard to Twelve Bridges Boulevard	1	690	100%	690	0%	0	0%	0	65
State Route 65 SB HOV Lane	Twelve Bridges Boulevard to Placer Parkway	1	620	100%	620	0%	0	0%	0	65
State Route 65 SB HOV Lane	Placer Parkway to Sunset Boulevard	1	700	100%	700	0%	0	0%	0	65
State Route 65 SB HOV Lane	Sunset Boulevard to Blue Oaks Boulevard	1	970	100%	970	0%	0	0%	0	65
State Route 65 SB HOV Lane	Blue Oaks Boulevard to Pleasant Grove Boulevard	1	1,250	100%	1,250	0%	0	0%	0	65
State Route 65 SB HOV Lane	Pleasant Grove Boulevard to Stanford Ranch Road	1	1,450	100%	1,450	0%	0	0%	0	65
Pleasant Grove Boulevard	Offramp from SR 65 NB	1	1,680	96%	1,613	0%	0	4%	67	40/40
Pleasant Grove Boulevard	Onramp to SR 65 SB	1	1,190	96%	1,142	0%	0	4%	48	40/40
Pleasant Grove Boulevard	Onramp to SR 65 NB	1	550	96%	528	0%	0	4%	22	40/40
Pleasant Grove Boulevard	Onramp to SR 65 SB	1	580	96%	557	0%	0	4%	23	40/40
Pleasant Grove Boulevard	Offramp from SR 65 SB	1	680	96%	653	0%	0	4%	27	40/40
Blue Oaks Boulevard	Onramp to SR 65 NB	1	1,080	96%	1,037	0%	0	4%	43	40/40
Blue Oaks Boulevard	Offramp from SR 65 NB	1	2,410	96%	2,314	0%	0	4%	96	40/40
Sunset Boulevard	Offramp from SR 65 NB	1	1,260	96%	1,210	0%	0	4%	50	40/40
Sunset Boulevard	Onramp to SR 65 SB	1	1,110	96%	1,066	0%	0	4%	44	40/40
Sunset Boulevard	Onramp to SR 65 NB	1	450	96%	432	0%	0	4%	18	40/40
Sunset Boulevard	Onramp to SR 65 SB	1	950	96%	912	0%	0	4%	38	40/40
Sunset Boulevard	Onramp to SR 65 NB	1	520	96%	499	0%	0	4%	21	40/40
Sunset Boulevard	Offramp from SR 65 SB	1	630	96%	605	0%	0	4%	25	40/40
Placer Parkway	Offramp from SR 65 NB	1	1,170	96%	1,123	0%	0	4%	47	40/40
Placer Parkway	Onramp to SR 65 NB	1	430	96%	413	0%	0	4%	17	40/40
Placer Parkway	Offramp from SR 65 SB	1	1,100	96%	1,056	0%	0	4%	44	40/40
Placer Parkway	Onramp to SR 65 SB	1	400	96%	384	0%	0	4%	16	40/40
Twelve Bridges Drive	Offramp from SR 65 NB	1	1,070	96%	1,027	0%	0	4%	43	40/40
Twelve Bridges Drive	Onramp to SR 65 SB	1	950	96%	912	0%	0	4%	38	40/40
Twelve Bridges Drive	Onramp to SR 65 NB	1	1,020	96%	979	0%	0	4%	41	40/40
Twelve Bridges Drive	Offramp from SR 65 SB	1	870	96%	835	0%	0	4%	35	40/40
Lincoln Boulevard	Offramp from SR 65 NB	1	1,390	96%	1,334	0%	0	4%	56	40/40
Lincoln Boulevard	Onramp to SR 65 SB	1	780	96%	749	0%	0	4%	31	40/40

Table A-3. Alternative 2: General Purpose Lanes (2040) Peak Hour Traffic Volumes

Roadway	Segment	Number of Lanes	Total Volume PM Peak Hour Volume	Auto		Medium Trucks		Heavy Trucks		Speed
				%	Volume	%	Volume	%	Volume	(A/HT)
State Route 65 NB	Stanford Ranch Road to Pleasant Grove Boulevard	3	7,600	96%	7,296	0%	0	4%	304	65/65
State Route 65 NB	Pleasant Grove Boulevard to Blue Oaks Boulevard	3	7,600	96%	7,296	0%	0	4%	304	65/65
State Route 65 NB	Blue Oaks Boulevard to Sunset Boulevard	3	6,760	96%	6,490	0%	0	4%	270	65/65
State Route 65 NB	Sunset Boulevard to Placer Parkway	3	6,450	96%	6,192	0%	0	4%	258	65/65
State Route 65 NB	Placer Parkway to Twelve Bridges Drive	3	6,320	96%	6,067	0%	0	4%	253	65/65
State Route 65 NB	Twelve Bridges Boulevard to Lincoln Boulevard	3	6,280	96%	6,029	0%	0	4%	251	65/65
State Route 65 SB	Lincoln Boulevard to Twelve Bridges Boulevard	3	4,640	96%	4,454	0%	0	4%	186	65/65
State Route 65 SB	Twelve Bridges Boulevard to Placer Parkway	3	4,640	96%	4,454	0%	0	4%	186	65/65
State Route 65 SB	Placer Parkway to Sunset Boulevard	3	4,760	96%	4,570	0%	0	4%	190	65/65
State Route 65 SB	Sunset Boulevard to Blue Oaks Boulevard	3	6,400	96%	6,144	0%	0	4%	256	65/65
State Route 65 SB	Blue Oaks Boulevard to Pleasant Grove Boulevard	3	7,400	96%	7,104	0%	0	4%	296	65/65
State Route 65 SB	Pleasant Grove Boulevard to Stanford Ranch Road	3	7,600	96%	7,296	0%	0	4%	304	65/65
State Route 65 NB HOV Lane	Stanford Ranch Road to Pleasant Grove Boulevard	1	1,730	100%	1,730	0%	0	0%	0	65
State Route 65 NB HOV Lane	Pleasant Grove Boulevard to Blue Oaks Boulevard	1	1,340	100%	1,340	0%	0	0%	0	65
State Route 65 NB HOV Lane	Blue Oaks Boulevard to Sunset Boulevard	1	990	100%	990	0%	0	0%	0	65
State Route 65 NB HOV Lane	Sunset Boulevard to Placer Parkway	1	1,020	100%	1,020	0%	0	0%	0	65
State Route 65 NB HOV Lane	Placer Parkway to Twelve Bridges Drive	1	950	100%	950	0%	0	0%	0	65
State Route 65 NB HOV Lane	Twelve Bridges Boulevard to Lincoln Boulevard	1	960	100%	960	0%	0	0%	0	65
State Route 65 SB HOV Lane	Lincoln Boulevard to Twelve Bridges Boulevard	1	690	100%	690	0%	0	0%	0	65
State Route 65 SB HOV Lane	Twelve Bridges Boulevard to Placer Parkway	1	620	100%	620	0%	0	0%	0	65
State Route 65 SB HOV Lane	Placer Parkway to Sunset Boulevard	1	690	100%	690	0%	0	0%	0	65
State Route 65 SB HOV Lane	Sunset Boulevard to Blue Oaks Boulevard	1	890	100%	890	0%	0	0%	0	65
State Route 65 SB HOV Lane	Blue Oaks Boulevard to Pleasant Grove Boulevard	1	970	100%	970	0%	0	0%	0	65
State Route 65 SB HOV Lane	Pleasant Grove Boulevard to Stanford Ranch Road	1	1,300	100%	1,300	0%	0	0%	0	65
Pleasant Grove Boulevard	Offramp from SR 65 NB	1	1,580	96%	1,517	0%	0	4%	63	40/40
Pleasant Grove Boulevard	Onramp to SR 65 SB	1	1,200	96%	1,152	0%	0	4%	48	40/40
Pleasant Grove Boulevard	Onramp to SR 65 NB	1	550	96%	528	0%	0	4%	22	40/40
Pleasant Grove Boulevard	Onramp to SR 65 SB	1	640	96%	614	0%	0	4%	26	40/40
Pleasant Grove Boulevard	Offramp from SR 65 SB	1	650	96%	624	0%	0	4%	26	40/40
Blue Oaks Boulevard	Onramp to SR 65 NB	1	1,000	96%	960	0%	0	4%	40	40/40
Blue Oaks Boulevard	Offramp from SR 65 NB	1	2,580	96%	2,477	0%	0	4%	103	40/40
Sunset Boulevard	Offramp from SR 65 NB	1	1,250	96%	1,200	0%	0	4%	50	40/40
Sunset Boulevard	Onramp to SR 65 SB	1	1,120	96%	1,075	0%	0	4%	45	40/40
Sunset Boulevard	Onramp to SR 65 NB	1	420	96%	403	0%	0	4%	17	40/40
Sunset Boulevard	Onramp to SR 65 SB	1	960	96%	922	0%	0	4%	38	40/40
Sunset Boulevard	Onramp to SR 65 NB	1	490	96%	470	0%	0	4%	20	40/40
Sunset Boulevard	Offramp from SR 65 SB	1	640	96%	614	0%	0	4%	26	40/40
Placer Parkway	Offramp from SR 65 NB	1	1,170	96%	1,123	0%	0	4%	47	40/40
Placer Parkway	Onramp to SR 65 NB	1	430	96%	413	0%	0	4%	17	40/40
Placer Parkway	Offramp from SR 65 SB	1	1,100	96%	1,056	0%	0	4%	44	40/40
Placer Parkway	Onramp to SR 65 SB	1	400	96%	384	0%	0	4%	16	40/40
Twelve Bridges Drive	Offramp from SR 65 NB	1	1,080	96%	1,037	0%	0	4%	43	40/40
Twelve Bridges Drive	Onramp to SR 65 SB	1	940	96%	902	0%	0	4%	38	40/40
Twelve Bridges Drive	Onramp to SR 65 NB	1	1,030	96%	989	0%	0	4%	41	40/40
Twelve Bridges Drive	Offramp from SR 65 SB	1	870	96%	835	0%	0	4%	35	40/40
Lincoln Boulevard	Offramp from SR 65 NB	1	1,420	96%	1,363	0%	0	4%	57	40/40
Lincoln Boulevard	Onramp to SR 65 SB	1	770	96%	739	0%	0	4%	31	40/40

Table A-4. Alternative 3: Future No-Build (2040) Peak Hour Traffic Volumes

Roadway	Segment	Number of Lanes	Total Volume PM Peak Hour Volume	Auto		Medium Trucks		Heavy Trucks		Speed (A/HT)
				%	Volume	%	Volume	%	Volume	
State Route 65 NB	Stanford Ranch Road to Pleasant Grove Boulevard	2	5,700	96%	5,472	0%	0	4%	228	65/65
State Route 65 NB	Pleasant Grove Boulevard to Blue Oaks Boulevard	2	5,660	96%	5,434	0%	0	4%	226	65/65
State Route 65 NB	Blue Oaks Boulevard to Sunset Boulevard	2	4,120	96%	3,955	0%	0	4%	165	65/65
State Route 65 NB	Sunset Boulevard to Placer Parkway	2	4,700	96%	4,512	0%	0	4%	188	65/65
State Route 65 NB	Placer Parkway to Twelve Bridges Drive	2	4,410	96%	4,234	0%	0	4%	176	65/65
State Route 65 NB	Twelve Bridges Boulevard to Lincoln Boulevard	2	4,730	96%	4,541	0%	0	4%	189	65/65
State Route 65 SB	Lincoln Boulevard to Twelve Bridges Boulevard	2	3,890	96%	3,734	0%	0	4%	156	65/65
State Route 65 SB	Twelve Bridges Boulevard to Placer Parkway	2	3,590	96%	3,446	0%	0	4%	144	65/65
State Route 65 SB	Placer Parkway to Sunset Boulevard	2	3,590	96%	3,446	0%	0	4%	144	65/65
State Route 65 SB	Sunset Boulevard to Blue Oaks Boulevard	2	3,990	96%	3,830	0%	0	4%	160	65/65
State Route 65 SB	Blue Oaks Boulevard to Pleasant Grove Boulevard	2	5,070	96%	4,867	0%	0	4%	203	65/65
State Route 65 SB	Pleasant Grove Boulevard to Stanford Ranch Road	2	5,700	96%	5,472	0%	0	4%	228	65/65
State Route 65 NB HOV Lane	Stanford Ranch Road to Pleasant Grove Boulevard	1	1,480	100%	1,480	0%	0	0%	0	65
State Route 65 NB HOV Lane	Pleasant Grove Boulevard to Blue Oaks Boulevard	1	1,020	100%	1,020	0%	0	0%	0	65
State Route 65 NB HOV Lane	Blue Oaks Boulevard to Sunset Boulevard	1	770	100%	770	0%	0	0%	0	65
State Route 65 NB HOV Lane	Sunset Boulevard to Placer Parkway	1	910	100%	910	0%	0	0%	0	65
State Route 65 NB HOV Lane	Placer Parkway to Twelve Bridges Drive	1	760	100%	760	0%	0	0%	0	65
State Route 65 NB HOV Lane	Twelve Bridges Boulevard to Lincoln Boulevard	1	810	100%	810	0%	0	0%	0	65
State Route 65 SB HOV Lane	Lincoln Boulevard to Twelve Bridges Boulevard	1	670	100%	670	0%	0	0%	0	65
State Route 65 SB HOV Lane	Twelve Bridges Boulevard to Placer Parkway	1	580	100%	580	0%	0	0%	0	65
State Route 65 SB HOV Lane	Placer Parkway to Sunset Boulevard	1	580	100%	580	0%	0	0%	0	65
State Route 65 SB HOV Lane	Sunset Boulevard to Blue Oaks Boulevard	1	590	100%	590	0%	0	0%	0	65
State Route 65 SB HOV Lane	Blue Oaks Boulevard to Pleasant Grove Boulevard	1	730	100%	730	0%	0	0%	0	65
State Route 65 SB HOV Lane	Pleasant Grove Boulevard to Stanford Ranch Road	1	1,170	100%	1,170	0%	0	0%	0	65
Pleasant Grove Boulevard	Offramp from SR 65 NB	1	2,040	96%	1,958	0%	0	4%	82	40/40
Pleasant Grove Boulevard	Onramp to SR 65 SB	1	1,190	96%	1,142	0%	0	4%	48	40/40
Pleasant Grove Boulevard	Onramp to SR 65 NB	1	600	96%	576	0%	0	4%	24	40/40
Pleasant Grove Boulevard	Onramp to SR 65 SB	1	820	96%	787	0%	0	4%	33	40/40
Pleasant Grove Boulevard	Offramp from SR 65 SB	1	580	96%	557	0%	0	4%	23	40/40
Blue Oaks Boulevard	Onramp to SR 65 NB	1	480	96%	461	0%	0	4%	19	40/40
Blue Oaks Boulevard	Offramp from SR 65 NB	1	2,020	96%	1,939	0%	0	4%	81	40/40
Sunset Boulevard	Offramp from SR 65 NB	1	710	96%	682	0%	0	4%	28	40/40
Sunset Boulevard	Onramp to SR 65 SB	1	730	96%	701	0%	0	4%	29	40/40
Sunset Boulevard	Onramp to SR 65 NB	1	450	96%	432	0%	0	4%	18	40/40
Sunset Boulevard	Onramp to SR 65 SB	1	370	96%	355	0%	0	4%	15	40/40
Sunset Boulevard	Onramp to SR 65 NB	1	840	96%	806	0%	0	4%	34	40/40
Sunset Boulevard	Offramp from SR 65 SB	1	760	96%	730	0%	0	4%	30	40/40
Placer Parkway	Offramp from SR 65 NB	1	1,080	96%	1,037	0%	0	4%	43	40/40
Placer Parkway	Onramp to SR 65 NB	1	300	96%	288	0%	0	4%	12	40/40
Placer Parkway	Offramp from SR 65 SB	1	1,050	96%	1,008	0%	0	4%	42	40/40
Placer Parkway	Onramp to SR 65 SB	1	380	96%	365	0%	0	4%	15	40/40
Twelve Bridges Drive	Offramp from SR 65 NB	1	780	96%	749	0%	0	4%	31	40/40
Twelve Bridges Drive	Onramp to SR 65 SB	1	590	96%	566	0%	0	4%	24	40/40
Twelve Bridges Drive	Onramp to SR 65 NB	1	1,100	96%	1,056	0%	0	4%	44	40/40
Twelve Bridges Drive	Offramp from SR 65 SB	1	890	96%	854	0%	0	4%	36	40/40
Lincoln Boulevard	Offramp from SR 65 NB	1	990	96%	950	0%	0	4%	40	40/40
Lincoln Boulevard	Onramp to SR 65 SB	1	740	96%	710	0%	0	4%	30	40/40

Appendix B Predicted Future Noise Levels and Impacts

Table B-1. Impact Assessment and Predicted Noise Levels, Alternative 1: HOV lanes

Receiver I.D.	Land Use / Activity Category	Location	Existing Noise Level $L_{eq}(h)$, dBA	Future Worst Hour Noise Levels (Traffic Noise Only) - $L_{eq}(h)$, 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	Design Year Noise Level with Project minus Existing Conditions Leq(h), dBA	Activity Category (NAC)	Impact Type (None, or A/E)
R01	Undeveloped / G	Gibson Drive	68	71	72	+ 3	+ 1	+ 4	G	None
R02	Commercial / F	Gibson Drive	64	67	68	+ 3	+ 1	+ 4	F	None
R03	Residential / B	Gibson Drive	55	58	59	+ 3	+ 1	+ 4	B	None
R04	Residential / B	Gibson Drive	60	62	64	+ 2	+ 2	+ 4	B	None
R05	Residential / B	Gibson Drive	53	56	57	+ 3	+ 1	+ 4	B	None
R06	Commercial / F	Pleasant Grove Blvd	63	66	67	+ 3	+ 1	+ 4	F	None
R07	Undeveloped / G	Fairway Drive	66	67	68	+ 1	+ 1	+ 2	G	None
R08	Residential / B	Fairway Drive	55	57	59	+ 2	+ 2	+ 4	B	None
R09	Undeveloped / G	Fairway Drive	54	56	57	+ 2	+ 1	+ 3	G	None
R10	Commercial / F	Pleasant Grove Blvd	57	58	59	+ 1	+ 1	+ 2	F	None
R11	Park / C	Summerhill Park	54	58	59	+ 4	+ 1	+ 5	C	None
R12	Residential / B	Fairway Drive	56	58	59	+ 2	+ 1	+ 3	B	None
R13	Commercial / F	Industrial Ave	65	67	69	+ 2	+ 2	+ 4	F	None
R14	Institutional / C	Placer County Jail	71	73	76	+ 2	+ 3	+ 5	C	A/E
R15	Residential / B	Lonetree Blvd	56	58	60	+ 2	+ 2	+ 4	B	None
R16	School / C	Adams Drive	60	63	65	+ 3	+ 2	+ 5	C	None
R17	School / C	Adams Drive	57	59	62	+ 2	+ 3	+ 5	C	None
R18	School / C	Adams Drive	55	58	60	+ 3	+ 2	+ 5	C	None
R19	Undeveloped / G	Atherton Road	69	71	74	+ 2	+ 3	+ 5	G	None
R20	Recreational / C	Ballfield, Industrial Ave	49	53	55	+ 4	+ 2	+ 6	C	None
R21	Undeveloped / G	Industrial Ave	68	72	73	+ 4	+ 1	+ 5	G	None
R22	School / C	Atherton Road	46	48	50	+ 2	+ 2	+ 4	C	None
R23	Undeveloped / G	Whitney Ranch Pkwy	59	63	65	+ 4	+ 2	+ 6	G	None
R24	Residential / B	Whitney Ranch Pkwy	47	51	52	+ 4	+ 1	+ 5	B	None
R25	Hospital / C	W Ranch View Drive	68	72	74	+ 4	+ 2	+ 6	C	A/E
R26	Undeveloped / G	Joiner Pkwy	66	69	71	+ 3	+ 2	+ 5	G	None
R27	Library / C	Twelve Bridges Drive	50	53	54	+ 3	+ 1	+ 4	C	None
R28	Undeveloped / G	Industrial Ave	61	64	65	+ 3	+ 1	+ 4	G	None
R29	Residential / B	Tavistock Lane	55	58	59	+ 3	+ 1	+ 4	B	None
R30	Residential / B	Ashford Lane	56	59	60	+ 3	+ 1	+ 4	B	None
R31	Residential / B	Ashford Lane	57	60	61	+ 3	+ 1	+ 4	B	None
R32	Residential / B	Ashford Lane	56	59	60	+ 3	+ 1	+ 4	B	None
M02	Commercial / F	Fairway Drive	73	76	77	+ 3	+ 1	+ 4	F	None
M04	Hotel / E	Fairway Drive	63	66	67	+ 3	+ 1	+ 4	E	None
M08	School / C	Adams Drive	59	61	63	+ 2	+ 2	+ 4	C	None
M09	School / C	Adams Drive	68	71	74	+ 3	+ 3	+ 6	C	A/E
M10	Institutional / C	Placer County Jail	67	70	72	+ 3	+ 2	+ 5	C	A/E
M11	School / C	Atherton Road	72	73	76	+ 1	+ 3	+ 4	C	A/E
M12A	Hospital / C	Dresden Drive	53	57	58	+ 4	+ 1	+ 5	C	None
M12B	Undeveloped / G	Dresden Drive	66	70	71	+ 4	+ 1	+ 5	G	None
M15A	Place of Worship / C	Technology Way	68	71	73	+ 3	+ 2	+ 5	C	A/E
M15B	Undeveloped / G	Atherton Road	66	69	71	+ 3	+ 2	+ 5	G	None
M17	Commercial / F	Highland Pointe Drive	72	74	76	+ 2	+ 2	+ 4	F	None

Notes:
A/E= Future noise conditions approach or exceed the Noise Abatement Criteria.
Calibration factors are included in predicted levels where applicable.

Table B-2. Impact Assessment and Predicted Noise Levels, Alternative 2: General Purpose Lanes

Receiver I.D.	Land Use / Activity Category	Location	Existing Noise Level $L_{eq}(h)$, dBA	Future Worst Hour Noise Levels (Traffic Noise Only) - $L_{eq}(h)$, 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	Design Year Noise Level with Project minus Existing Conditions Leq(h), dBA	Activity Category (NAC)	Impact Type (None, or A/E)
R01	Undeveloped / G	Gibson Drive	68	71	72	+ 3	+ 1	+ 4	G	None
R02	Commercial / F	Gibson Drive	64	67	68	+ 3	+ 1	+ 4	F	None
R03	Residential / B	Gibson Drive	55	58	59	+ 3	+ 1	+ 4	B	None
R04	Residential / B	Gibson Drive	60	62	64	+ 2	+ 2	+ 4	B	None
R05	Residential / B	Gibson Drive	53	56	57	+ 3	+ 1	+ 4	B	None
R06	Commercial / F	Pleasant Grove Blvd	63	66	67	+ 3	+ 1	+ 4	F	None
R07	Undeveloped / G	Fairway Drive	66	67	68	+ 1	+ 1	+ 2	G	None
R08	Residential / B	Fairway Drive	55	57	59	+ 2	+ 2	+ 4	B	None
R09	Undeveloped / G	Fairway Drive	54	56	57	+ 2	+ 1	+ 3	G	None
R10	Commercial / F	Pleasant Grove Blvd	57	58	59	+ 1	+ 1	+ 2	F	None
R11	Park / C	Summerhill Park	54	58	59	+ 4	+ 1	+ 5	C	None
R12	Residential / B	Fairway Drive	56	58	59	+ 2	+ 1	+ 3	B	None
R13	Commercial / F	Industrial Ave	65	67	69	+ 2	+ 2	+ 4	F	None
R14	Institutional / C	Placer County Jail	71	73	76	+ 2	+ 3	+ 5	C	A/E
R15	Residential / B	Lonetree Blvd	56	58	60	+ 2	+ 2	+ 4	B	None
R16	School / C	Adams Drive	60	63	65	+ 3	+ 2	+ 5	C	None
R17	School / C	Adams Drive	57	59	62	+ 2	+ 3	+ 5	C	None
R18	School / C	Adams Drive	55	58	60	+ 3	+ 2	+ 5	C	None
R19	Undeveloped / G	Atherton Road	69	71	73	+ 2	+ 2	+ 4	G	None
R20	Recreational / C	Ballfield, Industrial Ave	49	53	55	+ 4	+ 2	+ 6	C	None
R21	Undeveloped / G	Industrial Ave	68	72	73	+ 4	+ 1	+ 5	G	None
R22	School / C	Atherton Road	46	48	50	+ 2	+ 2	+ 4	C	None
R23	Undeveloped / G	Whitney Ranch Pkwy	59	63	65	+ 4	+ 2	+ 6	G	None
R24	Residential / B	Whitney Ranch Pkwy	47	51	52	+ 4	+ 1	+ 5	B	None
R25	Hospital / C	W Ranch View Drive	68	72	74	+ 4	+ 2	+ 6	C	A/E
R26	Undeveloped / G	Joiner Pkwy	66	69	71	+ 3	+ 2	+ 5	G	None
R27	Library / C	Twelve Bridges Drive	50	53	54	+ 3	+ 1	+ 4	C	None
R28	Undeveloped / G	Industrial Ave	61	64	65	+ 3	+ 1	+ 4	G	None
R29	Residential / B	Tavistock Lane	55	58	58	+ 3	0	+ 3	B	None
R30	Residential / B	Ashford Lane	56	59	60	+ 3	+ 1	+ 4	B	None
R31	Residential / B	Ashford Lane	57	60	61	+ 3	+ 1	+ 4	B	None
R32	Residential / B	Ashford Lane	56	59	60	+ 3	+ 1	+ 4	B	None
M02	Commercial / F	Fairway Drive	73	76	77	+ 3	+ 1	+ 4	F	None
M04	Hotel / E	Fairway Drive	63	66	67	+ 3	+ 1	+ 4	E	None
M08	School / C	Adams Drive	59	61	63	+ 2	+ 2	+ 4	C	None
M09	School / C	Adams Drive	68	71	74	+ 3	+ 3	+ 6	C	A/E
M10	Institutional / C	Placer County Jail	67	70	72	+ 3	+ 2	+ 5	C	A/E
M11	School / C	Atherton Road	72	73	76	+ 1	+ 3	+ 4	C	A/E
M12A	Hospital / C	Dresden Drive	53	57	58	+ 4	+ 1	+ 5	C	None
M12B	Undeveloped / G	Dresden Drive	66	70	71	+ 4	+ 1	+ 5	G	None
M15A	Place of Worship / C	Technology Way	68	71	72	+ 3	+ 1	+ 4	C	A/E
M15B	Undeveloped / G	Atherton Road	66	69	71	+ 3	+ 2	+ 5	G	None
M17	Commercial / F	Highland Pointe Drive	72	74	76	+ 2	+ 2	+ 4	F	None

Notes:
A/E= Future noise conditions approach or exceed the Noise Abatement Criteria.
Calibration factors are included in predicted levels where applicable.

Appendix C Field Measurements

2:35p on video start
2:50 stop

NOISE MEASUREMENT SITE INFORMATION SHEET

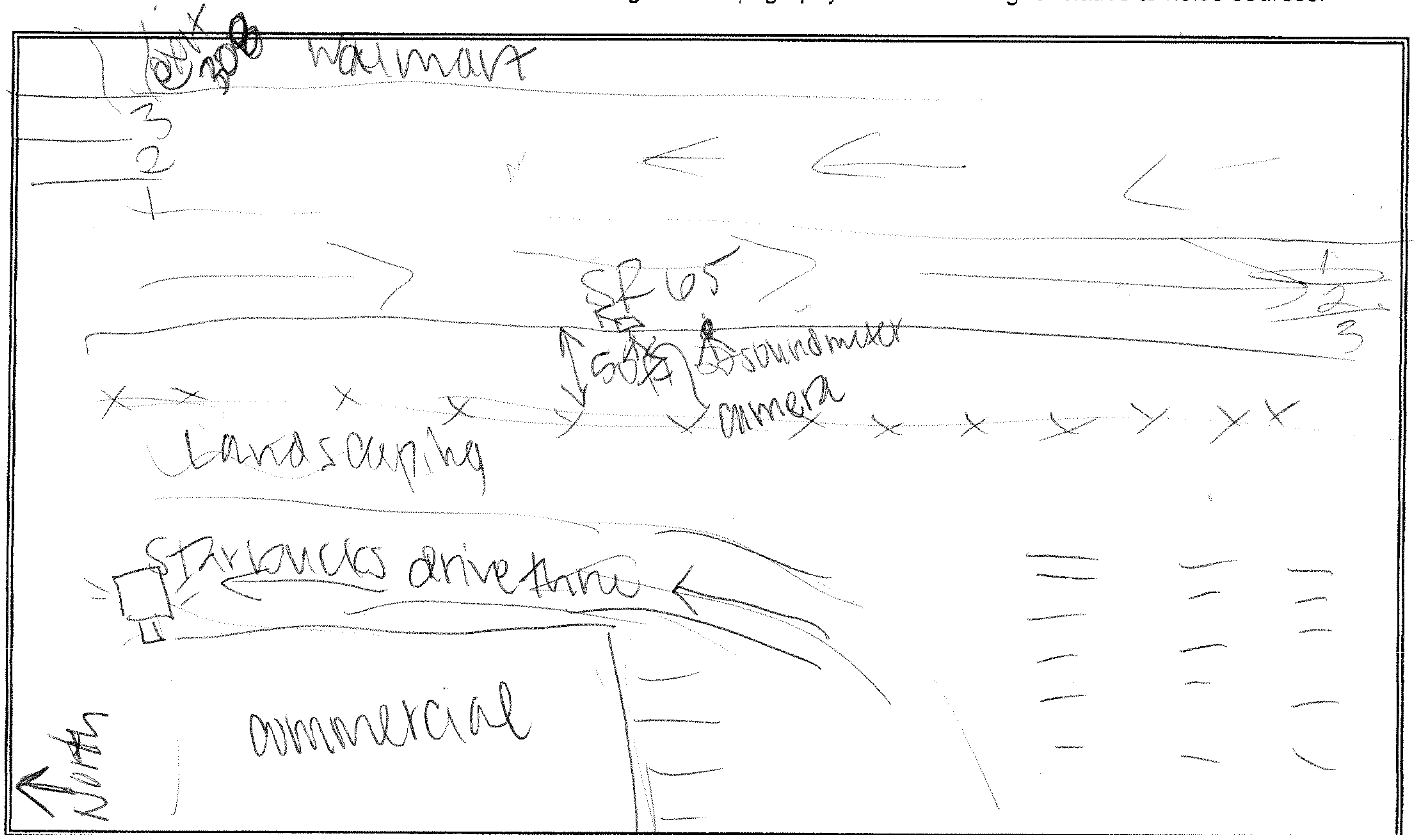
Jones & Stokes

PROJECT NAME: SR 65 | PROJECT #:

SITE NUMBER: M02 | DATE/TIME: 10/27/15 2:30p

LOCATION/ADDRESS: | ENGINEERS:

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

74.3° F, 3 mph SW, overcast, 41.2%

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LXT

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED: COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: ____________________ PROJECT #: ____________________

SITE NUMBER: __________ DATE/TIME: ____________________

LOCATION/ADDRESS: ____________________ ENGINEERS: ____________________

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)	
1								
2								
3								
4								
5								
6								
7								
8							8 min thru 10 min	
9							traffic ~~NB~~ slowing on SR65	
10								
11								
12								
13								
14							NB traffic slows to nearly stop	Leq 73.4
15								Lmax 88.8
16								Lmin 62.8
17								L10
18								L33
19								L50
20								L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = ______ **dBA**

Subset Leq (Exclude "O" and "X" minutes) = ______ **dBA**

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

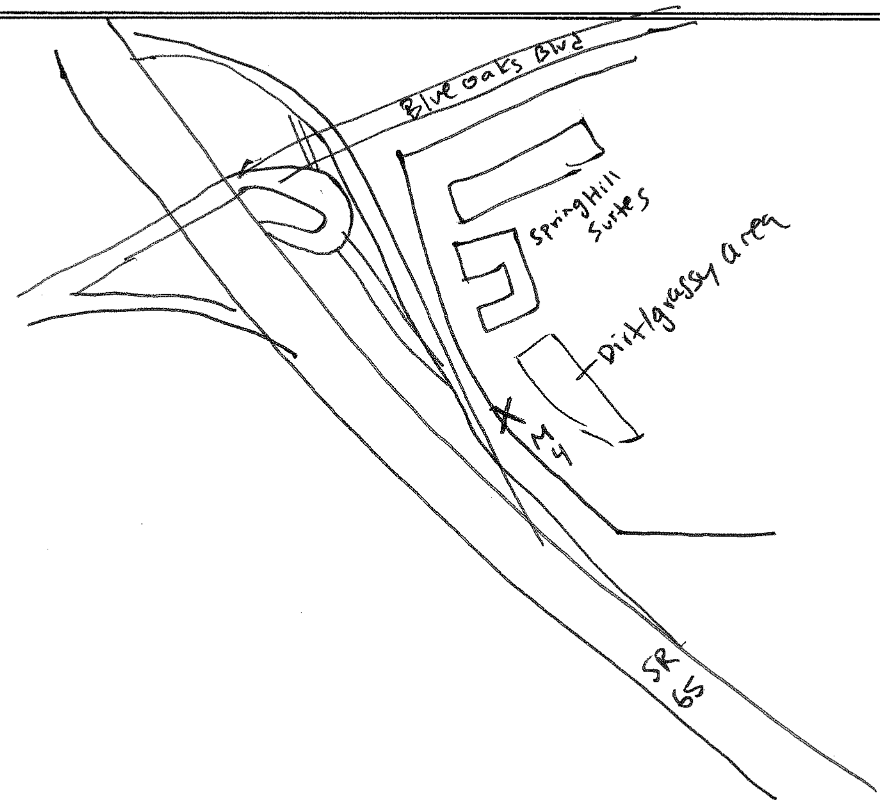
Jones & Stokes

PROJECT NAME: SR-65 PROJECT #:

SITE NUMBER: M4 DATE/TIME: 10/28 - 9:40

LOCATION/ADDRESS: near springhill Suites ENGINEERS: Liz Scott

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

See. M-17

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LD 831

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED: ______ COMMENTS: Speeds vary on off ramp, measured some at 40

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: SR-65
PROJECT #:
SITE NUMBER: M-4
DATE/TIME: 10/28 ~9:43
LOCATION/ADDRESS: Near Spring Hill Suites
ENGINEERS: Liz Scott

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)	
1	0:00						motorcycle Revving	
2	0:01							
3	0:02							
4	0:03							
5	0:04							
6	0:05							
7	0:06							
8	0:07							
9	0:08							
10	0:09							
11	0:10							
12	0:11							
13	0:12							
14	0:13						one car drove behind at ~ 13:35	Leq 64.3
15	0:14							Lmax
16								Lmin
17								L10
18								L33
19								L50
20								L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = 64.3 dBA
Subset Leq (Exclude "O" and "X" minutes) = dBA

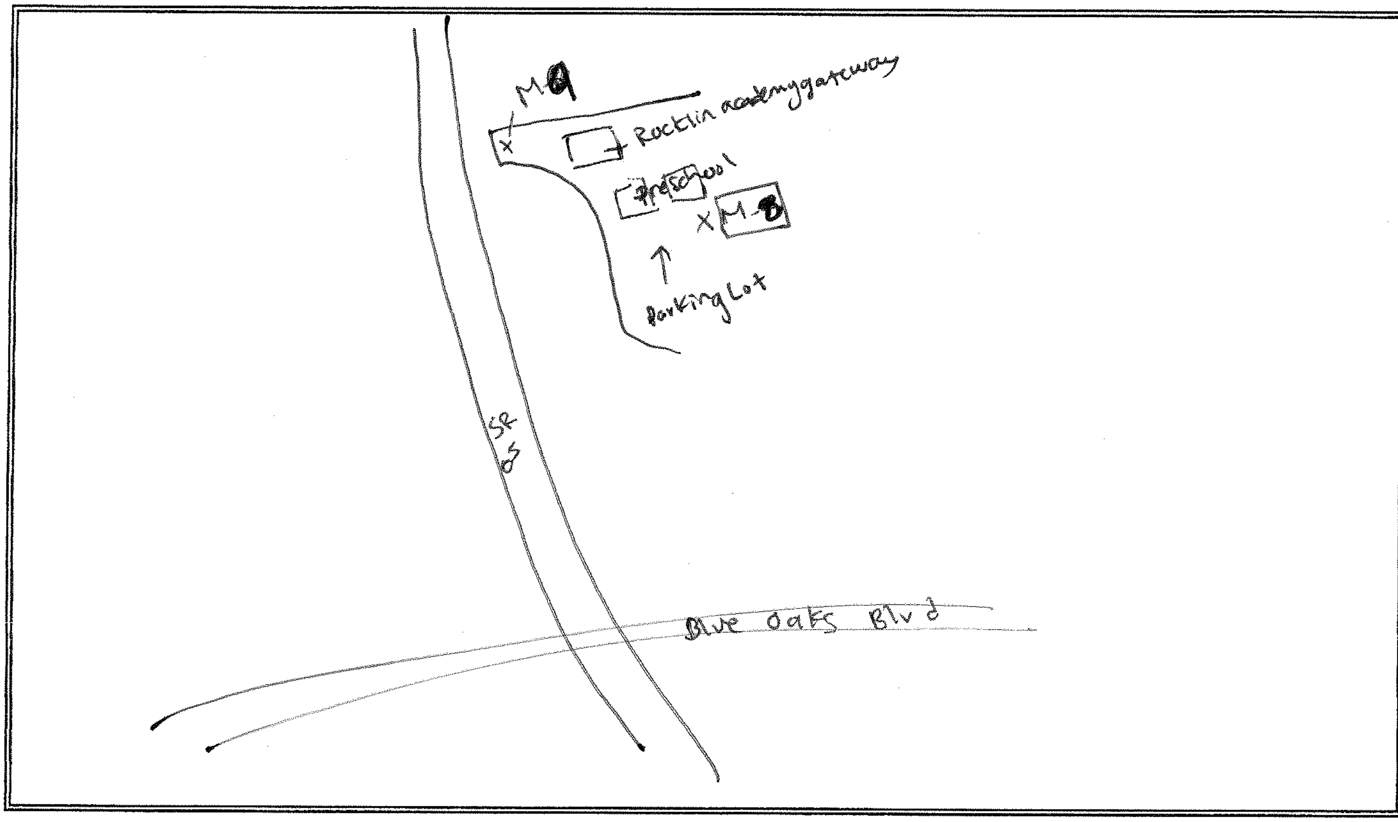
"O" = other characteristic sources that contributed to the Leq
"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

Jones & Stokes

PROJECT NAME: SR-65
PROJECT #:
SITE NUMBER: M-8
DATE/TIME: 10/28 10:50
LOCATION/ADDRESS: near pre-school
ENGINEERS: Liz Scott

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

See M-8

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LD-831

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED:
COMMENTS: parking lot

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME:
PROJECT #:
SITE NUMBER: M-8
DATE/TIME:
LOCATION/ADDRESS: Near Pre-School
ENGINEERS:

#	Minute Starting	Measured Leq (dBA)	O or X	Autos (in Parking lot)	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)
1	0:00						
2	0:01						
3	0:02			1			car starting ~2:20
4	0:03						
5	0:04						
6	0:05				1		UPS Truck @ 5:54 in lot
7	0:06			11			car at 6:01 in parking lot 2@ 6:39
8	0:07						
9	0:08			1	1		UPS @ ~8:40 car @ 8:50
10	0:09			1			car @ 9:30 + doors slamming until 10:25
11	0:10						
12	0:11						Truck unloading 60 feet away near end of minute
13	0:12						Plane @ 12:11 (ish)
14	0:13						Leq 59.6
15	0:14			11			14:20 - 14:30 = 2 cars; Lmax
16							Lmin
17							L10
18							L33
19							L50
20							L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = 59.6 dBA

Subset Leq (Exclude "O" and "X" minutes) = dBA

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

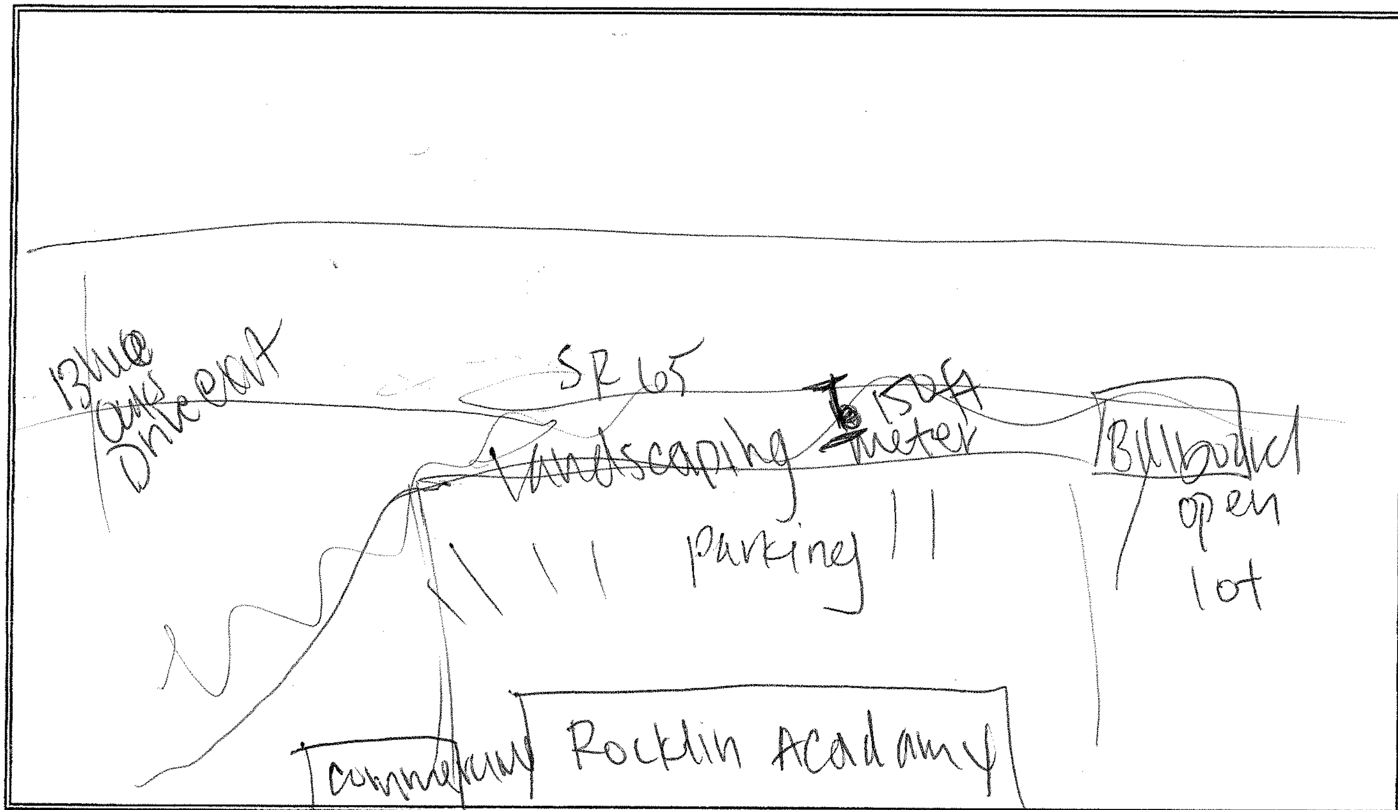
Jones & Stokes

PROJECT NAME: ____________ PROJECT #: ____________

SITE NUMBER: M9 DATE/TIME: ____________

LOCATION/ADDRESS: ____________ ENGINEERS: ____________

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

69.8°F, 2.8 mph SE, mostly sunny, 54.8%

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LTX

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction) ____________

POSTED SPEED: ________ COMMENTS: ____________

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: SR65

PROJECT #:

SITE NUMBER: MD9

DATE/TIME: 10/28/15 10:48A

LOCATION/ADDRESS:

ENGINEERS:

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)
1							
2							car parked near meter
3							
4							
5							
6							car parked near meter
7							
8							
9							
10							
11							
12							
13							
14							Leq 65.4
15							Lmax 87.4
16							Lmin 56.9
17							L10
18							L33
19							L50
20							L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = ______ dBA

Subset Leq (Exclude "O" and "X" minutes) = ______ dBA

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

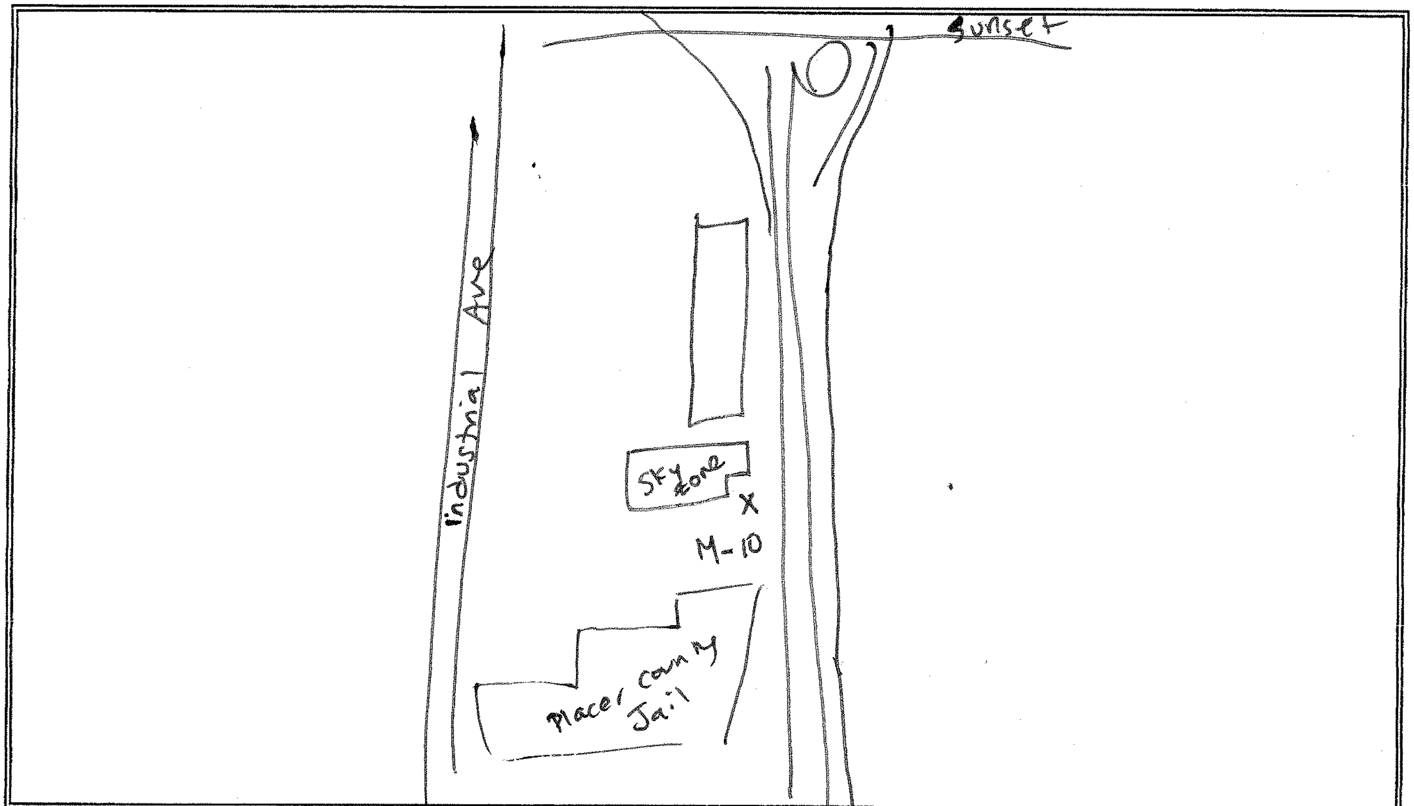
Jones & Stokes

PROJECT NAME: SR65 PROJECT #:

SITE NUMBER: M-10 DATE/TIME: 10/28 ~11:47

LOCATION/ADDRESS: near trampoline center ↑ skyzone ENGINEERS: Liz Scott

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

See M-11

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LD-831

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED: COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: SR-65 PROJECT #:

SITE NUMBER: M-10 DATE/TIME: 10/28 11:48

LOCATION/ADDRESS: near trampoline center ENGINEERS: Liz Scott

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)	
1	0:00		Videos					
2	0:01							
3	0:02							
4	0:03							
5	0:04							
6	0:05							
7	0:06							
8	0:07							
9	0:08							
10	0:09							
11	0:10							
12	0:11						siren@ 11:37 - 11:52	
13	0:12							
14	0:13							Leq 66.2
15	0:14							Lmax
16								Lmin
17								L10
18								L33
19								L50
20								L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = 66.2 dBA

Subset Leq (Exclude "O" and "X" minutes) = dBA

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

Jones & Stokes

PROJECT NAME: SR 65

PROJECT #:

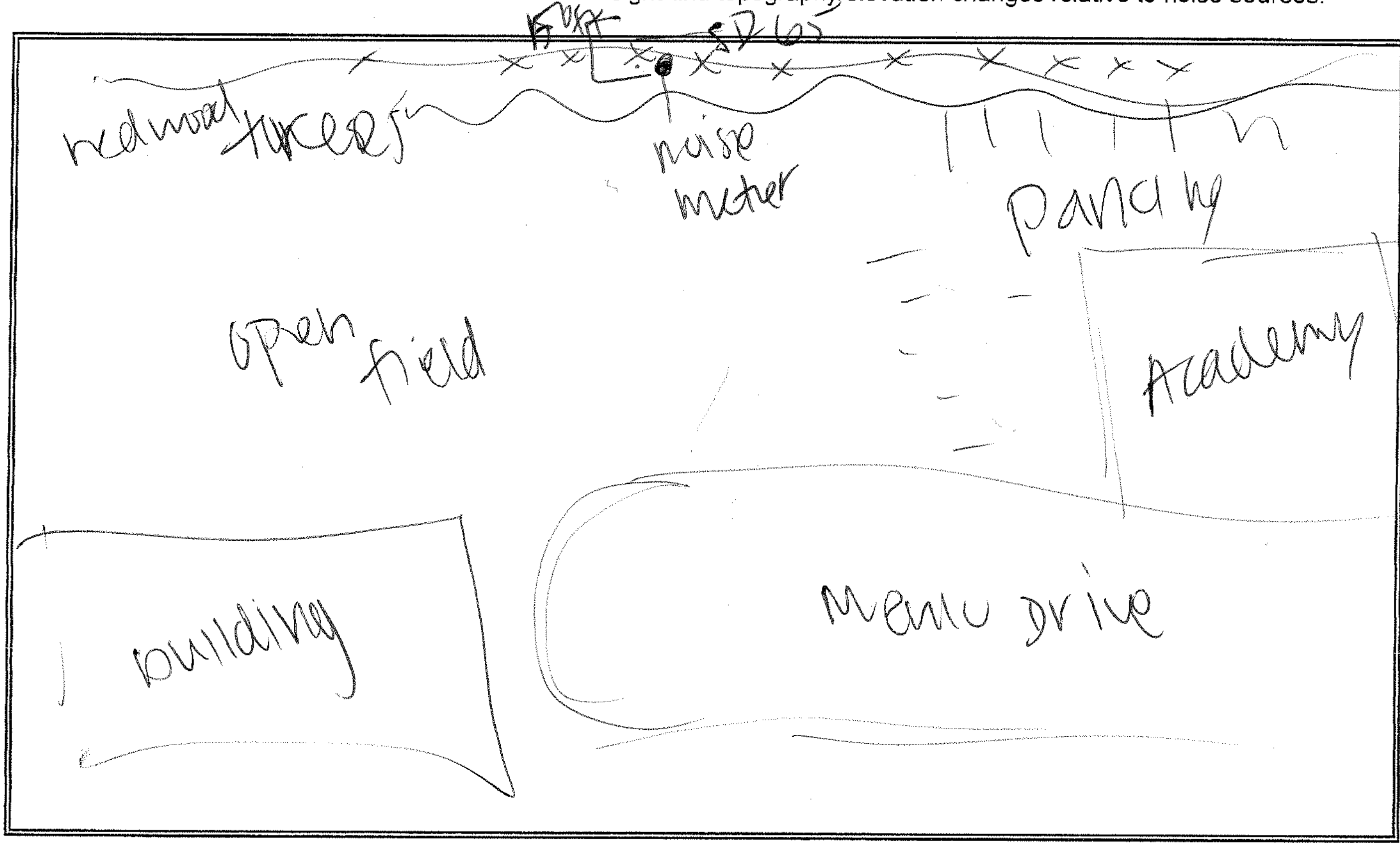
SITE NUMBER: M11

DATE/TIME: 10/28/15 11:45A

LOCATION/ADDRESS:

ENGINEERS:

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

67.5°F 3.0mph SW, partly cloudy, 58.2%

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LTX

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED:

COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: ____________________ PROJECT #: ____________________

SITE NUMBER: M11 DATE/TIME: ____________________

LOCATION/ADDRESS: ____________________ ENGINEERS: ____________________

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								Leq 65.8
15								Lmax 82.9
16								Lmin 57.2
17								L10
18								L33
19								L50
20								L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = ______ **dBA**

Subset Leq (Exclude "O" and "X" minutes) = ______ **dBA**

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

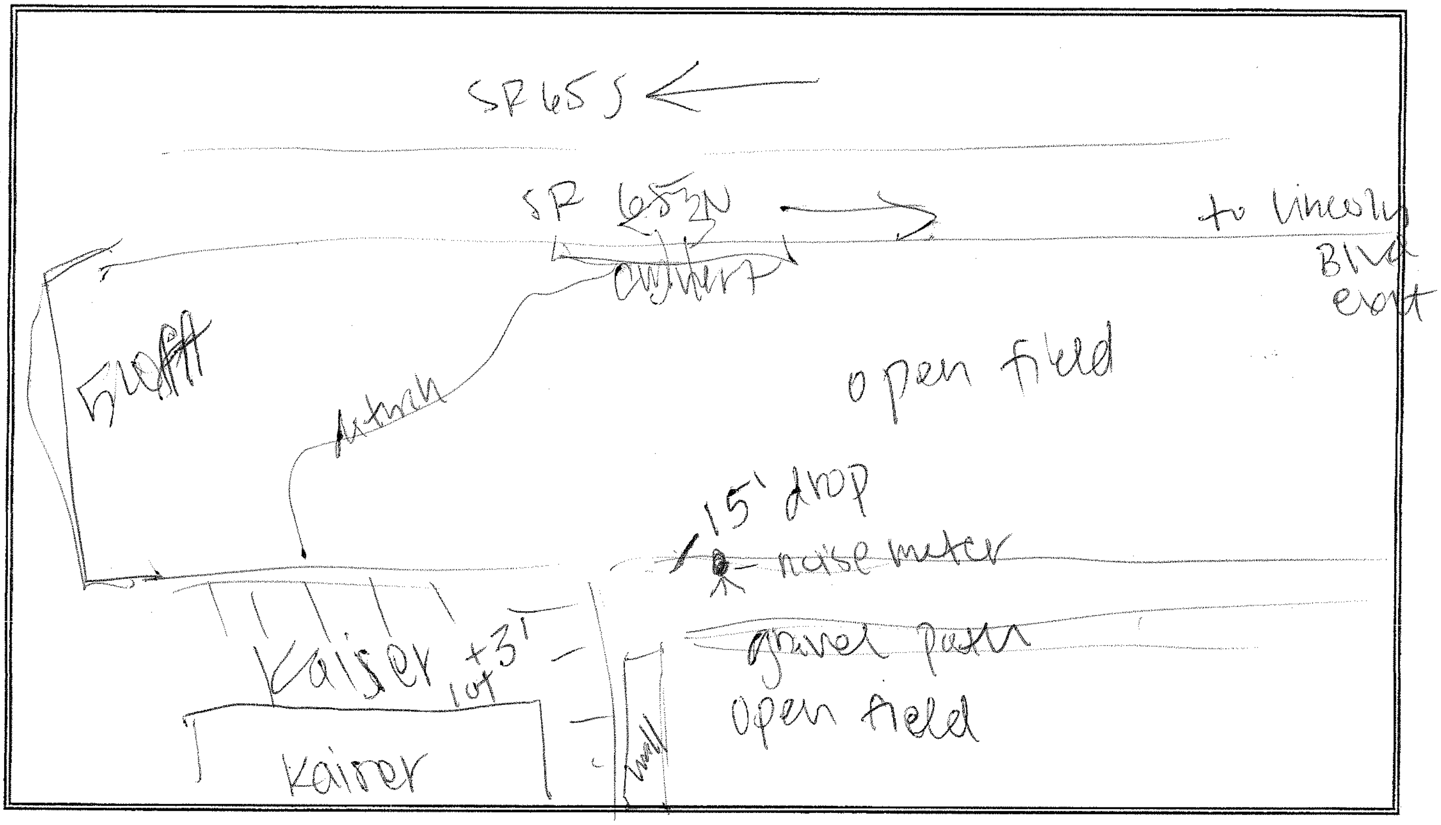
Jones & Stokes

PROJECT NAME: SR65 PROJECT #:

SITE NUMBER: M12 DATE/TIME: 10/28/15 3:25p

LOCATION/ADDRESS: ENGINEERS:

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

81.8F, 2.1mph N, mostly sunny, 40.0%

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LTX

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED: COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration
Northbound	632	12	6	65		
SB	466	9	5	65		

NB Bus 1

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: SR65 PROJECT #:

SITE NUMBER: M12 DATE/TIME:

LOCATION/ADDRESS: ENGINEERS:

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11							train passing by	
12						min 11-	13.	
13								
14								Leq 57.9
15								Lmax 62.5
16								Lmin 52.1
17								L10
18								L33
19								L50
20								L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = dBA

Subset Leq (Exclude "O" and "X" minutes) = dBA

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

Jones & Stokes

PROJECT NAME: SR-65

PROJECT #:

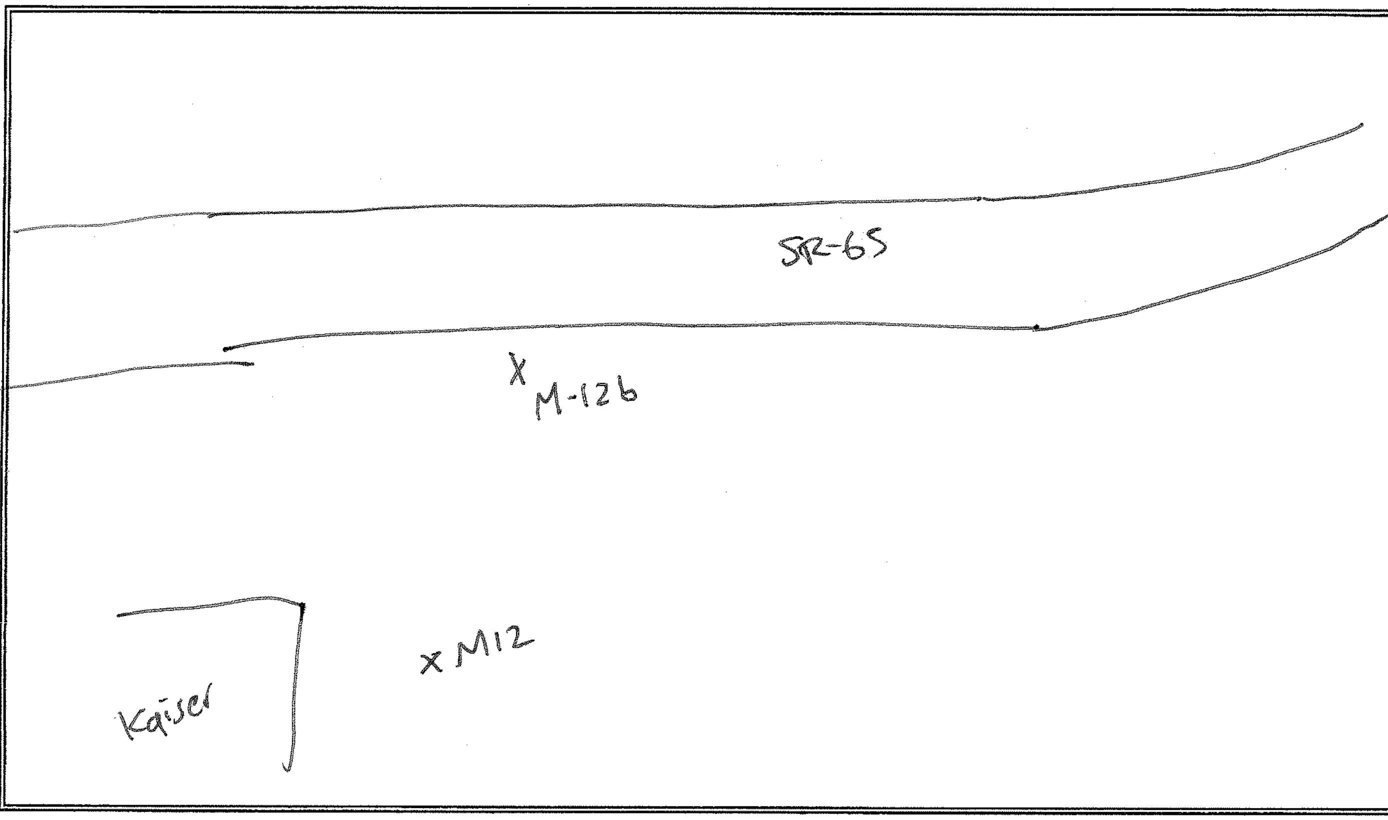
SITE NUMBER: M-12b

DATE/TIME: 10/28 ~ 3:20

LOCATION/ADDRESS: Near Kaiser, close to Freeway

ENGINEERS: Liz & Jason

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

See pair

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LD-831

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED:

COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: SR-65

PROJECT #:

SITE NUMBER: M-12b (close to Freeway)

DATE/TIME: 10/28 ~3:20 PM

LOCATION/ADDRESS: Near Kaiser, adjacent to Freeway

ENGINEERS: Liz Scott

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)	
1	0:00							
2	0:01							
3	0:02							
4	0:03							
5	0:04							
6	0:05							
7	0:06							
8	0:07							
9	0:08							
10	0:09							
11	0:10							
12	0:11						TRAIN	
13	0:12						till 13:20	
14	0:13			Southbound SR-64				Leq 63.6
15	0:14			TOTALS			Bus	Lmax
16				466	9	5	Ø	Lmin
17				Northbound SR-65				L10
18				632	12	6	1	L33
19								L50
20								L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = 63.6 dBA

Subset Leq (Exclude "O" and "X" minutes) = dBA

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

Jones & Stokes

PROJECT NAME: SR-65

PROJECT #:

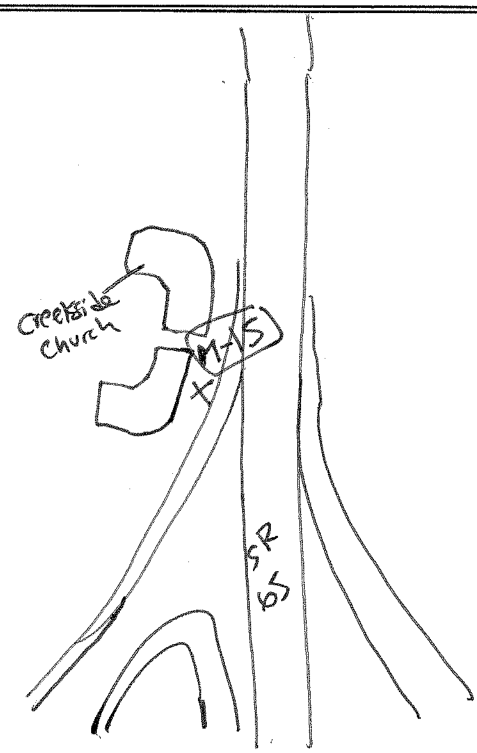
SITE NUMBER: M-15A

DATE/TIME: 8/28 2:15

LOCATION/ADDRESS: Seminary /church (Creekside)

ENGINEERS: Liz Scott

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

See Pair

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LD-831

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED:

COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: SR-65

PROJECT #:

SITE NUMBER: M-15

DATE/TIME: ~~[illegible]~~ 10/28

LOCATION/ADDRESS: SB off-ramp (NW)

ENGINEERS: Liz Scott

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)
1	0:00						
2	0:01						
3	0:02						
4	0:03						
5	0:04						
6	0:05						
7	0:06						NA
8	0:07						
9	0:08						
10	0:09						
11	0:10						
12	0:11						
13	0:12						
14	0:13						Leq 66.7
15	0:14						Lmax
16				55	Ø	5	Lmin
17							L10
18							L33
19							L50
20							L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = 66.7 dBA

Subset Leq (Exclude "O" and "X" minutes) = dBA

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

Jones & Stokes

PROJECT NAME: SR 65

PROJECT #:

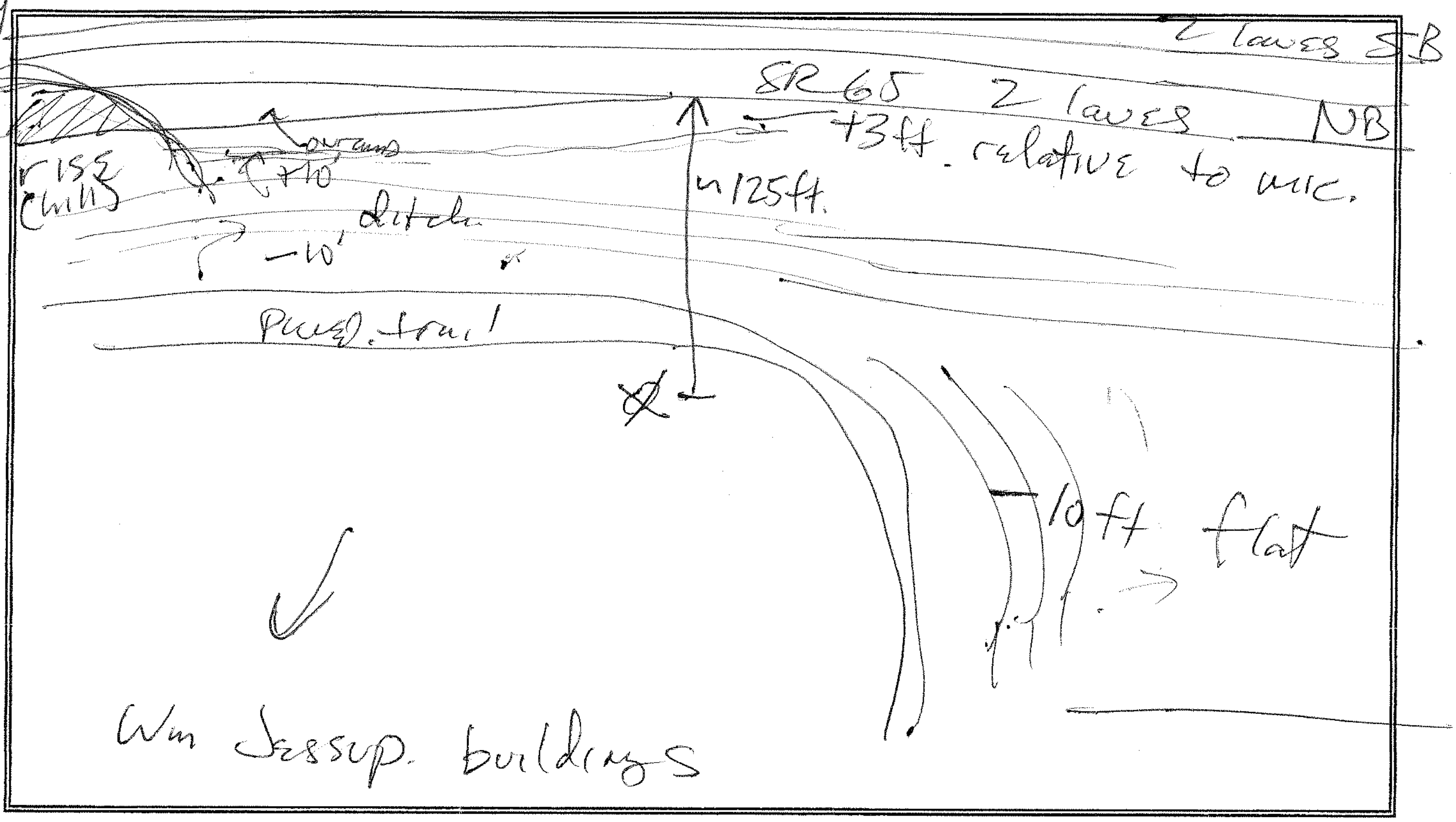
SITE NUMBER: M 19B

DATE/TIME: 10/25/15

LOCATION/ADDRESS: William Jessup bike trail?

ENGINEERS: Volk/Baker

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

77.8°F, 2.9 mph, partly cloudy, 46.3%

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

4004 LxT

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED:

COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: SR 65
SITE NUMBER: M15B
LOCATION/ADDRESS: Wm Jessup
PROJECT #:
DATE/TIME: 10/24/15 2:15p
ENGINEERS:

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)
1	64.4 Leq (15 min)						All SR 65
2							
3							max 76.7
4							No others
5							sources
6							
7							
8							
9							
10							
11							
12							
13							
14							Leq
15							Lmax
16							Lmin
17							L10
18							L33
19							L50
20							L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = dBA
Subset Leq (Exclude "O" and "X" minutes) = dBA

"O" = other characteristic sources that contributed to the Leq

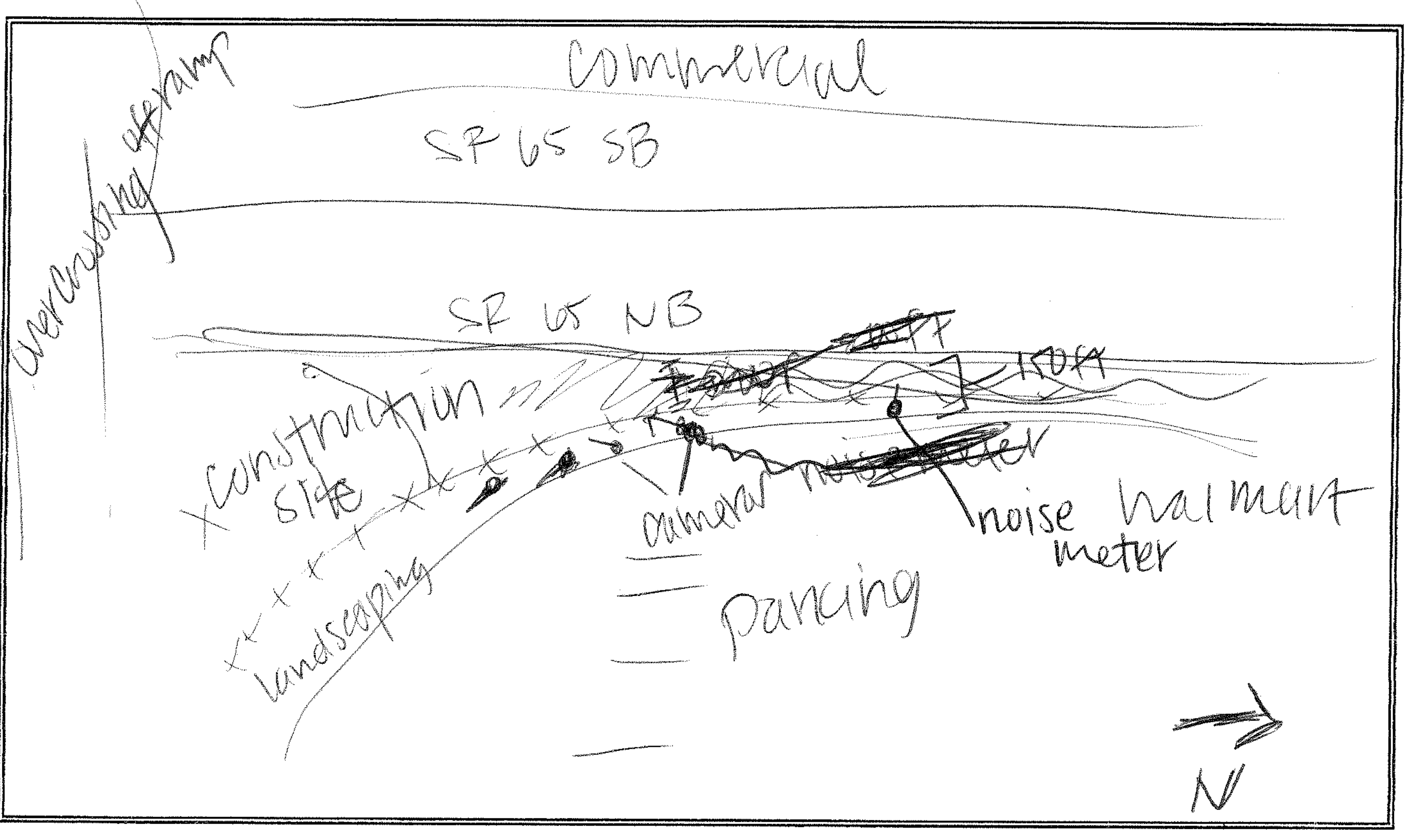
"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

Jones & Stokes

PROJECT NAME: SR 65
PROJECT #:
SITE NUMBER: M[redacted]17
DATE/TIME: 10/28/15 9:43 am
LOCATION/ADDRESS:
ENGINEERS:

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

64.2°F, 2.3 mph S, partly cloudy, 69.5%

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LXT

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED:

COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME:

PROJECT #:

SITE NUMBER: M 17

DATE/TIME:

LOCATION/ADDRESS:

ENGINEERS:

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)
1							
2							truck drove thru lot
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							Leq 71.9
15							Lmax 91.3
16							Lmin 64.5
17							L10
18							L33
19							L50
20							L90

Overall Leq (Include "O" minutes, Exclude "X" minutes) = dBA

Subset Leq (Exclude "O" and "X" minutes) = dBA

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement