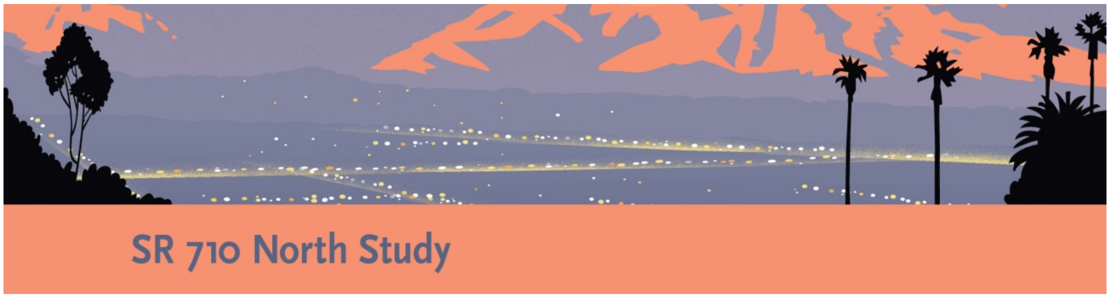

Noise Study Report

Vol. I – Text & Tables

State Route 710 North Study
County of Los Angeles
07-LA-710 (SR 710)

E.A. 187900
EFIS 0700000191

October 2014

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

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Vol. I – Text & Tables

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October 2014

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Summary

This *Noise Study Report* (NSR) was prepared in order to complete a noise impact analysis for the State Route 710 (SR 710) North Study.

The California Department of Transportation (Caltrans), in cooperation with the Los Angeles County Metropolitan Transportation Authority (Metro) proposes transportation improvements to improve mobility and relieve congestion in the area between State Route 2 (SR 2) and Interstates 5, 10, 210 and 605 (I-5, I-10, I-210, and I-605, respectively) in east/northeast Los Angeles and the western San Gabriel Valley. The study area for the State Route 710 (SR 710) North Study is approximately 100 square miles and generally bounded by I-210 on the north, I-605 on the east, I-10 on the south, and I-5 and SR 2 on the west. Caltrans is the Lead Agency under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

The lack of continuous north-south transportation facilities in the study area has the following consequences, which have been identified as the elements of need for the project:

- Degradation of the overall efficiency of the larger regional transportation system
- Congestion on freeways in the study area
- Congestion on the local streets in the study area
- Poor transit operations within the study area

The purpose of the proposed action is to effectively and efficiently accommodate regional and local north-south travel demands in the study area of the western San Gabriel Valley and east/northeast Los Angeles, including the following considerations:

- Improve efficiency of the existing regional freeway and transit networks.
- Reduce congestion on local arterials adversely affected due to accommodating regional traffic volumes.
- Minimize environmental impacts related to mobile sources.

The proposed alternatives for the project include the No Build Alternative, the Transportation System Management/Transportation Demand Management (TSM/TDM) Alternative, the Bus Rapid Transit (BRT) Alternative, the Light Rail

Transit (LRT) Alternative, and the Freeway Tunnel Alternative. Components of the TSM/TDM Alternative would also be included with the BRT, LRT and Freeway Tunnel Alternatives.

The No Build Alternative includes projects/planned improvements through 2035 that are contained in the Federal Transportation Improvement Program (FTIP), as listed in the Southern California Association of Governments (SCAG) 2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Measure R and the funded portion of Metro’s 2009 Long Range Transportation Plan (LRTP). The No Build Alternative does not include any planned improvements to the SR 710 Corridor.

The TSM/TDM Alternative consists of strategies and improvements to increase efficiency and capacity for all modes in the transportation system with lower capital cost investments and/or lower potential impacts. The TSM/TDM Alternative is designed to maximize the efficiency of the existing transportation system by improving capacity and reducing the effects of bottlenecks and chokepoints. TSM strategies include Intelligent Transportation Systems (ITS), local street and intersection improvements, and Active Traffic Management (ATM). The TDM strategies include expanded bus service, bus service improvements, and bicycle improvements. A detailed analysis of the TSM/TDM Alternative components that classify as a Type I analysis as defined in the Caltrans Traffic Noise Analysis Protocol (2011) are completed in this technical study.

The BRT Alternative would provide high-speed, high-frequency bus service through a combination of new, dedicated, and existing bus lanes, and mixed-flow traffic lanes to key destinations between East Los Angeles and Pasadena.

The LRT Alternative would include passenger rail operated along a dedicated guideway, similar to other Metro light rail lines. The LRT Alternative would begin on Mednik Avenue adjacent to the existing East Los Angeles Civic Center Station on the Metro Gold Line and end at Raymond Avenue adjacent to the existing Fillmore Station on the Metro Gold Line.

The Freeway Tunnel Alternative would start at the existing southern stub of SR 710 in Alhambra, just north of I-10, and connect to the existing northern stub of SR 710, south of the I-210/State Route 134 (SR 134) interchange in Pasadena. The Freeway Tunnel Alternative has two design variations: a single-bore tunnel and a dual-bore tunnel. Five operational variations for the Freeway Tunnel Alternative include the

Freeway Tunnel Alternative without tolls, Freeway Tunnel Alternative with trucks excluded, Freeway Tunnel Alternative with tolls, the Freeway Tunnel Alternative with tolls and trucks excluded, and the Freeway Tunnel Alternative with toll and express bus.

A total of 26 long-term and 152 short-term noise level measurements were conducted at representative locations to document the existing noise environment. Additionally, 26 short-term exterior-to-interior noise level measurements were conducted at 13 schools within the project study area. A total of 899 representative receptors were evaluated for potential noise impacts resulting from the project. The existing noise levels are shown in Tables B.1 through B.8 in Appendix B, Predicted Future Noise Levels and Noise Barrier Analysis.

S.1 TSM/TDM, BRT Alternative, and Freeway Tunnel Alternative

The future traffic noise levels for the TSM/TDM, BRT, and Freeway Tunnel Alternatives were modeled using either the peak-hour traffic volumes provided in *SR 710 North Transportation Technical Report* (CH2M HILL 2014) or the worst-case traffic operations, which equates to roadway capactity volumes in the Caltrans' Technical Noise Supplement (TeNS) (Caltrans 2013) prior to speed degradation (LOS C/D), whichever is lower.

The future traffic noise levels for the TSM/TDM, BRT, and Freeway Tunnel Alternatives are shown in Tables B.1 through B.11 in Appendix B. When traffic noise impacts have been identified, noise abatement measures must be considered. Traffic noise impacts result from one or more of the following occurrences: (1) an increase of 12 A-weighted decibels (dBA) or more over existing noise levels, or (2) predicted noise levels that approach or exceed the Noise Abatement Criteria (NAC).

Implementation of the project would result in potential short-term noise impacts during construction and long-term noise impacts from use of the completed project. No substantial noise level increase of 12 dBA or more from the corresponding existing noise level would result from operation of the completed project under the TSM/TDM, BRT, and Freeway Tunnel Alternatives.

Noise abatement measures were evaluated for receptors located in the project limits that would be or would continue to be exposed to traffic noise levels approaching or exceeding the NAC. Tables B.1 and B.2 show the future traffic noise levels for the

TSM/TDM Alternative, Tables B.3 and B.4 show the future traffic noise levels for the BRT Alternative, and Tables B.6 and B.10 show the future traffic noise levels for each operational variation under each design variation of the Freeway Tunnel Alternative. Section 2.1.5.2 describes each operational variation in detail. For the Freeway Tunnel Alternative, noise abatement was considered and analyzed for the worst-case operational variations of the single-bore design variation, V6 (which includes tolls), and dual-bore design variation, V4 (which has no tolling in the tunnel). A total of 9 noise barriers for the TSM/TDM Alternative, 6 noise barriers for the BRT Alternative, and 18 noise barriers for the Freeway Tunnel Alternative were evaluated within the project limits.

The results of the noise barrier modeling are shown in Tables B.1 through B.4 and B.7 through B.11 for the TSM/TDM, BRT, and Freeway Tunnel Alternatives, respectively. Of the 9 noise barriers for the TSM/TDM Alternative, 2 were located outside the Caltrans right of way (ROW), 3 were located at the receptor's property line, while the other 4 were located at the Caltrans ROW/property line or edge of shoulder. Of the 6 noise barriers for the BRT Alternative, all 6 were located at or within the receptor's property line. Of the 18 noise barriers evaluated for the Freeway Tunnel Alternative single-bore and dual-bore design variations, 4 were located outside the Caltrans ROW while the other 14 were located at the Caltrans ROW/ property line or edge of shoulder.

Of the 9 noise barriers for the TSM/TDM Alternative, all 9 noise barriers were capable of reducing noise levels by 5 dBA, as required to be considered feasible.

Of the 6 noise barriers for the BRT Alternative, 5 noise barriers were capable of reducing noise levels by 5 dBA, as required to be considered feasible. BRT Noise Barrier (BNB) No. 06 of the BRT Alternative was determined to be not feasible because the barriers would not reduce noise levels by 5 dBA or more.

Of the 18 noise barriers for the Freeway Tunnel Alternative, all but Freeway Tunnel Noise Barrier (FTNB) No.1 for the dual-bore variation were capable of reducing noise levels by 5 dBA, as required to be considered feasible. FTNB No. 9 was not necessary for the single-bore design variation because FR-72 does not approach or exceed the 72 dBA L_{eq} NAC for Category E.

As mentioned above, 13 schools were evaluated for potential long-term interior noise impacts associated with project operations. The future interior noise levels were determined using the predicted future exterior noise level calculated from Traffic

Noise Model (TNM) 2.5 and the exterior-to-interior attenuation. The exterior-to-interior attenuation was determined from the results of the simultaneous exterior and interior noise level measurements conducted at SM-01 through SM-06 and SM-08 through SM-13. At the time of the interior noise measurements, the building closest to the Freeway Tunnel alignment at Maranatha High School was under construction and did not have full insulation and wall construction. A standard exterior-to-interior noise level reduction at SM-07 (Maranatha High School) was assumed to be 25 dBA based on the Federal Highway Administration (FHWA) Highway Traffic Noise Analysis and Abatement Policy and Guidance (2011).

S.2 LRT Alternative

A total of 29 receptor locations were analyzed for potential noise impacts associated with train operations on the proposed LRT Alternative alignment. The *Advanced Conceptual Engineering Report Light Rail Transit Alternative* (CH2M HILL 2014) stated that on Fridays (worst-case day), the total number of train pass-bys would be 326 (i.e., 244 during daytime hours and 82 during nighttime hours).

The future train operation noise levels were compared to the existing daily noise levels, and it was determined that 13 receptors would experience moderate or severe impacts based on the criteria in the FTA *Transit Noise and Vibration Impact Assessment* (2006). In order to eliminate potential future impacts, noise barriers were considered at the edge of track due to the track being elevated above ground. Table B.11 shows the heights of proposed barriers that are required to reduce future noise impacts to no impact at each receptor location. With the implementation of the recommended barrier heights, the future noise level impacts would be reduced to No Impact at all receptors within 1,000 feet (ft) of the LRT Alternative alignment (limits of analysis).

A *Noise Abatement Decision Report* (NADR) will be prepared for this project. The NADR is a design responsibility and is prepared in order to compile information from the NSR, other relevant environmental studies, and design considerations into a single, comprehensive document before public review of the project. The NADR is prepared after completion of the NSR and prior to publication of the draft environmental document. The NADR includes noise abatement construction cost estimates that have been prepared and signed by the project engineer based on site-specific conditions. Construction cost estimates are compared to reasonable allowances in the NADR to identify which noise barrier configurations are reasonable from a cost perspective.

S.3 Construction Noise Levels

Typical noise levels at 50 ft from an active construction area range up to 88 dBA maximum instantaneous noise level (L_{max}) during the noisiest construction phases. Compliance with the construction hours specified in the Municipal Codes of the Cities of Alhambra, Monterey Park, Pasadena, Rosemead, San Marino, and South Pasadena, in the Los Angeles County Code, and in Caltrans Standard Special Provisions (SSP) would be required to minimize construction noise impacts on sensitive land uses adjacent to the project site. Construction noise is regulated by, and shall conform to, Caltrans Standard Specifications in Section 14-8.02, “Noise Control,” and also by SSP S5-310, “Noise Control.” The noise level from contractor operations between the hours of 9:00 p.m. and 6:00 a.m. shall not exceed 86 dBA L_{max} at a distance of 50 ft. The contractor should use an alternative warning method instead of a sound signal unless required by safety laws. In addition, the contractor shall equip all internal combustion engines with the manufacturer-recommended muffler and shall not operate any internal combustion engine on the job site without the appropriate muffler.

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List of Abbreviated Terms

µPa	micro-Pascals
ATM	Active Traffic Management
BNB	BRT Noise Barrier
BRT	Bus Rapid Transit
Cal State LA	California State University, Los Angeles
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CIDH	cast-in-drill-hole
CMS	changeable message signs
CNEL	Community Noise Equivalent Level
County	Los Angeles County
dB	decibels
dBA	A-weighted decibels
FHWA	Federal Highway Administration
ft	feet
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
FTNB	Freeway Tunnel Noise Barrier
HDM	Highway Design Manual
HOV	high-occupancy vehicle
Hz	Hertz
I-10	Interstate 10
I-210	Interstate 210
I-5	Interstate 5
I-605	Interstate 605
I-710	Interstate 710
IEN	Information Exchange Network
ITS	Intelligent Transportation Systems
kHz	kilohertz

L_{dn}	day-night average sound level
L_{eq}	equivalent continuous sound level
L_{eq}(h)	1-hour A-weighted equivalent continuous sound level
L_{max}	maximum instantaneous sound level
LNB	LRT Noise Barrier
LOS	level of service
LRT	Light Rail Transit
LRTP	Long Range Transportation Plan
L_{XX}	percentile-exceeded sound level
Metro	Los Angeles County Metropolitan Transportation Authority
mi	miles
mph	miles per hour
NAC	Noise Abatement Criteria
NADR	Noise Abatement Decision Report
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NSR	Noise Study Report
O&M	operations and maintenance
Protocol	California Department of Transportation Traffic Noise Analysis Protocol
ROW	right of way
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
SPL	sound pressure level
sq mi	square miles
SR 110	State Route 110
SR 134	State Route 134
SR 2	State Route 2
SR 60	State Route 60
SR 710	State Route 710
SSP	Standard Special Provisions
TAP	Transit Access Pass

TDM	Transportation Demand Management
TeNS	Technical Noise Supplement
TNB	TSM/TDM Noise Barrier
TNM	Traffic Noise Model
TRB	Transportation Research Board
TSM	Transportation System Management
TSSP	Traffic Signal Synchronization Program
v/c	volume-to-capacity (ratio)
vplph	vehicles per lane per hour

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Chapter 1. Introduction

1.1. Introduction

The California Department of Transportation (Caltrans), in cooperation with the Los Angeles County Metropolitan Transportation Authority (Metro) proposes transportation improvements to improve mobility and relieve congestion in the area between State Route 2 (SR 2) and Interstates 5, 10, 210 and 605 (I-5, I-10, I-210, and I-605, respectively) in east/northeast Los Angeles and the western San Gabriel Valley. The study area for the State Route 710 (SR 710) North Study as depicted on Figure 1-1 is approximately 100 square miles and generally bounded by I-210 on the north, I-605 on the east, I-10 on the south, and I-5 and SR 2 on the west. Caltrans is the Lead Agency under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

1.2. Purpose of the Noise Study Report

The purpose of 23 Code of Federal Regulations (CFR) 772, "Procedures for Abatement of Highway Traffic Noise," is to provide procedures to help protect public health and welfare, supply Noise Abatement Criteria (NAC), and establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to 23 CFR 772.1. As such, 23 CFR 772 provides procedures for preparing operational and construction noise impact 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.

The Caltrans Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects (Protocol) (Caltrans 2011) provides Caltrans policy for implementing 23 CFR 772 in California. The Protocol outlines the requirements for preparing Noise Study Reports (NSRs).

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Chapter 2. Project Description

2.1. Alternatives

The proposed alternatives include the No Build Alternative, the Transportation System Management/Transportation Demand Management (TSM/TDM) Alternative, the Bus Rapid Transit (BRT) Alternative, the Light Rail Transit (LRT) Alternative, and the Freeway Tunnel Alternative. These alternatives are each discussed below.

2.1.1. No Build Alternative

The No Build Alternative includes projects/planned improvements through 2035 that are contained in the Federal Transportation Improvement Program (FTIP), as listed in the Southern California Association of Governments (SCAG) 2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Measure R and the funded portion of Metro's 2009 Long Range Transportation Plan (LRTP). The No Build Alternative does not include any planned improvements to the SR 710 Corridor. Figure 2-1 illustrates the projects in the No Build Alternative.

2.1.2. Transportation System Management/Transportation Demand Management (TSM/TDM) Alternative

The TSM/TDM Alternative consists of strategies and improvements to increase efficiency and capacity for all modes in the transportation system with lower capital cost investments and/or lower potential impacts. The TSM/TDM Alternative is designed to maximize the efficiency of the existing transportation system by improving capacity and reducing the effects of bottlenecks and chokepoints. Components of the TSM/TDM Alternative are shown on Figure 2-2. TSM strategies increase the efficiency of existing facilities (i.e., TSM strategies are actions that increase the number of vehicle trips which a facility can carry without increasing the number of through lanes).

2.1.2.1. Transportation System Management

TSM strategies include Intelligent Transportation Systems (ITS), local street and intersection improvements, and Active Traffic Management (ATM):

- **ITS Improvements:** ITS improvements include traffic signal upgrades, synchronization and transit prioritization, arterial changeable message signs (CMS), and arterial video and speed data collection systems. The TSM/TDM Alternative includes signal optimization on corridors with signal coordination hardware already installed by Metro's Traffic Signal Synchronization Program (TSSP). These corridors include Del Mar Avenue, Rosemead Boulevard, Temple City Boulevard, Santa Anita Avenue, Fair Oaks Avenue, Fremont Avenue, and Peck Road. The only remaining major north-south corridor in the San Gabriel Valley in which TSSP has not been implemented is Garfield Avenue; therefore, TSSP on this corridor is included in the TSM/TDM Alternative. The locations are shown in Table 2.1.

Table 2.1 TSM/TDM Alternative Elements

ID No.	Description	Location
ITS Improvements		
ITS-1	Transit Signal Priority	Rosemead Boulevard (from Foothill Boulevard to Del Amo Boulevard)
ITS-2	Install Video Detection System on SR 110	SR 110 north of US-101
ITS-3	Install Video Detection System at Intersections	At key locations in study area
ITS-4	Arterial Speed Data Collection	On key north/south arterials
ITS-5	Install Arterial CMS	At key locations in study area
ITS-6	Traffic Signal Synchronization on Garfield Avenue	Huntington Drive to I-10
ITS-7	Signal optimization on Del Mar Avenue	Huntington Drive to I-10
ITS-8	Signal optimization on Rosemead Boulevard	Foothill Boulevard to I-10
ITS-9	Signal optimization on Temple City Boulevard	Duarte Road to I-10
ITS-10	Signal optimization on Santa Anita Avenue	Foothill Boulevard to I-10
ITS-11	Signal optimization on Peck Road	Live Oak Avenue to I-10
ITS-12	Signal optimization on Fremont Avenue	Huntington Drive to I-10

CMS = changeable message signs
I-10 = Interstate 10
ITS = Intelligent Transportation Systems
SR 110 = State Route 110
TDM = Transportation Demand Management
TSM = Transportation System Management
US-101 = United States Route 101

The following provide a further explanation of the ITS elements listed above:

- Traffic signal upgrades include turn arrows, vehicle and/or bicycle detection, pedestrian countdown timers, incorporation into regional management traffic center for real-time monitoring of traffic and updating of signal timing.
- Synchronization is accomplished through signal coordination to optimize travel times and reduce delay.
- Transit signal prioritization includes adjusting signal times for transit vehicles to optimize travel times for public transit riders.
- Arterial CMS are used to alert travelers about unusual road conditions, special event traffic, accident detours, and other incidents.
- Video and speed data collection includes cameras and other vehicle detection systems that are connected to a central monitoring location, allowing for faster detection and response to traffic incidents and other unusual traffic conditions.

- **Local Street and Intersection Improvements:** The local street and intersection improvements are within the Cities of Los Angeles, Pasadena, South Pasadena, Alhambra, San Gabriel, Rosemead, and San Marino. Table 2.2 outlines the location of the proposed improvements to local streets, intersections, and freeway ramps as well as two new local roadways. As identified in Table 2.2, Other Road Improvement T-1 (Valley Boulevard to Mission Road Connector Road) would only be constructed with the BRT and TSM/TDM Alternatives.

Table 2.2 Local Street and Intersection Improvements of the TSM/TDM Alternative

ID No.	Description	Location
	Local Street Improvements	
L-1	Figueroa Street from SR 134 to Colorado Boulevard	City of Los Angeles (Eagle Rock)
L-2a	Fremont Avenue from Huntington Drive to Alhambra Road	City of South Pasadena
L-2c	Fremont Avenue from Mission Road to Valley Boulevard	City of Alhambra
L-3[1]	Atlantic Boulevard from Glendon Way to I-10	City of Alhambra
L-4	Garfield Avenue from Valley Boulevard to Glendon Way	City of Alhambra
L-5	Rosemead Boulevard from Lower Azusa Road to Marshall Street	City of Rosemead
L-8[1]	Fair Oaks Avenue from Grevelia Street to Monterey Road	City of South Pasadena
	Intersection Improvements	
I-1	West Broadway/Colorado Boulevard	City of Los Angeles (Eagle Rock)
I-2	Eagle Rock Boulevard/York Boulevard	City of Los Angeles (Eagle Rock)
I-3	Eastern Avenue/Huntington Drive	City of Los Angeles (El Sereno)
I-4	I-710 SB On-Ramp/Valley Boulevard	City of Alhambra
I-5	I-710 NB Off-Ramp/Valley Boulevard	City of Alhambra
I-8	Fair Oaks Avenue/Monterey Road	City of South Pasadena
I-9	Fremont Street/Monterey Road	City of South Pasadena
I-10	Huntington Drive/Fair Oaks Avenue	City of South Pasadena
I-11	Fremont Avenue/Huntington Drive	City of South Pasadena
I-13	Huntington Drive/Garfield Avenue	Cities of Alhambra/South Pasadena/San Marino
I-14	Huntington Drive/Atlantic Boulevard	Cities of Alhambra/South Pasadena/San Marino
I-15	Atlantic Boulevard/Garfield Avenue	Cities of Alhambra/South Pasadena/San Marino
I-16	Garfield Avenue/Mission Road	City of Alhambra
I-18	San Gabriel Boulevard/Huntington Drive	City of San Marino/Unincorporated Los Angeles County (East Pasadena/East San Gabriel)
I-19	Del Mar Avenue/Mission Road	City of San Gabriel
I-22	San Gabriel Boulevard/Marshall Street	City of San Gabriel
I-24	Huntington Drive/Oak Knoll Avenue	City of San Marino
I-25	Huntington Drive/Sierra Madre Boulevard	City of San Marino
I-43	Del Mar Avenue/Valley Boulevard	City of San Gabriel
I-44	Hellman Avenue/Fremont Avenue	City of Alhambra
I-45	Eagle Rock Boulevard/Colorado Boulevard	City of Los Angeles (Eagle Rock)
	Other Road Improvements	
T-1[2]	Valley Boulevard to Mission Road Connector Road	Cities of Alhambra/Los Angeles (El Sereno)
T-2	SR 110/Fair Oaks Avenue Hook Ramps	Cities of South Pasadena/Pasadena
T-3[3]	St. John Avenue Extension between Del Mar Boulevard and California Avenue	City of Pasadena

[1] Local Street Improvements L-3 and L-8 would not be constructed with the BRT Alternative.

[2] Other Road Improvement T-1 would only be constructed with the BRT and TSM/TDM Alternatives.

[3] Other Road Improvement T-3 would not be constructed with either the single-bore or dual-bore design variation of the Freeway Tunnel Alternative.

I-10 = Interstate 10
I-710 = Interstate 710
NB = northbound
SB = southbound
SR 110 = State Route 110
SR 134 = State Route 134
TDM = Transportation Demand Management
TSM = Transportation System Management

- **Active Traffic Management:** ATM technology and strategies are also included in the TSM/TDM Alternative. The major elements of ATM are arterial speed data collection and CMS. Data on arterial speeds would be collected and distributed through Los Angeles County's Information Exchange Network (IEN). Many technologies are available for speed data collection or the data could be purchased from a third-party provider. Travel time data collected through this effort could be provided to navigation system providers for distribution to the traveling public. In addition, arterial CMS or "trailblazer" message signs would be installed at key locations to make travel time and other traffic data available to the public.

2.1.2.2. Transportation Demand Management

TDM strategies focus on regional means of reducing the number of vehicle trips and vehicle miles traveled as well as increasing vehicle occupancy. TDM strategies facilitate higher vehicle occupancy or reduce traffic congestion by expanding the traveler's transportation options in terms of travel method, travel time, travel route, travel costs, and the quality and convenience of the travel experience. The TDM strategies include reducing the demand for travel during peak periods, reducing the use of motor vehicles, shifting the use of motor vehicles to uncongested times of the day, encouraging rideshare and transit use, eliminating trips (i.e., telecommuting), and improved transportation options. The TDM strategies include expanded bus service, bus service improvements, and bicycle improvements:

- **Expanded Bus Service and Bus Service Improvements:** Transit service improvements included in the TSM/TDM Alternative are summarized in Tables 2.3 and 2.4 and illustrated on Figure 2-2. The transit service improvements enhance bus headways between 10 and 30 minutes during the peak hour and 15 to 60 minutes during the off-peak period. Bus headways are the amount of time between consecutive bus trips (traveling in the same direction) on the bus route. Some of the bus service enhancements almost double existing bus service.
- **Bicycle Facility Improvements:** The bicycle facility improvements include on-street Class III bicycle facilities that support access to transit facilities through the study area and expansion of bicycle parking facilities at existing Metro Gold Line stations. Proposed bicycle facility improvements are outlined in Table 2.4.

Table 2.3 Transit Refinements of the TSM/TDM Alternative

Bus Route	Operator	Route Type	Route Description	Existing Headways		Enhanced Headways	
				Peak	Off-Peak	Peak	Off-Peak
70	Metro	Local	From Downtown Los Angeles to El Monte via Garvey Avenue	10-12	15	10	15
770	Metro	Rapid	From Downtown Los Angeles to El Monte via Garvey Avenue/Cesar Chavez Avenue	10-13	15	10	15
76	Metro	Local	From Downtown Los Angeles to El Monte via Valley Boulevard	12-15	16	10	15
78	Metro	Local	From Downtown Los Angeles to Irwindale via Las Tunas Drive	10-20	16-40	10	15
378	Metro	Limited	From Downtown Los Angeles to Irwindale via Las Tunas Drive	18-23	-	20	30
79	Metro	Local	From Downtown Los Angeles to Santa Anita via Huntington Drive	20-30	40-45	15	30
180	Metro	Local	From Hollywood to Altadena via Los Feliz/ Colorado Boulevard	30	30-32	15	30
181	Metro	Local	From Hollywood to Pasadena via Los Feliz/ Colorado Boulevard	30	30-32	15	30
256	Metro	Local	From Commerce to Altadena via Hill Avenue/ Avenue 64/Eastern Avenue	45	45	30	40
258	Metro	Local	From Paramount to Alhambra via Fremont Avenue/Eastern Avenue	48	45-55	20	30
260	Metro	Local	From Compton to Altadena via Fair Oaks Avenue/Atlantic Boulevard	16-20	24-60	15	30
762[1]	Metro	Rapid	From Compton to Altadena via Atlantic Boulevard	25	30-60	15	30
266	Metro	Local	From Lakewood to Pasadena via Rosemead Boulevard/Lakewood Boulevard	30-35	40-45	15	30
267	Metro	Local	From El Monte to Pasadena via Temple City Boulevard/Del Mar Boulevard	30	30	15	30
485	Metro	Express	From Union Station to Altadena via Fremont/ Lake Avenue	40	60	30	60
487	Metro	Express	From Westlake to El Monte via Santa Anita Avenue/Sierra Madre Boulevard/San Gabriel Boulevard	18-30	45	15	30
489	Metro	Express	From Westlake to East San Gabriel via Rosemead Boulevard	18-20	-	15	-
270	Metro	Local	From Norwalk to Monrovia via Workman Mill/ Peck Road	40-60	60	30	60
780	Metro	Rapid	From West LA to Pasadena via Fairfax Avenue/Hollywood Boulevard/Colorado Boulevard	10-15	22-25	10	20
187	Foothill	Local	From Pasadena to Montclair via Colorado Boulevard/Huntington Drive/Foothill Boulevard	20	20	15	15

[1] This route would not be included as part of the BRT Alternative because the BRT Alternative would replace this service.

BRT = Bus Rapid Transit
Express = Express Bus
Foothill = Foothill Transit
Metro = Los Angeles County Metropolitan Transportation Authority
Rapid = Bus Rapid Transit
TDM = Transportation Demand Management
TSM = Transportation System Management

Table 2.4 Active Transportation and Bus Enhancements of the TSM/TDM Alternative

ID No.	Description	Location
Bus Service Improvements		
Bus-1	Additional bus service	See Table 2.3 and Figure 2-2
Bus-2	Bus stop enhancements	Along TSM routes
Bicycle Facility Improvements		
Bike-1	Rosemead Boulevard bike route (Class III)	Colorado Boulevard to Valley Boulevard (through Los Angeles County, Temple City, Rosemead)
Bike-2	Del Mar Avenue bike route (Class III)	Huntington Drive to Valley Boulevard (through San Marino, San Gabriel)
Bike-3	Huntington Drive bike route (Class III)	Mission Road to Santa Anita Avenue (through the City of Los Angeles, South Pasadena, San Marino, Alhambra, Los Angeles County, Arcadia)
Bike-4	Foothill Boulevard bike route (Class III)	In La Cañada Flintridge
Bike-5	Orange Grove bike route (Class III)	Walnut Street to Columbia Street (in Pasadena)
Bike-6	California Boulevard bike route (Class III)	Grand Avenue to Marengo Avenue (in Pasadena)
Bike-7	Add bike parking at transit stations	Metro Gold Line stations
Bike-8	Improve bicycle detection at existing intersections	Along bike routes in study area

Metro = Los Angeles County Metropolitan Transportation Authority
TDM = Transportation Demand Management
TSM = Transportation System Management

2.1.3. Bus Rapid Transit (BRT) Alternative

The BRT Alternative would provide high-speed, high-frequency bus service through a combination of new, dedicated, and existing bus lanes, and mixed-flow traffic lanes to key destinations between East Los Angeles and Pasadena. The proposed route length is approximately 12 miles (mi). Figure 2-3 illustrates the BRT Alternative.

The BRT Alternative includes the BRT trunk line arterial street and station improvements, frequent bus service, new bus feeder services, and enhanced connecting bus services. The BRT Alternative also includes the active transportation and local street and intersection improvements that are part of the TSM/TDM Alternative. BRT includes bus enhancements identified in the TSM/TDM Alternative, except for improvements to Route 762.

Buses are expected to operate every 10 minutes during peak hours and every 20 minutes during off-peak hours. The BRT service would generally replace, within the study area, the existing Metro Route 762 service. The 12 mi route would begin at Atlantic Boulevard and Whittier Boulevard to the south, follow Atlantic Boulevard, Huntington Drive, Fair Oaks Avenue, Del Mar Boulevard, and end with a terminal loop in Pasadena to the north. Buses operating in the corridor would be given transit signal priority from a baseline transit signal priority project that will be implemented separately by Metro.

Where feasible, buses would run in dedicated bus lanes adjacent to the curb, either in one direction or both directions, during peak periods. The new dedicated bus lanes would generally be created within the existing street rights of way (ROW) through a variety of methods that include restriping the roadway, restricted on-street parking during peak periods, narrowing medians, planted parkways, or sidewalks. Buses would share existing lanes with other traffic in cases where there is not enough ROW. The exclusive lanes would be exclusive to buses and right-turning traffic during a.m. and p.m. peak hours only. At other times of day, the exclusive lanes would be available for on-street parking use.

A total of 17 BRT stations with amenities would be placed on average, at approximately 0.8 mi intervals at major activity centers and cross streets. Typical station amenities would include new shelters, branding elements, seating, wind screens, leaning rails, variable message signs (next bus information), lighting, bus waiting signals, trash receptacles, and stop markers. Some of these stops will be combined with existing stops, while in some cases, new stops for BRT will be provided. The BRT service would include 60-foot (ft) articulated buses with three doors, and would have the latest fare collection technology such as on-board smart card (Transit Access Pass [TAP] card) readers to reduce dwell times at stations. The BRT stops would be provided at the following 17 locations:

- Atlantic Boulevard at Whittier Boulevard
- Atlantic Boulevard between Pomona Boulevard and Beverly Boulevard
- Atlantic Boulevard at Cesar Chavez Avenue/Riggin Street
- Atlantic Boulevard at Garvey Avenue
- Atlantic Boulevard at Valley Boulevard
- Atlantic Boulevard at Main Street
- Huntington Drive at Garfield Avenue
- Huntington Drive at Marengo Avenue
- Fair Oaks Avenue at Mission Street
- Fair Oaks Avenue at Glenarm Street
- Fair Oaks Avenue at California Boulevard
- Fair Oaks Avenue at Del Mar Boulevard
- Del Mar Boulevard at Los Robles Avenue
- Del Mar Boulevard at Lake Avenue
- Del Mar Boulevard at Hill Avenue (single direction only)

- Colorado Boulevard at Hill Avenue (single direction only)
- Colorado Boulevard at Lake Avenue (single direction only)

Additionally, this alternative would include bus feeder routes that would connect additional destinations with the BRT mainline. Two bus feeder routes are proposed: one that would run along Colorado Boulevard, Rosemead Boulevard, and Valley Boulevard to the El Monte transit station; and another bus feeder route that would travel from Atlantic Boulevard near the Gold Line station to the Metrolink stations in the City of Commerce and Montebello via Beverly Boulevard and Garfield Avenue. In addition, other existing bus services in the study area would be increased in frequency and/or span of service.

The TSM/TDM Alternative improvements would also be constructed as part of the BRT Alternative. These improvements would provide the additional enhancements to maximize the efficiency of the existing transportation system by improving capacity and reducing the effects of bottlenecks and chokepoints. As identified in Table 2.2, Other Road Improvement T-1 (Valley Boulevard to Mission Road Connector Road) is one of the TSM/TDM Alternative improvements that would be constructed with the BRT Alternative. Local Street Improvements L-8 (Fair Oaks Avenue from Grevelia Street to Monterey Road) and the reversible lane component of L-3 (Atlantic Boulevard from Glendon Way to I-10) would not be constructed with the BRT Alternative.

2.1.4. Light Rail Transit (LRT) Alternative

The LRT Alternative would include passenger rail operated along a dedicated guideway, similar to other Metro light rail lines. The LRT alignment is approximately 7.5 mi long, with 3 mi of aerial segments and 4.5 mi of bored tunnel segments. Figure 2-4 illustrates the LRT Alternative.

The LRT Alternative would begin at an aerial station on Mednik Avenue adjacent to the existing East Los Angeles Civic Center Station on the Metro Gold Line. The alignment would remain elevated as it travels north on Mednik Avenue, west on Floral Drive, north across Corporate Center Drive, and then along the west side of Interstate 710 (I-710), primarily in Caltrans ROW, to a station adjacent to the California State University, Los Angeles (Cal State LA). The alignment would descend into a tunnel south of Valley Boulevard and travel northeast to Fremont Avenue, north under Fremont Avenue, and easterly to Fair Oaks Avenue. The alignment would then cross under State Route 110 (SR 110) and end at an underground station beneath Raymond Avenue adjacent to the existing Fillmore Station on the Metro Gold Line.

Two directional tunnels are proposed with tunnel diameters approximately 20 ft each, located approximately 60 ft below the ground surface. Other supporting tunnel systems include emergency evacuation cross passages for pedestrians, a ventilation system consisting of exhaust fans at each portal and an exhaust duct along the entire length of the tunnel, fire detection and suppression systems, communications and surveillance systems, and 24-hour monitoring, similar to the existing LRT system.

Trains would operate at speeds of up to 65 miles per hour (mph) approximately every 5 minutes during peak hours and 10 minutes during off-peak hours.

Seven stations would be located along the LRT alignment at Mednik Avenue in East Los Angeles, Floral Drive in Monterey Park, Cal State LA, Fremont Avenue in Alhambra, Huntington Drive in South Pasadena, Mission Street in South Pasadena, and Fillmore Street in Pasadena. The Fremont Avenue Station, the Huntington Drive Station, the Mission Street Station, and the Fillmore Street Station would be underground stations. New Park-and-Ride facilities would be provided at all of the proposed stations except for the Mednik Avenue, Cal State LA, and Fillmore Street stations.

A maintenance yard to clean, maintain, and store light rail vehicles would be located on both sides of Valley Boulevard at the terminus of SR 710. A track spur from the LRT mainline to the maintenance yard would cross above Valley Boulevard.

Two bus feeder services would be provided. One would travel from the Commerce Station on the Orange County Metrolink line and the Montebello Station on the Riverside Metrolink line to the Floral Station, via East Los Angeles College. The other would travel from the El Monte Bus Station to the Fillmore Station via Rosemead and Colorado Boulevards. In addition, other existing bus services in the study area would be increased in frequency and/or span of service.

As part of the LRT Alternative, the I-710 southbound on-ramp at Valley Boulevard would be modified.

The TSM/TDM Alternative improvements would also be constructed as part of the LRT Alternative. These improvements would provide the additional enhancements to maximize the efficiency of the existing transportation system by improving capacity and reducing the effects of bottlenecks and chokepoints. The only component of the TSM/TDM Alternative improvements that would not be constructed with the LRT Alternative is Other Road Improvement T-1 (Valley Boulevard to Mission Road Connector Road).

2.1.5. Freeway Tunnel Alternative

The alignment for the Freeway Tunnel Alternative starts at the existing southern stub of SR 710 in Alhambra, just north of I-10, and connects to the existing northern stub of SR 710, south of the I-210/State Route 134 (SR 134) interchange in Pasadena. The Freeway Tunnel Alternative has two design variations: a dual-bore tunnel and a single-bore tunnel. Both tunnel design variations would include the following tunnel support systems: emergency evacuation for pedestrians and vehicles, air scrubbers, a ventilation system consisting of exhaust fans at each portal, an exhaust duct along the entire length of the tunnel and jet fans within the traffic area of the tunnel, fire detection and suppression systems, communications and surveillance systems, and 24-hour monitoring. An operations and maintenance (O&M) building would be constructed at the northern and southern ends of the tunnel. There would be no operational restrictions for the tunnel, with the exception of vehicles carrying flammable or hazardous materials. Figure 2-5 illustrates the dual-bore and single-bore tunnel design variations for the Freeway Tunnel Alternative.

As part of both design variations of the Freeway Tunnel Alternative, the I-710 northbound off-ramp and southbound on-ramp at Valley Boulevard would be modified.

The TSM/TDM Alternative improvements would also be constructed as part of the Freeway Tunnel Alternative, including either the dual-bore or single-bore design variations. These improvements would provide the additional enhancements to maximize the efficiency of the existing transportation system by improving capacity and reducing the effects of bottlenecks and chokepoints. The only components of the TSM/TDM Alternative improvements that would not be constructed with the Freeway Tunnel Alternative are Other Road Improvements T-1 (Valley Boulevard to Mission Road Connector Road) and T-3 (St. John Avenue Extension between Del Mar Boulevard and California Avenue).

2.1.5.1. Design Variations

The Freeway Tunnel Alternative includes two design variations. These variations relate to the number of tunnels constructed. The dual-bore design variation includes two tunnels that independently convey northbound and southbound vehicles. The single-bore design variation includes one tunnel that carries both northbound and southbound vehicles. Each of these design variations is described below.

- **Dual-Bore Tunnel:** The dual-bore tunnel variation is approximately 6.3 mi long, with 4.2 mi of bored tunnel, 0.7 mi of cut-and-cover tunnel, and 1.4 mi of at-grade segments. The dual-bore tunnel variation would consist of two side-by-side tunnels (one northbound, one southbound), each tunnel of which would have two levels. Each tunnel would consist of two lanes of traffic on each level, traveling in one direction, for a total of four lanes in each tunnel. The northbound tunnel would be constructed for northbound traffic, and the southbound tunnel would be constructed for southbound traffic. Each bored tunnel would have an outside diameter of approximately 60 ft and would be located approximately 120 to 160 ft below the ground surface. Vehicle cross passages would be provided throughout this tunnel variation that would connect one tunnel to the other tunnel for use in an emergency situation. Figure 2-5 illustrates the dual-bore tunnel variation of the Freeway Tunnel Alternative.

  Short segments of cut-and-cover tunnels would be located at the south and north termini to provide access via portals to the bored tunnels. The portal at the southern terminus would be located south of Valley Boulevard. The portal at the northern terminus would be located north of Del Mar Boulevard. No intermediate interchanges are planned for the tunnel.

- **Single-Bore Tunnel:** The single-bore tunnel design variation is also approximately 6.3 mi long, with 4.2 mi of bored tunnel, 0.7 mi of cut-and-cover tunnel, and 1.4 mi of at-grade segments. The single-bore tunnel variation would consist of one tunnel with two levels. Each level would have two lanes of traffic traveling in one direction. The northbound traffic would traverse the upper level, and the southbound traffic would traverse the lower level. The single-bore tunnel would provide a total of four lanes. The single-bore tunnel would also have an outside diameter of approximately 60 ft and would be located approximately 120 to 160 ft below the ground surface. The single-bore tunnel would be in the same location as the northbound tunnel in the dual-bore tunnel design variation. Figure 2-6 illustrates the single-bore tunnel variation cross section of the Freeway Tunnel Alternative.

2.1.5.2. Operational Variations

Five operational variations have been identified for the Freeway Tunnel Alternative, as described below:

- **Freeway Tunnel Alternative without Tolls:** The facility would operate as a conventional freeway with lanes open to all vehicles. This operational variation would be considered for only the dual-bore tunnel design variation.
- **Freeway Tunnel Alternative with Trucks Excluded:** The facility would operate as a conventional freeway; however, trucks would be excluded from using the tunnel. This operational variation would be considered for the dual-bore tunnel only. Signs would be provided along I-210, SR 134, I-710, and I-10 to provide advance notice of the truck restriction.
- **Freeway Tunnel Alternative with Tolls:** This operational variation would be considered for both the dual- and single-bore tunnels described above. All vehicles, including trucks, using the tunnel would be tolled.
- **Freeway Tunnel Alternative with Tolls and Trucks Excluded:** The facility would operate as a conventional freeway; however, trucks would be excluded from using the tunnel. This operational variation would be considered for the single-bore tunnel only. All automobiles would be tolled; however, trucks would be excluded from using the tunnel. Signs would be provided along I-210, SR 134, I-710, and I-10 to provide advance notice of the truck restriction.
- **Freeway Tunnel Alternative with Toll and Express Bus:** This operational variation would be considered for the single-bore tunnel only. The single-bore freeway tunnel would operate as a tolled facility and include an Express Bus component. The Express Bus would be allowed in any of the travel lanes in the tunnel; no bus-restricted lanes would be provided. The Express Bus route would start at the Commerce Station on the Orange County Metrolink line, and then serve the Montebello Station on the Riverside Metrolink line and East Los Angeles College before entering I-710 at Floral Drive. The bus would travel north to Pasadena via the proposed freeway tunnel, making a loop serving Pasadena City College, the California Institute of Technology, and downtown Pasadena before re-entering the freeway and making the reverse trip.

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 that is available on the Caltrans website (http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf).

3.1. Sound, Noise, and Acoustics

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

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

3.2. Frequency

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

3.3. Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (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 micro-Pascals. 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 1,000 ft		
	— 100 —	
Gas lawn mower at 3 ft		
	— 90 —	
Diesel truck at 50 ft at 50 mph		Food blender at 3 ft
	— 80 —	Garbage disposal at 3 ft
Noisy urban area, daytime		
Gas lawn mower, 100 ft	— 70 —	Vacuum cleaner at 10 ft
Commercial area		Normal speech at 3 ft
Heavy traffic at 300 ft	— 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: Technical Noise Supplement, California Department of Transportation (2009).
dBA = A-weighted decibels
ft = feet
mph = miles per hour

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 would 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 mid-frequency (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. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. 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 Continuous 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 continuous 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 the NAC used by Caltrans and the 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 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time).
- **Maximum Instantaneous Sound Level (L_{max}):** L_{max} is the highest instantaneous sound level measured during a specified period.
- **Day-Night Average Sound 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 10:00 p.m. and 7:00 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 10:00 p.m. and 7:00 a.m. and a 5 dB penalty applied to the A-weighted sound levels occurring during evening hours between 7:00 p.m. and 10:00 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 ft. 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 ft) 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 substantial 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 would 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, as discussed below.

4.1. Federal Regulations – TSM/TDM, BRT and Freeway Tunnel Alternatives

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 or Type II 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, or increases the number of through-traffic lanes. A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment.

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

Under 23 CFR 772.11, noise abatement must be considered for Type I projects if the project is predicted to result in a traffic noise impact. In such cases, 23 CFR 772 requires 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). 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 land use in a given area.

Table 4.1 Activity Categories and Noise Abatement Criteria

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.
B[2]	67	Exterior	Residential
C[2]	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands properties, or activities not included in A through 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.

Source: FHWA 23 CFR 772.

[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 dBA.

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

CFR = Code of Federal Regulations
dBA = A-weighted decibels
FHWA = Federal Highway Administration
$L_{eq}(h)$ = 1-hour A-weighted equivalent continuous sound level

In identifying noise impacts, primary consideration is given to exterior areas of frequent human use. In situations where there are no exterior activities, or where the exterior activities are far from the roadway or physically shielded in a manner that prevents an impact on exterior activities, the interior criterion (Activity Category E) is used as the basis for determining a noise impact. Activity Categories F and G do not have an NAC level; therefore, noise levels are presented for reporting purposes only.

4.1.2. Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual

Federal noise impact thresholds are defined in the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA Manual). The FTA criteria, which will be used to assess operational impacts for the LRT Alternative, are based on the best available research on community response to noise. The research shows that characterizing the overall noise environment using measures of noise exposure provides the best correlation with human annoyance. The FTA provides different thresholds for different land uses. Table 4.2 lists the three FTA land use categories and the applicable noise metric for each category. For Category 2 land uses (residential areas where people sleep), the noise exposure is characterized using L_{dn}. In calculating L_{dn}, noise created during the nighttime hours is more heavily weighted than daytime noise to reflect residents' greater sensitivity to noise during the nighttime hours. For Category 1 and Category 3 land uses, areas with primarily daytime use, noise exposure is characterized using the 1-hour L_{eq}. L_{eq} is the steady sound level that represents the same sound energy as the time-varying sound levels over the specified measurement period.

The basic concept of the FTA noise thresholds is that more project noise is allowed in areas where existing noise is higher, but the allowable increase above existing levels of noise exposure decreases in areas where existing noise is higher. The criteria for allowable cumulative noise exposure are shown in Table 4.3 for the three different categories of land use.

If the predicted project noise exceeds the moderate threshold, noise abatement must be considered. If the predicted project noise exceeds the severe threshold, noise abatement must be included in the project unless there are compelling reasons why abatement is not feasible. Noise from existing sources, such as traffic, is not included in the project noise level.

4.2. State Regulations and Policies

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

The Protocol specifies the policies, procedures, and practices to be used by agencies that sponsor new construction or reconstruction of federal or federal-aid highway projects. The NAC specified in the Protocol are the same as those specified in 23 CFR 772. The Protocol defines a noise increase as substantial when the predicted noise levels with project implementation exceed existing noise levels by 12 dBA.

Table 4.2 Noise Levels Defining Impact for Transit Projects

Existing Noise Exposure L_{eq}(h) or L_{dn} (dBA)[1]	**Project Noise Impact Exposure[1], L_{eq}(h) or L_{dn} (dBA)**					
	Category 1 or 2 Sites			**Category 3 Sites**		
	No Impact	**Moderate Impact**	**Severe Impact**	**No Impact**	**Moderate Impact**	**Severe Impact**
<43	<Ambient+10	Ambient + 10–15	>Ambient+15	<Ambient+15	Ambient + 15–20	>Ambient+20
43	<52	52-58	>58	<57	57-63	>63
44	<52	52-58	>58	<57	57-63	>63
45	<52	52-58	>58	<57	57-63	>63
46	<53	53-59	>59	<58	58-64	>64
47	<53	53-59	>59	<58	58-64	>64
48	<53	53-59	>59	<58	58-64	>64
49	<54	54-59	>59	<59	59-64	>64
50	<54	54-59	>59	<59	59-64	>64
51	<54	54-60	>60	<59	59-65	>65
52	<55	55-60	>60	<60	60-65	>65
53	<55	55-60	>60	<60	60-65	>65
54	<55	55-61	>61	<60	60-66	>66
55	<56	56-61	>61	<61	61-66	>66
56	<56	56-62	>62	<61	61-67	>67
57	<57	57-62	>62	<62	62-67	>67
58	<57	57-62	>62	<62	62-67	>67
59	<58	58-63	>63	<63	63-68	>68
60	<58	58-63	>63	<63	63-68	>68
61	<59	59-64	>64	<64	64-69	>69
62	<59	59-64	>64	<64	64-69	>69
63	<60	60-65	>65	<65	65-70	>70
64	<61	61-65	>65	<66	66-70	>70
65	<61	61-66	>66	<66	66-71	>71
66	<62	62-67	>67	<67	67-72	>72
67	<63	63-67	>67	<68	68-72	>72
68	<63	63-68	>68	<68	68-73	>73
69	<64	64-69	>69	<69	69-74	>74
70	<65	65-69	>69	<70	70-74	>74
71	<66	66-70	>70	<71	71-75	>75
72	<66	66-71	>71	<71	71-76	>76
73	<66	66-71	>71	<71	71-76	>76
74	<66	66-72	>72	<71	71-77	>77
75	<66	66-73	>73	<71	71-78	>78
76	<66	66-74	>74	<71	71-79	>79
77	<66	66-74	>74	<71	71-79	>79
>77	<66	66-75	>75	<71	71-80	>80

[1] L_{dn} is used for land use where nighttime sensitivity is a factor; L_{eq} during the hour of maximum transit noise exposure is used for land use involving only daytime activities.

dBA = A-weighted decibels

L_{eq}(h) = 1-hour A-weighted equivalent continuous sound level

L_{dn} = day-night average sound level

Table 4.3 Noise Impact Criteria – Effect on Cumulative Noise Exposure

L_{dn} or L_{eq} (in dBA rounded to nearest whole decibel)			
Existing Noise Exposure	**Allowable Project Noise Exposure**	**Allowable Combined Total Noise Exposure**	**Allowable Noise Exposure Increase**
45	51	52	7
50	53	55	5
55	55	58	3
60	57	62	2
65	60	66	1
70	64	71	1
75	65	75	0

dBA = A-weighted decibels

L_{dn} = day-night average sound level

L_{eq} = equivalent continuous sound level

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

4.2.2. Section 216 of the California Streets and Highways Code

Section 216 of the California Streets and Highways Code relates to the noise effects of a proposed freeway project on public and private elementary and secondary schools. Under this code, a noise impact occurs if, as a result of a proposed freeway project, noise levels exceed 52 dBA 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 E 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 non-freeway 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.

4.3. Regional and Local Regulations and Policies

4.3.1. County of Los Angeles

Section 12.08.440 of the Los Angeles County (County) Code limits construction-related noise that creates a noise disturbance across a residential or commercial real-property line between weekday hours of 7:00 p.m. and 7:00 a.m. or at any time on Sundays or holidays.

4.3.2. City of Alhambra

Section 18.02.060 of the City of Alhambra Municipal Code limits construction-related noise to between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday, and provided any vibration created does not endanger the public health, welfare and safety.

4.3.3. City of Monterey Park

Section 9.53.070 of the City of Monterey Park Municipal Code limits construction-related noise to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and between the hours of 9:00 a.m. and 6:00 p.m. on Saturdays, Sundays, and holidays.

4.3.4. City of Pasadena

Section 9.36.070 of the City of Pasadena Municipal Code limits construction-related noise within a residential district or within a radius of 500 ft to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays. Construction-related activities are prohibited on Sundays and holidays.

4.3.5. City of Rosemead

Section 8.36.030 of the City of Rosemead Municipal Code allows noise associated with construction, repair, remodeling or grading of any real property or during authorized seismic surveys, provided such activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday, and provided the noise level created by such activities does not exceed the noise standard of 65 dBA plus the limits specified in Section 8.36.060(B) as measured on residential property and does not endanger the public health, welfare, and safety.

4.3.6. City of San Marino

Section 14.04.07 of the City of San Marino Municipal Code limits construction-related noise within a residential district or within a radius of 500 ft to 65 dB from any parcel in an R-1 zone, 75 dB from any parcel in a C-1 zone, park and recreational zone, or historical and cultural zone.

4.3.7. City of South Pasadena

Section19A.13 of the City of South Pasadena Municipal Code limits construction-related noise within a residential zone or within 500 ft to between the hours of 8:00 a.m. and 7:00 p.m. Monday through Saturday and between the hours of 10:00 a.m. and 7:00 p.m. on Sundays.

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 that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas such as residential backyards, common use areas at multi-family residences, playgrounds, schools, parks, health care facilities, etc.

The geometry of the project relative to nearby existing and planned land uses was also identified.

Short-term measurement locations were selected to represent each major developed area and serve as representative modeling locations within the project area. Long-term measurement sites were selected to capture the diurnal traffic noise level pattern in the project area as well as the existing background noise levels within the surrounding communities. Several other receptor locations were selected as modeling locations at which noise measurements were not gathered.

5.2. Field Measurement Procedures

A field noise study was conducted in accordance with recommended procedures in TeNS (Caltrans 2013). The following is a summary of the procedures used to collect short-term and long-term sound level data.

5.2.1. Short-Term Measurements

Short-term noise level measurements for the TSM/TDM, BRT, and Freeway Tunnel Alternatives in the project vicinity were sampled during off-peak traffic hours when traffic was flowing freely. Short-term noise level measurements were made using Larson Davis Model 820, 824, and 831 Type 1 sound level meters.

The following measurement procedures were utilized:

- Calibrate the sound level meter.
- Set up the sound level meter at a height of 5 ft.
- Commence noise measurements.
- Collect site-specific data such as date, time, direction of traffic, meteorological data, and distance from the sound level meter to the ROW.
- Count passing vehicles for a period of 10 to 15 minutes concurrently with noise measurement. Vehicles were split into three categories: automobiles with two axles and four wheels, medium trucks with two axles and six wheels, and heavy trucks with more than two axles or six wheels.
- Stop measurement after 10 to 15 minutes.
- Proceed to the next measurement site and repeat.

The traffic counts were expanded to hourly volumes (multiplied by four or six to normalize the results to hourly values) and entered into the FHWA Traffic Noise Model (TNM) 2.5 model runs for each measurement site. The measurement results were used to calibrate the model outputs.

The short-term measurements conducted for the alignment of the LRT followed the same procedure as mentioned above, but no counting of vehicles is necessary. The existing noise levels (L_{eq}) were converted to daily noise levels (L_{dn}) by adding the delta in noise level from the measured hour to the peak hour at the nearest long-term 24-hour noise measurement.

For the school exterior/interior noise measurements, two Type 1 noise monitors were used to assess the transmission loss from exterior to interior at the classroom closest to the proposed freeway and bus rapid transit alignments. The measurements were taken for 5 minutes and occurred after school hours or during periods in which the classroom was vacant in order to assure that all noise sources were outside the classroom, thereby allowing the true noise reduction of the exterior wall to be measured. This methodology will allow a more accurate assessment of interior noise levels when class is in session and a quiet classroom is of importance.

5.2.2. Long-Term Measurements

There were 15 long-term, 24-hour noise level measurements conducted using Quest Type 2 Noise Level Dosimeters within the study area adjacent to the proposed TSM/TDM, BRT, Freeway Tunnel, and LRT alignments. The purpose of the long-term measurement was to identify variations in sound levels throughout the day and to determine the existing peak-hour noise levels.

5.2.3. Background Noise Level Measurements

There were 11 long-term, 24-hour background noise level measurements conducted in areas far away from the freeways and local streets where these noise sources would not contribute to the total noise level in order to establish existing ambient background levels. Additionally, the background noise level measurements are taken to ensure that any proposed noise barriers are not designed to reduce noise levels to below existing ambient noise levels. These measurements were conducted using Quest Type 2 Noise Level Dosimeters.

5.3. Traffic Noise Levels Prediction Methods – TSM/TDM, BRT, and Freeway Tunnel Alternatives

Traffic noise levels were predicted using FHWA 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). Key inputs to the traffic noise model were the locations of roadways, shielding features (e.g., topography and buildings), sound walls, ground type, and receptors. Three-dimensional representations of these inputs were developed using topographic maps provided by the design team.

The existing noise levels at all 227 receptor locations for the TSM/TDM Alternative, 506 receptor locations for the BRT Alternative, and 137 receptor locations for the Freeway Tunnel Alternative were modeled using traffic counts collected during short-term noise level measurements. The future traffic noise levels were modeled using either the peak-hour traffic volumes provided in *SR 710 North Transportation Technical Report* (CH2M HILL 2014) or the worst-case traffic operations, which equates to roadway capactity volumes in the Caltrans' Technical Noise Supplement (TeNS) (Caltrans 2013) prior to speed degradation, whichever is lower. The worst-case traffic condition is assumed to be level of service (LOS) C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85 percent of the roadway capacity. The worst-case volumes for the freeway and associated roadways are 1,950 vehicles per lane per hour (vplph) on the highway mainline, 1,500 vplph on high-occupancy vehicle (HOV) lanes, and 1,000 vplph on ramps. For the local roadways in the TSM/TDM Alternative, due to the nature of having reversible lanes dependent on peak traffic conditions, a volume of 1,000 vplph is used. For the BRT and Freeway Tunnel Alternatives, the peak-hour volume percentages for each segment were calculated from the data in the traffic study and then applied to local roadway capacities taken from the Level of Service tables in the *Highway Capacity Manual* (TRB 2010).

TNM 2.5 is sensitive to the volume of trucks on the roadway because trucks contribute disproportionally to traffic noise. The projected future vehicle distribution for each segment was obtained from the traffic model for the *SR 710 North Transportation Technical Report* (CH2M HILL 2014). The traffic table data (including segment volumes, percentages, and speeds) for 2035 conditions with and without the project are provided in Appendix A.

For the BRT analysis, which contains many signalized intersections, it was found that utilizing free-flow conditions was the most accurate and conservative approach. An example run, provided in Appendix C on the CD attached to this NSR, shows that when comparing the results of the 38 receptors modeled, noise levels were higher at only 1 receptor for the signalized condition due to its very close proximity to an acceleration leg of an intersection. Noise levels at the receptors in close proximity to a leg in which deceleration was artificially modeled due to the lack of a deceleration function within TNM were very low and inconsistent with expected noise levels for receptors located close to a major roadway.

The modeled future noise levels were compared to the modeled existing noise level (for substantial increases in noise levels) and to the NAC to determine potential noise impacts. Feasible noise abatement measures were considered to reduce the projected noise impacts.

5.4. Methods for Identifying Traffic Noise Impacts and Consideration of Abatement – TSM/TDM, BRT, and Freeway Tunnel Alternatives

Traffic noise impacts are considered to occur at receptor locations where predicted design-year noise levels are at least 12 dBA greater than existing noise levels, or where predicted design year noise levels would 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 dBA at impacted receptor locations is predicted with implementation of the abatement measure. 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 Caltrans *Highway Design Manual* (HDM), Chapter 1100 (2012). 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 considering factors such as the construction cost of the barrier, noise reduction design goal (a noise level reduction of 7 dBA or more at one or more benefited receptors), and the viewpoints of benefited receptors (including property owners and residents of the benefited receptors). Barriers more than 16 ft high must be considered in order to achieve acoustical feasibility (i.e., at least 5 dB of noise reduction) or reasonableness (i.e., to achieve the 7 dB design goal). Coordination with the Project Design Team is needed to support the final height.

The Protocol defines the procedure for assessing the reasonableness of noise barriers from a cost perspective. A cost-per-residence allowance is calculated for each benefited residence (i.e., residences that receive at least 5 dBA of noise reduction from a noise barrier). The 2011 allowance is $55,000 per benefited unit/receptor. Total allowances are calculated by multiplying the cost per residence by the number of benefited residences.

5.5. Methods for Identifying Traffic Noise Impacts and Consideration of Abatement – LRT Alternative

In order to assess potential noise impacts associated with the LRT Alternative train operations, the Detailed Noise Assessment guidelines outlined in *Transit Noise and Vibration Impact Assessment* (FTA 2006) were used. The steps were:

1. **Identify noise sensitive receivers.** Noise sensitive land uses were first identified using aerial photography. Field visits were then conducted to confirm land uses and gather additional relevant information, such as the presence of second stories or intervening structures. Sensitive receivers were then grouped together based on their location relative to the tracks and operational factors, such as train speed, that affect noise levels. The predictions for each cluster were based on the distance from the proposed project to the closest sensitive receiver in each cluster.
2. **Determine existing noise levels.** Measurements of noise levels were taken at 16 locations to estimate the existing noise level at each cluster of receivers.
3. **Develop noise prediction equations.** The noise prediction equations are based on formulas provided in the FTA Manual.

4. **Estimate future noise levels at each cluster of receivers.** Apply the prediction models to estimate the project noise at each cluster. Compare the predicted noise levels to the applicable FTA impact thresholds to identify potential noise impacts.
5. **Recommend noise mitigation measures.** Noise mitigation options were evaluated for all locations where predicted noise levels exceeded the Severe or Moderate impact thresholds.

Chapter 6. Existing Noise Environment

6.1. Existing Land Uses

Developed and undeveloped land uses in the project vicinity were identified through land use maps, aerial photography, and site inspection. Within each land use category, receptors were identified.

6.1.1. TSM/TDM Alternative

Existing land uses in the vicinity of the TSM/TDM Alternative study areas include single-family and multifamily residences, five schools, commercial uses, two restaurants, a hospital, a church, a sports field, a park, office uses, industrial uses, and vacant land. Single-family and multifamily residential uses with private areas of frequent human use are evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq.}$ Day-care centers, parks, medical facilities, museums, schools, and places of worship with frequent human outdoor uses are evaluated under Activity Category C, which has an exterior NAC of 67 dBA $L_{eq.}$ Any residential uses or uses mentioned above in Category C that do not have areas of frequent human use are evaluated under Activity Category D, which has an interior NAC of 52 dBA $L_{eq.}$ Hotels, office buildings, and commercial uses with areas of frequent human use are evaluated under Activity Category E, which has an exterior NAC of 72 dBA L_{eq}. Noise levels for industrial uses and commercial uses without areas of frequent human use are classified as Activity Category F, which does not have an NAC level, and are presented for reporting purposes only. Existing land uses in the vicinity of each of the TSM/TDM Alternative improvements are described in further detail below.

- **Local Street Improvement L-2a:**
    - **Fremont Avenue South of Alhambra Road:** Land uses in this area include single-family and multifamily residences. Land uses along the northbound and southbound sides are at-grade with Fremont Avenue.
    - **Fremont Avenue Between Alhambra Road and Maple Street:** Land uses in this area include single-family residences. Land uses along the northbound and southbound sides are at-grade with Fremont Avenue.
    - **Fremont Avenue Between Maple Street and Huntington Drive:** Land uses in this area include single-family residences and a school. Land uses along the northbound and southbound sides are at-grade with Fremont Avenue.

- **Local Street Improvement L-3:**
    - **Atlantic Boulevard Between I-10 and Valley Boulevard:** Land uses in this area include single-family and multifamily residences and commercial uses. Land uses along the northbound and southbound sides range from at-grade with Atlantic Boulevard to 15 ft higher in elevation than Atlantic Boulevard.
- **Local Street Improvement L-4:**
    - **Garfield Avenue Between I-10 and Valley Boulevard:** Land uses in this area include single-family and multifamily residences, office uses, and commercial uses. Land uses along the northbound and southbound sides range from at-grade with Garfield Avenue to 15 ft higher in elevation than Garfield Avenue.
- **Local Street Improvement L-5:**
    - **Rosemead Boulevard Between Marshall Street and Valley Boulevard:** Land uses in this area include single-family and multifamily residences, a restaurant, office uses, and commercial uses. Land uses along the northbound and southbound sides are at-grade with Rosemead Boulevard.
    - **Rosemead Boulevard Between Valley Boulevard and North of Lower Azusa Road:** Land uses in this area include single-family and multifamily residences, a restaurant, a school, a church, office uses, and commercial uses. Land uses along the northbound and southbound sides are at-grade with Rosemead Boulevard.
- **Local Street Improvement L-8:**
    - **Fair Oaks Avenue Between South of Monterey Road and Grevelia Street:** Land uses in this area include single-family and multifamily residences and commercial uses with frequent outdoor use areas. Land uses along the northbound and southbound sides are at-grade with Fair Oaks Avenue.
- **Other Road Improvement T-1:**
    - **SR 710 and Connector Road Between Paseo Rancho Castilla/Hellman Avenue and Alhambra Avenue/Mission Road:** Land uses in this area include single-family residences and a commercial use area (gas station). Land uses in this area range from 5 ft lower in elevation than SR 710 to 45 ft higher in elevation than SR 710 and the new connector road.

- **Other Road Improvement T-2:**
    - **SR 110 Between Fair Oaks Avenue and Glenarm Street:** Land uses in this area include single-family and multifamily residences, a public works facility, and a school. Land uses in this area range from 10 ft lower in elevation than SR 110 to 23 ft higher in elevation than SR 110.
- **Other Road Improvement T-3:**
    - **Pasadena Avenue Between Bellefontaine Street and Union Street:** Land uses in this area include multifamily residences, a church with frequent outdoor human use areas, a hospital, vacant land, and commercial uses with and without frequent outdoor use areas. Land uses in this area range from 5 ft lower in elevation than SR 710 to 30 ft higher in elevation than SR 710 and are generally at-grade with Pasadena Avenue.
    - **St. John Avenue Between Bellefontaine Street and Union Street:** Land uses in this area include single-family and multifamily residences, two schools, a sports field, and a park. Land uses in this area range from 5 ft lower in elevation than SR 710 to 40 ft higher in elevation than SR 710 and are generally at-grade with St. John Avenue.

6.1.2. BRT Alternative

Existing land uses in the vicinity of the BRT Alternative study area include single-family and multifamily residences, a day-care center, two parks, hospital/medical centers, a museum, two schools, two preschools, seven churches, three hotels, commercial uses, office uses, and industrial uses. Single-family and multifamily residential uses with private areas of frequent human use are evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq.}$ Day-care centers, parks, medical facilities, museums, schools, and places of worship with frequent human outdoor uses are evaluated under Activity Category C, which has an exterior NAC of 67 dBA $L_{eq.}$ Any residential uses or uses mentioned above in Category C that do not have areas of frequent human use are evaluated under Activity Category D, which has an interior NAC of 52 dBA $L_{eq.}$ Hotels, office buildings, and commercial uses with areas of frequent human use are evaluated under Activity Category E, which has an exterior NAC of 72 dBA L_{eq}. Noise levels for industrial uses and commercial uses without areas of frequent human use are classified as Activity Category F, which does not have an NAC level, and are presented for reporting purposes only. Existing land uses in the vicinity of the BRT Alternative are described in further detail below.

- **Atlantic Boulevard Between Olympic Boulevard and Whittier Boulevard:** Land uses in this area include single-family residences and commercial uses. Land uses along the northbound and southbound sides are at-grade with Atlantic Boulevard.
- **Atlantic Boulevard Between Whittier Boulevard and Beverly Boulevard:** Land uses in this area include single-family and multifamily residences, a preschool, a church, a park, and commercial uses with and without outdoor eating areas. Land uses along the northbound and southbound sides are at-grade with Atlantic Boulevard.
- **Atlantic Boulevard Between Beverly Boulevard and SR 60:** Land uses in this area include single-family and multifamily residences and commercial uses with and without outdoor eating areas. Land uses along the northbound and southbound sides are at-grade with Atlantic Boulevard.
- **Atlantic Boulevard Between SR 60 and Brightwood Street:** Land uses in this area include single-family and multifamily residences, a church, and commercial uses with and without outdoor eating areas. Land uses along the northbound side range from at-grade with Atlantic Boulevard to 50 ft higher in elevation than Atlantic Boulevard. Land uses along the southbound side range from at-grade with Atlantic Boulevard to 30 ft higher in elevation than Atlantic Boulevard.
- **Atlantic Boulevard Between Brightwood Street and Cadiz Street:** Land uses in this area include single-family and multifamily residences, two churches, a health care center, and commercial uses. Land uses along the northbound and southbound sides range from at-grade with Atlantic Boulevard to 45 ft higher in elevation than Atlantic Boulevard.
- **Atlantic Boulevard Between Cadiz Street and Garvey Avenue:** Land uses in this area include single-family and multifamily residences, a church, two hotels, and commercial uses with and without outdoor eating areas. Land uses along the northbound side range from 25 ft lower in elevation than Atlantic Boulevard to 5 ft higher in elevation than Atlantic Boulevard. Land uses along the southbound side range from at-grade with Atlantic Boulevard to 80 ft higher in elevation than Atlantic Boulevard.
- **Atlantic Boulevard Between Garvey Avenue and I-10:** Land uses in this area include single-family and multifamily residences, a hotel with an outdoor pool area, an office with an outdoor eating area, and commercial uses. Land uses along the northbound and southbound sides range from at-grade with Atlantic Boulevard to 15 ft higher in elevation than Atlantic Boulevard.

- **Atlantic Boulevard Between I-10 and Valley Boulevard:** Land uses in this area include single-family and multifamily residences, and commercial uses. Land uses along the northbound and southbound sides range from at-grade with Atlantic Boulevard to 15 ft higher in elevation than Atlantic Boulevard.
- **Atlantic Boulevard Between Valley Boulevard and Main Street:** Land uses in this area include single-family and multifamily residences, a school with outdoor recreational areas, a church with frequent outdoor use areas, and office and commercial uses. Land uses along the northbound and southbound sides range from at-grade with Atlantic Boulevard to 5 ft higher in elevation than Atlantic Boulevard.
- **Atlantic Boulevard Between Main Street and Alhambra Road:** Land uses in this area include single-family and multifamily residences, a church with frequent outdoor use areas, and commercial uses. Land uses along the northbound and southbound sides range from at-grade with Atlantic Boulevard to 5 ft higher in elevation than Atlantic Boulevard.
- **Atlantic Boulevard Between Alhambra Road and Huntington Drive:** Land uses in this area include single-family and multifamily residences, and commercial uses with and without outdoor eating areas. Land uses along the northbound and southbound sides range from at-grade with Atlantic Boulevard to 5 ft higher in elevation than Atlantic Boulevard.
- **Huntington Drive Between Atlantic Boulevard and Fletcher Avenue:** Land uses in this area include single-family and multifamily residences, a preschool with outdoor frequent human use, a medical building, a parcel under construction, and commercial uses. Land uses along the westbound side range from at-grade with Huntington Drive to 5 ft higher in elevation than Huntington Drive. Land uses along the eastbound side range from 5 ft lower in elevation than Huntington Drive to at-grade with Huntington Drive.
- **Huntington Drive Between Fletcher Avenue and Fair Oaks Avenue:** Land uses in this area include single-family and multifamily residences, and commercial uses. Land uses along the westbound side range from at-grade with Huntington Drive to 15 ft higher in elevation than Huntington Drive. Land uses along the eastbound side range from 5 ft lower in elevation than Huntington Drive to 10 ft higher in elevation than Huntington Drive.
- **Fair Oaks Avenue Between Huntington Drive and Monterey Road:** Land uses in this area include single-family and multifamily residences, a school, and office and commercial uses with and without outdoor eating areas. Land uses along the northbound side range from at-grade with Fair Oaks Avenue to 5 ft higher in

elevation than Fair Oaks Avenue. Land uses along the southbound side range from at-grade with Fair Oaks Avenue to 15 ft higher in elevation than Fair Oaks Avenue.

- **Fair Oaks Avenue Between Monterey Road and SR 110:** Land uses in this area include single-family and multifamily residences, and commercial uses with frequent outdoor use areas. Land uses along the northbound and southbound sides are at-grade with Fair Oaks Avenue.
- **Fair Oaks Avenue Between SR 110 and Glenarm Street:** Land uses in this area include single-family and multifamily residences, a medical center, a museum, and office, commercial, and industrial uses. Land uses along the northbound side range from 5 ft lower in elevation than Fair Oaks Avenue to 30 ft higher in elevation than Fair Oaks Avenue. Land uses along the southbound side range from 5 ft lower in elevation than Fair Oaks Avenue to 15 ft higher in elevation than Fair Oaks Avenue.
- **Fair Oaks Avenue Between Glenarm Street and California Boulevard:** Land uses in this area include single-family and multifamily residences, a nursing home, medical centers, and office and commercial uses with frequent outdoor use areas. Land uses along the northbound and southbound sides are at-grade with Fair Oaks Avenue.
- **Fair Oaks Avenue Between California Boulevard and Del Mar Boulevard:** Land uses in this area include a park and commercial uses with frequent outdoor use areas. Land uses along the northbound side range from at-grade with Fair Oaks Avenue to 40 ft higher in elevation than Fair Oaks Avenue. Land uses along the southbound side range from 10 ft to 30 ft higher in elevation than Fair Oaks Avenue.

6.1.3. Freeway Tunnel Alternative

Existing land uses in the vicinity of the Freeway Tunnel Alternative study area include single-family and multifamily residences, a golf course, four schools, Cal State LA, a church, a hospital, office, commercial, and recreational uses, and vacant land. In addition, a planned office development is located within the project area at the intersection of South Pasadena Avenue and West Dayton Street. Single-family and multifamily uses with private areas of frequent human use are evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq.}$ Day-care centers, parks, golf courses, medical facilities, museums, schools, and places of worship with frequent human outdoor uses are evaluated under Activity Category C, which has an exterior NAC of 67 dBA $L_{eq.}$ Any residential uses or uses mentioned above in

Category C that do not have areas of frequent human use are evaluated under Activity Category D, which has an interior NAC of 52 dBA $L_{eq.}$ Hotels, office buildings, and commercial uses with areas of frequent human use are evaluated under Activity Category E, which has an exterior NAC of 72 dBA L_{eq}. Noise levels for industrial uses and commercial uses without areas of frequent human use are classified as Activity Category F, which does not have an NAC level, and are presented for reporting purposes only. Areas of vacant or undeveloped land fall under Activity Category G, which also does not have an NAC level; therefore, noise levels for vacant or undeveloped land are presented for reporting purposes only. Existing land uses are described in further detail below.

- **Southeast Quadrant of SR 710 and I-10 Interchange:** Land uses in this area include single-family and multifamily residences, a golf course, and office and commercial uses. Land uses in this area are 10 to 150 ft higher in elevation than SR 710 and range from at-grade with I-10 to 175 ft higher in elevation than I-10. The single-family and multifamily residences were evaluated under Activity Category B, which has an exterior NAC of 67 dBA L_{eq}.
- **Northeast Quadrant of SR 710 and I-10 Interchange South of Paseo Rancho Castilla/Hellman Avenue:** Land uses in this area include single-family and multifamily residences. Land uses in this area range from 15 ft lower in elevation than SR 710 to 40 ft higher in elevation than SR 710, and range from 25 ft lower in elevation than I-10 to 50 ft higher in elevation than I-10.
- **SR 710 Northbound Side Between Paseo Rancho Castilla/Hellman Avenue and Alhambra Avenue/Mission Road:** Land uses in this area include single-family residences and a commercial use area (gas station). Land uses in this area range from 5 ft lower in elevation than SR 710 to 45 ft higher in elevation than SR 710.
- **SR 710 Southbound Side Between Paseo Rancho Castilla/Hellman Avenue and Alhambra Avenue/Mission Road:** Land uses in this area include single-family and multifamily residences. Land uses in this area range from 5 ft lower in elevation than SR 710 to 30 ft higher in elevation than SR 710.
- **Northwest Quadrant of SR 710 and I-10 Interchange South of Paseo Rancho Castilla/Hellman Avenue:** Land uses in this area include multifamily residences, Cal State LA classrooms and sports fields, and commercial uses. Land uses in this area are 30 ft to 95 ft higher in elevation than SR 710 and 35 ft to 50 ft higher in elevation than I-10.

- **Southwest Quadrant of SR 710 and I-10 Interchange:** Land uses in this area include single-family residences, police training areas, and office uses. Land uses in this area are 50 ft to 210 ft higher in elevation than SR 710 and 95 ft to 170 ft higher in elevation than I-10.
- **SR 710 Northbound Side Between Bellefontaine Street and Union Street:** Land uses in this area include multifamily residences, a church with frequent outdoor human use areas, a hospital, vacant land, and commercial uses with and without frequent outdoor use areas. Land uses in this area range from 5 ft lower in elevation than SR 710 to 30 ft higher in elevation than SR 710.
- **Southeast Quadrant of SR 710 and SR 134/I-210 Interchange North of Union Street:** Land uses in this area include commercial and office uses. Land uses in this area are at-grade with SR 710 and range from at-grade with I-210 to 20 ft higher in elevation than I-210.
- **Northeast Quadrant of SR 710 and SR 134/I-210 Interchange, West of Fair Oaks Avenue:** Land uses in this area include single-family and multifamily residences, a school with an outdoor basketball court, and commercial uses. Land uses in this area range from 10 ft to 35 ft higher in elevation than I-210.
- **I-210 Southbound Side Between Walnut Street and Mountain Street:** Land uses in this area include single-family and multifamily residences and a school. Land uses in this area are 14 ft to 50 ft higher in elevation than I-210 and 15 ft to 20 ft lower in elevation than SR 134.
- **SR 134 Westbound Side West of Orange Grove Boulevard:** Land uses in this area include single-family and multifamily residences and commercial uses. Land uses in this area range from 10 ft lower in elevation than SR 134 to 35 ft higher in elevation than SR-134.
- **Southwest Quadrant of SR 710 and SR 134/I-210 Interchange, North of Union Street:** Land uses in this area include commercial uses. Land uses in this area are 40 ft higher in elevation than SR 710, and range from 40 ft lower in elevation than SR 134 to 20 ft higher in elevation than SR 134.
- **SR 710 Southbound Side Between Bellefontaine Street and Union Street:** Land uses in this area include single-family and multifamily residences, two schools, a sports field, and a park. Land uses in this area range from 5 ft lower in elevation than SR 710 to 40 ft higher in elevation than SR 710.

6.1.4. LRT Alternative

Existing land uses in the vicinity of the LRT Alternative include single-family and multifamily residences, vacant land, and office, commercial, and recreational uses.

Receptors considered for analysis were located within 1,000 ft of the LRT alignment. Existing land uses are described in further detail below.

- **LRT Alignment Between 3rd Street and SR 60:** Land uses in this area include single-family residences, multifamily residences, and commercial uses. Under FTA criteria, the single-family and multifamily residences are the noise sensitive uses considered for abatement.
- **LRT Alignment Between SR 60 and Floral Drive:** Land uses in this area include single-family residences, multifamily residences, a learning facility, an active park, and office and commercial uses. Under FTA criteria, the single-family residences, multifamily residences, and learning facility are the noise sensitive uses considered for abatement.
- **LRT Alignment Between Mednik Avenue and I-710:** Land uses in this area include single-family residences, multifamily residences, and office and commercial uses. Under FTA criteria, the single-family residences and multifamily residences are the noise sensitive uses considered for abatement.
- **LRT Alignment Along I-710 South of I-10:** Land uses in this area include single-family residences, a golf course, and office and commercial uses. Under FTA criteria, the single-family residences are the noise sensitive uses considered for abatement.
- **LRT Alignment Along I-710 Between I-10 and Hellman Avenue:** Land uses in this area include single-family residences, multifamily residences, and a university (Cal State LA). Under FTA criteria, the single-family residences, multifamily residences, and the university are the noise sensitive uses considered for abatement.
- **LRT Alignment Along I-710 between Hellman Avenue and Valley Boulevard:** Land uses in this area include single-family residences and multifamily residences. Under FTA criteria, the single-family residences and multifamily residences are the noise sensitive uses considered for abatement.

6.2. Noise Measurements Results

The existing noise environment in the project area is characterized below and is based on the short-term, long-term, and exterior/interior noise level measurements conducted.

6.2.1. Short-Term Measurement Locations

6.2.1.1. TSM/TDM Short-Term Measurement Locations

Short-term (10- to 15-minute) noise measurements were conducted at 22 representative receptor locations along the project alignment. The noise level measurements were performed using Larson Davis Model 820, 824, and 831 Type 1 sound level meters. Table 6.1 (all tables for this chapter are provided at the end of the chapter text) shows the results of these measurements along with the date, start time, duration, location, and noise sources for each site. Of the 22 short-term noise level measurements, 20 noise measurements were used to calibrate the noise model and to predict the noise levels at all 227 modeled receptors in the project area. The short-term measurement locations are shown on Figure 6-1. The noise measurement results and concurrent traffic counts for each measurement site are provided in Appendix C, Noise Barrier Reasonableness Analysis Worksheet.

6.2.1.2. BRT Short-Term Measurement Locations

Short-term (10- to 15-minute) noise measurements were conducted at 50 representative receptor locations along the project alignment. The noise level measurements were performed using Larson Davis Model 820, 824, and 831 Type 1 sound level meters. Table 6.2 shows the results of these measurements along with the date, start time, duration, location, and noise sources for each site. Of the 50 short-term noise level measurements, 42 noise measurements were used to calibrate the noise model and to predict the noise levels at all 506 modeled receptors in the project area. The short-term measurement locations are shown on Figure 6-2. The noise measurement results and concurrent traffic counts for each measurement site are provided in Appendix C, Noise Barrier Reasonableness Analysis Worksheet.

6.2.1.3. Freeway Tunnel Alternative Short-Term Measurement

Short-term (10- to 15-minute) noise measurements were conducted at 64 representative receptor locations along the project alignment. The noise level measurements were performed using Larson Davis Model 820, 824, and 831 Type 1 sound level meters. Table 6.3 shows the results of these measurements along with the date, start time, duration, location, and noise sources for each site. Of the 64 short-term noise level measurements, 55 noise measurements were used to calibrate the noise model and to predict the noise levels at all 137 modeled receptors in the project area. The short-term measurement locations are shown on Figure 6-3. The noise measurement results and concurrent traffic counts for each measurement site are provided in Appendix C.

6.2.1.4. LRT Short-Term Measurement

Short-term (10-minute) noise measurements were conducted at 16 representative receptor locations along the project alignment. The noise level measurements were performed using Larson Davis Model 820, 824, and 831 Type 1 sound level meters. Table 6.4 shows the results of these measurements along with the date, start time, duration, location, and noise sources for each site. The short-term noise measurement locations were then compared to the closest long-term 24-hour noise measurements, which are presented below in Section 6.2.2, to create a daily L_{dn} noise level. The short-term measurement locations are shown on Figure 6-4. The noise measurement results for each measurement site are provided in Appendix C.

The meteorological conditions present during all short-term noise measurements are presented in Table 6.5.

6.2.2. Long-Term Measurements

A total of 26 long-term, 24-hour noise measurements (TML-1, BML-1 through BML-7, FML-1 through FML-5, LML-1 and LML-2, and NML-1 through NML-11) were conducted using Quest Type 2 Noise Level Dosimeters, and the results are summarized in Tables 6.6 through 6.31. The long-term noise measurement locations are shown on Figure 6-5. The long-term measurement results are provided in Appendix C.

6.2.3. Exterior-to-Interior Noise Measurement

A total of 13 schools within the project study area along the TSM/TDM Alternative, BRT Alternative, and Freeway Tunnel Alternative were analyzed for existing noise level reductions provided by each school’s building structure. Table 6.32 shows the location and results of the simultaneous 5-minute-long measurements at each school along with the calculated reduction as well as dominating noise sources at each school. The school noise measurement locations are shown on Figures 6-1 through 6-3. The exterior and interior measurement results are provided in Appendix C.

6.2.4. TSM/TDM Alternative, BRT Alternative, and Freeway Tunnel Alternative Calibration Results

After all noise measurements were gathered, the TNM noise models were then calibrated for the TSM/TDM, BRT, and Freeway Tunnel Alternatives. Table 6.33 shows the measured results, modeled results, and K-factor, which was determined by subtracting the modeled result from the measured noise level at each noise measurement location along the TSM/TDM alignments. Table 6.34 shows the measured results, modeled results, and K-factor, which was determined by subtracting the modeled result from the measured noise level at each noise measurement location along the BRT alignment. Table 6.35 shows the measured results, modeled results, and K-factor, which was determined by subtracting the modeled result from the measured noise level at each noise measurement location along the Freeway Tunnel alignment. Due to the complexity of the BRT Alternative and Freeway Tunnel Alternative, a K-factor ranging from -3.5 to 3.5 dB was considered in this study as opposed to the typical -3.0 to 3.0 dB. These calibration results were then carried over to future conditions in order to correct for discrepancies between the TNM noise models and real-world conditions. The calibration runs in the TNM noise models are located on the attached supplemental CD.

Table 6.1 Short-Term Ambient Noise Measurement Results – TSM/TDM Alternative

Measure-ment No.	Date	Start Time	Duration (minutes)	dBA L_{eq}	Location	Noise Sources
L2a/TM-1	4/16/2014	8:50 AM	10	65.2	211 Fremont Avenue	Traffic on Fremont Avenue and Alhambra Road
L2a/TM-2	4/16/2014	8:50 AM	10	67.8	2045 Fremont Avenue, Single-Family Home	Traffic on Fremont Avenue
L2a/TM-3	4/16/2014	9:23 AM	10	66.6	2012 Fremont Avenue	Traffic on Fremont Avenue
L2a/TM-4	4/16/2014	9:23 AM	10	65.9	1935 Fremont Avenue, Multi-Family Home	Traffic on Fremont Avenue
L2a/TM-5	4/16/2014	9:55 AM	10	69.4	1318 Huntington Drive, KFC Patio	Traffic on Fremont Avenue and Huntington Drive
L2a/TM-6	4/16/2014	9:55 AM	10	63.4	1400 Huntington Drive, The Barkley Restaurant	Traffic on Fremont Avenue and Huntington Drive
L4/TM-7	4/17/2014	9:50 AM	10	64.3	1824 Second Street, Alley	Traffic on Ramps near SB Garfield Avenue and I-10
L4/TM-8	4/17/2014	9:50 AM	10	56.9	1825 Stoneman Avenue	Traffic on I-10, Garfield Avenue, and Ramps
L4/TM-9	4/17/2014	10:30 AM	10	67.6	1617 Garfield Avenue	Traffic on Garfield Avenue
L4/TM-10	4/17/2014	10:30 AM	10	66.7	1714 Garfield Avenue	Traffic on Garfield Avenue
L4/TM-11	4/17/2014	10:55 AM	10	63.6	1517 Garfield Avenue	Traffic on Garfield Avenue
L4/TM-12	4/17/2014	10:55 AM	10	65.4	1426 Garfield Avenue, Pro Service Realty	Traffic on Garfield Avenue
L5/TM-13	4/17/2014	10:22 AM	10	70.6	3728 Rosemead Boulevard, Multi-Family Homes	Traffic on Rosemead Avenue
L5/TM-14	4/17/2014	10:22 AM	10	70.5	3845 Rosemead Boulevard, Rosemead Apartments	Traffic on Rosemead Avenue
L5/TM-15	4/17/2014	10:22 AM	10	67.9	3930 Rosemead Boulevard, Pine Crest Apartments	Traffic on Rosemead Avenue
L5/TM-16	4/17/2014	9:07 AM	10	71.9	4216 Rosemead Boulevard, Jack-in-the-Box	Traffic on Rosemead Avenue and Vehicles in Parking Lot
L5/TM-17	4/17/2014	9:07 AM	10	62.9	4251 Rosemead Boulevard, U-Haul	Traffic on Rosemead Avenue
L5/TM-18	4/17/2014	9:07 AM	10	61.2	Rosemead High School Softball Field	Traffic on Rosemead Avenue
T2/TM-19	4/17/2014	1:00 PM	10	55.9	409 Garfield Avenue	
T2/TM-20	4/17/2014	1:00 PM	10	61.5	1760 State Street, Apartment Complex	Traffic on SR 110, Light Traffic on State Street
T2/TM-21	4/17/2014	1:30 PM	10	57.1	1201 South Marengo Avenue, Blair High School Tennis/ Basketball Court	Traffic on SR 110
T2/TM-22	4/17/2014	1:30 PM	10	67.4	1800 State Street, Palm Garden Apartments	Traffic on SR 110, Light Traffic on State Street

Source: LSA Associates, Inc. (August 2013, October 2013, and April 2014).
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels
I-10 = Interstate 10
SB = southbound
SR 110 = State Route 110
TDM = Transportation Demand Management
TSM = Transportation System Management

Table 6.2 Short-Term Ambient Noise Measurement Results – BRT Alternative

Measure-ment No.	Date	Start Time	Duration (minutes)	dBA L_{eq}	Location	Noise Sources
BM-1	8/15/2013	9:25 AM	10	66.1	1002 Atlantic Boulevard, Wienerschnitzel patio area	Traffic on Atlantic Boulevard
BM-2	8/15/2013	9:25 AM	10	58.3	570 Atlantic Boulevard, Atlantic Park	Traffic on Atlantic Boulevard, Hasting Street, and Amalia Avenue; brief crow cawing
BM-3	8/15/2013	9:25 AM	10	70.0	532 Atlantic Boulevard, Alphonsus Church	Traffic on Atlantic Boulevard
BM-4	10/24/2013	3:21 PM	10	58.6	473 Amalia Avenue, Fourth Street Primary Center	Traffic on Atlantic Boulevard
BM-5	10/23/2013	2:25 PM	10	61.7	269 Atlantic Boulevard, McDonald’s patio area	Traffic on Atlantic Boulevard and Pomona Boulevard; Metro Rail train engines running; bus idling nearby on Pomona Boulevard; exhaust fan at McDonald's
BM-6	10/23/2013	2:25 PM	10	62.3	5314 Fernfield Drive across street	Traffic on I-210 and Atlantic Boulevard.
BM-7	8/15/2013	10:04 AM	10	66.4	2314 Atlantic Boulevard, Animal Hospital.	Traffic on Atlantic Boulevard
BM-8	8/15/2013	10:04 AM	10	66.0	2020 Atlantic Boulevard, Boston Market Restaurant	Traffic on Atlantic Boulevard; cars occasionally parking and activating alarm in commercial parking lot; nearby water fountain
BM-9	8/15/2013	10:04 AM	10	61.3	850 Brightwood Street, apartment complex	Traffic on Atlantic Boulevard
BM-10	8/15/2013	10:36 AM	10	64.1	1830 Atlantic Boulevard	Traffic on Atlantic Boulevard; buzzing noise from large building across street
BM-11	8/15/2013	10:36 AM	10	62.0	1600 Atlantic Boulevard (side street)	Traffic on Atlantic Boulevard; helicopter flyover
BM-12	8/15/2013	10:36 AM	10	65.0	1114 Atlantic Boulevard	Traffic on Atlantic Boulevard
BM-13	8/15/2013	11:11 AM	10	55.7	900 Atlantic Boulevard	Traffic on Atlantic Boulevard
BM-14	8/15/2013	11:11 AM	10	68.2	1111 Atlantic Boulevard	Traffic on Atlantic Boulevard and Sevilla Street; pedestrian briefly talking on cellphone near meter.
BM-15	8/15/2013	11:11 AM	10	66.3	826 Atlantic Boulevard	Traffic on Atlantic Boulevard
BM-16	8/15/2013	11:53 AM	10	61.0	606 Atlantic Boulevard, Good Shepherd Taiwanese Presbyterian Church	Traffic on Atlantic Boulevard
BM-17	8/15/2013	11:53 AM	10	68.6	500 South Atlantic Boulevard, optometry office	Traffic on Atlantic Boulevard and Harding Avenue; momentary bus unloading at bus stop
BM-18	8/15/2013	11:53 AM	10	66.8	400 Atlantic Boulevard, Mr. Baguette patio	Traffic on Atlantic Boulevard
BM-19	8/15/2013	1:58 PM	10	60.4	In between backyards of 261F and 297A Atlantic Boulevard	Traffic on Atlantic Boulevard
BM-20	8/15/2013	1:58 PM	10	59.4	840 Mabel Avenue, apartment complex	Traffic on Atlantic Boulevard and Mabel Avenue; helicopter flyover

Table 6.2 Short-Term Ambient Noise Measurement Results – BRT Alternative

Measurement No.	Date	Start Time	Duration (minutes)	dBA L_{eq}	Location	Noise Sources
BM-21	8/15/2013	1:58 PM	10	62.0	420 North Atlantic Boulevard, Monterey Park Best Western	Traffic on Atlantic Boulevard
BM-22	8/29/2013	9:40 AM	10	53.8	616 Hathaway Avenue, multi-family home	Traffic on Atlantic Boulevard and I-10
BM-23	8/29/2013	9:40 AM	10	72.4	908 West Ramona Road	Traffic on I-10
BM-24	8/29/2013	9:40 AM	10	70.3	1120 Ramona Road	Traffic on I-10 and ramps
BM-25	8/29/2013	10:12 AM	10	61.5	1825 9th Street	Traffic on I-10, ramps and Atlantic Boulevard
BM-26	8/29/2013	10:12 AM	10	62.2	1824 South Olive Avenue	Traffic on I-10 and ramps
BM-27	8/29/2013	10:12 AM	10	67.0	1701M Atlantic Boulevard, apartment complex	Traffic on Atlantic Boulevard
BM-28	8/15/2013	2:58 PM	10	68.0	1504(A/B) Atlantic Boulevard	Traffic on Atlantic Boulevard
BM-29	8/15/2013	2:58 PM	10	70.8	915 Atlantic Boulevard	Traffic on Atlantic Boulevard and San Marino Avenue
BM-30	8/15/2013	2:58 PM	10	71.2	806-1 Atlantic Boulevard	Traffic on Atlantic Boulevard
BM-31	10/24/2013	10:27 AM	10	65.5	409 Atlantic Boulevard, Northrop Elementary School	Traffic on Atlantic Boulevard
BM-32	10/24/2013	10:27 AM	10	57.8	Intersection of Irving Street and Atlantic Boulevard, grass area	Traffic on Atlantic Boulevard; minor noise from birds in tree nearby
BM-33	10/24/2013	11:03 AM	10	67.9	201A Atlantic Boulevard	Traffic on Atlantic Boulevard; UPS truck package drop-off nearby
BM-34	8/27/2013	9:10 AM	10	67.8	334 South Atlantic Boulevard, apartment complex	Traffic on Atlantic Boulevard
BM-35	8/27/2013	9:10 AM	10	62.3	433 Atlantic Boulevard	Traffic on Atlantic Boulevard; trash truck near meter at beginning of measurement
BM-36	8/27/2013	9:10 AM	10	65.4	812 Atlantic Boulevard	Traffic on Atlantic Boulevard
BM-37	8/27/2013	9:42 AM	10	63.9	1010 1st Street	Traffic on Atlantic Boulevard
BM-38	8/27/2013	9:42 AM	10	65.1	1210 Atlantic Boulevard, In-N-Out patio area	Traffic on Atlantic Boulevard, Huntington Drive and Garfield Avenue; helicopter flyover
BM-39	8/27/2013	9:42 AM	10	65.3	2051-2095 Huntington Drive	Traffic on Huntington Drive
BM-40	8/27/2013	10:17 AM	10	64.9	1919 North Huntington Drive, The Church of Jesus Christ of Latter-Day Saints	Traffic on Huntington Drive
BM-41	8/27/2013	10:17 AM	10	67.1	1651 Huntington Drive	Traffic on Huntington Drive
BM-42	8/27/2013	10:17 AM	10	55.5	1702 Fair Oaks Avenue	Traffic on Fair Oaks Avenue; ambient apartment noise
BM-43	10/24/2013	11:03 AM	10	62.7	1500 Fair Oaks Avenue, South Pasadena Middle School	Traffic on Fair Oaks Avenue
BM-44	10/24/2013	11:39 AM	10	66.9	1101 Fair Oaks Avenue, Jamba Juice patio area	Traffic on Fair Oaks Avenue and parking lot

Table 6.2 Short-Term Ambient Noise Measurement Results – BRT Alternative

Measure-ment No.	Date	Start Time	Duration (minutes)	dBA L_{eq}	Location	Noise Sources
BM-45	10/24/2013	11:39 AM	10	67.4	716 Fair Oaks Avenue, McDonald's patio area	Traffic on Fair Oaks Avenue and parking lot
BM-46	8/27/2013	11:19 AM	10	64.8	435 Fair Oaks Avenue	Traffic on Fair Oaks Avenue
BM-47	8/27/2013	11:19 AM	10	68.4	1602 Raymond Hill Road, apartment complex	Traffic on Fair Oaks Avenue, Columbia Street and Raymond Hill Road
BM-48	8/27/2013	11:19 AM	10	62.3	958 Fair Oaks Avenue	Traffic on Fair Oaks Avenue
BM-49	8/27/2013	11:53 AM	10	71.5	716 South Fair Oaks Avenue	Traffic on Fair Oaks Avenue
BM-50	8/27/2013	11:53 AM	10	65.5	576 Fair Oaks Avenue, Chase Bank patio area	Traffic on Fair Oaks Avenue and California Boulevard; people talking nearby

Source: LSA Associates, Inc. (August and October 2013).
BRT = Bus Rapid Transit
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels
I-10 = Interstate 10
I-210 = Interstate 210
UPS = United Parcel Service

Table 6.3 Short-Term Ambient Noise Measurement Results – Freeway Tunnel Alternative

Measure-ment No.	Date	Start Time	Duration (minutes)	dBA L_{eq}	Location	Noise Sources
FM-1	8/29/2013	10:59AM	10	58.2	568 Casuda Canyon Drive	Traffic on SR 710 and Corporate Center Drive
FM-2	8/29/2013	10:59AM	10	60.8	3912-4048 West Ramona Boulevard, Monterey Park Golf Course	Traffic on SR 710
FM-3	8/29/2013	10:59AM	10	56.6	3700 West Ramona Road, Monterey Hill restaurant parking lot	Traffic on SR 710 and I-10
FM-4	8/20/2013	12:19PM	10	62.8	3349 Balzac Road	Traffic on SR 710 and I-10 interchange
FM-5	8/20/2013	11:29AM	10	59.9	2405 Capetown Avenue	Traffic on SR 710 and I-10
FM-6	8/20/2013	11:29AM	10	57.4	2321 Charnwood Avenue	Traffic on SR 710 Freeway; some faint aircraft noise
FM-7	8/20/2013	11:29AM	10	61.4	2225 Charnwood Avenue	Traffic on SR 710; dog barking inside residence
FM-8	8/20/2013	10:56AM	10	58.1	2201 Charnwood Avenue	Traffic on SR 710
FM-9	8/20/2013	10:56AM	10	66.0	1937 Charnwood Avenue	Traffic on SR 710; some aircraft noise
FM-10	8/20/2013	10:56AM	10	73.3	1896 Charnwood Avenue	Traffic on SR 710
FM-11	8/20/2013	10:26AM	10	53.2	1905 Westmont Drive	Traffic on SR 710
FM-12	8/20/2013	10:26AM	10	59.5	1609 Westmont Drive	Traffic on SR 710 and ramp
FM-13	8/20/2013	10:26AM	10	50.7	1515 Westmont Drive	Traffic on SR 710, ramps, and Valley Boulevard
FM-14	8/20/2013	9:48AM	10	51.2	3215 Front Street	Traffic on Mission Avenue
FM-15	8/20/2013	9:48AM	10	61.2	5557 Valley Boulevard, Grifols Building	Traffic on SR 710; exhaust fan
FM-16	8/20/2013	9:48AM	10	65.1	5555 Valley Boulevard, Grifols Building	Traffic on Valley Boulevard
FM-17	8/29/2013	2:23PM	10	54.0	2410 Lillyvale Avenue, Grifols Building smoking patio area	Traffic on Valley Boulevard
FM-18	8/29/2013	2:23PM	10	65.0	Between 5506 and 5514 Valley Boulevard, apartment complex	Traffic on Valley Boulevard; air conditioner noise
FM-19	8/29/2013	2:23PM	10	62.3	2330 Highbury Avenue	Traffic on SR 710
FM-20	8/29/2013	1:53PM	10	68.0	2276 Highbury Avenue	Traffic on SR 710
FM-21	8/29/2013	1:53PM	10	52.5	End of Vandala Avenue cul-de-sac	Traffic on SR 710
FM-22	8/29/2013	1:53PM	10	55.5	California State University, Los Angeles quad area	Traffic on SR 710
FM-23	8/29/2013	1:15PM	10	55.2	Martin Luther King Memorial Hall, California State University, Los Angeles	Traffic on SR 710 and Circle Drive
FM-24	8/29/2013	1:15 PM	10	56.4	2004-2042 Circle Drive, between baseball field and tennis courts at California State University, Los Angeles	Traffic on I-10 and Circle Drive

Table 6.3 Short-Term Ambient Noise Measurement Results – Freeway Tunnel Alternative

Measure-ment No.	Date	Start Time	Duration (minutes)	dBA L_{eq}	Location	Noise Sources
FM-25	8/29/2013	11:41 AM	10	65.4	201 Centre Plaza Drive #3, Children's Law Center patio area	Traffic on SR 710
FM-26	7/30/2013	10:05 AM	10	53.6	Back parking lot of Los Angeles County Sheriff's Department closest to SR 710	Traffic on SR 710 and parking lot; airplane flyover
FM-27	8/21/2013	9:35 AM	10	55.2	100 West California Boulevard, Huntington Hospital patio area	Traffic on Pasadena Avenue; water fountain noise
FM-28	8/21/2013	10:22 AM	10	58.1	Intersection of Pasadena Avenue and California Boulevard, Vons parking lot	Traffic on California Boulevard, Pasadena Avenue, and parking lot; kids at daycare across Pasadena Avenue
FM-29	8/21/2013	10:22 AM	10	71.8	396 Pasadena Avenue	Traffic on I-210 on-ramp and Pasadena Avenue
FM-30	8/21/2013	10:22 AM	10	68.1	368 Pasadena Avenue	Traffic on I-210 ramp and Pasadena Avenue
FM-31	8/21/2013	10:50 AM	10	63.8	Intersection of Waverly Drive and Pasadena Avenue	Traffic on SR 710, Pasadena Avenue, and Waverly Drive
FM-32	8/21/2013	10:50 AM	10	64.3	250 South Pasadena Avenue, apartment complex	Traffic on I-210 on-ramp and Pasadena Avenue
FM-33	8/21/2013	10:50 AM	10	61.9	250 South Pasadena Avenue	Traffic on Pasadena Avenue
FM-34	8/21/2013	11:25 AM	10	63.0	54 South Pasadena Avenue	Traffic on I-210, Pasadena Avenue, and Green Street
FM-35	8/21/2013	11:25 AM	10	67.5	168 West Colorado Boulevard	Traffic on Colorado Boulevard and Pasadena Avenue; waterfall and music in nearby restaurant
FM-36	8/21/2013	1:10 PM	10	64.6	74 North Pasadena Avenue, office building	Traffic on I-210, Pasadena Avenue, and Union Street
FM-37	8/21/2013	1:10 PM	10	64.1	100 West Walnut Street, Parsons Corporation Building	Traffic on SR 710, SR 134, and interchange ramps
FM-38	8/21/2013	2:46 PM	10	65.7	480 Cypress Avenue	Traffic on SR 134 WB to I-210 NB on-ramp and adjacent ramps
FM-39	8/21/2013	2:46 PM	10	62.1	Between 502 and 540 Orange Grove Place near pool area, apartment complex	Traffic on I-210
FM-40	8/21/2013	2:46 PM	10	68.2	572 Orange Grove Place	Traffic on I-210 and Ramps
FM-41	10/23/2013	9:19 AM	15	65.8	651 North Orange Grove Boulevard, New Horizon School near soccer field and basketball court	Traffic on I-210
FM-42	8/22/2013	11:44 AM	10	62.6	717 Cypress Avenue	Traffic on I-210
FM-43	8/22/2013	11:44 AM	10	70.7	849 Lincoln Ave	Traffic on I-210
FM-44	8/22/2013	12:18 PM	10	67.7	877 Lincoln Avenue	Traffic on I-210 Freeway and on I-210 WB Off-Ramp
FM-45	8/22/2013	12:18 PM	10	60.3	924 Cypress Avenue	Traffic on I-210
FM-46	8/22/2013	12:18 PM	10	61.4	860 Winona Avenue	Traffic on I-210
FM-47	8/22/2013	11:54 AM	10	65.0	1 Mayview Lane	Traffic on SR-710 Freeway.
FM-48	10/23/2013	9:19 AM	15	67.6	6 Mayview Lane	Traffic on I-210
FM-49	10/23/2013	9:19 AM	15	67.1	550 Rosewood Lane	Traffic on SR 710

Table 6.3 Short-Term Ambient Noise Measurement Results – Freeway Tunnel Alternative

Measurement No.	Date	Start Time	Duration (minutes)	dBA L_{eq}	Location	Noise Sources
FM-50	10/23/2013	7:33 AM	15	65.2	Intersection of Longwood Lane and Pasadena Avenue	Traffic on SR 134 and Pasadena Avenue
FM-51	10/23/2013	7:33 AM	15	64.8	404-490 Rosemont Avenue, apartment complex	Traffic on SR 710 and I-210; bird noise
FM-52	10/23/2013	7:33 AM	15	62.5	315 North Pasadena Avenue, Roosevelt Elementary School	Traffic on SR 710, I-210, and ramps
FM-53	10/23/2013	10:15 AM	15	63.9	Orange Grove Village apartment complex tennis court	Traffic on I-210
FM-54	8/21/2013	1:52 PM	10	61.4	337 West Colorado Boulevard, Rusnak car dealership patio area	Traffic on SR 710 and SR 134
FM-55	8/21/2013	1:52 PM	10	61.5	337 West Colorado Boulevard, Rusnak car dealership	Traffic on SR 710 and St. John Avenue; car wash noise from dealership
FM-56	8/21/2013	1:52 PM	10	60.9	277 Green Street	Traffic on SR 710 and St. John Avenue
FM-57	10/23/2013	8:18 AM	15	59.1	131 South St. John Avenue, HRock Church	Traffic on St. John Avenue
FM-58	10/23/2013	8:18 AM	15	57.3	169 South St. John Avenue, Maranatha High School	Traffic on SR 710; construction activity across SR 710
FM-59	10/23/2013	8:18 AM	15	60.5	Intersection of St. John Avenue and Del Mar Boulevard, Maranatha High School	Traffic on St. John Avenue and Del Mar Boulevard
FM-60	8/21/2013	9:35 AM	10	53.3	Intersection of Waverly Drive and Havendale Drive	Traffic on SR 710 and Del Mar Boulevard; bird noise
FM-61	8/21/2013	9:35 AM	10	51.9	410-422 Gordon Terrace, apartment complex	Traffic on SR 710; emergency vehicle sirens in distance
FM-62	8/20/2013	2:44 PM	10	55.0	Open lot at end of Palmetto Drive	Traffic on SR 710
FM-63	8/20/2013	2:44 PM	10	67.2	265 California Boulevard, apartment complex	Traffic on St. John Avenue and California Boulevard
FM-64	8/20/2013	2:44 PM	10	62.7	202 California Boulevard	Traffic on California Boulevard and Pasadena Avenue

Source: LSA Associates, Inc. (August and October 2013).
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels
I-10 = Interstate 10
I-210 = Interstate 210
NB = northbound
SR 134 = State Route 134
SR 710 = State Route 710
WB = westbound

Table 6.4 Short-Term Ambient Noise Measurement Results – LRT Alternative

Measure-ment No.	Date	Start Time	Duration (minutes)	dBA (L_{eq})	Location	Noise Sources
LM-1	8/14/2013	10:14 AM	10	50.1	252 Kern Avenue	Traffic on SR 60, Kern Avenue, and Mednik Avenue
LM-2	8/14/2013	9:05 AM	10	61.5	142 Kern Avenue	Traffic on SR 60 and Kern Avenue
LM-3	8/14/2013	9:31 AM	10	64.8	4682 Gleason Street	Traffic on SR 60, Gleason Street, and Arizona Avenue
LM-4	8/14/2013	11:03 AM	10	62.0	4848 Civic Center Way, Mary Ridgway East Los Angeles Probation Office open space area	Traffic on SR 60, Mednik Avenue, Civic Center Way, and Gleason Street
LM-5	8/14/2013	11:50 AM	10	59.3	Intersection of 1st Street and Mednik Avenue, Belvedere Skate Park	Traffic on SR 60, 1st Street, and Mednik Avenue
LM-6	8/14/2013	1:20 PM	10	55.1	4775 East 1st Street, Apartment #9	Traffic on Mednik Avenue
LM-7	8/14/2013	1:46 PM	10	57.1	229 Kern Avenue	Traffic on SR 60 and Kern Avenue
LM-8	8/14/2013	11:20 AM	10	63.0	337 Mednik Avenue	Traffic on Mednik Avenue
LM-9	8/14/2013	12:57 PM	10	64.9	Intersection of Mednik Avenue and Cesar E. Chavez Avenue	Traffic on Mednik Avenue and Cesar E. Chavez Avenue
LM-10	8/14/2013	1:28 PM	10	49.3	4821 Colonia De Los Pinos, apartment complex	Traffic on Mednik Avenue; bird noise, helicopter flyover, ambient apartment noise
LM-11	8/14/2013	10:45 AM	10	50.0	End of alley between Hammel Street and Dozier Street	Traffic on Mednik Avenue; dog barking
LM-12	8/14/2013	2:06 PM	10	63.6	4800 Colonia De Las Rosas, apartment complex	Traffic on Mednik Avenue
LM-13	8/14/2013	2:13 PM	10	63.7	4132 Floral Drive	Traffic on Floral Drive
LM-14	8/14/2013	9:54 AM	10	55.3	1588 Corporate Center Drive	Traffic on SR 710
LM-15	8/14/2013	9:31 AM	10	62.3	1255 Corporate Center Drive	Traffic on SR 710
LM-16	8/14/2013	9:05 AM	10	59.2	1155 Corporate Center Drive	Traffic on SR 710

Source: LSA Associates, Inc. (August through November 2013).
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels
LRT = Light Rail Transit
SR 60 = State Route 60
SR 710 = State Route 710

Table 6.5 Meteorological Conditions During Short-Term Noise Measurement

Date	Temperature (°F)	Average Wind Speed (mph)
07/30/2013	68.4–82.0	0.6–2.6
08/13/2013	69.3–89.0	1.3–2.8
08/14/2013	73.4–92.2	0.0–3.4
08/15/2013	63.1–95.5	0.6–3.8
08/20/2013	76.9–90.5	0.0–4.8
08/21/2013	77.5–97.3	0.6–2.4
08/22/2013	84.5–102.6	0.0–2.3
08/27/2103	78.5–92.2	0.3–2.0
08/29/2013	94.4–98.9	0.8–1.9
09/24/2013	78.8–87.8	6.9–10.4
10/03/2013	64.4–75.3	0.0–6.9
10/17/2013	53.6–84.2	0.0–6.9
10/23/2013	56.7–75.2	0.6–2.6
10/24/2013	62.5–71.6	0.0–4.6
4/16/2014	63.0-69.0	0.6-1.2
4/17/2014	63.5-72.5	0.7-2.4

Source: LSA Associates, Inc. (July through October 2013 and April 2014).
°F = degrees Fahrenheit
mph = miles per hour

Table 6.6 Long-Term Noise Measurement at TML-1 (1201 South Marengo Avenue)

Time	Noise Level, dBA L_{eq}(h)
1:00 PM	54.7
2:00 PM	55.5
3:00 PM	54.7
4:00 PM	55.9
5:00 PM	55.9
6:00 PM	54.9
7:00 PM	54.7
8:00 PM	54.0
9:00 PM	53.7
10:00 PM	53.3
11:00 PM	51.3
12:00 AM	49.1
1:00 AM	47.8
2:00 AM	47.4
3:00 AM	46.4
4:00 AM	47.5
5:00 AM	51.3
6:00 AM	55.0
7:00 AM	55.8
8:00 AM	***57.9***
9:00 AM	55.6
10:00 AM	54.7
11:00 AM	54.8
12:00 PM	54.9

Source: LSA Associates, Inc. (April 16-17, 2014).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
TML = TSM/TDM Measurement, Long-Term (24 hours)

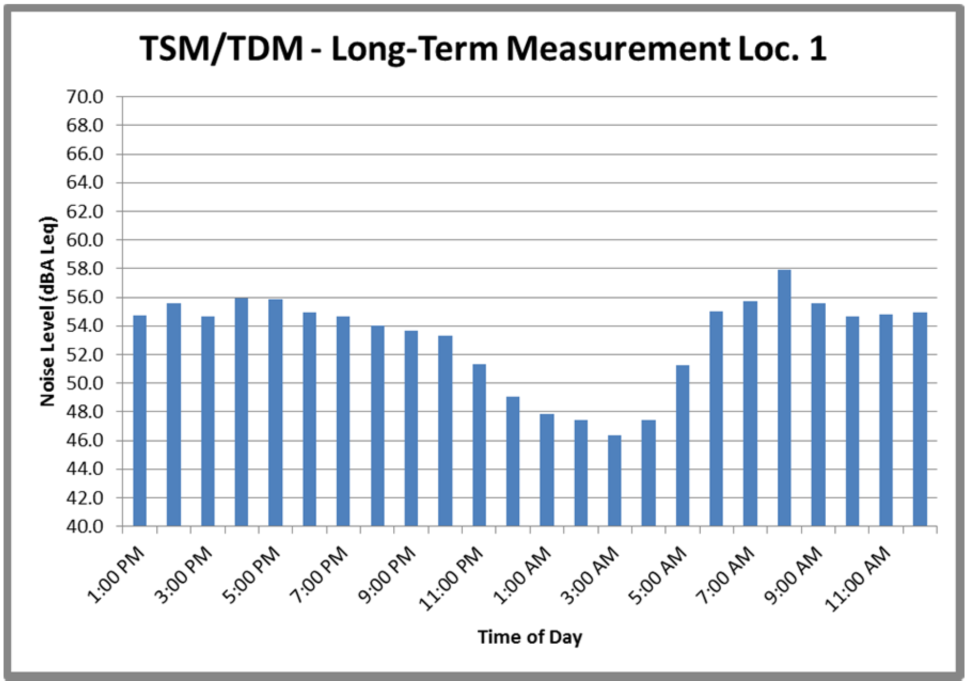

Table 6.7 Long-Term Noise Measurement at BML-1 (535 Atlantic Boulevard)

Time	Noise Level, dBA L_{eq}(h)
9:00 AM	55.8
10:00 AM	55.8
11:00 AM	53.7
12:00 PM	55.1
1:00 PM	56.8
2:00 PM	53.9
3:00 PM	55.1
4:00 PM	54.7
5:00 PM	56.2
6:00 PM	56.1
7:00 PM	***57.2***
8:00 PM	56.8
9:00 PM	56.7
10:00 PM	55.2
11:00 PM	53.0
12:00 AM	51.1
1:00 AM	47.5
2:00 AM	50.4
3:00 AM	49.5
4:00 AM	49.9
5:00 AM	53.4
6:00 AM	54.8
7:00 AM	56.0
8:00 AM	55.9

Source: LSA Associates, Inc. (July 23-24, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
BML = BRT Measurement, Long-Term (24 hours)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels

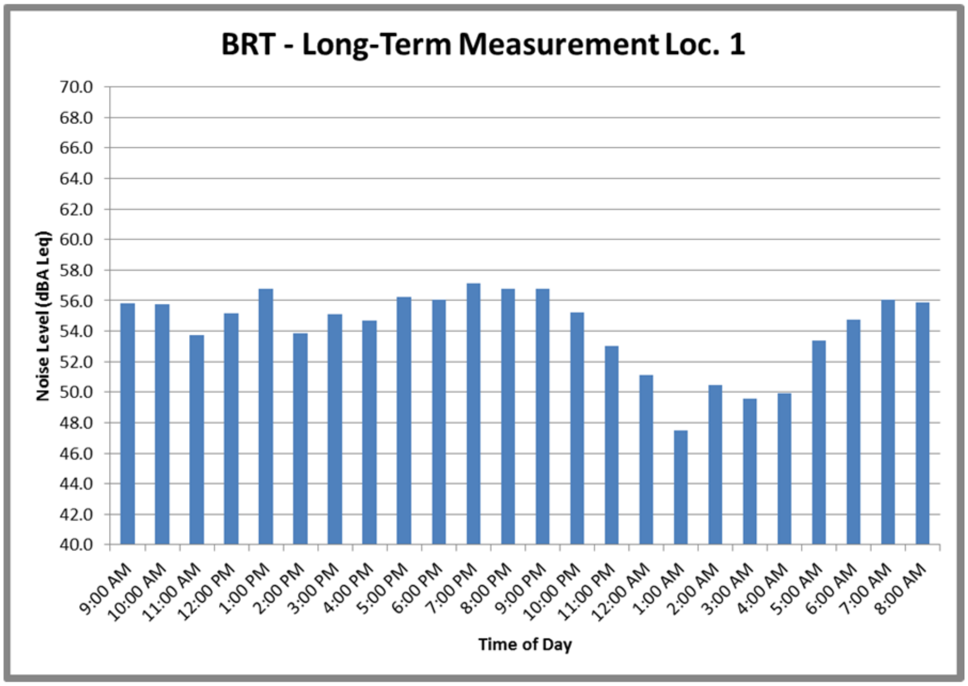

Table 6.8 Long-Term Noise Measurement at BML-2 (1680 Atlantic Boulevard)

Time	Noise Level, dBA L_{eq}(h)
10:00 AM	60.6
11:00 AM	60.4
12:00 PM	61.0
1:00 PM	60.0
2:00 PM	60.3
3:00 PM	61.1
4:00 PM	60.9
5:00 PM	***61.5***
6:00 PM	61.4
7:00 PM	60.3
8:00 PM	59.8
9:00 PM	58.4
10:00 PM	58.3
11:00 PM	55.3
12:00 AM	53.5
1:00 AM	51.8
2:00 AM	51.6
3:00 AM	50.8
4:00 AM	52.1
5:00 AM	54.9
6:00 AM	58.4
7:00 AM	60.0
8:00 AM	60.2
9:00 AM	60.3

Source: LSA Associates, Inc. (July 23-24, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
BML = BRT Measurement, Long-Term (24 hours)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels

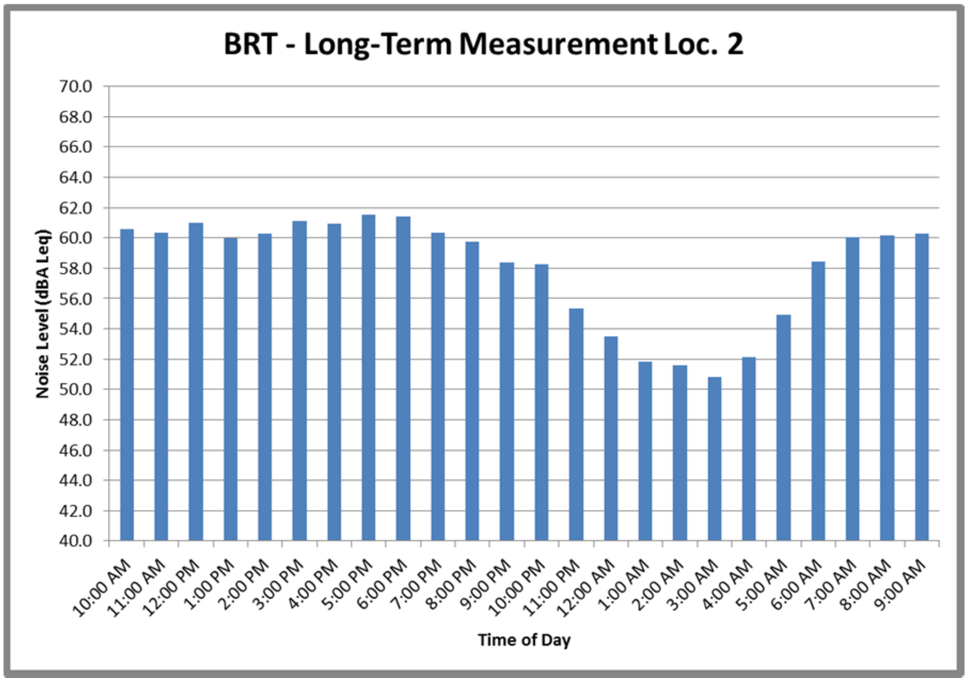

Table 6.9 Long-Term Noise Measurement at BML-3 (315 Atlantic Boulevard)

Time	Noise Level, dBA L_{eq}(h)
12:00 PM	65.8
1:00 PM	64.8
2:00 PM	65.0
3:00 PM	65.2
4:00 PM	65.4
5:00 PM	65.8
6:00 PM	***65.9***
7:00 PM	64.6
8:00 PM	63.5
9:00 PM	63.5
10:00 PM	61.1
11:00 PM	57.5
12:00 AM	54.3
1:00 AM	49.8
2:00 AM	48.6
3:00 AM	49.0
4:00 AM	52.4
5:00 AM	56.9
6:00 AM	62.6
7:00 AM	64.9
8:00 AM	64.8
9:00 AM	64.4
10:00 AM	64.6
11:00 AM	65.1

Source: LSA Associates, Inc. (November 5-6, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
BML = BRT Measurement, Long-Term (24 hours)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels

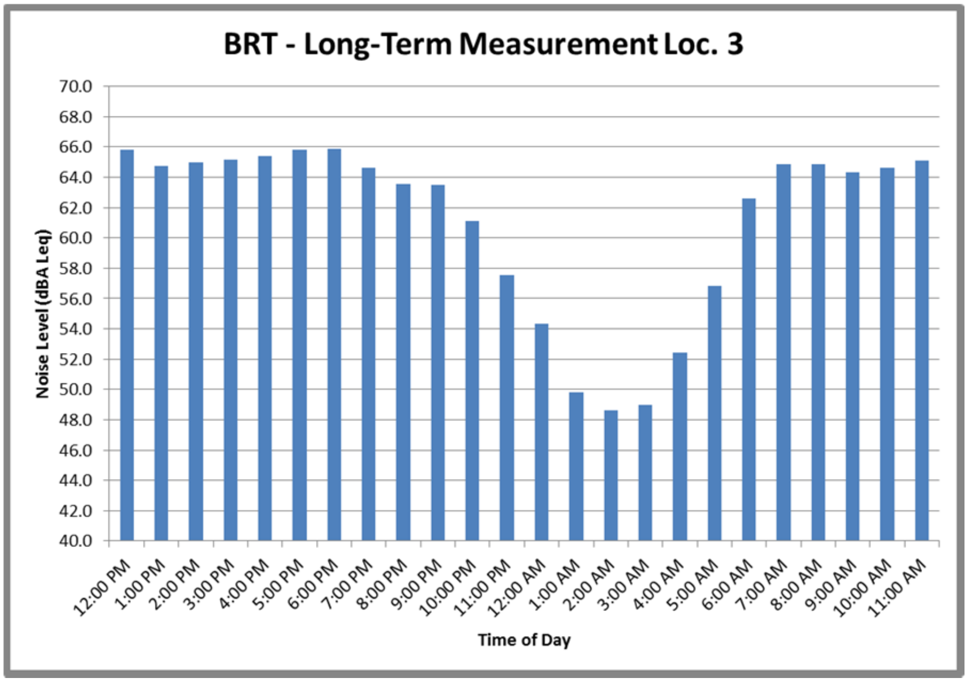

Table 6.10 Long-Term Noise Measurement at BML-4 (1108 Atlantic Boulevard)

Time	Noise Level, dBA L_{eq}(h)
10:00 AM	60.3
11:00 AM	60.3
12:00 PM	60.9
1:00 PM	60.8
2:00 PM	60.6
3:00 PM	60.9
4:00 PM	59.7
5:00 PM	58.7
6:00 PM	58.8
7:00 PM	60.1
8:00 PM	59.5
9:00 PM	59.3
10:00 PM	58.3
11:00 PM	56.8
12:00 AM	54.4
1:00 AM	53.0
2:00 AM	52.1
3:00 AM	50.8
4:00 AM	52.2
5:00 AM	55.7
6:00 AM	59.7
7:00 AM	***62.3***
8:00 AM	61.5
9:00 AM	61.0

Source: LSA Associates, Inc. (July 23-24, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
BML = BRT Measurement, Long-Term (24 hours)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels

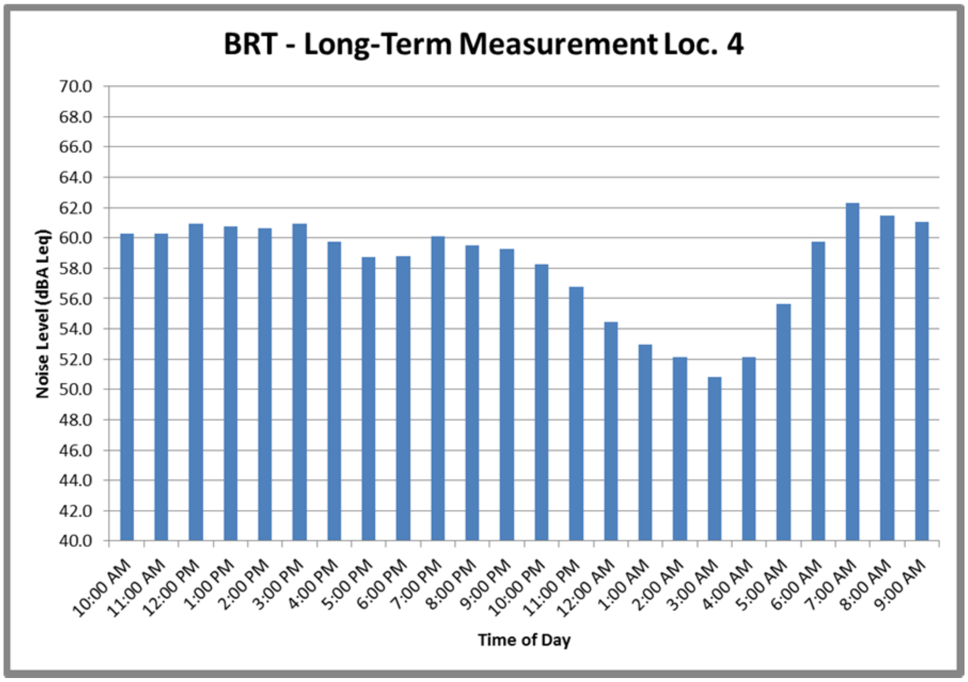

Table 6.11 Long-Term Noise Measurement at BML-5 (1910 Huntington Drive)

Time	Noise Level, dBA L_{eq}(h)
1:00 PM	65.1
2:00 PM	65.5
3:00 PM	65.6
4:00 PM	65.9
5:00 PM	66.5
6:00 PM	66.3
7:00 PM	65.5
8:00 PM	64.7
9:00 PM	64.6
10:00 PM	62.7
11:00 PM	60.6
12:00 AM	58.0
1:00 AM	53.0
2:00 AM	51.0
3:00 AM	49.4
4:00 AM	54.7
5:00 AM	60.2
6:00 AM	66.0
7:00 AM	***68.9***
8:00 AM	68.6
9:00 AM	66.5
10:00 AM	65.5
11:00 AM	64.4
12:00 PM	67.6

Source: LSA Associates, Inc. (July 24-25, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
BML = BRT Measurement, Long-Term (24 hours)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels

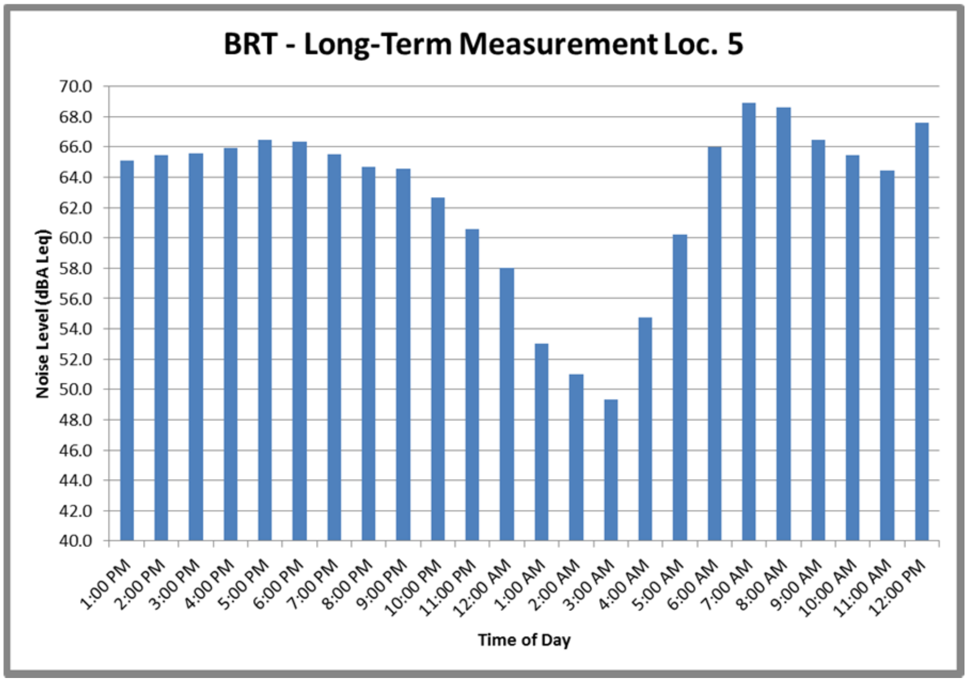

Table 6.12 Long-Term Noise Measurement at BML-6 (909 Fair Oaks Avenue)

Time	Noise Level, dBA L_{eq}(h)
1:00 PM	59.8
2:00 PM	61.3
3:00 PM	62.2
4:00 PM	61.3
5:00 PM	61.1
6:00 PM	60.3
7:00 PM	58.6
8:00 PM	58.2
9:00 PM	57.9
10:00 PM	56.9
11:00 PM	53.6
12:00 AM	52.7
1:00 AM	51.3
2:00 AM	50.5
3:00 AM	49.4
4:00 AM	51.2
5:00 AM	55.3
6:00 AM	59.3
7:00 AM	61.0
8:00 AM	63.8
9:00 AM	***64.4***
10:00 AM	61.4
11:00 AM	60.9
12:00 PM	60.2

Source: LSA Associates, Inc. (July 24-25, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
BML = BRT Measurement, Long-Term (24 hours)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels

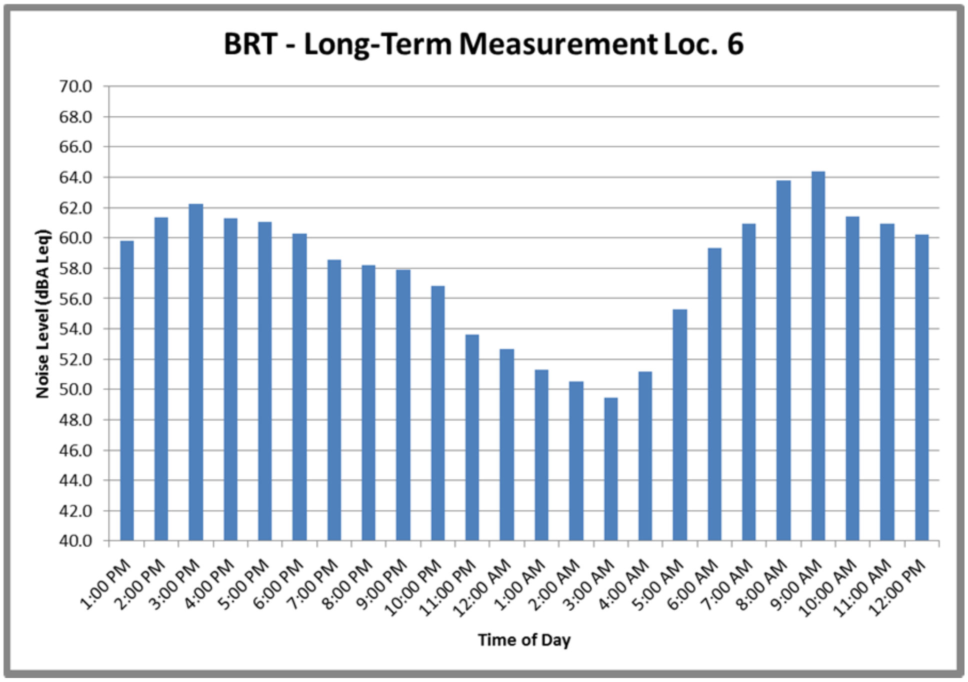

Table 6.13 Long-Term Noise Measurement at BML-7 (151 South Hill Avenue)

Time	Noise Level, dBA L_{eq}(h)
2:00 PM	61.3
3:00 PM	62.2
4:00 PM	61.3
5:00 PM	61.1
6:00 PM	60.3
7:00 PM	58.6
8:00 PM	58.2
9:00 PM	57.9
10:00 PM	56.9
11:00 PM	53.6
12:00 AM	52.7
1:00 AM	51.3
2:00 AM	50.5
3:00 AM	49.4
4:00 AM	51.2
5:00 AM	55.3
6:00 AM	59.3
7:00 AM	61.0
8:00 AM	63.8
9:00 AM	***64.4***
10:00 AM	61.4
11:00 AM	60.9
12:00 PM	60.2
1:00 PM	60.7

Source: LSA Associates, Inc. (July 24-25, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
BML = BRT Measurement, Long-Term (24 hours)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels

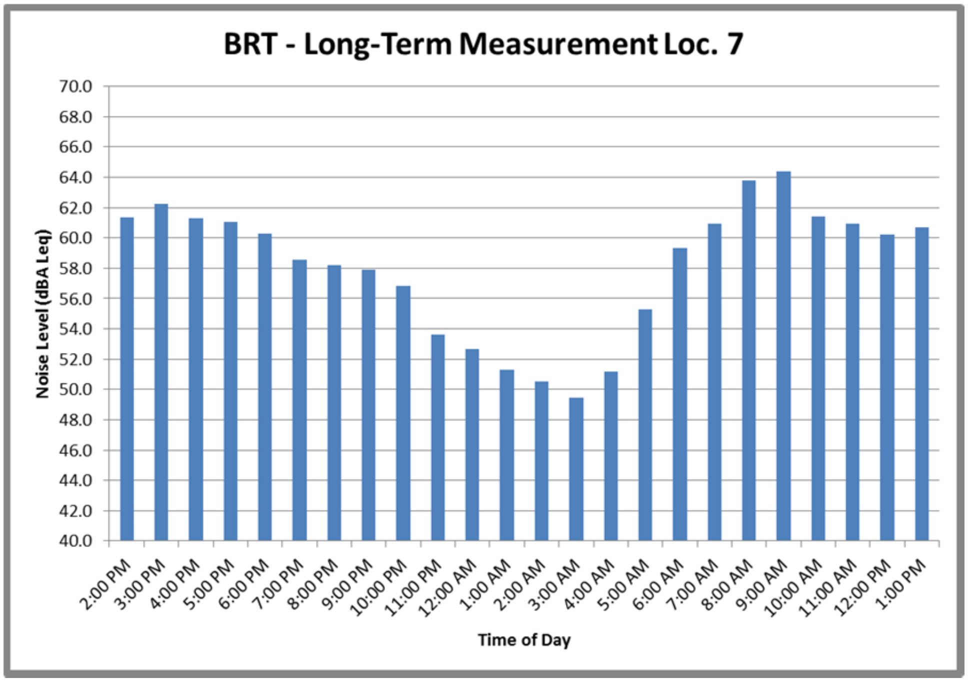

Table 6.14 Long-Term Noise Measurement at FML-1 (3351 Balzac Street)

Time	Noise Level, dBA L_{eq}(h)
11:00 AM	63.4
12:00 PM	63.7
1:00 PM	65.0
2:00 PM	***66.9***
3:00 PM	66.8
4:00 PM	66.3
5:00 PM	66.7
6:00 PM	66.2
7:00 PM	63.9
8:00 PM	62.3
9:00 PM	61.8
10:00 PM	60.9
11:00 PM	59.3
12:00 AM	57.1
1:00 AM	54.8
2:00 AM	54.8
3:00 AM	55.3
4:00 AM	58.8
5:00 AM	62.6
6:00 AM	65.9
7:00 AM	65.6
8:00 AM	65.0
9:00 AM	64.8
10:00 AM	64.2

Source: LSA Associates, Inc. (July 23-24, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
FML = Freeway Tunnel Measurement, Long-Term (24 hours)

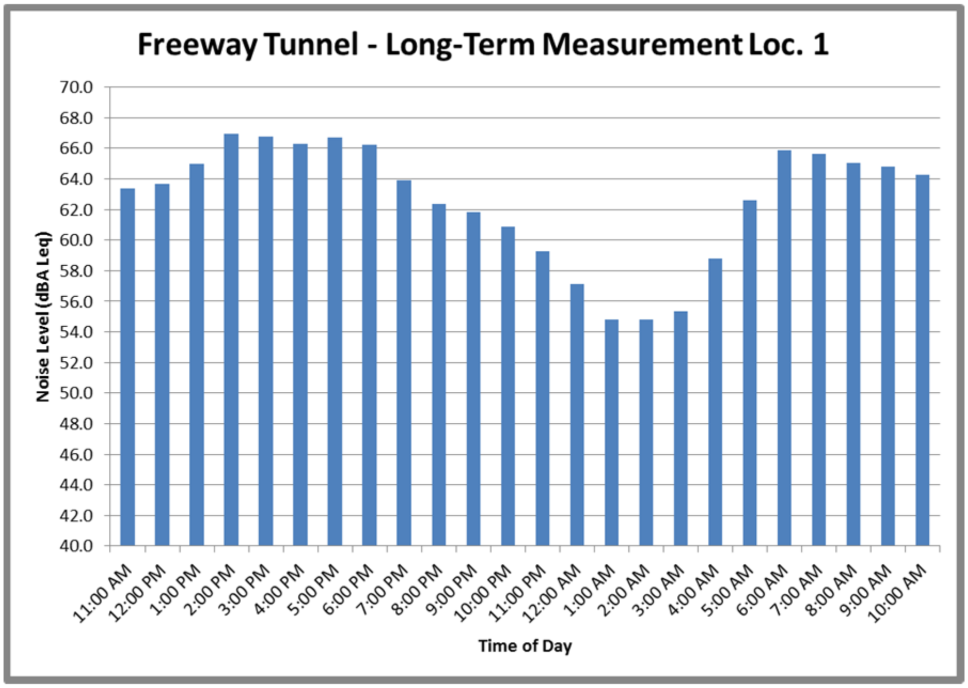

Table 6.15 Long-Term Noise Measurement at FML-2 (1912 Charnwood Avenue)

Time	Noise Level, dBA L_{eq}(h)
11:00 AM	73.0
12:00 PM	73.3
1:00 PM	73.4
2:00 PM	73.5
3:00 PM	73.1
4:00 PM	73.4
5:00 PM	74.0
6:00 PM	74.3
7:00 PM	74.0
8:00 PM	72.8
9:00 PM	72.1
10:00 PM	71.1
11:00 PM	69.4
12:00 AM	66.2
1:00 AM	64.3
2:00 AM	63.8
3:00 AM	63.7
4:00 AM	66.8
5:00 AM	71.7
6:00 AM	74.4
7:00 AM	***74.5***
8:00 AM	74.2
9:00 AM	73.8
10:00 AM	73.0

Source: LSA Associates, Inc. (July 23-24, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
FML = Freeway Tunnel Measurement, Long-Term (24 hours)

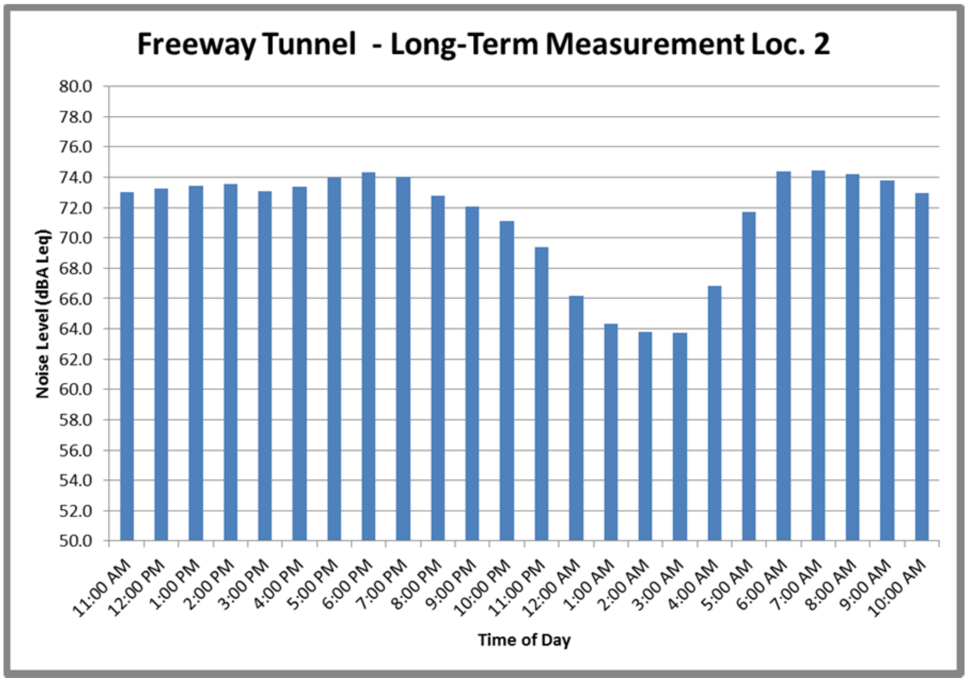

Table 6.16 Long-Term Noise Measurement at FML-3 (Palmetto Drive Terminus)

Time	Noise Level, dBA L_{eq}(h)
2:00 PM	58.6
3:00 PM	58.6
4:00 PM	58.5
5:00 PM	***59.7***
6:00 PM	58.5
7:00 PM	58.0
8:00 PM	56.8
9:00 PM	56.6
10:00 PM	55.2
11:00 PM	53.5
12:00 AM	51.5
1:00 AM	49.7
2:00 AM	49.1
3:00 AM	49.8
4:00 AM	52.4
5:00 AM	55.9
6:00 AM	57.8
7:00 AM	58.4
8:00 AM	58.7
9:00 AM	58.0
10:00 AM	57.2
11:00 AM	56.9
12:00 PM	56.8
1:00 PM	57.5

Source: LSA Associates, Inc. (July 23-24, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
FML = Freeway Tunnel Measurement, Long-Term (24 hours)

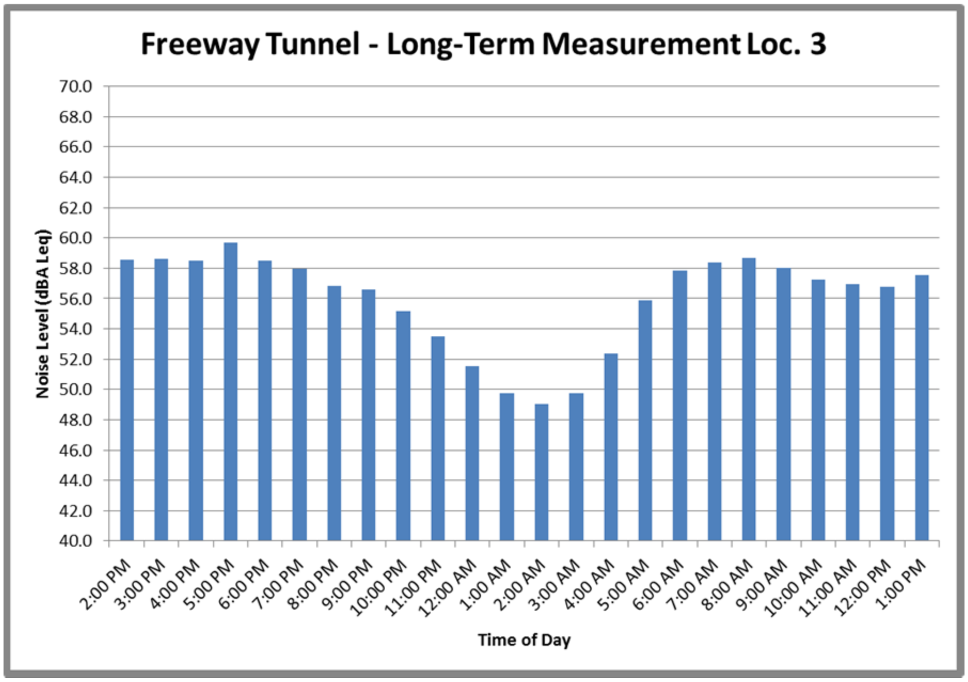

Table 6.17 Long-Term Noise Measurement at FML-4 (St. John Avenue and Green Street)

Time	Noise Level, dBA L_{eq}(h)
2:00 PM	57.9
3:00 PM	58.5
4:00 PM	58.5
5:00 PM	***60.1***
6:00 PM	58.4
7:00 PM	58.2
8:00 PM	57.1
9:00 PM	56.8
10:00 PM	56.8
11:00 PM	54.0
12:00 AM	52.5
1:00 AM	54.1
2:00 AM	52.1
3:00 AM	50.0
4:00 AM	51.9
5:00 AM	55.5
6:00 AM	58.2
7:00 AM	58.5
8:00 AM	58.9
9:00 AM	58.2
10:00 AM	57.8
11:00 AM	57.6
12:00 PM	57.8
1:00 PM	57.3

Source: LSA Associates, Inc. (July 24-25, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
FML = Freeway Tunnel Measurement, Long-Term (24 hours)

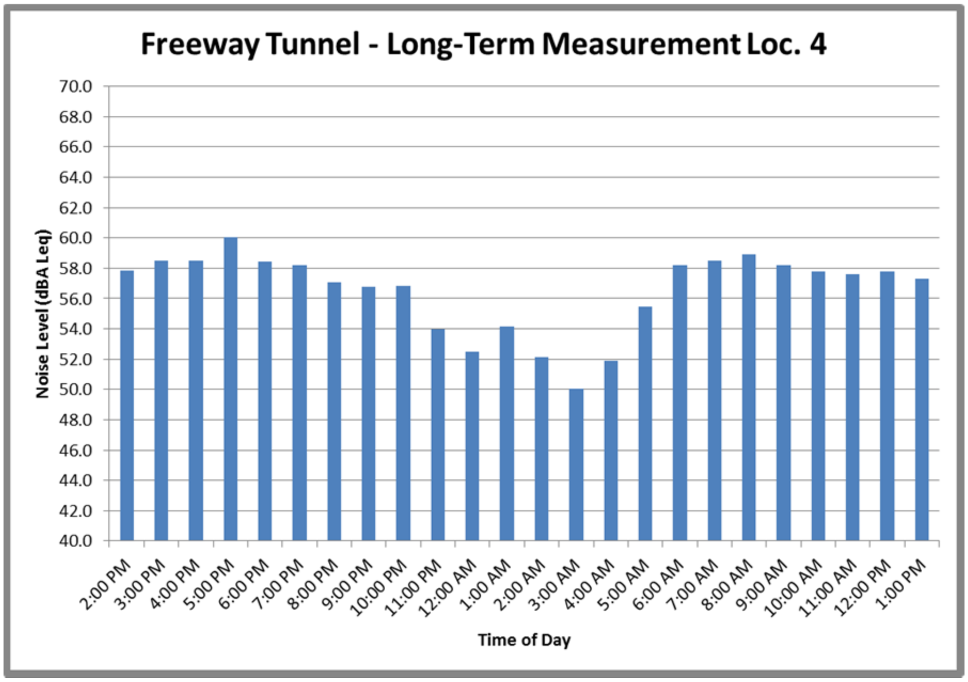

Table 6.18 Long-Term Noise Measurement at FML-5 (1709 Ramona Boulevard)

Time	Noise Level, dBA L_{eq}(h)
4:00 PM	51.3
5:00 PM	***53.2***
6:00 PM	52.9
7:00 PM	50.8
8:00 PM	49.4
9:00 PM	46.8
10:00 PM	45.2
11:00 PM	43.9
12:00 AM	43.4
1:00 AM	41.9
2:00 AM	45.4
3:00 AM	43.9
4:00 AM	41.5
5:00 AM	44.6
6:00 AM	48.7
7:00 AM	50.8
8:00 AM	51.3
9:00 AM	50.8
10:00 AM	50.2
11:00 AM	50.4
12:00 PM	50.8
1:00 PM	53.2
2:00 PM	50.4
3:00 PM	51.5

Source: LSA Associates, Inc. (July 25-26, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
FML = Freeway Tunnel Measurement, Long-Term (24 hours)

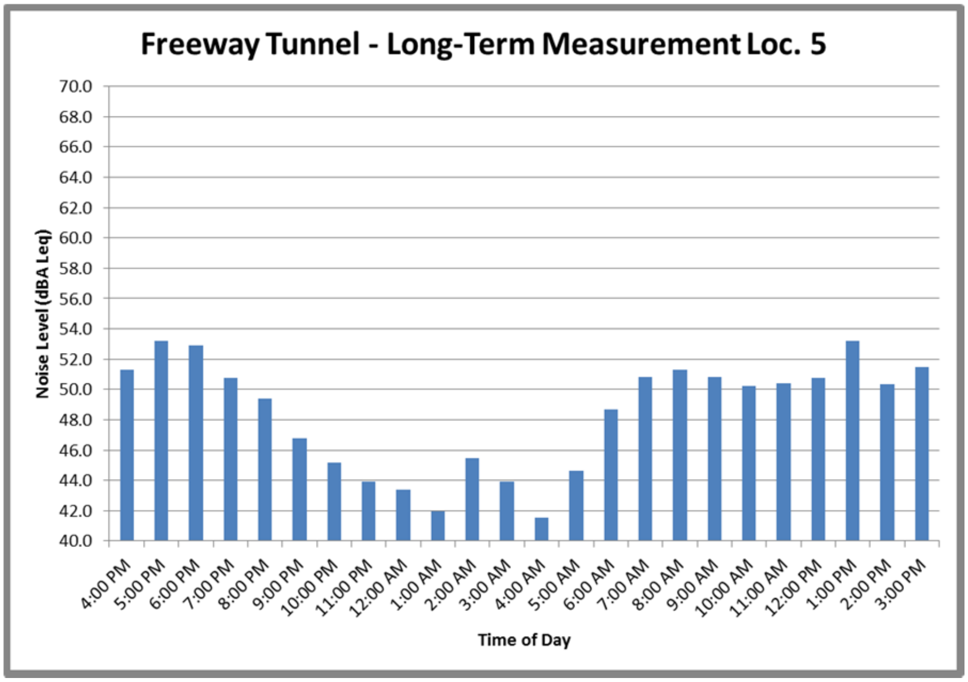

Table 6.19 Long-Term Noise Measurement at LML-1 (4820 E. Cesar Chavez Avenue)

Time	Noise Level, dBA L_{eq}(h)
5:00 PM	59.8
6:00 PM	59.8
7:00 PM	60.5
8:00 PM	59.0
9:00 PM	57.8
10:00 PM	56.3
11:00 PM	54.5
12:00 AM	53.9
1:00 AM	51.5
2:00 AM	51.3
3:00 AM	52.8
4:00 AM	53.9
5:00 AM	55.1
6:00 AM	57.9
7:00 AM	***60.9***
8:00 AM	57.8
9:00 AM	58.1
10:00 AM	57.5
11:00 AM	59.4
12:00 PM	60.1
1:00 PM	59.1
2:00 PM	58.0
3:00 PM	57.4
4:00 PM	58.3

Source: LSA Associates, Inc. (July 25-26, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
LML = LRT Measurement, Long-Term (24 hours)

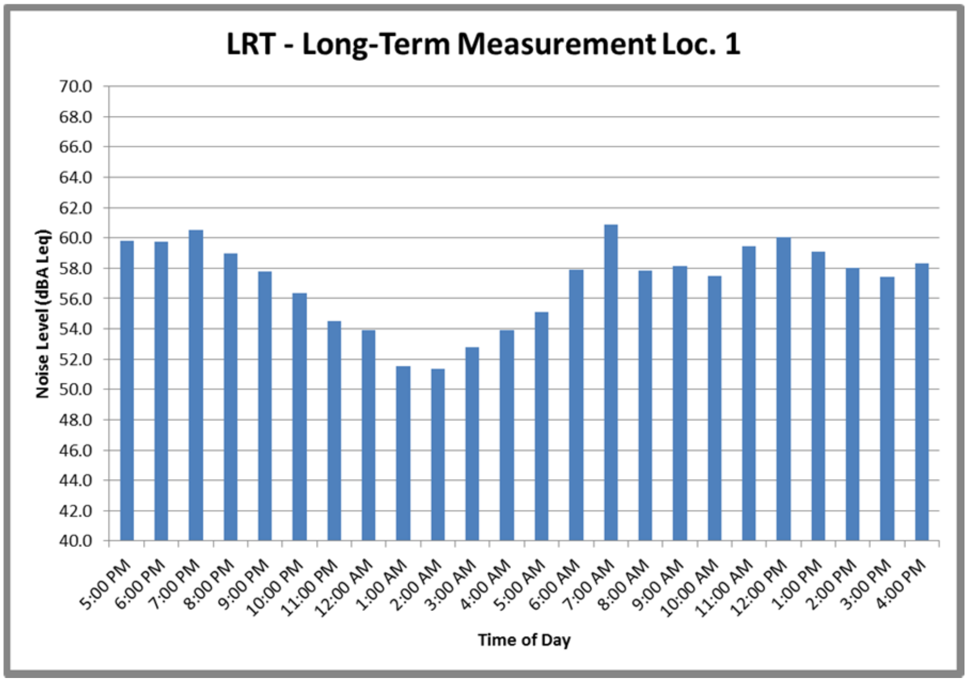

Table 6.20 Long-Term Noise Measurement at LML-2 (1255 Corporate Center Drive)

Time	Noise Level, dBA L_{eq}(h)
5:00 PM	58.1
6:00 PM	58.3
7:00 PM	60.6
8:00 PM	60.4
9:00 PM	59.5
10:00 PM	58.8
11:00 PM	57.6
12:00 AM	56.9
1:00 AM	56.1
2:00 AM	55.4
3:00 AM	55.6
4:00 AM	56.8
5:00 AM	59.2
6:00 AM	60.5
7:00 AM	58.5
8:00 AM	60.3
9:00 AM	59.9
10:00 AM	60.3
11:00 AM	61.1
12:00 PM	61.5
1:00 PM	***61.8***
2:00 PM	60.7
3:00 PM	60.0
4:00 PM	60.4

Source: LSA Associates, Inc. (July 25-26, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
LML = LRT Measurement, Long-Term (24 hours)

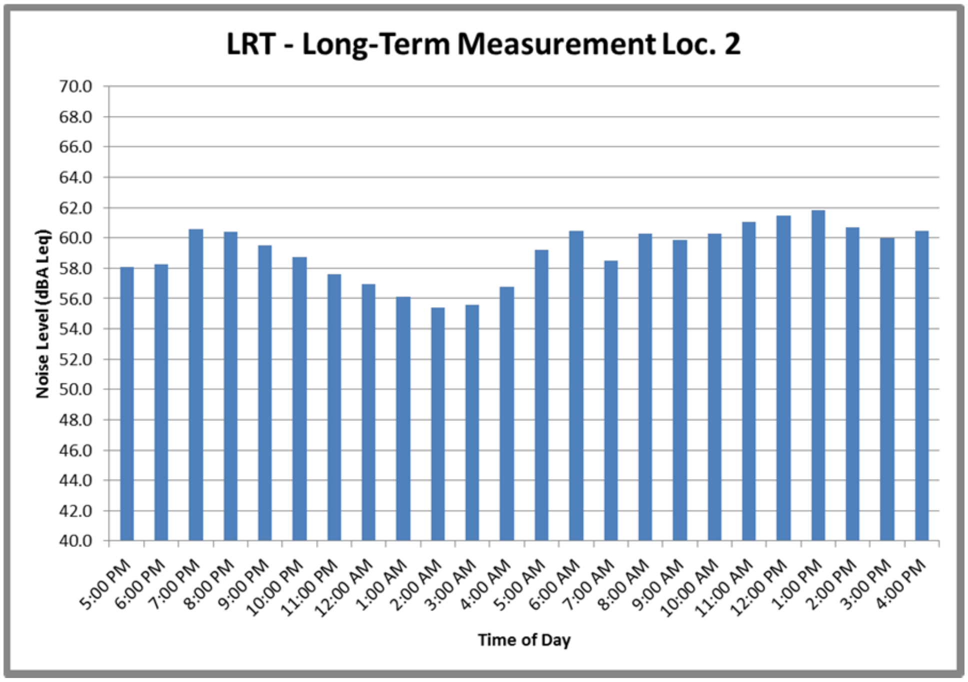

Table 6.21 Long-Term Noise Measurement at NML-1 (600 North Eighteenth Street)

Time	Noise Level, dBA L_{eq}(h)
5:00 PM	51.9
6:00 PM	51.1
7:00 PM	52.1
8:00 PM	51.0
9:00 PM	49.3
10:00 PM	48.6
11:00 PM	46.9
12:00 AM	45.1
1:00 AM	44.8
2:00 AM	45.9
3:00 AM	45.6
4:00 AM	47.8
5:00 AM	47.5
6:00 AM	47.8
7:00 AM	49.9
8:00 AM	***55.3***
9:00 AM	51.2
10:00 AM	49.7
11:00 AM	49.2
12:00 PM	50.0
1:00 PM	49.5
2:00 PM	49.4
3:00 PM	49.4
4:00 PM	49.3

Source: LSA Associates, Inc. (July 25-26, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

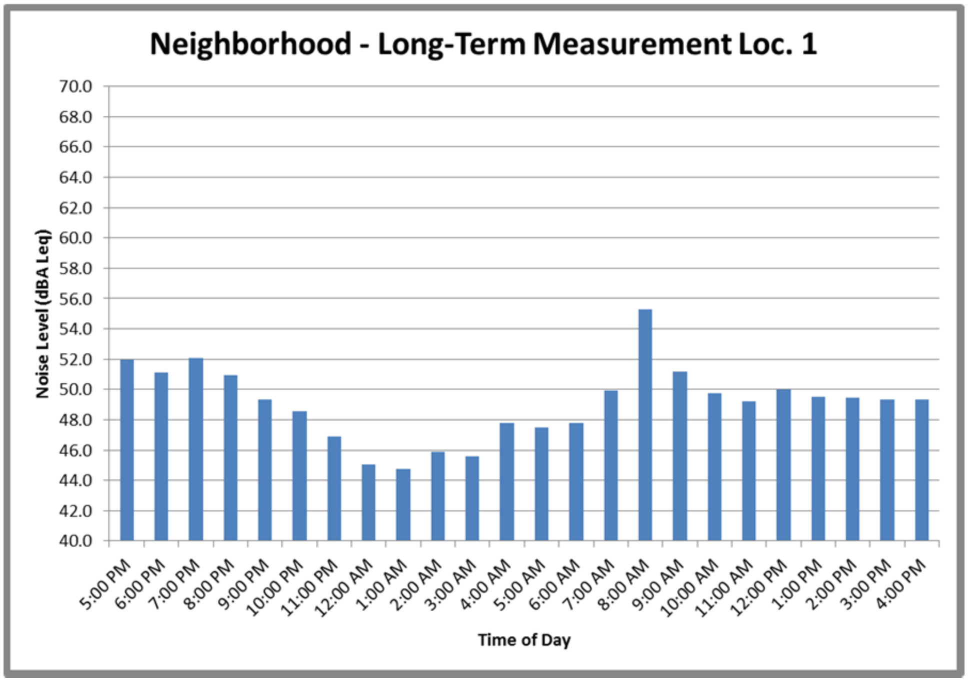

Table 6.22 Long-Term Noise Measurement at NML-2 (7422 Toll Road)

Time	Noise Level, dBA L_{eq}(h)
11:00 AM	48.0
12:00 PM	***50.2***
1:00 PM	47.0
2:00 PM	48.2
3:00 PM	48.5
4:00 PM	49.3
5:00 PM	48.9
6:00 PM	47.2
7:00 PM	47.8
8:00 PM	45.0
9:00 PM	44.0
10:00 PM	44.0
11:00 PM	43.5
12:00 AM	43.2
1:00 AM	43.3
2:00 AM	44.1
3:00 AM	44.0
4:00 AM	44.5
5:00 AM	43.7
6:00 AM	42.6
7:00 AM	44.1
8:00 AM	43.5
9:00 AM	45.9
10:00 AM	44.0

Source: LSA Associates, Inc. (July 29-30, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

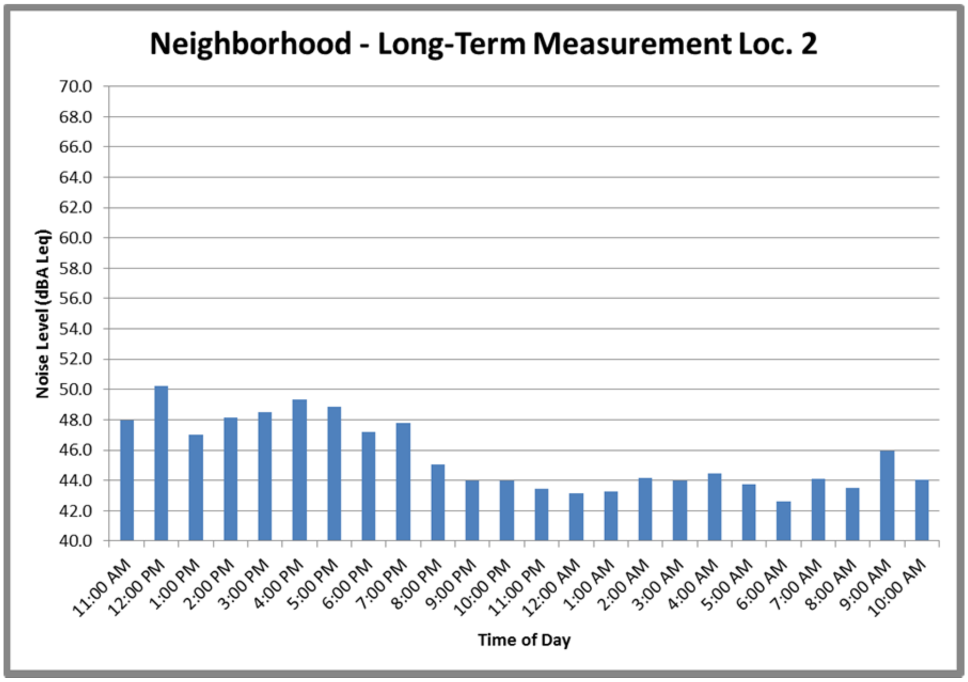

Table 6.23 Long-Term Noise Measurement at NML-3 (1265 Hillside Street)

Time	Noise Level, dBA L_{eq}(h)
12:00 PM	51.2
1:00 PM	***52.6***
2:00 PM	50.1
3:00 PM	50.3
4:00 PM	50.0
5:00 PM	50.1
6:00 PM	48.8
7:00 PM	50.6
8:00 PM	49.5
9:00 PM	46.8
10:00 PM	47.4
11:00 PM	47.8
12:00 AM	47.7
1:00 AM	43.5
2:00 AM	47.2
3:00 AM	45.6
4:00 AM	44.9
5:00 AM	46.6
6:00 AM	47.8
7:00 AM	49.1
8:00 AM	48.4
9:00 AM	49.7
10:00 AM	50.5
11:00 AM	48.5

Source: LSA Associates, Inc. (July 29-30, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

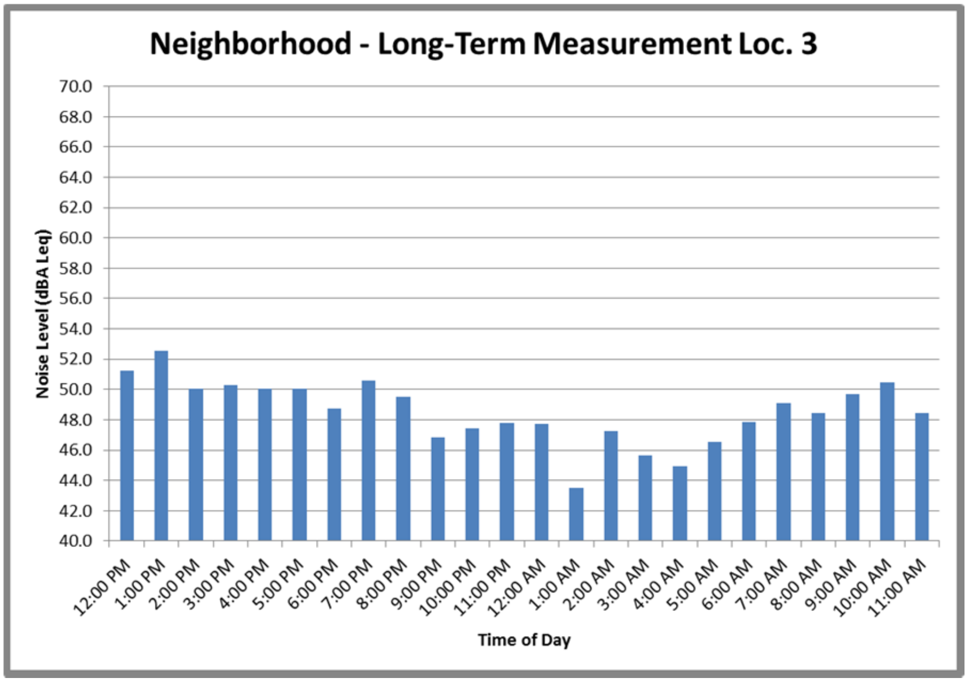

Table 6.24 Long-Term Noise Measurement at NML-4 (501 Ethel Avenue)

Time	Noise Level, dBA L_{eq}(h)
1:00 PM	55.8
2:00 PM	55.8
3:00 PM	53.9
4:00 PM	54.4
5:00 PM	56.0
6:00 PM	***56.1***
7:00 PM	55.0
8:00 PM	51.7
9:00 PM	48.9
10:00 PM	47.3
11:00 PM	44.3
12:00 AM	44.6
1:00 AM	42.8
2:00 AM	43.8
3:00 AM	41.7
4:00 AM	42.3
5:00 AM	43.5
6:00 AM	48.9
7:00 AM	51.4
8:00 AM	54.8
9:00 AM	53.9
10:00 AM	55.2
11:00 AM	55.5
12:00 PM	53.0

Source: LSA Associates, Inc. (July 29-30, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

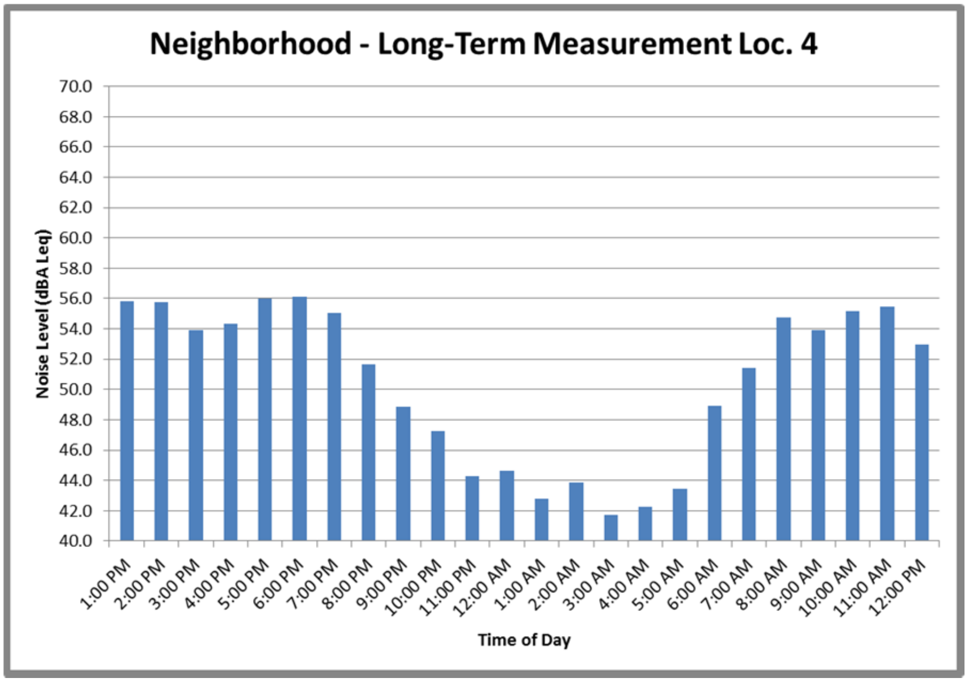

Table 6.25 Long-Term Noise Measurement at NML-5 (1500 Marengo Avenue)

Time	Noise Level, dBA L_{eq}(h)
1:00 PM	49.4
2:00 PM	50.0
3:00 PM	50.5
4:00 PM	52.1
5:00 PM	51.2
6:00 PM	51.7
7:00 PM	49.9
8:00 PM	49.3
9:00 PM	47.2
10:00 PM	46.6
11:00 PM	45.8
12:00 AM	43.8
1:00 AM	42.0
2:00 AM	41.5
3:00 AM	41.5
4:00 AM	41.6
5:00 AM	43.2
6:00 AM	45.3
7:00 AM	48.1
8:00 AM	49.4
9:00 AM	54.7
10:00 AM	54.5
11:00 AM	54.1
12:00 PM	***55.0***

Source: LSA Associates, Inc. (July 29-30, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

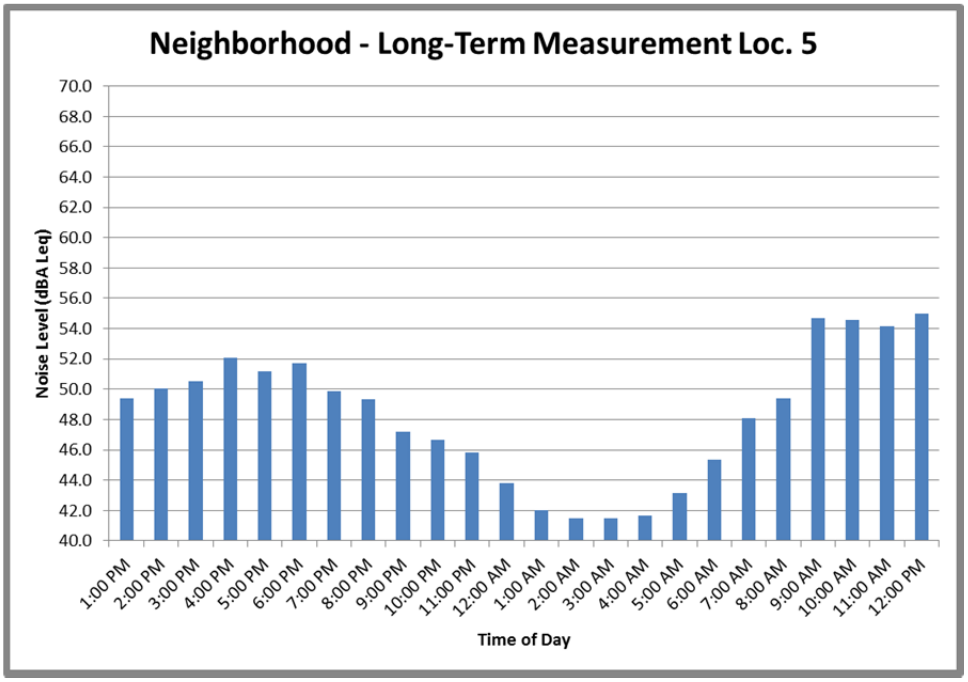

Table 6.26 Long-Term Noise Measurement at NML-6 (700 South El Molino Avenue)

Time	**Noise Level, dBA L_{eq}(h)**
4:00 PM	52.2
5:00 PM	53.7
6:00 PM	53.9
7:00 PM	51.7
8:00 PM	50.6
9:00 PM	47.7
10:00 PM	46.4
11:00 PM	43.9
12:00 AM	42.1
1:00 AM	41.5
2:00 AM	41.0
3:00 AM	40.8
4:00 AM	42.0
5:00 AM	46.1
6:00 AM	47.9
7:00 AM	52.7
8:00 AM	55.0
9:00 AM	52.5
10:00 AM	51.9
11:00 AM	52.1
12:00 PM	53.5
1:00 PM	53.2
2:00 PM	***57.4***
3:00 PM	56.0

Source: LSA Associates, Inc. (July 30-31, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

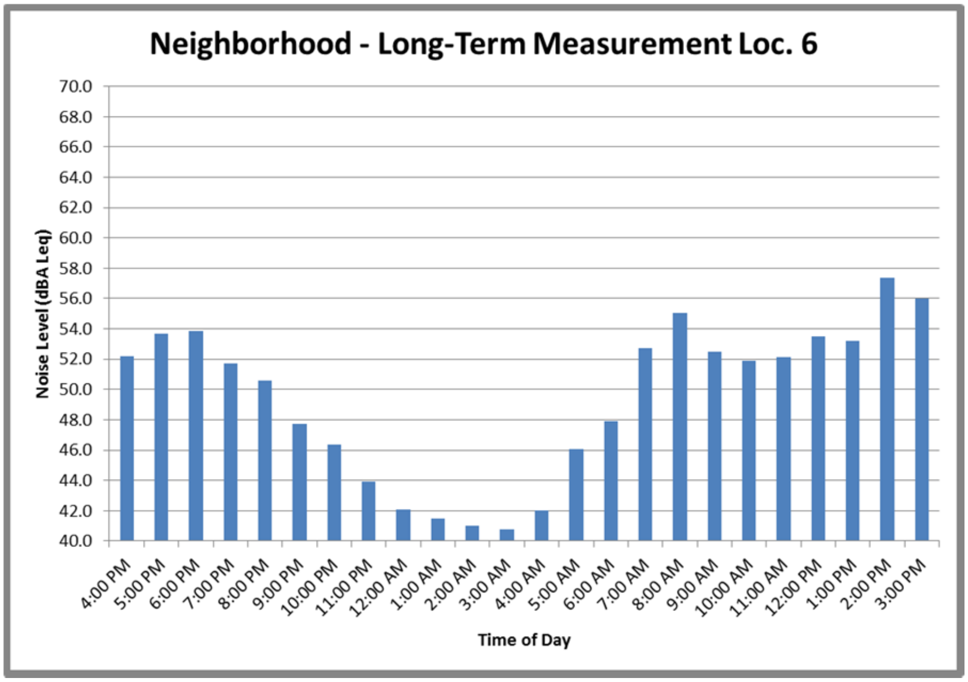

Table 6.27 Long-Term Noise Measurement at NML-7 (1116 Birch Lane)

Time	Noise Level, dBA L_{eq}(h)
5:00 PM	56.3
6:00 PM	***60.1***
7:00 PM	56.8
8:00 PM	54.6
9:00 PM	55.7
10:00 PM	50.9
11:00 PM	46.9
12:00 AM	46.1
1:00 AM	45.8
2:00 AM	45.5
3:00 AM	46.0
4:00 AM	47.7
5:00 AM	49.2
6:00 AM	55.8
7:00 AM	56.6
8:00 AM	59.7
9:00 AM	55.0
10:00 AM	51.6
11:00 AM	50.9
12:00 PM	53.4
1:00 PM	52.5
2:00 PM	55.3
3:00 PM	55.7
4:00 PM	55.8

Source: LSA Associates, Inc. (July 30-31, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

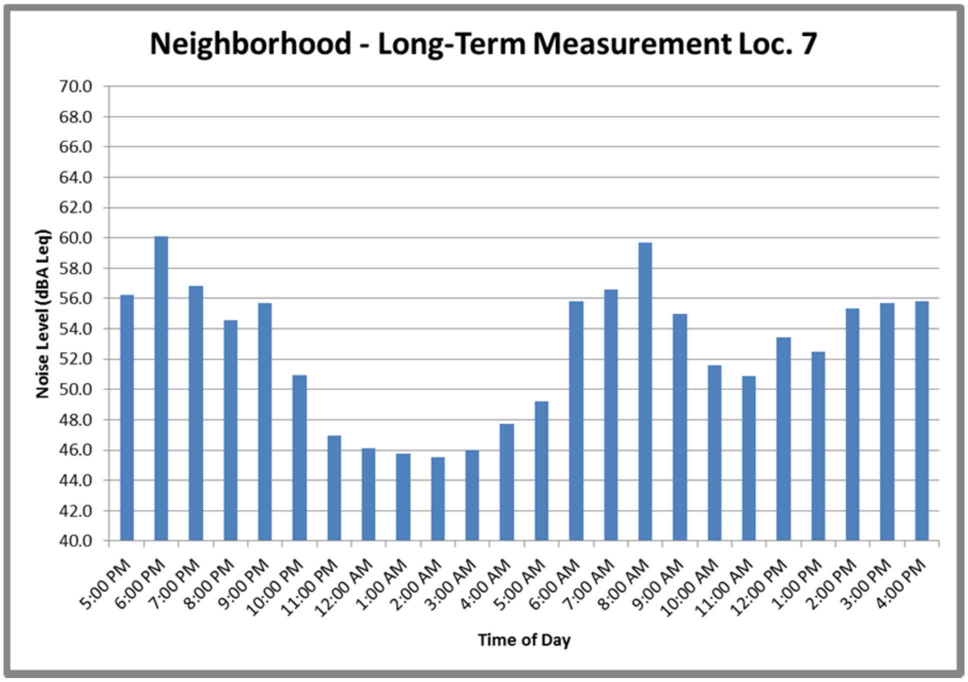

Table 6.28 Long-Term Noise Measurement at NML-8 (1848 Keystone Street)

Time	Noise Level, dBA L_{eq}(h)
11:00 AM	51.9
12:00 PM	51.3
1:00 PM	51.1
2:00 PM	51.7
3:00 PM	51.8
4:00 PM	52.8
5:00 PM	52.8
6:00 PM	52.9
7:00 PM	53.8
8:00 PM	53.4
9:00 PM	53.9
10:00 PM	54.0
11:00 PM	54.5
12:00 AM	54.6
1:00 AM	54.9
2:00 AM	55.1
3:00 AM	55.4
4:00 AM	55.7
5:00 AM	56.0
6:00 AM	***56.2***
7:00 AM	55.9
8:00 AM	54.5
9:00 AM	53.8
10:00 AM	53.6

Source: LSA Associates, Inc. (November 5-6, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

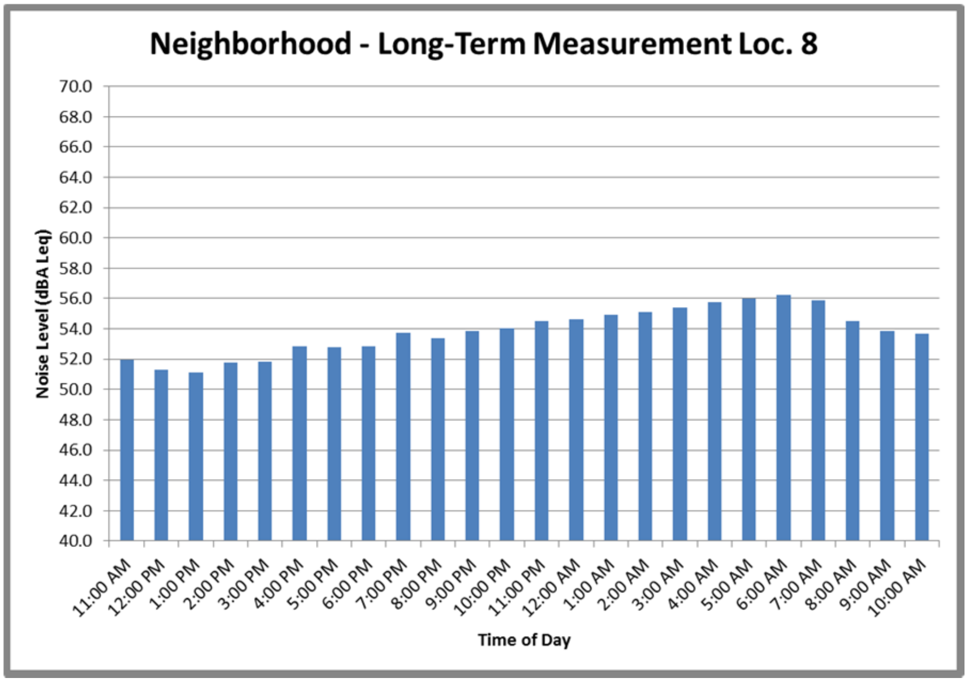

Table 6.29 Long-Term Noise Measurement at NML-9 (204 Circle Drive)

Time	Noise Level, dBA L_{eq}(h)
5:00 PM	48.7
6:00 PM	48.2
7:00 PM	47.3
8:00 PM	***50.8***
9:00 PM	46.1
10:00 PM	44.6
11:00 PM	42.3
12:00 AM	42.8
1:00 AM	41.5
2:00 AM	41.6
3:00 AM	41.2
4:00 AM	42.6
5:00 AM	42.1
6:00 AM	43.2
7:00 AM	45.3
8:00 AM	46.3
9:00 AM	45.1
10:00 AM	46.1
11:00 AM	47.4
12:00 PM	49.2
1:00 PM	48.6
2:00 PM	47.9
3:00 PM	48.6
4:00 PM	48.9

Source: LSA Associates, Inc. (July 30-31, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

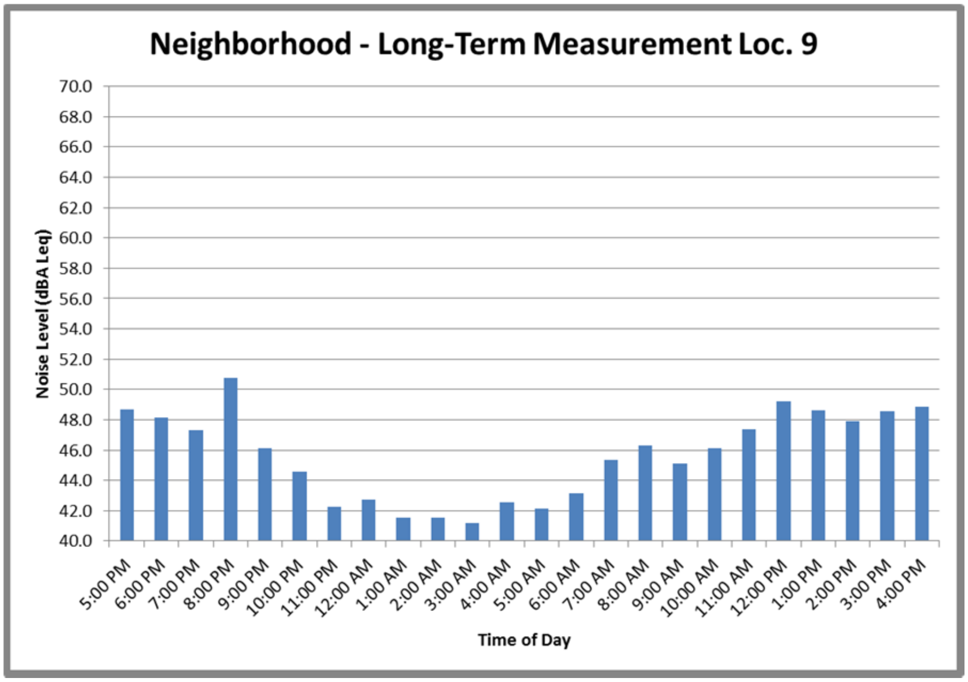

Table 6.30 Long-Term Noise Measurement at NML-10 (Indianola Way Terminus)

Time	Noise Level, dBA L_{eq}(h)
10:00 AM	61.3
11:00 AM	61.4
12:00 PM	62.0
1:00 PM	61.6
2:00 PM	62.4
3:00 PM	63.5
4:00 PM	64.6
5:00 PM	67.2
6:00 PM	***68.2***
7:00 PM	67.3
8:00 PM	65.8
9:00 PM	65.2
10:00 PM	63.8
11:00 PM	63.4
12:00 AM	61.6
1:00 AM	61.5
2:00 AM	60.7
3:00 AM	62.0
4:00 AM	63.9
5:00 AM	66.4
6:00 AM	67.6
7:00 AM	64.8
8:00 AM	62.3
9:00 AM	61.2

Source: LSA Associates, Inc. (November 5-6, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

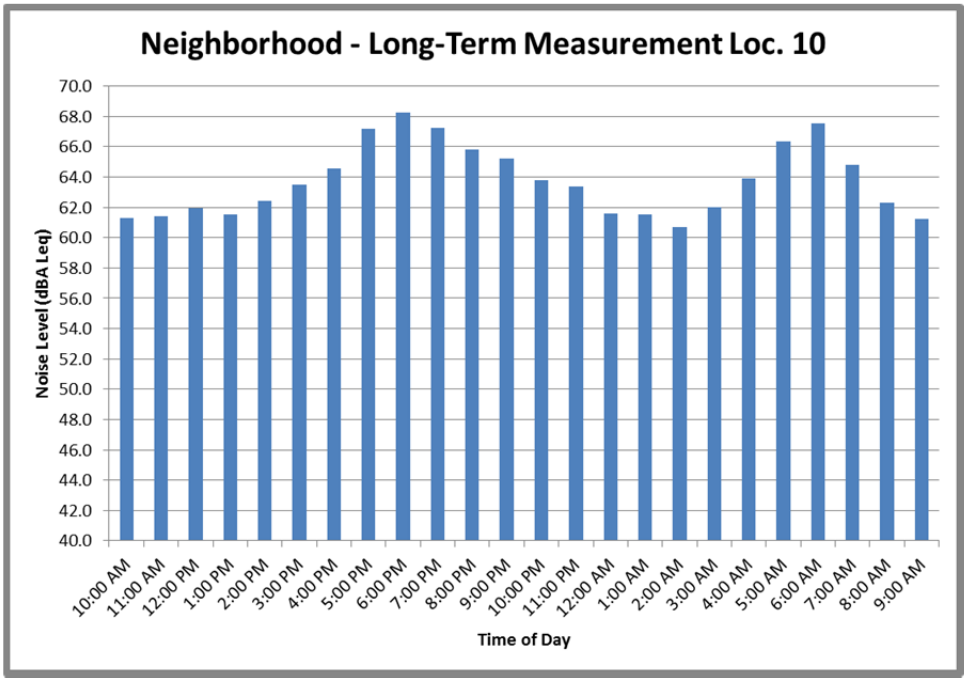

Table 6.31 Long-Term Noise Measurement at NML-11 (4463 Oak Grove Drive)

Time	Noise Level, dBA L_{eq}(h)
10:00 AM	68.5
11:00 AM	68.2
12:00 PM	68.1
1:00 PM	68.0
2:00 PM	68.9
3:00 PM	69.2
4:00 PM	70.0
5:00 PM	70.4
6:00 PM	70.4
7:00 PM	69.9
8:00 PM	68.4
9:00 PM	68.1
10:00 PM	66.9
11:00 PM	65.2
12:00 AM	63.9
1:00 AM	63.5
2:00 AM	62.6
3:00 AM	63.8
4:00 AM	66.6
5:00 AM	69.2
6:00 AM	71.2
7:00 AM	***71.7***
8:00 AM	69.8
9:00 AM	68.9

Source: LSA Associates, Inc. (November 5-6, 2013).
Note: ***Bold italicized*** number(s) denote peak traffic noise hour(s)
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
NML = Neighborhood Measurement, Long-Term (24 hours)

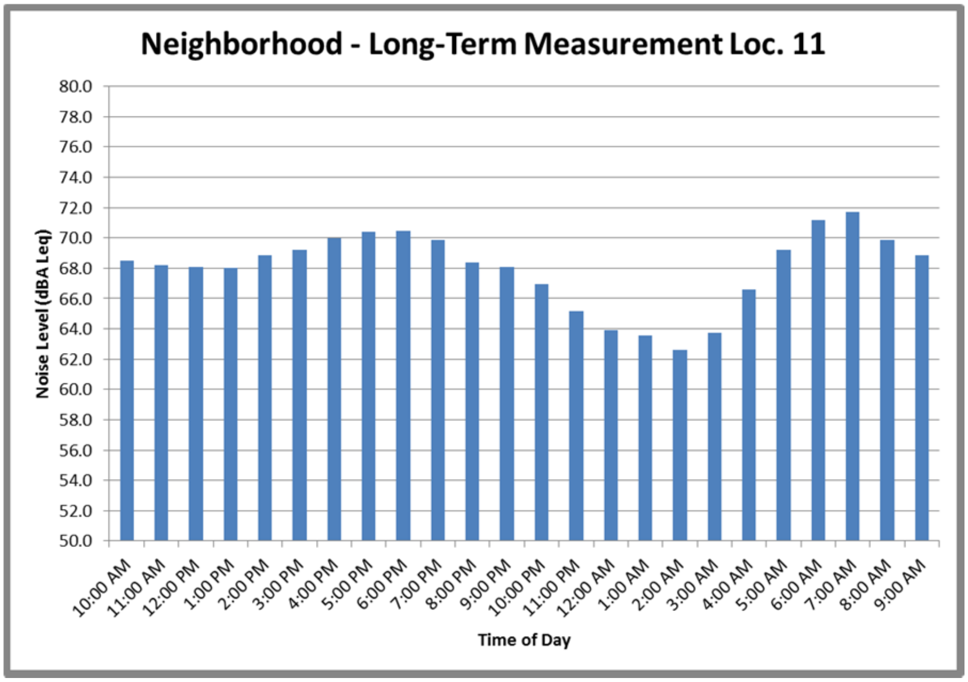

Table 6.32 Short-Term Ambient Noise Measurement Results – Schools

Measure-ment No.	Date	Start Time	Duration (minutes)	dBA L_{eq}	Reduction (dBA)	Location	Noise Sources
SM-1 Ext.	10/17/2013	2:30PM	10	73		668 South Atlantic Boulevard, Kipp Raices Academy Exterior	Traffic on Atlantic Boulevard
SM-1 Int.	10/17/2013	2:30PM	10	39	34	668 South Atlantic Boulevard, Kipp Raices Academy Classroom 115 Interior	Traffic on Atlantic Boulevard
SM-2 Ext.	10/24/2013	3:22PM	10	59		420 Amalia Avenue, Fourth Street Primary School Kindergarten Room Exterior	Traffic on Atlantic Boulevard
SM-2 Int.	10/24/2013	3:22PM	10	38	21	420 Amalia Avenue, Fourth Street Primary School Kindergarten Room Interior	Traffic on Atlantic Boulevard
SM-3 Ext.	10/3/2013	10:09AM	10	62		409 South Atlantic Boulevard, Northrop Elementary School Classroom K-1 Exterior	Traffic on Atlantic Boulevard
SM-3 Int.	10/3/2013	10:09AM	10	37	25	409 South Atlantic Boulevard, Northrop Elementary School Classroom K-1 Interior	Traffic on Atlantic Boulevard; some noise from kids on playground
SM-4 Ext.	10/3/2013	8:34AM	10	51		110 West McLean Street, Garfield Elementary School Library Exterior	Traffic on Alhambra Road; aircraft noise
SM-4 Int.	10/3/2013	8:34AM	10	27	24	110 West McLean Street, Garfield Elementary School Library Interior	Traffic on Alhambra Road
SM-5 Ext.	10/3/2013	7:44AM	10	73		1500 Fair Oaks Avenue, South Pasadena Middle School Room 201 Upstairs Exterior	Traffic on Fair Oaks Avenue and Oak Street; kids talking and opening and closing lockers (talking was very loud in second half of measurement)
SM-5 Int.	10/3/2013	7:44AM	10	52	21	1500 Fair Oaks Avenue, South Pasadena Middle School Room 201 Upstairs Interior	Kids on outside walkway
SM-6 Ext.	9/24/2013	1:49PM	10	59		535 South Pasadena Avenue, Sequoyah School Classroom 114 Exterior	Traffic on I-210 off-ramp to California Boulevard
SM-6 Int.	9/24/2013	1:49PM	10	34	25	535 South Pasadena Avenue, Sequoyah School Classroom 114 Interior	Traffic on I-210 off-ramp to California Boulevard
SM-7 Ext.	10/17/2013	11:02AM	10	63		169 South St. John Avenue, Maranatha High School Exterior	Traffic on St. John Avenue
SM-7 Int.	10/17/2013	11:02AM	10	48[1]	15	169 South St. John Avenue, Maranatha High School Physical Education Classroom Interior	Traffic on SR 710 southbound off-ramp and St. John Avenue

Table 6.32 Short-Term Ambient Noise Measurement Results – Schools

Measurement No.	Date	Start Time	Duration (minutes)	dBA L_{eq}	Reduction (dBA)	Location	Noise Sources
SM-8 Ext.	10/17/2013	7:34AM	10	65		315 North Pasadena Avenue, Roosevelt Elementary School Exterior.	Traffic on I-210, SR 134 and ramps
SM-8 Int.	10/17/2013	7:34AM	10	45	20	315 North Pasadena Avenue, Roosevelt Elementary School Physical Therapy Room Interior	Traffic on I-210; air conditioning on in room
SM-9 Ext.	10/17/2013	9:59AM	10	62		55 West Eureka Street, Pacific Oaks College Exterior	Traffic on I-210
SM-9 Int.	10/17/2013	9:59AM	10	38	24	55 West Eureka Street, Pacific Oaks College Office Interior	Traffic on I-210
SM-10 Ext.	9/24/2013	5:13PM	10	67		651 North Orange Grove Boulevard, New Horizon School Farthest North Classroom Exterior	Traffic on I-210
SM-10 Int.	9/24/2013	5:13PM	10	37	30	651 North Orange Grove Boulevard, New Horizon School Farthest North Classroom Interior	Traffic on I-210
SM-11 Ext.	4/16/2014	2:43PM	10	64		1955 Fremont Avenue, Almansor Academy Physical Therapy Room Exterior	Traffic on Fremont Avenue
SM-11 Int.	4/16/2014	2:43PM	10	37	27	1955 Fremont Avenue, Almansor Academy Physical Therapy Room Interior	Traffic on Fremont Avenue
SM-12 Ext.	4/16/2014	3:53PM	10	70		9063 East Mission Drive, Rosemead High School Science Lab 105 Exterior	Traffic on Rosemead Boulevard
SM-12 Int.	4/16/2014	3:53PM	10	33	37	9063 East Mission Drive, Rosemead High School Science Lab 105 Interior	Traffic on Rosemead Boulevard
SM-13 Ext.	4/16/2014	12:24PM	10	64		1201 South Marengo Avenue, Blair High School Room 133 Health Careers Academy Exterior	Traffic on SR 110
SM-13 Int.	4/16/2014	12:24PM	10	45	19	1201 South Marengo Avenue, Blair High School Room 133 Health Careers Academy Interior	Traffic on SR 110

Source: LSA Associates, Inc. (August through November 2013 and April 2014).

[1] The building was currently under construction. With new construction, a reduction of 25 dBA will be assumed.

dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels
I-210 = Interstate 210
SR 110 = State Route 110
SR 134 = State Route 134
SR 710 = State Route 710

Table 6.33 Model Calibration – TSM/TDM Alternative

Measure-ment No.[1]	Measured Noise Level (dBA L_{eq})	Modeled Noise Level (dBA L_{eq})	K-Factor (dB)	Representative Modeled Receptors
L2a/TM-1	65.2	65.8	-0.6	L2a/TR-1, L2a/TR-20
L2a/TM-2	67.8	66.2	1.6	L2a/TR-17 to L2a/TR-19
L2a/TM-3	66.6	66.2	0.4	L2a/TR-2 to L2a/TR-6
L2a/TM-4	65.9	66.2	-0.3	L2a/TR-7 to L2a/TR-16
L2a/TM-5	69.4	67.1	2.3	–
L2a/TM-6	63.4	64.1	-0.7	–
L4/TM-7	64.3	65.9	-1.6	L4/TR-31 to L4/TR-35
L4/TM-8	56.9	58.6	-1.7	L4/TR-1 to L4/TR-5
L4/TM-9	67.6	68.4	-0.8	L4/TR-25 to L4/TR-30
L4/TM-10	66.7	67.8	-1.1	L4/TR-6 to L4/TR-10
L4/TM-11	63.6	66.2	-2.6	L4/TR-19 to L4/TR-24
L4/TM-12	65.4	67.7	-2.3	L4/TR-11 to L4/TR-18
L5/TM-13	70.6	70.5	0.1	L5/TR-1 to L5/TR-7
L5/TM-14	70.5	70.8	-0.3	L5/TR-33 to L5/TR-44
L5/TM-15	67.9	69.5	-1.6	L5/TR-8 to L5/TR-12
L5/TM-16	71.9	69.2	2.7	L5/TR-13 to L5/TR-18
L5/TM-17	62.9	65.6	-2.7	L5/TR-28 to L5/TR-32
L5/TM-18	61.2	64.8	-3.6	L5/TR-19 to L5/TR-27
T2/TM-19	55.9	57.5	-1.6	T2/TR-1 to T2/TR-4
T2/TM-20	61.5	63.9	-2.4	T2/TR-11, T2/TR-13 to T2/TR-15
T2/TM-21	57.1	58.7	-1.6	T2/TR-5 to T2/TR-6
T2/TM-22	67.4	65.9	1.5	T2/TR-7 to T2/TR-10, T2/TR-12
BM-25	61.5	64.1	-2.6	L3/TR-1 to L3/TR-6
BM-27	67.0	67.6	-0.6	L3/TR-7 to L3/TR-13, L3/TR-27 to L3/TR-39
BM-28	68.0	67.6	0.4	L3/TR-14 to L3/TR-19, L3/TR-20 to L3/TR-26
BM-29	70.8	70.1	0.7	L3/TR-20
BM-43	62.7	61.6	1.1	L8/TR-1 to L8/TR-3, L8/TR-20
BM-44	66.9	63.7	3.2	L8/TR-4 to L8/TR-8, L8/TR-16 to L8/TR-16 to L8/TR-19
BM-45	67.4	66.0	1.4	L8/TR-9 to L8/TR-15
FM-9	66.0	68.8	-2.8	T1/TR-1
FM-11	53.2	52.3	0.9	T1/TR-2 to T1/TR-9
FM-12	59.5	61.6	-2.1	T1/TR-10 to T1/TR-13
FM-13	50.7	49.3	1.4	T1/TR-14 to T1/TR-17
FM-14	51.2	50.3	0.9	T1/TR-18 to T1/TR-27
FM-16	65.1	65.6	-0.5	T1/TR-28
FM-18	65.0	64.6	0.4	T1/TR-29
FM-19	62.3	61.0	1.3	T1/TR-30 to T1/TR-33
FM-20	68.0	68.7	-0.7	T1/TR-34 to T1/TR-36
FM-28	58.1	59.6	-1.5	T3/TR-1 to T3/TR-3
FM-29	71.8	71.3	0.5	T3/TR-4
FM-30	68.1	68.3	-0.2	T3/TR-5
FM-31	63.8	62.7	1.1	T3/TR-6
FM-59	60.5	60.2	0.3	T3/TR-7
FM-60	53.3	54.6	-1.3	T3/TR-8 to T3/TR-12
FM-62	55.0	55.1	-0.1	T3/TR-13 to T3/TR-15, T3/TR-17 to T3/TR-18
FM-63	67.2	63.9	3.3	T3/TR-16

Source: LSA Associates, Inc. (May 2014).

[1] For improvements L-3, L-8, T-1, and T-3, BRT and Freeway Tunnel noise measurements were used to calibrate the traffic noise model.

dB = decibels

dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

Table 6.34 Model Calibration – BRT Alternative

Measurement No.	Measured Noise Level, (dBA L_{eq})	Modeled Noise Level (dBA L_{eq})	K-Factor (dB)	Representative Modeled Receptors
BM-1	66.1	65.6	0.5	BR-1 to BR-5, BR-504 to BR-506
BM-2	58.3	60.9	-2.6	BR-6 to BR-12, BR-497 to BR-503
BM-3	70.0	66.9	3.1	–
BM-4	58.6	58.5	0.1	BR-13 to BR-20, BR-491 to BR-496
BM-5	61.7	61.8	-0.1	BR-21 to BR-25, BR-489, BR-490
BM-6	62.3	67.0	-4.7	–
BM-7	66.4	64.3	2.1	BR-26 to BR-28, BR-486 to BR-488
BM-8	66.0	63.7	2.3	BR-29 to BR-33
BM-9	61.3	60.4	0.9	BR-482 to BR-485
BM-10	64.1	63.4	0.7	BR-34 to BR-36, BR-481
BM-11	62.0	64.0	-2.0	BR-37 to BR-41, BR-475 to BR-480
BM-12	65.0	64.4	0.6	BR-42 to BR-48
BM-13	55.7	61.7	-6.0	–
BM-14	68.2	66.5	1.7	BR-462 to BR-474
BM-15	66.3	66.8	-0.5	BR-50 to BR-57, BR-458 to BR-461
BM-16	61.0	64.9	-3.9	–
BM-17	68.6	67.7	0.9	BR-58 to BR-64, BR-455 to BR-457
BM-18	66.8	66.6	0.2	BR-65 to BR-78, BR-443 to BR-454
BM-19	60.4	63.9	-3.5	–
BM-20	59.4	57.4	2.0	BR-440 to BR-442
BM-21	62.0	63.3	-1.3	BR-79 to BR-85
BM-22	53.8	56.4	-2.6	BR-426 to BR-439
BM-23	72.4	74.2	-1.8	BR-86 to BR-90
BM-24	70.3	72.5	-2.2	BR-421 to BR-425
BM-25	61.5	66.6	-2.6	BR-91 to BR-96
BM-26	62.2	67.6	-5.4	–
BM-27	67.0	67.6	-0.6	BR-97 to BR-103, BR-408 to BR-420
BM-28	68.0	67.6	0.4	BR-104 to BR-109, BR-402 to BR-407
BM-29	70.8	70.1	0.7	BR-110 to BR-121, BR-389 to BR-401
BM-30	71.2	69.7	1.5	BR-122 to BR-128
BM-31	65.5	63.7	1.8	BR-129 to BR-132, BR-380 to BR-388
BM-32	57.8	57.9	-0.1	BR-133 to BR-138, BR-372 to BR-379
BM-33	67.9	65.6	2.3	BR-139 to BR-146, BR-365 to BR-371
BM-34	67.8	66.1	1.7	BR-147 to BR-157
BM-35	62.3	63.2	-0.9	BR-350 to BR-364
BM-36	65.4	65.3	0.1	BR-158 to BR-164, BR-341 to BR-349
BM-37	63.9	63.1	0.8	BR-165 to BR-180, BR-337 to BR-340
BM-38	65.1	59.5	5.6	–
BM-39	65.3	64.0	1.3	BR-181 to BR-192, BR-324 to BR-336
BM-40	64.9	63.5	1.4	BR-193 to BR-202, BR-312 to BR-323
BM-41	67.1	64.4	2.7	BR-203 to BR-209, BR-304 to BR-311
BM-42	55.5	55.3	0.2	BR-210 to BR-217, BR-293 to BR-303
BM-43	62.7	61.6	1.1	BR-218 to BR-225, BR-285 to BR-292
BM-44	66.9	63.7	3.2	BR-226 to BR-230, BR-281 to BR-284
BM-45	67.4	66.0	1.4	BR-231 to BR-235, BR-277 to BR-280
BM-46	64.8	66.0	-1.2	BR-236 to BR-244, BR-265 to BR-276
BM-47	68.4	65.0	3.4	–
BM-48	62.3	62.9	-0.6	BR-245 to BR-247, BR-261 to BR-264
BM-49	71.5	68.1	3.4	BR-248 to BR-251, BR-259, BR-260
BM-50	65.5	67.3	-1.8	BR-252 to BR-258

Source: LSA Associates, Inc. (January 2014).
BRT = Bus Rapid Transit
dB = decibels
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

Table 6.35 Model Calibration – Freeway Tunnel Alternative

Measure-ment No.	Measured Noise Level (dBA L_{eq})	Modeled Noise Level (dBA L_{eq})	K-Factor (dB)	Representative Modeled Receptors
FM-1	58.2	57.0	1.2	FR-1 to FR-3
FM-2	60.8	67.6	-6.8	–
FM-3	56.6	60.1	-3.5	FR-5
FM-4	62.8	62.8	0.0	FR-6 to FR-11
FM-5	59.9	62.8	-2.9	FR-12, FR-13
FM-6	57.4	59.2	-1.8	FR-14 to FR-16
FM-7	61.4	61.9	-0.5	FR-17 to FR-19
FM-8	58.1	59.3	-1.2	FR-20 to FR-22
FM-9	66.0	68.8	-2.8	FR-23 to FR-27
FM-10	73.3	69.3	4.0	–
FM-11	53.2	52.3	0.9	FR-28 to FR-35
FM-12	59.5	61.6	-2.1	FR-36 to FR-39
FM-13	50.7	49.3	1.4	FR-40 to FR-43
FM-14	51.2	50.3	0.9	FR-44, FR-45
FM-15	61.2	51.0	10.2	–
FM-16	65.1	65.6	-0.5	–
FM-17	54.0	53.0	1.0	–
FM-18	65.0	64.6	0.4	FR-46
FM-19	62.3	61.0	1.3	FR-47 to FR-49
FM-20	68.0	68.7	-0.7	FR-50 to FR-52
FM-21	52.5	53.1	-0.6	–
FM-22	55.5	54.3	1.2	FR-53
FM-23	55.2	56.4	-1.2	FR-54
FM-24	56.4	58.8	-2.4	FR-55
FM-25	65.4	65.0	0.4	FR-4, FR-56 to FR-58
FM-26	53.6	57.4	-3.8	–
FM-27	55.2	55.5	-0.3	FR-59, FR-60
FM-28	58.1	59.6	-1.5	FR-61 to FR-64
FM-29	71.8	71.3	0.5	FR-65
FM-30	68.1	68.3	-0.2	FR-66
FM-31	63.8	62.5	1.3	FR-67
FM-32	64.3	65.4	-1.1	FR-68
FM-33	61.9	64.6	-2.7	FR-69, FR-70
FM-34	63.0	64.2	-1.2	FR-71
FM-35	67.5	66.2	1.3	FR-72
FM-36	64.6	65.4	-0.8	FR-73
FM-37	64.1	65.6	-1.5	FR-74
FM-38	65.7	66.0	-0.3	FR-75 to FR-78
FM-39	62.1	62.4	-0.3	FR-79 to FR-82
FM-40	68.2	67.2	1.0	FR-83, FR-84
FM-41	65.8	65.2	0.6	FR-85 to FR-88
FM-42	62.6	64.1	-1.5	FR-89 to FR-92
FM-43	70.7	71.0	-0.3	FR-93 to FR-95
FM-44	67.7	68.8	-1.1	FR-96 to FR-98
FM-45	60.3	61.3	-1.0	FR-99
FM-46	61.4	61.2	0.2	FR-100
FM-47	65.0	64.5	0.5	FR-101, FR-102
FM-48	67.6	67.6	0.0	FR-103 to FR-105
FM-49	67.1	66.7	0.4	FR-106 to FR-109
FM-50	65.2	62.6	2.6	FR-110 to FR-112
FM-51	64.8	63.9	0.9	FR-113, FR-114
FM-52	62.5	64.4	-1.9	FR-115 to FR-117
FM-53	63.9	68.3	-4.4	–
FM-54	61.4	62.3	-0.9	FR-118
FM-55	61.5	65.0	-3.5	FR-119
FM-56	60.9	62.1	-1.2	FR-120
FM-57	59.1	57.3	1.8	FR-121, FR- 122
FM-58	57.3	59.2	-1.9	FR-123
FM-59	60.5	60.2	0.3	FR-124
FM-60	53.3	54.6	-1.3	FR-125 to FR-129

Table 6.35 Model Calibration – Freeway Tunnel Alternative

Measurement No.	Measured Noise Level (dBA L_{eq})	Modeled Noise Level (dBA L_{eq})	K-Factor (dB)	Representative Modeled Receptors
FM-61	51.9	55.6	-3.7	–
FM-62	55.0	55.1	-0.1	FR-130 to FR-132, FR-134, FR-135
FM-63	67.2	63.9	3.3	FR-133
FM-64	62.7	65.3	-2.6	FR-136, FR-137

Source: LSA Associates, Inc. (May 2014).
dB = decibels
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

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

7.1. Future Noise Environment and Impacts

7.1.1. TSM/TDM Alternative

Potential long-term noise impacts associated with operations of the TSM/TDM Alternative are solely from traffic noise. Traffic noise was evaluated for the worst-case traffic condition. Using coordinates obtained from the topographic maps, a total of 227 receptor locations were evaluated. Land uses in the vicinity of the TSM/TDM Alternative improvements include single-family and multifamily residences, five schools, commercial uses, two restaurants, a hospital, a church, a sports field, a park, office uses, industrial uses, and vacant land.

Future traffic noise levels at 227 receptor locations were determined with existing property line walls and noise barriers using the future (2035) peak-hour traffic volumes obtained from the *SR 710 North Transportation Technical Report* (CH2M HILL 2014) or the worst-case traffic operations (prior to speed degradation) as described in Section 5.3. The traffic noise model results for the Existing, Future No Build, and Future TSM/TDM Alternative are shown in Table B.1 in Appendix B. The modeled future traffic noise levels for the TSM/TDM Alternative were compared to the modeled existing noise levels (after calibration) from TNM 2.5 to determine whether a substantial noise increase would occur. Also, the modeled future noise levels for the TSM/TDM Alternative were compared to the NAC under Activity Categories B, C, D, and E to determine whether a traffic noise impact would occur.

Traffic noise impacts result from one or more of the following occurrences: (1) if the traffic noise level at a receptor location is predicted to “approach or exceed” its NAC, or (2) if the predicted traffic noise level is 12 dBA or more over its corresponding modeled existing noise level at the receptor location analyzed. When traffic noise impacts occur, noise abatement measures must be considered. Of the 227 receptors, 70 receptors would approach or exceed the NAC under the TSM/TDM Alternative. Of the 70 receptors that would approach or exceed the NAC under the TSM/TDM Alternative, 43 are not considered for abatement due to driveway or pedestrian access or due to abatement placed along the ROW of the TSM/TDM Alternative that would not break the line of sight to the impacted receivers. No receptors would experience a substantial increase over their corresponding modeled existing noise levels.

The noise levels at the following receptor locations for existing and future conditions would approach or exceed the NAC under Activity Categories B, C, D, and E for the TSM/TDM Alternative. (The results of the TSM/TDM Alternative improvement analysis are provided in Tables B.1 and B.2 of Appendix B.)

- **Local Street Improvement L-3:**
  - **Receptor TR-22 (L3/TR-22):** This receptor location represents an existing swimming pool area on the west side of Atlantic Boulevard. Currently, there are no existing walls that shield this area. One noise barrier, TSM/TDM Noise Barrier (TNB) No. 1, was modeled along the property line to shield this residence.
  - **Receptor TR-34 (L3/TR-34):** This receptor location represents an existing residence along Glendon Way on the west side of Atlantic Boulevard. Currently, there are no existing walls that shield this residence. One noise barrier, TNB No. 2, was modeled along the property line to shield this residence.
- **Local Street Improvement L-5:**
  - **Receptor TR-33 (L5/TR-33):** This receptor location represents an existing residence on the west side of Rosemead Boulevard. Currently, there are no existing walls that shield this residence. One noise barrier, TNB No. 1, was modeled along the property line to shield this residence.
- **Other Road Improvement T-1:**
  - **Receptors TR-6 (T1/TR-6) through TR-13 (T1/TR-13):** These receptor locations represent existing residences along the east side of SR 710. Currently, there are no existing walls that shield these residences. One noise barrier, TNB No. 1, was modeled along the property line to shield these residences.
  - **Receptors TR-30 (T1/TR-30) through TR-36 (T1/TR-36):** These receptor locations represent existing residences along the west side of SR 710. Currently, there are no existing walls that shield these residences. Three noise barriers, TNB Nos. 2 through 4, were modeled along the edge of shoulder of SR 710 and the property lines to shield these residences. Two scenarios were analyzed: Scenario 1 only includes modeled TNB No. 2, and Scenario 2 includes modeled TNB Nos. 3 and 4.

- **Other Road Improvement T-2:**
  - **Receptors TR-1 (T2/TR-1) and TR-2 (T2/TR-2):** These receptor locations represent existing single-family and multifamily residences along the east side of SR 110. Currently, there are no existing walls that shield these residences. One noise barrier, TNB No. 1, was modeled along the ROW/property line to shield these residences and multifamily residence balconies.
  - **Receptors TR-8 (T2/TR-8) through TR-14 (T2/TR-14):** These receptor locations represent existing multifamily residences along the west side of SR 110. Currently, there are no existing walls that shield these residences. One noise barrier, TNB No. 2, was modeled along the ROW/edge of roadway to shield the first, second, and third floor balconies of these multifamily residences.

7.1.2. BRT Alternative

Potential long-term noise impacts associated with operations of the BRT Alternative are solely from traffic noise. Traffic noise was evaluated for the worst-case traffic condition. Using coordinates obtained from the topographic maps, a total of 506 receptor locations were evaluated. Land uses in the vicinity of the BRT Alternative include single-family and multifamily residences, two schools, two preschools, a daycare center, seven churches, two parks, three hotels, hospitals/medical centers, a museum, and office, industrial, and commercial uses.

Future traffic noise levels at 506 receptor locations were determined with existing property line walls and noise barriers using the future (2035) peak-hour traffic volumes obtained from the *SR 710 North Transportation Technical Report* (CH2M HILL 2014) or the worst-case traffic operations (prior to speed degradation) as described in Section 5.3. The traffic noise model results for the Existing, Future No Build, and the Future BRT Alternative are shown in Table B.3 in Appendix B. The modeled future traffic noise levels for the BRT Alternative were compared to the modeled existing noise levels (after calibration) from TNM 2.5 to determine whether a substantial noise increase would occur. Also, the modeled future noise levels for the BRT Alternative were compared to the NAC under Activity Categories B, C, D, and E to determine whether a traffic noise impact would occur.

Traffic noise impacts result from one or more of the following occurrences: (1) if the traffic noise level at a receptor location is predicted to “approach or exceed” its NAC, or (2) if the predicted traffic noise level is 12 dBA or more over its corresponding modeled existing noise level at the receptor location analyzed. When traffic noise impacts occur, noise abatement measures must be considered. Of the 506 receptors, 129 receptors would approach or exceed the NAC under the BRT Alternative. Of the 129 receptors that would approach or exceed the NAC under the BRT Alternative, 120 of them are not considered for abatement due to driveway or pedestrian access or due to abatement placed along the ROW of the BRT Alternative that would not break the line of sight to the impacted receivers. No receptors would experience a substantial increase over their corresponding modeled existing noise levels.

The noise levels at the following receptor locations for existing and future conditions would approach or exceed the NAC under Activity Categories B, C, D, and E for the BRT Alternative. (The results of the BRT Alternative improvement analysis are provided in Tables B.3 and B.4 of Appendix B.)

- **Receptor BR-122:** This receptor location represents an existing residence along San Marino Avenue on the east side of Atlantic Boulevard. Currently, there are no existing walls that shield this residence. One noise barrier, BRT Noise Barrier (BNB) No. 5, was modeled along the property line to shield this residence.
- **Receptor BR-237:** This receptor location represents an existing apartment complex along Amberwood Drive on the east side of Atlantic Boulevard. Currently, there are no existing walls that shield these apartments. One noise barrier, BNB No. 6, was modeled along the property line to shield these apartments.
- **Receptor BR-397:** This receptor location represents an existing pool area associated with an apartment complex along Shorb Street on the west side of Atlantic Boulevard. Currently, there are no existing walls that shield this pool area. One noise barrier, BNB No. 4, was modeled along the property line to shield this pool area.
- **Receptors BR-443, BR-444, BR-446, BR-447, and BR-449:** These receptor locations represent existing single-family and multifamily residences along the west side of Atlantic Boulevard, between Harding Avenue and Mabel Avenue. Currently, there are no existing walls that shield these residences. Two noise barriers, BNB Nos. 2 and 3, were modeled along the City’s ROW/property line and at the top of slope to shield these residences.
- **Receptor BR-450:** This receptor location represents an existing multifamily residence along the west side of Atlantic Boulevard, between Harding Avenue and Mabel Avenue. Currently, there are no existing walls that shield this residence. One noise barrier, BNB No. 1, was modeled along the property line to shield this residence.

7.1.3. Freeway Tunnel Alternative

Potential long-term noise impacts associated with operations of the Freeway Tunnel Alternative are solely from traffic noise. Traffic noise was evaluated for the worst-case traffic condition. Using coordinates obtained from the topographic maps, a total of 137 receptor locations were evaluated. Land uses in the vicinity of the Freeway Tunnel Alternative include single-family and multifamily residences, four schools and Cal State LA, a church, a hospital, a golf course, vacant land, and office, commercial, and recreational uses. In addition, a planned office development is located within the project area.

Future traffic noise levels at 137 receptor locations were determined with existing walls using the future (2035) peak-hour traffic volumes obtained from the *SR 710 North Transportation Technical Report* (CH2M HILL 2014) or the worst-case traffic operations (prior to speed degradation) as described in Section 5.3. The traffic noise model results for the Existing, Future No Build, and the Future Freeway Tunnel Alternative single-bore and dual-bore design variations are shown in Tables B.5 and B.7 in Appendix B. The modeled future traffic noise levels for the Freeway Tunnel Alternative were compared to the modeled existing noise levels (after calibration) from TNM 2.5 to determine whether a substantial noise increase would occur. Also, the modeled future noise levels for the Freeway Tunnel Alternative were compared to the NAC under Activity Categories B, C, D, and E to determine whether a traffic noise impact would occur. Due to the complexity of the noise model, creating a “tunnel” within TNM 2.5 is not possible. In order to account for potential noise from the portals of the tunnel, the roadways were extended into the covered area of the tunnel for approximately 500 to 800 ft. Additionally, in reference to Table 15 of the National Cooperative Highway Research Program (NCHRP) Report 791: Supplemental Guidance of the Application of FHWA’s Traffic Noise Model (TNM) (Transportation Research Board 2014), an additional 1 dBA was added to the future build levels of Receptors FR-44, FR-62, FR-63 and FR-129 to FR-131 due to their proximity to the tunnel openings. The future noise level impacts would range from 58 dBA to 61 dBA L_{eq} without the tunnel opening factor and 59 dBA to 62 dBA L_{eq} with the tunnel opening factor added. Therefore, the small noise increase due to tunnel opening does not cause the predicted noise levels to approach/exceed the 67 dBA threshold for noise impacts.

Traffic noise impacts result from one or more of the following occurrences: (1) if the traffic noise level at a receptor location is predicted to “approach or exceed” its NAC, or (2) if the predicted traffic noise level is 12 dBA or more over its corresponding modeled existing noise level at the receptor location analyzed. When traffic noise impacts occur, noise abatement measures must be considered. Of the 137 receptors, 66 receptors would approach or exceed the NAC under the Freeway Tunnel Alternative single-bore design variation and 75 receptors would approach or exceed the NAC under the dual-bore design variation. No receptors would experience a substantial increase over their corresponding modeled existing noise levels.

The noise levels at the following receptor locations for existing and future conditions would approach or exceed the NAC under Activity Categories B, C, D, and E for both the single-bore and dual-bore design variations. (The results of the Freeway Tunnel Alternative improvement analysis are provided in Tables B.7 through B.10 in Appendix B.)

- **Receptor FR-2:** This receptor location represents an existing residence along Corporate Center Drive on the east side of I-710. Currently, there is an existing 6 ft high wall located along the residential property line that shields this residence. Two separate noise barrier locations were modeled to shield this residence to compare their effectiveness. One noise barrier, Freeway Tunnel Noise Barrier (FTNB) No. 1, was modeled along the Caltrans ROW, and an alternative noise barrier, FTNB No. 2, was modeled along the residential property line.
- **Receptors FR-6 through FR-22:** These receptor locations represent existing residences along Balzac Street on the north side of SR 60 and Capetown Avenue, Charnwood Avenue, Julep Place, and Hellman Avenue on the west side of I-710. Currently, there are two existing 5.5 to 6 ft high walls that shield some of these residences. Three noise barriers were modeled along the edge of shoulder and Caltrans ROW/property line to shield these residences. For the first alternative, FTNB No. 03A was calculated from 6 ft to 20 ft while the existing walls were not touched. For the second alternative, FTNB No. 03B would replace the existing wall and, along with FTNB No. 3A, was calculated from 6 ft to 20 ft. A third scenario was modeled that includes leaving all existing walls at the residential property lines as is and modeling FTNB No. 4 along the shoulder of the connector ramp on the east side of SR 710. A small gap is necessary to allow access to the retention basin between the freeway and the residences.
- **Receptors FR-24 through FR-38:** These receptor locations represent existing residences along Charnwood Avenue and Westmont Drive on the east side of I-710. Currently, there are no existing walls that shield these residences. One noise barrier, FTNB No. 5, was modeled along the Caltrans ROW/property line to shield these residences.

- **Receptors FR-47 through FR-49:** These receptor locations represent existing residences along Highbury Avenue on the west side of I-710. Currently, there are no existing walls that shield these residences. Two separate noise barrier locations were modeled to shield these residences to compare their effectiveness. One noise barrier (FTNB No. 7) was modeled along the residential private property line for each design variation, and the other noise barrier (FTNB No. 6) was modeled along the edge of the shoulder for each design variation (6S for single bore and 6D for dual bore).
- **Receptors FR-50 and FR-51:** These receptor locations represent existing residences along Highbury Avenue on the west side of I-710. Currently, there are no existing walls that shield these residences. Two separate noise barrier locations were modeled to shield these residences to compare their effectiveness. One noise barrier (FTNB No. 8) was modeled along the residential private property line for each design variation, and the other noise barrier (FTNB No. 6) was modeled along the edge of the shoulder for each design variation (6S for single bore and 6D for dual bore).
- **Receptor FR-72:** This receptor location represents an existing restaurant patio along Colorado Boulevard on the east side of SR 710. Currently, there is no existing wall that shields the outdoor frequent human use area associated with this restaurant patio. One noise barrier, FTNB No. 9, was modeled along the property line to shield this outdoor frequent human use area.
- **Receptors FR-75 through FR-84:** These receptor locations represent existing multifamily residences along Orange Grove Place and Cypress Avenue on the east side of I-210. Currently, there is an existing 6.5 ft high wall that shields these residences. One noise barrier, FTNB No. 10, was modeled along the Caltrans ROW/property line to shield these residences.
- **Receptors FR-85, FR-89, and FR-90:** These receptor locations represent existing residences along Cypress Avenue and a school along Orange Grove Boulevard on the east side of I-210. Currently, there is an existing 6 ft high wall that shields these residences and school. One noise barrier, FTNB No. 11, was modeled along the Caltrans ROW/property line to shield these residences and school.
- **Receptors FR-96 through FR-98:** These receptor locations represent existing residences along Lincoln Avenue on the east side of I-210. Currently, there is an existing 6 ft high wall that shields these residences. One noise barrier, FTNB No. 12, was modeled along the Caltrans ROW/property line to shield these residences.

- **Receptors FR-102 through FR-106, FR-108, FR-110 through FR-112:** These receptor locations represent existing residences along Winona Avenue, Pasadena Avenue, Mayview Lane, Ridgewood Lane, Rosewood Lane, Longwood Lane, Orange Grove Boulevard, and Prospect Boulevard on the west side of I-210. Currently, there is an existing 6.5 to 10 ft high wall that shields some of these residences. Two locations were modeled for the barrier. For the first location, FTNB No. 13B was calculated from 6 ft to 20 ft while the existing walls were not touched. For the second location, FTNB No. 13A, which would replace the existing wall, was calculated up along with FTNB No. 13B.
- **Receptor FR-115:** This receptor location represents an existing school along Pasadena Avenue on the west side of I-210. Currently, there are no existing walls that shield the outdoor frequent human use areas associated with the school. One noise barrier, FTNB No. 14, was modeled along the property line to shield these outdoor frequent human use areas.
- **Receptors FR-116 and FR-117:** These receptor locations represent an existing pool and tennis court associated with an apartment complex along Walnut Street on the northwest side of the I-210/SR 134 interchange. Currently, there are no existing walls that shield the outdoor frequent human use areas associated with the apartments. One noise barrier, FTNB No. 15, was modeled along the property line to shield these outdoor frequent human use areas.

7.1.4. Light Rail Alternative

Existing land uses in the vicinity of the LRT Alternative project area include single-family and multifamily residences, vacant land, and office, commercial, and recreational uses. Receptors considered for analysis were located within 1,000 ft of the LRT alignment. Existing land uses in the project area within the buffer zone are described below in further detail.

- **LRT Alignment between 3rd Street and SR 60:** Land uses in this area include single-family residences, multifamily residences, and commercial uses. Under FTA criteria, the single-family and multifamily residences are the noise sensitive uses considered for abatement.
- **LRT Alignment between SR 60 and Floral Drive:** Land uses in this area include single-family residences, multifamily residences, a learning facility, an active park, and office and commercial uses. Under FTA criteria, the single-family residences, multifamily residences, and learning facility are the noise sensitive uses considered for abatement.

- **LRT Alignment between Mednik Avenue and I-710:** Land uses in this area include single-family residences, multifamily residences, and office and commercial uses. Under FTA criteria, the single-family residences and multifamily residences are the noise sensitive uses considered for abatement.
- **LRT Alignment along I-710 south of I-10:** Land uses in this area include single-family residences, a golf course, and office and commercial uses. Under FTA criteria, the single-family residences are the noise sensitive uses considered for abatement.
- **LRT Alignment along I-710 between I-10 and Hellman Avenue:** Land uses in this area include single-family residences, multifamily residences, and a university. Under FTA criteria, the single-family residences, multifamily residences, and university are the noise sensitive uses considered for abatement.
- **LRT Alignment along I-710 between Hellman Avenue and Valley Boulevard:** Land uses in this area include single-family residences and multifamily residences. Under FTA criteria, the single-family residences and multifamily residences are the noise sensitive uses considered for abatement.

7.2. Interior Noise Impacts

Ten schools (SM-1 through SM-13) were evaluated for potential long-term interior noise impacts associated with project operations. The future interior noise levels were determined using the predicted future exterior noise level calculated from TNM 2.5 and the exterior-to-interior attenuation. The exterior-to-interior attenuation was determined from the results of the simultaneous exterior and interior noise level measurements conducted at SM-1 through SM-6 and SM-8 through SM-13.
A standard exterior-to-interior noise level reduction at SM-7 (Maranatha High School) was assumed to be 25 dBA based on the FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance (1995). At the time of the interior noise measurements, the building closest to the Freeway Tunnel alignment at Maranatha High School was under construction and did not have full insulation and wall construction. As shown in Table 7.1, the predicted future interior noise levels at all 13 locations would not approach or exceed the 52 dBA L_{eq}(h) NAC under Activity Category D(52) for the TSM/TDM, BRT and Freeway Tunnel Alternatives. Therefore, no noise abatement measures are required for schools evaluated in this NSR.

Table 7.1 Predicted Future Interior Noise Levels for the BRT and Freeway Tunnel Alternatives

Measurement Location	Modeled Receptor Location	Exterior to Interior Reduction (dB)[1]	Exterior (dBA L_{eq})[2]	Interior (dBA L_{eq})
SM-1	BR-7	34	68	34
SM-2	BR-13	21	62	41
SM-3	BR-380	25	68	43
SM-4	BR-161	24	63	39
SM-5	BR-218	21	69	48
SM-6	FR-180	25	59	34
SM-7	FR-170	25	63	38
SM-8	FR-152	20	68	48
SM-9	FR-118	24	69	45
SM-10	FR-133	30	69	39
SM-11	L2a/TR-14	27	64	37
SM-12	L5/TR-19	37	67	30
SM-13	T2/TR-6	19	61	42

Source: LSA Associates, Inc. (May 2014).

[1] The exterior to interior reduction was calculated based on simultaneous exterior and interior noise level measurements shown in Table 6.32.

[2] The exterior noise level was chosen for the worst-case condition at each receptor modeled.

dB = decibels

dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

7.3. Preliminary Noise Abatement Analysis

In accordance with 23 CFR 772, noise abatement is considered where noise impacts are predicted in areas of frequent human use that would benefit from a lowered noise level. Potential noise abatement measures identified in the Protocol include the following:

- Avoiding the impact by using design alternatives, such as altering the horizontal and vertical alignment of the project
- Constructing noise barriers
- Acquiring property to serve as a buffer zone
- Using traffic management measures to regulate types of vehicles and speeds
- Acoustically insulating public use or nonprofit institutional structures

All of these abatement options have been considered. However, because of the configuration and location of the project, abatement in the form of noise barriers is the only abatement that is considered to be feasible. It should be assumed that if a noise barrier is modeled in the same location as an existing wall, the existing wall will be completely removed prior to the construction of the noise barrier. Typically, it is not possible to add additional height to an existing wall due to engineering issues.

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

The design of noise barriers presented in this report is preliminary and has been conducted at a level appropriate for environmental review and not for final design of the project. Preliminary information on the physical location, length, and height of noise barriers is provided in this report. If pertinent parameters change substantially during the final project design, preliminary noise barrier designs may be modified or eliminated from the final project. A final decision on the construction of the noise abatement would be made upon completion of the project design.

7.3.1. TSM/TDM Alternative

Noise barriers were considered to shield receptors along Atlantic Boulevard, Garfield Avenue, Fair Oaks Avenue, Fremont Avenue, SR 110, Rosemead Boulevard, St. John Avenue, and the Connector Road between Valley Boulevard and Mission Road where receptors would continue to be exposed to traffic noise levels approaching or exceeding the NAC. All properties requiring abatement consideration are within Categories B and C (which have a 67 dBA L_{eq} NAC) and Category E (which has a 72 dBA L_{eq} NAC). At each location, noise barrier heights were evaluated at 2 ft increments from 6 ft to 20 ft along private property lines and from 8 ft to 20 ft along Caltrans and City ROW. Each noise barrier was evaluated for feasibility based on the achievable noise reduction. For each noise barrier found to be acoustically feasible, reasonable cost allowances were calculated. The following is a discussion of noise abatement considered for each receptor or group of receptors where traffic noise impacts are predicted. A summary of the data from the preliminary noise abatement analysis is shown in Table 7.2. The locations of the noise barriers under the TSM/TDM Alternative are shown on Figure 7-1.

7.3.1.1. Local Street Improvement L-3/TNB No. 1

A 48 ft long barrier, TNB No. 1, was modeled along the private property line to shield Receptor L3/TR-22 because traffic noise levels for existing conditions and/or in Year 2035 for the TSM/TDM Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.1 shows that traffic noise levels would be 67 dBA L_{eq}(h) for existing conditions and 69 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 2 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.1.2. Local Street Improvement L-3/TNB No. 2

A 46 ft long barrier, TNB No. 2, was modeled along the private property line to shield Receptor L3/TR-34 because traffic noise levels for existing conditions and/or in Year 2035 for the TSM/TDM Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.1 shows that traffic noise levels would be 66 dBA L_{eq}(h) for existing conditions and 67 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 1 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.1.3. Local Street Improvement L-5/TNB No. 1

A 202 ft long barrier, TNB No. 1, was modeled along the private property line to shield Receptor L5/TR-33 because traffic noise levels for existing conditions and/or in Year 2035 for the TSM/TDM Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.1 shows that traffic noise levels would be 67 dBA L_{eq}(h) for existing conditions and 68 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 1 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.1.4. Other Road Improvement T-1/TNB No. 1

A 1,247 ft long barrier, TNB No. 1, was modeled along the Caltrans ROW/private property line to shield Receptors T1/TR-6 through T1/TR-13 because traffic noise levels for existing conditions and/or in Year 2035 for the TSM/TDM Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.1 shows

Table 7.2 Summary of Feasibility – TSM/TDM Alternative

TSM/TDM Intersection ID	Noise Barrier No.	Design Year (2035) Noise Level (dBA L_{eq}(h))	Noise Increase (dBA)	Approximate Length (feet)	Height (feet)	Highest Noise Reduction (dBA)	Number of Benefited Units/ Receptors	Total Reasonable Allowance Per Barrier[2]
L-3	TNB No. 1	69	2	48	6	5	1	$55,000
					8	6	1	$55,000
					10	6	1	$55,000
					12	6	1	$55,000
					14	6	1	$55,000
					16	**7**	**1**	**$55,000**
					18	**7**	**1**	**$55,000**
					20	**7**	**1**	**$55,000**
	TNB No. 2	67	1	46	**6**	**7**	**1**	**$55,000**
					8	**10**	**1**	**$55,000**
					10	**13**	**1**	**$55,000**
					12	**14**	**1**	**$55,000**
					14	**15**	**1**	**$55,000**
					16	**16**	**1**	**$55,000**
					18	**17**	**1**	**$55,000**
					20	**18**	**1**	**$55,000**
L-5	TNB No. 1	68	1	202	**6**	**7**	**2**	**$110,000**
					8	**9**	**2**	**$110,000**
					10	**9**	**2**	**$110,000**
					12	**10**	**2**	**$110,000**
					14	**10**	**2**	**$110,000**
					16	**10**	**2**	**$110,000**
					18	**10**	**2**	**$110,000**
					20	**10**	**2**	**$110,000**
T-1	TNB No. 1	60-70	0-2	1247	**6**	**-**	**-**	**-**
					8	**10**	**18**	**$990,000**
					10	**12**	**18**	**$990,000**
					12	**13**	**18**	**$990,000**
					14	**13**	**18**	**$990,000**
					16	**14**	**18**	**$990,000**
					18	**15**	**18**	**$990,000**
					20	**15**	**18**	**$990,000**
	TNB No. 2	62-70	-3-0	963	6	-	-	-
					8	-	-	-
					10	5	4	$220,000
					12	6	5	$275,000
					14	6	11	$605,000
					16	**7**	**15**	**$825,000**
					18	**8**	**16**	**$880,000**
					20	**8**	**16**	**$880,000**
	TNB No. 3	64-66	-3-0	673	6	6	4	$220,000
					8	**7**	**4**	**$220,000**
					10	**8**	**4**	**$220,000**
					12	**8**	**4**	**$220,000**
					14	**8**	**8**	**$440,000**
					16	**9**	**8**	**$440,000**
					18	**10**	**8**	**$440,000**
					20	**11**	**9**	**$495,000**
	TNB No. 4	62-70	0	406	**6**	**8**	**6**	**$330,000**
					8	**11**	**6**	**$330,000**
					10	**13**	**6**	**$330,000**
					12	**15**	**6**	**$330,000**
					14	**16**	**6**	**$330,000**
					16	**17**	**6**	**$330,000**
					18	**17**	**6**	**$330,000**
					20	**18**	**6**	**$330,000**

Table 7.2 Summary of Feasibility – TSM/TDM Alternative

TSM/TDM Intersection ID	Noise Barrier No.	Design Year (2035) Noise Level (dBA L_{eq}(h))	Noise Increase (dBA)	Approximate Length (feet)	Height (feet)	Highest Noise Reduction (dBA)	Number of Benefited Units/ Receptors	Total Reasonable Allowance Per Barrier[2]
T-2	TNB No. 1	62-68	1	349	**6**	**9**	4	**$220,000**
					8	**10**	4	**$220,000**
					10	**11**	4	**$220,000**
					12	**12**	4	**$220,000**
					14	**12**	4	**$220,000**
					16	**14**	4	**$220,000**
					18	**15**	4	**$220,000**
					20	**16**	4	**$220,000**
	TNB No. 2	48-74	0-2	743	6	3	0	$0
					8	5	13	$715,000
					10	6	13	$715,000
					12	**7**	**34**	**$1,870,000**
					14	**8**	**34**	**$1,870,000**
					16	**9**	**34**	**$1,870,000**
					18	**9**	**34**	**$1,870,000**
					20	**9**	**34**	**$1,870,000**

Source: LSA Associates, Inc., (May 2014).

[1] A Noise Abatement Decision Report will be prepared that will identify noise barrier construction cost information and the noise barriers that are reasonable from a cost perspective. The barrier heights that meet the acoustical reasonableness criteria of a minimum of 7 dBA reduction at one or more receptors are shown in **bold**.

[2] The cost consideration in the reasonableness determination of noise abatement is based on a 2011 allowance per benefited unit/receptor of $55,000 (Caltrans 2011).

Caltrans = California Department of Transportation
dBA = A-weighted decibels
L_{eq}(h) = equivalent continuous sound level per hour
TDM = Transportation Demand Management
TNB = TSM/TDM Noise Barrier
TSM = Transportation System Management

that traffic noise levels would range from 60 to 70 dBA L_{eq}(h) for existing conditions and from 60 to 70 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 0 to 2 dB at the modeled receptors, and the minimum feasible barrier height is 8 ft.

7.3.1.5. Other Road Improvement T-1/TNB No. 2

A 963 ft long barrier, TNB No. 2, was modeled along the edge of shoulder to shield Receptors T1/TR-30 through T1/TR-36 because traffic noise levels for existing conditions and/or in Year 2035 for the TSM/TDM Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.1 shows that traffic noise levels would range from 62 to 70 dBA L_{eq}(h) for existing conditions and from 62 to 70 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The decrease in noise from the existing worst-hour noise level to future worst-hour noise level would range from 0 to 3 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.1.6. Other Road Improvement T-1/TNB No. 3

A 673 ft long barrier, TNB No. 3, was modeled along the private property line as an alternative to Other Road Improvement T-1/TNB No. 2 to shield Receptors T1/TR-30 through T1/TR-33 because traffic noise levels for existing conditions and/or in Year 2035 for the TSM/TDM Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.2 shows that traffic noise levels would range from 64 to 67 dBA L_{eq}(h) for existing conditions and from 64 to 66 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The decrease in noise from the existing worst-hour noise level to future worst-hour noise level would range from 0 to 3 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.1.7. Other Road Improvement T-1/TNB No. 4

A 406 ft long barrier, TNB No. 4, was modeled along the private property line as an alternative to Other Road Improvement T-1/TNB No. 2 to shield Receptors T1/TR-34 through T1/TR-36 because traffic noise levels for existing conditions and/or in Year 2035 for the TSM/TDM Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.2 shows that traffic noise levels would range from 62 to 70 dBA L_{eq}(h) for existing conditions and from 62 to 70 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The noise from the existing worst-hour noise level to future worst-hour noise level would remain as the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.1.8. Other Road Improvement T-2/TNB No. 1

A 349 ft long barrier, TNB No. 1, was modeled along the Caltrans ROW/private property line to shield Receptors T2/TR-1 and T2/TR-2 because traffic noise levels for existing conditions and/or in Year 2035 for the TSM/TDM Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.1 shows that traffic noise levels would range from 61 to 67 dBA L_{eq}(h) for existing conditions and from 62 to 68 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 1 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.1.9. Other Road Improvement T-2/TNB No. 2

A 743 ft long barrier, TNB No. 2, was modeled along the edge of shoulder to shield first, second, and third floor Receptors T2/TR-8 through T2/TR-14 because traffic noise levels for existing conditions and/or in Year 2035 for the TSM/TDM Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table

B.1 shows that traffic noise levels would range from 47 to 72 dBA L_{eq}(h) for existing conditions and from 48 to 74 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 0 to 2 dB at the modeled receptors, and the minimum feasible barrier height is 8 ft.

7.3.2. BRT Alternative

Noise barriers were considered to shield receptors along Atlantic Boulevard, Huntington Boulevard, and Fair Oaks Avenue where receptors would continue to be exposed to traffic noise levels approaching or exceeding the NAC. All properties requiring abatement consideration are within Categories B and C (which have a 67 dBA L_{eq} NAC) and Category E (which has a 72 dBA L_{eq} NAC). At each location, noise barrier heights were evaluated at 2 ft increments from 6 ft to 20 ft along private property lines and from 8 ft to 20 ft along Caltrans and City ROW. Each noise barrier was evaluated for feasibility based on the achievable noise reduction. For each noise barrier found to be acoustically feasible, reasonable cost allowances were calculated. The following is a discussion of noise abatement considered for each receptor or group of receptors where traffic noise impacts are predicted. A summary of the data from the preliminary noise abatement analysis is shown in Table 7.3. The locations of the noise barriers under the BRT Alternative are shown on Figure 7-2.

7.3.2.1. BNB No. 1

A 340 ft long barrier, BNB No. 1, was modeled along the private property line to shield second floor Receptors BR-450 and BR-451 because traffic noise levels for existing conditions and/or in Year 2035 for the BRT Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.3 shows that traffic noise levels would range from 61 to 67 dBA L_{eq}(h) for existing conditions and from 62 to 69 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 1 to 2 dB at the modeled receptors, and the minimum feasible barrier height is 10 ft.

7.3.2.2. BNB No. 2

An 826 ft long barrier, BNB No. 2, was modeled along the private property line to shield second floor Receptors BR-443 through BR-449 because traffic noise levels for existing conditions and/or in Year 2035 for the BRT Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.3 shows that traffic noise levels would range from 54 to 68 dBA L_{eq}(h) for existing conditions and from

Table 7.3 Summary of Feasibility – BRT Alternative

Noise Barrier No.	Design Year (2035) Noise Level (dBA L_{eq}(h))	Noise Increase (dBA)	Approximate Length (feet)	Height (feet)[1]	Highest Noise Reduction (dBA)[1]	Number of Benefited Units/ Receptors[1]	Total Reasonable Allowance Per Barrier[1,2]
BNB No. 1	62-69	1-2	340	6	3	0	$0
				8	4	0	$0
				10	**9**	**12**	**$660,000**
				12	**11**	**12**	**$660,000**
				14	**12**	**12**	**$660,000**
				16	**13**	**12**	**$660,000**
				18	**14**	**12**	**$660,000**
				20	**14**	**12**	**$660,000**
BNB No. 2	55-69	1	826	6	2	0	$0
				8	3	0	$0
				10	5	3	$165,000
				12	**7**	**9**	**$495,000**
				14	**9**	**16**	**$880,000**
				16	**9**	**24**	**$1,320,000**
				18	**11**	**24**	**$1,320,000**
				20	**12**	**24**	**$1,320,000**
BNB No. 3	55-69	1	623	6	**11**	**24**	**$1,320,000**
				8	**13**	**24**	**$1,320,000**
				10	**14**	**24**	**$1,320,000**
				12	**14**	**24**	**$1,320,000**
				14	**15**	**24**	**$1,320,000**
				16	**15**	**24**	**$1,320,000**
				18	**16**	**24**	**$1,320,000**
				20	**16**	**24**	**$1,320,000**
BNB No. 4	67	0	67	**6**	4	0	$0
				8	5	1	$55,000
				10	5	1	$55,000
				12	6	1	$55,000
				14	6	1	$55,000
				16	6	1	$55,000
				18	6	1	$55,000
				20	6	1	$55,000
BNB No. 5	69	0	146	6	7	1	$55,000
				8	10	1	$55,000
				10	12	1	$55,000
				12	14	1	$55,000
				14	15	1	$55,000
				16	17	1	$55,000
				18	18	1	$55,000
				20	**19**	**1**	**$55,000**
BNB No. 6	67	2	488	**6**	**0**	**0**	**$0**
				8	**0**	**0**	**$0**
				10	**1**	**0**	**$0**
				12	**1**	**0**	**$0**
				14	**1**	**0**	**$0**
				16	**1**	**0**	**$0**
				18	**3**	**0**	**$0**
				20	**4**	**0**	**$0**

Source: LSA Associates, Inc. (May 2014).

[1] A Noise Abatement Decision Report will be prepared that will identify noise barrier construction cost information and the noise barriers that are reasonable from a cost perspective. The barrier heights which meet the acoustical reasonableness criteria of a minimum of 7 dBA reduction at one or more receptors are shown in ***bold italics***.

[2] The cost consideration in the reasonableness determination of noise abatement is based on a 2011 allowance per benefited unit/receptor of $55,000 (Caltrans 2011).

BNB = BRT Noise Barrier
Caltrans = California Department of Transportation
dBA = A-weighted decibels
L_{eq}(h) = equivalent continuous sound level

55 to 69 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 1 dB at the modeled receptors, and the minimum feasible barrier height is 10 ft.

7.3.2.3. BNB No. 3

A 623 ft long barrier, BNB No. 3, was modeled within the private property line at top of slope as an alternative to BNB No. 2 to shield second floor Receptors BR-443 through BR-449 because traffic noise levels for existing conditions and/or in Year 2035 for the BRT Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.4 shows that traffic noise levels would range from 54 to 68 dBA L_{eq}(h) for existing conditions and from 55 to 69 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 1 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.2.4. BNB No. 04

A 67 ft long barrier, BNB No. 4, was modeled along the private property line to shield Receptor BR-397 because traffic noise levels for existing conditions and/or in Year 2035 for the BRT Alternative would approach or exceed the 67 dBA Leq(h) NAC. In Appendix B, Table B.3 shows that traffic noise levels would be 67 for existing conditions and would be 67 dBA Leq(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 0 dB at the modeled receptors and the minimum feasible barrier height is 8 ft

7.3.2.5. BNB No. 05

A 146 ft long barrier, BNB No. 5, was modeled along the private property line to shield Receptor BR-122 because traffic noise levels for existing conditions and/or in Year 2035 for the BRT Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.3 shows that traffic noise levels would be 69 dBA L_{eq}(h) for existing conditions and 69 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 0 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.2.6. BNB No. 06

A 488 ft long barrier, BNB No. 6, was modeled along the private property line to shield second floor Receptor BR-237 because traffic noise levels for existing conditions and/or in Year 2035 for the BRT Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.3 shows that traffic noise levels would be 65 dBA L_{eq}(h) for existing conditions and 67 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 2 dB at the modeled receptors, and the barrier is not feasible at any modeled height.

7.3.3. Freeway Tunnel Alternatives

Noise barriers were considered to shield receptors along I-710, SR 60, SR 710, I-10, I-210, and SR 134, where receptors would continue to be exposed to traffic noise levels approaching or exceeding the NAC. All properties requiring abatement consideration are within Categories B and C, which have a 67 dBA L_{eq} NAC, and Category E, which has a 72 dBA L_{eq} NAC. At each location, noise barrier heights were evaluated at 2 ft increments from 6 to 20 ft. Each noise barrier was evaluated for feasibility based on the achievable noise reduction. For each noise barrier found to be acoustically feasible, reasonable cost allowances were calculated.

The following is a discussion of noise abatement considered for each receptor or group of receptors where traffic noise impacts are predicted. A summary of the data from the preliminary noise abatement analysis is shown in Tables 7.4 and 7.5. The locations of the noise barriers under the Freeway Tunnel Alternative single-bore and dual-bore design variations are shown on Figures 7-3 and 7-4.

7.3.3.1. FTNB No. 01

A 537 ft long barrier, FTNB No. 1, was modeled along the Caltrans ROW to shield Receptors FR-1 to FR-3 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.7 shows that traffic noise levels for the single-bore design variation would range from 63 to 73 dBA L_{eq}(h) for existing conditions and from 64 to 74 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 1 dB at the modeled receptors, and the minimum feasible barrier height is 14 ft.

Table 7.4 Summary of Feasibility – Freeway Tunnel Alternative Single-Bore Design Variation

Noise Barrier No.	Design Year (2035) Noise Level (dBA L_{eq}(h))	Noise Increase (dBA)	Approximate Length (feet)	Height (feet)	Highest Noise Reduction (dBA)	Number of Benefited Units/ Receptors	Total Reasonable Allowance Per Barrier^2
FTNB No. 1	64-74	1	537	6	4	0	$0
				8	4	0	$0
				10	4	0	$0
				12	4	0	$0
				14	5	1	$55,000
				16	5	1	$55,000
				18	5	1	$55,000
				20	5	1	$55,000
FTNB No. 2	64-71	1	115	6	5	1	$55,000
				8	6	1	$55,000
				10	6	1	$55,000
				12	6	1	$55,000
				14	6	1	$55,000
				16	6	1	$55,000
				18	6	1	$55,000
				20	6	1	$55,000
FTNB No. 3A	64-71	1-6	3128	**6**	**11**	**17**	**$935,000**
				8	**12**	**20**	**$1,100,000**
				10	**13**	**23**	**$1,265,000**
				12	**14**	**24**	**$1,320,000**
				14	**15**	**24**	**$1,320,000**
				16	**15**	**24**	**$1,320,000**
				18	**15**	**24**	**$1,320,000**
				20	**16**	**26**	**$1,430,000**
FTNB No. 3B	64-71	1-6	3649	**6**	**11**	**19**	**$1,045,000**
				8	**12**	**28**	**$1,540,000**
				10	**13**	**34**	**$1,870,000**
				12	**14**	**34**	**$1,870,000**
				14	**15**	**34**	**$1,870,000**
				16	**15**	**34**	**$1,870,000**
				18	**15**	**34**	**$1,870,000**
				20	**16**	**36**	**$1,980,000**
FTNB No. 4	64-71	1-6	2621	6	6	10	$550,000
				8	6	15	$825,000
				10	**7**	**18**	**$990,000**
				12	**8**	**21**	**$1,155,000**
				14	**10**	**21**	**$1,155,000**
				16	**10**	**21**	**$1,155,000**
				18	**11**	**26**	**$1,430,000**
				20	**12**	**29**	**$1,595,000**
FTNB No. 5	61-76	0-8	1801	**6**	**12**	**19**	**$1,045,000**
				8	**13**	**19**	**$1,045,000**
				10	**15**	**22**	**$1,210,000**
				12	**16**	**32**	**$1,760,000**
				14	**17**	**33**	**$1,815,000**
				16	**18**	**39**	**$2,145,000**
				18	**19**	**42**	**$2,310,000**
				20	**19**	**42**	**$2,310,000**
FTNB No. 6S	73-76	5-8	1454	6	0	0	$0
				8	2	0	$0
				10	2	0	$0
				12	2	0	$0
				14	3	0	$0
				16	3	0	$0
				18	4	0	$0
				20	5	5	$275,000

Table 7.4 Summary of Feasibility – Freeway Tunnel Alternative Single-Bore Design Variation

Noise Barrier No.	Design Year (2035) Noise Level (dBA L_{eq}(h))	Noise Increase (dBA)	Approximate Length (feet)	Height (feet)	Highest Noise Reduction (dBA)	Number of Benefited Units/ Receptors	Total Reasonable Allowance Per Barrier[2]
FTNB No. 7	73-75	5-8	673	6	6	4	$220,000
				8	**8**	**4**	**$220,000**
				10	**9**	**4**	**$220,000**
				12	**10**	**8**	**$440,000**
				14	**11**	**8**	**$440,000**
				16	**12**	**9**	**$495,000**
				18	**12**	**9**	**$495,000**
				20	**13**	**9**	**$495,000**
FTNB No. 8	75-76	6-7	406	**6**	**8**	**6**	**$330,000**
				8	**11**	**6**	**$330,000**
				10	**13**	**6**	**$330,000**
				12	**14**	**6**	**$330,000**
				14	**15**	**6**	**$330,000**
				16	**16**	**6**	**$330,000**
				18	**17**	**6**	**$330,000**
				20	**17**	**6**	**$330,000**
FTNB No. 10	63-75	0-2	1207	6	–	–	–
				8	5	10	$550,000
				10	**9**	**10**	**$550,000**
				12	**11**	**12**	**$660,000**
				14	**12**	**18**	**$990,000**
				16	**13**	**22**	**$1,210,000**
				18	**14**	**22**	**$1,210,000**
				20	**15**	**22**	**$1,210,000**
FTNB No. 11	59-72	1-2	1404	6	–	–	–
				8	2	0	$0
				10	4	0	$0
				12	5	2	$110,000
				14	6	5	$275,000
				16	**7**	**5**	**$275,000**
				18	**8**	**12**	**$660,000**
				20	**8**	**12**	**$660,000**
FTNB No. 12	69-71	1-2	1047	6	–	–	–
				8	1	0	$0
				10	2	0	$0
				12	4	0	$0
				14	5	3	$165,000
				16	5	3	$165,000
				18	6	3	$165,000
				20	6	5	$275,000
FTNB No. 13A	62-74	0-4	2316	6	–	–	–
				8	–	–	–
				10	**7**	**5**	**$275,000**
				12	**8**	**5**	**$275,000**
				14	**9**	**5**	**$275,000**
				16	**10**	**5**	**$275,000**
				18	**11**	**5**	**$275,000**
				20	**11**	**10**	**$550,000**
FTNB No. 13B	62-74	0-4	709	6	**3**	0	$0
				8	**3**	0	$0
				10	4	0	$0
				12	4	0	$0
				14	4	0	$0
				16	4	0	$0
				18	4	0	$0
				20	4	0	$0
FTNB No. 14	67	1	263	6	3	0	$0

Table 7.4 Summary of Feasibility – Freeway Tunnel Alternative Single-Bore Design Variation

Noise Barrier No.	Design Year (2035) Noise Level (dBA L_{eq}(h))	Noise Increase (dBA)	Approximate Length (feet)	Height (feet)	Highest Noise Reduction (dBA)	Number of Benefited Units/ Receptors	Total Reasonable Allowance Per Barrier[2]
				8	5	1	$55,000
				10	6	1	$55,000
				12	**7**	**1**	**$55,000**
				14	**7**	**1**	**$55,000**
				16	**8**	**1**	**$55,000**
				18	**8**	**1**	**$55,000**
				20	**9**	**1**	**$55,000**
FTNB No. 15	69-70	0-1	262	6	4	0	$0
				8	**8**	**1**	**$55,000**
				10	**10**	**1**	**$55,000**
				12	**11**	**1**	**$55,000**
				14	**12**	**2**	**$110,000**
				16	**13**	**2**	**$110,000**
				18	**14**	**2**	**$110,000**
				20	**15**	**2**	**$110,000**

Source: LSA Associates, Inc. (May 2014).

[1] A Noise Abatement Decision Report will be prepared that will identify noise barrier construction cost information and the noise barriers that are reasonable from a cost perspective. The barrier heights which meet the acoustical reasonableness criteria of a minimum of 7 dBA reduction at one or more receptors are shown in **bold**.

[2] The cost consideration in the reasonableness determination of noise abatement is based on a 2011 allowance per benefited unit/receptor of $55,000 (Caltrans 2011).

Caltrans = California Department of Transportation
dBA = A-weighted decibels
FTNB = Freeway Tunnel Noise Barrier
L_{eq}(h) = equivalent continuous sound level per hour

Table 7.5 Summary of Feasibility – Freeway Tunnel Alternative Dual-Bore Design Variation

Noise Barrier No.	Design Year (2035) Noise Level (dBA L_{eq}(h))	Noise Increase (dBA)	Approximate Length (feet)	Height (feet)	Highest Noise Reduction (dBA)	Number of Benefited Units/ Receptors	Total Reasonable Allowance Per Barrier[2]
FTNB No. 1	65-75	2	537	6	3	0	$0
				8	3	0	$0
				10	4	0	$0
				12	4	0	$0
				14	4	0	$0
				16	4	0	$0
				18	4	0	$0
				20	4	0	$0
FTNB No. 2	65-72	2	115	6	5	1	$55,000
				8	6	1	$55,000
				10	6	1	$55,000
				12	6	1	$55,000
				14	6	1	$55,000
				16	6	1	$55,000
				18	6	1	$55,000
				20	6	1	$55,000
FTNB No. 3A	67-73	2-9	3128	**6**	**11**	**17**	**$935,000**
				8	**13**	**21**	**$1,155,000**
				10	**14**	**24**	**$1,320,000**
				12	**14**	**24**	**$1,320,000**
				14	**15**	**24**	**$1,320,000**
				16	**16**	**24**	**$1,320,000**
				18	**16**	**24**	**$1,320,000**
				20	**16**	**26**	**$1,430,000**
FTNB No. 3B	67-73	2-9	3649	**6**	**11**	**17**	**$935,000**
				8	**13**	**26**	**$1,430,000**
				10	**14**	**32**	**$1,760,000**
				12	**14**	**35**	**$1,925,000**
				14	**15**	**35**	**$1,925,000**
				16	**16**	**35**	**$1,925,000**
				18	**16**	**35**	**$1,925,000**
				20	**16**	**37**	**$2,035,000**
FTNB No. 4	67-73	2-9	2621	6	5	5	$275,000
				8	6	10	$550,000
				10	**8**	**12**	**$660,000**
				12	**9**	**21**	**$1,155,000**
				14	**9**	**23**	**$1,265,000**
				16	**10**	**26**	**$1,430,000**
				18	**11**	**27**	**$1,485,000**
				20	**11**	**27**	**$1,485,000**
FTNB No. 5	63-78	2-10	1801	**6**	**13**	**21**	**$1,155,000**
				8	**14**	**21**	**$1,155,000**
				10	**15**	**21**	**$1,155,000**
				12	**16**	**25**	**$1,375,000**
				14	**17**	**34**	**$1,870,000**
				16	**18**	**40**	**$2,200,000**
				18	**19**	**40**	**$2,200,000**
				20	**19**	**43**	**$2,365,000**
FTNB No. 6D	74-78	6-10	1404	6	6	4	$220,000
				8	**8**	**4**	**$220,000**
				10	**10**	**4**	**$220,000**
				12	**11**	**11**	**$605,000**
				14	**12**	**15**	**$825,000**
				16	**12**	**15**	**$825,000**
				18	**13**	**15**	**$825,000**
				20	**13**	**15**	**$825,000**

Table 7.5 Summary of Feasibility – Freeway Tunnel Alternative Dual-Bore Design Variation

Noise Barrier No.	Design Year (2035) Noise Level (dBA L_{eq}(h))	Noise Increase (dBA)	Approximate Length (feet)	Height (feet)	Highest Noise Reduction (dBA)	Number of Benefited Units/ Receptors	Total Reasonable Allowance Per Barrier[2]
FTNB No. 7	74-77	6-10	673	**6**	**7**	**4**	**$220,000**
				8	**10**	**4**	**$220,000**
				10	**11**	**4**	**$220,000**
				12	**12**	**8**	**$440,000**
				14	**14**	**8**	**$440,000**
				16	**16**	**9**	**$440,000**
				18	**17**	**9**	**$495,000**
				20	**19**	**9**	**$495,000**
FTNB No. 8	77-78	8-9	406	**6**	**8**	**6**	**$330,000**
				8	**11**	**6**	**$330,000**
				10	**13**	**6**	**$330,000**
				12	**15**	**6**	**$330,000**
				14	**16**	**6**	**$330,000**
				16	**16**	**6**	**$330,000**
				18	**17**	**6**	**$330,000**
				20	**17**	**6**	**$330,000**
FTNB No. 9	72	6	84	**6**	**7**	**1**	**$55,000**
				8	**8**	**1**	**$55,000**
				10	**10**	**1**	**$55,000**
				12	**11**	**1**	**$55,000**
				14	**12**	**1**	**$55,000**
				16	**13**	**1**	**$55,000**
				18	**14**	**1**	**$55,000**
				20	**14**	**1**	**$55,000**
FTNB No. 10	64-76	1-3	1207	**-**	**-**	**-**	**-**
				8	6	10	$550,000
				10	**9**	**10**	**$550,000**
				12	**11**	**10**	**$550,000**
				14	**12**	**18**	**$990,000**
				16	**13**	**22**	**$1,210,000**
				18	**14**	**22**	**$1,210,000**
				20	**15**	**23**	**$1,265,000**
FTNB No. 11	61-74	3-4	1404	**-**	**-**	**-**	**-**
				8	3	0	$0
				10	5	2	$110,000
				12	6	2	$110,000
				14	**7**	**5**	**$275,000**
				16	**8**	**6**	**$330,000**
				18	**8**	**9**	**$495,000**
				20	**9**	**12**	**$660,000**
FTNB No. 12	71-73	3	1047	**-**	**-**	**-**	**-**
				8	1	0	$0
				10	3	0	$0
				12	4	0	$0
				14	5	3	$165,000
				16	6	3	$165,000
				18	6	3	$165,000
				20	6	3	$165,000
FTNB No. 13A	64-75	2-5	2316	6	-	-	-
				8	-	-	-
				10	**7**	**5**	**$275,000**
				12	**8**	**5**	**$275,000**
				14	**9**	**7**	**$385,000**
				16	**10**	**7**	**$385,000**
				18	**11**	**7**	**$385,000**
				20	**11**	**9**	**$495,000**

Table 7.5 Summary of Feasibility – Freeway Tunnel Alternative Dual-Bore Design Variation

Noise Barrier No.	Design Year (2035) Noise Level (dBA L_{eq}(h))	Noise Increase (dBA)	Approximate Length (feet)	Height (feet)	Highest Noise Reduction (dBA)	Number of Benefited Units/ Receptors	Total Reasonable Allowance Per Barrier[2]
FTNB No. 13B	64-75	2-5	709	6	**3**	0	$0
				8	**3**	0	$0
				10	4	0	$0
				12	4	0	$0
				14	4	0	$0
				16	4	0	$0
				18	5	2	$110,000
				20	5	2	$110,000
FTNB No. 14	68	2	263	6	3	0	$0
				8	5	1	$55,000
				10	6	1	$55,000
				12	6	1	$55,000
				14	**7**	**1**	**$55,000**
				16	**8**	**1**	**$55,000**
				18	**8**	**1**	**$55,000**
				20	**8**	**1**	**$55,000**
FTNB No. 15	70	1	262	6	4	0	$0
				8	**8**	**1**	**$55,000**
				10	**10**	**1**	**$55,000**
				12	**11**	**1**	**$55,000**
				14	**12**	**2**	**$110,000**
				16	**12**	**2**	**$110,000**
				18	**14**	**2**	**$110,000**
				20	**15**	**2**	**$110,000**

Source: LSA Associates, Inc. (May 2014).

[1] A Noise Abatement Decision Report will be prepared that will identify noise barrier construction cost information and the noise barriers that are reasonable from a cost perspective. The barrier heights which meet the acoustical reasonableness criteria of a minimum of 7 dBA reduction at one or more receptors are shown in **bold**.

[2] The cost consideration in the reasonableness determination of noise abatement is based on a 2011 allowance per benefited unit/receptor of $55,000 (Caltrans 2011).

Caltrans = California Department of Transportation
dBA = A-weighted decibels
FTNB = Freeway Tunnel Noise Barrier
L_{eq}(h) = equivalent continuous sound level per hour

Table B.9 shows that the dual-bore design variation traffic noise levels would range from 63 to 73 dBA L_{eq}(h) for existing conditions and from 65 to 75 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 2 dB at the modeled receptors, and the barrier is not feasible at any height.

7.3.3.2. FTNB No. 2

A 115 ft long barrier, FTNB No. 2, was modeled along the private property line as an alternate to FTNB No. 1 to shield Receptors FR-1 through FR-3 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.8 shows that traffic noise levels for the single-bore design variation would range from 63 to 70 dBA L_{eq}(h) for existing conditions and from 64 to 71 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 1 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft. Table B.10 shows that the dual-bore design variation traffic noise levels would range from 63 to 70 dBA L_{eq}(h) for existing conditions and from 65 to 72 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 2 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.3.3. FTNB No. 3A

A 3,128 ft long barrier, FTNB No. 3A, was modeled along the Caltrans ROW/private property line to shield Receptors FR-6 through FR-17 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.4 shows that traffic noise levels for the single-bore design variation would range from 59 to 69 dBA L_{eq}(h) for existing conditions and from 64 to 71 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 1 to 6 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft. Table B.5 shows that the dual-bore design variation traffic noise levels would range from 59 to 69 dBA L_{eq}(h) for existing conditions and from 67 to 73 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 2 to 9 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.3.4. FTNB No. 3B

A 3,649 ft long barrier, FTNB No. 3B (which includes FTNB No. 3A and an extension that would perturb up the existing wall), was modeled along the Caltrans ROW/private property line to shield Receptors FR-6 through FR-22 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.8 shows that traffic noise levels for the single-bore design variation would range from 59 to 69 dBA L_{eq}(h) for existing conditions and from 64 to 71 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 1 to 6 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft. Table B.10 shows that the dual-bore design variation traffic noise levels would range from 59 to 69 dBA L_{eq}(h) for existing conditions and from 67 to 73 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 2 to 9 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.3.5. FTNB No. 4

A 2,621 ft long barrier, FTNB No. 4, was modeled along the edge of shoulder as an alternative to FTNB Nos. 3A and 3B to shield Receptors FR-6 through FR-22 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. This wall will have a break, as shown on Figures 7-3 and 7-4, to allow access to the adjacent water retention basin. In Appendix B, Table B.8 shows that traffic noise levels for the single-bore design variation would range from 59 to 69 dBA L_{eq}(h) for existing conditions and from 64 to 71 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 1 to 6 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft. Table B.10 shows that the dual-bore design variation traffic noise levels would range from 59 to 69 dBA L_{eq}(h) for existing conditions and from 67 to 73 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 2 to 9 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.3.6. FTNB No. 5

A 1,801 ft long barrier, FTNB No. 5, was modeled along the Caltrans ROW/private property line to shield Receptors FR-24 through FR-38 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.7 shows that traffic noise levels for the single-bore design variation would range from 56 to 71 dBA L_{eq}(h) for existing conditions and from 61 to 76 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 0 to 8 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft. Table B.9 shows that the dual-bore design variation traffic noise levels would range from 56 to 71 dBA L_{eq}(h) for existing conditions and from 63 to

78 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 2 to 10 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.3.7. FTNB No. 6S

A 1,454 ft long barrier, FTNB No. 6S, was modeled along the edge of shoulder to shield Receptors FR-47 through FR-51 because traffic noise levels for existing conditions and/or in Year 2035 for the single-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.8 shows that traffic noise levels for the single-bore design variation would range from 67 to 70 dBA L_{eq}(h) for existing conditions and from 73 to 76 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 5 to 8 dB at the modeled receptors, and the minimum feasible barrier height is 20 ft.

7.3.3.8. FTNB No. 6D

A 1,404 ft long barrier, FTNB No. 6D, was modeled along the edge of shoulder to shield Receptors FR-47 through FR-51 because traffic noise levels for existing conditions and/or in Year 2035 for the dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.10 shows that the dual-bore design variation traffic noise levels would range from 67 to 70 dBA L_{eq}(h) for existing conditions and from 74 to 78 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 6 to 10 dB at the modeled receptors, and the minimum feasible barrier height is 12 ft.

7.3.3.9. FTNB No. 7

A 673 ft long barrier, FTNB No. 7, was modeled along the Caltrans ROW/private property line as an alternative to FTNB Nos. 6S and 6D to shield Receptors FR-47 through FR-49 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.7 shows that traffic noise levels for the single-bore design variation would range from 67 to 68 dBA L_{eq}(h) for existing conditions and from 73 to 75 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 5 to

8 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft. Table B.9 shows that the dual-bore design variation traffic noise levels would range from 67 to 68 dBA L_{eq}(h) for existing conditions and from 74 to 77 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 6 to 10 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.3.10. FTNB No. 8

A 406 ft long barrier, FTNB No. 8, was modeled along the Caltrans ROW/private property line as an alternative to FTNB Nos. 6S and 6D to shield Receptors FR-50 and FR-51 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.7 shows that traffic noise levels for the single-bore design variation would range from 68 to 70 dBA L_{eq}(h) for existing conditions and from 75 to 76 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 6 to 7 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft. Table B.9 shows that the dual-bore design variation traffic noise levels would range from 68 to 70 dBA L_{eq}(h) for existing conditions and from 77 to 78 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 8 to 9 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft.

7.3.3.11. FTNB No. 9

An 84 ft long barrier, FTNB No. 9, was modeled along the private property line to shield Receptor FR-72 because traffic noise levels for existing conditions and/or in Year 2035 for the dual-bore design variation of the Freeway Tunnel Alternative would approach or exceed the 72 dBA L_{eq}(h) NAC. Table B.9 shows that the dual-bore design variation traffic noise levels would be 66 dBA L_{eq}(h) for existing conditions and 72 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 6 dB at the modeled receptors, and the minimum feasible barrier height is 6 ft. Receptor FR-72 does not approach or exceed the NAC for the single-bore design variation of the Freeway Tunnel Alternative.

7.3.3.12. FTNB No. 10

A 1,207 ft long barrier, FTNB No. 10, was modeled along the Caltrans ROW/private property line to shield Receptors FR-75 through FR-84 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.7 shows that traffic noise levels for the single-bore design variation would range from 62 to 73 dBA L_{eq}(h) for existing conditions and from 63 to 75 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 0 to 2 dB at the modeled receptors, and the minimum feasible barrier height is 8 ft. Table B.9 shows that the dual-bore design variation traffic noise levels would range from 62 to 73 dBA L_{eq}(h) for existing conditions and from 64 to 76 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 1 to 3 dB at the modeled receptors, and the minimum feasible barrier height is 8 ft.

7.3.3.13. FTNB No. 11

A 1,404 ft long barrier, FTNB No. 11, was modeled along the Caltrans ROW/private property line to shield Receptors FR-85 through FR-95 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.4 shows that traffic noise levels for the single-bore design variation would range from 57 to 71 dBA L_{eq}(h) for existing conditions and from 59 to 72 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 1 to 2 dB at the modeled receptors, and the minimum feasible barrier height is 12 ft. Table B.5 shows that the dual-bore design variation traffic noise levels would range from 57 to 71 dBA L_{eq}(h) for existing conditions and from 61 to 74 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 3 to 4 dB at the modeled receptors, and the minimum feasible barrier height is 10 ft.

7.3.3.14. FTNB No. 12

A 1,047 ft long barrier, FTNB No. 12, was modeled along the edge of shoulder to shield Receptors FR-96 through FR-98 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.4 shows that traffic noise levels for the single-bore design variation would range from 68 to 70 dBA L_{eq}(h) for existing conditions and from 69 to 71 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 1 to 2 dB at the modeled receptors, and the minimum feasible barrier height is 20 ft. Table B.5 shows that the dual-bore design variation traffic noise levels would range from 68 to 70 dBA L_{eq}(h) for existing conditions and from 71 to 73 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 3 dB at the modeled receptors, and the minimum feasible barrier height is 14 ft.

7.3.3.15. FTNB No. 13A

A 2,316 ft long barrier, FTNB No. 13A, an extension of 13B, was modeled along the Caltrans ROW/private property line to shield Receptors FR-99 through FR-112 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.4 shows that traffic noise levels for the single-bore design variation would range from 61 to 72 dBA L_{eq}(h) for existing conditions and from 62 to 74 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 0 to 4 dB at the modeled receptors, and the minimum feasible barrier height is 10 ft. Table B.5 shows that the dual-bore design variation traffic noise levels would range from 61 to 72 dBA L_{eq}(h) for existing conditions and from 64 to 75 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 2 to 5 dB at the modeled receptors, and the minimum feasible barrier height is 10 ft.

7.3.3.16. FTNB No. 13B

A 709 ft long barrier, FTNB No. 13B, was modeled along the Caltrans ROW/private property line to shield Receptors FR-99 through FR-112 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.4 shows that traffic noise levels for the single-bore design variation would range from 61 to 72 dBA L_{eq}(h) for existing conditions and from 62 to 74 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 0 to 4 dB at the modeled receptors, and the barrier is not feasible at any height. Table B.5 shows that the dual-bore design variation traffic noise levels would range from 61 to 72 dBA L_{eq}(h) for existing conditions and from 64 to 75 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 2 to 5 dB at the modeled receptors, and the minimum feasible barrier height is 18 ft.

7.3.3.17. FTNB No. 14

A 263 ft long barrier, FTNB No. 14, was modeled along the private property line to shield Receptors FR-114 and FR-115 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.4 shows that traffic noise levels for the single-bore design variation would be 66 dBA L_{eq}(h) for existing conditions and 67 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 1 dB at the modeled receptors, and the minimum feasible barrier height is 8 ft. Table B.5 shows that the dual-bore design variation traffic noise levels would be 66 dBA L_{eq}(h) for existing conditions and 68 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 2 dB at the modeled receptors, and the minimum feasible barrier height is 8 ft.

7.3.3.18. FTNB No. 15

A 262 ft long barrier, FTNB No. 15, was modeled along the private property line to shield Receptors FR-116 and FR-117 because traffic noise levels for existing conditions and/or in Year 2035 for both the single-bore and dual-bore design variations of the Freeway Tunnel Alternative would approach or exceed the 67 dBA L_{eq}(h) NAC. In Appendix B, Table B.7 shows that traffic noise levels for the single-bore design variation would be 69 dBA L_{eq}(h) for existing conditions and would range from 69 to 70 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would range from 0 to 1 dB at the modeled receptors, and the minimum feasible barrier height is 8 ft. Table B.9 shows that the dual-bore design variation traffic noise levels would be 69 dBA L_{eq}(h) for existing conditions and 70 dBA L_{eq}(h) for Year 2035 conditions at the modeled receptors. The increase in noise from the existing worst-hour noise level to future worst-hour noise level would be 1 dB at the modeled receptors, and the minimum feasible barrier height is 8 ft.

7.3.4. LRT Alternative

Noise barriers were considered for the receptors that, under future conditions, would experience a moderate or severe impact in accordance with the methodology presented in Section 4.4.

7.3.4.1. Train Pass-by Noise Modeling Assumptions

The following variables were used in order to provide future noise levels associated with light rail operations:

- Distance from the receptor to the train tracks
- Track height above ground/receptor
- Number of trains during the daytime hours (7:00 a.m. to 10:00 p.m.)
- Number of trains during the nighttime hours (10:00 p.m. to 7:00 a.m.)
- Speed of the train
- Length of the train

The *Advanced Conceptual Engineering Report Light Rail Transit Alternative* (CH2M HILL 2014) stated that on Friday (worst-case day) the total number of train pass-bys would be 326 (i.e., 244 during daytime hours and 82 during nighttime hours). The Technical Memorandum also states that the length of each train would be 180 ft and that each train would travel at a maximum speed of 55 mph.

7.3.4.2. Train Pass-by Noise Level Impacts

Once the train operation noise levels were compared to the existing daily noise levels, it was determined that receptors FR-2, LR-4, LR-5, LR-9, LR-11 through LR-15, and LR-20 through LR-22 would experience moderate impacts while LR-1, LR-3, LR-6, LR-8, and LR-10 would experience severe impacts. In order to eliminate potential future impacts, noise barriers were considered at the edge of track due to the track being elevated above ground. Table 7.6 shows the heights of proposed barriers that are required at each receptor location. Figure 7-5 shows the location of each track barrier along with its respective height. In Appendix B, Table B.11 presents a more detailed description of all the variables for the calculations at each receptor.

Table 7.6 Train Operations Noise Impact Analysis Abatement Summary

Receptor Location	Existing Noise Level (L_{dn})	Train Operations Noise Level (L_{dn})	Noise Exposure Increase (dBA)	No Impact, Moderate, Severe[1]	Proposed Barrier Height (ft)[2]	Train Noise Level With Barrier (dBA)	No Impact, Moderate, Severe After Mitigation[1]
LR-1	54.6	63.6	9.5	Severe	6.0	54.4	No Impact
LR-2	54.6	57.2	4.5	Moderate	4.0	51.8	No Impact
LR-3	63.1	67.5	5.7	Severe	5.5	59.5	No Impact
LR-4	63.1	60.5	1.9	Moderate	4.0	55.8	No Impact
LR-5	64.6	63.7	2.6	Moderate	4.0	58.4	No Impact
LR-6	58.0	67.3	9.8	Severe	9.5	56.9	No Impact
LR-7[3]	61.9	63.7	4.0	-	0.0	-	-
LR-8	61.9	68.3	7.3	Severe	7.0	58.7	No Impact
LR-9	60.0	59.1	2.6	Moderate	4.0	54.4	No Impact
LR-10	65.6	69.3	5.2	Severe	5.0	60.8	No Impact
LR-11	67.8	68.4	3.3	Moderate	4.0	61.4	No Impact
LR-12	67.6	67.9	3.2	Moderate	4.0	60.6	No Impact
LR-13	67.6	67.9	3.2	Moderate	4.0	60.6	No Impact
LR-14	67.6	67.3	2.9	Moderate	4.0	60.2	No Impact
LR-15	67.6	67.6	3.0	Moderate	4.0	60.4	No Impact
LR-16	67.7	60.5	0.8	No Impact	0.0	-	-
LR-17	61.7	54.7	0.8	No Impact	0.0	-	-
LR-18	67.0	56.3	0.4	No Impact	0.0	-	-
LR-19	64.4	55.9	0.6	No Impact	0.0	-	-
LR-20	61.9	61.9	3.0	Moderate	4.0	56.4	No Impact
LR-21	65.9	62.1	1.5	Moderate	4.0	56.5	No Impact
LR-22	61.8	62.0	3.1	Moderate	4.0	57.0	No Impact
LR-23	69.7	63.0	0.8	No Impact	0.0	-	-
LR-24	77.0	65.8	0.3	No Impact	0.0	-	-
LR-25	63.3	56.2	0.8	No Impact	0.0	-	-
LR-26	76.7	57.0	0.0	No Impact	0.0	-	-
LR-27	71.4	61.6	0.4	No Impact	0.0	-	-
LR-28	58.9	52.3	0.9	No Impact	0.0	-	-
LR-29	58.1	54.2	1.5	No Impact	0.0	-	-

[1] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 3-1.

[2] Proposed barrier height is relative to the track height level.

[3] Non-noise-sensitive active park. Only passive parks are classified as being noise sensitive. Level shown for reporting purposes only.

dBA = A-weighted decibels
ft = feet
L_{dn} = day-night average sound level

The design of noise barriers presented in this report is preliminary and has been conducted at a level appropriate for environmental review and not for final design of the project. Preliminary information on the physical location, length, and height of noise barriers is provided in this report. If pertinent parameters change substantially during the final project design, preliminary noise barrier designs may be modified or eliminated from the final project. A final decision on the construction of the noise abatement would be made upon completion of the project design.

Chapter 8. Construction Noise

8.1. Construction Noise

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

The second type of short-term noise impact is related to noise generated during excavation, grading, and roadway construction. Construction is performed in discrete steps, each of which having its own mix of equipment and consequently its own noise characteristics. These various sequential phases would change the character of the noise generated and therefore the noise levels along the project alignment as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table 8.1 lists typical construction equipment noise levels (L_{max}) recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor.

The site preparation phase, which includes grading and paving, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, and front loaders. Earthmoving and compacting equipment include compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by 3 or 4 minutes at lower power settings.

Table 8.1 Typical Construction Equipment Noise Levels

Equipment Description	Spec 721.560[1] L_{max} at 50 ft	Actual Measured[2] L_{max} at 50 ft
Backhoes	80	78
Compactor (ground)	80	83
Cranes	85	81
Dozers	85	82
Dump Trucks	84	76
Excavators	85	81
Flat Bed Trucks	84	74
Front-End Loaders	80	79
Graders	85	N/A[3]
Jackhammers	85	89
Pick-up Truck	55	75
Pneumatic Tools	85	85
Pumps	77	81
Rock Drills	85	81
Rollers	85	80
Scrapers	85	84
Tractors	84	N/A
Vibratory Pile Drivers	95	101

Source: Federal Highway Administration Roadway Construction Noise Model (January 2006).

Note: Noise levels reported in this table are rounded to the nearest whole number.

[1] Maximum noise levels were developed based on Spec 721.560 from the Central Artery/Tunnel (CA/T) program to be consistent with the City of Boston's Noise Code for the "Big Dig" project.

[2] The maximum noise level was developed based on the average noise level measured of each piece of equipment during the CA/T program in Boston, Massachusetts.

[3] Since the maximum noise level based on the average noise level measured for this piece of equipment was not available, the maximum noise level developed based on Spec 721.560 was used.

ft = foot/feet
L_{max} = maximum instantaneous sound level
N/A = Not Applicable

Construction of the proposed project is expected to require the use of earthmovers, bulldozers, water trucks, and pickup trucks. Noise associated with the use of construction equipment is estimated to be between 80 and 85 dBA L_{max} at a distance of 50 ft from the active construction area for the grading phase.

As seen in Table 8.1, the maximum noise level generated by each grader is assumed to be approximately 85 dBA L_{max} at 50 ft from the earthmover in operation. Each bulldozer would generate approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks and pickup trucks is approximately 55 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound source with equal strength increases the noise level by 3 dBA. Each piece of construction equipment operates as an individual point source. The worst-case composite noise level at the nearest residence during this phase of construction would be 88 dBA L_{max} (at a distance of 50 ft from an active construction area).

Construction noise is regulated by Caltrans' Standard Specifications in Section 14-8.02, "Noise Control". The noise levels from the Contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dBA at a distance of 50 ft. In addition, the Contractor shall equip all internal combustion engines with the manufacturer-recommended muffler and shall not operate any internal combustion engine on the job site without the appropriate muffler.

Construction hours should be limited to the hours presented within each jurisdiction for all Build Alternatives in which construction would occur outside of State ROW. The specific construction noise level standards for each local jurisdiction are presented above in Section 4.3.

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Chapter 9. References and Qualifications

9.1. References

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9.2. Qualifications

- **J.T. Stephens, INCE Member, E.I.T.:** Mr. Stephens is a Senior Acoustical Specialist with 10 years experience and part of LSA's environmental technical staff. He is primarily responsible for the preparation of noise studies for a variety of projects. Mr. Stephens is proficient in the use of the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108), the SOUND32 noise model, the Traffic Noise Model (TNM) 2.5, the Roadway Construction Noise Model (RCNM), the Wyle Train Noise Model, and Computer Aided Noise Abatement (CadnaA) Noise Prediction Software.
  Mr. Stephens is also responsible for performing noise monitoring surveys using a variety of Larson-Davis sound level meters.
- **Tung-chen Chung, Ph.D., INCE Bd. Cert.:** Dr. Tung-chen (Tony) Chung has over 26 years of experience in environmental studies, specializing in noise and air quality impact analysis. He is a Board-certified member of the Institute of Noise Control Engineering (INCE), and has conducted more than 950 noise impact analyses and noise monitoring for general plans/specific plans, highways/freeways, airports/railroads, landfills and industrial/manufacturing plants, as well as schools, hospitals, and residential communities. He is experienced with noise models such as FHWA's TNM, Federal Aviation Administration's (FAA's) Integrated Noise Model (INM), and methods to assess rail noise and other stationary noise sources. His noise study experience also includes building exterior/interior sound and vibration isolation, and expert witness testimony.

Appendix A. Traffic Data

This appendix contains tables presenting the traffic data for Existing and Year 2035 conditions with and without the project.

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Table A.1 TSM/TDM Alternative – Year 2035 No Build

Segment	Total Segment Volumes				Percentage By Classification (%)			Traffic Volumes By Classification			Vehicle Speed (mph)		
	LOS C/D Peak Hour[1,2]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Automobiles	Medium Trucks	Heavy Trucks	Automobiles	Medium Trucks	Heavy Trucks
Atlantic Blvd – South of Glendon Way	4000	3854	3918	3918	0.97	0.02	0.01	3801	78	39	40	40	35
Atlantic Blvd – Glendon Way to Valley Blvd	4000	2771	2761	2771	0.97	0.02	0.01	2688	55	28	40	40	35
Garfield Ave – South of Glendon Way	4000	2976	3460	3460	0.98	0.01	0.01	3390	35	35	40	40	35
Garfield Ave – Glendon Way to Valley Blvd	4000	2510	2916	2916	0.98	0.01	0.01	2858	29	29	40	40	35
Connector Rd – Valley Blvd to Mission Rd	–	–	–	–	–	–	–	–	–	–	–	–	–
Mission Rd - Warwick Ave to Fremont Ave	4000	1512	1726	1726	0.97	0.02	0.01	1674	35	17	40	40	35
Valley Blvd - West of Connector Rd	4000	3580	3112	3580	0.97	0.02	0.01	3472	72	36	35	35	30
Valley Blvd - East of Connector Rd	4000	4033	3875	4000	0.97	0.02	0.01	3880	80	40	35	35	30
St. John Ave - North of Del Mar Blvd	3000	1507	806	1507	0.97	0.02	0.01	1462	30	15	35	35	30
St. John Ave - Del Mar Blvd to California Ave	–	–	–	–	–	–	–	–	–	–	–	–	–
Del Mar Blvd - West of St. John Ave	2000	595	472	595	0.97	0.02	0.01	577	12	6	30	30	25
Del Mar Blvd - East of St. John Ave	2000	1360	964	1360	0.97	0.02	0.01	1319	27	14	30	30	25
California Blvd - West of St. John Ave	2000	1101	1283	1283	0.97	0.02	0.01	1244	26	13	30	30	25
California Blvd - East of St. John Ave	4000	1538	1740	1740	0.97	0.02	0.01	1688	35	17	30	30	25
Rosemead Blvd - Marshall St to Valley Blvd	4000	3081	3368	3368	0.96	0.03	0.01	3233	101	34	40	40	35
Rosemead Blvd - Valley Blvd to Mission Rd	4000	2786	2770	2786	0.96	0.03	0.01	2674	84	28	40	40	35
Rosemead Blvd - Mission Rd to Lower Azusa Rd	4000	2736	2815	2815	0.96	0.03	0.01	2703	84	28	40	40	35
Fair Oaks Ave - Monterey Rd to Mission St	4000	1889	2240	2240	0.97	0.02	0.01	2173	45	22	35	35	30
Fair Oaks Ave - Mission St to Grevelia St	4000	2190	2368	2368	0.97	0.02	0.01	2297	47	24	35	35	30
Fremont Ave - Alhambra Rd to Huntington Dr	4000	2100	2101	2101	0.98	0.01	0.01	2059	21	21	35	35	30
Alhambra Rd - West of Fremont Ave	2000	549	750	750	0.97	0.02	0.01	727	15	8	25	25	20
Alhambra Rd - East of Fremont Ave	2000	483	726	726	0.97	0.02	0.01	704	15	7	25	25	20
Huntington Dr - West of Fremont Ave	6000	1985	2074	2074	0.97	0.02	0.01	2012	41	21	45	45	40
Huntington Dr - East of Fremont Ave	6000	2673	2762	2762	0.97	0.02	0.01	2679	55	28	45	45	40
SR 110 - Fair Oaks Ave to Glenarm St	7800	2610	3320	3320	0.98	0.01	0.01	3254	33	33	60	60	55
SR 110 SB Off-Ramp	1000	143	164	164	0.97	0.01	0.02	159	2	3	40	40	35
SR 110 SB On-Ramp	–	–	–	–	–	–	–	–	–	–	–	–	–

Source: LSA Associates, Inc. (May 2014).

[1] A capacity volume of 1,000 vehicles per lane is assumed for local roads.

[2] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
LOS = Level of Service
mph = miles per hour
Rd = Road
SB = southbound
SR 110 = State Route 110
St = Street

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Table A.2 TSM/TDM Alternative – Year 2035 Build

Segment	Total Segment Volumes				Percentage By Classification (%)			Traffic Volumes By Classification			Vehicle Speed (mph)		
	LOS C/D Peak Hour[1,2]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Automobiles	Medium Trucks	Heavy Trucks	Automobiles	Medium Trucks	Heavy Trucks
Atlantic Blvd – South of Glendon Way	5000	–	–	5000	0.97	0.02	0.01	4850	100	50	40	40	35
Atlantic Blvd – Glendon Way to Valley Blvd	5000	–	–	5000	0.97	0.02	0.01	4850	100	50	40	40	35
Garfield Ave – South of Glendon Way	4000	3266	3460	3460	0.98	0.01	0.01	3390	35	35	40	40	35
Garfield Ave – Glendon Way to Valley Blvd	5000	–	–	5000	0.98	0.01	0.01	4900	50	50	40	40	35
Connector Rd – Valley Blvd to Mission Rd	4000	3315	4248	4000	0.97	0.02	0.01	3880	80	40	40	40	35
Mission Rd - Warwick Ave to Fremont Ave	4000	2206	1726	2206	0.97	0.02	0.01	2140	44	22	40	40	35
Valley Blvd - West of Connector Rd	4000	3621	3112	3621	0.97	0.02	0.01	3513	72	36	35	35	30
Valley Blvd - East of Connector Rd	4000	4618	3875	4000	0.97	0.02	0.01	3880	80	40	35	35	30
St. John Ave - North of Del Mar Blvd	4000	1740	1049	1740	0.97	0.02	0.01	1688	35	17	35	35	30
St. John Ave - Del Mar Blvd to California Ave	2000	681	622	681	0.97	0.02	0.01	660	14	7	35	35	30
Del Mar Blvd - West of St. John Ave	2000	604	472	604	0.97	0.02	0.01	586	12	6	30	30	25
Del Mar Blvd - East of St. John Ave	2000	1195	964	1195	0.97	0.02	0.01	1159	24	12	30	30	25
California Blvd - West of St. John Ave	2000	1067	1284	1284	0.97	0.02	0.01	1245	26	13	30	30	25
California Blvd - East of St. John Ave	4000	1609	1824	1824	0.97	0.02	0.01	1770	36	18	30	30	25
Rosemead Blvd - Marshall St to Valley Blvd	6000	3651	3368	3651	0.96	0.03	0.01	3504	110	37	40	40	35
Rosemead Blvd - Valley Blvd to Mission Rd	6000	3872	2770	3872	0.96	0.03	0.01	3717	116	39	40	40	35
Rosemead Blvd - Mission Rd to Lower Azusa Rd	6000	3714	2815	3714	0.96	0.03	0.01	3566	111	37	40	40	35
Fair Oaks Ave - Monterey Rd to Mission St	5000	–	–	5000	0.97	0.02	0.01	4850	100	50	35	35	30
Fair Oaks Ave - Mission St to Grevelia St	5000	–	–	5000	0.97	0.02	0.01	4850	100	50	35	35	30
Fremont Ave - Alhambra Rd to Huntington Dr	4000	2352	2101	2352	0.98	0.01	0.01	2304	24	24	35	35	30
Alhambra Rd - West of Fremont Ave	2000	567	771	771	0.97	0.02	0.01	748	15	8	25	25	20
Alhambra Rd - East of Fremont Ave	2000	474	724	724	0.97	0.02	0.01	703	14	7	25	25	20
Huntington Dr - West of Fremont Ave	6000	2001	2110	2110	0.97	0.02	0.01	2047	42	21	45	45	40
Huntington Dr - East of Fremont Ave	6000	2794	2872	2872	0.97	0.02	0.01	2786	57	29	45	45	40
SR 110 - Fair Oaks Ave to Glenarm St	7800	2800	3340	3340	0.98	0.01	0.01	3274	33	33	60	60	55
SR 110 SB Off-Ramp	1000	122	169	169	0.97	0.01	0.02	164	2	3	40	40	35
SR 110 SB On-Ramp	1000	158	165	165	0.97	0.01	0.02	160	2	3	40	40	35

Source: LSA Associates, Inc. (May 2014).

[1] A capacity volume of 1,000 vehicles per lane is assumed for local roads. For the improvements that include a reversible peak-hour traffic lane, each lane is assumed to have a volume of 1,000.

[2] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
LOS = level of service
mph = miles per hour
Rd = Road
SB = southbound
SR 110 = State Route 110
St = Street

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Table A.3 BRT Alternative – Year 2035 No Build

Segment	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification				Vehicle Speed			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
Atlantic Blvd – Olympic Blvd to Whittier Blvd	1991	2877	2655	1991	97.49	0.65	1.16	0.70	1941	13	23	14	35	35	30	30
Atlantic Blvd – Whittier Blvd to Beverly Blvd	2022	2806	2628	2022	96.88	0.64	1.14	1.34	1959	13	23	27	35	35	30	30
Atlantic Blvd – Beverly Blvd to SR 60	2720	3453	2942	2720	97.16	0.63	1.03	1.18	2643	17	28	32	35	35	30	30
Atlantic Blvd – SR 60 to Brightwood St (1)	3257	3383	2959	3257	97.24	0.58	0.74	1.44	3167	19	24	47	35	35	30	30
Atlantic Blvd – SR 60 to Brightwood St (2)	2062	3383	2959	2062	97.24	0.58	0.73	1.45	2005	12	15	30	35	35	30	30
Atlantic Blvd – Brightwood St to Cadiz St	2057	2745	2473	2057	97.38	0.53	0.63	1.46	2003	11	13	30	40	40	35	35
Atlantic Blvd – Cadiz St to Garvey Ave	2081	2663	2411	2081	97.41	0.53	0.62	1.44	2027	11	13	30	40	40	35	35
Atlantic Blvd – Garvey Ave to Hellman Ave	2058	2519	2218	2058	98.25	0.39	0.44	0.92	2022	8	9	19	35	35	30	30
Atlantic Blvd – I-10 to Valley Blvd	1839	3361	3193	1839	98.10	0.54	0.76	0.60	1804	10	14	11	40	40	35	35
Atlantic Blvd – Valley Blvd to Main St	1957	3606	3296	1957	98.11	0.56	0.72	0.61	1920	11	14	12	35	35	30	30
Atlantic Blvd – Main St to Alhambra Rd	1956	2994	2869	1956	98.16	0.46	0.66	0.72	1920	9	13	14	35	35	30	30
Atlantic Blvd – Alhambra Rd to Huntington Dr	1976	3185	3058	1976	98.27	0.46	0.66	0.61	1942	9	13	12	35	35	30	30
Fair Oaks Ave – Huntington Dr to Monterey Rd	3222	3783	3402	3222	96.96	1.02	1.46	0.56	3124	33	47	18	35	35	30	30
Fair Oaks Ave – Monterey Rd to SR 110	1904	2676	2546	1904	96.90	0.89	1.47	0.74	1845	17	28	14	35	35	30	30
Fair Oaks Ave – SR 110 to Glenarm St	1818	2193	2096	1818	96.09	1.10	1.65	1.16	1747	20	30	21	35	35	30	30
Fair Oaks Ave – Glenarm St to California Blvd	1858	2061	1947	1858	95.00	1.18	1.67	2.15	1765	22	31	40	35	35	30	30
Fair Oaks Ave – California Blvd to Del Mar Blvd	1746	1218	1244	1244	94.86	0.80	1.37	2.97	1180	10	17	37	35	35	30	30
Huntington Dr – Atlantic Blvd to Fletcher Ave	3458	3765	3346	3458	97.13	0.87	0.90	1.10	3359	30	31	38	35	35	30	30
Huntington Dr – Fletcher Ave to Fair Oaks Ave	3445	3684	3299	3445	97.07	0.84	0.87	1.22	3344	29	30	42	35	35	30	30

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
I-10 = Interstate 10
LOS = level of service
mph = miles per hour
Rd = Road
SB = southbound
SR 60 = State Route 60
SR 110 = State Route 110
St = Street

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Table A.4 BRT Alternative – Year 2035 Build

Segment	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
Atlantic Blvd – Olympic Blvd to Whittier Blvd	1988	2853	2635	1988	96.93	0.65	1.11	1.31	1927	13	22	26	35	35	30	30
Atlantic Blvd – Whittier Blvd to Beverly Blvd	2590	2758	2587	2590	96.21	0.66	1.16	1.97	2492	17	30	51	35	35	30	30
Atlantic Blvd – Beverly Blvd to SR 60	3331	3428	2912	3331	96.55	0.66	1.05	1.74	3216	22	35	58	35	35	30	30
Atlantic Blvd – SR 60 to Brightwood St	3174	2913	2586	2913	96.90	0.62	0.76	1.72	2823	18	22	50	35	35	30	30
Atlantic Blvd – Brightwood St to Cadiz St	3226	2640	2394	2640	97.42	0.57	0.61	1.40	2572	15	16	37	35	35	30	30
Atlantic Blvd – Cadiz St to Garvey Ave (1)	3260	2599	2383	2599	97.34	0.62	0.62	1.42	2530	16	16	37	40	40	35	35
Atlantic Blvd – Cadiz St to Garvey Ave (2)	2662	2599	2383	2599	97.34	0.62	0.62	1.42	2530	16	16	37	40	40	35	35
Atlantic Blvd – Garvey Ave to Hellman Ave	2635	2491	2204	2491	98.16	0.52	0.48	0.84	2445	13	12	21	35	35	30	30
Atlantic Blvd – Garvey Ave to Hellman Ave	2043	2491	2204	2043	97.99	0.54	0.54	0.93	2002	11	11	19	40	40	35	35
Atlantic Blvd – I-10 to Valley Blvd	1925	3420	3080	1925	97.92	0.68	0.78	0.62	1885	13	15	12	35	35	30	30
Atlantic Blvd – I-10 to Valley Blvd	2483	3420	3080	2483	97.95	0.68	0.77	0.60	2432	17	19	15	35	35	30	30
Atlantic Blvd – Valley Blvd to Main St	1966	3537	3245	1966	98.02	0.61	0.76	0.61	1927	12	15	12	35	35	30	30
Atlantic Blvd – Main St to Alhambra Rd	1983	3114	2947	1983	97.82	0.66	0.86	0.66	1940	13	17	13	35	35	30	30
Atlantic Blvd – Alhambra Rd to Huntington Dr	2027	3421	3192	2027	97.98	0.64	0.79	0.59	1986	13	16	12	35	35	30	30
Fair Oaks Ave – Huntington Dr to Monterey Rd	5075	3860	3446	3860	97.02	1.04	1.40	0.54	3745	40	54	21	35	35	30	30
Fair Oaks Ave – Monterey Rd to SR 110	3297	3477	3285	3297	96.81	1.06	1.55	0.58	3192	35	51	19	35	35	30	30
Fair Oaks Ave – SR 110 to Glenarm St	2914	2336	2282	2336	95.51	1.41	2.01	1.07	2231	33	47	25	35	35	30	30
Fair Oaks Ave – SR 110 to Glenarm St	2379	2336	2282	2336	95.51	1.41	2.01	1.07	2231	33	47	25	35	35	30	30
Fair Oaks Ave – Glenarm St to California Blvd	2450	2158	2000	2158	94.48	1.44	2.04	2.04	2039	31	44	44	35	35	30	30

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
I-10 = Interstate 10
LOS = level of service
mph = miles per hour
Rd = Road
SB = southbound
SR 60 = State Route 60
SR 110 = State Route 110
St = Street

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Table A.5(a) Freeway Tunnel Alternative – Year 2035 No Build (Arterials and Freeways)

Segment – Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification – NB/EB				Traffic Volumes By Classification – SB/WB				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																				
California Blvd – Orange Grove Blvd to St. John Ave	637	1063	947	637	97.81	0.94	0.94	0.31	349	3	3	1	274	3	3	1	30	30	25	25
California Blvd – St. John Ave to Pasadena Ave	692	1389	1359	692	97.54	1.01	1.16	0.29	500	5	6	1	175	2	2	1	30	30	25	25
California Blvd – Pasadena Ave to Fair Oaks Ave	1856	1772	1842	1842	97.99	0.76	1.03	0.22	962	8	11	2	843	6	8	2	30	30	25	25
Colorado Blvd – Orange Grove Blvd to St. John Ave	1432	451	501	501	91.61	0.80	0.60	6.99	151	1	1	16	308	3	2	19	25	25	20	20
Colorado Blvd – St. John Ave to Pasadena Ave	1142	342	439	439	92.25	0.46	0.46	6.83	151	1	1	11	254	1	1	19	25	25	20	20
Colorado Blvd – Pasadena Ave to Fair Oaks Ave	1209	354	510	510	93.92	0.59	0.59	4.90	99	1	1	11	380	2	2	14	25	25	20	20
Del Mar Blvd – Orange Grove Blvd to St. John Ave	706	734	775	706	99.16	0.42	0.42	0.00	154	1	1	0	546	2	2	0	30	30	25	25
Del Mar Blvd – St. John Ave to Pasadena Ave	666	784	859	666	98.20	0.90	0.90	0.00	612	5	6	0	42	1	0	0	30	30	25	25
Del Mar Blvd – Pasadena Ave to Fair Oaks Ave	1889	1419	1284	1419	98.09	0.92	0.99	0.00	690	7	8	0	702	6	6	0	30	30	25	25
Fair Oaks Ave – Walnut St to Corson St	2059	1923	1646	1923	96.36	1.09	1.25	1.30	806	10	11	14	1047	11	13	11	30	30	25	25
Fair Oaks Ave – Corson St to I-210 EB On-Ramp	1878	1944	1798	1878	96.96	0.80	0.96	1.28	1130	10	12	14	691	5	6	10	30	30	25	25
Fair Oaks Ave – I-210 EB On-Ramp to Maple St	1911	1887	1799	1887	96.77	0.90	1.06	1.27	956	10	12	14	870	7	8	10	30	30	25	25
Fair Oaks Ave – Maple St to Villa St	2093	1651	1311	1651	96.43	0.91	1.33	1.33	652	8	14	12	940	7	8	10	30	30	25	25
Green St – Orange Grove Blvd to St. John Ave	598	17	15	17	0.00	0.00	0.00	100.00	0	0	0	11	0	0	0	6	30	30	25	25
Green St – St. John Ave to Pasadena Ave	1619	10	9	10	0.00	0.00	0.00	100.00	0	0	0	10	0	0	0	0	30	30	25	25
Green St – Pasadena Ave to Fair Oaks Ave	1088	5	4	5	0.00	0.00	0.00	100.00	0	0	0	5	0	0	0	0	30	30	25	25
Lincoln Ave – Between Orange Grove Blvd and Mountain St	740	536	503	536	98.31	0.75	0.19	0.75	417	3	1	2	110	1	0	2	30	30	25	25
Mountain St – Rosemont Ave to Lincoln Ave	1792	398	325	398	96.22	1.01	1.01	1.76	187	2	2	3	196	2	2	4	35	35	30	30
Mountain St – Lincoln Ave to I-210	1969	1374	1041	1374	97.38	1.02	1.09	0.51	777	8	8	3	561	6	7	4	35	35	30	30
Mountain St – I-210 to Fair Oaks Ave	2036	1021	862	1021	96.38	1.37	1.47	0.78	563	8	8	4	421	6	7	4	35	35	30	30
Orange Grove Blvd – Green St to Colorado Blvd	1941	1745	1676	1745	98.28	0.63	0.63	0.46	983	6	6	2	732	5	5	6	35	35	30	30
Orange Grove Blvd – Colorado Blvd to SR 134 Ramps	1950	1183	1128	1183	98.39	0.85	0.76	0.00	697	4	4	0	467	6	5	0	35	35	30	30
Orange Grove Blvd – SR 134 Ramps to Walnut St	1637	660	777	777	98.33	0.77	0.90	0.00	567	4	5	0	197	2	2	0	35	35	30	30
Orange Grove Blvd – Walnut St to Lincoln Ave	1635	664	781	781	97.82	0.77	0.90	0.51	567	4	5	2	197	2	2	2	35	35	30	30
Orange Grove Blvd – Lincoln Ave to Fair Oaks Ave	1697	847	816	847	97.05	1.42	1.53	0.00	447	6	6	0	375	6	7	0	35	35	30	30
Pasadena Ave – South of California Blvd	616	891	887	616	98.21	0.65	1.14	0.00	605	4	7	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – California Blvd to SR 710 NB On-Ramp	665	1465	1501	665	98.35	0.60	1.05	0.00	654	4	7	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – SR 710 NB On-Ramp to Del Mar Ave	624	682	705	624	97.76	0.80	1.44	0.00	610	5	9	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – Del Mar Blvd to Green St	337	66	165	165	98.78	0.61	0.61	0.00	163	1	1	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – Green St to Colorado Blvd	357	71	170	170	95.88	0.59	0.59	2.94	163	1	1	5	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – Colorado Blvd to Union St	419	175	344	344	98.84	0.58	0.58	0.00	340	2	2	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – Union St to I-210 NB On-Ramp	419	175	344	344	98.84	0.58	0.58	0.00	340	2	2	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – I-210 NB On-Ramp to SR 134 EB Off-Ramp	349	102	130	130	99.23	0.77	0.00	0.00	129	1	0	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – SR 134 EB Off-Ramp to Fair Oaks Ave	672	888	722	672	98.07	0.89	0.89	0.15	659	6	6	1	0	0	0	0	35	35	30	30
St. John Ave – South of California Blvd	1862	728	644	728	97.81	0.82	1.37	0.00	0	0	0	0	712	6	10	0	35	35	30	30
St. John Ave/Maple St – Del Mar Blvd to Green St	877	32	32	32	100.00	0.00	0.00	0.00	0	0	0	0	32	0	0	0	35	35	30	30
St. John Ave/Maple St – Green St to Colorado Blvd	649	38	37	38	84.21	0.00	0.00	15.79	0	0	0	0	32	0	0	6	35	35	30	30
St. John Ave/Maple St – Colorado Blvd to Union St	726	135	89	135	96.30	2.22	1.48	0.00	0	0	0	0	130	3	2	0	35	35	30	30
St. John Ave/Maple St – Union St to I-210 SB Off-Ramp	754	217	107	217	97.70	0.92	0.92	0.46	0	0	0	0	212	2	2	1	35	35	30	30
St. John Ave/Maple St – I-210 SB Off-Ramp to SR 134 WB On-ramp	756	83	83	83	100.00	0.00	0.00	0.00	0	0	0	0	83	0	0	0	35	35	30	30
St. John Ave/Maple St – SR 134 WB On-ramp to Fair Oaks Ave	694	1087	1154	694	98.28	0.86	0.72	0.14	0	0	0	0	682	6	5	1	35	35	30	30
I-210 – SR 134 to Orange Grove Blvd	9750	6008	6171	6171	95.24	1.35	3.35	0.06	3254	35	87	2	2623	48	120	2	65	65	60	60
I-210 – Orange Grove Blvd to Mountain St	17550	11293	11800	11800	92.06	2.10	5.81	0.03	6182	121	326	2	4680	127	360	2	65	65	60	60
SR 134 – San Rafael Ave to Orange Grove Blvd – Mainline	15600	15393	14791	15393	92.39	2.78	4.80	0.03	6950	222	382	2	7272	206	357	2	65	65	60	60
SR 134 – Orange Grove Blvd to I-210 Freeway – Mainline	15600	13130	13191	13191	93.48	2.19	4.31	0.02	6843	141	258	1	5488	148	311	1	65	65	60	60
SR 134/I-210 – I-210 Freeway to Fair Oaks Ave - Mainline	15600	12002	12122	12122	93.10	2.30	4.60	0.00	6460	135	252	0	4825	144	306	0	65	65	60	60
SR 134 – Figueroa St to Orange Grove Blvd – HOV EB	1500	1458	1888	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134 – Figueroa St to Los Robles Ave – HOV WB	1500	1797	1821	1500	100.00	0.00	0.00	0.00	0	0	0	0	1500	0	0	0	65	65	60	60
SR 134 – Orange Grove Blvd to 210 Freeway – HOV EB	1500	1452	1882	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134/I-210 – I-210 Freeway to Fair Oaks Ave – HOV EB	1500	1507	1814	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 710 – Del Mar Blvd to SR 134/I-210 (All Alternatives Except Dual Bore)	9750	3016	3180	3180	98.59	0.53	0.88	0.00	1711	7	14	0	1424	10	14	0	65	65	60	60

Table A.5(a) Freeway Tunnel Alternative – Year 2035 No Build (Arterials and Freeways)

Segment – Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification – NB/EB				Traffic Volumes By Classification – SB/WB				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
South																				
Campus Road – Ramona Rd to I-10 WB On-ramp	2054	2350	1942	2054	96.44	0.73	1.17	1.66	1026	9	15	30	955	6	9	4	35	35	30	30
Campus Road – I-10 WB On-ramp to I-10 WB Off-Ramp	1973	1984	1643	1973	96.19	0.71	1.17	1.93	626	6	12	34	1272	8	11	4	35	35	30	30
Campus Road – I-10 WB Off-Ramp to Circle Dr	1919	779	777	779	92.55	0.51	1.03	5.91	316	1	3	33	405	3	5	13	35	35	30	30
Corporate Center Dr – Davidson Dr to I-710 NB Off-ramp	1982	722	669	722	97.37	0.83	0.83	0.97	262	2	2	3	441	4	4	4	35	35	30	30
Corporate Center Dr – I-710 NB Off-ramp to Ramona Blvd	1963	1609	1390	1609	97.20	1.06	1.37	0.37	867	10	16	2	697	7	6	4	35	35	30	30
Hellman Ave – 710 to Orange Grove Ave	2494	275	248	275	97.10	0.36	0.36	2.18	62	0	0	3	205	1	1	3	30	30	25	25
Alhambra / Mission Rd – Bullard Ave to Concord Ave	2111	1318	1097	1318	97.35	1.06	0.83	0.76	468	5	4	5	815	9	7	5	35	35	30	30
Alhambra / Mission Rd – Concord Ave to Fremont Ave	2104	1398	1172	1398	97.78	1.22	1.00	0.00	581	7	6	0	786	10	8	0	35	35	30	30
Paseo Rancho Castilla – Ramona Rd to I-10 EB On-Ramp	2215	1935	1663	1935	97.16	0.62	0.72	1.50	1135	6	5	0	745	6	9	29	35	35	30	30
Paseo Rancho Castilla – I-10 EB On-Ramp to Eastern Ave	2185	1686	1459	1686	96.50	0.77	1.01	1.72	751	4	4	0	876	9	13	29	35	35	30	30
Ramona Rd – Eastern Ave to Campus Dr	2105	833	653	833	93.04	0.96	0.84	5.16	222	4	3	36	553	4	4	7	35	35	30	30
Ramona Rd – Campus Dr to I-710 SB On-ramp at Ramona	2025	2363	2066	2025	95.81	0.84	1.23	2.12	855	7	10	22	1085	10	15	21	35	35	30	30
Ramona Rd – I-710 SB On-ramp at Ramona to Corporate Center Dr	2111	1892	1482	1892	96.99	0.90	1.11	1.00	352	3	2	10	1483	14	19	9	35	35	30	30
Ramona Rd – Corporate Center Dr to I-10 EB C/D Road	2494	1384	794	1384	97.62	0.72	0.72	0.94	196	1	1	6	1155	9	9	7	35	35	30	30
Ramona Rd – I-10 EB C/D Road to Atlantic Blvd	2214	1288	1186	1288	97.98	0.54	0.47	1.01	507	3	2	6	755	4	4	7	35	35	30	30
Ramona Ave – Between Winthrop Dr and Meridian Ave	1126	574	278	574	97.74	0.87	1.39	0.00	0	0	0	0	561	5	8	0	35	35	30	30
Valley Blvd – Bullard Ave to I-710 SB On-Ramp	2381	1222	886	1222	96.73	0.90	1.47	0.90	344	3	4	5	838	8	14	6	35	35	30	30
Valley Blvd – I-710 SB On-Ramp to I-710 NB Off-Ramp	1931	2265	1947	1931	97.00	0.83	1.55	0.62	88	0	0	4	1785	16	30	8	35	35	30	30
Valley Blvd – I-710 to Fremont Ave	1804	3403	3172	1804	97.17	0.83	1.50	0.50	968	8	16	4	785	7	11	5	35	35	30	30
I-10 - west of Eastern Ave to SR-710 – Mainline	15600	11887	11940	11940	97.15	0.74	2.11	0.00	6860	49	150	0	4740	39	102	0	65	65	60	60
I-10 - SR-710 to Fremont Ave - Mainline	13650	15170	14767	13650	96.53	0.95	2.52	0.00	6901	69	184	0	6275	61	160	0	65	65	60	60
I-10 HOV/El Monte Busway – Between SR 710 Ramps and I-10 HOV lanes East of SR 710	3900	2152	1907	2152	96.24	0.00	0.00	3.76	821	0	0	13	1250	0	0	68	65	65	60	60
I-10 HOV/El Monte Busway – Between Cal State LA Metrolink Station and SR 710 Ramps	3900	2158	1913	2158	95.97	0.00	0.00	4.03	821	0	0	16	1250	0	0	71	65	65	60	60
I-710 – Floral Dr to I-10	11700	10382	10093	10382	94.87	1.39	3.74	0.00	4840	71	209	0	5010	73	179	0	65	65	60	60
I-710 – I-10 to Hellman Ave (All Alternatives Except Dual Bore)	11700	3797	3611	3797	96.69	1.13	2.13	0.05	2183	26	48	2	1488	17	33	0	65	65	60	60
SR 710 – Hellman Ave to Valley Blvd (All Alternatives Except Dual Bore)	9750	3836	3629	3836	96.61	1.12	2.11	0.16	2183	26	48	3	1523	17	33	3	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
C/D Road = Collector/Distributor Road
Cal State LA = California State University, Los Angeles
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

Table A.5(b) Freeway Tunnel Alternative – Year 2035 No Build (Ramps)

Segment – Ramps	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																
SR 134 Eastbound Off-Ramp to SR 710 Northbound	2000	702	314	702	96.44	1.57	1.99	0.00	677	11	14	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Southbound	1000	540	463	540	97.03	1.30	1.67	0.00	524	7	9	0	50	50	45	45
SR 710 Southbound On-Ramp from I-210 Westbound	2000	344	219	344	99.42	0.29	0.29	0.00	342	1	1	0	50	50	45	45
SR 710 Northbound Off-Ramp to I-210 Eastbound	2000	173	1	173	100.00	0.00	0.00	0.00	173	0	0	0	50	50	45	45
SR 134 Westbound On-Ramp from SR 710 Northbound	2000	624	404	624	97.76	0.96	1.28	0.00	610	6	8	0	50	50	45	45
I-210 Southbound Off-Ramp to SR 134 Eastbound	2000	3994	3719	2000	87.05	3.45	9.50	0.00	1741	69	190	0	50	50	45	45
I-210 Southbound Off-Ramp to St. John Ave	1000	418	138	418	98.56	0.48	0.48	0.48	412	2	2	2	45	45	40	40
SR 134 Westbound On-Ramp from Maple St	1000	679	716	716	98.60	0.56	0.70	0.14	706	4	5	1	65	65	60	60
I-210 Eastbound On-Ramp from Mountain	1000	625	552	625	96.64	1.44	1.92	0.00	604	9	12	0	65	65	60	60
SR 134 Eastbound On-Ramp from Orange Grove Blvd	1000	373	284	373	98.92	0.54	0.54	0.00	369	2	2	0	65	65	60	60
SR 134 Eastbound Off-Ramp to Corson St	1000	774	627	774	97.68	1.03	1.03	0.26	756	8	8	2	45	45	40	40
SR 134 Westbound On-Ramp from I-210 Southbound	1000	517	434	517	97.29	1.16	1.55	0.00	503	6	8	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 SB and SR 710 NB	1000	1142	811	1000	97.50	1.10	1.40	0.00	975	11	14	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 (NB/SB)	2000	1243	776	1243	96.70	1.53	1.77	0.00	1202	19	22	0	50	50	45	45
I-210 Northbound On-Ramp from I-210 Westbound	2000	3567	4089	2000	87.35	3.45	9.20	0.00	1747	69	184	0	50	50	45	45
I-210 Westbound Off-Ramp to Maple St	1000	243	20	243	94.65	1.65	3.70	0.00	230	4	9	0	45	45	40	40
I-210 Westbound Off-Ramp to Mountain	1000	592	173	592	95.78	1.86	2.36	0.00	567	11	14	0	45	45	40	40
SR 134 Westbound Off-Ramp to Orange Grove Blvd	1000	151	67	151	98.02	0.66	1.32	0.00	148	1	2	0	45	45	40	40
I-210 Northbound On-Ramp from Pasadena/Corson	1000	347	669	669	98.80	0.30	0.60	0.30	661	2	4	2	65	65	60	60
SR 710 Southbound Off-Ramp to Del Mar Blvd	2000	1232	971	1232	98.54	0.65	0.81	0.00	1214	8	10	0	45	45	40	40
SR 710 Northbound On-Ramp from Del Mar Blvd	2000	1301	1341	1341	98.43	0.60	0.97	0.00	1320	8	13	0	65	65	60	60
SR 710 Northbound On-Ramp from Pasadena Ave	1000	784	796	796	98.87	0.38	0.75	0.00	787	3	6	0	65	65	60	60
SR 710 Southbound Off-Ramp to California Blvd	2000	1330	1139	1330	97.97	0.83	1.20	0.00	1303	11	16	0	45	45	40	40
South																
I-10 WB C/D Rd to I-10 WB On-ramp	1000	1450	435	1000	91.60	2.10	6.30	0.00	916	21	63	0	50	50	45	45
I-10 Westbound C/D Rd/On-Ramp from Ramona and SR 710 (NB/SB)	2000	3093	2104	2000	87.00	2.90	10.10	0.00	1740	58	202	0	65	65	60	60
I-10 Westbound Off-Ramp to Campus	2000	457	347	457	98.46	0.66	0.88	0.00	450	3	4	0	45	45	40	40
I-10 Westbound On-Ramp from Campus	1000	678	667	678	98.24	0.88	0.88	0.00	666	6	6	0	65	65	60	60
I-710 Northbound Off-Ramp to I-10 (EB/WB)	2000	3796	3719	2000	91.30	1.90	6.80	0.00	1826	38	136	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Westbound	1000	1607	1661	1000	84.00	3.40	12.60	0.00	840	34	126	0	50	50	45	45
I-710 Northbound Off-Ramp to Casuda Canyon Dr	1000	393	288	393	95.68	1.27	3.05	0.00	376	5	12	0	65	65	60	60
I-710 Southbound On-Ramp from Valley	2000	1576	1392	1576	96.64	1.08	2.09	0.19	1523	17	33	3	65	65	60	60
SR 710 Southbound Off-Ramp to I-10 Westbound	1000	37	7	37	100.00	0.00	0.00	0.00	37	0	0	0	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte WB and I-10 EB	1000	16	12	16	81.25	0.00	0.00	18.75	13	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte Busway Westbound	1000	3	3	3	0.00	0.00	0.00	100.00	0	0	0	3	50	50	45	45
I-10 Westbound On-Ramp from SR 710	1000	1645	1668	1000	84.10	3.40	12.50	0.00	841	34	125	0	50	50	45	45
SR 710 Northbound On-Ramp from I-10 HOV Eastbound	1000	3	3	3	0.00	0.00	0.00	100.00	0	0	0	3	50	50	45	45
I-710 SB On-ramp from Ramona Rd	1000	659	656	659	96.67	1.21	2.12	0.00	637	8	14	0	65	65	60	60
SR 710 Northbound On-Ramp from I-10 Westbound	1000	1	0	1	100.00	0.00	0.00	0.00	1	0	0	0	50	50	45	45
I-710 Northbound Off-Ramp to Valley	2000	2260	2237	2000	97.05	0.95	1.85	0.15	1941	19	37	3	45	45	40	40
I-710 Southbound On-Ramp from Eastbound I-10	1000	2288	2221	1000	90.40	2.30	7.30	0.00	904	23	73	0	50	50	45	45
I-10 Eastbound Off-Ramp to Ramona/Garvey	1000	724	859	859	98.37	0.70	0.93	0.00	845	6	8	0	45	45	40	40
I-10 Westbound Off-Ramp to SR 710 Northbound and I-10 WB HOV	2000	3523	2715	2000	96.05	1.05	2.90	0.00	1921	21	58	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Eastbound	1000	12	9	12	100.00	0.00	0.00	0.00	12	0	0	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Eastbound	1000	2188	2058	1000	97.00	0.70	2.30	0.00	970	7	23	0	50	50	45	45
I-10 Eastbound On-Ramp from Paseo Rancho Castilla EB	1000	526	551	551	98.55	0.54	0.91	0.00	543	3	5	0	65	65	60	60
I-710 SB/I-10 WB On-Ramp from Ramona	1000	4096	2993	1000	96.30	1.00	2.70	0.00	963	10	27	0	65	65	60	60
I-10 Eastbound On-Ramp from SR 710 SB/I-710 NB	1000	2200	2067	1000	97.00	0.70	2.30	0.00	970	7	23	0	50	50	45	45
I-10 Eastbound CD Rd/Off-Ramp Between Paseo Rancho Castilla and I-710 SB Ramp	1000	2354	2425	1000	91.00	2.20	6.80	0.00	910	22	68	0	50	50	45	45

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
C/D Rd = Collector/Distributor Road
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

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Table A.6(a) Freeway Tunnel Alternative – Single Bore – V1 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																				
California Blvd – Orange Grove Blvd to St. John Ave	707	1107	1014	707	98.16	0.85	0.71	0.28	361	3	2	1	333	3	3	1	30	30	25	25
California Blvd – St. John Ave to Pasadena Ave	698	922	833	698	97.85	0.86	0.72	0.57	444	4	3	2	239	2	2	2	30	30	25	25
California Blvd – Pasadena Ave to Fair Oaks Ave	1677	983	1079	1079	98.15	0.74	0.74	0.37	503	5	5	2	556	3	3	2	30	30	25	25
Colorado Blvd – Orange Grove Blvd to St. John Ave	2070	1216	1027	1216	91.78	1.32	1.64	5.26	712	8	10	30	404	8	10	34	25	25	20	20
Colorado Blvd – St. John Ave to Pasadena Ave	1847	941	896	941	91.40	1.06	1.38	6.16	383	4	4	24	477	6	9	34	25	25	20	20
Colorado Blvd – Pasadena Ave to Fair Oaks Ave	1923	806	754	806	91.69	0.74	0.99	6.58	354	3	4	24	385	3	4	29	25	25	20	20
Del Mar Blvd – Orange Grove Blvd to St. John Ave	544	412	467	467	99.36	0.43	0.21	0.00	274	1	1	0	190	1	0	0	30	30	25	25
Del Mar Blvd – St. John Ave to Pasadena Ave	654	690	674	654	99.08	0.61	0.31	0.00	392	2	1	0	256	2	1	0	30	30	25	25
Del Mar Blvd – Pasadena Ave to Fair Oaks Ave	1943	886	773	886	98.64	0.68	0.68	0.00	435	3	3	0	439	3	3	0	30	30	25	25
Fair Oaks Ave – Walnut St to Corson St	2064	1797	1476	1797	95.10	1.11	1.17	2.62	754	10	12	26	955	10	9	21	30	30	25	25
Fair Oaks Ave – Corson St to I-210 EB On-Ramp	1885	1843	1781	1843	95.61	0.92	1.03	2.44	1051	11	13	26	711	6	6	19	30	30	25	25
Fair Oaks Ave – I-210 EB On-Ramp to Maple St	1895	1845	1745	1845	95.61	0.92	1.03	2.44	1009	11	13	26	755	6	6	19	30	30	25	25
Fair Oaks Ave – Maple St to Villa St	2034	1572	1292	1572	95.22	0.89	1.15	2.74	648	8	12	24	849	6	6	19	30	30	25	25
Green St – Orange Grove Blvd to St. John Ave	1055	190	105	190	90.52	0.00	0.53	8.95	15	0	0	11	157	0	1	6	30	30	25	25
Green St – St. John Ave to Pasadena Ave	1451	77	29	77	84.41	1.30	1.30	12.99	0	0	0	10	65	1	1	0	30	30	25	25
Green St – Pasadena Ave to Fair Oaks Ave	1805	257	33	257	94.93	1.17	1.95	1.95	244	3	5	5	0	0	0	0	30	30	25	25
Lincoln Ave – Between Orange Grove Blvd and Mountain St	784	761	664	761	96.98	0.79	0.92	1.31	451	4	5	5	287	2	2	5	30	30	25	25
Mountain St – Rosemont Ave to Lincoln Ave	1887	419	316	419	96.43	0.95	0.95	1.67	195	2	2	3	209	2	2	4	35	35	30	30
Mountain St – Lincoln Ave to I-210	2076	1270	915	1270	97.09	1.02	1.34	0.55	687	7	10	3	546	6	7	4	35	35	30	30
Mountain St – I-210 to Fair Oaks Ave	1916	1299	1377	1377	96.81	0.94	1.45	0.80	580	6	9	4	753	7	11	7	35	35	30	30
Orange Grove Blvd – Green St to Colorado Blvd	1753	2358	2153	1753	98.86	0.34	0.40	0.40	983	3	4	2	750	3	3	5	35	35	30	30
Orange Grove Blvd – Colorado Blvd to SR 134 Ramps	1936	1676	1389	1676	99.04	0.48	0.48	0.00	792	4	4	0	868	4	4	0	35	35	30	30
Orange Grove Blvd – SR 134 Ramps to Walnut St	1810	813	831	831	99.04	0.60	0.36	0.00	566	3	2	0	257	2	1	0	35	35	30	30
Orange Grove Blvd – Lincoln Ave to Fair Oaks Ave	1808	801	676	801	97.50	1.25	1.25	0.00	401	5	5	0	380	5	5	0	35	35	30	30
Pasadena Ave – South of California Blvd	758	480	501	501	97.00	1.00	2.00	0.00	486	5	10	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – California Blvd to SR 710 NB On-Ramp	711	713	926	711	97.61	0.84	1.55	0.00	694	6	11	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – SR 710 NB On-Ramp to Del Mar Ave	711	713	926	711	97.61	0.84	1.55	0.00	694	6	11	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – Del Mar Blvd to Green St	715	1020	1062	715	97.48	0.98	1.54	0.00	697	7	11	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – Green St to Colorado Blvd	710	1145	1156	710	97.32	0.85	1.41	0.42	691	6	10	3	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – Colorado Blvd to Union St	680	1071	1091	680	98.08	0.74	1.18	0.00	667	5	8	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – Union St to I-210 NB On-Ramp	680	1071	1091	680	98.08	0.74	1.18	0.00	667	5	8	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – I-210 NB On-Ramp to SR 134 EB Off-Ramp	542	260	295	295	98.64	0.68	0.68	0.00	291	2	2	0	0	0	0	0	35	35	30	30
Pasadena Ave/Corson St – SR 134 EB Off-Ramp to Fair Oaks Ave	703	928	846	703	98.30	0.85	0.71	0.14	691	6	5	1	0	0	0	0	35	35	30	30
St. John Ave – South of California Blvd	2330	612	375	612	96.57	1.31	2.12	0.00	0	0	0	0	591	8	13	0	35	35	30	30
St. John Ave/Maple St – California Blvd to Del Mar Blvd	1587	831	602	831	97.12	1.20	1.68	0.00	0	0	0	0	807	10	14	0	35	35	30	30
St. John Ave/Maple St – Del Mar Blvd to Green St	1698	1216	751	1216	97.69	0.99	1.32	0.00	0	0	0	0	1188	12	16	0	35	35	30	30
St. John Ave/Maple St – Green St to Colorado Blvd	1856	1299	826	1299	97.39	0.92	1.23	0.46	0	0	0	0	1265	12	16	6	35	35	30	30
St. John Ave/Maple St – Colorado Blvd to Union St	873	883	668	873	97.71	1.03	1.26	0.00	0	0	0	0	853	9	11	0	35	35	30	30
St. John Ave/Maple St – Union St to I-210 SB Off-Ramp	901	947	677	901	97.67	0.89	1.33	0.11	0	0	0	0	880	8	12	1	35	35	30	30
St. John Ave/Maple St – I-210 SB Off-Ramp to SR 134 WB On-ramp	790	110	99	110	97.27	0.91	1.82	0.00	0	0	0	0	107	1	2	0	35	35	30	30
St. John Ave/Maple St – SR 134 WB On-ramp to Fair Oaks Ave	677	1090	1154	677	97.93	0.89	1.03	0.15	0	0	0	0	663	6	7	1	35	35	30	30
I-210 – 134 to Orange Grove Blvd	11700	7920	7742	7920	90.00	2.44	7.46	0.10	3179	81	264	2	3949	112	327	6	65	65	60	60
I-210 – Orange Grove Blvd to Mountain St	17550	12857	12959	12959	89.80	2.49	7.68	0.03	6190	160	488	2	5447	163	507	2	65	65	60	60
SR 134 – Figueroa St to San Rafael Ave – Mainline	15600	14872	14650	14872	92.05	2.86	5.03	0.06	6732	222	387	2	6957	204	361	7	65	65	60	60
SR 134 – San Rafael Ave to Orange Grove Blvd – Mainline	15600	15146	14830	15146	92.23	2.80	4.93	0.04	6907	221	387	2	7063	203	359	4	65	65	60	60
SR 134 – Orange Grove Blvd to 210 Freeway – Mainline	15600	13343	13367	13367	93.67	2.14	4.18	0.01	6894	139	253	1	5626	147	306	1	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave - Mainline	15600	12403	12377	12403	91.38	3.08	5.54	0.00	5437	197	353	0	5897	185	334	0	65	65	60	60
SR 134 – Figueroa St to Orange Grove Blvd – HOV EB	1500	1427	1886	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134 – Figueroa St to Los Robles Ave – HOV WB	1500	1845	1761	1500	100.00	0.00	0.00	0.00	0	0	0	0	1500	0	0	0	65	65	60	60
SR 134 – Orange Grove Blvd to 210 Freeway – HOV EB	1500	1420	1879	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave – HOV EB	1500	1449	1841	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
I-210 – Fair Oaks Ave to Los Robles Ave – HOV EB	1500	1536	1996	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 710 – Del Mar Blvd to 134/210 (Dual Bore - Top Tunnel)	7800	4395	4530	4530	87.74	2.52	9.65	0.09	1850	60	245	1	2125	54	192	3	65	65	60	60

Table A.6(a) Freeway Tunnel Alternative – Single Bore – V1 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification-SB/WB				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
South																				
Campus Road – Ramona Rd to I-10 WB On-ramp	2070	2365	1941	2070	96.81	0.63	0.92	1.64	1011	8	12	30	993	5	7	4	35	35	30	30
Campus Road – I-10 WB On-ramp to I-10 WB Off-Ramp	1988	2000	1654	1988	96.63	0.55	0.91	1.91	610	5	9	34	1311	6	9	4	35	35	30	30
Campus Road – I-10 WB Off-Ramp to Circle Dr	1901	774	764	774	92.38	0.39	1.03	6.20	323	1	3	34	392	2	5	14	35	35	30	30
Corporate Center Dr – Davidson Dr to I-710 NB Off-ramp	1897	872	806	872	97.82	0.69	0.69	0.80	337	2	2	3	516	4	4	4	35	35	30	30
Corporate Center Dr – I-710 NB Off-ramp to Ramona Blvd	1994	1699	1462	1699	97.71	0.94	1.00	0.35	889	8	11	2	771	8	6	4	35	35	30	30
Hellman Ave – 710 to Orange Grove Ave	2805	280	181	280	97.14	0.36	0.36	2.14	76	0	0	3	196	1	1	3	30	30	25	25
Alhambra / Mission Rd – Bullard Ave to Concord Ave	1955	1008	961	1008	96.83	1.19	0.99	0.99	351	5	4	5	625	7	6	5	35	35	30	30
Alhambra / Mission Rd – Concord Ave to Fremont Ave	2124	1332	1180	1332	97.74	1.13	1.13	0.00	582	7	7	0	720	8	8	0	35	35	30	30
Paseo Rancho Castilla – Ramona Rd to I-10 EB On-Ramp	2199	1990	1815	1990	96.94	0.70	0.85	1.51	1170	5	3	0	759	9	14	30	35	35	30	30
Paseo Rancho Castilla – I-10 EB On-Ramp to Eastern Ave	2193	1718	1507	1718	96.22	0.81	1.22	1.75	774	3	2	0	879	11	19	30	35	35	30	30
Ramona Rd – Eastern Ave to Campus Dr	2434	961	579	961	93.86	0.73	0.31	5.10	209	3	1	40	693	4	2	9	35	35	30	30
Ramona Rd – Campus Dr to I-710 SB On-ramp at Ramona	2077	2303	1928	2077	95.82	0.72	0.96	2.50	820	6	7	27	1170	9	13	25	35	35	30	30
Ramona Rd – I-710 SB On-ramp at Ramona to Corporate Center Dr	2146	1959	1529	1959	97.13	0.77	0.87	1.23	405	4	2	13	1498	11	15	11	35	35	30	30
Ramona Rd – Corporate Center Dr to I-10 EB C/D Road	2510	1390	785	1390	97.41	0.65	0.65	1.29	190	1	1	9	1164	8	8	9	35	35	30	30
Ramona Rd – I-10 EB C/D Road to Atlantic Blvd	2234	1301	1185	1301	97.62	0.54	0.46	1.38	518	3	2	9	752	4	4	9	35	35	30	30
Ramona Ave – Between Winthrop Dr and Meridian Ave	1191	622	269	622	97.59	0.96	1.45	0.00	0	0	0	0	607	6	9	0	35	35	30	30
Valley Blvd – Bullard Ave to I-710 SB On-Ramp	2711	770	486	770	95.45	0.78	1.17	2.60	236	1	2	10	499	5	7	10	35	35	30	30
Valley Blvd – I-710 SB On-Ramp to I-710 NB Off-Ramp	2256	1683	1251	1683	95.96	1.01	1.66	1.37	236	1	1	10	1379	16	27	13	35	35	30	30
Valley Blvd – I-710 to Fremont Ave	1984	2541	2378	1984	96.77	0.81	1.41	1.01	1048	9	16	10	872	7	12	10	35	35	30	30
I-10 - west of Eastern Ave to SR-710 – Mainline	15600	12184	11934	12184	96.08	1.15	2.77	0.00	5664	84	200	0	6042	56	138	0	65	65	60	60
I-10 - SR-710 to Fremont Ave - Mainline	13650	15265	14628	13650	96.49	0.97	2.54	0.00	6963	70	185	0	6208	62	162	0	65	65	60	60
I-10 HOV/El Monte Busway – Between SR 710 Ramps and I-10 HOV lanes East of SR 710	3000	2100	1870	2100	96.05	0.00	0.00	3.95	810	0	0	14	1207	0	0	69	65	65	60	60
I-10 HOV/El Monte Busway – Between Cal State LA Metrolink Station and SR 710 Ramps	3000	2107	1877	2107	95.73	0.00	0.00	4.27	810	0	0	17	1207	0	0	73	65	65	60	60
I-710 – Floral Dr to I-10	11700	12290	11711	11700	92.88	1.63	5.44	0.05	5289	97	351	3	5577	94	286	3	65	65	60	60
I-710 – I-10 to Hellman Ave (Dual Bore - Top Tunnel)	9750	7627	7154	7627	91.68	1.93	6.23	0.16	3874	67	223	7	3119	80	252	5	65	65	60	60
SR 710 – Hellman Ave to Valley Blvd (Dual Bore - Top Tunnel)	7800	5754	5383	5754	90.16	2.16	7.58	0.10	2898	52	197	3	2290	72	239	3	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
C/D Road = Collector/Distributor Road
Cal State LA = California State University, Los Angeles
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

Table A.6(b) Freeway Tunnel Alternative – Single Bore – V1 (Ramps)

Segment - Ramps	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																
I-210 Westbound Off-Ramp to Mountain	1000	753	346	753	96.15	1.59	2.26	0.00	724	12	17	0	45	45	40	40
I-210 Eastbound On-Ramp from Mountain	1000	729	669	729	95.47	1.51	2.61	0.41	696	11	19	3	65	65	60	60
I-210 Southbound Off-Ramp to SR 134 Eastbound	2000	3900	3552	2000	87.50	3.35	9.15	0.00	1750	67	183	0	50	50	45	45
I-210 Northbound On-Ramp from I-210 Westbound	2000	3566	4034	2000	88.00	3.35	8.65	0.00	1760	67	173	0	50	50	45	45
I-210 Southbound Off-Ramp to St. John Ave	1000	1096	662	1000	97.70	0.80	1.30	0.20	977	8	13	2	45	45	40	40
I-210 Northbound On-Ramp from Pasadena/Corson	1000	791	848	848	98.46	0.47	0.83	0.24	835	4	7	2	65	65	60	60
I-210 Westbound Off-Ramp to Maple St	1000	174	19	174	93.10	2.30	4.60	0.00	162	4	8	0	45	45	40	40
SR 134 Eastbound On-Ramp from Orange Grove Blvd	1000	449	305	449	98.88	0.45	0.67	0.00	444	2	3	0	65	65	60	60
SR 134 Westbound Off-Ramp to Orange Grove Blvd	1000	416	254	416	99.04	0.48	0.48	0.00	412	2	2	0	45	45	40	40
SR 134 Eastbound Off-Ramp to SR 710 (NB/SB)	2000	839	552	839	95.11	1.79	3.10	0.00	798	15	26	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Northbound	2000	685	318	685	96.93	1.46	1.61	0.00	664	10	11	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Southbound	1000	155	235	235	90.64	2.55	6.81	0.00	213	6	16	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 Southbound	1000	517	487	517	97.87	0.97	1.16	0.00	506	5	6	0	50	50	45	45
SR 134 Westbound On-Ramp from SR 710 Northbound	2000	177	169	177	93.23	1.69	5.08	0.00	165	3	9	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 SB and SR 710 NB	1000	694	494	694	96.69	1.15	2.16	0.00	671	8	15	0	65	65	60	60
SR 134 Eastbound Off-Ramp to Corson Street	1000	800	630	800	98.12	0.88	0.75	0.25	785	7	6	2	45	45	40	40
SR 134 Westbound On-Ramp from Maple Street	1000	702	755	755	98.42	0.66	0.79	0.13	743	5	6	1	65	65	60	60
SR 710 Southbound On-Ramp from I-210 Westbound	2000	457	476	476	97.06	1.05	1.89	0.00	462	5	9	0	50	50	45	45
SR 710 Northbound Off-Ramp to I-210 Eastbound	2000	517	218	517	96.52	0.97	1.93	0.58	499	5	10	3	50	50	45	45
I-10 Eastbound On-Ramp from Paseo Rancho Castilla EB	1000	526	570	570	98.77	0.53	0.70	0.00	563	3	4	0	65	65	60	60
I-10 Westbound On-Ramp from Campus	1000	682	655	682	98.24	0.88	0.88	0.00	670	6	6	0	65	65	60	60
I-10 Westbound Off-Ramp to Campus	2000	567	430	567	98.59	0.53	0.88	0.00	559	3	5	0	45	45	40	40
South																
I-10 Eastbound CD Road/Off-Ramp Between Paseo Rancho Castilla and I-710 SB Ramp	1000	2149	2222	1000	95.50	1.50	3.00	0.00	955	15	30	0	50	50	45	45
I-10 Eastbound CD Road/Off-Ramp Between I-710 SB Ramp and SR 710 NB Ramp	1000	1003	1046	1000	97.70	1.00	1.30	0.00	977	10	13	0	50	50	45	45
I-10 WB C/D to I-10 WB On-ramp	1000	1702	997	1000	95.80	1.20	3.00	0.00	958	12	30	0	50	50	45	45
I-10 Westbound On-Ramp from SR 710	1000	1137	1296	1000	90.70	2.50	6.80	0.00	907	25	68	0	50	50	45	45
I-10 Westbound CD Road/On-Ramp from Ramona and SR 710 (NB/SB)	2000	2839	2293	2000	93.10	1.90	5.00	0.00	1862	38	100	0	50	50	45	45
I-10 Eastbound Off-Ramp to Ramona/Garvey	1000	753	896	896	98.44	0.78	0.78	0.00	882	7	7	0	45	45	40	40
I-10 Westbound Off-Ramp to SR 710 Northbound and I-10 WB HOV	2000	3472	2671	2000	96.45	0.95	2.60	0.00	1929	19	52	0	50	50	45	45
I-10 Eastbound On-Ramp from SR 710 SB/I-710 NB	1000	1913	1870	1000	96.80	0.80	2.40	0.00	968	8	24	0	50	50	45	45
I-710 Northbound Off-Ramp to Casuda Canyon Dr	1000	316	180	316	97.15	0.63	2.22	0.00	307	2	7	0	45	45	40	40
I-710 Southbound On-Ramp from Eastbound I-10	1000	1639	1637	1000	95.10	1.50	3.40	0.00	951	15	34	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 (EB/WB)	2000	2933	3009	2000	94.60	1.40	4.00	0.00	1892	28	80	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Eastbound	1000	1872	1770	1000	96.90	0.80	2.30	0.00	969	8	23	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Westbound	1000	1061	1241	1000	91.10	2.30	6.60	0.00	911	23	66	0	50	50	45	45
I-710 SB On-ramp from Ramona Rd	1000	493	461	493	97.97	0.61	1.42	0.00	483	3	7	0	65	65	60	60
I-710 SB/I-10 WB On-Ramp from Ramona	1000	4010	2919	1000	97.00	0.90	2.10	0.00	970	9	21	0	65	65	60	60
SR 710 Northbound On-Ramp from Eastbound I-10	1000	250	151	250	95.20	2.00	2.80	0.00	238	5	7	0	65	65	60	60
I-710 Southbound On-Ramp from I-10 Westbound	2000	1741	1492	1741	97.59	0.69	1.72	0.00	1699	12	30	0	50	50	45	45
SR 710 Northbound On-Ramp from I-10 HOV Eastbound	1000	3	3	3	0.00	0.00	0.00	100.00	0	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte Busway Westbound	1000	3	3	3	0.00	0.00	0.00	100.00	0	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte WB and I-10 EB	1000	43	104	104	93.28	0.96	2.88	2.88	97	1	3	3	50	50	45	45
SR 710 Northbound On-Ramp from I-10 Westbound	1000	84	19	84	96.43	1.19	2.38	0.00	81	1	2	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Westbound	1000	77	56	77	84.42	6.49	9.09	0.00	65	5	7	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Eastbound	1000	40	101	101	96.04	0.99	2.97	0.00	97	1	3	0	50	50	45	45
I-710 Northbound Off-Ramp to Valley	2000	1056	1109	1109	97.12	0.81	1.80	0.27	1077	9	20	3	45	45	40	40
I-710 Southbound On-Ramp from Valley	2000	913	765	913	96.28	1.20	2.19	0.33	879	11	20	3	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

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Table A.7(a) Freeway Tunnel Alternative – Single Bore – V6 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																				
California Blvd. – Orange Grove Blvd. to St. John Ave.	708	1108	1017	708	98.16	0.85	0.71	0.28	360	3	2	1	335	3	3	1	30	30	25	25
California Blvd. – St. John Ave. to Pasadena Ave.	691	919	837	691	97.83	0.87	0.72	0.58	461	4	4	2	215	2	1	2	30	30	25	25
California Blvd. – Pasadena Ave. to Fair Oaks Ave.	1745	1049	1094	1094	98.17	0.73	0.73	0.37	522	5	4	2	552	3	4	2	30	30	25	25
Colorado Blvd. – Orange Grove Blvd. to St. John Ave.	2093	1236	1031	1236	91.91	1.29	1.62	5.18	715	8	10	30	421	8	10	34	25	25	20	20
Colorado Blvd. – St. John Ave. to Pasadena Ave.	1851	957	900	957	91.54	1.04	1.36	6.06	382	4	4	24	494	6	9	34	25	25	20	20
Colorado Blvd. – Pasadena Ave. to Fair Oaks Ave.	1915	812	755	812	91.62	0.86	0.99	6.53	354	3	4	24	390	4	4	29	25	25	20	20
Del Mar Blvd. – Orange Grove Blvd. to St. John Ave.	545	412	474	474	99.37	0.42	0.21	0.00	278	1	1	0	193	1	0	0	30	30	25	25
Del Mar Blvd. – St. John Ave. to Pasadena Ave.	656	693	677	656	99.09	0.61	0.30	0.00	375	2	1	0	275	2	1	0	30	30	25	25
Del Mar Blvd. – Pasadena Ave. to Fair Oaks Ave.	1920	862	762	862	98.84	0.58	0.58	0.00	391	2	2	0	461	3	3	0	30	30	25	25
Fair Oaks Ave. – Walnut St. to Corson St.	2043	1766	1470	1766	95.25	1.13	1.19	2.43	741	10	12	22	941	10	9	21	30	30	25	25
Fair Oaks Ave. – Corson St. to I-210 EB On-Ramp	1852	1820	1774	1820	95.78	0.93	1.04	2.25	1045	11	13	22	698	6	6	19	30	30	25	25
Fair Oaks Ave. – I-210 EB On-Ramp to Maple St.	1877	1820	1741	1820	95.78	0.93	1.04	2.25	1001	11	13	22	742	6	6	19	30	30	25	25
Fair Oaks Ave. – Maple St. to Villa St	2014	1549	1274	1549	95.42	0.90	1.10	2.58	639	8	11	21	839	6	6	19	30	30	25	25
Green St. – Orange Grove Blvd. to St. John Ave.	1073	197	105	197	90.86	0.00	0.51	8.63	19	0	0	11	160	0	1	6	30	30	25	25
Green St. – St. John Ave. to Pasadena Ave.	1387	77	29	77	84.41	1.30	1.30	12.99	0	0	0	10	65	1	1	0	30	30	25	25
Green St. – Pasadena Ave. to Fair Oaks Ave.	1806	257	32	257	94.93	1.17	1.95	1.95	244	3	5	5	0	0	0	0	30	30	25	25
Lincoln Ave. – Between Orange Grove Blvd. and Mountain St.	785	761	665	761	96.98	0.79	0.92	1.31	439	4	5	5	299	2	2	5	30	30	25	25
Mountain St. – Rosemont Ave. to Lincoln Ave.	1895	419	315	419	96.43	0.95	0.95	1.67	195	2	2	3	209	2	2	4	35	35	30	30
Mountain St. – Lincoln Ave. to I-210	2064	1257	917	1257	97.06	1.03	1.35	0.56	670	7	10	3	550	6	7	4	35	35	30	30
Mountain St. – I-210 to Fair Oaks Ave.	1911	1292	1365	1365	96.99	0.95	1.47	0.59	576	6	9	4	748	7	11	4	35	35	30	30
Orange Grove Blvd. – Green St. to Colorado Blvd.	1750	2348	2153	1750	98.86	0.34	0.40	0.40	982	3	4	2	748	3	3	5	35	35	30	30
Orange Grove Blvd. – Colorado Blvd. to SR 134 Ramps	1933	1669	1391	1669	99.04	0.48	0.48	0.00	783	4	4	0	870	4	4	0	35	35	30	30
Orange Grove Blvd. – SR 134 Ramps to Walnut St.	1832	822	836	836	99.04	0.60	0.36	0.00	569	3	2	0	259	2	1	0	35	35	30	30
Orange Grove Blvd. – Lincoln Ave. to Fair Oaks Ave.	1871	833	679	833	97.48	1.32	1.20	0.00	415	6	5	0	397	5	5	0	35	35	30	30
Pasadena Ave. – South of California Blvd.	725	457	499	499	97.20	1.00	1.80	0.00	485	5	9	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – California Blvd. to SR 710 NB On-Ramp	741	763	930	741	97.58	0.94	1.48	0.00	723	7	11	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 710 NB On-Ramp to Del Mar Ave.	741	763	930	741	97.58	0.94	1.48	0.00	723	7	11	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Del Mar Blvd. to Green St.	730	1046	1064	730	97.53	0.96	1.51	0.00	712	7	11	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Green St. to Colorado Blvd.	719	1169	1162	719	97.36	0.83	1.39	0.42	700	6	10	3	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Colorado Blvd. to Union St.	684	1081	1090	684	98.10	0.73	1.17	0.00	671	5	8	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Union St. to I-210 NB On-Ramp	684	1081	1090	684	98.10	0.73	1.17	0.00	671	5	8	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – I-210 NB On-Ramp to SR 134 EB Off-Ramp	542	270	295	295	98.64	0.68	0.68	0.00	291	2	2	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 134 EB Off-Ramp to Fair Oaks Ave.	692	928	842	692	98.42	0.72	0.72	0.14	681	5	5	1	0	0	0	0	35	35	30	30
Saint John Ave. – South of California Blvd.	2374	628	377	628	96.82	1.27	1.91	0.00	0	0	0	0	608	8	12	0	35	35	30	30
St. John Ave./Maple St. – California Blvd. to Del Mar Blvd.	1650	940	636	940	97.13	1.17	1.70	0.00	0	0	0	0	913	11	16	0	35	35	30	30
St. John Ave./Maple St. – Del Mar Blvd. to Green St.	1692	1231	759	1231	97.81	0.89	1.30	0.00	0	0	0	0	1204	11	16	0	35	35	30	30
St. John Ave./Maple St. – Green St. to Colorado Blvd.	1846	1313	833	1313	97.48	0.84	1.22	0.46	0	0	0	0	1280	11	16	6	35	35	30	30
St. John Ave./Maple St. – Colorado Blvd. to Union St.	872	894	672	872	97.70	0.92	1.38	0.00	0	0	0	0	852	8	12	0	35	35	30	30
St. John Ave./Maple St. – Union St. to I-210 SB Off-Ramp	893	957	681	893	97.65	0.90	1.34	0.11	0	0	0	0	872	8	12	1	35	35	30	30
St. John Ave./Maple St. – I-210 SB Off-Ramp to SR 134 WB On-ramp	812	112	99	112	97.32	0.89	1.79	0.00	0	0	0	0	109	1	2	0	35	35	30	30
St. John Ave./Maple St. – SR 134 WB On-ramp to Fair Oaks Ave.	676	1083	1153	676	97.92	0.89	1.04	0.15	0	0	0	0	662	6	7	1	35	35	30	30
I-210 – 134 to Orange Grove Blvd.	11700	7918	7731	7918	89.93	2.45	7.57	0.05	3180	82	268	2	3941	112	331	2	65	65	60	60
I-210 – Orange Grove Blvd. to Mountain St.	17550	12862	12936	12936	89.78	2.50	7.69	0.03	6177	160	488	2	5437	163	507	2	65	65	60	60
SR 134 – Figueroa St. to San Rafael Ave. – Mainline	15600	14878	14660	14878	92.02	2.88	5.04	0.06	6710	222	387	2	6981	206	363	7	65	65	60	60
SR 134 – San Rafael Ave. to Orange Grove Blvd. – Mainline	15600	15131	14840	15131	92.20	2.81	4.95	0.04	6888	221	388	2	7063	204	361	4	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – Mainline	15600	13317	13382	13382	93.67	2.14	4.18	0.01	6900	139	253	1	5635	147	306	1	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave - Mainline	15600	12371	12388	12388	93.32	2.23	4.45	0.00	6509	134	249	0	5052	142	302	0	65	65	60	60
SR 134 – Figueroa St. to Orange Grove Blvd. – HOV EB	1500	1415	1876	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134 – Figueroa St. to Los Robles Ave. – HOV WB	1500	1887	1772	1500	100.00	0.00	0.00	0.00	0	0	0	0	1500	0	0	0	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – HOV EB	1500	1408	1871	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60

Table A.7(a) Freeway Tunnel Alternative – Single Bore – V6 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
SR 134/I-210 – 210 Freeway to Fair Oaks Ave – HOV EB	1500	1436	1839	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
I-210 – Fair Oaks Ave. to Los Robles Ave. – HOV EB	1500	1525	1990	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 710 – Del Mar Blvd to 134/210 (Dual Bore - Top Tunnel)	7800	4382	4515	4515	87.84	2.50	9.66	0.00	1845	59	244	0	2121	54	192	0	65	65	60	60
South																				
Campus Road – Ramona Rd. to I-10 WB On-ramp	2080	2343	1940	2080	96.92	0.58	0.87	1.63	1020	8	12	30	996	4	6	4	35	35	30	30
Campus Road – I-10 WB On-ramp to I-10 WB Off-Ramp	2001	1982	1650	1982	96.67	0.55	0.96	1.82	694	5	10	32	1222	6	9	4	35	35	30	30
Campus Road – I-10 WB Off-Ramp to Circle Dr.	1894	770	764	770	92.34	0.39	1.04	6.23	315	1	3	34	396	2	5	14	35	35	30	30
Corporate Center Dr. – Davidson Dr. to I-710 NB Off-ramp	1894	858	805	858	97.90	0.70	0.58	0.82	333	2	2	3	507	4	3	4	35	35	30	30
Corporate Center Dr. – I-710 NB Off-ramp to Ramona Blvd.	2007	1694	1458	1694	97.53	1.00	1.12	0.35	889	9	13	2	763	8	6	4	35	35	30	30
Hellman Ave. – 710 to Orange Grove Ave.	2864	284	181	284	97.19	0.35	0.35	2.11	64	0	0	3	212	1	1	3	30	30	25	25
Alhambra / Mission Rd. – Bullard Ave. to Concord Ave.	1927	985	960	985	96.95	1.12	0.91	1.02	334	5	4	5	621	6	5	5	35	35	30	30
Alhambra / Mission Rd. – Concord Ave. to Freemont Ave.	2136	1337	1180	1337	97.76	1.12	1.12	0.00	577	7	7	0	730	8	8	0	35	35	30	30
Paseo Rancho Castilla – Ramona Rd. to I-10 EB On-Ramp	2189	2017	1815	2017	96.83	0.74	0.94	1.49	1172	5	3	0	781	10	16	30	35	35	30	30
Paseo Rancho Castilla – I-10 EB On-Ramp to Eastern Ave.	2165	1728	1506	1728	96.12	0.87	1.27	1.74	762	3	2	0	899	12	20	30	35	35	30	30
Ramona Rd. – Eastern Ave. to Campus Dr.	2417	957	578	957	93.73	0.73	0.42	5.12	226	3	2	40	671	4	2	9	35	35	30	30
Ramona Rd. – Campus Dr. to I-710 SB On-ramp at Ramona	2115	2320	1927	2115	95.93	0.71	0.90	2.46	845	5	6	27	1184	10	13	25	35	35	30	30
Ramona Rd. – I-710 SB On-ramp at Ramona to Corporate Center Dr.	2145	1960	1530	1960	96.94	0.87	0.97	1.22	402	4	2	13	1498	13	17	11	35	35	30	30
Ramona Rd. – Corporate Center Dr. to I-10 EB C/D Road	2522	1389	783	1389	97.33	0.72	0.65	1.30	191	1	1	9	1161	9	8	9	35	35	30	30
Ramona Rd. – I-10 EB C/D Road to Atlantic Blvd.	2251	1314	1187	1314	97.64	0.53	0.46	1.37	532	3	2	9	751	4	4	9	35	35	30	30
Ramona Ave. – Between Winthrop Dr. and Meridian Ave.	1098	552	249	552	97.82	0.91	1.27	0.00	0	0	0	0	540	5	7	0	35	35	30	30
Valley Blvd. – Bullard Ave. to I-710 SB On-Ramp	2651	749	483	749	95.46	0.80	1.07	2.67	234	1	1	10	481	5	7	10	35	35	30	30
Valley Blvd. – I-710 SB On-Ramp to I-710 NB Off-Ramp	2223	1657	1238	1657	95.95	0.97	1.69	1.39	234	1	1	10	1356	15	27	13	35	35	30	30
Valley Blvd. – I-710 to Freemont Ave.	1967	2526	2365	1967	96.80	0.81	1.37	1.02	1038	9	15	10	866	7	12	10	35	35	30	30
I-10 - west of Eastern Ave. to SR-710 – Mainline	15600	11826	11956	11956	97.16	0.74	2.10	0.00	6975	51	157	0	4641	38	94	0	65	65	60	60
I-10 - SR-710 to Freemont Ave. - Mainline	13650	15192	14652	13650	96.52	0.97	2.51	0.00	6982	71	186	0	6194	61	156	0	65	65	60	60
I-10 HOV/El Monte Busway – Between SR 710 Ramps and I-I-10 HOV lanes East of SR 710	3000	2076	1870	2076	96.00	0.00	0.00	4.00	796	0	0	14	1197	0	0	69	65	65	60	60
I-10 HOV/El Monte Busway – Between Cal State LA Metrolink Station and SR 710 Ramps	3000	2084	1877	2084	95.68	0.00	0.00	4.32	797	0	0	17	1197	0	0	73	65	65	60	60
I-710 – Floral Dr. to I-10	11700	12225	11711	11700	92.83	1.64	5.53	0.00	5292	98	360	0	5569	94	287	0	65	65	60	60
I-710 – I-10 to Hellman Ave. (Dual Bore - Top Tunnel)	9750	7587	7126	7587	91.61	1.95	6.39	0.05	3845	68	229	3	3105	80	256	1	65	65	60	60
SR 710 – Hellman Ave. to Valley Blvd. (Dual Bore - Top Tunnel)	7800	5750	5365	5750	90.11	2.17	7.72	0.00	2905	53	201	0	2276	72	243	0	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
C/D Road = Collector/Distributor Road
Cal State LA = California State University, Los Angeles
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

Table A.7(b) Freeway Tunnel Alternative – Single Bore – V6 (Ramps)

Segment - Ramps	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																
I-210 Westbound Off-Ramp to Mountain	1000	767	343	767	95.96	1.69	2.35	0.00	736	13	18	0	45	45	40	40
I-210 Eastbound On-Ramp from Mountain	1000	731	667	731	95.90	1.50	2.60	0.00	701	11	19	0	65	65	60	60
I-210 Southbound Off-Ramp to SR 134 Eastbound	2000	3954	3546	2000	87.55	3.35	9.10	0.00	1751	67	182	0	50	50	45	45
I-210 Northbound On-Ramp from I-210 Westbound	2000	3546	4024	2000	87.95	3.35	8.70	0.00	1759	67	174	0	50	50	45	45
I-210 Southbound Off-Ramp to St. John Ave.	1000	1103	667	1000	97.80	0.80	1.20	0.20	978	8	12	2	45	45	40	40
I-210 Northbound On-Ramp from Pasadena/Corson	1000	790	850	850	98.47	0.47	0.82	0.24	837	4	7	2	65	65	60	60
I-210 Westbound Off-Ramp to Maple St	1000	169	21	169	93.49	1.78	4.73	0.00	158	3	8	0	45	45	40	40
SR 134 Eastbound On-Ramp from Orange Grove Blvd	1000	442	305	442	98.87	0.45	0.68	0.00	437	2	3	0	65	65	60	60
SR 134 Westbound Off-Ramp to Orange Grove Blvd	1000	408	250	408	99.02	0.49	0.49	0.00	404	2	2	0	45	45	40	40
SR 134 Eastbound Off-Ramp to SR 710 (NB/SB)	2000	853	548	853	95.07	1.76	3.17	0.00	811	15	27	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Northbound	2000	690	316	690	96.96	1.45	1.59	0.00	669	10	11	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Southbound	1000	163	233	233	90.55	2.58	6.87	0.00	211	6	16	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 Southbound	1000	507	484	507	97.83	0.99	1.18	0.00	496	5	6	0	50	50	45	45
SR 134 Westbound On-Ramp from SR 710 Northbound	2000	179	168	179	93.29	1.68	5.03	0.00	167	3	9	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 SB and SR 710 NB	1000	687	488	687	96.51	1.16	2.33	0.00	663	8	16	0	65	65	60	60
SR 134 Eastbound Off-Ramp to Corson Street.	1000	792	626	792	98.11	0.88	0.76	0.25	777	7	6	2	45	45	40	40
SR 134 Westbound On-Ramp from Maple Street	1000	706	754	754	98.55	0.66	0.66	0.13	743	5	5	1	65	65	60	60
SR 710 Southbound On-Ramp from I-210 Westbound	2000	463	475	475	97.06	1.05	1.89	0.00	461	5	9	0	50	50	45	45
SR 710 Northbound Off-Ramp to I-210 Eastbound	2000	520	215	520	96.92	0.96	2.12	0.00	504	5	11	0	50	50	45	45
I-10 Eastbound On-Ramp from Paseo Rancho Castilla EB	1000	539	577	577	98.79	0.52	0.69	0.00	570	3	4	0	65	65	60	60
I-10 Westbound On-Ramp from Campus	1000	680	659	680	98.24	0.88	0.88	0.00	668	6	6	0	65	65	60	60
I-10 Westbound Off-Ramp to Campus	2000	540	430	540	98.51	0.56	0.93	0.00	532	3	5	0	45	45	40	40
South																
I-10 Eastbound CD Road/Off-Ramp Between Paseo Rancho Castilla and I-710 SB Ramp	1000	2123	2215	1000	95.50	1.50	3.00	0.00	955	15	30	0	50	50	45	45
I-10 Eastbound CD Road/Off-Ramp Between I-710 SB Ramp and SR 710 NB Ramp	1000	1011	1036	1000	97.70	1.00	1.30	0.00	977	10	13	0	50	50	45	45
I-10 WB C/D to I-10 WB On-ramp	1000	2074	947	1000	94.30	1.50	4.20	0.00	943	15	42	0	50	50	45	45
I-10 Westbound On-Ramp from SR 710	1000	1106	1300	1000	89.80	2.60	7.60	0.00	898	26	76	0	50	50	45	45
I-10 Westbound CD Road/On-Ramp from Ramona and SR 710 (NB/SB)	2000	3180	2248	2000	92.00	2.00	6.00	0.00	1840	40	120	0	50	50	45	45
I-10 Eastbound Off-Ramp to Ramona/Garvey	1000	763	891	891	98.42	0.79	0.79	0.00	877	7	7	0	45	45	40	40
I-10 Westbound Off-Ramp to SR 710 Northbound and I-10 WB HOV	2000	3848	2652	2000	95.95	1.05	3.00	0.00	1919	21	60	0	50	50	45	45
I-10 Eastbound On-Ramp from SR 710 SB/I-710 NB	1000	1933	1883	1000	96.70	0.80	2.50	0.00	967	8	25	0	50	50	45	45
I-710 Northbound Off-Ramp to Casuda Canyon Dr.	1000	324	176	324	96.29	0.93	2.78	0.00	312	3	9	0	45	45	40	40
I-710 Southbound On-Ramp from Eastbound I-10	1000	1634	1639	1000	95.20	1.40	3.40	0.00	952	14	34	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 (EB/WB)	2000	2934	3026	2000	94.20	1.40	4.40	0.00	1884	28	88	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Eastbound	1000	1892	1781	1000	96.90	0.80	2.30	0.00	969	8	23	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Westbound	1000	1042	1244	1000	90.20	2.30	7.50	0.00	902	23	75	0	50	50	45	45
I-710 SB On-ramp from Ramona Rd.	1000	522	461	522	98.09	0.57	1.34	0.00	512	3	7	0	65	65	60	60
I-710 SB/I-10 WB On-Ramp from Ramona	1000	4316	2881	1000	96.50	1.00	2.50	0.00	965	10	25	0	65	65	60	60
SR 710 Northbound On-Ramp from Eastbound I-10	1000	248	146	248	95.16	2.02	2.82	0.00	236	5	7	0	65	65	60	60
I-710 Southbound On-Ramp from I-10 Westbound	2000	1701	1503	1701	97.76	0.65	1.59	0.00	1663	11	27	0	50	50	45	45
SR 710 Northbound On-Ramp from I-10 HOV Eastbound	1000	3	3	3	0.00	0.00	0.00	100.00	0	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte Busway Westbound	1000	3	3	3	0.00	0.00	0.00	100.00	0	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte WB and I-10 EB	1000	45	104	104	93.28	0.96	2.88	2.88	97	1	3	3	50	50	45	45
SR 710 Northbound On-Ramp from I-10 Westbound	1000	84	19	84	96.43	1.19	2.38	0.00	81	1	2	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Westbound	1000	63	56	63	82.54	6.35	11.11	0.00	52	4	7	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Eastbound	1000	42	101	101	96.04	0.99	2.97	0.00	97	1	3	0	50	50	45	45
I-710 Northbound Off-Ramp to Valley	2000	1022	1110	1110	97.84	0.63	1.26	0.27	1086	7	14	3	45	45	40	40
I-710 Southbound On-Ramp from Valley	2000	908	755	908	96.37	1.10	2.20	0.33	875	10	20	3	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

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Table A.8(a) Freeway Tunnel Alternative – Single Bore – V7 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																				
California Blvd. – Orange Grove Blvd. to St. John Ave.	742	1098	1019	742	97.85	0.94	0.94	0.27	363	3	3	1	363	4	4	1	30	30	25	25
California Blvd. – St. John Ave. to Pasadena Ave.	660	927	978	660	98.33	0.76	0.61	0.30	434	3	2	1	215	2	2	1	30	30	25	25
California Blvd. – Pasadena Ave. to Fair Oaks Ave.	1610	1001	1194	1194	98.57	0.59	0.50	0.34	616	4	3	2	561	3	3	2	30	30	25	25
Colorado Blvd. – Orange Grove Blvd. to St. John Ave.	1930	1073	962	1073	90.78	1.58	1.68	5.96	631	9	10	30	343	8	8	34	25	25	20	20
Colorado Blvd. – St. John Ave. to Pasadena Ave.	1759	1044	1015	1044	92.14	1.15	1.15	5.56	373	4	4	24	589	8	8	34	25	25	20	20
Colorado Blvd. – Pasadena Ave. to Fair Oaks Ave.	1861	982	885	982	92.87	0.92	0.81	5.40	356	4	4	24	556	5	4	29	25	25	20	20
Del Mar Blvd. – Orange Grove Blvd. to St. John Ave.	581	548	588	581	98.79	0.69	0.52	0.00	274	2	2	0	300	2	1	0	30	30	25	25
Del Mar Blvd. – St. John Ave. to Pasadena Ave.	723	707	560	707	98.72	0.71	0.57	0.00	318	3	2	0	380	2	2	0	30	30	25	25
Del Mar Blvd. – Pasadena Ave. to Fair Oaks Ave.	1932	955	844	955	98.95	0.63	0.42	0.00	417	3	2	0	528	3	2	0	30	30	25	25
Fair Oaks Ave. – Walnut St. to Corson St.	2019	1689	1434	1689	94.37	1.42	1.66	2.55	721	12	14	22	873	12	14	21	30	30	25	25
Fair Oaks Ave. – Corson St. to I-210 EB On-Ramp	1889	1802	1726	1802	95.28	1.11	1.33	2.28	1089	12	14	22	628	8	10	19	30	30	25	25
Fair Oaks Ave. – I-210 EB On-Ramp to Maple St.	1859	1745	1706	1745	95.12	1.15	1.38	2.35	993	12	14	22	667	8	10	19	30	30	25	25
Fair Oaks Ave. – Maple St. to Villa St	1984	1608	1344	1608	94.96	1.06	1.49	2.49	630	9	14	21	897	8	10	19	30	30	25	25
Green St. – Orange Grove Blvd. to St. John Ave.	954	230	208	230	92.18	0.43	0.00	7.39	52	0	0	11	160	1	0	6	30	30	25	25
Green St. – St. John Ave. to Pasadena Ave.	1246	224	189	224	95.54	0.00	0.00	4.46	0	0	0	10	214	0	0	0	30	30	25	25
Green St. – Pasadena Ave. to Fair Oaks Ave.	1701	259	67	259	98.07	0.00	0.00	1.93	254	0	0	5	0	0	0	0	30	30	25	25
Lincoln Ave. – Between Orange Grove Blvd. and Mountain St.	819	774	598	774	97.16	0.90	0.65	1.29	453	4	3	5	299	3	2	5	30	30	25	25
Mountain St. – Rosemont Ave. to Lincoln Ave.	1858	426	319	426	96.48	0.94	0.94	1.64	195	2	2	3	216	2	2	4	35	35	30	30
Mountain St. – Lincoln Ave. to I-210	2033	1286	950	1286	97.74	0.86	0.86	0.54	704	6	6	3	553	5	5	4	35	35	30	30
Mountain St. – I-210 to Fair Oaks Ave.	1869	1110	1221	1221	97.21	0.90	1.23	0.66	569	5	6	4	618	6	9	4	35	35	30	30
Orange Grove Blvd. – Green St. to Colorado Blvd.	1766	2387	2209	1766	98.69	0.40	0.51	0.40	951	3	4	2	792	4	5	5	35	35	30	30
Orange Grove Blvd. – Colorado Blvd. to SR 134 Ramps	1954	1635	1336	1635	98.78	0.61	0.61	0.00	778	5	5	0	837	5	5	0	35	35	30	30
Orange Grove Blvd. – SR 134 Ramps to Walnut St.	1879	827	811	827	98.67	0.73	0.60	0.00	354	3	2	0	462	3	3	0	35	35	30	30
Orange Grove Blvd. – Lincoln Ave. to Fair Oaks Ave.	1844	859	705	859	97.20	1.40	1.40	0.00	445	6	6	0	390	6	6	0	35	35	30	30
Pasadena Ave. – South of California Blvd.	769	480	509	509	96.66	1.18	2.16	0.00	492	6	11	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – California Blvd. to SR 710 NB On-Ramp	716	731	949	716	97.48	0.98	1.54	0.00	698	7	11	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 710 NB On-Ramp to Del Mar Ave.	716	731	949	716	97.48	0.98	1.54	0.00	698	7	11	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Del Mar Blvd. to Green St.	674	894	1101	674	97.77	0.89	1.34	0.00	659	6	9	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Green St. to Colorado Blvd.	713	1111	1102	713	97.48	0.84	1.26	0.42	695	6	9	3	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Colorado Blvd. to Union St.	705	1083	1059	705	98.58	0.57	0.85	0.00	695	4	6	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Union St. to I-210 NB On-Ramp	705	1083	1059	705	98.58	0.57	0.85	0.00	695	4	6	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – I-210 NB On-Ramp to SR 134 EB Off-Ramp	647	312	274	312	99.68	0.32	0.00	0.00	311	1	0	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 134 EB Off-Ramp to Fair Oaks Ave.	724	984	822	724	98.20	0.83	0.83	0.14	711	6	6	1	0	0	0	0	35	35	30	30
Saint John Ave. – South of California Blvd.	2351	636	400	636	95.76	1.57	2.67	0.00	0	0	0	0	609	10	17	0	35	35	30	30
St. John Ave./Maple St. – California Blvd. to Del Mar Blvd.	1408	458	387	458	96.72	1.31	1.97	0.00	0	0	0	0	443	6	9	0	35	35	30	30
St. John Ave./Maple St. – Del Mar Blvd. to Green St.	1669	1166	709	1166	97.26	1.11	1.63	0.00	0	0	0	0	1134	13	19	0	35	35	30	30
St. John Ave./Maple St. – Green St. to Colorado Blvd.	1433	1664	1414	1433	97.97	0.70	0.98	0.35	0	0	0	0	1404	10	14	5	35	35	30	30
St. John Ave./Maple St. – Colorado Blvd. to Union St.	714	1142	1169	714	98.18	0.70	1.12	0.00	0	0	0	0	701	5	8	0	35	35	30	30
St. John Ave./Maple St. – Union St. to I-210 SB Off-Ramp	810	1207	1016	810	98.15	0.74	1.11	0.00	0	0	0	0	795	6	9	0	35	35	30	30
St. John Ave./Maple St. – I-210 SB Off-Ramp to SR 134 WB On-ramp	604	287	329	329	99.40	0.30	0.30	0.00	0	0	0	0	327	1	1	0	35	35	30	30
St. John Ave./Maple St. – SR 134 WB On-ramp to Fair Oaks Ave.	675	1281	1356	675	98.37	0.74	0.74	0.15	0	0	0	0	664	5	5	1	35	35	30	30
I-210 – 134 to Orange Grove Blvd.	11700	7772	7631	7772	95.74	1.26	2.95	0.05	3348	44	102	2	4093	54	127	2	65	65	60	60
I-210 – Orange Grove Blvd. to Mountain St.	17550	12874	12977	12977	93.05	1.83	5.09	0.03	6506	113	308	2	5569	124	353	2	65	65	60	60
SR 134 – Figueroa St. to San Rafael Ave. – Mainline	15600	14911	14665	14911	92.09	2.87	4.98	0.06	6748	222	383	2	6984	206	359	7	65	65	60	60
SR 134 – San Rafael Ave. to Orange Grove Blvd. – Mainline	15600	15206	14780	15206	92.29	2.80	4.87	0.04	6913	222	382	2	7121	204	358	4	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – Mainline	15600	13376	13437	13437	93.60	2.16	4.23	0.01	6893	141	256	1	5684	149	312	1	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave - Mainline	15600	12426	12457	12457	93.24	2.26	4.50	0.00	6498	136	251	0	5118	145	309	0	65	65	60	60
SR 134 – Figueroa St. to Orange Grove Blvd. - HOV EB	1500	1400	1888	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134 – Figueroa St. to Los Robles Ave. – HOV WB	1500	1849	1749	1500	100.00	0.00	0.00	0.00	0	0	0	0	1500	0	0	0	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – HOV EB	1500	1392	1881	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60

Table A.8(a) Freeway Tunnel Alternative – Single Bore – V7 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
SR 134/I-210 – 210 Freeway to Fair Oaks Ave – HOV EB	1500	1421	1840	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
I-210 – Fair Oaks Ave. to Los Robles Ave. – HOV EB	1500	1557	1976	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 710 – Del Mar Blvd to 134/210 (Dual Bore - Top Tunnel)	7800	4112	4250	4250	100.00	0.00	0.00	0.00	2239	0	0	0	2011	0	0	0	65	65	60	60
South																				
Campus Road – Ramona Rd. to I-10 WB On-ramp	2114	2385	1910	2114	96.78	0.61	0.95	1.66	1016	8	13	31	1030	5	7	4	35	35	30	30
Campus Road – I-10 WB On-ramp to I-10 WB Off-Ramp	2048	2039	1625	2039	96.66	0.59	0.98	1.77	685	5	10	32	1286	7	10	4	35	35	30	30
Campus Road – I-10 WB Off-Ramp to Circle Dr.	1864	766	763	766	92.30	0.39	1.04	6.27	310	1	3	34	397	2	5	14	35	35	30	30
Corporate Center Dr. – Davidson Dr. to I-710 NB Off-ramp	1910	879	831	879	97.84	0.68	0.68	0.80	331	2	2	3	529	4	4	4	35	35	30	30
Corporate Center Dr. – I-710 NB Off-ramp to Ramona Blvd.	1990	1714	1482	1714	97.55	0.93	1.17	0.35	887	8	13	2	785	8	7	4	35	35	30	30
Hellman Ave. – 710 to Orange Grove Ave.	2828	281	182	281	97.14	0.36	0.36	2.14	67	0	0	3	206	1	1	3	30	30	25	25
Alhambra / Mission Rd. – Bullard Ave. to Concord Ave.	1951	999	966	999	97.00	1.10	0.90	1.00	344	5	4	5	625	6	5	5	35	35	30	30
Alhambra / Mission Rd. – Concord Ave. to Freemont Ave.	2144	1331	1172	1331	97.67	1.20	1.13	0.00	577	8	7	0	723	8	8	0	35	35	30	30
Paseo Rancho Castilla – Ramona Rd. to I-10 EB On-Ramp	2125	1955	1854	1955	96.83	0.72	0.92	1.53	1170	5	4	0	723	9	14	30	35	35	30	30
Paseo Rancho Castilla – I-10 EB On-Ramp to Eastern Ave.	2099	1674	1535	1674	96.18	0.84	1.19	1.79	766	3	2	0	844	11	18	30	35	35	30	30
Ramona Rd. – Eastern Ave. to Campus Dr.	2241	947	623	947	93.88	0.63	0.32	5.17	191	2	1	40	698	4	2	9	35	35	30	30
Ramona Rd. – Campus Dr. to I-710 SB On-ramp at Ramona	2085	2304	1925	2085	95.83	0.67	1.01	2.49	842	5	7	27	1156	9	14	25	35	35	30	30
Ramona Rd. – I-710 SB On-ramp at Ramona to Corporate Center Dr.	2124	1944	1525	1944	97.02	0.82	0.93	1.23	412	4	2	13	1474	12	16	11	35	35	30	30
Ramona Rd. – Corporate Center Dr. to I-10 EB C/D Road	2503	1376	765	1376	97.31	0.65	0.73	1.31	189	1	1	9	1150	8	9	9	35	35	30	30
Ramona Rd. – I-10 EB C/D Road to Atlantic Blvd.	2218	1268	1155	1268	97.64	0.55	0.39	1.42	506	3	2	9	732	4	3	9	35	35	30	30
Ramona Ave. – Between Winthrop Dr. and Meridian Ave.	1171	565	217	565	95.22	1.59	3.19	0.00	0	0	0	0	538	9	18	0	35	35	30	30
Valley Blvd. – Bullard Ave. to I-710 SB On-Ramp	2638	769	485	769	95.58	0.78	1.04	2.60	234	1	1	10	501	5	7	10	35	35	30	30
Valley Blvd. – I-710 SB On-Ramp to I-710 NB Off-Ramp	2249	1640	1209	1640	95.79	1.04	1.77	1.40	234	1	1	10	1337	16	28	13	35	35	30	30
Valley Blvd. – I-710 to Freemont Ave.	1985	2512	2308	1985	96.67	0.81	1.51	1.01	1060	9	17	10	859	7	13	10	35	35	30	30
I-10 - west of Eastern Ave. to SR-710 – Mainline	15600	12128	11962	12128	96.11	1.14	2.75	0.00	5644	84	204	0	6012	54	130	0	65	65	60	60
I-10 - SR-710 to Freemont Ave. - Mainline	13650	15233	14593	13650	96.46	0.98	2.56	0.00	6967	72	194	0	6199	62	156	0	65	65	60	60
I-10 HOV/El Monte Busway – Between SR 710 Ramps and I-10 HOV lanes East of SR 710	3000	1975	1802	1975	95.80	0.00	0.00	4.20	773	0	0	14	1119	0	0	69	65	65	60	60
I-10 HOV/El Monte Busway – Between Cal State LA Metrolink Station and SR 710 Ramps	3000	1983	1809	1983	95.46	0.00	0.00	4.54	773	0	0	17	1120	0	0	73	65	65	60	60
I-710 – Floral Dr. to I-10	11700	12458	11918	11700	97.07	0.77	2.16	0.00	5516	50	158	0	5841	40	95	0	65	65	60	60
I-710 – I-10 to Hellman Ave. (Dual Bore - Top Tunnel)	9750	7796	7377	7796	98.91	0.37	0.67	0.05	4150	18	31	3	3561	11	21	1	65	65	60	60
SR 710 – Hellman Ave. to Valley Blvd. (Dual Bore - Top Tunnel)	7800	5952	5645	5952	100.00	0.00	0.00	0.00	3179	0	0	0	2773	0	0	0	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
C/D Road = Collector/Distributor Road
Cal State LA = California State University, Los Angeles
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

Table A.8(b) Freeway Tunnel Alternative – Single Bore – V7 (Ramps)

Segment - Ramps	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																
I-210 Westbound Off-Ramp to Mountain	1000	762	352	762	97.25	1.18	1.57	0.00	741	9	12	0	45	45	40	40
I-210 Eastbound On-Ramp from Mountain	1000	623	580	623	97.11	1.28	1.61	0.00	605	8	10	0	65	65	60	60
I-210 Southbound Off-Ramp to SR 134 Eastbound	2000	3967	3601	2000	87.05	3.45	9.50	0.00	1741	69	190	0	50	50	45	45
I-210 Northbound On-Ramp from I-210 Westbound	2000	3578	4043	2000	87.40	3.45	9.15	0.00	1748	69	183	0	50	50	45	45
I-210 Southbound Off-Ramp to St. John Ave.	1000	1217	748	1000	97.70	0.80	1.30	0.20	977	8	13	2	45	45	40	40
I-210 Northbound On-Ramp from Pasadena/Corson	1000	788	836	836	98.32	0.48	0.96	0.24	822	4	8	2	65	65	60	60
I-210 Westbound Off-Ramp to Maple St	1000	185	20	185	92.98	2.16	4.86	0.00	172	4	9	0	45	45	40	40
SR 134 Eastbound On-Ramp from Orange Grove Blvd	1000	429	289	429	98.83	0.47	0.70	0.00	424	2	3	0	65	65	60	60
SR 134 Westbound Off-Ramp to Orange Grove Blvd	1000	379	235	379	98.94	0.53	0.53	0.00	375	2	2	0	45	45	40	40
SR 134 Eastbound Off-Ramp to SR 710 (NB/SB)	2000	828	427	828	97.10	1.33	1.57	0.00	804	11	13	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Northbound	2000	703	307	703	96.59	1.56	1.85	0.00	679	11	13	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Southbound	1000	126	120	126	100.00	0.00	0.00	0.00	126	0	0	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 Southbound	1000	513	506	513	96.89	1.36	1.75	0.00	497	7	9	0	50	50	45	45
SR 134 Westbound On-Ramp from SR 710 Northbound	2000	201	67	201	100.00	0.00	0.00	0.00	201	0	0	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 SB and SR 710 NB	1000	714	507	714	97.76	0.98	1.26	0.00	698	7	9	0	65	65	60	60
SR 134 Eastbound Off-Ramp to Corson Street.	1000	782	626	782	97.70	1.02	1.02	0.26	764	8	8	2	45	45	40	40
SR 134 Westbound On-Ramp from Maple Street	1000	695	726	726	98.62	0.55	0.69	0.14	716	4	5	1	65	65	60	60
SR 710 Southbound On-Ramp from I-210 Westbound	2000	316	234	316	100.00	0.00	0.00	0.00	316	0	0	0	50	50	45	45
SR 710 Northbound Off-Ramp to I-210 Eastbound	2000	539	217	539	100.00	0.00	0.00	0.00	539	0	0	0	50	50	45	45
I-10 Eastbound On-Ramp from Paseo Rancho Castilla EB	1000	536	583	583	98.80	0.51	0.69	0.00	576	3	4	0	65	65	60	60
I-10 Westbound On-Ramp from Campus	1000	665	650	665	98.20	0.90	0.90	0.00	653	6	6	0	65	65	60	60
I-10 Westbound Off-Ramp to Campus	2000	565	441	565	98.59	0.53	0.88	0.00	557	3	5	0	45	45	40	40
South																
I-10 Eastbound CD Road/Off-Ramp Between Paseo Rancho Castilla and I-710 SB Ramp	1000	2213	2191	1000	95.50	1.40	3.10	0.00	955	14	31	0	50	50	45	45
I-10 Eastbound CD Road/Off-Ramp Between I-710 SB Ramp and SR 710 NB Ramp	1000	999	1003	1000	98.70	0.60	0.70	0.00	987	6	7	0	50	50	45	45
I-10 WB C/D to I-10 WB On-ramp	1000	1764	947	1000	96.30	1.10	2.60	0.00	963	11	26	0	50	50	45	45
I-10 Westbound On-Ramp from SR 710	1000	1154	1306	1000	86.40	2.80	10.80	0.00	864	28	108	0	50	50	45	45
I-10 Westbound CD Road/On-Ramp from Ramona and SR 710 (NB/SB)	2000	2917	2252	2000	90.95	1.95	7.10	0.00	1819	39	142	0	50	50	45	45
I-10 Eastbound Off-Ramp to Ramona/Garvey	1000	747	886	886	98.31	0.79	0.90	0.00	871	7	8	0	45	45	40	40
I-10 Westbound Off-Ramp to SR 710 Northbound and I-10 WB HOV	2000	3511	2564	2000	96.70	0.95	2.35	0.00	1934	19	47	0	50	50	45	45
I-10 Eastbound On-Ramp from SR 710 SB/I-710 NB	1000	1944	1870	1000	96.20	1.00	2.80	0.00	962	10	28	0	50	50	45	45
I-710 Northbound Off-Ramp to Casuda Canyon Dr.	1000	321	176	321	96.27	0.93	2.80	0.00	309	3	9	0	45	45	40	40
I-710 Southbound On-Ramp from Eastbound I-10	1000	1727	1650	1000	94.50	1.60	3.90	0.00	945	16	39	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 (EB/WB)	2000	3011	3045	2000	91.95	1.75	6.30	0.00	1839	35	126	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Eastbound	1000	1902	1789	1000	96.10	1.00	2.90	0.00	961	10	29	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Westbound	1000	1108	1256	1000	86.00	2.80	11.20	0.00	860	28	112	0	50	50	45	45
I-710 SB On-ramp from Ramona Rd.	1000	512	461	512	98.04	0.59	1.37	0.00	502	3	7	0	65	65	60	60
I-710 SB/I-10 WB On-Ramp from Ramona	1000	3956	2781	1000	96.60	1.00	2.40	0.00	966	10	24	0	65	65	60	60
SR 710 Northbound On-Ramp from Eastbound I-10	1000	252	117	252	100.00	0.00	0.00	0.00	252	0	0	0	65	65	60	60
I-710 Southbound On-Ramp from I-10 Westbound	2000	1627	1394	1627	96.50	0.98	2.52	0.00	1570	16	41	0	50	50	45	45
SR 710 Northbound On-Ramp from I-10 HOV Eastbound	1000	3	3	3	0.00	0.00	0.00	100.00	0	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte Busway Westbound	1000	3	3	3	0.00	0.00	0.00	100.00	0	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte WB and I-10 EB	1000	45	85	85	96.47	0.00	0.00	3.53	82	0	0	3	50	50	45	45
SR 710 Northbound On-Ramp from I-10 Westbound	1000	119	1	119	100.00	0.00	0.00	0.00	119	0	0	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Westbound	1000	45	50	50	100.00	0.00	0.00	0.00	50	0	0	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Eastbound	1000	42	81	81	100.00	0.00	0.00	0.00	81	0	0	0	50	50	45	45
I-710 Northbound Off-Ramp to Valley	2000	1075	1087	1087	97.23	0.83	1.66	0.28	1057	9	18	3	45	45	40	40
I-710 Southbound On-Ramp from Valley	2000	871	724	871	95.99	1.26	2.41	0.34	836	11	21	3	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

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Table A.9(a) Freeway Tunnel Alternative – Dual Bore – V2 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																				
California Blvd. – Orange Grove Blvd. to St. John Ave.	758	1109	976	758	98.42	0.79	0.53	0.26	376	3	2	1	370	3	2	1	30	30	25	25
California Blvd. – St. John Ave. to Pasadena Ave.	655	889	1053	655	98.62	0.61	0.46	0.31	407	2	2	1	239	2	1	1	30	30	25	25
California Blvd. – Pasadena Ave. to Fair Oaks Ave.	1668	980	1206	1206	98.17	0.75	0.75	0.33	608	3	2	2	576	6	7	2	30	30	25	25
Colorado Blvd. – Orange Grove Blvd. to St. John Ave.	1869	989	931	989	90.09	1.52	1.92	6.47	622	9	10	30	269	6	9	34	25	25	20	20
Colorado Blvd. – St. John Ave. to Pasadena Ave.	1802	1088	1093	1093	93.51	0.64	0.82	5.03	299	2	2	23	723	5	7	32	25	25	20	20
Colorado Blvd. – Pasadena Ave. to Fair Oaks Ave.	1914	1090	995	1090	93.48	0.83	0.83	4.86	348	3	3	24	671	6	6	29	25	25	20	20
Del Mar Blvd. – Orange Grove Blvd. to St. John Ave.	616	567	527	567	99.11	0.71	0.18	0.00	182	1	0	0	380	3	1	0	30	30	25	25
Del Mar Blvd. – St. John Ave. to Pasadena Ave.	748	658	409	658	98.78	0.76	0.46	0.00	279	2	2	0	371	3	1	0	30	30	25	25
Del Mar Blvd. – Pasadena Ave. to Fair Oaks Ave.	2046	1011	800	1011	98.42	0.79	0.79	0.00	386	3	2	0	609	5	6	0	30	30	25	25
Fair Oaks Ave. – Walnut St. to Corson St.	1927	1558	1420	1558	94.92	1.16	1.16	2.76	705	9	9	22	774	9	9	21	30	30	25	25
Fair Oaks Ave. – Corson St. to I-210 EB On-Ramp	1837	1692	1738	1738	96.44	0.69	0.63	2.24	1241	8	8	21	435	4	3	18	30	30	25	25
Fair Oaks Ave. – I-210 EB On-Ramp to Maple St.	1837	1692	1708	1708	96.38	0.70	0.64	2.28	1157	8	8	21	489	4	3	18	30	30	25	25
Fair Oaks Ave. – Maple St. to Villa St	2012	1684	1479	1684	95.60	0.89	1.13	2.38	673	8	12	21	937	7	7	19	30	30	25	25
Green St. – Orange Grove Blvd. to St. John Ave.	1045	330	386	386	95.33	0.26	0.52	3.89	256	1	1	10	112	0	1	5	30	30	25	25
Green St. – St. John Ave. to Pasadena Ave.	1581	495	328	495	95.76	0.81	1.41	2.02	0	0	0	10	474	4	7	0	30	30	25	25
Green St. – Pasadena Ave. to Fair Oaks Ave.	1532	406	245	406	96.30	0.99	1.48	1.23	391	4	6	5	0	0	0	0	30	30	25	25
Lincoln Ave. – Between Orange Grove Blvd. and Mountain St.	813	726	556	726	97.38	0.69	0.55	1.38	407	3	2	5	300	2	2	5	30	30	25	25
Mountain St. – Rosemont Ave. to Lincoln Ave.	1929	477	335	477	96.85	0.84	0.84	1.47	199	2	2	3	263	2	2	4	35	35	30	30
Mountain St. – Lincoln Ave. to I-210	2002	1421	1099	1421	97.54	0.91	1.06	0.49	746	7	7	3	640	6	8	4	35	35	30	30
Mountain St. – I-210 to Fair Oaks Ave.	1940	1113	1058	1113	96.31	1.26	1.71	0.72	641	8	10	4	431	6	9	4	35	35	30	30
Orange Grove Blvd. – Green St. to Colorado Blvd.	1825	2378	2071	1825	98.64	0.49	0.49	0.38	979	4	4	2	821	5	5	5	35	35	30	30
Orange Grove Blvd. – Colorado Blvd. to SR 134 Ramps	1872	1484	1209	1484	98.92	0.54	0.54	0.00	703	4	4	0	765	4	4	0	35	35	30	30
Orange Grove Blvd. – SR 134 Ramps to Walnut St.	1958	757	615	757	98.81	0.66	0.53	0.00	301	2	2	0	447	3	2	0	35	35	30	30
Orange Grove Blvd. – Lincoln Ave. to Fair Oaks Ave.	1988	831	552	831	97.36	1.32	1.32	0.00	409	5	5	0	400	6	6	0	35	35	30	30
Pasadena Ave. – South of California Blvd.	708	348	344	348	95.97	1.44	2.59	0.00	334	5	9	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – California Blvd. to SR 710 NB On-Ramp	725	625	717	717	97.77	0.84	1.39	0.00	701	6	10	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 710 NB On-Ramp to Del Mar Ave.	725	625	717	717	97.77	0.84	1.39	0.00	701	6	10	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Del Mar Blvd. to Green St.	697	876	1032	697	97.28	1.00	1.72	0.00	678	7	12	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Green St. to Colorado Blvd.	724	1075	1013	724	97.24	0.83	1.52	0.41	704	6	11	3	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Colorado Blvd. to Union St.	734	1165	1001	734	98.23	0.68	1.09	0.00	721	5	8	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Union St. to I-210 NB On-Ramp	734	1165	1001	734	98.23	0.68	1.09	0.00	721	5	8	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – I-210 NB On-Ramp to SR 134 EB Off-Ramp	617	328	342	342	98.84	0.58	0.58	0.00	338	2	2	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 134 EB Off-Ramp to Fair Oaks Ave.	730	958	857	730	98.50	0.68	0.68	0.14	719	5	5	1	0	0	0	0	35	35	30	30
Saint John Ave. – South of California Blvd.	2269	544	357	544	96.14	1.47	2.39	0.00	0	0	0	0	523	8	13	0	35	35	30	30
St. John Ave./Maple St. – California Blvd. to Del Mar Blvd.	1437	412	299	412	97.33	0.97	1.70	0.00	0	0	0	0	401	4	7	0	35	35	30	30
St. John Ave./Maple St. – Del Mar Blvd. to Green St.	1712	1046	559	1046	97.42	1.05	1.53	0.00	0	0	0	0	1019	11	16	0	35	35	30	30
St. John Ave./Maple St. – Green St. to Colorado Blvd.	1456	1777	1561	1456	97.60	0.82	1.24	0.34	0	0	0	0	1421	12	18	5	35	35	30	30
St. John Ave./Maple St. – Colorado Blvd. to Union St.	736	1181	1199	736	97.56	0.95	1.49	0.00	0	0	0	0	718	7	11	0	35	35	30	30
St. John Ave./Maple St. – Union St. to I-210 SB Off-Ramp	857	1189	974	857	97.55	0.93	1.52	0.00	0	0	0	0	836	8	13	0	35	35	30	30
St. John Ave./Maple St. – I-210 SB Off-Ramp to SR 134 WB On-ramp	858	507	393	507	98.02	0.99	0.99	0.00	0	0	0	0	497	5	5	0	35	35	30	30
St. John Ave./Maple St. – SR 134 WB On-ramp to Fair Oaks Ave.	723	1443	1421	723	98.48	0.69	0.69	0.14	0	0	0	0	712	5	5	1	35	35	30	30
I-210 – 134 to Orange Grove Blvd.	11700	9728	10126	10126	92.88	1.68	5.40	0.04	5203	82	265	2	4202	88	282	2	65	65	60	60
I-210 – Orange Grove Blvd. to Mountain St.	17550	13999	14680	14680	91.26	2.16	6.55	0.03	7456	156	463	2	5941	161	499	2	65	65	60	60
SR 134 – Figueroa St. to San Rafael Ave. – Mainline	15600	15145	15003	15145	92.20	2.79	4.95	0.06	6899	220	389	2	7065	203	360	7	65	65	60	60
SR 134 – San Rafael Ave. to Orange Grove Blvd. – Mainline	15600	15551	15258	15551	92.45	2.71	4.80	0.04	7127	219	388	2	7250	202	359	4	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – Mainline	15600	13063	12962	13063	91.69	2.97	5.31	0.03	5778	199	356	2	6199	189	338	2	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave - Mainline	15600	12031	12020	12031	91.17	3.14	5.69	0.00	5245	194	352	0	5723	184	333	0	65	65	60	60
SR 134 – Figueroa St. to Orange Grove Blvd. – HOV EB	1500	1497	1886	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134 – Figueroa St. to Los Robles Ave. – HOV WB	1500	1832	1784	1500	100.00	0.00	0.00	0.00	0	0	0	0	1500	0	0	0	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – HOV EB	1500	1486	1874	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave – HOV EB	1500	1511	1850	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
I-210 – Fair Oaks Ave. to Los Robles Ave. – HOV EB	1500	1583	1988	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60

Table A.9(a) Freeway Tunnel Alternative – Dual Bore – V2 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
SR 710 – Del Mar Blvd to 134/210 (Dual Bore - Top Tunnel)	7800	3953	4310	4310	93.85	1.37	4.78	0.00	2336	35	128	0	1709	24	78	0	65	65	60	60
SR 710 – Del Mar Blvd to 134/210 (Dual Bore - Bottom Tunnel)	7800	5293	5416	5416	92.34	1.66	6.00	0.00	2646	43	153	0	2355	47	172	0	65	65	60	60
South																				
Campus Road – Ramona Rd. to I-10 WB On-ramp	2093	2375	1894	2093	97.04	0.57	0.72	1.67	1020	8	10	31	1011	4	5	4	35	35	30	30
Campus Road – I-10 WB On-ramp to I-10 WB Off-Ramp	2022	2015	1590	2015	96.92	0.55	0.74	1.79	699	5	8	32	1254	6	7	4	35	35	30	30
Campus Road – I-10 WB Off-Ramp to Circle Dr.	1879	742	736	742	92.05	0.40	1.08	6.47	312	1	3	34	371	2	5	14	35	35	30	30
Corporate Center Dr. – Davidson Dr. to I-710 NB Off-ramp	1901	1002	1051	1051	97.62	0.76	0.95	0.67	638	4	6	3	388	4	4	4	35	35	30	30
Corporate Center Dr. – I-710 NB Off-ramp to Ramona Blvd.	2068	1810	1519	1810	97.74	0.94	0.99	0.33	918	9	11	2	851	8	7	4	35	35	30	30
Hellman Ave. – 710 to Orange Grove Ave.	2706	286	186	286	97.20	0.35	0.35	2.10	62	0	0	3	216	1	1	3	30	30	25	25
Alhambra / Mission Rd. – Bullard Ave. to Concord Ave.	1970	938	845	938	96.69	1.17	1.07	1.07	311	5	5	5	596	6	5	5	35	35	30	30
Alhambra / Mission Rd. – Concord Ave. to Freemont Ave.	2197	1334	1114	1334	97.68	1.20	1.12	0.00	572	8	7	0	731	8	8	0	35	35	30	30
Paseo Rancho Castilla – Ramona Rd. to I-10 EB On-Ramp	2244	1909	1618	1909	96.44	0.84	1.15	1.57	1151	6	5	0	690	10	17	30	35	35	30	30
Paseo Rancho Castilla – I-10 EB On-Ramp to Eastern Ave.	2197	1664	1425	1664	95.80	0.96	1.44	1.80	781	4	3	0	813	12	21	30	35	35	30	30
Ramona Rd. – Eastern Ave. to Campus Dr.	2317	1043	733	1043	94.25	0.67	0.38	4.70	233	3	1	40	750	4	3	9	35	35	30	30
Ramona Rd. – Campus Dr. to I-710 SB On-ramp at Ramona	2074	2329	1983	2074	96.15	0.72	0.72	2.41	816	5	5	26	1178	10	10	24	35	35	30	30
Ramona Rd. – I-710 SB On-ramp at Ramona to Corporate Center Dr.	2080	1964	1617	1964	97.16	0.81	0.81	1.22	445	4	2	13	1463	12	14	11	35	35	30	30
Ramona Rd. – Corporate Center Dr. to I-10 EB C/D Road	2544	1363	746	1363	97.36	0.66	0.66	1.32	188	1	1	9	1139	8	8	9	35	35	30	30
Ramona Rd. – I-10 EB C/D Road to Atlantic Blvd.	2268	1277	1142	1277	97.65	0.55	0.39	1.41	514	3	2	9	733	4	3	9	35	35	30	30
Ramona Ave. – Between Winthrop Dr. and Meridian Ave.	1219	569	213	569	98.77	0.53	0.70	0.00	0	0	0	0	562	3	4	0	35	35	30	30
Valley Blvd. – Bullard Ave. to I-710 SB On-Ramp	2307	624	531	624	95.67	0.48	0.64	3.21	217	1	1	10	380	2	3	10	35	35	30	30
Valley Blvd. – I-710 SB On-Ramp to I-710 NB Off-Ramp	2101	1456	1250	1456	95.67	0.96	1.79	1.58	217	1	1	10	1176	13	25	13	35	35	30	30
Valley Blvd. – I-710 to Freemont Ave.	1998	2275	2098	1998	96.95	0.80	1.15	1.10	994	10	12	11	943	6	11	11	35	35	30	30
I-10 - west of Eastern Ave. to SR-710 – Mainline	15600	12188	11610	12188	96.06	1.17	2.77	0.00	5616	83	198	0	6093	59	139	0	65	65	60	60
I-10 - SR-710 to Freemont Ave. - Mainline	13650	15253	14542	13650	96.42	1.00	2.58	0.00	6947	71	187	0	6215	65	165	0	65	65	60	60
I-10 HOV/El Monte Busway – Between SR 710 Ramps and I-10 HOV lanes East of SR 710	3000	1987	1871	1987	95.82	0.00	0.00	4.18	745	0	0	14	1159	0	0	69	65	65	60	60
I-10 HOV/El Monte Busway – Between Cal State LA Metrolink Station and SR 710 Ramps	3000	1997	1880	1997	95.49	0.00	0.00	4.51	746	0	0	17	1161	0	0	73	65	65	60	60
I-710 – Floral Dr. to I-10	11700	13556	12975	11700	94.49	1.31	4.20	0.00	5261	78	264	0	5795	75	227	0	65	65	60	60
I-710 – I-10 to Hellman Ave. (Dual Bore - Top Tunnel)	9750	8265	8159	8265	96.07	1.17	2.71	0.05	4146	52	117	3	3794	45	107	1	65	65	60	60
I-710 – I-10 to Hellman Ave. (Dual Bore - Bottom Tunnel)	9750	5293	5416	5416	92.34	1.66	6.00	0.00	2646	43	153	0	2355	47	172	0	65	65	60	60
SR 710 – Hellman Ave. to Valley Blvd. (Dual Bore - Top Tunnel)	7800	5956	5789	5956	97.54	0.86	1.60	0.00	2810	22	41	0	3000	29	54	0	65	65	60	60
SR 710 – Hellman Ave. to Valley Blvd. (Dual Bore - Bottom Tunnel)	7800	5293	5416	5416	92.34	1.66	6.00	0.00	2646	43	153	0	2355	47	172	0	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
C/D Road = Collector/Distributor Road
Cal State LA = California State University, Los Angeles
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

Table A.9(b) Freeway Tunnel Alternative – Dual Bore – V2 (Ramps)

Segment - Ramps	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																
I-210 Westbound Off-Ramp to Mountain	1000	964	640	964	95.65	1.76	2.59	0.00	922	17	25	0	45	45	40	40
I-210 Eastbound On-Ramp from Mountain	1000	760	675	760	96.05	1.58	2.37	0.00	730	12	18	0	65	65	60	60
I-210 Southbound Off-Ramp to SR 134 Eastbound	2000	3418	3298	2000	87.05	3.50	9.45	0.00	1741	70	189	0	50	50	45	45
I-210 Northbound On-Ramp from I-210 Westbound	2000	3321	3688	2000	88.10	3.40	8.50	0.00	1762	68	170	0	50	50	45	45
I-210 Southbound Off-Ramp to St. John Ave.	1000	854	553	854	97.90	0.70	1.17	0.23	836	6	10	2	45	45	40	40
I-210 Northbound On-Ramp from Pasadena/Corson	1000	717	752	752	98.53	0.40	0.80	0.27	741	3	6	2	65	65	60	60
I-210 Westbound Off-Ramp to Maple St	1000	229	145	229	94.76	1.75	3.49	0.00	217	4	8	0	45	45	40	40
SR 134 Eastbound On-Ramp from Orange Grove Blvd	1000	418	324	418	99.04	0.48	0.48	0.00	414	2	2	0	65	65	60	60
SR 134 Westbound Off-Ramp to Orange Grove Blvd	1000	298	267	298	98.66	0.67	0.67	0.00	294	2	2	0	45	45	40	40
SR 134 Eastbound Off-Ramp to SR 710 (NB/SB)	2000	1283	1024	1283	96.03	1.48	2.49	0.00	1232	19	32	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Northbound	2000	587	246	587	97.45	1.19	1.36	0.00	572	7	8	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Southbound	1000	696	779	779	95.89	1.16	2.95	0.00	747	9	23	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 Southbound	1000	429	450	450	97.78	1.11	1.11	0.00	440	5	5	0	50	50	45	45
SR 134 Westbound On-Ramp from SR 710 Northbound	2000	619	935	935	94.76	1.50	3.74	0.00	886	14	35	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 SB and SR 710 NB	1000	1047	743	1000	96.90	1.10	2.00	0.00	969	11	20	0	65	65	60	60
SR 134 Eastbound Off-Ramp to Corson Street.	1000	808	619	808	98.63	0.62	0.50	0.25	797	5	4	2	45	45	40	40
SR 134 Westbound On-Ramp from Maple Street	1000	693	741	741	99.07	0.40	0.40	0.13	734	3	3	1	65	65	60	60
SR 710 Southbound On-Ramp from I-210 Westbound	2000	968	553	968	96.49	1.34	2.17	0.00	934	13	21	0	50	50	45	45
SR 710 Northbound Off-Ramp to I-210 Eastbound	2000	993	792	993	95.97	1.61	2.42	0.00	953	16	24	0	50	50	45	45
I-10 Eastbound On-Ramp from Paseo Rancho Castilla EB	1000	505	471	505	98.02	0.79	1.19	0.00	495	4	6	0	65	65	60	60
I-10 Westbound On-Ramp from Campus	1000	649	688	688	98.84	0.58	0.58	0.00	680	4	4	0	65	65	60	60
I-10 Westbound Off-Ramp to Campus	2000	614	437	614	98.54	0.65	0.81	0.00	605	4	5	0	45	45	40	40
South																
I-10 Eastbound CD Road/Off-Ramp Between Paseo Rancho Castilla and I-710 SB Ramp	1000	1983	2235	1000	95.90	1.80	2.30	0.00	959	18	23	0	50	50	45	45
I-10 Eastbound CD Road/Off-Ramp Between I-710 SB Ramp and SR 710 NB Ramp	1000	1846	2135	1000	96.60	1.60	1.80	0.00	966	16	18	0	50	50	45	45
I-10 WB C/D to I-10 WB On-ramp	1000	1850	1160	1000	96.20	1.10	2.70	0.00	962	11	27	0	50	50	45	45
I-10 Westbound On-Ramp from SR 710	1000	1126	1009	1000	93.20	2.70	4.10	0.00	932	27	41	0	50	50	45	45
I-10 Westbound CD Road/On-Ramp from Ramona and SR 710 (NB/SB)	2000	2977	2171	2000	95.00	1.75	3.25	0.00	1900	35	65	0	50	50	45	45
I-10 Eastbound Off-Ramp to Ramona/Garvey	1000	719	851	851	98.58	0.71	0.71	0.00	839	6	6	0	45	45	40	40
I-10 Westbound Off-Ramp to SR 710 Northbound and I-10 WB HOV	2000	3324	3208	2000	96.70	0.95	2.35	0.00	1934	19	47	0	50	50	45	45
I-10 Eastbound On-Ramp from SR 710 SB/I-710 NB	1000	2318	2069	1000	97.10	0.80	2.10	0.00	971	8	21	0	50	50	45	45
I-710 Northbound Off-Ramp to Casuda Canyon Dr.	1000	316	4	316	96.52	0.95	2.53	0.00	305	3	8	0	45	45	40	40
I-710 Southbound On-Ramp from Eastbound I-10	1000	537	500	537	95.16	1.49	3.35	0.00	511	8	18	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 (EB/WB)	2000	2123	2240	2000	96.55	0.95	2.50	0.00	1931	19	50	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Eastbound	1000	1677	1646	1000	97.20	0.70	2.10	0.00	972	7	21	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Westbound	1000	446	594	594	94.62	1.68	3.70	0.00	562	10	22	0	50	50	45	45
I-710 SB On-ramp from Ramona Rd.	1000	399	402	402	99.25	0.25	0.50	0.00	399	1	2	0	65	65	60	60
I-710 SB/I-10 WB On-Ramp from Ramona	1000	3312	2291	1000	97.20	0.80	2.00	0.00	972	8	20	0	65	65	60	60
SR 710 Northbound On-Ramp from Eastbound I-10	1000	1125	1285	1000	95.40	2.20	2.40	0.00	954	22	24	0	65	65	60	60
I-710 Southbound On-Ramp from I-10 Westbound	2000	848	693	848	98.71	0.35	0.94	0.00	837	3	8	0	50	50	45	45
SR 710 Northbound On-Ramp from I-10 HOV Eastbound	1000	5	11	11	72.73	0.00	0.00	27.27	8	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte Busway Westbound	1000	9	4	9	66.67	0.00	0.00	33.33	6	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte WB and I-10 EB	1000	649	426	649	96.30	1.08	2.16	0.46	625	7	14	3	50	50	45	45
SR 710 Northbound On-Ramp from I-10 Westbound	1000	540	1164	1000	96.40	1.10	2.50	0.00	964	11	25	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Westbound	1000	680	416	680	92.50	3.53	3.97	0.00	629	24	27	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Eastbound	1000	640	422	640	96.72	1.09	2.19	0.00	619	7	14	0	50	50	45	45
I-710 Northbound Off-Ramp to Valley	2000	749	704	749	96.52	1.34	1.74	0.40	723	10	13	3	45	45	40	40
I-710 Southbound On-Ramp from Valley	2000	843	705	843	96.79	0.83	2.02	0.36	816	7	17	3	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

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Table A.10(a) Freeway Tunnel Alternative – Dual Bore – V4 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																				
California Blvd. – Orange Grove Blvd. to St. John Ave.	747	1086	987	747	98.92	0.54	0.27	0.27	368	2	1	1	371	2	1	1	30	30	25	25
California Blvd. – St. John Ave. to Pasadena Ave.	657	871	1015	657	98.94	0.46	0.30	0.30	411	2	1	1	239	1	1	1	30	30	25	25
California Blvd. – Pasadena Ave. to Fair Oaks Ave.	1675	958	1147	1147	98.43	0.61	0.61	0.35	595	2	1	2	534	5	6	2	30	30	25	25
Colorado Blvd. – Orange Grove Blvd. to St. John Ave.	1926	1028	921	1028	91.15	1.26	1.36	6.23	624	9	10	30	313	4	4	34	25	25	20	20
Colorado Blvd. – St. John Ave. to Pasadena Ave.	1835	1098	1051	1098	92.36	1.18	1.18	5.28	388	4	3	24	626	9	10	34	25	25	20	20
Colorado Blvd. – Pasadena Ave. to Fair Oaks Ave.	1941	1115	991	1115	93.00	1.08	1.17	4.75	345	3	3	24	692	9	10	29	25	25	20	20
Del Mar Blvd. – Orange Grove Blvd. to St. John Ave.	648	588	519	588	98.13	1.02	0.85	0.00	204	1	0	0	373	5	5	0	30	30	25	25
Del Mar Blvd. – St. John Ave. to Pasadena Ave.	757	660	414	660	98.03	0.91	1.06	0.00	285	2	2	0	362	4	5	0	30	30	25	25
Del Mar Blvd. – Pasadena Ave. to Fair Oaks Ave.	2085	1036	825	1036	97.87	0.97	1.16	0.00	394	3	3	0	620	7	9	0	30	30	25	25
Fair Oaks Ave. – Walnut St. to Corson St.	1946	1559	1425	1559	95.96	0.77	0.51	2.76	713	6	4	22	783	6	4	21	30	30	25	25
Fair Oaks Ave. – Corson St. to I-210 EB On-Ramp	1864	1701	1725	1725	96.87	0.52	0.35	2.26	1236	6	5	21	435	3	1	18	30	30	25	25
Fair Oaks Ave. – I-210 EB On-Ramp to Maple St.	1864	1701	1698	1701	96.41	0.71	0.47	2.41	1053	8	6	22	587	4	2	19	30	30	25	25
Fair Oaks Ave. – Maple St. to Villa St	2024	1672	1434	1672	96.11	0.72	0.78	2.39	686	6	9	21	921	6	4	19	30	30	25	25
Green St. – Orange Grove Blvd. to St. John Ave.	1008	337	389	389	94.60	0.51	1.03	3.86	266	1	2	10	102	1	2	5	30	30	25	25
Green St. – St. John Ave. to Pasadena Ave.	1524	547	424	547	93.96	1.65	2.56	1.83	0	0	0	10	514	9	14	0	30	30	25	25
Green St. – Pasadena Ave. to Fair Oaks Ave.	1510	426	263	426	94.37	1.88	2.58	1.17	402	8	11	5	0	0	0	0	30	30	25	25
Lincoln Ave. – Between Orange Grove Blvd. and Mountain St.	825	721	550	721	97.50	0.69	0.42	1.39	411	3	2	5	292	2	1	5	30	30	25	25
Mountain St. – Rosemont Ave. to Lincoln Ave.	1945	480	346	480	96.88	0.83	0.83	1.46	201	2	2	3	264	2	2	4	35	35	30	30
Mountain St. – Lincoln Ave. to I-210	1970	1418	1110	1418	97.11	1.13	1.27	0.49	741	8	9	3	636	8	9	4	35	35	30	30
Mountain St. – I-210 to Fair Oaks Ave.	1962	1142	1081	1142	95.62	1.58	2.10	0.70	632	10	13	4	460	8	11	4	35	35	30	30
Orange Grove Blvd. – Green St. to Colorado Blvd.	1834	2379	2064	1834	98.58	0.49	0.55	0.38	979	4	5	2	829	5	5	5	35	35	30	30
Orange Grove Blvd. – Colorado Blvd. to SR 134 Ramps	1851	1444	1192	1444	99.16	0.42	0.42	0.00	713	3	3	0	719	3	3	0	35	35	30	30
Orange Grove Blvd. – SR 134 Ramps to Walnut St.	1927	730	601	730	99.18	0.55	0.27	0.00	299	2	1	0	425	2	1	0	35	35	30	30
Orange Grove Blvd. – Lincoln Ave. to Fair Oaks Ave.	1973	813	546	813	97.54	1.23	1.23	0.00	405	5	4	0	388	5	6	0	35	35	30	30
Pasadena Ave. – South of California Blvd.	702	328	317	328	96.04	1.52	2.44	0.00	315	5	8	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – California Blvd. to SR 710 NB On-Ramp	723	599	661	661	97.88	0.76	1.36	0.00	647	5	9	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 710 NB On-Ramp to Del Mar Ave.	723	599	661	661	97.88	0.76	1.36	0.00	647	5	9	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Del Mar Blvd. to Green St.	706	868	995	706	97.03	1.13	1.84	0.00	685	8	13	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Green St. to Colorado Blvd.	724	1045	958	724	96.69	1.10	1.66	0.55	700	8	12	4	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Colorado Blvd. to Union St.	733	1150	982	733	97.69	0.95	1.36	0.00	716	7	10	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Union St. to I-210 NB On-Ramp	733	1150	982	733	97.69	0.95	1.36	0.00	716	7	10	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – I-210 NB On-Ramp to SR 134 EB Off-Ramp	635	339	332	339	97.35	1.18	1.47	0.00	330	4	5	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 134 EB Off-Ramp to Fair Oaks Ave.	735	961	841	735	98.78	0.54	0.54	0.14	726	4	4	1	0	0	0	0	35	35	30	30
Saint John Ave. – South of California Blvd.	2217	510	334	510	96.86	1.18	1.96	0.00	0	0	0	0	494	6	10	0	35	35	30	30
St. John Ave./Maple St. – California Blvd. to Del Mar Blvd.	1378	390	301	390	97.43	1.03	1.54	0.00	0	0	0	0	380	4	6	0	35	35	30	30
St. John Ave./Maple St. – Del Mar Blvd. to Green St.	1674	990	573	990	97.58	1.01	1.41	0.00	0	0	0	0	966	10	14	0	35	35	30	30
St. John Ave./Maple St. – Green St. to Colorado Blvd.	1448	1742	1496	1448	96.75	1.17	1.73	0.35	0	0	0	0	1401	17	25	5	35	35	30	30
St. John Ave./Maple St. – Colorado Blvd. to Union St.	744	1167	1132	744	96.91	1.21	1.88	0.00	0	0	0	0	721	9	14	0	35	35	30	30
St. John Ave./Maple St. – Union St. to I-210 SB Off-Ramp	854	1150	932	854	96.96	1.17	1.87	0.00	0	0	0	0	828	10	16	0	35	35	30	30
St. John Ave./Maple St. – I-210 SB Off-Ramp to SR 134 WB On-ramp	810	488	375	488	96.93	1.43	1.64	0.00	0	0	0	0	473	7	8	0	35	35	30	30
St. John Ave./Maple St. – SR 134 WB On-ramp to Fair Oaks Ave.	718	1419	1376	718	98.46	0.70	0.70	0.14	0	0	0	0	707	5	5	1	35	35	30	30
I-210 – 134 to Orange Grove Blvd.	11700	10016	10414	10414	89.57	2.44	7.95	0.04	5225	126	404	2	4103	128	424	2	65	65	60	60
I-210 – Orange Grove Blvd. to Mountain St.	17550	14045	14802	14802	89.28	2.61	8.08	0.03	7416	191	570	2	5800	195	626	2	65	65	60	60
SR 134 – Figueroa St. to San Rafael Ave. – Mainline	15600	15195	15115	15195	92.27	2.75	4.92	0.06	6932	217	388	2	7089	201	359	7	65	65	60	60
SR 134 – San Rafael Ave. to Orange Grove Blvd. – Mainline	15600	15585	15401	15585	92.50	2.67	4.79	0.04	7167	217	388	2	7250	199	358	4	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – Mainline	15600	12963	12759	12963	91.76	2.92	5.29	0.03	5761	194	352	2	6133	185	334	2	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave - Mainline	15600	11931	11865	11931	91.17	3.12	5.71	0.00	5235	191	350	0	5643	181	331	0	65	65	60	60
SR 134 – Figueroa St. to Orange Grove Blvd. – HOV EB	1500	1515	1919	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134 – Figueroa St. to Los Robles Ave. – HOV WB	1500	1840	1796	1500	100.00	0.00	0.00	0.00	0	0	0	0	1500	0	0	0	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – HOV EB	1500	1503	1904	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave – HOV EB	1500	1528	1772	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
I-210 – Fair Oaks Ave. to Los Robles Ave. – HOV EB	1500	1602	1910	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60

Table A.10(a) Freeway Tunnel Alternative – Dual Bore – V4 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
SR 710 – Del Mar Blvd to 134/210 (Dual Bore - Top Tunnel)	7800	4321	4622	4622	91.24	2.12	6.64	0.00	2441	53	167	0	1776	45	140	0	65	65	60	60
SR 710 – Del Mar Blvd to 134/210 (Dual Bore - Bottom Tunnel)	7800	5602	5862	5862	86.73	2.90	10.37	0.00	2799	83	290	0	2285	87	318	0	65	65	60	60
South																				
Campus Road – Ramona Rd. to I-10 WB On-ramp	2104	2383	1891	2104	97.06	0.57	0.71	1.66	1031	8	10	31	1011	4	5	4	35	35	30	30
Campus Road – I-10 WB On-ramp to I-10 WB Off-Ramp	2045	2034	1582	2034	96.85	0.54	0.84	1.77	722	6	10	32	1248	5	7	4	35	35	30	30
Campus Road – I-10 WB Off-Ramp to Circle Dr.	1863	733	735	735	92.25	0.54	0.95	6.26	223	2	4	32	455	2	3	14	35	35	30	30
Corporate Center Dr. – Davidson Dr. to I-710 NB Off-ramp	1929	1020	1067	1067	97.84	0.66	0.84	0.66	647	4	5	3	397	3	4	4	35	35	30	30
Corporate Center Dr. – I-710 NB Off-ramp to Ramona Blvd.	2099	1847	1534	1847	97.68	0.97	1.03	0.32	937	10	13	2	867	8	6	4	35	35	30	30
Hellman Ave. – 710 to Orange Grove Ave.	2697	293	193	293	97.27	0.34	0.34	2.05	65	0	0	3	220	1	1	3	30	30	25	25
Alhambra / Mission Rd. – Bullard Ave. to Concord Ave.	1962	924	806	924	96.76	1.19	0.97	1.08	307	5	4	5	587	6	5	5	35	35	30	30
Alhambra / Mission Rd. – Concord Ave. to Freemont Ave.	2210	1341	1089	1341	97.62	1.19	1.19	0.00	576	8	8	0	733	8	8	0	35	35	30	30
Paseo Rancho Castilla – Ramona Rd. to I-10 EB On-Ramp	2241	1892	1591	1892	96.40	0.85	1.16	1.59	1129	6	5	0	695	10	17	30	35	35	30	30
Paseo Rancho Castilla – I-10 EB On-Ramp to Eastern Ave.	2209	1661	1395	1661	95.60	1.02	1.57	1.81	764	4	4	0	824	13	22	30	35	35	30	30
Ramona Rd. – Eastern Ave. to Campus Dr.	2384	1091	729	1091	94.32	0.73	0.46	4.49	263	3	2	40	766	5	3	9	35	35	30	30
Ramona Rd. – Campus Dr. to I-710 SB On-ramp at Ramona	2093	2355	1980	2093	96.13	0.72	0.76	2.39	821	5	5	26	1191	10	11	24	35	35	30	30
Ramona Rd. – I-710 SB On-ramp at Ramona to Corporate Center Dr.	2090	1976	1609	1976	97.07	0.81	0.91	1.21	454	4	3	13	1464	12	15	11	35	35	30	30
Ramona Rd. – Corporate Center Dr. to I-10 EB C/D Road	2546	1351	743	1351	97.41	0.67	0.59	1.33	188	1	1	9	1128	8	7	9	35	35	30	30
Ramona Rd. – I-10 EB C/D Road to Atlantic Blvd.	2240	1251	1129	1251	97.68	0.48	0.40	1.44	496	3	2	9	726	3	3	9	35	35	30	30
Ramona Ave. – Between Winthrop Dr. and Meridian Ave.	1129	529	248	529	98.86	0.57	0.57	0.00	0	0	0	0	523	3	3	0	35	35	30	30
Valley Blvd. – Bullard Ave. to I-710 SB On-Ramp	2210	604	570	604	95.86	0.50	0.33	3.31	212	1	1	10	367	2	1	10	35	35	30	30
Valley Blvd. – I-710 SB On-Ramp to I-710 NB Off-Ramp	2108	1447	1275	1447	96.48	0.62	1.31	1.59	212	1	1	10	1184	8	18	13	35	35	30	30
Valley Blvd. – I-710 to Freemont Ave.	2059	2228	1996	2059	96.98	0.78	1.07	1.17	998	9	11	12	999	7	11	12	35	35	30	30
I-10 - west of Eastern Ave. to SR-710 – Mainline	15600	12175	11548	12175	96.10	1.13	2.77	0.00	5600	81	196	0	6100	57	141	0	65	65	60	60
I-10 - SR-710 to Freemont Ave. - Mainline	13650	15208	14574	13650	96.48	0.98	2.54	0.00	6950	70	186	0	6219	64	161	0	65	65	60	60
I-10 HOV/El Monte Busway – Between SR 710 Ramps and I-10 HOV lanes East of SR 710	3000	1998	1883	1998	95.85	0.00	0.00	4.15	702	0	0	14	1213	0	0	69	65	65	60	60
I-10 HOV/El Monte Busway – Between Cal State LA Metrolink Station and SR 710 Ramps	3000	2013	1899	2013	95.53	0.00	0.00	4.47	704	0	0	17	1219	0	0	73	65	65	60	60
I-710 – Floral Dr. to I-10	11700	13534	12980	11700	91.94	1.91	6.15	0.00	5128	106	355	0	5629	118	364	0	65	65	60	60
I-710 – I-10 to Hellman Ave. (Dual Bore - Top Tunnel)	9750	8680	8528	8680	94.12	1.75	4.08	0.05	4187	80	189	3	3983	72	165	1	65	65	60	60
I-710 – I-10 to Hellman Ave. (Dual Bore - Bottom Tunnel)	9750	5602	5862	5862	86.73	2.90	10.37	0.00	2799	83	290	0	2285	87	318	0	65	65	60	60
SR 710 – Hellman Ave. to Valley Blvd. (Dual Bore - Top Tunnel)	7800	6537	6453	6537	95.95	1.50	2.55	0.00	2958	43	74	0	3314	55	93	0	65	65	60	60
SR 710 – Hellman Ave. to Valley Blvd. (Dual Bore - Bottom Tunnel)	7800	5602	5862	5862	86.73	2.90	10.37	0.00	2799	83	290	0	2285	87	318	0	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
C/D Road = Collector/Distributor Road
Cal State LA = California State University, Los Angeles
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

Table A.10(b) Freeway Tunnel Alternative – Dual Bore – V4 (Ramps)

Segment - Ramps	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																
I-210 Westbound Off-Ramp to Mountain	1000	964	640	964	95.65	1.76	2.59	0.00	922	17	25	0	45	45	40	40
I-210 Eastbound On-Ramp from Mountain	1000	760	675	760	96.05	1.58	2.37	0.00	730	12	18	0	65	65	60	60
I-210 Southbound Off-Ramp to SR 134 Eastbound	2000	3418	3298	2000	87.05	3.50	9.45	0.00	1741	70	189	0	50	50	45	45
I-210 Northbound On-Ramp from I-210 Westbound	2000	3321	3688	2000	88.10	3.40	8.50	0.00	1762	68	170	0	50	50	45	45
I-210 Southbound Off-Ramp to St. John Ave.	1000	854	553	854	97.90	0.70	1.17	0.23	836	6	10	2	45	45	40	40
I-210 Northbound On-Ramp from Pasadena/Corson	1000	717	752	752	98.53	0.40	0.80	0.27	741	3	6	2	65	65	60	60
I-210 Westbound Off-Ramp to Maple St	1000	229	145	229	94.76	1.75	3.49	0.00	217	4	8	0	45	45	40	40
SR 134 Eastbound On-Ramp from Orange Grove Blvd	1000	418	324	418	99.04	0.48	0.48	0.00	414	2	2	0	65	65	60	60
SR 134 Westbound Off-Ramp to Orange Grove Blvd	1000	298	267	298	98.66	0.67	0.67	0.00	294	2	2	0	45	45	40	40
SR 134 Eastbound Off-Ramp to SR 710 (NB/SB)	2000	1283	1024	1283	96.03	1.48	2.49	0.00	1232	19	32	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Northbound	2000	587	246	587	97.45	1.19	1.36	0.00	572	7	8	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Southbound	1000	696	779	779	95.89	1.16	2.95	0.00	747	9	23	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 Southbound	1000	429	450	450	97.78	1.11	1.11	0.00	440	5	5	0	50	50	45	45
SR 134 Westbound On-Ramp from SR 710 Northbound	2000	619	935	935	94.76	1.50	3.74	0.00	886	14	35	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 SB and SR 710 NB	1000	1047	743	1000	96.90	1.10	2.00	0.00	969	11	20	0	65	65	60	60
SR 134 Eastbound Off-Ramp to Corson Street.	1000	808	619	808	98.63	0.62	0.50	0.25	797	5	4	2	45	45	40	40
SR 134 Westbound On-Ramp from Maple Street	1000	693	741	741	99.07	0.40	0.40	0.13	734	3	3	1	65	65	60	60
SR 710 Southbound On-Ramp from I-210 Westbound	2000	968	553	968	96.49	1.34	2.17	0.00	934	13	21	0	50	50	45	45
SR 710 Northbound Off-Ramp to I-210 Eastbound	2000	993	792	993	95.97	1.61	2.42	0.00	953	16	24	0	50	50	45	45
I-10 Eastbound On-Ramp from Paseo Rancho Castilla EB	1000	505	471	505	98.02	0.79	1.19	0.00	495	4	6	0	65	65	60	60
I-10 Westbound On-Ramp from Campus	1000	649	688	688	98.84	0.58	0.58	0.00	680	4	4	0	65	65	60	60
I-10 Westbound Off-Ramp to Campus	2000	614	437	614	98.54	0.65	0.81	0.00	605	4	5	0	45	45	40	40
South																
I-10 Eastbound CD Road/Off-Ramp Between Paseo Rancho Castilla and I-710 SB Ramp	1000	1983	2235	1000	95.90	1.80	2.30	0.00	959	18	23	0	50	50	45	45
I-10 Eastbound CD Road/Off-Ramp Between I-710 SB Ramp and SR 710 NB Ramp	1000	1846	2135	1000	96.60	1.60	1.80	0.00	966	16	18	0	50	50	45	45
I-10 WB C/D to I-10 WB On-ramp	1000	1850	1160	1000	96.20	1.10	2.70	0.00	962	11	27	0	50	50	45	45
I-10 Westbound On-Ramp from SR 710	1000	1126	1009	1000	93.20	2.70	4.10	0.00	932	27	41	0	50	50	45	45
I-10 Westbound CD Road/On-Ramp from Ramona and SR 710 (NB/SB)	2000	2977	2171	2000	95.00	1.75	3.25	0.00	1900	35	65	0	50	50	45	45
I-10 Eastbound Off-Ramp to Ramona/Garvey	1000	719	851	851	98.58	0.71	0.71	0.00	839	6	6	0	45	45	40	40
I-10 Westbound Off-Ramp to SR 710 Northbound and I-10 WB HOV	2000	3324	3208	2000	96.70	0.95	2.35	0.00	1934	19	47	0	50	50	45	45
I-10 Eastbound On-Ramp from SR 710 SB/I-710 NB	1000	2318	2069	1000	97.10	0.80	2.10	0.00	971	8	21	0	50	50	45	45
I-710 Northbound Off-Ramp to Casuda Canyon Dr.	1000	316	4	316	96.52	0.95	2.53	0.00	305	3	8	0	45	45	40	40
I-710 Southbound On-Ramp from Eastbound I-10	1000	537	500	537	95.16	1.49	3.35	0.00	511	8	18	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 (EB/WB)	2000	2123	2240	2000	96.55	0.95	2.50	0.00	1931	19	50	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Eastbound	1000	1677	1646	1000	97.20	0.70	2.10	0.00	972	7	21	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Westbound	1000	446	594	594	94.62	1.68	3.70	0.00	562	10	22	0	50	50	45	45
I-710 SB On-ramp from Ramona Rd.	1000	399	402	402	99.25	0.25	0.50	0.00	399	1	2	0	65	65	60	60
I-710 SB/I-10 WB On-Ramp from Ramona	1000	3312	2291	1000	97.20	0.80	2.00	0.00	972	8	20	0	65	65	60	60
SR 710 Northbound On-Ramp from Eastbound I-10	1000	1125	1285	1000	95.40	2.20	2.40	0.00	954	22	24	0	65	65	60	60
I-710 Southbound On-Ramp from I-10 Westbound	2000	848	693	848	98.71	0.35	0.94	0.00	837	3	8	0	50	50	45	45
SR 710 Northbound On-Ramp from I-10 HOV Eastbound	1000	5	11	11	72.73	0.00	0.00	27.27	8	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte Busway Westbound	1000	9	4	9	66.67	0.00	0.00	33.33	6	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte WB and I-10 EB	1000	649	426	649	96.30	1.08	2.16	0.46	625	7	14	3	50	50	45	45
SR 710 Northbound On-Ramp from I-10 Westbound	1000	540	1164	1000	96.40	1.10	2.50	0.00	964	11	25	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Westbound	1000	680	416	680	92.50	3.53	3.97	0.00	629	24	27	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Eastbound	1000	640	422	640	96.72	1.09	2.19	0.00	619	7	14	0	50	50	45	45
I-710 Northbound Off-Ramp to Valley	2000	749	704	749	96.52	1.34	1.74	0.40	723	10	13	3	45	45	40	40
I-710 Southbound On-Ramp from Valley	2000	843	705	843	96.79	0.83	2.02	0.36	816	7	17	3	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

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Table A.11(a) Freeway Tunnel Alternative – Dual Bore – V5 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																				
California Blvd. – Orange Grove Blvd. to St. John Ave.	737	1102	1011	737	98.11	0.81	0.81	0.27	357	3	3	1	366	3	3	1	30	30	25	25
California Blvd. – St. John Ave. to Pasadena Ave.	662	883	1023	662	98.03	0.91	0.76	0.30	413	3	3	1	236	3	2	1	30	30	25	25
California Blvd. – Pasadena Ave. to Fair Oaks Ave.	1687	967	1154	1154	97.91	0.87	0.87	0.35	598	4	3	2	532	6	7	2	30	30	25	25
Colorado Blvd. – Orange Grove Blvd. to St. John Ave.	1960	1035	910	1035	90.53	1.45	1.84	6.18	614	9	11	30	323	6	8	34	25	25	20	20
Colorado Blvd. – St. John Ave. to Pasadena Ave.	1887	1125	1028	1125	93.06	0.89	0.89	5.16	390	5	4	24	657	5	6	34	25	25	20	20
Colorado Blvd. – Pasadena Ave. to Fair Oaks Ave.	1955	1113	982	1113	93.80	0.72	0.72	4.76	347	4	4	24	697	4	4	29	25	25	20	20
Del Mar Blvd. – Orange Grove Blvd. to St. John Ave.	619	576	523	576	98.79	0.69	0.52	0.00	210	1	0	0	359	3	3	0	30	30	25	25
Del Mar Blvd. – St. John Ave. to Pasadena Ave.	727	644	418	644	98.44	0.78	0.78	0.00	289	2	2	0	345	3	3	0	30	30	25	25
Del Mar Blvd. – Pasadena Ave. to Fair Oaks Ave.	2084	1046	818	1046	99.14	0.48	0.38	0.00	400	3	3	0	637	2	1	0	30	30	25	25
Fair Oaks Ave. – Walnut St. to Corson St.	1928	1569	1433	1569	94.14	1.40	1.72	2.74	694	11	14	22	783	11	13	21	30	30	25	25
Fair Oaks Ave. – Corson St. to I-210 EB On-Ramp	1847	1715	1730	1730	95.96	0.81	0.98	2.25	1227	9	12	21	433	5	5	18	30	30	25	25
Fair Oaks Ave. – I-210 EB On-Ramp to Maple St.	1848	1717	1705	1717	95.05	1.16	1.40	2.39	1043	12	14	22	589	8	10	19	30	30	25	25
Fair Oaks Ave. – Maple St. to Villa St	1964	1596	1386	1596	94.98	1.07	1.44	2.51	667	9	14	21	849	8	9	19	30	30	25	25
Green St. – Orange Grove Blvd. to St. John Ave.	1080	347	391	391	96.16	0.00	0.00	3.84	278	0	0	10	98	0	0	5	30	30	25	25
Green St. – St. John Ave. to Pasadena Ave.	1509	542	435	542	98.15	0.00	0.00	1.85	0	0	0	10	532	0	0	0	30	30	25	25
Green St. – Pasadena Ave. to Fair Oaks Ave.	1496	419	259	419	98.81	0.00	0.00	1.19	414	0	0	5	0	0	0	0	30	30	25	25
Lincoln Ave. – Between Orange Grove Blvd. and Mountain St.	810	722	565	722	96.81	0.97	0.83	1.39	417	4	3	5	282	3	3	5	30	30	25	25
Mountain St. – Rosemont Ave. to Lincoln Ave.	1943	498	349	498	96.99	0.80	0.80	1.41	218	2	2	3	265	2	2	4	35	35	30	30
Mountain St. – Lincoln Ave. to I-210	1947	1364	1090	1364	98.03	0.73	0.73	0.51	702	5	5	3	635	5	5	4	35	35	30	30
Mountain St. – I-210 to Fair Oaks Ave.	1961	1251	1167	1251	97.20	0.96	1.20	0.64	659	6	8	4	557	6	7	4	35	35	30	30
Orange Grove Blvd. – Green St. to Colorado Blvd.	1823	2356	2072	1823	98.58	0.55	0.49	0.38	970	5	4	2	827	5	5	5	35	35	30	30
Orange Grove Blvd. – Colorado Blvd. to SR 134 Ramps	1873	1463	1196	1463	98.64	0.68	0.68	0.00	719	5	5	0	724	5	5	0	35	35	30	30
Orange Grove Blvd. – SR 134 Ramps to Walnut St.	1958	743	607	743	98.39	0.94	0.67	0.00	304	3	2	0	427	4	3	0	35	35	30	30
Orange Grove Blvd. – Lincoln Ave. to Fair Oaks Ave.	1971	812	548	812	96.92	1.60	1.48	0.00	396	7	6	0	391	6	6	0	35	35	30	30
Pasadena Ave. – South of California Blvd.	717	343	319	343	95.33	1.75	2.92	0.00	327	6	10	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – California Blvd. to SR 710 NB On-Ramp	720	606	669	669	97.90	0.75	1.35	0.00	655	5	9	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 710 NB On-Ramp to Del Mar Ave.	720	606	669	669	97.90	0.75	1.35	0.00	655	5	9	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Del Mar Blvd. to Green St.	721	902	994	721	98.20	0.69	1.11	0.00	708	5	8	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Green St. to Colorado Blvd.	744	1076	969	744	97.84	0.54	1.08	0.54	728	4	8	4	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Colorado Blvd. to Union St.	732	1154	1010	732	98.77	0.55	0.68	0.00	723	4	5	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – Union St. to I-210 NB On-Ramp	732	1154	1010	732	98.77	0.55	0.68	0.00	723	4	5	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – I-210 NB On-Ramp to SR 134 EB Off-Ramp	644	337	346	346	99.71	0.29	0.00	0.00	345	1	0	0	0	0	0	0	35	35	30	30
Pasadena Ave./Corson St. – SR 134 EB Off-Ramp to Fair Oaks Ave.	732	961	854	732	98.22	0.82	0.82	0.14	719	6	6	1	0	0	0	0	35	35	30	30
Saint John Ave. – South of California Blvd.	2194	520	337	520	95.77	1.54	2.69	0.00	0	0	0	0	498	8	14	0	35	35	30	30
St. John Ave./Maple St. – California Blvd. to Del Mar Blvd.	1342	397	315	397	96.98	1.26	1.76	0.00	0	0	0	0	385	5	7	0	35	35	30	30
St. John Ave./Maple St. – Del Mar Blvd. to Green St.	1600	1008	600	1008	97.22	1.09	1.69	0.00	0	0	0	0	980	11	17	0	35	35	30	30
St. John Ave./Maple St. – Green St. to Colorado Blvd.	1445	1683	1447	1445	98.27	0.55	0.83	0.35	0	0	0	0	1420	8	12	5	35	35	30	30
St. John Ave./Maple St. – Colorado Blvd. to Union St.	729	1112	1108	729	98.21	0.69	1.10	0.00	0	0	0	0	716	5	8	0	35	35	30	30
St. John Ave./Maple St. – Union St. to I-210 SB Off-Ramp	848	1128	914	848	98.11	0.71	1.18	0.00	0	0	0	0	832	6	10	0	35	35	30	30
St. John Ave./Maple St. – I-210 SB Off-Ramp to SR 134 WB On-ramp	834	406	316	406	99.02	0.49	0.49	0.00	0	0	0	0	402	2	2	0	35	35	30	30
St. John Ave./Maple St. – SR 134 WB On-ramp to Fair Oaks Ave.	711	1347	1330	711	98.46	0.70	0.70	0.14	0	0	0	0	700	5	5	1	35	35	30	30
I-210 – 134 to Orange Grove Blvd.	11700	10087	10402	10402	97.53	0.67	1.76	0.04	5603	29	72	2	4542	41	111	2	65	65	60	60
I-210 – Orange Grove Blvd. to Mountain St.	17550	14183	14824	14824	94.09	1.57	4.31	0.03	7781	113	295	2	6167	120	344	2	65	65	60	60
SR 134 – Figueroa St. to San Rafael Ave. – Mainline	15600	15264	15202	15264	92.40	2.74	4.80	0.06	6985	217	380	2	7119	201	353	7	65	65	60	60
SR 134 – San Rafael Ave. to Orange Grove Blvd. – Mainline	15600	15641	15534	15600	93.47	2.29	4.21	0.03	7475	180	321	1	7106	177	336	4	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – Mainline	15600	12900	12652	12900	91.51	3.04	5.42	0.03	5696	201	360	2	6109	191	339	2	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave - Mainline	15600	11869	11737	11869	91.02	3.19	5.79	0.00	5179	195	354	0	5624	184	333	0	65	65	60	60
SR 134 – Figueroa St. to Orange Grove Blvd. – HOV EB	1500	1478	1913	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134 – Figueroa St. to Los Robles Ave. – HOV WB	1500	1822	1783	1500	100.00	0.00	0.00	0.00	0	0	0	0	1500	0	0	0	65	65	60	60
SR 134 – Orange Grove Blvd. to 210 Freeway – HOV EB	1500	1466	1900	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
SR 134/I-210 – 210 Freeway to Fair Oaks Ave – HOV EB	1500	1490	1808	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60
I-210 – Fair Oaks Ave. to Los Robles Ave. – HOV EB	1500	1564	1944	1500	100.00	0.00	0.00	0.00	1500	0	0	0	0	0	0	0	65	65	60	60

Table A.11(a) Freeway Tunnel Alternative – Dual Bore – V5 (Arterials and Freeways)

Segment - Arterials and Freeways	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification - NB/EB				Traffic Volumes By Classification- SB/WB				Vehicle Speed			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
SR 710 – Del Mar Blvd to 134/210 (Dual Bore - Top Tunnel)	7800	4367	4566	4566	100.00	0.00	0.00	0.00	2588	0	0	0	1978	0	0	0	65	65	60	60
SR 710 – Del Mar Blvd to 134/210 (Dual Bore - Bottom Tunnel)	7800	5534	5992	5992	100.00	0.00	0.00	0.00	3299	0	0	0	2693	0	0	0	65	65	60	60
South																				
Campus Road – Ramona Rd. to I-10 WB On-ramp	2090	2358	1878	2090	96.94	0.62	0.77	1.67	1015	9	11	31	1011	4	5	4	35	35	30	30
Campus Road – I-10 WB On-ramp to I-10 WB Off-Ramp	2027	2017	1586	2017	96.79	0.59	0.84	1.78	708	6	10	32	1244	6	7	4	35	35	30	30
Campus Road – I-10 WB Off-Ramp to Circle Dr.	1874	738	736	738	92.01	0.41	1.08	6.50	310	1	3	34	369	2	5	14	35	35	30	30
Corporate Center Dr. – Davidson Dr. to I-710 NB Off-ramp	1912	1005	1048	1048	97.62	0.76	0.95	0.67	641	4	6	3	382	4	4	4	35	35	30	30
Corporate Center Dr. – I-710 NB Off-ramp to Ramona Blvd.	2090	1821	1504	1821	97.53	1.04	1.10	0.33	923	10	12	2	853	9	8	4	35	35	30	30
Hellman Ave. – 710 to Orange Grove Ave.	2771	294	195	294	97.28	0.34	0.34	2.04	63	0	0	3	223	1	1	3	30	30	25	25
Alhambra / Mission Rd. – Bullard Ave. to Concord Ave.	1920	918	835	918	96.73	1.20	0.98	1.09	309	5	4	5	579	6	5	5	35	35	30	30
Alhambra / Mission Rd. – Concord Ave. to Freemont Ave.	2190	1337	1112	1337	97.60	1.20	1.20	0.00	574	8	8	0	731	8	8	0	35	35	30	30
Paseo Rancho Castilla – Ramona Rd. to I-10 EB On-Ramp	2285	1932	1592	1932	96.63	0.78	1.04	1.55	1148	5	4	0	719	10	16	30	35	35	30	30
Paseo Rancho Castilla – I-10 EB On-Ramp to Eastern Ave.	2245	1685	1405	1685	95.91	0.95	1.36	1.78	773	4	2	0	843	12	21	30	35	35	30	30
Ramona Rd. – Eastern Ave. to Campus Dr.	2403	1095	742	1095	94.52	0.64	0.37	4.47	276	3	1	40	759	4	3	9	35	35	30	30
Ramona Rd. – Campus Dr. to I-710 SB On-ramp at Ramona	2091	2349	1989	2091	96.12	0.72	0.77	2.39	834	5	5	26	1176	10	11	24	35	35	30	30
Ramona Rd. – I-710 SB On-ramp at Ramona to Corporate Center Dr.	2089	1959	1604	1959	97.03	0.87	0.87	1.23	450	4	2	13	1451	13	15	11	35	35	30	30
Ramona Rd. – Corporate Center Dr. to I-10 EB C/D Road	2531	1346	731	1346	97.18	0.74	0.74	1.34	188	1	1	9	1120	9	9	9	35	35	30	30
Ramona Rd. – I-10 EB C/D Road to Atlantic Blvd.	2273	1271	1123	1271	97.56	0.55	0.47	1.42	519	3	2	9	721	4	4	9	35	35	30	30
Ramona Ave. – Between Winthrop Dr. and Meridian Ave.	1112	535	259	535	98.51	0.56	0.93	0.00	0	0	0	0	527	3	5	0	35	35	30	30
Valley Blvd. – Bullard Ave. to I-710 SB On-Ramp	2280	615	535	615	95.77	0.49	0.49	3.25	217	1	1	10	372	2	2	10	35	35	30	30
Valley Blvd. – I-710 SB On-Ramp to I-710 NB Off-Ramp	2100	1458	1249	1458	94.79	1.23	2.40	1.58	217	1	1	10	1165	17	34	13	35	35	30	30
Valley Blvd. – I-710 to Freemont Ave.	2020	2308	2041	2020	96.19	1.04	1.58	1.19	996	11	15	12	947	10	17	12	35	35	30	30
I-10 - west of Eastern Ave. to SR-710 – Mainline	15600	12125	11651	12125	96.56	1.01	2.43	0.00	5618	84	200	0	6090	38	95	0	65	65	60	60
I-10 - SR-710 to Freemont Ave. - Mainline	13650	15223	14682	13650	96.57	0.95	2.48	0.00	6929	71	190	0	6252	59	149	0	65	65	60	60
I-10 HOV/El Monte Busway – Between SR 710 Ramps and I-I-10 HOV lanes East of SR 710	3000	2008	1841	2008	95.87	0.00	0.00	4.13	711	0	0	14	1214	0	0	69	65	65	60	60
I-10 HOV/El Monte Busway – Between Cal State LA Metrolink Station and SR 710 Ramps	3000	2021	1858	2021	95.55	0.00	0.00	4.45	712	0	0	17	1219	0	0	73	65	65	60	60
I-710 – Floral Dr. to I-10	11700	13841	13227	11700	98.50	0.39	1.11	0.00	5487	27	83	0	6037	19	47	0	65	65	60	60
I-710 – I-10 to Hellman Ave. (Dual Bore - Top Tunnel)	9750	8791	8666	8791	98.98	0.34	0.63	0.05	4518	15	23	3	4184	15	32	1	65	65	60	60
I-710 – I-10 to Hellman Ave. (Dual Bore - Bottom Tunnel)	9750	5534	5992	5992	100.00	0.00	0.00	0.00	3299	0	0	0	2693	0	0	0	65	65	60	60
SR 710 – Hellman Ave. to Valley Blvd. (Dual Bore - Top Tunnel)	7800	6611	6535	6611	100.00	0.00	0.00	0.00	3123	0	0	0	3488	0	0	0	65	65	60	60
SR 710 – Hellman Ave. to Valley Blvd. (Dual Bore - Bottom Tunnel)	7800	5534	5992	5992	100.00	0.00	0.00	0.00	3299	0	0	0	2693	0	0	0	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
C/D Road = Collector/Distributor Road
Cal State LA = California State University, Los Angeles
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

Table A.11(b) Freeway Tunnel Alternative – Dual Bore – V5 (Ramps)

Segment - Ramps	Total Segment Volumes				Percentage By Classification (%)				Traffic Volumes By Classification				Vehicle Speed (mph)			
	LOS C/D Peak Hour[1]	AM Peak Hour	PM Peak Hour	Selected	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses	Automobiles	Medium Trucks	Heavy Trucks	Buses
North																
I-210 Westbound Off-Ramp to Mountain	1000	949	579	949	97.68	0.95	1.37	0.00	927	9	13	0	45	45	40	40
I-210 Eastbound On-Ramp from Mountain	1000	789	711	789	97.84	0.89	1.27	0.00	772	7	10	0	65	65	60	60
I-210 Southbound Off-Ramp to SR 134 Eastbound	2000	3548	3312	2000	85.90	3.80	10.30	0.00	1718	76	206	0	50	50	45	45
I-210 Northbound On-Ramp from I-210 Westbound	2000	3366	3692	2000	86.75	3.65	9.60	0.00	1735	73	192	0	50	50	45	45
I-210 Southbound Off-Ramp to St. John Ave.	1000	911	584	911	97.80	0.77	1.21	0.22	891	7	11	2	45	45	40	40
I-210 Northbound On-Ramp from Pasadena/Corson	1000	723	765	765	98.30	0.52	0.92	0.26	752	4	7	2	65	65	60	60
I-210 Westbound Off-Ramp to Maple St	1000	196	157	196	93.37	2.04	4.59	0.00	183	4	9	0	45	45	40	40
SR 134 Eastbound On-Ramp from Orange Grove Blvd	1000	420	327	420	98.81	0.48	0.71	0.00	415	2	3	0	65	65	60	60
SR 134 Westbound Off-Ramp to Orange Grove Blvd	1000	301	263	301	98.68	0.66	0.66	0.00	297	2	2	0	45	45	40	40
SR 134 Eastbound Off-Ramp to SR 710 (NB/SB)	2000	1370	1073	1370	98.25	0.80	0.95	0.00	1346	11	13	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Northbound	2000	586	244	586	95.90	1.88	2.22	0.00	562	11	13	0	50	50	45	45
SR 134 Eastbound Off-Ramp to SR 710 Southbound	1000	784	829	829	100.00	0.00	0.00	0.00	829	0	0	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 Southbound	1000	364	444	444	96.85	1.35	1.80	0.00	430	6	8	0	50	50	45	45
SR 134 Westbound On-Ramp from SR 710 Northbound	2000	694	1135	1135	100.00	0.00	0.00	0.00	1135	0	0	0	50	50	45	45
SR 134 Westbound On-Ramp from I-210 SB and SR 710 NB	1000	1058	752	1000	98.70	0.50	0.80	0.00	987	5	8	0	65	65	60	60
SR 134 Eastbound Off-Ramp to Corson Street.	1000	806	617	806	97.89	0.87	0.99	0.25	789	7	8	2	45	45	40	40
SR 134 Westbound On-Ramp from Maple Street	1000	696	743	743	98.25	0.81	0.81	0.13	730	6	6	1	65	65	60	60
SR 710 Southbound On-Ramp from I-210 Westbound	2000	955	555	955	100.00	0.00	0.00	0.00	955	0	0	0	50	50	45	45
SR 710 Northbound Off-Ramp to I-210 Eastbound	2000	967	835	967	100.00	0.00	0.00	0.00	967	0	0	0	50	50	45	45
I-10 Eastbound On-Ramp from Paseo Rancho Castilla EB	1000	509	480	509	98.03	0.79	1.18	0.00	499	4	6	0	65	65	60	60
I-10 Westbound On-Ramp from Campus	1000	649	674	674	98.37	0.74	0.89	0.00	663	5	6	0	65	65	60	60
I-10 Westbound Off-Ramp to Campus	2000	608	422	608	98.35	0.66	0.99	0.00	598	4	6	0	45	45	40	40
South																
I-10 Eastbound CD Road/Off-Ramp Between Paseo Rancho Castilla and I-710 SB Ramp	1000	1963	2276	1000	97.70	0.90	1.40	0.00	977	9	14	0	50	50	45	45
I-10 Eastbound CD Road/Off-Ramp Between I-710 SB Ramp and SR 710 NB Ramp	1000	1774	2128	1000	98.70	0.60	0.70	0.00	987	6	7	0	50	50	45	45
I-10 WB C/D to I-10 WB On-ramp	1000	1904	1017	1000	94.00	1.60	4.40	0.00	940	16	44	0	50	50	45	45
I-10 Westbound On-Ramp from SR 710	1000	1186	1018	1000	92.20	1.60	6.20	0.00	922	16	62	0	50	50	45	45
I-10 Westbound CD Road/On-Ramp from Ramona and SR 710 (NB/SB)	2000	3090	2036	2000	92.90	1.70	5.40	0.00	1858	34	108	0	50	50	45	45
I-10 Eastbound Off-Ramp to Ramona/Garvey	1000	742	851	851	98.24	0.82	0.94	0.00	836	7	8	0	45	45	40	40
I-10 Westbound Off-Ramp to SR 710 Northbound and I-10 WB HOV	2000	3448	3230	2000	96.30	1.00	2.70	0.00	1926	20	54	0	50	50	45	45
I-10 Eastbound On-Ramp from SR 710 SB/I-710 NB	1000	2280	2043	1000	96.80	0.80	2.40	0.00	968	8	24	0	50	50	45	45
I-710 Northbound Off-Ramp to Casuda Canyon Dr.	1000	304	4	304	96.38	0.99	2.63	0.00	293	3	8	0	45	45	40	40
I-710 Southbound On-Ramp from Eastbound I-10	1000	612	586	612	95.26	1.47	3.27	0.00	583	9	20	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 (EB/WB)	2000	2147	2234	2000	93.00	1.60	5.40	0.00	1860	32	108	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Eastbound	1000	1588	1594	1000	95.60	1.10	3.30	0.00	956	11	33	0	50	50	45	45
I-710 Northbound Off-Ramp to I-10 Westbound	1000	558	639	639	81.07	3.44	15.49	0.00	518	22	99	0	50	50	45	45
I-710 SB On-ramp from Ramona Rd.	1000	422	438	438	99.31	0.23	0.46	0.00	435	1	2	0	65	65	60	60
I-710 SB/I-10 WB On-Ramp from Ramona	1000	3434	2174	1000	95.40	1.20	3.40	0.00	954	12	34	0	65	65	60	60
SR 710 Northbound On-Ramp from Eastbound I-10	1000	1031	1278	1000	99.00	0.50	0.50	0.00	990	5	5	0	65	65	60	60
I-710 Southbound On-Ramp from I-10 Westbound	2000	925	735	925	97.62	0.54	1.84	0.00	903	5	17	0	50	50	45	45
SR 710 Northbound On-Ramp from I-10 HOV Eastbound	1000	5	12	12	75.00	0.00	0.00	25.00	9	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte Busway Westbound	1000	8	4	8	62.50	0.00	0.00	37.50	5	0	0	3	50	50	45	45
SR 710 Southbound Off-Ramp to El Monte WB and I-10 EB	1000	700	452	700	99.57	0.00	0.00	0.43	697	0	0	3	50	50	45	45
SR 710 Northbound On-Ramp from I-10 Westbound	1000	548	1315	1000	100.00	0.00	0.00	0.00	1000	0	0	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Westbound	1000	629	379	629	100.00	0.00	0.00	0.00	629	0	0	0	50	50	45	45
SR 710 Southbound Off-Ramp to I-10 Eastbound	1000	692	448	692	100.00	0.00	0.00	0.00	692	0	0	0	50	50	45	45
I-710 Northbound Off-Ramp to Valley	2000	824	775	824	95.03	1.82	2.79	0.36	783	15	23	3	45	45	40	40
I-710 Southbound On-Ramp from Valley	2000	843	713	843	94.06	1.78	3.80	0.36	793	15	32	3	65	65	60	60

Source: LSA Associates, Inc. (May 2014).

[1] The worst-case traffic condition is assumed to be LOS C/D. The volume-to-capacity (v/c) ratio for a highway that corresponds to LOS C/D is approximately 85% of the roadway capacity.

Ave = Avenue
Blvd = Boulevard
Dr = Drive
EB = eastbound
HOV = high-occupancy vehicle
I-10 = Interstate 10
I-210 = Interstate 210
I-710 = Interstate 710
LOS = level of service
mph = miles per hour
NB = northbound
Rd = Road
SB = southbound
SR 134 = State Route 134
SR 710 = State Route 710
St = Street
WB = westbound

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Appendix B. Predicted Future Noise Levels and Noise Barrier Analysis

This appendix contains tables that summarize the traffic noise results for Existing, Future No Build, BRT Alternative, and Freeway Tunnel Alternative (worst-case single-bore and worst-case dual-bore design variations) for Year 2035 conditions. These tables also compare the predicted noise reductions by barrier height for each noise barrier analyzed. This appendix also shows the LRT Alternative analysis impacts along with the necessary barrier heights for abatement.

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Table B.1 Predicted Future Noise Level and Noise Barrier Analysis – TSM/TDM Alternative

TSM/TDM Inter-section ID	Receptor No.	ETW No.[1]	TNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA $L_{eq}(h)$)[2]	Future Worst-Hour Noise Levels (dBA $L_{eq}(h)$)																													
								2035 Noise Level						Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[5,6]																							
								Without Project[2]	With Project[2]	With Project Minus No Project Condi-tions	With Project Minus Existing Condi-tions	Activity Category	Impact Type[3,4]	6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
														L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR
L-2a	L2a/TR-1			Residential	1	Fremont Avenue	**67**	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-2			Residential	4	Fremont Avenue	56	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-3			Residential	8	Fair Oaks Avenue	52	52	53	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-4			Residential	5	Fremont Avenue	54	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-5			Residential	2	Fremont Avenue	60	60	62	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-6			Residential	6	Fremont Avenue	56	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-7			Residential	4	Fremont Avenue	64	64	65	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-8			Residential	4	Fremont Avenue	61	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-9	ETW No. 1		Residential	1	Fremont Avenue	59	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-10			Residential	1	Fremont Avenue	**66**	**66**	**67**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-11			Residential	1	Fremont Avenue	**66**	**66**	**67**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-12			Residential	3	Fremont Avenue	**67**	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-13			School Playground	1	Fremont Avenue	**66**	**66**	**67**	1	1	C(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-14			School Playground	1	Fremont Avenue	63	63	64	1	1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-15			Residential	1	Elm Park Street	56	56	58	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-16			Residential	2	Elm Park Street	60	61	62	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-17			Residential	8	Fremont Avenue	58	58	60	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-18			Residential	8	Fremont Avenue	58	58	60	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-19			Residential	8	Fremont Avenue	58	59	60	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L2a/TR-20			Residential	2	Fremont Avenue	**66**	**66**	**68**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
L-3	L3/TR-1			Residential	3	9th Street	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-2			Residential	11	9th Street	65	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-3			Residential	3	9th Street	**70**	**70**	**70**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-4			Residential	7	9th Street	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-5			Residential	7	9th Street	59	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-6			Residential	4	Glendon Way	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-7			Residential	2	Atlantic Boulevard	**70**	**70**	**72**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-8			Residential	4	Atlantic Boulevard	63	63	65	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-9			Residential	6	Atlantic Boulevard	**68**	**69**	**71**	2	3	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-10			Residential	4	Atlantic Boulevard	63	63	64	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-11			Residential	18	9th Street	58	58	60	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-12			Residential	5	Atlantic Boulevard	**70**	**70**	**72**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.1 Predicted Future Noise Level and Noise Barrier Analysis – TSM/TDM Alternative

TSM/TDM Inter-section ID	Receptor No.	ETW No.[1]	TNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA L_{eq}(h))[2]	Future Worst-Hour Noise Levels (dBA L_{eq}(h))																													
								2035 Noise Level				Activity Category	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[5,6]																							
								Without Project[2]	With Project[2]	With Project Minus No Project Condi-tions	With Project Minus Existing Condi-tions			6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
														L_{eq}(h)	I.L.[2]	NBR	L_{eq}(h)	I.L.[2]	NBR	L_{eq}(h)	I.L.[2]	NBR	L_{eq}(h)	I.L.[2]	NBR	L_{eq}(h)	I.L.[2]	NBR	L_{eq}(h)	I.L.[2]	NBR	L_{eq}(h)	I.L.[2]	NBR	L_{eq}(h)	I.L.[2]	NBR
	L3/TR-13			Residential	6	Atlantic Boulevard	62	62	64	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-14			Residential	6	Atlantic Boulevard	**70**	**70**	**72**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-15	ETW No. 1		Residential	6	Atlantic Boulevard	64	64	**67**	3	3	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-16			Residential	8	9th Street	57	58	60	2	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-17			Residential	10	Atlantic Boulevard	62	62	64	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-18			Residential	4	Atlantic Boulevard	**71**	**71**	**73**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-19			Commercial	1	Atlantic Boulevard	69	69	71	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-20			Commercial	1	Atlantic Boulevard	69	71	72	1	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-21			Commercial	1	Atlantic Boulevard	70	71	73	2	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-22		TNB No. 1	Residential	1	Atlantic Boulevard	**67**	**67**	**69**	2	2	B(67)	A/E	64	5	1	63	6	1	63	6	1	63	6	1	63	6	1	62	7	1	62	7	1	62	7	1
	L3/TR-23			Residential	1	Atlantic Boulevard	**68**	**69**	**71**	2	3	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-24			Residential	10	Olive Avenue	54	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-25			Residential	6	Atlantic Boulevard	**66**	**66**	**68**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-26			Residential	2	Atlantic Boulevard	58	58	60	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-27			Residential	2	Atlantic Boulevard	58	59	60	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-28			Residential	4	Atlantic Boulevard	65	**66**	**68**	2	3	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-29			Residential	6	Atlantic Boulevard	58	58	60	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-30			Residential	13	Olive Avenue	55	55	57	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-31			Residential	4	Atlantic Boulevard	62	62	64	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-32			Residential	3	Atlantic Boulevard	59	59	61	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-33			Residential	3	Atlantic Boulevard	65	65	**67**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-34		TNB No. 2	Residential	1	Atlantic Boulevard	**66**	**66**	**67**	1	1	B(67)	A/E	60	7	1	57	10	1	54	13	1	53	14	1	52	15	1	51	16	1	50	17	1	49	18	1
	L3/TR-35			Residential	7	Atlantic Boulevard	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-36	ETW No. 2		Residential	1	Glendon Way	64	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-37			Residential	4	Olive Avenue	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-38			Residential	3	Olive Avenue	**70**	**70**	**70**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L3/TR-39			Residential	3	Olive Avenue	65	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
L-4	L4/TR-1			Residential	1	Stoneman Avenue	**75**	**75**	**75**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-2			Residential	3	Stoneman Avenue	**70**	**70**	**70**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-3			Residential	4	Stoneman Avenue	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-4			Residential	4	Stoneman Avenue	62	63	63	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-5			Residential	1	Glendon Way	**69**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.1 Predicted Future Noise Level and Noise Barrier Analysis – TSM/TDM Alternative

TSM/TDM Inter-section ID	Receptor No.	ETW No.[1]	TNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA $L_{eq}(h)$)[2]	Future Worst-Hour Noise Levels (dBA $L_{eq}(h)$)																											
								2035 Noise Level				Activity Category	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[5,6]																							
								Without Project[2]	With Project[2]	With Project Minus No Project Condi-tions	With Project Minus Existing Condi-tions			6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
														L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR
	L4/TR-6			Residential	3	Garfield Avenue	**70**	**70**	**72**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-7			Residential	7	Stoneman Avenue	57	57	59	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-8			Residential	1	Garfield Avenue	**70**	**70**	**72**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-9			Medical Center	1	Garfield Avenue	69	69	72	3	3	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-10			Residential	6	Stoneman Avenue	57	57	59	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-11			Medical Center	1	Garfield Avenue	68	68	70	2	2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-12			Residential	6	Stoneman Avenue	55	55	58	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-13			Residential	1	Garfield Avenue	**68**	**68**	**71**	3	3	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-14			Residential	4	Garfield Avenue	**68**	**68**	**70**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-15			Residential	6	Stoneman Avenue	55	55	58	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-16			Office	1	Garfield Avenue	67	67	70	3	3	E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-17			Residential	1	Stoneman Avenue	56	56	58	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-18			Commercial/ Restaurant	1	Garfield Avenue	69	69	71	2	2	E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-19			Commercial	1	Garfield Avenue	69	69	70	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-20			Commercial	1	Garfield Avenue	68	68	70	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-21			Residential	1	Garfield Avenue	**68**	**68**	**70**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-22			Residential	1	2nd Street	54	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-23			Residential	6	Garfield Avenue	56	56	59	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-24			Office	1	Garfield Avenue	69	69	71	2	2	E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-25			Office	1	Garfield Avenue	69	69	72	3	3	E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-26			Residential	6	2nd Street	59	59	61	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-27			Residential	4	Garfield Avenue	**69**	**69**	**72**	3	3	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-28			Residential	3	Garfield Avenue	**69**	**69**	**71**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-29			Residential	1	2nd Street	60	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-30			Residential	1	Garfield Avenue	**68**	**68**	**70**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-31			Residential	1	Glendon Way	**67**	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-32			Residential	3	2nd Street	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-33			Residential	4	2nd Street	64	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-34			Residential	5	2nd Street	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L4/TR-35			Residential	1	2nd Street	**75**	**75**	**75**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.1 Predicted Future Noise Level and Noise Barrier Analysis – TSM/TDM Alternative

TSM/TDM Inter-section ID	Receptor No.	ETW No.[1]	TNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA L_{eq}(h))[2]	Future Worst-Hour Noise Levels (dBA L_{eq}(h))																													
								2035 Noise Level						Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[5,6]																							
														6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
								Without Project[2]	With Project[2]	With Project Minus No Project Condi-tions	With Project Minus Existing Condi-tions	Activity Category	Impact Type[3,4]	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR
L-5	L5/TR-1			Commercial/ Restaurant	1	Rosemead Boulevard	70	69	70	1	0	E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-2			Residential	1	Rosemead Boulevard	**71**	**71**	**72**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-3			Residential	2	Marshall Street	58	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-4			Residential	1	Rosemead Boulevard	**70**	**70**	**71**	1	1	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-5			Residential	1	Rosemead Boulevard	61	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-6			Residential	1	Rosemead Boulevard	**70**	**71**	**72**	1	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-7			Residential	2	Ralph Street	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-8			Residential	1	Rosemead Boulevard	**69**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-9			Residential	2	Rosemead Boulevard	56	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-10			Residential	3	Rosemead Boulevard	63	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-11			Residential	1	Rosemead Boulevard	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-12			Commercial	1	Rosemead Boulevard	70	70	71	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-13			Commercial	1	Rosemead Boulevard	74	74	76	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-14			Commercial	1	Rosemead Boulevard	74	74	76	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-15			Restaurant	1	Rosemead Boulevard	**73**	**73**	**75**	2	2	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-16			Residential	2	Newby Avenue	62	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-17			Residential	1	Rosemead Boulevard	62	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-18			Restaurant	1	Rosemead Boulevard	67	67	68	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-19			School	1	Rosemead Boulevard	65	65	67	2	2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-20			School Sports Field	1	Rosemead Boulevard	63	63	64	1	1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-21			Commercial	1	Lower Azusa Road	62	62	63	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-22	ETW No. 1		Residential	2	Damon Street	50	50	52	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-23	ETW No. 1		Residential	2	Mead Avenue	57	57	59	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-24			Office	1	Rosemead Boulevard	65	65	67	2	2	E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-25			Commercial	1	Rosemead Boulevard	62	62	63	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-26			Residential	1	Rosemead Boulevard	63	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-27			Commercial	1	Rosemead Boulevard	67	67	69	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-28			Commercial	1	Rosemead Boulevard	64	64	65	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-29			Commercial	1	Rosemead Boulevard	67	67	68	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.1 Predicted Future Noise Level and Noise Barrier Analysis – TSM/TDM Alternative

TSM/TDM Inter-section ID	Receptor No.	ETW No.[1]	TNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA L_{eq}(h))[2]	Future Worst-Hour Noise Levels (dBA L_{eq}(h))																													
								2035 Noise Level				Activity Category	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[5,6]																							
								Without Project[2]	With Project[2]	With Project Minus No Project Condi-tions	With Project Minus Existing Condi-tions			6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
														L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR
	L5/TR-30			Church	1	Rosemead Boulevard	68	68	70	2	2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-31			School	1	Rosemead Boulevard	68	68	70	2	2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-32			Commercial	1	Rosemead Boulevard	64	64	65	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-33		TNB No. 1	Residential	2	Rosemead Boulevard	**67**	**67**	**68**	1	1	B(67)	A/E	61	7	2	59	9	2	59	9	2	58	10	2	58	10	2	58	10	2	58	10	2	58	10	2
	L5/TR-34			Residential	2	Rosemead Boulevard	63	64	64	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-35			Restaurant	1	Rosemead Boulevard	**71**	**71**	**72**	1	1	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-36			Residential	1	Rosemead Boulevard	**70**	**70**	**71**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-37			Office	1	Rosemead Boulevard	67	67	68	1	1	E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-38			Commercial	1	Rosemead Boulevard	70	71	72	1	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-39			Residential	1	Rosemead Boulevard	**70**	**71**	**72**	1	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-40			Residential	4	Rosemead Boulevard	60	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-41			Office	1	Rosemead Boulevard	70	70	71	1	1	E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-42			Residential	1	Rosemead Boulevard	**70**	**70**	**71**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-43			Residential	2	Marshall Street	57	57	57	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L5/TR-44			Commercial	1	Rosemead Boulevard	70	70	71	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
L-8	L8/TR-1			Residential	2	Lyndon Street	57	57	60	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-2			Restaurant	1	Fair Oaks Avenue	68	69	**71**	2	3	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-3			Residential	3	Monterey Road	56	56	59	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-4			Residential	10	Brent Avenue	58	58	61	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-5			Commercial	1	Fair Oaks Avenue	71	71	74	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-6			Residential	5	Brent Avenue	59	59	61	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-7			Commercial	1	Fair Oaks Avenue	71	71	75	4	4	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-8			Commercial	1	Fair Oaks Avenue	71	71	74	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-9			Restaurant	1	Fair Oaks Avenue	69	69	**72**	3	3	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-10			Restaurant	1	Fair Oaks Avenue	68	68	**71**	3	3	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-11			Residential	1	Brent Avenue	58	58	61	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-12			Restaurant	1	Fair Oaks Avenue	70	70	**72**	2	2	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-13			Commercial	1	Fair Oaks Avenue	68	68	71	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-14			Commercial	1	Fair Oaks Avenue	70	70	73	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-15			Restaurant	1	Fair Oaks Avenue	70	70	**73**	3	3	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.1 Predicted Future Noise Level and Noise Barrier Analysis – TSM/TDM Alternative

TSM/TDM Inter-section ID	Receptor No.	ETW No.[1]	TNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA $L_{eq}(h)$)[2]	Future Worst-Hour Noise Levels (dBA $L_{eq}(h)$)																													
								2035 Noise Level				Activity Category	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[5,6]																							
														6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
								Without Project[2]	With Project[2]	With Project Minus No Project Condi-tions	With Project Minus Existing Condi-tions			L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR
	L8/TR-16			Commercial	1	Fair Oaks Avenue	71	71	74	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-17			Commercial	1	Fair Oaks Avenue	71	71	75	4	4	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-18			Restaurant	1	Fair Oaks Avenue	70	70	**73**	3	3	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-19			Restaurant	1	Fair Oaks Avenue	59	60	62	2	3	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L8/TR-20			Commercial	1	Fair Oaks Avenue	57	57	59	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-1	T1/TR-1			Residential	6	Charnwood Avenue	56	56	56	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-2			Residential	3	Charnwood Avenue	62	62	61	-1	-1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-3			Residential	4	Westmond Drive	63	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-4			Residential	3	Charnwood Avenue	63	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-5			Residential	3	Westmond Drive	65	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-6		TNB No. 1	Residential	3	Westmond Drive	60	60	60	0	0	B(67)	--	--	--	--	59	1	--	59	1	--	59	1	--	59	1	--	59	1	--	59	1	--	59	1	--
	T1/TR-7		TNB No. 1	Residential	2	Westmond Drive	**70**	**70**	**70**	0	0	B(67)	A/E	--	--	--	60	10	2	58	12	2	57	13	2	57	13	2	56	14	2	55	15	2	55	15	2
	T1/TR-8		TNB No. 1	Residential	3	Westmond Drive	**68**	**68**	**68**	0	0	B(67)	A/E	--	--	--	60	8	3	58	10	3	57	11	3	56	12	3	55	13	3	55	13	3	54	14	3
	T1/TR-9		TNB No. 1	Residential	3	Westmond Drive	**67**	**67**	**67**	0	0	B(67)	A/E	--	--	--	60	7	3	58	9	3	57	10	3	56	11	3	56	11	3	55	12	3	55	12	3
	T1/TR-10		TNB No. 1	Residential	4	Westmond Drive	63	63	64	1	1	B(67)	--	--	--	--	56	8	4	55	9	4	54	10	4	53	11	4	52	12	4	52	12	4	51	13	4
	T1/TR-11		TNB No. 1	Residential	2	Westmond Drive	**66**	**66**	**67**	1	1	B(67)	A/E	--	--	--	57	10	2	56	11	2	55	12	2	54	13	2	54	13	2	53	14	2	53	14	2
	T1/TR-12		TNB No. 1	Residential	2	Westmond Drive	**66**	**66**	**67**	1	1	B(67)	A/E	--	--	--	58	9	2	57	10	2	57	10	2	56	11	2	56	11	2	56	11	2	55	12	2
	T1/TR-13		TNB No. 1	Residential	2	Westmond Drive	65	**66**	**67**	1	2	B(67)	A/E	--	--	--	59	8	2	59	8	2	59	8	2	59	8	2	59	8	2	59	8	2	59	8	2
	T1/TR-14			Commercial	1	Valley Boulevard	71	71	71	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-15			Residential	4	Westmond Drive	62	62	64	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-16			Residential	5	Westmond Drive	59	59	62	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-17			Residential	5	Westmond Drive	56	56	60	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-18			Residential	3	Westmond Drive	56	56	60	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-19			Residential	3	Front Street	62	62	64	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-20			Industrial	1	Mission Road	64	65	66	1	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-21			Residential	1	Stockbridge Avenue	58	59	60	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-22			Residential	4	Lowell Avenue	59	59	61	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-23			Residential	2	Lowell Avenue	59	60	61	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-24			Commercial/ Industrial	1	Alhambra Avenue	67	68	69	1	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.1 Predicted Future Noise Level and Noise Barrier Analysis – TSM/TDM Alternative

TSM/TDM Inter-section ID	Receptor No.	ETW No.[1]	TNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA L_{eq}(h))[2]	Future Worst-Hour Noise Levels (dBA L_{eq}(h))																													
								2035 Noise Level				Activity Category	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[5,6]																							
								Without Project[2]	With Project[2]	With Project Minus No Project Condi-tions	With Project Minus Existing Condi-tions			6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
														L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR
	T1/TR-25			Commercial/ Industrial	1	Alhambra Avenue	68	68	70	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-26			Commercial/ Industrial	1	Alhambra Avenue	63	64	68	4	5	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-27			Industrial	1	Valley Boulevard	53	53	60	7	7	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-28			Industrial	1	Valley Boulevard	55	55	59	4	4	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-29			Residential	1	Valley Boulevard	**66**	**66**	**69**	3	3	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T1/TR-30		TNB No. 2	Residential	1	Highbury Avenue	**67**	**67**	64	-3	-3	B(67)	--	62	2	--	61	3	--	60	4	--	59	5	1	59	5	1	58	6	1	57	7	1	57	7	1
	T1/TR-31		TNB No. 2	Residential	4	Highbury Avenue	**67**	**67**	65	-2	-2	B(67)	--	64	1	--	62	3	--	60	5	4	59	6	4	59	6	4	58	7	4	57	8	4	57	8	4
	T1/TR-32		TNB No. 2	Residential	1	Highbury Avenue	64	64	64	0	0	B(67)	--	63	1	--	63	1	--	63	1	--	61	3	--	61	3	--	60	4	--	59	5	1	59	5	1
	T1/TR-33		TNB No. 2	Residential	4	Highbury Avenue	**67**	**67**	**66**	-1	-1	B(67)	A/E	**66**	0	--	**66**	0	--	64	2	--	62	4	--	61	5	4	60	6	4	60	6	4	59	7	4
	T1/TR-34		TNB No. 2	Residential	2	Highbury Avenue	**68**	**68**	**68**	0	0	B(67)	A/E	**67**	1	--	**67**	1	--	**66**	2	--	64	4	--	62	6	2	61	7	2	60	8	2	60	8	2
	T1/TR-35		TNB No. 2	Residential	5	Highbury Avenue	62	62	62	0	0	B(67)	--	62	0	--	62	0	--	62	0	--	61	1	--	60	2	--	59	3	--	58	4	--	58	4	--
	T1/TR-36		TNB No. 2	Residential	4	Highbury Avenue	**70**	**70**	**70**	0	0	B(67)	A/E	**69**	1	--	**69**	1	--	**67**	3	--	**66**	4	--	**66**	4	--	65	5	4	65	5	4	65	5	4
T2	T2/TR-1		TNB No. 1	Residential	9	Garfield Avenue	61	62	62	0	1	B(67)	--	59	3	--	59	3	--	59	3	--	58	4	--	58	4	--	58	4	--	58	4	--	58	4	--
	T2/TR-2		TNB No. 1	Residential	4	Garfield Avenue	**67**	**68**	**68**	0	1	B(67)	A/E	59	9	4	58	10	4	57	11	4	56	12	4	56	12	4	54	14	4	53	15	4	52	16	4
	T2/TR-3			Utility	1	Garfield Avenue	58	59	59	0	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T2/TR-4			Residential	1	Garfield Avenue	61	62	62	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T2/TR-5			School Tennis	1	Marengo Avenue	60	61	61	0	1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T2/TR-6			School Pool	1	Marengo Avenue	61	61	61	0	0	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T2/TR-7			Utility	1	State Street	70	70	70	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T2/TR-8		TNB No. 2	Residential	4	State Street	**71**	**71**	**71**	0	0	B(67)	A/E	**69**	2	--	**69**	2	--	**68**	3	--	**68**	3	--	**68**	3	--	**68**	3	--	**68**	3	--	**68**	3	--
	T2/TR-9		TNB No. 2	Residential	13	State Street[7]	**72**	**74**	**74**	0	2	B(67)	A/E	**71**	3	--	**69**	5	13	**68**	6	13	**67**	7	13	**66**	8	13	65	9	13	65	9	13	65	9	13
	T2/TR-10		TNB No. 2	Residential	13	State Street[8]	**72**	**74**	**74**	0	2	B(67)	A/E	**73**	1	--	**72**	2	--	**71**	3	--	**69**	5	13	**67**	7	13	**66**	8	13	65	9	13	65	9	13
	T2/TR-11		TNB No. 2	Residential	8	State Street[8]	**68**	**70**	**70**	0	2	B(67)	A/E	**69**	1	--	**68**	2	--	**66**	4	--	63	7	8	62	8	8	61	9	8	61	9	8	61	9	8
	T2/TR-12		TNB No. 2	Residential	1	State Street	53	54	54	0	1	B(67)	--	53	1	--	53	1	--	52	2	--	52	2	--	51	3	--	51	3	--	51	3	--	50	4	--
	T2/TR-13		TNB No. 2	Residential	1	State Street	47	48	48	0	1	B(67)	--	47	1	--	47	1	--	47	1	--	46	2	--	45	3	--	44	4	--	44	4	--	44	4	--
	T2/TR-14		TNB No. 2	Residential	1	State Street	65	65	**66**	1	1	B(67)	*A/E*	65	1	--	64	2	--	64	2	--	64	2	--	64	2	--	64	2	--	64	2	--	64	2	--
	T2/TR-15			Residential	1	State Street	47	49	49	0	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.1 Predicted Future Noise Level and Noise Barrier Analysis – TSM/TDM Alternative

TSM/TDM Inter-section ID	Receptor No.	ETW No.[1]	TNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA L_{eq}(h))[2]	Future Worst-Hour Noise Levels (dBA L_{eq}(h))																													
								2035 Noise Level				Activity Category	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[5,6]																							
								Without Project[2]	With Project[2]	With Project Minus No Project Condi-tions	With Project Minus Existing Condi-tions			6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
														L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR
T-3	T3/TR-1			Church BB Court	1	Pasadena Avenue	62	62	62	0	0	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-2			Restaurant	1	Pasadena Avenue	60	60	61	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-3			Commercial	1	Pasadena Avenue	66	66	66	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-4			Commercial	1	Pasadena Avenue	71	71	71	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-5			Commercial	1	Pasadena Avenue	68	68	68	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-6			Commercial	1	Pasadena Avenue	64	64	65	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-7			School	1	Saint John Avenue	66	66	67	1	1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-8			Residential	1	Waverly Drive	58	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-9			Residential	1	Waverly Drive	58	58	61	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-10			Residential	4	Gordon Terrace	57	57	59	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-11			Residential	2	Havendale Drive	57	57	61	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-12			Residential	1	Havendale Drive	57	57	61	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-13			Residential	1	Palmetto Drive	56	56	62	6	6	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-14			Residential	2	Palmetto Drive	55	55	58	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-15	ETW No. 5		Residential	1	Palmetto Drive	54	54	57	3	3	B(68)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-16			Residential	1	California Boulevard	**70**	**71**	**71**	0	1	B(69)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-17			School	1	Pasadena Avenue	64	64	66	2	2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	T3/TR-18			School Playground	1	Pasadena Avenue	60	61	61	0	1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Source: LSA Associates, Inc. (May 2014).

[1] Refer to Figure 6-1 for existing wall heights.

[2] Numbers in bold represent noise levels that approach or exceed the NAC.

[3] A dash (–) indicates that no barrier was analyzed at this location because the modeled receptor would not approach or exceed the NAC.

[4] Italics indicate either no outdoor frequent human use areas or abatement not feasible due to sidewalk or driveway access.

[5] Underlined numbers have been attenuated by at least 5 dBA (i.e., feasible wall height).

[6] Shaded areas represent existing walls and their approximate height.

[7] Receptor represents second story balconies.

[8] Receptor represents third story balconies.

A/E = Approach or Exceed
dBA L_{eq}(h) = equivalent continuous sound level measured in A-weighted decibels
ETW = Existing TSM/TDM Wall
I.L. = Insertion Loss
NAC = Noise Abatement Criteria
NBR = Number of Benefited Receptors
TDM = Transportation Demand Management
TNB = TSM/TDM Noise Barrier
TSM = Transportation System Management

Table B.2 Predicted Future Noise Level and Noise Barrier Analysis – TSM/TDM Alternative (Alternate Barriers)

TSM/TDM Inter-section ID	Receptor No.	ETW No.[1]	TNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA L_{eq}(h))	Future Worst-Hour Noise Levels (dBA L_{eq}(h))																													
								2035 Noise Level				Activity Category	Impact Type	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)																							
								Without Project	With Project	With Project Minus No Project Condi-tions	With Project Minus Existing Condi-tions			6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
														L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR
T-1	T1/TR-30		TNB No. 3	Residential	1	Highbury Avenue	**67**	**67**	64	-3	-3	B(67)	--	64	0	--	64	0	--	64	0	--	64	0	--	64	0	--	63	1	--	61	3	--	58	6	1
	T1/TR-31		TNB No. 3	Residential	4	Highbury Avenue	**67**	**67**	65	-2	-2	B(67)	--	65	0	--	65	0	--	64	1	--	62	3	--	60	5	4	58	7	4	57	8	4	56	9	4
	T1/TR-32		TNB No. 3	Residential	1	Highbury Avenue	64	64	64	0	0	B(67)	--	64	0	--	64	0	--	63	1	--	62	2	--	62	2	--	62	2	--	62	2	--	62	2	--
	T1/TR-33		TNB No. 3	Residential	4	Highbury Avenue	**67**	**67**	**66**	-1	-1	B(67)	A/E	60	6	4	59	7	4	58	8	4	58	8	4	58	8	4	57	9	4	56	10	4	55	11	4
	T1/TR-34		TNB No. 4	Residential	2	Highbury Avenue	**68**	**68**	**68**	0	0	B(67)	A/E	62	6	2	60	8	2	58	10	2	57	11	2	56	12	2	55	13	2	54	14	2	53	15	2
	T1/TR-35		TNB No. 4	Residential	5	Highbury Avenue	62	62	62	0	0	B(67)	--	62	0	--	61	1	--	61	1	--	60	2	--	59	3	--	58	4	--	58	4	--	58	4	--
	T1/TR-36		TNB No. 4	Residential	4	Highbury Avenue	**70**	**70**	**70**	0	0	B(67)	A/E	62	8	4	59	11	4	57	13	4	55	15	4	54	16	4	53	17	4	53	17	4	52	18	4

Source: LSA Associates, Inc. (May 2014).

[1] Refer to Figure 6-1 for existing wall heights.

[2] Numbers in bold represent noise levels that approach or exceed the NAC.

[3] A dash (–) indicates that no barrier was analyzed at this location because the modeled receptor would not approach or exceed the NAC.

[4] Italics indicate either no outdoor frequent human use areas or abatement not feasible due to sidewalk or driveway access.

[5] Underlined numbers have been attenuated by at least 5 dBA (i.e., feasible wall height).

A/E = Approach or Exceed
dBA L_{eq}(h) = equivalent continuous sound level measured in A-weighted decibels
ETW = Existing TSM/TDM Wall
I.L. = Insertion Loss
NAC = Noise Abatement Criteria
NBR = Number of Benefited Receptors
TDM = Transportation Demand Management
TNB = TSM/TDM Noise Barrier
TSM = Transportation System Management

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Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[1]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																							
												6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR	$L_{eq}(h)$	I.L.	NBR
BR-1		Residential	5	Amalia Avenue	59	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-2		Commercial	1	Atlantic Boulevard	68	68	69	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-3		Residential	14	Amalia Avenue	56	57	58	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-4		Commercial	1	Atlantic Boulevard	70	70	71	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-5		Residential	11	Amalia Avenue	57	58	59	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-6		Residential	13	Amalia Avenue	54	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-7		Commercial	1	Atlantic Boulevard	66	66	67	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-8		Residential	12	Amalia Avenue	54	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-9		Park	1	Atlantic Boulevard	61	61	62	1	1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-10		Church	1	Atlantic Boulevard	64	64	66	2	2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-11		Residential	1	Amalia Avenue	53	53	55	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-12		Residential	1	Amalia Avenue	54	55	56	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-13		School	1	Atlantic Boulevard	61	61	62	1	1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-14		Residential	11	Amalia Avenue	58	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-15		Residential	4	Amalia Avenue	59	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-16		Commercial	1	Atlantic Boulevard	69	69	71	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-17		Residential	3	Repetto Street	59	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-18		Residential	1	Repetto Street	61	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-19		Residential	1	Via Corona	61	62	62	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-20		Residential	1	Via Corona	61	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-21		Commercial	1	Atlantic Boulevard	69	69	72	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-22		Residential	1	Via Campo	63	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-23		Residential	2	Fernfield Drive	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-24		Commercial	1	Atlantic Boulevard	70	70	71	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-25		Residential	3	Fernfield Drive	**69**	**69**	**68**	-1	-1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-26		Church	1	Hillview Avenue	73	73	73	0	0	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-27		Residential	5	Hillview Avenue	**66**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-28		Commercial	1	Atlantic Boulevard	69	69	70	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-29		Commercial	1	Atlantic Boulevard	71	71	71	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-30		Restaurant	1	Atlantic Boulevard	68	68	69	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-31		Residential	7	Bradshaw Avenue	61	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-32		Commercial	1	Atlantic Boulevard	69	70	72	2	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-33		Residential	1	Brightwood Street	60	60	62	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-34		Residential	7	Atlantic Boulevard	59	59	61	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-35		Residential	1	Adobe Place	59	59	61	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-36		Residential	1	Atlantic Boulevard	64	64	65	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-37		Residential	4	Atlantic Boulevard	57	57	58	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-38		Residential	5	Atlantic Boulevard	57	57	58	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-39		Residential	16	Ynez Avenue	44	44	45	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-40		Residential	5	Atlantic Boulevard	58	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-41		Residential	3	Atlantic Boulevard	59	59	60	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-42		Residential	4	Atlantic Boulevard	62	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-43		Residential	13	Ynez Avenue	45	45	45	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-44		Residential	4	Atlantic Boulevard	62	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-45		Residential	1	Atlantic Boulevard	65	**66**	**67**	1	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-46		Residential	4	Ynez Avenue	48	49	50	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-47		Medical Center	1	Atlantic Boulevard	67	67	68	1	1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-48		Residential	11	Ynez Avenue	46	46	47	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-49		Medical Center	1	Atlantic Boulevard	68	68	69	1	1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-50		Residential	1	Cadiz Street	55	55	56	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-51		Residential	4	El Mercado Avenue	54	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-52		Restaurant	1	Atlantic Boulevard	69	69	**71**	2	2	B(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-53		Commercial	1	Atlantic Boulevard	69	69	71	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA L_{eq}(h)[1]	Future Peak-Hour Noise Levels, dBA L_{eq}(h)																													
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																							
												6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
BR-54		Residential	6	El Mercado Avenue	54	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-55		Commercial	1	Atlantic Boulevard	65	65	66	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-56		Residential	5	El Mercado Avenue	54	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-57		Restaurant	1	Atlantic Boulevard	64	64	65	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-58		Residential	1	El Mercado Avenue	55	55	57	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-59		Commercial	1	Atlantic Boulevard	70	70	72	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-60		Residential	12	El Mercado Avenue	56	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-61		Church	1	Atlantic Boulevard	**66**	**66**	**66**	0	0	C(67)/D(52)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-62		Hotel	1	Atlantic Boulevard	68	68	69	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-63		Residential	6	El Mercado Avenue	53	53	55	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-64		Commercial	1	Atlantic Boulevard	70	70	71	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-65		Restaurant	1	Atlantic Boulevard	69	69	70	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-66		Motel	1	El Mercado Avenue	62	62	63	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-67		Residential	3	Harding Avenue	49	49	50	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-68		Restaurant	1	Atlantic Boulevard	68	68	70	2	2	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-69		Commercial	1	Atlantic Boulevard	63	63	64	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-70		Residential	9	Chandler Avenue	58	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-71		Residential	1	Newmark Avenue	58	58	60	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-72		Commercial	1	Atlantic Boulevard	70	70	72	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-73		Commercial	1	Atlantic Boulevard	69	69	71	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-74		Residential	1	Chandler Avenue	59	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-75		Residential	1	Chandler Avenue	58	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-76		Residential	1	Chandler Avenue	58	58	60	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-77		Commercial	1	Atlantic Boulevard	68	68	69	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-78		Commercial	1	Atlantic Boulevard	69	69	71	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-79		Commercial	1	Atlantic Boulevard	63	63	64	1	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-80		Residential	3	Chandler Avenue	52	52	53	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-81		Commercial	1	Atlantic Boulevard	58	58	60	2	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-82		Residential	2	Chandler Avenue	52	53	53	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-83		Commercial	1	Atlantic Boulevard	61	62	63	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-84		Hotel	1	Atlantic Boulevard	58	59	58	-1	-1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-85		Residential	1	Atlantic Boulevard	**66**	**66**	**67**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-86		Residential	1	Hellman Avenue	**71**	**72**	**71**	-1	-1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-87		Residential	2	Hellman Avenue	63	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-88		Residential	3	9th Street	**70**	**70**	**70**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-89		Residential	3	9th Street	**74**	**74**	**74**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-90		Residential	2	9th Street	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-91		Residential	3	Ramona Road	65	**67**	**67**	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-92		Residential	11	9th Street	63	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-93		Residential	3	9th Street	**67**	**70**	**70**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-94		Residential	7	9th Street	60	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-95		Residential	7	9th Street	57	60	60	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-96		Residential	4	Glendon Way	65	**67**	**68**	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-97		Residential	2	Atlantic Boulevard	**69**	**69**	**70**	1	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-98		Residential	4	Atlantic Boulevard	62	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-99		Residential	1	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-100		Residential	4	Atlantic Boulevard	61	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-101		Residential	18	9th Street	57	57	58	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-102		Residential	1	Atlantic Boulevard	**68**	**68**	**70**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-103		Residential	6	Atlantic Boulevard	60	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-104		Residential	1	Atlantic Boulevard	**68**	**68**	**69**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-105		Residential	6	Atlantic Boulevard	62	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-106		Residential	8	9th Street	56	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[1]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																							
												6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
BR-107		Residential	10	Atlantic Boulevard	60	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-108		Residential	1	Atlantic Boulevard	**69**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-109		Commercial	1	Atlantic Boulevard	67	67	68	1	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-110		Commercial	1	Atlantic Boulevard	69	69	69	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-111		Residential	4	9th Street	54	54	55	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-112		Commercial	1	Atlantic Boulevard	68	68	68	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-113		Residential	20	Atlantic Boulevard	58	58	58	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-114		Residential	1	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-115		Residential	1	Atlantic Boulevard	48	48	48	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-116		Residential	4	Atlantic Boulevard	61	61	61	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-117		Residential	24	9th Street	48	48	48	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-118		Residential	1	Atlantic Boulevard	54	54	54	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-119		Residential	1	Atlantic Boulevard	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-120		Residential	1	Atlantic Boulevard	58	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-121		Residential	1	Atlantic Boulevard	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-122	BNB No. 5	Residential	1	Atlantic Boulevard	**69**	**69**	**69**	0	0	B(67)	A/E	62[4]	7	1	59	10	1	57	12	1	55	14	1	54	15	1	52	17	1	51	18	1	50	19	1
BR-123		Residential	1	Atlantic Boulevard	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-124		Residential	1	Atlantic Boulevard	58	58	58	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-125		Residential	1	Atlantic Boulevard	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-126		Residential	15	9th Street	54	55	55	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-127		Residential	6	Atlantic Boulevard	60	60	60	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-128		Commercial	1	Atlantic Boulevard	69	69	70	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-129		Commercial	1	Atlantic Boulevard	64	64	64	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-130		Residential	3	Beacon Street	59	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-131		Commercial	1	Atlantic Boulevard	68	68	68	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-132		Residential	4	Commonwealth Avenue	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-133		Commercial	1	Atlantic Boulevard	64	64	64	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-134		Residential	4	Commonwealth Avenue	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-135		Residential	12	Atlantic Boulevard	63	64	64	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-136		Residential	1	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-137		Residential	1	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-138		Office	1	Atlantic Boulevard	68	68	68	0	0	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-139		Commercial	1	Atlantic Boulevard	66	66	66	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-140		Residential	1	Atlantic Boulevard	65	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-141		Residential	3	Atlantic Boulevard	**70**	**70**	**70**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-142		Residential	1	Atlantic Boulevard	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-143		Residential	1	Atlantic Boulevard	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-144		Residential	20	Atlantic Boulevard	55	55	55	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-145		Residential	1	Atlantic Boulevard	64	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-146		Residential	2	5th Street	60	60	60	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-147		Residential	1	Atlantic Boulevard	60	60	60	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-148		Residential	1	Atlantic Boulevard	**67**	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-149		Residential	1	Atlantic Boulevard	63	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-150		Residential	3	Atlantic Boulevard	60	60	60	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-151		Residential	3	Atlantic Boulevard	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-152		Residential	3	Atlantic Boulevard	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-153		Residential	1	Atlantic Boulevard	61	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-154		Residential	5	Atlantic Boulevard	64	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-155		Residential	1	Atlantic Boulevard	49	49	49	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-156		Residential	4	Atlantic Boulevard	64	64	65	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-157		Restaurant	1	Atlantic Boulevard	70	70	70	0	0	B(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-158		Commercial	1	Atlantic Boulevard	69	68	68	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-159		Residential	4	Atlantic Boulevard	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[1]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																							
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
												L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
BR-160		Residential	1	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-161		Residential	4	Atlantic Boulevard	63	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-162		Residential	1	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-163		Residential	7	Atlantic Boulevard	59	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-164		Residential	2	Atlantic Boulevard	60	60	60	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-165		Residential	1	Atlantic Boulevard	**70**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-166		Residential	2	Atlantic Boulevard	59	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-167		Residential	1	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-168		Residential	8	Atlantic Boulevard	60	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-169		Residential	1	Atlantic Boulevard	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-170		Residential	2	Atlantic Boulevard	62	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-171		Residential	1	1st Street	63	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-172		Residential	2	Pine Street	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-173		Residential	1	Pine Street	56	56	56	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-174		Residential	5	Atlantic Boulevard	64	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-175		Residential	2	Pine Street	61	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-176		Residential	1	Atlantic Boulevard	68	68	68	0	0	B(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-177		Residential	1	Garfield Avenue	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-178		Restaurant	1	Atlantic Boulevard	64	64	64	0	0	B(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-179		Commercial	1	Atlantic Boulevard	72	72	71	-1	-1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-180		Medical Center	1	Huntington Drive	67	68	65	-3	-2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-181		Residential	1	Huntington Drive	**67**	**68**	**66**	-2	-1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-182		Commercial	1	Huntington Drive	70	71	71	0	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-183		Residential	1	Huntington Drive	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-184		Residential	3	La Senda Place	58	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-185		Residential	3	Huntington Drive	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-186		Residential	4	Huntington Drive	57	57	57	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-187		Residential	4	Court Avenue	57	58	58	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-188		Office	1	Huntington Drive	69	69	70	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-189		Residential	3	Camden Avenue	59	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-190		Residential	1	Huntington Drive	**68**	**69**	**69**	0	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-191		Residential	2	Wayne Avenue	58	58	58	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-192		Residential	1	Huntington Drive	**69**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-193		Residential	6	Huntington Drive	64	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-194		Residential	11	Huntington Drive	59	60	60	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-195		Residential	11	Huntington Drive	60	60	60	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-196		Commercial	1	Huntington Drive	69	69	70	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-197		Residential	4	Spruce Street	59	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-198		Residential	1	Huntington Drive	**66**	**67**	**67**	0	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-199		Commercial	1	Huntington Drive	68	69	69	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-200		Residential	1	Huntington Drive	**68**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-201		Residential	11	Spruce Street	56	57	57	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-202		Residential	1	Huntington Drive	**69**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-203		Residential	1	Marengo Avenue	57	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-204		Residential	3	Marengo Avenue	55	56	56	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-205		Residential	1	Huntington Drive	58	58	58	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-206		Residential	1	Huntington Drive	**70**	**70**	**71**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-207		Residential	7	Spruce Street	58	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-208		Residential	4	Huntington Drive	60	61	61	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-209		Residential	1	Huntington Drive	**68**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-210		Residential	1	Spruce Street	60	62	62	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-211		Residential	1	Huntington Drive	65	67	66	-1	-1	B(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-212		Office	1	Fair Oaks Avenue	66	69	68	-1	0	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[1]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																							
												6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
BR-213		Residential	4	Fair Oaks Avenue	54	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-214		Residential	1	Laurel Street	57	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-215		Residential	1	Fair Oaks Avenue	65	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-216		Residential	4	Oak Street	51	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-217		Residential	1	Oak Street	57	60	61	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-218		School	1	Fair Oaks Avenue	66	68	69	1	1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-219		Commercial	1	Fair Oaks Avenue	67	69	70	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-220		Commercial	1	Fair Oaks Avenue	67	70	70	0	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-221		Residential	3	Bank Street	56	58	61	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-222		Restaurant	1	Fair Oaks Avenue	66	68	69	1	1	B(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-223		Residential	2	Lyndon Street	57	60	61	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-224		Restaurant	1	Fair Oaks Avenue	68	70	70	0	0	B(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-225		Residential	3	Monterey Road	55	57	60	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-226		Residential	10	Brent Avenue	57	58	61	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-227		Commercial	1	Fair Oaks Avenue	70	70	74	4	4	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-228		Residential	5	Brent Avenue	58	58	62	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-229		Commercial	1	Fair Oaks Avenue	70	71	74	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-230		Commercial	1	Fair Oaks Avenue	70	70	74	4	4	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-231		Restaurant	1	Fair Oaks Avenue	68	68	**71**	3	3	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-232		Restaurant	1	Fair Oaks Avenue	67	67	70	3	3	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-233		Residential	1	Brent Avenue	58	58	61	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-234		Restaurant	1	Fair Oaks Avenue	68	69	**72**	3	3	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-235		Commercial	1	Fair Oaks Avenue	64	65	66	1	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-236		Commercial	1	Fair Oaks Avenue	65	65	67	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-237	BNB No. 6	Residential	1	Amberwood Drive[5]	65	65	**67**	2	2	B(67)	A/E	**67**	0	--	**67**	0	--	**66**	1	--	**66**	1	--	**66**	1	--	**66**	1	--	64	3	--	63	4	--
BR-238		Residential	1	Amberwood Drive	46	46	48	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-239		Residential	1	Amberwood Drive	47	47	49	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-240		Residential	1	Fair Oaks Avenue	65	65	**67**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-241		Residential	1	Fair Oaks Avenue	65	65	**67**	2	2	C(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-242		Restaurant	1	Fair Oaks Avenue	64	64	65	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-243		Industrial/ Commercial	1	Fair Oaks Avenue	64	64	65	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-244		Office	1	Fair Oaks Avenue	60	60	61	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-245		Commercial	1	Fair Oaks Avenue	66	66	67	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-246		Restaurant	1	Fair Oaks Avenue	63	63	64	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-247		Commercial	1	Fair Oaks Avenue	65	66	67	1	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-248		Commercial	1	Fair Oaks Avenue	72	73	75	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-249		Medical Facility	1	Fair Oaks Avenue	71	71	72	1	1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-250		Commercial	1	Fair Oaks Avenue	72	73	73	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-251		Restaurant	1	Fair Oaks Avenue	69	69	70	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-252		Restaurant	1	Fair Oaks Avenue	64	64	66	2	2	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-253		Commercial	1	Fair Oaks Avenue	65	65	67	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-254		Commercial	1	Fair Oaks Avenue	65	65	66	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-255		Park	1	Fair Oaks Avenue	53	53	54	1	1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-256		Commercial	1	Fair Oaks Avenue	63	63	64	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-257		Restaurant	1	Fair Oaks Avenue	63	63	64	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-258		Commercial	1	Fair Oaks Avenue	64	64	65	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-259		Medical Center	1	Fair Oaks Avenue	70	71	71	0	1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-260		Medical Center	1	Fair Oaks Avenue	70	70	71	1	1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-261		Office	1	Fair Oaks Avenue	67	67	68	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-262		Residential	1	Fair Oaks Avenue	**68**	**68**	**69**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-263		Residential	1	Arlington Drive	55	55	56	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-264		Medical Center	1	Fair Oaks Avenue	68	69	69	0	1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA L_{eq}(h)[1]	Future Peak-Hour Noise Levels, dBA L_{eq}(h)																													
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																									
												6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
BR-265		Commercial	1	Fair Oaks Avenue	67	67	68	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-266		Residential	5	Grace Terrace	59	59	59	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-267		Residential	3	State Street	60	60	61	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-268		Residential	3	Columbia Place	56	56	58	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-269		Residential	7	Columbia Place	54	54	57	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-270		Medical Center	1	Fair Oaks Avenue	66	66	68	2	2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-271		Residential	8	Grace Drive	54	54	57	3	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-272		Residential	6	Grace Drive	57	57	59	2	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-273		Institutional	1	Fair Oaks Avenue	65	65	67	2	2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-274		Commercial	1	Fair Oaks Avenue	64	64	66	2	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-275		Residential	1	Fair Oaks Avenue	65	65	**67**	2	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-276		Residential	5	Mound Avenue	55	55	58	3	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-277		Commercial	1	Fair Oaks Avenue	69	69	72	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-278		Commercial	1	Fair Oaks Avenue	67	67	70	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-279		Commercial	1	Fair Oaks Avenue	68	69	72	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-280		Restaurant	1	Fair Oaks Avenue	69	69	**73**	4	4	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-281		Commercial	1	Fair Oaks Avenue	70	70	73	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-282		Commercial	1	Fair Oaks Avenue	70	71	74	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-283		Restaurant	1	Fair Oaks Avenue	69	69	**72**	3	3	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-284		Restaurant	1	Oxley Street	59	59	63	4	4	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-285		Commercial	1	Fair Oaks Avenue	56	58	60	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-286		Commercial	1	Fair Oaks Avenue	66	68	69	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-287		Residential	6	Fair Oaks Avenue	59	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-288		Residential	8	Fair Oaks Avenue	59	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-289		Residential	1	Fair Oaks Avenue	65	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-290		Residential	2	Rollin Street	54	57	59	2	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-291		Commercial	1	Fair Oaks Avenue	66	68	69	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-292		Residential	4	Oak Street	55	57	59	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-293		Residential	1	Fair Oaks Avenue	65	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-294		Residential	1	Fair Oaks Avenue	57	60	60	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-295		Residential	3	Oak Street	51	53	55	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-296		Residential	1	Fair Oaks Avenue	64	**66**	**67**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-297		Residential	1	Fair Oaks Avenue	54	57	59	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-298		Residential	1	Fair Oaks Avenue	46	49	49	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-299		Residential	3	Spruce Street	48	49	49	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-300		Residential	1	Spruce Street	43	45	45	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-301		Residential	1	Fair Oaks Avenue	62	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-302		Residential	2	Spruce Street	58	60	60	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-303		Commercial	1	Huntington Drive	66	68	68	0	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-304		Commercial	1	Huntington Drive	71	71	70	-1	-1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-305		Residential	10	Oneonta Knoll	61	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-306		Residential	1	Huntington Drive	**70**	**70**	**70**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-307		Residential	2	Primrose Avenue	59	60	60	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-308		Residential	1	Huntington Drive	65	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-309		Commercial	1	Huntington Drive	70	71	71	0	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-310		Residential	4	La France Avenue	59	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-311		Residential	1	Huntington Drive	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-312		Residential	2	Marengo Avenue	60	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-313		Residential	1	Huntington Drive	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-314		Residential	3	Leman Street	57	58	58	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-315		Residential	4	Huntington Drive	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-316		Residential	1	Huntington Drive	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-317		Residential	3	Leman Street	58	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA L_{eq}(h)[1]	Future Peak-Hour Noise Levels, dBA L_{eq}(h)																													
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																							
												6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
BR-318		Residential	1	Huntington Drive	62	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-319		Residential	4	Fletcher Avenue	58	58	58	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-320		Commercial	1	Huntington Drive	70	70	70	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-321		Residential	1	Huntington Drive	60	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-322		Residential	1	Huntington Drive	**69**	**70**	**70**	0	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-323		Residential	4	Electric Avenue	56	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-324		Residential	1	Electric Avenue	**67**	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-325		Residential	1	Dos Robles Place	64	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-326		Residential	5	Dos Robles Place	58	58	58	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-327		Residential	2	Pine Street	61	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-328		Commercial	1	Huntington Drive	69	69	69	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-329		Residential	8	Huntington Drive	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-330		Residential	1	Huntington Drive	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-331		Residential	4	Pine Street	59	60	60	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-332		Residential	1	Huntington Drive	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-333		Residential	1	Huntington Drive	**68**	**69**	**69**	0	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-334		Residential	1	Huntington Drive	**69**	**70**	**70**	0	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-335		Residential	1	Huntington Drive	70	70	70	0	0	B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-336		Residential	3	Olive Avenue	60	61	61	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-337		Commercial	1	Atlantic Boulevard	69	69	69	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-338		Residential	3	Atlantic Boulevard	60	60	60	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-339		Residential	9	Olive Avenue	56	56	56	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-340		Residential	5	Atlantic Boulevard	60	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-341		Residential	4	Atlantic Boulevard	59	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-342		Residential	6	Atlantic Boulevard	59	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-343		Residential	5	Atlantic Boulevard	65	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-344		Residential	26	Olive Avenue	56	56	56	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-345		Residential	3	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-346		Residential	6	Atlantic Boulevard	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-347		Residential	3	Atlantic Boulevard	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-348		Residential	1	Atlantic Boulevard	59	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-349		Commercial	1	Atlantic Boulevard	69	69	70	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-350		Commercial	1	Atlantic Boulevard	62	62	62	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-351		Residential	2	Atlantic Boulevard	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-352		Residential	4	Atlantic Boulevard	65	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-353		Church	1	Atlantic Boulevard	63	63	63	0	0	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-354		Residential	18	Olive Avenue	55	55	55	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-355		Residential	1	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-356		Residential	3	Atlantic Boulevard	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-357		Residential	1	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-358		Residential	1	Atlantic Boulevard	65	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-359		Residential	2	Atlantic Boulevard	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-360		Residential	2	Atlantic Boulevard	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-361		Residential	3	Olive Avenue	53	53	53	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-362		Residential	1	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-363		Residential	6	Atlantic Boulevard	63	63	63	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-364		Residential	1	Olive Avenue	53	53	53	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-365		Residential	4	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-366		Residential	1	Atlantic Boulevard	60	60	60	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-367		Residential	4	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-368		Residential	8	Olive Avenue	58	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-369		Residential	1	Atlantic Boulevard	**69**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-370		Residential	1	Atlantic Boulevard	**69**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[1]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																							
												6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
BR-371		Commercial	1	Atlantic Boulevard	70	70	71	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-372		Commercial	1	Atlantic Boulevard	63	63	63	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-373		Church	1	Atlantic Boulevard	49	49	49	0	0	C(67)/D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-374		Residential	1	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-375		Residential	1	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-376		Residential	1	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-377		Residential	2	Atlantic Boulevard	65	65	**66**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-378		Residential	1	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-379		Residential	1	Atlantic Boulevard	**66**	**66**	**67**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-380		Commercial	1	Atlantic Boulevard	68	68	68	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-381		School	1	Atlantic Boulevard	63	63	63	0	0	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-382		Commercial	1	Atlantic Boulevard	69	69	69	0	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-383		Commercial	1	Atlantic Boulevard	66	66	66	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-384		Residential	1	Atlantic Boulevard	**70**	**70**	**69**	-1	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-385		Residential	3	Atlantic Boulevard	65	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-386		Residential	3	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-387		Residential	24	Olive Avenue	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-388		Residential	2	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-389		Residential	2	Atlantic Boulevard	**66**	**66**	**66**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-390		Residential	2	Atlantic Boulevard	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-391		Residential	1	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-392		Residential	3	Atlantic Boulevard	58	58	58	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-393		Residential	3	Atlantic Boulevard	**68**	**68**	**68**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-394		Residential	1	Atlantic Boulevard	48	48	48	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-395		Residential	3	Atlantic Boulevard	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-396		Residential	4	Atlantic Boulevard	64	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-397	BNB No. 4	Residential	1	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	A/E	63	4	--	62	5	1	61	6	1	61	6	1	61	6	1	61	6	1	61	6	1	61	6	1
BR-398		Residential	4	Shorb Street	57	57	58	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-399		Commercial	1	Atlantic Boulevard	66	66	66	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-400		Residential	1	Atlantic Boulevard	63	63	64	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-401		Commercial	1	Atlantic Boulevard	68	68	71	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-402		Commercial	1	Atlantic Boulevard	69	69	70	1	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-403		Residential	1	Atlantic Boulevard	**67**	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-404		Residential	1	Atlantic Boulevard	**67**	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-405		Residential	10	Olive Avenue	56	55	58	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-406		Residential	6	Atlantic Boulevard	**66**	**66**	**67**	1	2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-407		Residential	2	Atlantic Boulevard	65	62	65	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-408		Residential	2	Atlantic Boulevard	63	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-409		Residential	4	Atlantic Boulevard	64	64	65	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-410		Residential	6	Atlantic Boulevard	63	59	60	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-411		Residential	13	Olive Avenue	56	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-412		Residential	4	Atlantic Boulevard	**66**	**66**	**67**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-413		Residential	3	Atlantic Boulevard	63	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-414		Residential	3	Atlantic Boulevard	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-415		Residential	1	Atlantic Boulevard	**68**	**68**	**69**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-416		Residential	7	Olive Avenue	62	62	62	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-417		Residential	1	Glendon Way	64	64	64	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-418		Residential	4	Olive Avenue	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-419		Residential	3	Olive Avenue	**71**	**71**	**71**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-420		Residential	3	Olive Avenue	65	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-421		Residential	2	Ramona Road	**69**	**69**	**69**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-422		Residential	1	Ramona Road	**75**	**75**	**75**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-423		Residential	6	Olive Avenue	**70**	**70**	**70**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[1]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																							
												6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
BR-424		Residential	3	Hellman Avenue	64	64	65	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-425		Residential	2	Hellman Avenue	**67**	**67**	**67**	0	0	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-426		Residential	2	Hellman Avenue	61	61	61	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-427		Residential	8	Hathaway Avenue	56	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-428		Commercial	1	Atlantic Boulevard	63	64	64	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-429		Residential	10	Hathaway Avenue	55	55	55	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-430		Residential	2	Hathaway Avenue	53	53	54	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-431		Residential	3	Hathaway Avenue	49	49	50	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-432		Residential	1	Atlantic Boulevard	**67**	**68**	**66**	-2	-2	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-433		Residential	4	Hathaway Avenue	52	52	53	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-434		Residential	4	Hathaway Avenue	52	52	53	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-435		Residential	5	Hathaway Avenue	48	48	48	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-436		Residential	5	Hathaway Avenue	47	47	48	1	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-437		Residential	1	Atlantic Boulevard	63	63	64	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-438		Residential	4	Hathaway Avenue	48	48	49	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-439		Commercial	1	Atlantic Boulevard	65	65	67	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-440		Residential	2	Mabel Avenue	60	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-441		Commercial	1	Atlantic Boulevard	72	72	73	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-442		Residential	4	Mabel Avenue	60	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-443	BNB No. 2	Residential	2	Atlantic Boulevard	**68**	**68**	**69**	1	1	B(67)	A/E	**68**	1	--	**68**	1	--	**67**	2	--	**66**	3	--	65	4	--	64	5	2	62	7	2	59	10	2
BR-444	BNB No. 2	Residential	7	Atlantic Boulevard	65	65	**66**	1	1	B(67)	A/E	**66**	0	--	65	1	--	64	2	--	63	3	--	61	5	7	58	8	7	56	10	7	55	11	7
BR-445	BNB No. 2	Residential	12	Atlantic Boulevard	53	54	55	1	1	B(67)	--	54	1	--	54	1	--	53	2	--	53	2	--	53	2	--	53	2	--	53	2	--	53	2	--
BR-446	BNB No. 2	Residential	6	Atlantic Boulevard	65	65	**66**	1	1	B(67)	A/E	**66**	0	--	65	1	--	64	2	--	64	2	--	62	4	--	61	5	6	60	6	6	60	6	6
BR-447	BNB No. 2	Residential	6	Atlantic Boulevard	**66**	**67**	**67**	0	1	B(67)	A/E	65	2	--	65	2	--	64	3	--	61	6	6	59	8	6	58	9	6	57	10	6	56	11	6
BR-448	BNB No. 2	Residential	6	De La Fuente Street	59	59	60	1	1	B(67)	--	59	1	--	59	1	--	58	2	--	58	2	--	58	2	--	57	3	--	57	3	--	57	3	--
BR-449	BNB No. 2	Residential	3	Atlantic Boulevard	**68**	**68**	**69**	1	1	B(67)	A/E	**67**	2	--	**66**	3	--	64	5	3	62	7	3	60	9	3	60	9	3	58	11	3	57	12	3
BR-450	BNB No. 1	Residential	12	Atlantic Boulevard[5]	**67**	**68**	**69**	1	2	B(67)	A/E	**66**	3	--	65	4	--	60	9	12	58	11	12	57	12	12	56	13	12	55	14	12	55	14	12
BR-451	BNB No. 1	Residential	7	De La Fuente Street	61	61	62	1	1	B(67)	--	59	3	--	59	3	--	58	4	--	58	4	--	58	4	--	58	4	--	58	4	--	58	4	--
BR-452		Commercial	1	Atlantic Boulevard	71	71	72	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-453		Residential	7	De La Fuente Street	61	61	62	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-454		Commercial	1	Atlantic Boulevard	69	69	71	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-455		Commercial	1	Atlantic Boulevard	70	70	72	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-456		Residential	11	De La Fuente Street	57	57	59	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-457		Commercial	1	Atlantic Boulevard	71	71	73	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-458		Residential	5	De La Fuente Street	60	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-459		Commercial	1	Atlantic Boulevard	69	69	71	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-460		Residential	8	De La Fuente Street	60	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-461		Commercial	1	Atlantic Boulevard	68	68	70	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-462		Residential	5	De La Fuente Street	62	62	63	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-463		Commercial	1	Atlantic Boulevard	67	67	69	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-464		Residential	12	De La Fuente Street	63	63	64	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-465		Commercial	1	Atlantic Boulevard	68	68	69	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-466		Residential	6	De La Fuente Street	61	61	63	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-467		Church	1	Atlantic Boulevard	69	69	71	2	2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-468		Residential	3	Atlantic Boulevard	**67**	**67**	**68**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-469		Residential	6	Atlantic Boulevard	63	63	63	0	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-470		Residential	3	Atlantic Boulevard	54	54	56	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-471		Residential	6	Atlantic Boulevard	56	56	58	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-472		Residential	1	Atlantic Boulevard	52	52	53	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-473		Residential	9	Atlantic Boulevard	**69**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-474		Residential	12	Atlantic Boulevard	**69**	**69**	**70**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-475		Residential	4	El Repetto Drive	53	54	55	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-476		Residential	2	El Repetto Drive	56	56	57	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.3 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[1]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																												
						2035 Noise Levels				Activity Category (NAC)	Impact Type[2,3]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[1,4]																								
												6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
						Without Project[1]	With Project[1]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
BR-477		Residential	5	El Repetto Drive	**66**	**66**	**67**	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-478		Residential	3	El Repetto Drive	56	56	57	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-479		Residential	2	El Repetto Drive	59	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-480		Church	1	Atlantic Boulevard	64	64	65	1	1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-481		Commercial	1	Atlantic Boulevard	66	66	67	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-482		Residential	1	Brightwood Street	62	63	64	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-483		Commercial	1	Atlantic Boulevard	64	65	66	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-484		Commercial	1	Atlantic Boulevard	69	69	69	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-485		Restaurant	1	Atlantic Boulevard	69	70	69	-1	0	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-486		Commercial	1	Atlantic Boulevard	72	73	73	0	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-487		Residential	3	1st Street	65	65	65	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-488		Commercial	1	Atlantic Boulevard	75	75	77	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-489		Commercial	1	Atlantic Boulevard	70	70	72	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-490		Restaurant	1	Atlantic Boulevard	62	62	62	0	0	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-491		Commercial	1	Atlantic Boulevard	67	68	69	1	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-492		Residential	12	Woods Avenue	59	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-493		Commercial	1	Atlantic Boulevard	68	68	69	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-494		Residential	10	Woods Avenue	58	58	59	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-495		Residential	10	Woods Avenue	57	57	58	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-496		Commercial	1	Atlantic Boulevard	68	68	69	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-497		Commercial	1	Atlantic Boulevard	61	62	62	0	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-498		Residential	21	Woods Avenue	55	55	56	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-499		Restaurant	1	Atlantic Boulevard	63	64	65	1	2	B(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-500		Residential	1	Woods Avenue	54	55	56	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-501		Residential	10	Woods Avenue	54	54	55	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-502		Residential	9	Woods Avenue	53	54	55	1	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-503		Commercial	1	Atlantic Boulevard	65	65	66	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-504		Residential	19	Woods Avenue	57	57	58	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-505		Commercial	1	Atlantic Boulevard	69	69	70	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BR-506		Commercial	1	Atlantic Boulevard	64	64	64	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Source: LSA Associates, Inc. (May 2014).

[1] Numbers in **bold** represent noise levels that approach or exceed the NAC.

[2] A dash (–) indicates that no barrier was analyzed at this location because the modeled receptor would not approach or exceed the NAC.

[3] *Italics* indicate either no outdoor frequent human use areas or abatement not feasible due to sidewalk or driveway access.

[4] Underlined numbers have been attenuated by at least 5 dBA (i.e., feasible wall height).

[5] Receptor represents a second-story balcony.

A/E = Approach or Exceed
BNB = BRT Noise Barrier
BRT = Bus Rapid Transit
dBA = A-weighted decibels
dBA $L_{eq}(h)$ = equivalent continuous sound level measured per hour in A-weighted decibels
NAC = Noise Abatement Criteria

Table B.4 Predicted Future Noise Level and Noise Barrier Analysis – BRT Alternative (Alternate Barriers)

Receptor No.	BNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level (dBA L_{eq}(h))	Future Worst-Hour Noise Levels (dBA L_{eq}(h))																													
						2035 Noise Level				Activity Category	Impact Type	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)																							
						Without Project	With Project	With Project Minus No Project Conditions	With Project Minus Existing Conditions			6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet			18 Feet			20 Feet		
												L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR	L_{eq} (h)	I.L.[2]	NBR
BR-443	BNB No. 3	Residential	2	Atlantic Boulevard	**68**	**68**	**69**	1	1	B(67)	A/E	58[4]	11	2	56	13	2	55	14	2	55	14	2	54	15	2	54	15	2	53	16	2	53	16	2
BR-444	BNB No. 3	Residential	7	Atlantic Boulevard	65	65	**66**	1	1	B(67)	A/E	57	9	7	56	10	7	56	10	7	55	11	7	55	11	7	55	11	7	54	12	7	54	12	7
BR-445	BNB No. 3	Residential	12	Atlantic Boulevard	54	54	55	1	1	B(67)	--	54	1	--	54	1	--	54	1	--	54	1	--	54	1	--	54	1	--	54	1	--	54	1	--
BR-446	BNB No. 3	Residential	6	Atlantic Boulevard	65	65	**66**	1	1	B(67)	A/E	59	7	6	58	8	6	58	8	6	57	9	6	57	9	6	57	9	6	57	9	6	57	9	6
BR-447	BNB No. 3	Residential	6	Atlantic Boulevard	**66**	**67**	**67**	0	1	B(67)	A/E	58	9	6	57	10	6	56	11	6	55	12	6	55	12	6	55	12	6	55	12	6	55	12	6
BR-448	BNB No. 3	Residential	6	De La Fuente Street	59	59	60	1	1	B(67)	--	58	2	--	58	2	--	58	2	--	58	2	--	58	2	--	58	2	--	58	2	--	58	2	--
BR-449	BNB No. 3	Residential	3	Atlantic Boulevard	**68**	**68**	**69**	1	1	B(67)	A/E	59	10	3	56	13	3	55	14	3	55	14	3	54	15	3	54	15	3	54	15	3	54	15	3

Source: LSA Associates, Inc. (May 2014).

[1] Refer to Figure 6-1 for existing wall heights.

[2] Numbers in bold represent noise levels that approach or exceed the NAC.

[3] A dash (–) indicates that no barrier was analyzed at this location because the modeled receptor would not approach or exceed the NAC.

[4] Italics indicate either no outdoor frequent human use areas or abatement not feasible due to sidewalk or driveway access.

[5] Underlined numbers have been attenuated by at least 5 dBA (i.e., feasible wall height).

A/E = Approach or Exceed
BNB = BRT Noise Barrier
BRT = Bus Rapid Transit
dBA L_{eq}(h) = equivalent continuous sound level measured in A-weighted decibels
I.L. = Insertion Loss
NAC = Noise Abatement Criteria
NBR = Number of Benefited Receptors

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Table B.5 Predicted Future Traffic Noise Level – Freeway Tunnel Alternative – Single-Bore Design Variation

Receptor No.	Location	Type of Land Use	Number of Units/ Receptors Represented	Noise Abatement Criteria	Existing Noise Level[1] (dBA L_{eq})	Future No Build[1] (dBA L_{eq})	Predicted Noise Level, V1[1,2] (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V6[1,3] (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V7[1,4] (dBA L_{eq})	Change from Existing Level (dBA)
FR-1	Casuda Canyon Drive	Single Family Home	1	B(67)	63	63	65	2	65	2	64	1
FR-2	Corporate Center Drive	Single Family Home	1	B(67)	**70**[4]	**70**	**71**	1	**71**	1	**71**	1
FR-3	Ramona Boulevard	Golf Course	1	*C(67)*	73	73	74	1	74	1	73	0
FR-4	Corporate Center Drive	Storage Units	1	F	80	80	81	1	81	1	80	0
FR-5	Ramona Boulevard	Restaurant Patio	1	E(72)	68	68	69	1	69	1	69	1
FR-6	Balzac Street	Single Family Homes	3	B(67)	**69**	**69**	**69**	0	**69**	0	**69**	0
FR-7	Capetown Avenue	Single Family Homes	1	B(67)	64	64	**67**	3	**67**	3	**66**	2
FR-8	Balzac Street	Single Family Homes	1	B(67)	**68**	**68**	**71**	3	**71**	3	**70**	2
FR-9	Balzac Street	Single Family Homes	1	B(67)	**66**	**67**	**70**	4	**70**	4	**69**	3
FR-10	Balzac Street	Single Family Homes	2	B(67)	65	65	**69**	4	**69**	4	**68**	3
FR-11	Balzac Street	Single Family Homes	2	B(67)	64	65	**68**	4	**68**	4	**67**	3
FR-12	Capetown Avenue	Single Family Homes	3	B(67)	62	62	**66**	4	**66**	4	65	3
FR-13	Capetown Avenue	Single Family Homes	3	B(67)	61	61	**66**	5	**66**	5	65	4
FR-14	Julep Place	Single Family Homes	2	B(67)	64	65	**69**	5	**69**	5	**68**	4
FR-15	Charnwood Avenue	Single Family Homes	2	B(67)	64	65	**69**	5	**69**	5	**68**	4
FR-16	Charnwood Avenue	Single Family Homes	3	B(67)	59	59	64	5	64	5	62	3
FR-17	Charnwood Avenue	Single Family Homes	3	B(67)	**66**	**66**	**69**	3	**69**	3	**67**	1
FR-18	Charnwood Avenue	Single Family Homes	3	B(67)	62	63	**68**	6	**68**	6	**66**	4
FR-19	Charnwood Avenue	Single Family Homes	3	B(67)	65	65	**70**	5	**70**	5	**69**	4
FR-20	Charnwood Avenue	Single Family Homes	3	B(67)	61	62	**66**	5	**66**	5	65	4
FR-21	Hellman Avenue	Single Family Homes	2	B(67)	63	63	**68**	5	**68**	5	**67**	4
FR-22	Charnwood Avenue	Single Family Homes	4	B(67)	60	60	65	5	65	5	63	3
FR-23	Charnwood Avenue	Single Family Homes	5	B(67)	56	56	58	2	58	2	56	0
FR-24	Charnwood Avenue	Single Family Homes	1	B(67)	64	64	**68**	4	**68**	4	**66**	2
FR-25	Charnwood Avenue	Single Family Homes	3	B(67)	**70**	**70**	**75**	5	**75**	5	**74**	4
FR-26	Charnwood Avenue	Single Family Homes	2	B(67)	**71**	**71**	**76**	5	**76**	5	**75**	4
FR-27	Charnwood Avenue	Single Family Homes	6	B(67)	56	57	59	3	59	3	57	1
FR-28	Charnwood Avenue	Single Family Homes	3	B(67)	62	63	65	3	65	3	63	1
FR-29	Westmont Drive	Single Family Homes	4	B(67)	63	64	65	2	65	2	63	0
FR-30	Charnwood Avenue	Single Family Homes	3	B(67)	63	64	**66**	3	**66**	3	65	2
FR-31	Westmont Drive	Single Family Homes	3	B(67)	65	**66**	**67**	2	**67**	2	65	0
FR-32	Westmont Drive	Single Family Homes	3	B(67)	61	62	**66**	5	**66**	5	64	3
FR-33	Westmont Drive	Single Family Homes	2	B(67)	**70**	**71**	**73**	3	**73**	3	**72**	2
FR-34	Westmont Drive	Single Family Homes	3	B(67)	**68**	**68**	**75**	7	**75**	7	**74**	6
FR-35	Westmont Drive	Single Family Homes	3	B(67)	**67**	**67**	**70**	3	**70**	3	**69**	2
FR-36	Westmont Drive	Single Family Homes	4	B(67)	63	64	65	2	65	2	64	1
FR-37	Westmont Drive	Single Family Homes	2	B(67)	65	**66**	64	-1	64	-1	63	-2
FR-38	Westmont Drive	Single Family Homes	2	B(67)	65	65	**67**	2	**67**	2	**66**	1

Table B.5 Predicted Future Traffic Noise Level – Freeway Tunnel Alternative – Single-Bore Design Variation

Receptor No.	Location	Type of Land Use	Number of Units/ Receptors Represented	Noise Abatement Criteria	Existing Noise Level[1] (dBA L_{eq})	Future No Build[1] (dBA L_{eq})	Predicted Noise Level, V1[1,2] (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V6[1,3] (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V7[1,4] (dBA L_{eq})	Change from Existing Level (dBA)
FR-39	Westmont Drive	Single Family Homes	2	B(67)	65	65	**66**	1	**66**	1	**66**	1
FR-40	Valley Boulevard	Gas Station	1	F	68	68	69	1	69	1	69	1
FR-41	Westmont Drive	Single Family Homes	4	B(67)	60	60	64	4	64	4	63	3
FR-42	Westmont Drive	Single Family Homes	5	B(67)	57	57	61	4	61	4	61	4
FR-43	Westmont Drive	Single Family Homes	5	B(67)	55	56	59	4	59	4	58	3
FR-44	Westmont Drive	Single Family Homes	3	B(67)	55	55	58	3	58	3	57	2
FR-45	Front Street	Single Family Homes	3	B(67)	60	60	61	1	61	1	61	1
FR-46	Valley Boulevard	Apartment Complex	1	B(67)	64	64	65	1	65	1	65	1
FR-47	Highbury Avenue	Single Family Homes	1	B(67)	**68**	**66**	**73**	5	**73**	5	**72**	4
FR-48	Highbury Avenue	Single Family Homes	4	B(67)	**68**	**68**	**73**	5	**73**	5	**72**	4
FR-49	Highbury Avenue	Single Family Homes	4	B(67)	**67**	**68**	**74**	7	**74**	7	**73**	6
FR-50	Highbury Avenue	Single Family Homes	2	B(67)	**68**	**69**	**74**	6	**74**	6	**75**	4
FR-51	Highbury Avenue	Single Family Homes	4	B(67)	**70**	**71**	**74**	4	**74**	4	**73**	3
FR-52	Highbury Avenue	Single Family Homes	5	B(67)	55	55	59	4	59	4	57	2
FR-53	Paseo Rancho Casilla	CSU Apartments	1	B(67)	58	58	62	4	62	4	61	3
FR-54	Circle Drive	CSU Classrooms	1	D(52)	56	56	60	4	60	4	58	2
FR-55	Circle Drive	CSU Sports Fields	1	C(67)	57	57	59	2	59	2	58	1
FR-56	Center Plaza Drive	Office Building	1	E(72)	**74**	**74**	**74**	0	**74**	0	**74**	0
FR-57	Center Plaza Drive	Office Building	1	E(72)	62	63	64	2	64	2	63	1
FR-58	Sheriff Road	Police Training	1	C(72)	66	66	67	1	67	1	66	0
FR-59	California Boulevard	Hospital	1	D(52)	53	53	52	-1	52	-1	52	-1
FR-60	Pasadena Avenue	Commercial	1	F	62	62	62	0	62	0	62	0
FR-61	Pasadena Avenue	Commercial	1	F	56	56	55	-1	55	-1	55	-1
FR-62	Pasadena Avenue	Church - Basketball Court	1	C(67)	59	60	60	1	60	1	59	0
FR-63	Pasadena Avenue	Restaurant - Outdoor Patio	1	E(72)	58	58	58	0	58	0	58	0
FR-64	Pasadena Avenue	Commercial	1	F	63	63	63	0	63	0	63	0
FR-65	Pasadena Avenue	Commercial	1	F	70	70	66	-4	66	-4	66	-4
FR-66	Pasadena Avenue	Commercial	1	F	67	68	66	-1	67	0	66	-1
FR-67	Pasadena Avenue	Commercial	1	F	64	64	62	-2	63	-1	62	-2
FR-68	Pasadena Avenue	Apartment Complex	1	B(67)	64	65	**67**	3	**67**	3	65	1
FR-69	Pasadena Avenue	Apartment Complex	1	B(67)	61	62	65	4	65	4	64	3
FR-70	Pasadena Avenue	Vacant Land	1	G	59	59	67	8	67	8	66	7
FR-71	Pasadena Avenue	Commercial	1	F	66	66	69	3	69	3	68	2
FR-72	Colorado Boulevard	Outdoor Patio	1	E(72)	66	66	69	3	69	3	68	2
FR-73	Pasadena Avenue	Office Building	1	E(72)	66	66	69	3	69	3	67	1
FR-74	Walnut Street	Office Building	1	E(72)	66	67	67	1	67	1	67	1
FR-75	Cypress Avenue	Multi-Family Homes	6	B(67)	**70**	**71**	**72**	2	**71**	1	**71**	1

Table B.5 Predicted Future Traffic Noise Level – Freeway Tunnel Alternative – Single-Bore Design Variation

Receptor No.	**Location**	**Type of Land Use**	**Number of Units/ Receptors Represented**	**Noise Abatement Criteria**	**Existing Noise Level[1] (dBA L$_{eq}$)**	**Future No Build[1] (dBA L$_{eq}$)**	**Predicted Noise Level, V1[1,2] (dBA L$_{eq}$)**	**Change from Existing Level (dBA)**	**Predicted Noise Level, V6[1,3] (dBA L$_{eq}$)**	**Change from Existing Level (dBA)**	**Predicted Noise Level, V7[1,4] (dBA L$_{eq}$)**	**Change from Existing Level (dBA)**
FR-76	Orange Grove Place	Multi-Family Homes	2	B(67)	65	**66**	**66**	1	**66**	1	**66**	1
FR-77	Cypress Avenue	Single Family Homes	4	B(67)	**67**	**67**	**68**	1	**67**	0	**67**	0
FR-78	Orange Grove Place	Multi-Family Homes	2	B(67)	**66**	**67**	**67**	1	**67**	1	**67**	1
FR-79	Orange Grove Place	Multi-Family Homes	4	B(67)	65	65	**66**	1	**66**	1	**66**	1
FR-80	Orange Grove Place	Multi-Family Homes	4	B(67)	**73**	**73**	**75**	2	**75**	2	**74**	1
FR-81	Orange Grove Place	Multi-Family Homes-Pool	1	B(67)	63	64	65	2	64	1	64	1
FR-82	Orange Grove Place	Multi-Family Homes	3	B(67)	62	62	63	1	63	1	63	1
FR-83	Orange Grove Place	Multi-Family Homes	4	B(67)	63	64	65	2	65	2	64	1
FR-84	Orange Grove Place	Multi-Family Homes	3	B(67)	65	65	**66**	1	**66**	1	**66**	1
FR-85	Orange Grove Boulevard	School	1	C(67)/D(52)	**66**	**67**	**68**	2	**68**	2	**68**	2
FR-86	Cypress Avenue	Single Family Homes	1	B(67)	57	58	59	2	59	2	59	2
FR-87	Cypress Avenue	Single Family Homes	3	B(67)	58	59	60	2	60	2	59	1
FR-88	Cypress Avenue	Single Family Homes	3	B(67)	61	62	63	2	63	2	63	2
FR-89	Cypress Avenue	Single Family Homes	3	B(67)	64	64	**66**	2	**66**	2	65	1
FR-90	Cypress Avenue	Single Family Homes	3	B(67)	65	**66**	**67**	2	**67**	2	**66**	1
FR-91	Cypress Avenue	Multi-Family Homes	2	B(67)	**68**	**68**	**69**	1	**69**	1	**69**	1
FR-92	Cypress Avenue	Single Family Homes	3	B(67)	**66**	**67**	**68**	2	**68**	2	**67**	1
FR-93	Cypress Avenue	Single Family Homes	2	B(67)	**69**	**69**	**70**	1	**70**	1	**69**	0
FR-94	Cypress Avenue	Single Family Homes	1	B(67)	**71**	**72**	**72**	1	**72**	1	**72**	1
FR-95	Cypress Avenue	Single Family Homes	1	B(67)	**70**	**71**	**72**	2	**72**	2	**71**	1
FR-96	Lincoln Avenue	Single Family Homes	3	B(67)	**70**	**70**	**71**	1	**71**	1	**70**	0
FR-97	Lincoln Avenue	Single Family Homes	2	B(67)	**68**	**69**	**69**	1	**69**	1	**69**	1
FR-98	Lincoln Avenue	Single Family Homes	1	B(67)	**68**	**69**	**70**	2	**70**	2	**69**	1
FR-99	Cypress Avenue	Single Family Homes	1	B(67)	62	63	64	2	64	2	63	1
FR-100	Winona Avenue	Single Family Homes	6	B(67)	63	64	64	1	64	1	63	0
FR-101	Winona Avenue	Single Family Homes	1	B(67)	61	62	63	2	63	2	62	1
FR-102	Winona Avenue	Single Family Homes	3	B(67)	**67**	**67**	**68**	1	**68**	1	**67**	0
FR-103	Mayview Lane	Single Family Homes	2	B(67)	64	65	**67**	3	**67**	3	**66**	2
FR-104	Mayview Lane	Single Family Homes	3	B(67)	**70**	**71**	**72**	2	**72**	2	**71**	1
FR-105	Pasadena Avenue	Single Family Homes	2	B(67)	**72**	**73**	**74**	2	**74**	2	**73**	1
FR-106	Pasadena Avenue	Single Family Homes	1	B(67)	64	65	**69**	5	**69**	5	**68**	4
FR-107	Rosewood Lane	Single Family Homes	1	B(67)	62	62	64	2	64	2	64	2
FR-108	Pasadena Avenue	Single Family Homes	2	B(67)	**68**	**69**	**71**	3	**71**	3	**71**	3
FR-109	Rosewood Lane	Single Family Homes	2	B(67)	63	64	65	2	65	2	65	2
FR-110	Longwood Lane	Single Family Homes	1	B(67)	**70**	**71**	**73**	3	**73**	3	**73**	3
FR-111	Orange Grove Boulevard	Single Family Homes	2	B(67)	**66**	**66**	**67**	1	**67**	1	**67**	1

Table B.5 Predicted Future Traffic Noise Level – Freeway Tunnel Alternative – Single-Bore Design Variation

Receptor No.	**Location**	**Type of Land Use**	**Number of Units/ Receptors Represented**	**Noise Abatement Criteria**	**Existing Noise Level[1] (dBA L_{eq})**	**Future No Build[1] (dBA L_{eq})**	**Predicted Noise Level, V1[1,2] (dBA L_{eq})**	**Change from Existing Level (dBA)**	**Predicted Noise Level, V6[1,3] (dBA L_{eq})**	**Change from Existing Level (dBA)**	**Predicted Noise Level, V7[1,4] (dBA L_{eq})**	**Change from Existing Level (dBA)**
FR-112	Prospect Boulevard	Single Family Homes	2	B(67)	**66**	**67**	**68**	2	**68**	2	**67**	1
FR-113	Pasadena Avenue	Apartment Complex	3	B(67)	**69**	**69**	**70**	1	**70**	1	**70**	1
FR-114	Orange Grove Boulevard	Apartment Complex	1	B(67)	**67**	**67**	**68**	1	**68**	1	**67**	0
FR-115	Pasadena Avenue	School	1	C(67)/D(52)	**66**	**66**	**67**	1	**67**	1	**67**	1
FR-116	Walnut Street	Tennis Court	1	B(67)	**69**	**69**	**69**	0	**69**	0	**69**	0
FR-117	Walnut Street	Apartment Complex-Pool	1	B(67)	**69**	**69**	**69**	0	**69**	0	**69**	0
FR-118	Saint John Avenue	Commercial	1	F	63	63	63	0	63	0	62	-1
FR-119	Saint John Avenue	Commercial	1	F	64	64	67	3	67	3	66	2
FR-120	Saint John Avenue	Apartment Complex	1	B(67)	61	61	**68**	7	**68**	7	**68**	7
FR-121	Saint John Avenue	Church	1	D(52)	61	61	**69**	8	**69**	8	**67**	6
FR-122	Saint John Avenue	School	1	C(67)	54	54	56	2	56	2	56	2
FR-123	Saint John Avenue	Sports Field	1	C(67)	53	53	53	0	53	0	52	-1
FR-124	Saint John Avenue	School	1	D(52)	**66**	**66**	58	-8	58	-8	57	-9
FR-125	Waverly Drive	Single Family Homes	1	B(67)	58	58	56	-2	56	-2	55	-3
FR-126	Waverly Drive	Single Family Homes	1	B(67)	58	58	57	-1	57	-1	55	-3
FR-127	Gordon Terrace	Single Family Homes	4	B(67)	57	57	57	0	57	0	55	-2
FR-128	Gordon Terrace	Single Family Homes	2	B(67)	57	57	57	0	58	1	56	-1
FR-129	Bellevue Drive	Single Family Homes	1	B(67)	57	57	57	0	57	0	55	-2
FR-130	Palmetto Drive	Single Family Homes	1	B(67)	56	57	56	0	56	0	54	-2
FR-131	Palmetto Drive	Single Family Homes	2	B(67)	55	56	55	0	55	0	53	-2
FR-132	Palmetto Drive	Apartment Complex - Pool	1	B(67)	53	54	53	0	53	0	52	-1
FR-133	California Boulevard	Apartment Complex	1	B(67)	**68**	**68**	**67**	-1	**67**	-1	**67**	-1
FR-134	Pasadena Avenue	School	1	C(67)/D(52)	64	64	60	-4	61	-3	58	-6
FR-135	Pasadena Avenue	School Playground	1	C(67)	57	57	57	0	57	0	57	0
FR-136	California Boulevard	Apartment Complex	1	B(67)	59	59	59	0	59	0	58	-1
FR-137	California Boulevard	Single Family Homes	1	B(67)	53	53	53	0	53	0	52	-1

[1] Numbers in **bold** represent noise levels that approach or exceed the NAC.
[2] V1 = Operational Variation with Toll and with Express Bus Lane
[3] V6 = Operational Variation with Toll
[4] V7 = Operational Variation with Toll and No Trucks
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

Table B.6 Predicted Future Traffic Noise Level – Freeway Tunnel Alternative – Dual-Bore Design Variation

Receptor No.	Location	Type of Land Use	Number of Units/ Receptors Represented	Noise Abatement Criteria	Existing Noise Level[1] (dBA L_{eq})	Future No Build[1] (dBA L_{eq})	Predicted Noise Level, V2[1,2] (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V4[1,3] (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V5[1,4] (dBA L_{eq})	Change from Existing Level (dBA)
FR-1	Casuda Canyon Drive	Single Family Home	1	B(67)	63	63	65	2	65	2	64	1
FR-2	Corporate Center Drive	Single Family Home	1	B(67)	**70**[4]	**70**	**72**	2	**72**	2	**71**	1
FR-3	Ramona Boulevard	Golf Course	1	*C(67)*	73	73	74	1	75	2	74	1
FR-4	Corporate Center Drive	Storage Units	1	F	80	80	81	1	81	1	81	1
FR-5	Ramona Boulevard	Restaurant Patio	1	E(72)	68	68	70	2	70	2	69	1
FR-6	Balzac Street	Single Family Homes	3	B(67)	**69**	**69**	**70**	1	**71**	2	**70**	1
FR-7	Capetown Avenue	Single Family Homes	1	B(67)	64	64	**69**	5	**70**	6	**68**	4
FR-8	Balzac Street	Single Family Homes	1	B(67)	**68**	**68**	**72**	4	**73**	5	**71**	3
FR-9	Balzac Street	Single Family Homes	1	B(67)	**66**	**67**	**71**	5	**72**	6	**70**	4
FR-10	Balzac Street	Single Family Homes	2	B(67)	65	65	**70**	5	**72**	7	**70**	5
FR-11	Balzac Street	Single Family Homes	2	B(67)	64	65	**70**	6	**71**	7	**69**	5
FR-12	Capetown Avenue	Single Family Homes	3	B(67)	62	62	**68**	6	**69**	7	**67**	5
FR-13	Capetown Avenue	Single Family Homes	3	B(67)	61	61	**68**	7	**70**	9	**67**	6
FR-14	Julep Place	Single Family Homes	2	B(67)	64	65	**71**	7	**72**	8	**70**	6
FR-15	Charnwood Avenue	Single Family Homes	2	B(67)	64	65	**71**	7	**72**	8	**70**	6
FR-16	Charnwood Avenue	Single Family Homes	3	B(67)	59	59	**66**	7	**67**	8	64	5
FR-17	Charnwood Avenue	Single Family Homes	3	B(67)	**66**	**66**	**71**	5	**72**	6	**70**	4
FR-18	Charnwood Avenue	Single Family Homes	3	B(67)	62	63	**69**	7	**70**	8	**68**	6
FR-19	Charnwood Avenue	Single Family Homes	3	B(67)	65	65	**71**	6	**73**	8	**70**	5
FR-20	Charnwood Avenue	Single Family Homes	3	B(67)	61	62	**67**	6	**69**	8	**66**	5
FR-21	Hellman Avenue	Single Family Homes	2	B(67)	63	63	**70**	7	**71**	8	**69**	6
FR-22	Charnwood Avenue	Single Family Homes	4	B(67)	60	60	**66**	6	**68**	8	65	5
FR-23	Charnwood Avenue	Single Family Homes	5	B(67)	56	56	60	4	62	6	60	4
FR-24	Charnwood Avenue	Single Family Homes	1	B(67)	64	64	**70**	6	**72**	8	**70**	6
FR-25	Charnwood Avenue	Single Family Homes	3	B(67)	**70**	**70**	**75**	5	**77**	7	**75**	5
FR-26	Charnwood Avenue	Single Family Homes	2	B(67)	**71**	**71**	**76**	5	**78**	7	**75**	4
FR-27	Charnwood Avenue	Single Family Homes	6	B(67)	56	57	61	5	63	7	61	5
FR-28	Charnwood Avenue	Single Family Homes	3	B(67)	62	63	**67**	5	**68**	6	**66**	4
FR-29	Westmont Drive	Single Family Homes	4	B(67)	63	64	**69**	6	**70**	7	**68**	5
FR-30	Charnwood Avenue	Single Family Homes	3	B(67)	63	64	**68**	5	**69**	6	**67**	4
FR-31	Westmont Drive	Single Family Homes	3	B(67)	65	**66**	**70**	5	**72**	7	**70**	5
FR-32	Westmont Drive	Single Family Homes	3	B(67)	61	62	**66**	5	**68**	7	65	4
FR-33	Westmont Drive	Single Family Homes	2	B(67)	**70**	**71**	**75**	5	**77**	7	**75**	5
FR-34	Westmont Drive	Single Family Homes	3	B(67)	**68**	**68**	**76**	8	**78**	10	**76**	8
FR-35	Westmont Drive	Single Family Homes	3	B(67)	**67**	**67**	**71**	4	**73**	6	**71**	4
FR-36	Westmont Drive	Single Family Homes	4	B(67)	63	64	**66**	3	**68**	5	**66**	3
FR-37	Westmont Drive	Single Family Homes	2	B(67)	65	**66**	**66**	1	**67**	2	65	0
FR-38	Westmont Drive	Single Family Homes	2	B(67)	65	65	**66**	1	**67**	2	**66**	1

Table B.6 Predicted Future Traffic Noise Level – Freeway Tunnel Alternative – Dual-Bore Design Variation

Receptor No.	Location	Type of Land Use	Number of Units/ Receptors Represented	Noise Abatement Criteria	Existing Noise Level^{1} (dBA L_{eq})	Future No Build^{1} (dBA L_{eq})	Predicted Noise Level, V2^{1,2} (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V4^{1,3} (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V5^{1,4} (dBA L_{eq})	Change from Existing Level (dBA)
FR-39	Westmont Drive	Single Family Homes	2	B(67)	65	65	63	-2	64	-1	64	-1
FR-40	Valley Boulevard	Gas Station	1	F	68	68	69	1	69	1	69	1
FR-41	Westmont Drive	Single Family Homes	4	B(67)	60	60	64	4	65	5	64	4
FR-42	Westmont Drive	Single Family Homes	5	B(67)	57	57	62	5	64	7	62	5
FR-43	Westmont Drive	Single Family Homes	5	B(67)	55	56	61	6	62	7	61	6
FR-44	Westmont Drive	Single Family Homes	3	B(67)	55	55	60	5	61	6	59	4
FR-45	Front Street	Single Family Homes	3	B(67)	60	60	62	2	63	3	61	1
FR-46	Valley Boulevard	Apartment Complex	1	B(67)	64	64	64	0	**66**	2	64	0
FR-47	Highbury Avenue	Single Family Homes	1	B(67)	**68**	**66**	**73**	5	**74**	6	**73**	5
FR-48	Highbury Avenue	Single Family Homes	4	B(67)	**68**	**68**	**74**	6	**75**	7	**74**	6
FR-49	Highbury Avenue	Single Family Homes	4	B(67)	**67**	**68**	**76**	9	**77**	10	**75**	8
FR-50	Highbury Avenue	Single Family Homes	2	B(67)	**68**	**69**	**75**	7	**77**	9	**75**	7
FR-51	Highbury Avenue	Single Family Homes	4	B(67)	**70**	**71**	**76**	6	**78**	8	**76**	6
FR-52	Highbury Avenue	Single Family Homes	5	B(67)	55	55	60	5	62	7	60	5
FR-53	Paseo Rancho Casilla	CSU Apartments	1	B(67)	58	58	67	9	69	11	66	8
FR-54	Circle Drive	CSU Classrooms	1	D(52)	56	56	61	5	63	7	60	4
FR-55	Circle Drive	CSU Sports Fields	1	C(67)	57	57	61	4	62	5	60	3
FR-56	Center Plaza Drive	Office Building	1	E(72)	**74**	**74**	**75**	1	**75**	1	**75**	1
FR-57	Center Plaza Drive	Office Building	1	E(72)	62	63	64	2	65	3	64	2
FR-58	Sheriff Road	Police Training	1	C(72)	66	66	68	2	68	2	67	1
FR-59	California Boulevard	Hospital	1	D(52)	53	53	52	-1	53	0	52	-1
FR-60	Pasadena Avenue	Commercial	1	F	62	62	61	-1	61	-1	61	-1
FR-61	Pasadena Avenue	Commercial	1	F	56	56	55	-1	55	-1	55	-1
FR-62	Pasadena Avenue	Church - Basketball Court	1	C(67)	59	60	60	1	60	1	59	0
FR-63	Pasadena Avenue	Restaurant - Outdoor Patio	1	E(72)	58	58	58	0	58	0	58	0
FR-64	Pasadena Avenue	Commercial	1	F	63	63	63	0	63	0	63	0
FR-65	Pasadena Avenue	Commercial	1	F	70	70	67	-3	66	-4	66	-4
FR-66	Pasadena Avenue	Commercial	1	F	67	68	67	0	67	0	66	-1
FR-67	Pasadena Avenue	Commercial	1	F	64	64	63	-1	62	-2	62	-2
FR-68	Pasadena Avenue	Apartment Complex	1	B(67)	64	65	**68**	4	**69**	5	**67**	3
FR-69	Pasadena Avenue	Apartment Complex	1	B(67)	61	62	**66**	5	**67**	6	**66**	5
FR-70	Pasadena Avenue	Vacant Land	1	G	59	59	67	8	68	9	67	8
FR-71	Pasadena Avenue	Commercial	1	F	66	66	72	6	73	7	71	5
FR-72	Colorado Boulevard	Outdoor Patio	1	E(72)	66	66	70	4	**72**	6	70	4
FR-73	Pasadena Avenue	Office Building	1	E(72)	66	66	70	4	72	6	69	3
FR-74	Walnut Street	Office Building	1	E(72)	66	67	67	1	68	2	67	1
FR-75	Cypress Avenue	Multi-Family Homes	6	B(67)	**70**	**71**	**72**	2	**73**	3	**72**	2

Table B.6 Predicted Future Traffic Noise Level – Freeway Tunnel Alternative – Dual-Bore Design Variation

Receptor No.	Location	Type of Land Use	Number of Units/ Receptors Represented	Noise Abatement Criteria	Existing Noise Level^{1} (dBA L_{eq})	Future No Build^{1} (dBA L_{eq})	Predicted Noise Level, V2^{1,2} (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V4^{1,3} (dBA L_{eq})	Change from Existing Level (dBA)	Predicted Noise Level, V5^{1,4} (dBA L_{eq})	Change from Existing Level (dBA)
FR-76	Orange Grove Place	Multi-Family Homes	2	B(67)	65	**66**	**66**	1	**67**	2	**66**	1
FR-77	Cypress Avenue	Single Family Homes	4	B(67)	**67**	**67**	**68**	1	**68**	1	**67**	0
FR-78	Orange Grove Place	Multi-Family Homes	2	B(67)	**66**	**67**	**68**	2	**68**	2	**67**	1
FR-79	Orange Grove Place	Multi-Family Homes	4	B(67)	65	65	**66**	1	**67**	2	**66**	1
FR-80	Orange Grove Place	Multi-Family Homes	4	B(67)	**73**	**73**	**75**	2	**76**	3	**75**	2
FR-81	Orange Grove Place	Multi-Family Homes-Pool	1	B(67)	63	64	65	2	**66**	3	65	2
FR-82	Orange Grove Place	Multi-Family Homes	3	B(67)	62	62	63	1	64	2	63	1
FR-83	Orange Grove Place	Multi-Family Homes	4	B(67)	63	64	65	2	**66**	3	65	2
FR-84	Orange Grove Place	Multi-Family Homes	3	B(67)	65	65	**66**	1	**67**	2	**66**	1
FR-85	Orange Grove Boulevard	School	1	C(67)/D(52)	**66**	**67**	**69**	3	**70**	4	**68**	2
FR-86	Cypress Avenue	Single Family Homes	1	B(67)	57	58	60	3	61	4	59	2
FR-87	Cypress Avenue	Single Family Homes	3	B(67)	58	59	60	2	61	3	60	2
FR-88	Cypress Avenue	Single Family Homes	3	B(67)	61	62	63	2	65	4	63	2
FR-89	Cypress Avenue	Single Family Homes	3	B(67)	64	64	**66**	2	**67**	3	65	1
FR-90	Cypress Avenue	Single Family Homes	3	B(67)	65	**66**	**67**	2	**68**	3	**67**	2
FR-91	Cypress Avenue	Multi-Family Homes	2	B(67)	**68**	**68**	**69**	1	**71**	3	**69**	1
FR-92	Cypress Avenue	Single Family Homes	3	B(67)	**66**	**67**	**68**	2	**69**	3	**68**	2
FR-93	Cypress Avenue	Single Family Homes	2	B(67)	**69**	**69**	**70**	1	**72**	3	**70**	1
FR-94	Cypress Avenue	Single Family Homes	1	B(67)	**71**	**72**	**73**	2	**74**	3	**72**	1
FR-95	Cypress Avenue	Single Family Homes	1	B(67)	**70**	**71**	**72**	2	**73**	3	**71**	1
FR-96	Lincoln Avenue	Single Family Homes	3	B(67)	**70**	**70**	**72**	2	**73**	3	**71**	1
FR-97	Lincoln Avenue	Single Family Homes	2	B(67)	**68**	**69**	**70**	2	**71**	3	**69**	1
FR-98	Lincoln Avenue	Single Family Homes	1	B(67)	**68**	**69**	**70**	2	**71**	3	**70**	2
FR-99	Cypress Avenue	Single Family Homes	1	B(67)	62	63	64	2	**66**	4	64	2
FR-100	Winona Avenue	Single Family Homes	6	B(67)	63	64	64	1	**66**	3	63	0
FR-101	Winona Avenue	Single Family Homes	1	B(67)	61	62	63	2	64	3	62	1
FR-102	Winona Avenue	Single Family Homes	3	B(67)	**67**	**67**	**68**	1	**69**	2	**67**	0
FR-103	Mayview Lane	Single Family Homes	2	B(67)	64	65	**67**	3	**68**	4	**67**	3
FR-104	Mayview Lane	Single Family Homes	3	B(67)	**70**	**71**	**72**	2	**73**	3	**72**	2
FR-105	Pasadena Avenue	Single Family Homes	2	B(67)	**72**	**73**	**74**	2	**75**	3	**74**	2
FR-106	Pasadena Avenue	Single Family Homes	1	B(67)	64	65	**69**	5	**69**	5	**68**	4
FR-107	Rosewood Lane	Single Family Homes	1	B(67)	62	62	64	2	65	3	64	2
FR-108	Pasadena Avenue	Single Family Homes	2	B(67)	**68**	**69**	**71**	3	**72**	4	**71**	3
FR-109	Rosewood Lane	Single Family Homes	2	B(67)	63	64	65	2	**67**	4	65	2
FR-110	Longwood Lane	Single Family Homes	1	B(67)	**70**	**71**	**73**	3	**74**	4	**73**	3
FR-111	Orange Grove Boulevard	Single Family Homes	2	B(67)	**66**	**66**	**67**	1	**68**	2	**67**	1

Table B.6 Predicted Future Traffic Noise Level – Freeway Tunnel Alternative – Dual-Bore Design Variation

Receptor No.	**Location**	**Type of Land Use**	**Number of Units/ Receptors Represented**	**Noise Abatement Criteria**	**Existing Noise Level^1 (dBA L_{eq})**	**Future No Build^1 (dBA L_{eq})**	**Predicted Noise Level, V2^{1,2} (dBA L_{eq})**	**Change from Existing Level (dBA)**	**Predicted Noise Level, V4^{1,3} (dBA L_{eq})**	**Change from Existing Level (dBA)**	**Predicted Noise Level, V5^{1,4} (dBA L_{eq})**	**Change from Existing Level (dBA)**
FR-112	Prospect Boulevard	Single Family Homes	2	B(67)	**66**	**67**	**68**	2	**68**	2	**68**	2
FR-113	Pasadena Avenue	Apartment Complex	3	B(67)	**69**	**69**	**71**	2	**72**	3	**70**	1
FR-114	Orange Grove Boulevard	Apartment Complex	1	B(67)	**67**	**67**	**68**	1	**69**	2	**68**	1
FR-115	Pasadena Avenue	School	1	C(67)/D(52)	**66**	**66**	**67**	1	**68**	2	**67**	1
FR-116	Walnut Street	Tennis Court	1	B(67)	**69**	**69**	**70**	1	**70**	1	**70**	1
FR-117	Walnut Street	Apartment Complex-Pool	1	B(67)	**69**	**69**	**69**	0	**70**	1	**69**	0
FR-118	Saint John Avenue	Commercial	1	F	63	63	64	1	65	2	64	1
FR-119	Saint John Avenue	Commercial	1	F	64	64	69	5	71	7	68	4
FR-120	Saint John Avenue	Apartment Complex	1	B(67)	61	61	**70**	9	**70**	9	**69**	8
FR-121	Saint John Avenue	Church	1	D(52)	61	61	**71**	10	**72**	11	**70**	9
FR-122	Saint John Avenue	School	1	C(67)	54	54	58	4	59	5	57	3
FR-123	Saint John Avenue	Sports Field	1	C(67)	53	53	56	3	58	5	55	2
FR-124	Saint John Avenue	School	1	D(52)	**66**	**66**	63	-3	64	-2	62	-4
FR-125	Waverly Drive	Single Family Homes	1	B(67)	58	58	59	1	61	3	58	0
FR-126	Waverly Drive	Single Family Homes	1	B(67)	58	58	60	2	61	3	59	1
FR-127	Gordon Terrace	Single Family Homes	4	B(67)	57	57	59	2	60	3	58	1
FR-128	Gordon Terrace	Single Family Homes	2	B(67)	57	57	59	2	61	4	58	1
FR-129	Bellevue Drive	Single Family Homes	1	B(67)	57	57	59	2	60	3	58	1
FR-130	Palmetto Drive	Single Family Homes	1	B(67)	56	57	58	2	59	3	57	1
FR-131	Palmetto Drive	Single Family Homes	2	B(67)	55	56	57	2	58	3	56	1
FR-132	Palmetto Drive	Apartment Complex - Pool	1	B(67)	53	54	52	-1	53	0	52	-1
FR-133	California Boulevard	Apartment Complex	1	B(67)	**68**	**68**	**66**	-2	65	-3	**66**	-2
FR-134	Pasadena Avenue	School	1	C(67)/D(52)	64	64	59	-5	61	-3	59	-5
FR-135	Pasadena Avenue	School Playground	1	C(67)	57	57	56	-1	56	-1	56	-1
FR-136	California Boulevard	Apartment Complex	1	B(67)	59	59	58	-1	57	-2	58	-1
FR-137	California Boulevard	Single Family Homes	1	B(67)	53	53	52	-1	52	-1	52	-1

[1] Numbers in **bold** represent noise levels that approach or exceed the NAC.
[2] V2 = Operational Variation with Toll
[3] V4 = Operational Variation with No Toll
[4] V5 = Operational Variation with No Toll and No Trucks
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

Table B.7 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Single-Bore Design Variation

Receptor No.	EFTW No.[1]	FTNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[2]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
							2035 Noise Levels				Activity Category (NAC)	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[2,5,6]																							
													6 feet			8 feet			10 feet			12 feet			14 feet			16 feet			18 feet			20 feet		
							Without Project[2]	With Project[2]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
FR-1		FTNB No. 1	Residential	1	Casuda Canyon Drive	63	63	65	2	2	B(67)	--	63	2	--	62	3	--	62	3	--	62	3	--	62	3	--	62	3	--	62	3	--	62	3	--
FR-2		FTNB No. 1	Residential	1	Corporate Center Drive	**70**	**70**	**71**	1	1	B(67)	A/E	67	4	--	**67**	4	--	**67**	4	--	**67**	4	--	**66**	5	1	**66**	5	1	**66**	5	1	**66**	5	1
FR-3		FTNB No. 1	Golf Course	1	Ramona Boulevard	73	73	74	1	1	C(67)	*A/E*	73	1	--	73	1	--	73	1	--	73	1	--	73	1	--	73	1	--	73	1	--	73	1	--
FR-4			Commercial	1	Corporate Center Drive	80	80	81	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-5			Restaurant	1	Ramona Boulevard	68	68	69	1	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-6		FTNB No. 3A	Residential	3	Balzac Street	**69**	**69**	**69**	0	0	B(67)	A/E	64	5	3	63	6	3	62	7	3	61	8	3	60	9	3	59	10	3	58	11	3	58	11	3
FR-7		FTNB No. 3A	Residential	1	Capetown Avenue	64	64	**67**	3	3	B(67)	A/E	63	4	--	63	4	--	63	4	--	62	5	1	62	5	1	61	6	1	61	6	1	60	7	1
FR-8		FTNB No. 3A	Residential	1	Balzac Street	**68**	**68**	**71**	3	3	B(67)	A/E	61	10	1	59	12	1	58	13	1	57	14	1	57	14	1	57	14	1	56	15	1	56	15	1
FR-9		FTNB No. 3A	Residential	1	Balzac Street	**66**	**67**	**70**	3	4	B(67)	A/E	59	11	1	58	12	1	57	13	1	56	14	1	55	15	1	55	15	1	55	15	1	54	16	1
FR-10		FTNB No. 3A	Residential	2	Balzac Street	65	65	**69**	4	4	B(67)	A/E	62	7	2	60	9	2	59	10	2	58	11	2	57	12	2	57	12	2	56	13	2	56	13	2
FR-11		FTNB No. 3A	Residential	2	Balzac Street	64	65	**68**	3	4	B(67)	A/E	63	5	2	61	7	2	61	7	2	60	8	2	60	8	2	59	9	2	59	9	2	58	10	2
FR-12		FTNB No. 3A	Residential	3	Capetown Avenue	62	62	**66**	4	4	B(67)	A/E	62	4	--	62	4	--	61	5	3	61	5	3	60	6	3	59	7	3	58	8	3	58	8	3
FR-13		FTNB No. 3A	Residential	3	Capetown Avenue	61	61	**66**	5	5	B(67)	A/E	58	8	3	56	10	3	55	11	3	54	12	3	54	12	3	53	13	3	53	13	3	53	13	3
FR-14		FTNB No. 3A	Residential	2	Julep Place	64	65	**69**	4	5	B(67)	A/E	**68**	1	--	**68**	1	--	**67**	2	--	**67**	2	--	**66**	3	--	**66**	3	--	65	4	--	63	6	2
FR-15		FTNB No. 3A	Residential	2	Charnwood Avenue	64	65	**69**	4	5	B(67)	A/E	61	8	2	60	9	2	60	9	2	59	10	2	58	11	2	57	12	2	56	13	2	55	14	2
FR-16		FTNB No. 3A	Residential	3	Charnwood Avenue	59	59	64	5	5	B(67)	--	60	4	--	58	6	3	57	7	3	56	8	3	55	9	3	54	10	3	54	10	3	54	10	3
FR-17		FTNB No. 3A	Residential	3	Charnwood Avenue	**66**	**66**	**69**	3	3	B(67)	A/E	64	5	3	62	7	3	60	9	3	59	10	3	58	11	3	57	12	3	57	12	3	56	13	3
FR-18	EFTW No. 4		Residential	3	Charnwood Avenue	62	63	**68**	5	6	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-19	EFTW No. 4		Residential	3	Charnwood Avenue	65	65	**70**	5	5	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-20	EFTW No. 4		Residential	3	Charnwood Avenue	61	62	**66**	4	5	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-21			Residential	2	Hellman Avenue	63	63	**68**	5	5	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-22			Residential	4	Charnwood Avenue	60	60	65	5	5	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-23			Residential	5	Charnwood Avenue	56	56	58	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-24		FTNB No. 5	Residential	1	Charnwood Avenue	64	64	**68**	4	4	B(67)	A/E	65	3	--	64	4	--	64	4	--	64	4	--	63	5	1	63	5	1	63	5	1	63	5	1
FR-25		FTNB No. 5	Residential	3	Charnwood Avenue	**70**	**70**	**75**	5	5	B(67)	A/E	**67**	8	3	65	10	3	63	12	3	62	13	3	61	14	3	60	15	3	60	15	3	59	16	3
FR-26		FTNB No. 5	Residential	2	Charnwood Avenue	**71**	**71**	**76**	5	5	B(67)	A/E	**66**	10	2	63	13	2	61	15	2	60	16	2	59	17	2	58	18	2	57	19	2	57	19	2
FR-27		FTNB No. 5	Residential	6	Charnwood Avenue	56	57	59	2	3	B(67)	--	57	2	--	57	2	--	56	3	--	55	4	--	55	4	--	54	5	6	54	5	6	53	6	6
FR-28		FTNB No. 5	Residential	3	Charnwood Avenue	62	63	65	2	3	B(67)	--	63	2	--	62	3	--	61	4	--	59	6	3	58	7	3	58	7	3	57	8	3	57	8	3
FR-29		FTNB No. 5	Residential	4	Westmont Drive	63	64	65	1	2	B(67)	A/E	63	2	--	62	3	--	61	4	--	60	5	4	58	7	4	58	7	4	57	8	4	57	8	4
FR-30		FTNB No. 5	Residential	3	Charnwood Avenue	63	64	**66**	2	3	B(67)	A/E	65	1	--	63	3	--	62	4	--	61	5	3	60	6	3	59	7	3	58	8	3	58	8	3
FR-31		FTNB No. 5	Residential	3	Westmont Drive	65	**66**	**67**	1	2	B(67)	A/E	65	2	--	64	3	--	62	5	3	61	6	3	60	7	3	59	8	3	58	9	3	58	9	3
FR-32		FTNB No. 5	Residential	3	Westmont Drive	61	62	**66**	4	5	B(67)	A/E	65	1	--	64	2	--	63	3	--	63	3	--	62	4	--	62	4	--	60	6	3	59	7	3
FR-33		FTNB No. 5	Residential	2	Westmont Drive	**70**	**71**	**73**	2	3	B(67)	A/E	**67**	6	2	**66**	7	2	65	8	2	64	9	2	63	10	2	62	11	2	61	12	2	60	13	2
FR-34		FTNB No. 5	Residential	3	Westmont Drive	**68**	**68**	**75**	7	7	B(67)	A/E	63	12	3	62	13	3	61	14	3	60	15	3	59	16	3	59	16	3	58	17	3	57	18	3
FR-35		FTNB No. 5	Residential	3	Westmont Drive	**67**	**67**	**70**	3	3	B(67)	A/E	63	7	3	62	8	3	61	9	3	61	9	3	60	10	3	60	10	3	59	11	3	58	12	3
FR-36		FTNB No. 5	Residential	4	Westmont Drive	63	64	65	1	2	B(67)	--	60	5	4	59	6	4	58	7	4	57	8	4	57	8	4	56	9	4	55	10	4	55	10	4
FR-37		FTNB No. 5	Residential	2	Westmont Drive	65	**66**	64	-2	-1	B(67)	--	59	5	2	58	6	2	57	7	2	57	7	2	56	8	2	56	8	2	55	9	2	55	9	2
FR-38		FTNB No. 5	Residential	2	Westmont Drive	65	65	**67**	2	2	B(67)	--	63	4	--	63	4	--	63	4	--	63	4	--	63	4	--	63	4	--	63	4	--	63	4	--
FR-39			Residential	2	Westmont Drive	65	65	**66**	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-40			Commercial	1	Valley Boulevard	68	68	69	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-41			Residential	4	Westmont Drive	60	60	64	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-42			Residential	5	Westmont Drive	57	57	61	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-43			Residential	5	Westmont Drive	55	56	59	3	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-44			Residential	3	Westmont Drive	55	55	58	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-45			Residential	3	Front Street	60	60	61	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-46			Residential	1	Valley Boulevard	64	64	65	1	1	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-47		FTNB No. 7	Residential	1	Highbury Avenue	**68**	**68**	**73**	5	5	B(67)	A/E	**73**	0	--	**73**	0	--	**73**	0	--	**72**	1	--	**72**	1	--	**68**	5	1	**65**	8	1	63	10	1
FR-48		FTNB No. 7	Residential	4	Highbury Avenue	**68**	**68**	**73**	5	5	B(67)	A/E	**72**	1	--	**71**	2	--	**70**	3	--	**67**	6	4	65	8	4	64	9	4	62	11	4	61	12	4
FR-49		FTNB No. 7	Residential	4	Highbury Avenue	**67**	**68**	**74**	6	7	B(67)	A/E	**68**	6	4	**66**	8	4	65	9	4	64	10	4	63	11	4	62	12	4	62	12	4	61	13	4
FR-50		FTNB No. 8	Residential	2	Highbury Avenue	**68**	**69**	**74**	5	6	B(67)	A/E	**67**	7	2	65	9	2	64	10	2	62	11	2	61	13	2	60	14	2	59	15	2	58	16	2
FR-51		FTNB No. 8	Residential	4	Highbury Avenue	**70**	**71**	**74**	3	4	B(67)	A/E	**66**	8	4	63	11	4	61	13	4	60	14	4	59	15	4	58	16	4	57	17	4	57	17	4
FR-52			Residential	5	Highbury Avenue	55	55	59	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-53			Residential	1	Paseo Rancho Casilla	58	58	62	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.7 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Single-Bore Design Variation

Receptor No.	EFTW No.[1]	FTNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[2]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
							2035 Noise Levels				Activity Category (NAC)	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[2,5,6]																							
													6 feet			8 feet			10 feet			12 feet			14 feet			16 feet			18 feet			20 feet		
							Without Project[2]	With Project[2]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
FR-54			Classrooms	1	Circle Drive	56	56	60	4	4	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-55			Sports Field	1	Circle Drive	57	57	59	2	2	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-56			Office	1	Center Plaza Drive	**74**	**74**	**74**	0	0	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-57			Office	1	Center Plaza Drive	62	63	64	1	2	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-58			Police Training	1	Sheriff Road	66	66	67	1	1	C(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-59			Hospital	1	California Boulevard	53	53	52	-1	-1	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-60			Commercial	1	Pasadena Avenue	62	62	62	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-61			Commercial	1	Pasadena Avenue	56	56	55	-1	-1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-62			Church Recreational	1	Pasadena Avenue	59	60	60	0	1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-63			Restaurant	1	Pasadena Avenue	58	58	58	0	0	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-64			Commercial	1	Pasadena Avenue	63	63	63	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-65			Commercial	1	Pasadena Avenue	70	70	66	-4	-4	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-66			Commercial	1	Pasadena Avenue	67	68	67	-1	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-67			Commercial	1	Pasadena Avenue	64	64	63	-1	-1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-68			Residential	1	Pasadena Avenue	64	65	**67**	2	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-69			Residential	1	Pasadena Avenue	61	62	65	3	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-70			Vacant	1	Pasadena Avenue	59	59	67	8	8	G	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-71			Commercial	1	Pasadena Avenue	66	66	69	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-72		FTNB No. 9	Restaurant	1	Colorado Boulevard	66	66	69	3	3	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-73			Office	1	Pasadena Avenue	66	66	69	3	3	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-74			Office	1	Walnut Street	66	67	67	0	1	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-75		FTNB No. 10	Residential	6	Cypress Avenue	**70**	**71**	**71**	0	1	B(67)	A/E	--	--	--	**66**	5	6	64	7	6	63	8	6	62	9	6	61	10	6	61	10	6	60	11	6
FR-76	EFTW No. 8	FTNB No. 10	Residential	2	Orange Grove Place	65	**66**	**66**	0	1	B(67)	A/E	--	--	--	64	2	--	63	3	--	62	4	--	61	5	2	61	5	2	60	6	2	60	6	2
FR-77	EFTW No. 8	FTNB No. 10	Residential	4	Cypress Avenue	**67**	**67**	**67**	0	0	B(67)	A/E	--	--	--	**67**	0	--	64	3	--	63	4	--	62	5	4	61	6	4	61	6	4	60	7	4
FR-78	EFTW No. 8	FTNB No. 10	Residential	2	Orange Grove Place	**66**	**67**	**67**	0	1	B(67)	A/E	--	--	--	65	2	--	63	4	--	62	5	2	62	5	2	61	6	2	60	7	2	60	7	2
FR-79	EFTW No. 8	FTNB No. 10	Residential	4	Orange Grove Place	65	65	**66**	1	1	B(67)	A/E	--	--	--	65	1	--	63	3	--	62	4	--	62	4	--	61	5	4	60	6	4	60	6	4
FR-80	EFTW No. 8	FTNB No. 10	Residential	4	Orange Grove Place	**73**	**73**	**75**	2	2	B(67)	A/E	--	--	--	**70**	5	4	**66**	9	4	64	11	4	63	12	4	62	13	4	61	14	4	60	15	4
FR-81	EFTW No. 8	FTNB No. 10	Residential	1	Orange Grove Place	63	64	64	0	1	B(67)	--	--	--	--	64	0	--	63	1	--	62	2	--	62	2	--	61	3	--	60	4	--	60	4	--
FR-82	EFTW No. 8	FTNB No. 10	Residential	3	Orange Grove Place	62	62	63	1	1	B(67)	--	--	--	--	62	1	--	62	1	--	61	2	--	60	3	--	60	3	--	59	4	--	59	4	--
FR-83	EFTW No. 8	FTNB No. 10	Residential	4	Orange Grove Place	63	64	65	1	2	B(67)	--	--	--	--	64	1	--	64	1	--	63	2	--	63	2	--	62	3	--	62	3	--	62	3	--
FR-84	EFTW No. 8	FTNB No. 10	Residential	3	Orange Grove Place	65	65	**66**	1	1	B(67)	A/E	--	--	--	**66**	0	--	**66**	0	--	**66**	0	--	65	1	--	65	1	--	65	1	--	65	1	--
FR-85	EFTW No. 9	FTNB No. 11	School	1	Orange Grove Boulevard	**66**	**67**	**68**	1	2	C(67)/D(52)	A/E	--	--	--	**67**	1	--	**66**	2	--	65	3	--	65	3	--	64	4	--	63	5	1	63	5	1
FR-86	EFTW No. 9	FTNB No. 11	Residential	1	Cypress Avenue	57	58	59	1	2	B(67)	--	--	--	--	59	0	--	58	1	--	58	1	--	58	1	--	58	1	--	58	1	--	58	1	--
FR-87	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	58	59	60	1	2	B(67)	--	--	--	--	59	1	--	59	1	--	59	1	--	59	1	--	59	1	--	59	1	--	59	1	--
FR-88	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	61	62	63	1	2	B(67)	--	--	--	--	62	1	--	62	1	--	62	1	--	61	2	--	61	2	--	61	2	--	61	2	--
FR-89	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	64	64	**66**	2	2	B(67)	A/E	--	--	--	65	1	--	64	2	--	63	3	--	62	4	--	62	4	--	61	5	3	61	5	3
FR-90	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	65	**66**	**67**	1	2	B(67)	A/E	--	--	--	**66**	1	--	65	2	--	64	3	--	63	4	--	63	4	--	62	5	3	61	6	3
FR-91	EFTW No. 9	FTNB No. 11	Residential	2	Cypress Avenue	**68**	**68**	**69**	1	1	B(67)	--	--	--	--	67	2	--	65	4	--	64	5	2	63	6	2	62	7	2	61	8	2	61	8	2
FR-92	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	**66**	**67**	**68**	1	2	B(67)	A/E	--	--	--	69	2	--	68	3	--	67	4	--	66	5	3	65	6	3	65	6	3	64	7	3
FR-93	EFTW No. 9	FTNB No. 11	Residential	2	Cypress Avenue	**69**	**69**	**70**	1	1	B(67)	A/E	--	--	--	69	1	--	69	1	--	69	1	--	68	2	--	68	2	--	68	2	--	68	2	--
FR-94	EFTW No. 9	FTNB No. 11	Residential	1	Cypress Avenue	**71**	**72**	**72**	0	1	B(67)	A/E	--	--	--	71	1	--	71	1	--	71	1	--	71	1	--	70	2	--	70	2	--	70	2	--
FR-95	EFTW No. 9	FTNB No. 11	Residential	1	Cypress Avenue	**70**	**71**	**72**	1	2	B(67)	A/E	--	--	--	71	0	--	71	0	--	71	0	--	71	0	--	71	0	--	70	1	--	70	1	--
FR-96	EFTW No. 10	FTNB No. 12	Residential	3	Lincoln Avenue	**70**	**70**	**71**	1	1	B(67)	A/E	--	--	--	70	1	--	68	3	--	67	4	--	66	5	3	65	6	3	65	6	3	64	7	3
FR-97	EFTW No. 10	FTNB No. 12	Residential	2	Lincoln Avenue	**68**	**69**	**69**	0	1	B(67)	A/E	--	--	--	68	1	--	67	2	--	66	3	--	65	4	--	65	4	--	64	5	2	64	5	2
FR-98	EFTW No. 10	FTNB No. 12	Residential	1	Lincoln Avenue	**68**	**69**	**70**	1	2	B(67)	A/E	--	--	--	69	1	--	69	1	--	68	2	--	67	3	--	67	3	--	66	4	--	66	4	--
FR-99		FTNB No. 13A	Residential	1	Cypress Avenue	62	63	64	1	2	B(67)	--	64	0	--	64	0	--	64	0	--	64	0	--	64	0	--	64	0	--	64	0	--	64	0	--
FR-100		FTNB No. 13A	Residential	6	Winona Avenue	63	64	64	0	1	B(67)	--	63	1	--	63	1	--	63	1	--	63	1	--	63	1	--	63	1	--	63	1	--	63	1	--
FR-101		FTNB No. 13A	Residential	1	Winona Avenue	61	62	63	1	2	B(67)	--	62	0	--	62	0	--	62	0	--	62	0	--	62	0	--	62	0	--	62	0	--	62	0	--
FR-102		FTNB No. 13A	Residential	3	Winona Avenue	**67**	**67**	**68**	1	1	B(67)	A/E	67	0	--	67	0	--	67	0	--	67	0	--	67	0	--	67	0	--	67	0	--	67	0	--
FR-103		FTNB No. 13A	Residential	2	Mayview Lane	64	65	**67**	2	3	B(67)	A/E	**67**	0	--	**66**	1	--	**66**	1	--	**66**	1	--	**66**	1	--	**66**	1	--	**66**	1	--	**66**	1	--
FR-104		FTNB No. 13A	Residential	3	Mayview Lane	**70**	**71**	**72**	1	2	B(67)	A/E	**70**	2	--	**70**	2	--	**70**	2	--	**70**	2	--	**70**	2	--	**70**	2	--	**70**	2	--	**70**	2	--
FR-105		FTNB No. 13A	Residential	2	Pasadena Avenue	**72**	**73**	**74**	1	2	B(67)	A/E	**72**	2	--	**72**	2	--	**71**	3	--	**71**	3	--	**71**	3	--	**71**	3	--	**71**	3	--	**71**	3	--

Table B.7 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Single-Bore Design Variation

Receptor No.	EFTW No.[1]	FTNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[2]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
							2035 Noise Levels				Activity Category (NAC)	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[2,5,6]																							
													6 feet			8 feet			10 feet			12 feet			14 feet			16 feet			18 feet			20 feet		
							Without Project[2]	With Project[2]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
FR-106		FTNB No. 13A	Residential	1	Pasadena Avenue	64	65	**69**	4	5	B(67)	A/E	**68**	1	--	**67**	2	--	**67**	2	--	**67**	2	--	**67**	2	--	**67**	2	--	**67**	2	--	**67**	2	--
FR-107		FTNB No. 13A	Residential	1	Rosewood Lane	62	62	64	2	2	B(67)	--	63	1	--	62	2	--	62	2	--	62	2	--	62	2	--	62	2	--	62	2	--	62	2	--
FR-108		FTNB No. 13A	Residential	2	Pasadena Avenue	**68**	**69**	**71**	2	3	B(67)	A/E	**68**	3	--	**68**	3	--	**67**	4	--	**67**	4	--	**67**	4	--	**67**	4	--	**67**	4	--	**67**	4	--
FR-109		FTNB No. 13A	Residential	2	Rosewood Lane	63	64	65	1	2	B(67)	A/E	63	2	--	63	2	--	62	3	--	62	3	--	62	3	--	62	3	--	62	3	--	62	3	--
FR-110		FTNB No. 13A	Residential	1	Longwood Lane	**70**	**71**	**73**	2	3	B(67)	A/E	**70**	3	--	**70**	3	--	**70**	3	--	**70**	3	--	**69**	4	--	**69**	4	--	**69**	4	--	**69**	4	--
FR-111		FTNB No. 13A	Residential	2	Orange Grove Boulevard	**66**	**66**	**67**	1	1	B(67)	A/E	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--
FR-112		FTNB No. 13A	Residential	2	Prospect Boulevard	**66**	**67**	**68**	1	2	B(67)	A/E	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--
FR-113			Residential	3	Pasadena Avenue	**69**	**69**	**70**	1	1	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-114		FTNB No. 14	Residential	1	Orange Grove Boulevard	**67**	**67**	**68**	1	1	B(67)	--	**67**	1	--	**67**	1	--	**67**	1	--	**67**	1	--	**67**	1	--	**67**	1	--	**67**	1	--	**66**	2	--
FR-115		FTNB No. 14	School	1	Pasadena Avenue	**66**	**66**	**67**	1	1	C(67)/D(52)	A/E	64	3	--	62	5	1	61	6	1	60	7	1	60	7	1	59	8	1	59	8	1	58	9	1
FR-116		FTNB No. 15	Residential	1	Walnut Street	**69**	**69**	**69**	0	0	B(67)	A/E	65	4	--	61	8	1	59	10	1	58	11	1	57	12	1	56	13	1	55	14	1	54	15	1
FR-117		FTNB No. 15	Residential	1	Walnut Street	**69**	**69**	**69**	0	0	B(67)	A/E	**69**	0	--	**69**	0	--	**68**	1	--	65	4	--	63	6	1	62	7	1	62	7	1	61	8	1
FR-118			Commercial	1	Saint John Avenue	63	63	63	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-119			Commercial	1	Saint John Avenue	64	64	67	3	3	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-120			Residential	1	Saint John Avenue	61	61	**68**	7	7	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-121			Church	1	Saint John Avenue	61	61	69	8	8	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-122			School	1	Saint John Avenue	54	54	56	2	2	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-123			Sports Field	1	Saint John Avenue	53	53	53	0	0	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-124			School	1	Saint John Avenue	66	66	58	-8	-8	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-125			Residential	1	Waverly Drive	58	58	56	-2	-2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-126			Residential	1	Waverly Drive	58	58	57	-1	-1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-127			Residential	4	Gordon Terrace	57	57	57	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-128			Residential	2	Gordon Terrace	57	57	58	1	1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-129			Residential	1	Bellevue Drive	57	57	57	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-130			Residential	1	Palmetto Drive	56	57	56	-1	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-131			Residential	2	Palmetto Drive	55	56	55	-1	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-132	EFTW No. 15		Residential	1	Palmetto Drive	53	54	53	-1	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-133			Residential	1	California Boulevard	**68**	**68**	**67**	-1	-1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-134			School	1	Pasadena Avenue	64	64	61	-3	-3	C(67)/D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-135			School Playground	1	Pasadena Avenue	57	57	57	0	0	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-136			Residential	1	California Boulevard	59	59	59	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-137			Residential	1	California Boulevard	53	53	53	0	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Source: LSA Associates, Inc.. (May 2014).

[1] Refer to Figure 6-2 for existing wall heights.

[2] Numbers in **bold** represent noise levels that approach or exceed the NAC.

[3] A dash (–) indicates that no barrier was analyzed at this location because the modeled receptor would not approach or exceed the NAC.

[4] *Italics* indicate either no outdoor frequent human use areas or abatement not feasible due to sidewalk or driveway access.

[5] Underlined numbers have been attenuated by at least 5 dBA (i.e., feasible wall height).

[6] Shaded areas represent existing walls and their approximate height. Refer to Figure 6-2 for the existing wall height.

A/E = Approach or Exceed
dBA = A-weighted decibels
dBA $L_{eq}(h)$ = equivalent continuous sound level per hour measured in A-weighted decibels
EFTW = Existing Freeway Tunnel Wall
FTNB = Freeway Tunnel Noise Barrier
NAC = Noise Abatement Criteria

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Table B.8 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Single-Bore Design Variation (Alternate Barriers)

Receptor No.	EFTW No.[1]	FTNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[2]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																											
							2035 Noise Levels				Activity Category (NAC)	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[2,5,6]																							
													6 feet			8 feet			10 feet			12 feet			14 feet			16 feet			18 feet			20 feet		
							Without Project[2]	With Project[2]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
FR-1		FTNB No. 2	Residential	1	Casuda Canyon Drive	63	63	65	2	2	B(67)	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--
FR-2		FTNB No. 2	Residential	1	Corporate Center Drive	**70**	**70**	**71**	1	1	B(67)	A/E	**66**	5	1	65	6	1	65	6	1	65	6	1	65	6	1	65	6	1	65	6	1	65	6	1
FR-6		FTNB No. 3B	Residential	3	Balzac Street	**69**	**69**	**69**	0	0	B(67)	A/E	64	5	3	64	5	3	64	5	3	64	5	3	64	5	3	64	5	3	64	5	3	64	5	3
FR-7		FTNB No. 3B	Residential	1	Capetown Avenue	64	64	**67**	3	3	B(67)	A/E	63	4	--	63	4	--	63	4	--	63	4	--	63	4	--	63	4	--	63	4	--	63	4	--
FR-8		FTNB No. 3B	Residential	1	Balzac Street	**68**	**68**	**71**	3	3	B(67)	A/E	61	10	1	61	10	1	61	10	1	61	10	1	61	10	1	61	10	1	61	10	1	61	10	1
FR-9		FTNB No. 3B	Residential	1	Balzac Street	**66**	**67**	**70**	3	4	B(67)	A/E	59	11	1	58	12	1	57	13	1	56	14	1	55	15	1	55	15	1	55	15	1	54	16	1
FR-10		FTNB No. 3B	Residential	2	Balzac Street	65	65	**69**	4	4	B(67)	A/E	62	7	2	60	9	2	59	10	2	58	11	2	57	12	2	57	12	2	56	13	2	56	13	2
FR-11		FTNB No. 3B	Residential	2	Balzac Street	64	65	**68**	3	4	B(67)	A/E	63	5	2	61	7	2	61	7	2	60	8	2	60	8	2	59	9	2	59	9	2	58	10	2
FR-12		FTNB No. 3B	Residential	3	Capetown Avenue	62	62	**66**	4	4	B(67)	A/E	62	4	--	62	4	--	61	5	3	61	5	3	60	6	3	59	7	3	58	8	3	58	8	3
FR-13		FTNB No. 3B	Residential	3	Capetown Avenue	61	61	**66**	5	5	B(67)	A/E	57	9	3	56	10	3	55	11	3	54	12	3	54	12	3	53	13	3	53	13	3	53	13	3
FR-14		FTNB No. 3B	Residential	2	Julep Place	64	65	**69**	4	5	B(67)	A/E	**68**	1	--	**68**	1	--	**67**	2	--	**67**	2	--	**66**	3	--	**66**	3	--	65	4	--	63	6	2
FR-15		FTNB No. 3B	Residential	2	Charnwood Avenue	64	65	**69**	4	5	B(67)	A/E	61	8	2	60	9	2	59	10	2	59	10	2	58	11	2	56	13	2	56	13	2	55	14	2
FR-16		FTNB No. 3B	Residential	3	Charnwood Avenue	59	59	64	5	5	B(67)	--	60	4	--	58	6	3	57	7	3	56	8	3	55	9	3	54	10	3	54	10	3	54	10	3
FR-17		FTNB No. 3B	Residential	3	Charnwood Avenue	**66**	**66**	**69**	3	3	B(67)	A/E	64	5	3	62	7	3	60	9	3	59	10	3	58	11	3	57	12	3	57	12	3	56	13	3
FR-18	EFTW No. 4	FTNB No. 3B	Residential	3	Charnwood Avenue	62	63	**68**	5	6	B(67)	A/E	64	4	--	63	5	3	61	7	3	60	8	3	59	9	3	58	10	3	58	10	3	58	10	3
FR-19	EFTW No. 4	FTNB No. 3B	Residential	3	Charnwood Avenue	65	65	**70**	5	5	B(67)	A/E	**66**	4	--	62	8	3	61	9	3	59	11	3	58	12	3	57	13	3	57	13	3	57	13	3
FR-20	EFTW No. 4	FTNB No. 3B	Residential	3	Charnwood Avenue	61	62	**66**	4	5	B(67)	A/E	63	3	--	62	4	--	61	5	3	60	6	3	60	6	3	59	7	3	59	7	3	59	7	3
FR-21		FTNB No. 3B	Residential	2	Hellman Avenue	63	63	**68**	5	5	B(67)	A/E	63	5	2	63	5	2	62	6	2	62	6	2	61	7	2	61	7	2	61	7	2	61	7	2
FR-22		FTNB No. 3B	Residential	4	Charnwood Avenue	60	60	65	5	5	B(67)	--	63	2	--	63	2	--	62	3	--	62	3	--	62	3	--	62	3	--	61	4	--	61	4	--
FR-6		FTNB No. 4	Residential	3	Balzac Street	**69**	**69**	**69**	0	0	B(67)	A/E	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--
FR-7		FTNB No. 4	Residential	1	Capetown Avenue	64	64	**67**	3	3	B(67)	A/E	65	2	--	65	2	--	65	2	--	65	2	--	65	2	--	65	2	--	65	2	--	65	2	--
FR-8		FTNB No. 4	Residential	1	Balzac Street	**68**	**68**	**71**	3	3	B(67)	A/E	**69**	2	--	**69**	2	--	**69**	2	--	**69**	2	--	**69**	2	--	**69**	2	--	**69**	2	--	**69**	2	--
FR-9		FTNB No. 4	Residential	1	Balzac Street	**66**	**67**	**70**	3	4	B(67)	A/E	**68**	2	--	**67**	3	--	**67**	3	--	**67**	3	--	**66**	4	--	**66**	4	--	**66**	4	--	64	6	1
FR-10		FTNB No. 4	Residential	2	Balzac Street	65	65	**69**	4	4	B(67)	A/E	**66**	3	--	65	4	--	65	4	--	65	4	--	65	4	--	65	4	--	64	5	2	64	5	2
FR-11		FTNB No. 4	Residential	2	Balzac Street	64	65	**68**	3	4	B(67)	A/E	65	3	--	65	3	--	64	4	--	64	4	--	64	4	--	64	4	--	64	4	--	63	5	2
FR-12		FTNB No. 4	Residential	3	Capetown Avenue	62	62	**66**	4	4	B(67)	A/E	63	3	--	63	3	--	62	4	--	62	4	--	62	4	--	62	4	--	61	5	3	61	5	3
FR-13		FTNB No. 4	Residential	3	Capetown Avenue	61	61	**66**	5	5	B(67)	A/E	63	3	--	62	4	--	61	5	3	61	5	3	60	6	3	60	6	3	59	7	3	58	8	3
FR-14		FTNB No. 4	Residential	2	Julep Place	64	65	**69**	4	5	B(67)	A/E	**66**	3	--	64	5	2	64	5	2	63	6	2	61	8	2	61	8	2	60	9	2	59	10	2
FR-15		FTNB No. 4	Residential	2	Charnwood Avenue	64	65	**69**	4	5	B(67)	A/E	64	5	2	63	6	2	63	6	2	62	7	2	60	9	2	60	9	2	59	10	2	58	11	2
FR-16		FTNB No. 4	Residential	3	Charnwood Avenue	59	59	64	5	5	B(67)	--	63	1	--	62	2	--	60	4	--	59	5	3	58	6	3	58	6	3	58	6	3	57	7	3
FR-17		FTNB No. 4	Residential	3	Charnwood Avenue	**66**	**66**	**69**	3	3	B(67)	A/E	65	4	--	64	5	3	62	7	3	61	8	3	60	9	3	60	9	3	59	10	3	59	10	3
FR-18	EFTW No. 4	FTNB No. 4	Residential	3	Charnwood Avenue	62	63	**68**	5	6	B(67)	A/E	63	5	3	62	6	3	61	7	3	60	8	3	58	10	3	58	10	3	58	10	3	57	11	3
FR-19	EFTW No. 4	FTNB No. 4	Residential	3	Charnwood Avenue	65	65	**70**	5	5	B(67)	A/E	64	6	3	64	6	3	63	7	3	62	8	3	61	9	3	61	9	3	59	11	3	58	12	3
FR-20	EFTW No. 4	FTNB No. 4	Residential	3	Charnwood Avenue	61	62	**66**	4	5	B(67)	A/E	63	3	--	63	3	--	63	3	--	63	3	--	62	4	--	62	4	--	62	4	--	62	4	--
FR-21		FTNB No. 4	Residential	2	Hellman Avenue	63	63	**68**	5	5	B(67)	A/E	63	5	2	63	5	2	63	5	2	63	5	2	63	5	2	63	5	2	63	5	2	62	6	2
FR-22		FTNB No. 4	Residential	4	Charnwood Avenue	60	60	65	5	5	B(67)	--	63	2	--	62	3	--	62	3	--	62	3	--	62	3	--	62	3	--	62	3	--	62	3	--
FR-47		FTNB No. 6 S	Residential	1	Highbury Avenue	**68**	**68**	**73**	5	5	B(67)	A/E	--	--	--	**73**	0	--	**72**	1	--	**72**	1	--	**71**	2	--	**70**	3	--	**69**	4	--	**68**	5	1
FR-48		FTNB No. 6 S	Residential	4	Highbury Avenue	**68**	**68**	**73**	5	5	B(67)	A/E	--	--	--	**73**	0	--	**73**	0	--	**72**	1	--	**72**	1	--	**71**	2	--	**70**	3	--	**70**	3	--
FR-49		FTNB No. 6 S	Residential	4	Highbury Avenue	**67**	**68**	**74**	6	7	B(67)	A/E	--	--	--	**74**	0	--	**74**	0	--	**74**	0	--	**73**	1	--	**72**	2	--	**72**	2	--	**72**	2	--
FR-50		FTNB No. 6 S	Residential	2	Highbury Avenue	**68**	**69**	**74**	5	6	B(67)	A/E	--	--	--	**73**	1	--	**73**	2	--	**72**	2	--	**72**	2	--	**72**	2	--	**71**	3	--	**71**	3	--
FR-51		FTNB No. 6 S	Residential	4	Highbury Avenue	**70**	**71**	**74**	3	4	B(67)	A/E	--	--	--	**72**	2	--	**72**	2	--	**72**	2	--	**71**	3	--	**71**	3	--	**70**	4	--	**69**	5	4
FR-99		FTNB No. 13B	Residential	1	Cypress Avenue	62	63	64	1	2	B(67)	--	--	--	--	--	--	--	63	1	--	63	1	--	63	1	--	63	1	--	63	1	--	63	1	--
FR-100		FTNB No. 13B	Residential	6	Winona Avenue	63	64	64	0	1	B(67)	--	--	--	--	--	--	--	62	2	--	62	2	--	62	2	--	62	2	--	62	2	--	62	2	--
FR-101		FTNB No. 13B	Residential	1	Winona Avenue	61	62	63	1	2	B(67)	--	--	--	--	--	--	--	61	1	--	61	1	--	61	1	--	61	1	--	61	1	--	61	1	--
FR-102		FTNB No. 13B	Residential	3	Winona Avenue	**67**	**67**	**68**	1	1	B(67)	A/E	--	--	--	--	--	--	**67**	0	--	**66**	1	--	65	2	--	64	3	--	63	4	--	62	5	3
FR-103		FTNB No. 13B	Residential	2	Mayview Lane	64	65	**67**	2	3	B(67)	A/E	--	--	--	--	--	--	**66**	1	--	65	2	--	65	2	--	64	3	--	64	3	--	64	3	--
FR-104		FTNB No. 13B	Residential	3	Mayview Lane	**70**	**71**	**72**	1	2	B(67)	A/E	--	--	--	--	--	--	**67**	5	3	65	7	3	64	8	3	63	9	3	63	9	3	62	10	3
FR-105		FTNB No. 13B	Residential	2	Pasadena Avenue	**72**	**73**	**74**	1	2	B(67)	A/E	--	--	--	--	--	--	**67**	7	2	**66**	8	2	65	9	2	64	10	2	63	11	2	63	11	2
FR-106		FTNB No. 13B	Residential	1	Pasadena Avenue	64	65	**69**	4	5	B(67)	A/E	--	--	--	--	--	--	**67**	2	--	**67**	2	--	**67**	2	--	**67**	2	--	**67**	2	--	**66**	3	--
FR-107		FTNB No. 13B	Residential	1	Rosewood Lane	62	62	64	2	2	B(67)	--	--	--	--	--	--	--	62	2	--	62	2	--	62	2	--	62	2	--	61	3	--	61	3	--
FR-108		FTNB No. 13B	Residential	2	Pasadena Avenue	**68**	**69**	**71**	2	3	B(67)	A/E	--	--	--	--	--	--	**67**	4	--	**67**	4	--	**67**	4	--	**67**	4	--	**67**	4	--	**66**	5	2
FR-109		FTNB No. 13B	Residential	2	Rosewood Lane	63	64	65	1	2	B(67)	A/E	--	--	--	--	--	--	62	3	--	62	3	--	62	3	--	62	3	--	62	3	--	61	4	--
FR-110		FTNB No. 13B	Residential	1	Longwood Lane	**70**	**71**	**73**	2	3	B(67)	A/E	--	--	--	--	--	--	**70**	3	--	**70**	3	--	**69**	4	--	**69**	4	--	**69**	4	--	**69**	4	--

Table B.8 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Single-Bore Design Variation (Alternate Barriers)

Receptor No.	EFTW No.[1]	FTNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA L_{eq}(h)[2]	Future Peak-Hour Noise Levels, dBA L_{eq}(h)																													
							2035 Noise Levels				Activity Category (NAC)	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[2,5,6]																							
													6 feet			8 feet			10 feet			12 feet			14 feet			16 feet			18 feet			20 feet		
							Without Project[2]	With Project[2]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
FR-111		FTNB No. 13B	Residential	2	Orange Grove Boulevard	**66**	**66**	**67**	1	1	B(67)	A/E	--	--	--	--	--	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--
FR-112		FTNB No. 13B	Residential	2	Prospect Boulevard	**66**	**67**	**68**	1	2	B(67)	A/E	--	--	--	--	--	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--

Source: LSA Associates, Inc. (May 2014).

[1] Refer to Figure 6-2 for existing wall heights.

[2] Numbers in **bold** represent noise levels that approach or exceed the NAC.

[3] a dash (–) indicates that no barrier was analyzed at this location because the modeled receptor would not approach or exceed the NAC.

[4] *Italics* indicate either no outdoor frequent human use areas or abatement not feasible due to sidewalk or driveway access.

[5] Underlined numbers have been attenuated by at least 5 dBA (i.e., feasible wall height).

[6] Shaded areas represent existing walls and their approximate height. Refer to Figure 6-2 for the existing wall height.

A/E = Approach or Exceed
dBA = A-weighted decibels
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
EFTW = Existing Freeway Tunnel Wall
FTNB = Freeway Tunnel Noise Barrier
NAC = Noise Abatement Criteria

Table B.9 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Dual-Bore Design Variation

Receptor No.	EFTW No.[1]	FTNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[2]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
							2035 Noise Levels				Activity Category (NAC)	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[2,5,6]																							
													6 feet			8 feet			10 feet			12 feet			14 feet			16 feet			18 feet			20 feet		
							Without Project[2]	With Project[2]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
FR-1		FTNB No. 1	Residential	1	Casuda Canyon Drive	63	63	65	2	2	B(67)	--	63	2	--	63	2	--	63	2	--	63	2	--	63	2	--	63	2	--	63	2	--	63	2	--
FR-2		FTNB No. 1	Residential	1	Corporate Center Drive	**70**	**70**	**72**	2	2	B(67)	A/E	**69**	3	--	**69**	3	--	**68**	4	--	**68**	4	--	**68**	4	--	**68**	4	--	**68**	4	--	**68**	4	--
FR-3		FTNB No. 1	Golf Course	1	Ramona Boulevard	73	73	75	2	2	C(67)	*A/E*	74	1	--	74	1	--	74	1	--	74	1	--	74	1	--	74	1	--	74	1	--	74	1	--
FR-4			Commercial	1	Corporate Center Drive	80	80	81	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-5			Restaurant	1	Ramona Boulevard	68	68	70	2	2	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-6		FTNB No. 3A	Residential	3	Balzac Street	**69**	**69**	**71**	2	2	B(67)	A/E	65	6	3	64	7	3	63	8	3	62	9	3	62	9	3	61	10	3	60	11	3	60	11	3
FR-7		FTNB No. 3A	Residential	1	Capetown Avenue	64	64	**70**	6	6	B(67)	A/E	**66**	4	--	65	5	1	64	6	1	64	6	1	63	7	1	63	7	1	62	8	1	62	8	1
FR-8		FTNB No. 3A	Residential	1	Balzac Street	**68**	**68**	**73**	5	5	B(67)	A/E	63	10	1	61	12	1	60	13	1	59	14	1	59	14	1	58	15	1	58	15	1	57	16	1
FR-9		FTNB No. 3A	Residential	1	Balzac Street	**66**	**67**	**72**	5	6	B(67)	A/E	61	11	1	59	13	1	58	14	1	58	14	1	57	15	1	56	16	1	56	16	1	56	16	1
FR-10		FTNB No. 3A	Residential	2	Balzac Street	65	65	**72**	7	7	B(67)	A/E	65	7	2	63	9	2	61	11	2	60	12	2	59	13	2	59	13	2	58	14	2	58	14	2
FR-11		FTNB No. 3A	Residential	2	Balzac Street	64	65	**71**	6	7	B(67)	A/E	65	6	2	63	8	2	62	9	2	62	9	2	61	10	2	61	10	2	60	11	2	60	11	2
FR-12		FTNB No. 3A	Residential	3	Capetown Avenue	62	62	**69**	7	7	B(67)	A/E	65	4	--	65	4	--	64	5	3	64	5	3	63	6	3	62	7	3	61	8	3	60	9	3
FR-13		FTNB No. 3A	Residential	3	Capetown Avenue	61	61	**70**	9	9	B(67)	A/E	60	10	3	58	12	3	57	13	3	56	14	3	55	15	3	55	15	3	54	16	3	54	16	3
FR-14		FTNB No. 3A	Residential	2	Julep Place	64	65	**72**	7	8	B(67)	A/E	**71**	1	--	**71**	1	--	**71**	1	--	**70**	2	--	**70**	2	--	**69**	3	--	**68**	4	--	**66**	6	2
FR-15		FTNB No. 3A	Residential	2	Charnwood Avenue	64	65	**72**	7	8	B(67)	A/E	65	7	2	64	8	2	63	9	2	61	11	2	60	12	2	59	13	2	58	14	2	57	15	2
FR-16		FTNB No. 3A	Residential	3	Charnwood Avenue	59	59	**67**	8	8	B(67)	A/E	63	4	--	62	5	3	60	7	3	59	8	3	58	9	3	57	10	3	56	11	3	56	11	3
FR-17		FTNB No. 3A	Residential	3	Charnwood Avenue	**66**	**66**	**72**	6	6	B(67)	A/E	**66**	6	3	65	7	3	64	8	3	63	9	3	61	11	3	60	12	3	60	12	3	59	13	3
FR-18	EFTW No. 4		Residential	3	Charnwood Avenue	62	63	**70**	7	8	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-19	EFTW No. 4		Residential	3	Charnwood Avenue	65	65	**73**	8	8	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-20	EFTW No. 4		Residential	3	Charnwood Avenue	61	62	**69**	7	8	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-21			Residential	2	Hellman Avenue	63	63	**71**	8	8	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-22			Residential	4	Charnwood Avenue	60	60	**68**	8	8	B(67)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-23			Residential	5	Charnwood Avenue	56	56	62	6	6	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-24		FTNB No. 5	Residential	1	Charnwood Avenue	64	64	**72**	8	8	B(67)	A/E	**68**	4	--	**68**	4	--	**68**	4	--	**68**	4	--	**68**	4	--	**68**	4	--	**68**	4	--	**68**	4	--
FR-25		FTNB No. 5	Residential	3	Charnwood Avenue	**70**	**70**	**77**	7	7	B(67)	A/E	**72**	5	3	**72**	5	3	**72**	5	3	**72**	5	3	**72**	5	3	**72**	5	3	**72**	5	3	**72**	5	3
FR-26		FTNB No. 5	Residential	2	Charnwood Avenue	**71**	**71**	**78**	7	7	B(67)	A/E	**68**	10	2	65	13	2	63	15	2	62	16	2	61	17	2	60	18	2	59	19	2	59	19	2
FR-27		FTNB No. 5	Residential	6	Charnwood Avenue	56	57	63	6	7	B(67)	--	62	1	--	61	2	--	61	2	--	60	3	--	59	4	--	58	5	6	58	5	6	57	6	6
FR-28		FTNB No. 5	Residential	3	Charnwood Avenue	62	63	**68**	5	6	B(67)	A/E	**67**	1	--	**66**	2	--	65	3	--	64	4	--	63	5	3	62	6	3	61	7	3	60	8	3
FR-29		FTNB No. 5	Residential	4	Westmont Drive	63	64	**70**	6	7	B(67)	A/E	**69**	1	--	**68**	2	--	**67**	3	--	65	5	4	63	7	4	62	8	4	61	9	4	61	9	4
FR-30		FTNB No. 5	Residential	3	Charnwood Avenue	63	64	**69**	5	6	B(67)	A/E	**68**	1	--	**67**	2	--	**66**	3	--	65	4	--	64	5	3	63	6	3	62	7	3	61	8	3
FR-31		FTNB No. 5	Residential	3	Westmont Drive	65	**66**	**72**	6	7	B(67)	A/E	**70**	2	--	**69**	3	--	**68**	4	--	**68**	4	--	65	7	3	64	8	3	63	9	3	62	10	3
FR-32		FTNB No. 5	Residential	3	Westmont Drive	61	62	**68**	6	7	B(67)	A/E	**67**	1	--	**67**	1	--	**66**	2	--	**66**	2	--	65	3	--	65	3	--	64	4	--	63	5	3
FR-33		FTNB No. 5	Residential	2	Westmont Drive	**70**	**71**	**77**	6	7	B(67)	A/E	**69**	8	2	**68**	9	2	**67**	10	2	**66**	11	2	65	12	2	64	13	2	63	14	2	62	15	2
FR-34		FTNB No. 5	Residential	3	Westmont Drive	**68**	**68**	**78**	10	10	B(67)	A/E	65	13	3	64	14	3	63	15	3	62	16	3	61	17	3	61	17	3	60	18	3	59	19	3
FR-35		FTNB No. 5	Residential	3	Westmont Drive	**67**	**67**	**73**	6	6	B(67)	A/E	**66**	7	3	65	8	3	64	9	3	63	10	3	62	11	3	62	11	3	61	12	3	60	13	3
FR-36		FTNB No. 5	Residential	4	Westmont Drive	63	64	**68**	4	5	B(67)	A/E	62	6	4	61	7	4	60	8	4	59	9	4	58	10	4	57	11	4	56	12	4	56	12	4
FR-37		FTNB No. 5	Residential	2	Westmont Drive	65	**66**	**67**	1	2	B(67)	A/E	61	6	2	60	7	2	59	8	2	58	9	2	58	9	2	57	10	2	56	11	2	56	11	2
FR-38		FTNB No. 5	Residential	2	Westmont Drive	65	65	**67**	2	2	B(67)	A/E	61	6	2	61	6	2	60	7	2	60	7	2	60	7	2	60	7	2	59	8	2	59	8	2
FR-39			Residential	2	Westmont Drive	65	65	64	-1	-1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-40			Commercial	1	Valley Boulevard	68	68	69	1	1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-41			Residential	4	Westmont Drive	60	60	65	5	5	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-42			Residential	5	Westmont Drive	57	57	64	7	7	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-43			Residential	5	Westmont Drive	55	56	62	6	7	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-44			Residential	3	Westmont Drive	55	55	61	6	6	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-45			Residential	3	Front Street	60	60	63	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-46			Residential	1	Valley Boulevard	64	64	**66**	2	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-47		FTNB No. 7	Residential	1	Highbury Avenue	**68**	**68**	**74**	6	6	B(67)	A/E	**74**	0	--	**74**	0	--	**74**	0	--	**74**	0	--	**72**	2	--	**68**	6	1	**66**	8	1	65	9	1
FR-48		FTNB No. 7	Residential	4	Highbury Avenue	**68**	**68**	**75**	7	7	B(67)	A/E	**74**	1	--	**73**	2	--	**71**	4	--	**68**	7	4	**66**	9	4	65	10	4	64	11	4	63	12	4
FR-49		FTNB No. 7	Residential	4	Highbury Avenue	**67**	**68**	**77**	9	10	B(67)	A/E	**70**	7	4	**67**	10	4	**66**	11	4	65	12	4	63	14	4	61	16	4	60	17	4	58	19	4
FR-50		FTNB No. 8	Residential	2	Highbury Avenue	**68**	**69**	**77**	8	9	B(67)	A/E	**70**	7	2	**69**	8	2	**67**	10	2	66	11	2	65	12	2	64	13	2	63	14	2	63	14	2
FR-51		FTNB No. 8	Residential	4	Highbury Avenue	**70**	**71**	**78**	7	8	B(67)	A/E	**70**	8	4	**67**	11	4	65	13	4	63	15	4	62	16	4	62	16	4	61	17	4	61	17	4
FR-52			Residential	5	Highbury Avenue	55	55	62	7	7	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-53			Residential	1	Paseo Rancho Casilla	58	58	69	11	11	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B.9 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Dual-Bore Design Variation

Receptor No.	EFTW No.[1]	FTNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA $L_{eq}(h)$[2]	Future Peak-Hour Noise Levels, dBA $L_{eq}(h)$																													
							2035 Noise Levels				Activity Category (NAC)	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[2,5,6]																							
													6 feet			8 feet			10 feet			12 feet			14 feet			16 feet			18 feet			20 feet		
							Without Project[2]	With Project[2]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
FR-54			Classrooms	1	Circle Drive	56	56	63	7	7	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-55			Sports Field	1	Circle Drive	57	57	62	5	5	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-56			Office	1	Center Plaza Drive	**74**	**74**	**75**	1	1	E(72)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-57			Office	1	Center Plaza Drive	62	63	65	2	3	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-58			Police Training	1	Sheriff Road	66	66	68	2	2	C(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-59			Hospital	1	California Boulevard	53	53	53	0	0	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-60			Commercial	1	Pasadena Avenue	62	62	61	-1	-1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-61			Commercial	1	Pasadena Avenue	56	56	55	-1	-1	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-62			Church Recreational	1	Pasadena Avenue	59	60	60	0	1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-63			Restaurant	1	Pasadena Avenue	58	58	58	0	0	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-64			Commercial	1	Pasadena Avenue	63	63	63	0	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-65			Commercial	1	Pasadena Avenue	70	70	66	-4	-4	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-66			Commercial	1	Pasadena Avenue	67	68	67	-1	0	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-67			Commercial	1	Pasadena Avenue	64	64	62	-2	-2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-68			Residential	1	Pasadena Avenue	64	65	**69**	4	5	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-69			Residential	1	Pasadena Avenue	61	62	**67**	5	6	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-70			Vacant	1	Pasadena Avenue	59	59	68	9	9	G	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-71			Commercial	1	Pasadena Avenue	66	66	73	7	7	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-72		FTNB No. 9	Restaurant	1	Colorado Boulevard	66	66	**72**	6	6	E(72)	A/E	65	7	1	64	8	1	62	10	1	61	11	1	60	12	1	59	13	1	58	14	1	58	14	1
FR-73			Office	1	Pasadena Avenue	66	66	72	6	6	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-74			Office	1	Walnut Street	66	67	68	1	2	E(72)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-75		FTNB No. 10	Residential	6	Cypress Avenue	**70**	**71**	**73**	2	3	B(67)	A/E	--	--	--	**67**	6	6	65	8	6	64	9	6	63	10	6	62	11	6	62	11	6	61	12	6
FR-76	EFTW No. 8	FTNB No. 10	Residential	2	Orange Grove Place	65	**66**	**67**	1	2	B(67)	A/E	--	--	--	65	2	--	64	3	--	63	4	--	62	5	2	62	5	2	61	6	2	61	6	2
FR-77	EFTW No. 8	FTNB No. 10	Residential	4	Cypress Avenue	**67**	**67**	**68**	1	1	B(67)	A/E	--	--	--	**68**	0	--	65	3	--	64	4	--	63	5	4	63	5	4	62	6	4	62	6	4
FR-78	EFTW No. 8	FTNB No. 10	Residential	2	Orange Grove Place	**66**	**67**	**68**	1	2	B(67)	A/E	--	--	--	**66**	2	--	65	3	--	64	4	--	63	5	2	62	6	2	62	6	2	61	7	2
FR-79	EFTW No. 8	FTNB No. 10	Residential	4	Orange Grove Place	65	65	**67**	2	2	B(67)	A/E	--	--	--	**66**	1	--	64	3	--	64	3	--	63	4	--	62	5	4	62	5	4	61	6	4
FR-80	EFTW No. 8	FTNB No. 10	Residential	4	Orange Grove Place	**73**	**73**	**76**	3	3	B(67)	A/E	--	--	--	**71**	5	4	**67**	9	4	65	11	4	64	12	4	63	13	4	62	14	4	61	15	4
FR-81	EFTW No. 8	FTNB No. 10	Residential	1	Orange Grove Place	63	64	**66**	2	3	B(67)	--	--	--	--	65	1	--	65	1	--	64	2	--	63	3	--	62	4	--	62	4	--	61	5	1
FR-82	EFTW No. 8	FTNB No. 10	Residential	3	Orange Grove Place	62	62	64	2	2	B(67)	--	--	--	--	64	0	--	63	1	--	62	2	--	62	2	--	61	3	--	61	3	--	61	3	--
FR-83	EFTW No. 8	FTNB No. 10	Residential	4	Orange Grove Place	63	64	**66**	2	3	B(67)	A/E	--	--	--	**66**	0	--	65	1	--	65	1	--	64	2	--	64	2	--	63	3	--	63	3	--
FR-84	EFTW No. 8	FTNB No. 10	Residential	3	Orange Grove Place	65	65	**67**	2	2	B(67)	A/E	--	--	--	**67**	0	--	**67**	0	--	**67**	0	--	**66**	1	--	**66**	1	--	**66**	1	--	**66**	1	--
FR-85	EFTW No. 9	FTNB No. 11	School	1	Orange Grove Boulevard	**66**	**67**	**70**	3	4	C(67)/D(52)	A/E	--	--	--	**68**	2	--	**67**	3	--	**67**	3	--	**66**	4	--	65	5	1	65	5	1	64	6	1
FR-86	EFTW No. 9	FTNB No. 11	Residential	1	Cypress Avenue	57	58	61	3	4	B(67)	--	--	--	--	60	1	--	60	1	--	59	2	--	59	2	--	59	2	--	59	2	--	59	2	--
FR-87	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	58	59	61	2	3	B(67)	--	--	--	--	61	0	--	60	1	--	60	1	--	60	1	--	60	1	--	60	1	--	60	1	--
FR-88	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	61	62	65	3	4	B(67)	--	--	--	--	64	1	--	63	2	--	63	2	--	63	2	--	62	3	--	62	3	--	62	3	--
FR-89	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	64	64	**67**	3	3	B(67)	A/E	--	--	--	**66**	1	--	65	2	--	65	2	--	64	3	--	63	4	--	63	4	--	62	5	3
FR-90	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	65	**66**	**68**	2	3	B(67)	A/E	--	--	--	**67**	1	--	**66**	2	--	65	3	--	65	3	--	64	4	--	63	5	3	63	5	3
FR-91	EFTW No. 9	FTNB No. 11	Residential	2	Cypress Avenue	**68**	**68**	**71**	3	3	B(67)	A/E	--	--	--	68	3	--	66	5	2	65	6	2	64	7	2	63	8	2	63	8	2	62	9	2
FR-92	EFTW No. 9	FTNB No. 11	Residential	3	Cypress Avenue	**66**	**67**	**69**	2	3	B(67)	A/E	--	--	--	70	2	--	69	3	--	68	4	--	67	5	3	67	5	3	66	6	3	65	7	3
FR-93	EFTW No. 9	FTNB No. 11	Residential	2	Cypress Avenue	**69**	**69**	**72**	3	3	B(67)	A/E	--	--	--	70	1	--	70	1	--	70	1	--	70	1	--	69	2	--	69	2	--	69	2	--
FR-94	EFTW No. 9	FTNB No. 11	Residential	1	Cypress Avenue	**71**	**72**	**74**	2	3	B(67)	A/E	--	--	--	73	0	--	72	1	--	72	1	--	72	1	--	72	1	--	72	1	--	72	1	--
FR-95	EFTW No. 9	FTNB No. 11	Residential	1	Cypress Avenue	**70**	**71**	**73**	2	3	B(67)	A/E	--	--	--	72	1	--	72	1	--	72	1	--	72	1	--	72	1	--	72	1	--	72	1	--
FR-96	EFTW No. 10	FTNB No. 12	Residential	3	Lincoln Avenue	**70**	**70**	**73**	3	3	B(67)	A/E	--	--	--	71	2	--	70	3	--	68	5	3	67	6	3	67	6	3	66	7	3	66	7	3
FR-97	EFTW No. 10	FTNB No. 12	Residential	2	Lincoln Avenue	**68**	**69**	**71**	2	3	B(67)	A/E	--	--	--	70	1	--	69	2	--	68	3	--	67	4	--	67	4	--	67	4	--	67	4	--
FR-98	EFTW No. 10	FTNB No. 12	Residential	1	Lincoln Avenue	**68**	**69**	**71**	2	3	B(67)	A/E	--	--	--	71	0	--	70	1	--	69	2	--	69	2	--	69	2	--	68	3	--	68	3	--
FR-99		FTNB No. 13A	Residential	1	Cypress Avenue	62	63	**66**	3	4	B(67)	A/E	66	0	--	66	0	--	66	0	--	66	0	--	66	0	--	66	0	--	66	0	--	66	0	--
FR-100		FTNB No. 13A	Residential	6	Winona Avenue	63	64	**66**	2	3	B(67)	--	65	0	--	65	0	--	65	0	--	65	0	--	65	0	--	65	0	--	65	0	--	65	0	--
FR-101		FTNB No. 13A	Residential	1	Winona Avenue	61	62	64	2	3	B(67)	--	64	0	--	64	0	--	64	0	--	64	0	--	64	0	--	64	0	--	64	0	--	64	0	--
FR-102		FTNB No. 13A	Residential	3	Winona Avenue	**67**	**67**	**69**	2	2	B(67)	A/E	69	0	--	69	0	--	69	0	--	69	0	--	69	0	--	69	0	--	69	0	--	69	0	--

Table B.9 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Dual-Bore Design Variation

Receptor No.	EFTW No.[1]	FTNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA L_{eq}(h)[2]	Future Peak-Hour Noise Levels, dBA L_{eq}(h)																														
							2035 Noise Levels				Activity Category (NAC)	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[2,5,6]																							
							Without Project[2]	With Project[2]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			6 feet			8 feet			10 feet			12 feet			14 feet			16 feet			18 feet			20 feet		
													L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
FR-103		FTNB No. 13A	Residential	2	Mayview Lane	64	65	**68**	3	4	B(67)	A/E	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--
FR-104		FTNB No. 13A	Residential	3	Mayview Lane	**70**	**71**	**73**	2	3	B(67)	A/E	**68**	5	3	**68**	5	3	**68**	5	3	**68**	5	3	**68**	5	3	**68**	5	3	**68**	5	3	**68**	5	3
FR-105		FTNB No. 13A	Residential	2	Pasadena Avenue	**72**	**73**	**75**	2	3	B(67)	A/E	**72**	3	--	**72**	3	--	**72**	3	--	**72**	3	--	**72**	3	--	**72**	3	--	**72**	3	--	**72**	3	--
FR-106		FTNB No. 13A	Residential	1	Pasadena Avenue	64	65	**69**	4	5	B(67)	A/E	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--	**69**	0	--
FR-107		FTNB No. 13A	Residential	1	Rosewood Lane	62	62	65	3	3	B(67)	--	65	0	--	65	0	--	65	0	--	65	0	--	65	0	--	65	0	--	65	0	--	65	0	--
FR-108		FTNB No. 13A	Residential	2	Pasadena Avenue	**68**	**69**	**72**	3	4	B(67)	A/E	64	8	2	63	9	2	63	9	2	63	9	2	63	9	2	63	9	2	63	9	2	63	9	2
FR-109		FTNB No. 13A	Residential	2	Rosewood Lane	63	64	**67**	3	4	B(67)	A/E	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--	**67**	0	--
FR-110		FTNB No. 13A	Residential	1	Longwood Lane	**70**	**71**	**74**	3	4	B(67)	A/E	**66**	8	1	**66**	8	1	65	9	1	65	9	1	65	9	1	65	9	1	65	9	1	65	9	1
FR-111		FTNB No. 13A	Residential	2	Orange Grove Boulevard	**66**	**66**	**68**	2	2	B(67)	A/E	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--
FR-112		FTNB No. 13A	Residential	2	Prospect Boulevard	**66**	**67**	**68**	1	2	B(67)	A/E	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--
FR-113			Residential	3	Pasadena Avenue	**69**	**69**	**72**	3	3	B(67)	A/E	69	3	--	69	3	--	68	4	--	68	4	--	68	4	--	68	4	--	68	4	--	68	4	--
FR-114			Residential	1	Orange Grove Boulevard	**67**	**67**	**69**	2	2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-115		FTNB No. 14	School	1	Pasadena Avenue	**66**	**66**	**68**	2	2	C(67)/D(52)	A/E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-116		FTNB No. 15	Residential	1	Walnut Street	**69**	**69**	**70**	1	1	B(67)	A/E	**66**	4	--	62	8	1	60	10	1	59	11	1	58	12	1	58	12	1	56	14	1	55	15	1
FR-117		FTNB No. 15	Residential	1	Walnut Street	**69**	**69**	**70**	1	1	B(67)	A/E	**70**	0	--	**70**	0	--	**69**	1	--	**66**	4	--	64	6	1	63	7	1	63	7	1	62	8	1
FR-118			Commercial	1	Saint John Avenue	63	63	65	2	2	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-119			Commercial	1	Saint John Avenue	64	64	71	7	7	F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-120			Residential	1	Saint John Avenue	61	61	**70**	9	9	B(67)	*A/E*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-121			Church	1	Saint John Avenue	61	61	72	11	11	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-122			School	1	Saint John Avenue	54	54	59	5	5	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-123			Sports Field	1	Saint John Avenue	53	53	58	5	5	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-124			School	1	Saint John Avenue	66	66	64	-2	-2	D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-125			Residential	1	Waverly Drive	58	58	61	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-126			Residential	1	Waverly Drive	58	58	61	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-127			Residential	4	Gordon Terrace	57	57	60	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-128			Residential	2	Gordon Terrace	57	57	61	4	4	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-129			Residential	1	Bellevue Drive	57	57	60	3	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-130			Residential	1	Palmetto Drive	56	57	59	2	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-131			Residential	2	Palmetto Drive	55	56	58	2	3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-132	EFTW No. 15		Residential	1	Palmetto Drive	53	54	53	-1	0	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-133			Residential	1	California Boulevard	**68**	**68**	65	-3	-3	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-134			School	1	Pasadena Avenue	64	64	61	-3	-3	C(67)/D(52)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-135			School Playground	1	Pasadena Avenue	57	57	56	-1	-1	C(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-136			Residential	1	California Boulevard	59	59	57	-2	-2	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FR-137			Residential	1	California Boulevard	53	53	52	-1	-1	B(67)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Source: LSA Associates, Inc. (May 2014).

[1] Refer to Figure 6-2 for existing wall heights.

[2] Numbers in **bold** represent noise levels that approach or exceed the NAC.

[3] A dash (–) indicates that no barrier was analyzed at this location because the modeled receptor would not approach or exceed the NAC.

[4] *Italics* indicate either no outdoor frequent human use areas or abatement not feasible due to sidewalk or driveway access.

[5] Underlined numbers have been attenuated by at least 5 dBA (i.e., feasible wall height).

[6] Shaded areas represent existing walls and their approximate height. Refer to Figure 6-2 for the existing wall height.

A/E = Approach or Exceed
dBA = A-weighted decibels
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
EFTW = Existing Freeway Tunnel Wall
FTNB = Freeway Tunnel Noise Barrier
NAC = Noise Abatement Criteria

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Table B.10 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Dual-Bore Design Variation (Alternate Barriers)

Receptor No.	**EFTW No.**[1]	**FTNB No.**	**Land Use**	**No. of Units/ Receptors**	**Location**	**Existing Noise Level, dBA L_{eq}(h)**[2]	**Future Peak-Hour Noise Levels, dBA L_{eq}(h)**																													
							2035 Noise Levels				**Activity Category (NAC)**	**Impact Type**[3,4]	**Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)**[2,5,6]																							
													6 feet			**8 feet**			**10 feet**			**12 feet**			**14 feet**			**16 feet**			**18 feet**			**20 feet**		
							Without Project[2]	**With Project**[2]	**With Project Minus No Project Conditions**	**With Project Minus Existing Conditions**			**L_{eq} (h)**	**I.L.**	**NBR**	**L_{eq} (h)**	**I.L.**	**NBR**	**L_{eq} (h)**	**I.L.**	**NBR**	**L_{eq} (h)**	**I.L.**	**NBR**	**L_{eq} (h)**	**I.L.**	**NBR**	**L_{eq} (h)**	**I.L.**	**NBR**	**L_{eq} (h)**	**I.L.**	**NBR**	**L_{eq} (h)**	**I.L.**	**NBR**
FR-1		FTNB No. 2	Residential	1	Casuda Canyon Drive	63	63	65	2	2	B(67)	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--
FR-2		FTNB No. 2	Residential	1	Corporate Center Drive	**70**	**70**	**72**	2	2	B(67)	A/E	**67**	5	1	**66**	6	1	**66**	6	1	**66**	6	1	**66**	6	1	**66**	6	1	**66**	6	1	**66**	6	1
FR-6		FTNB No. 3B	Residential	3	Balzac Street	**69**	**69**	**71**	2	2	B(67)	A/E	65	6	3	64	7	3	63	8	3	62	9	3	62	9	3	61	10	3	60	11	3	60	11	3
FR-7		FTNB No. 3B	Residential	1	Capetown Avenue	64	64	**70**	6	6	B(67)	A/E	**66**	4	--	65	5	1	64	6	1	64	6	1	63	7	1	63	7	1	62	8	1	62	8	1
FR-8		FTNB No. 3B	Residential	1	Balzac Street	**68**	**68**	**73**	5	5	B(67)	A/E	63	10	1	61	12	1	60	13	1	59	14	1	59	14	1	58	15	1	58	15	1	57	16	1
FR-9		FTNB No. 3B	Residential	1	Balzac Street	**66**	**67**	**72**	5	6	B(67)	A/E	61	11	1	59	13	1	58	14	1	58	14	1	57	15	1	56	16	1	56	16	1	56	16	1
FR-10		FTNB No. 3B	Residential	2	Balzac Street	65	65	**72**	7	7	B(67)	A/E	65	7	2	63	9	2	61	11	2	60	12	2	59	13	2	59	13	2	58	14	2	58	14	2
FR-11		FTNB No. 3B	Residential	2	Balzac Street	64	65	**71**	6	7	B(67)	A/E	65	6	2	63	8	2	62	9	2	62	9	2	61	10	2	61	10	2	60	11	2	60	11	2
FR-12		FTNB No. 3B	Residential	3	Capetown Avenue	62	62	**69**	7	7	B(67)	A/E	65	4	--	65	4	--	64	5	3	64	5	3	63	6	3	62	7	3	61	8	3	60	9	3
FR-13		FTNB No. 3B	Residential	3	Capetown Avenue	61	61	**70**	9	9	B(67)	A/E	60	10	3	58	12	3	57	13	3	56	14	3	55	15	3	55	15	3	54	16	3	54	16	3
FR-14		FTNB No. 3B	Residential	2	Julep Place	64	65	**72**	7	8	B(67)	A/E	**71**	1	--	**71**	1	--	**71**	1	--	**70**	2	--	**70**	2	--	**69**	3	--	**68**	4	--	**66**	6	2
FR-15		FTNB No. 3B	Residential	2	Charnwood Avenue	64	65	**72**	7	8	B(67)	A/E	65	7	2	64	8	2	63	9	2	61	11	2	60	12	2	59	13	2	58	14	2	57	15	2
FR-16		FTNB No. 3B	Residential	3	Charnwood Avenue	59	59	**67**	8	8	B(67)	A/E	63	4	--	62	5	3	60	7	3	59	8	3	58	9	3	57	10	3	56	11	3	56	11	3
FR-17		FTNB No. 3B	Residential	3	Charnwood Avenue	**66**	**66**	**72**	6	6	B(67)	A/E	**66**	6	3	65	7	3	64	8	3	63	9	3	61	11	3	60	12	3	60	12	3	59	13	3
FR-18	EFTW No. 4	FTNB No. 3B	Residential	3	Charnwood Avenue	62	63	**70**	7	8	B(67)	A/E	**70**	0	--	**67**	3	--	65	5	3	64	6	3	63	7	3	62	8	3	61	9	3	60	10	3
FR-19	EFTW No. 4	FTNB No. 3B	Residential	3	Charnwood Avenue	65	65	**73**	8	8	B(67)	A/E	**73**	0	--	**68**	5	3	65	8	3	63	10	3	61	12	3	60	13	3	60	13	3	59	14	3
FR-20	EFTW No. 4	FTNB No. 3B	Residential	3	Charnwood Avenue	61	62	**69**	7	8	B(67)	A/E	**69**	0	--	**66**	3	--	65	4	--	64	5	3	63	6	3	62	7	3	61	8	3	61	8	3
FR-21		FTNB No. 3B	Residential	2	Hellman Avenue	63	63	**71**	8	8	B(67)	A/E	**71**	0	--	**66**	5	2	65	6	2	65	6	2	64	7	2	64	7	2	64	7	2	63	8	2
FR-22		FTNB No. 3B	Residential	4	Charnwood Avenue	60	60	**68**	8	8	B(67)	A/E	**68**	0	--	**66**	2	--	**66**	2	--	65	3	--	65	3	--	65	3	--	65	3	--	64	4	--
FR-6		FTNB No. 4	Residential	3	Balzac Street	**69**	**69**	**71**	2	2	B(67)	A/E	**70**	1	--	**70**	1	--	**70**	1	--	**70**	1	--	**70**	1	--	**70**	1	--	**70**	1	--	**70**	1	--
FR-7		FTNB No. 4	Residential	1	Capetown Avenue	64	64	**70**	6	6	B(67)	A/E	**67**	3	--	**67**	3	--	**67**	3	--	**67**	3	--	**67**	3	--	**67**	3	--	**67**	3	--	**67**	3	--
FR-8		FTNB No. 4	Residential	1	Balzac Street	**68**	**68**	**73**	5	5	B(67)	A/E	**72**	1	--	**72**	1	--	**72**	1	--	**72**	1	--	**72**	1	--	**72**	1	--	**72**	1	--	**72**	1	--
FR-9		FTNB No. 4	Residential	1	Balzac Street	**66**	**67**	**72**	5	6	B(67)	A/E	**70**	2	--	**69**	3	--	**69**	3	--	**69**	3	--	**68**	4	--	**68**	4	--	**66**	6	1	65	7	1
FR-10		FTNB No. 4	Residential	2	Balzac Street	65	65	**72**	7	7	B(67)	A/E	**69**	3	--	**68**	4	--	**67**	5	2	**67**	5	2	**67**	5	2	**67**	5	2	**67**	5	2	**66**	6	2
FR-11		FTNB No. 4	Residential	2	Balzac Street	64	65	**71**	6	7	B(67)	A/E	**68**	3	--	**67**	4	--	**67**	4	--	**67**	4	--	**66**	5	2	**66**	5	2	65	6	2	65	6	2
FR-12		FTNB No. 4	Residential	3	Capetown Avenue	62	62	**69**	7	7	B(67)	A/E	**66**	3	--	**66**	3	--	65	4	--	64	5	3	64	5	3	63	6	3	63	6	3	62	7	3
FR-13		FTNB No. 4	Residential	3	Capetown Avenue	61	61	**70**	9	9	B(67)	A/E	**66**	4	--	65	5	3	64	6	3	63	7	3	63	7	3	61	9	3	61	9	3	60	10	3
FR-14		FTNB No. 4	Residential	2	Julep Place	64	65	**72**	7	8	B(67)	A/E	**69**	3	--	**67**	5	2	**67**	5	2	**66**	6	2	64	8	2	63	9	2	62	10	2	61	11	2
FR-15		FTNB No. 4	Residential	2	Charnwood Avenue	64	65	**72**	7	8	B(67)	A/E	**67**	5	2	**66**	6	2	**66**	6	2	64	8	2	63	9	2	62	10	2	61	11	2	61	11	2
FR-16		FTNB No. 4	Residential	3	Charnwood Avenue	59	59	**67**	8	8	B(67)	A/E	65	2	--	64	3	--	63	4	--	62	5	3	61	6	3	61	6	3	60	7	3	60	7	3
FR-17		FTNB No. 4	Residential	3	Charnwood Avenue	**66**	**66**	**72**	6	6	B(67)	A/E	**67**	5	3	**66**	6	3	64	8	3	63	9	3	63	9	3	62	10	3	62	10	3	61	11	3
FR-18	EFTW No. 4	FTNB No. 4	Residential	3	Charnwood Avenue	62	63	**70**	7	8	B(67)	A/E	**68**	2	--	**67**	3	--	**67**	3	--	**66**	4	--	**66**	4	--	65	5	3	65	5	3	65	5	3
FR-19	EFTW No. 4	FTNB No. 4	Residential	3	Charnwood Avenue	65	65	**73**	8	8	B(67)	A/E	**71**	2	--	**71**	2	--	**69**	4	--	**68**	5	3	**67**	6	3	65	8	3	64	9	3	63	10	3
FR-20	EFTW No. 4	FTNB No. 4	Residential	3	Charnwood Avenue	61	62	**69**	7	8	B(67)	A/E	**69**	0	--	**69**	0	--	**69**	0	--	**68**	1	--	**68**	1	--	**68**	1	--	**68**	1	--	**67**	2	--
FR-21		FTNB No. 4	Residential	2	Hellman Avenue	63	63	**71**	8	8	B(67)	A/E	**71**	0	--	**71**	0	--	**71**	0	--	**71**	0	--	**71**	0	--	**71**	0	--	**71**	0	--	**70**	1	--
FR-22		FTNB No. 4	Residential	4	Charnwood Avenue	60	60	**68**	8	8	B(67)	A/E	**68**	0	--	**67**	1	--	**67**	1	--	**67**	1	--	**67**	1	--	**66**	2	--	**66**	2	--	65	3	--
FR-47		FTNB No. 6 D	Residential	1	Highbury Avenue	**68**	**68**	**74**	6	6	B(67)	A/E	**73**	1	--	**72**	2	--	**70**	4	--	**68**	6	1	**67**	7	1	**65**	9	1	64	10	1	64	10	1
FR-48		FTNB No. 6 D	Residential	4	Highbury Avenue	**68**	**68**	**75**	7	7	B(67)	A/E	**74**	1	--	**73**	2	--	**71**	4	--	**79**	6	4	**67**	8	4	**66**	9	4	**65**	10	4	**64**	11	4
FR-49		FTNB No. 6 D	Residential	4	Highbury Avenue	**67**	**68**	**77**	9	10	B(67)	A/E	**77**	0	--	**76**	1	--	**74**	3	--	**73**	4	--	**72**	5	--	**71**	6	4	**68**	9	4	**66**	11	4
FR-50		FTNB No. 6 D	Residential	2	Highbury Avenue	**68**	**69**	**77**	8	9	B(67)	A/E	**77**	0	--	**74**	3	--	**73**	4	--	**70**	7	2	**67**	10	2	**66**	11	2	**65**	12	2	**64**	13	2
FR-51		FTNB No. 6 D	Residential	4	Highbury Avenue	**70**	**71**	**78**	7	8	B(67)	A/E	**72**	6	4	**70**	8	4	**68**	10	4	**67**	11	4	**66**	12	4	**66**	12	4	65	13	4	65	13	4
FR-99		FTNB No. 13B	Residential	1	Cypress Avenue	62	63	**66**	3	4	B(67)	A/E	--	--	--	--	--	--	65	1	--	65	1	--	65	1	--	65	1	--	65	1	--	65	1	--
FR-100		FTNB No. 13B	Residential	6	Winona Avenue	63	64	**66**	2	3	B(67)	--	--	--	--	--	--	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--	64	1	--
FR-101		FTNB No. 13B	Residential	1	Winona Avenue	61	62	64	2	3	B(67)	--	--	--	--	--	--	--	63	1	--	63	1	--	63	1	--	63	1	--	63	1	--	63	1	--
FR-102		FTNB No. 13B	Residential	3	Winona Avenue	**67**	**67**	**69**	2	2	B(67)	A/E	--	--	--	--	--	--	**68**	1	--	**67**	2	--	**66**	3	--	65	4	--	65	4	--	64	5	3
FR-103		FTNB No. 13B	Residential	2	Mayview Lane	64	65	**68**	3	4	B(67)	A/E	--	--	--	--	--	--	**67**	1	--	**67**	1	--	**66**	2	--	65	3	--	65	3	--	65	3	--
FR-104		FTNB No. 13B	Residential	3	Mayview Lane	**70**	**71**	**73**	2	3	B(67)	A/E	--	--	--	--	--	--	**68**	5	3	**66**	7	3	**66**	7	3	64	9	3	64	9	3	63	10	3
FR-105		FTNB No. 13B	Residential	2	Pasadena Avenue	**72**	**73**	**75**	2	3	B(67)	A/E	--	--	--	--	--	--	**68**	7	2	**67**	8	2	**66**	9	2	65	10	2	64	11	2	64	11	2
FR-106		FTNB No. 13B	Residential	1	Pasadena Avenue	64	65	**69**	4	5	B(67)	A/E	--	--	--	--	--	--	**68**	1	--	**68**	1	--	**67**	2	--	**67**	2	--	**67**	2	--	**67**	2	--
FR-107		FTNB No. 13B	Residential	1	Rosewood Lane	62	62	65	3	3	B(67)	--	--	--	--	--	--	--	63	2	--	63	2	--	63	2	--	63	2	--	62	3	--	62	3	--
FR-108		FTNB No. 13B	Residential	2	Pasadena Avenue	**68**	**69**	**72**	3	4	B(67)	A/E	--	--	--	--	--	--	**69**	3	--	**68**	4	--	**68**	4	--	**68**	4	--	**67**	5	2	**67**	5	2
FR-109		FTNB No. 13B	Residential	2	Rosewood Lane	63	64	**67**	3	4	B(67)	A/E	--	--	--	--	--	--	64	3	--	63	4	--	63	4	--	63	4	--	63	4	--	63	4	--
FR-110		FTNB No. 13B	Residential	1	Longwood Lane	**70**	**71**	**74**	3	4	B(67)	A/E	--	--	--	--	--	--	**71**	3	--	**71**	3	--	**70**	4	--	**70**	4	--	**70**	4	--	**70**	4	--

Table B.10 Predicted Future Noise Level and Noise Barrier Analysis – Freeway Tunnel Alternative – Dual-Bore Design Variation (Alternate Barriers)

Receptor No.	EFTW No.[1]	FTNB No.	Land Use	No. of Units/ Receptors	Location	Existing Noise Level, dBA L_{eq}(h)[2]	Future Peak-Hour Noise Levels, dBA L_{eq}(h)																											
							2035 Noise Levels				Activity Category (NAC)	Impact Type[3,4]	Noise Prediction With Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receptors (NBR)[2,5,6]																							
													6 feet			8 feet			10 feet			12 feet			14 feet			16 feet			18 feet			20 feet		
							Without Project[2]	With Project[2]	With Project Minus No Project Conditions	With Project Minus Existing Conditions			L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR	L_{eq} (h)	I.L.	NBR
FR-111		FTNB No. 13B	Residential	2	Orange Grove Boulevard	**66**	**66**	**68**	2	2	B(67)	A/E	--	--	--	--	--	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--
FR-112		FTNB No. 13B	Residential	2	Prospect Boulevard	**66**	**67**	**68**	1	2	B(67)	A/E	--	--	--	--	--	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--	**68**	0	--

Source: LSA Associates, Inc., January 2014.

[1] Refer to Figure 6-2 for existing wall heights.

[2] Numbers in **bold** represent noise levels that approach or exceed the NAC.

[3] A dash (–) indicates that no barrier was analyzed at this location because the modeled receptor would not approach or exceed the NAC.

[4] *Italics* indicate either no outdoor frequent human use areas or abatement not feasible due to sidewalk or driveway access.

[5] Underlined numbers have been attenuated by at least 5 dBA (i.e., feasible wall height).

[6] Shaded areas represent existing walls and their approximate height. Refer to Figure 6-2 for the existing wall height.

A/E = Approach or Exceed
dBA = A-weighted decibels
dBA L_{eq}(h) = equivalent continuous sound level per hour measured in A-weighted decibels
EFTW = Existing Freeway Tunnel Wall
FTNB = Freeway Tunnel Noise Barrier
NAC = Noise Abatement Criteria

Table B.11 Light Rail Train Operations Noise Impact Analysis

Receptor Location	Associated Measurement Location	Existing Noise Measurement (L$_{eq}$)	Existing Noise Level (L$_{dn}$)[1]	Distance to Tracks (ft)	Track Height Above Ground/ Receptor (ft)	Train Operations Noise Level (L$_{dn}$)	Noise Exposure Increase (dBA)	No Impact, Moderate, or Severe[3]	Project Noise Exposure Producing No Impact (L$_{dn}$)[3]	Proposed Barrier Height (ft)	Train Noise Level With Mitigation (dBA)	Noise Exposure Increase After Mitigation (dBA)
LR-1	LM-1	50.1	54.6	75	29	62.5	8.6	Severe	<55	6.0	53.4	2.4
LR-2	LM-1	50.1	54.6	210	29	56.2	3.9	Moderate	<55	4.0	50.8	1.5
LR-3	LM-2	61.5	63.1	90	20	66.4	5.0	Severe	<60	5.5	58.4	1.3
LR-4	LM-2	61.5	63.1	260	20	59.5	1.6	Moderate	<60	4.0	54.7	0.6
LR-5	LM-4	62.0	64.6	160	20	62.6	2.1	Moderate	<61	4.0	57.3	0.7
LR-6	LM-6	55.1	58.0	95	25.5	66.2	8.8	Severe	<57	9.5	55.8	2.1
LR-7[3]	LM-5	59.3	61.9	170	27	62.6	3.4	-	-	0.0	-	-
LR-8	LM-5	59.3	61.9	82	27	67.2	6.4	Severe	<59	7.0	57.7	1.4
LR-9	LM-7	57.1	60.0	355	27.5	58.0	2.1	Moderate	<58	4.0	53.4	0.9
LR-10	LM-8	63.0	65.6	70	28	68.2	4.5	Severe	<61	5.0	59.8	1.0
LR-11	LM-9	64.9	67.8	80	27	67.4	2.8	Moderate	<63	4.0	60.3	0.7
LR-12	LM-12	63.6	67.6	90	35	66.9	2.7	Moderate	<63	4.0	59.6	0.6
LR-13	LM-12	63.6	67.6	90	35	66.9	2.7	Moderate	<63	4.0	59.6	0.6
LR-14	LM-12	63.6	67.6	100	35	66.2	2.4	Moderate	<63	4.0	59.2	0.6
LR-15	LM-12	63.6	67.6	95	35	66.5	2.5	Moderate	<63	4.0	59.4	0.6
LR-16	LM-13	63.7	67.7	265	22	59.5	0.6	No Impact	<63	0.0	-	-
LR-17	FM-1	58.2	61.7	490	-18	53.7	0.6	No Impact	<59	0.0	-	-
LR-18	FM-4	62.8	67.0	835	50	55.3	0.3	No Impact	<63	0.0	-	-
LR-19	FM-5	59.9	64.4	710	38	54.9	0.5	No Impact	<61	0.0	-	-
LR-20	FM-6	57.4	61.9	400	68	60.8	2.5	Moderate	<59	4.0	55.4	0.9
LR-21	FM-7	61.4	65.9	275	47	61.1	1.2	Moderate	<62	4.0	55.5	0.4
LR-22	FM-8	58.1	61.8	210	22	61.0	2.6	Moderate	<59	4.0	55.9	1.0
LR-23	FM-9	66.0	69.7	155	0	62.0	0.7	No Impact	<65	0.0	-	-
LR-24	FM-10	73.3	77.0	105	0	64.8	0.3	No Impact	<66	0.0	-	-
LR-25	FM-12	59.5	63.3	400	0	55.2	0.6	No Impact	<60	0.0	-	-
LR-26	FM-19	62.3	76.7	360	0	55.9	0.0	No Impact	<66	0.0	-	-
LR-27	FM-20	68.0	71.4	190	0	60.5	0.3	No Impact	<66	0.0	-	-
LR-28	FM-22	55.5	58.9	690	0	51.2	0.7	No Impact	<58	0.0	-	-
LR-29	FM-23	55.2	58.1	530	0	53.1	1.2	No Impact	<57	0.0	-	-

[1] Short-term measurements LR-1 through LR-13 were converted to L$_{dn}$ levels using LML1 as a reference daily level.
Short-term measurements LR-14 through LR-17 were converted to L$_{dn}$ levels using LML2 as a reference daily level.
Short-term measurements LM-18 through LR-21 were converted to L$_{dn}$ levels using FML1 as a reference daily level.
Short-term measurements LM-22 through LM-29 were converted to L$_{dn}$ levels using LML2 as a reference daily level.

[3] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 3-1.

[3] Non-noise sensitive park. Level shown for reporting purposes only.

dBA = A-weighted decibels
L$_{dn}$ = day-night average noise level
ft = foot/feet
L$_{eq}$ = equivalent continuous noise level

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Appendix C. Noise Barrier Reasonableness Analysis Worksheet

This appendix contains the short-term, long-term, background, and interior/exterior noise level measurement survey sheets. Also, this appendix contains the concurrent traffic counts during the short-term noise level measurements and the sound level meter calibration certificates. (Contents of Appendix C are located on the attached CD-ROM.)

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SHORT-TERM NOISE LEVEL MEASUREMENTS

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: LD 824

Site Number: TM-1 Date: 4/16/2014

Time: From 8:50 AM To 9:00 AM

Site Location: 211 Fremont Avenue. On the southwest corner of Alhambra (E/W) and Fremont (N/S). On the sidewalk approximately 20 ft from the edge of shoulder on Alhambra.

Primary Noise Sources: Traffic on Fremont and Alhambra

Measurement Results	
	dBA
L_{eq}	65.2
L_{max}	81.5
L_{min}	49.1
L_{peak}	97.4
L_2	69.9
L_8	67.8
L_{25}	66.1
L_{50}	64.4
L_{90}	57.6
L_{99}	51.3
SEL	--

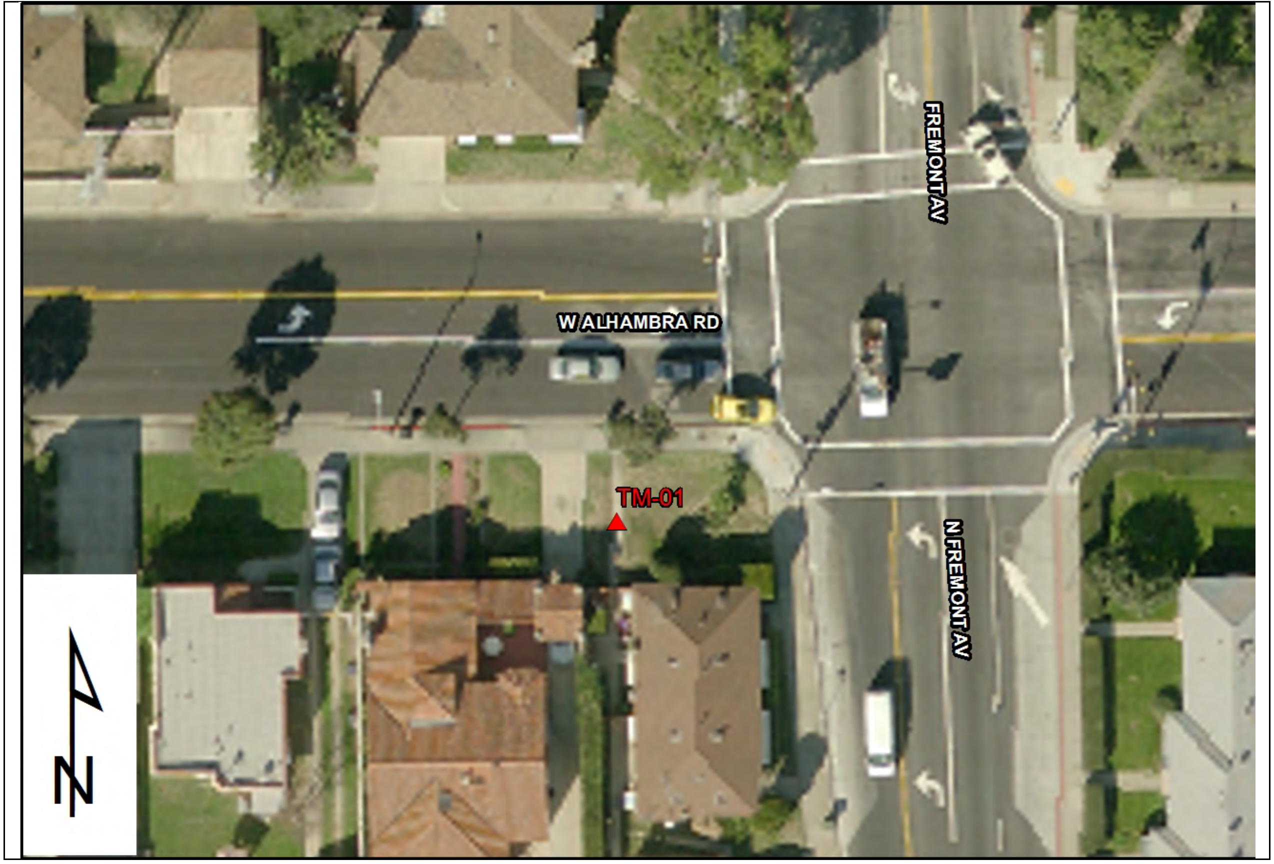
Atmospheric Conditions	
Average Wind Velocity (mph)	1.2
Maximum Wind Velocity (mph)	3.2
Temperature (F)	64.0
Relative Humidity (%)	68.8

Comments: Posted speed is 30 mph.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Alhambra Avenue	1/1	25 MPH	50	0	0	35	0	0

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: TM-2 Date: 4/16/2014

Time: From 8:51 AM To 9:01 AM

Site Location: 2045 Fremont Avenue. In the front yard

Primary Noise Sources: Traffic on Fremont Avenue.

Measurement Results	
	dBA
L_{eq}	67.8
L_{max}	86.0
L_{min}	43.4
L_{peak}	101.2
L_2	72.7
L_8	71.3
L_{25}	69.4
L_{50}	66.8
L_{90}	55.8
L_{99}	45.8
SEL	95.7

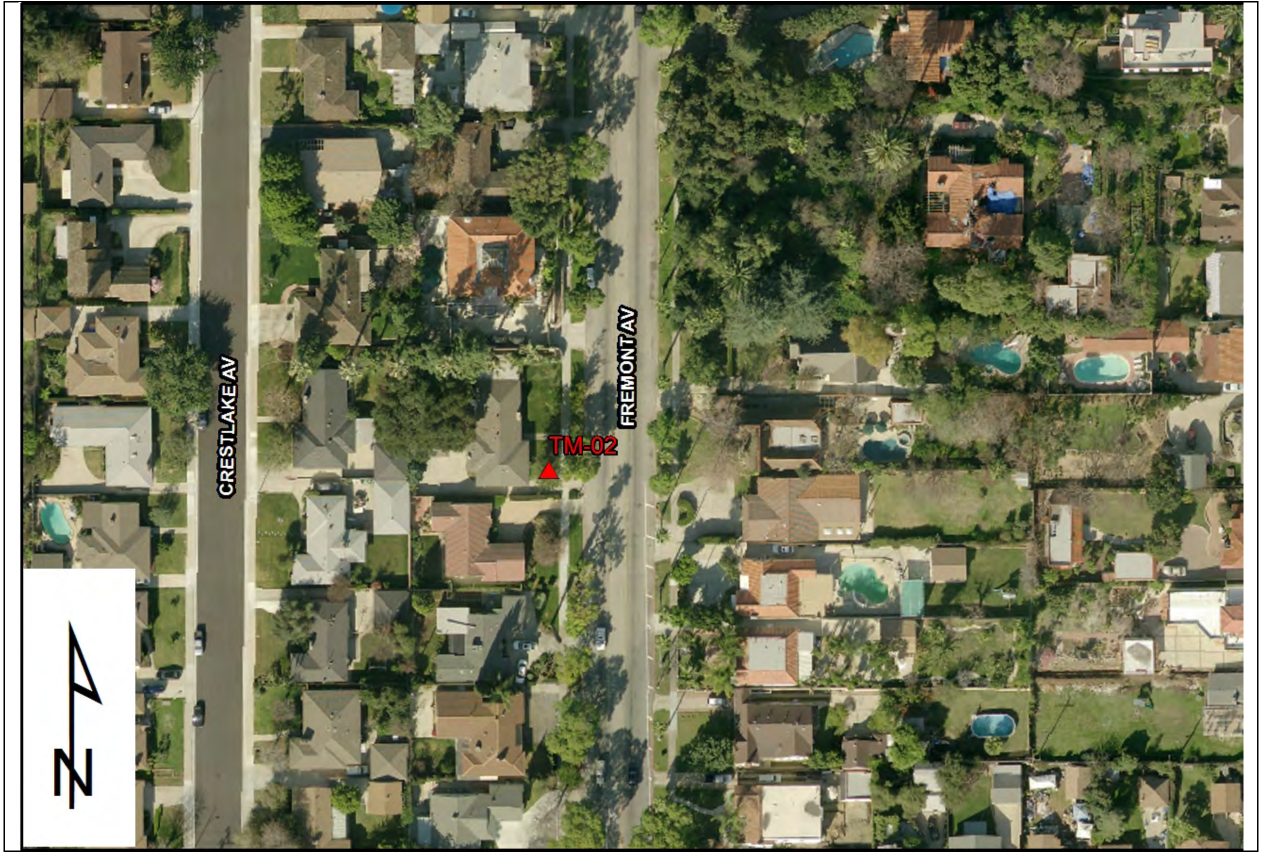
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Property wall on the north side of residences is 11 ft (10 blocks plus 2 ft.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Fremont Avenue	1/1		171	4	1	165	0	0

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD 824

Site Number: TM-3 Date: 4/16/2014
Time: From 9:23 AM To 9:33 AM

Site Location: 2012 Fremont Avenue. In the front yard.

Primary Noise Sources: Traffic on Fremont Avenue.

Measurement Results	
	dBA
L_{eq}	66.6
L_{max}	79.4
L_{min}	44.5
L_{peak}	97.4
L_2	71.9
L_8	69.9
L_{25}	68.0
L_{50}	66.0
L_{90}	52.3
L_{99}	47.2
SEL	--

Atmospheric Conditions	
Average Wind Velocity (mph)	0.6
Maximum Wind Velocity (mph)	2.2
Temperature (F)	63.0
Relative Humidity (%)	66.2

Comments: Helicopter Flyover.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Fremont Avenue	1/1	30 mph	123	1	1	147	1	4

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: TM-4 Date: 4/16/2014

Time: From 9:23 AM To 9:33 AM

Site Location: 1935 Fremont Avenue. In the front yard

Primary Noise Sources: Traffic on Fremont Avenue. Cement crew located approximately one block to the north and tuck idling loudly for first half of the measurement.

Measurement Results	
	dBA
L_{eq}	65.9
L_{max}	78.7
L_{min}	46.6
L_{peak}	89.6
L_2	72.6
L_8	69.0
L_{25}	66.9
L_{50}	64.8
L_{90}	54.4
L_{99}	49.4
SEL	93.8

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

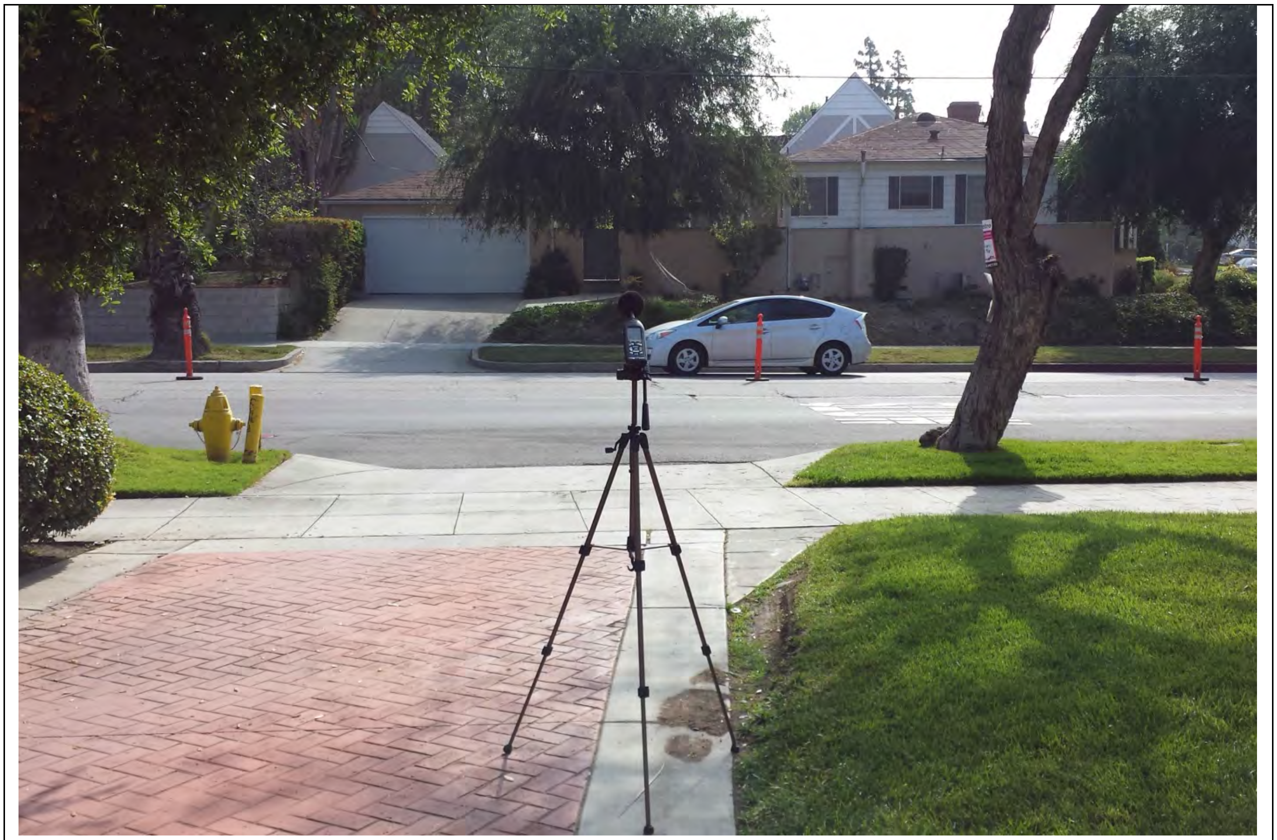
Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Fremont Avenue	1/1		150	2	1	160	4	4

Diagram:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 824

Site Number: TM-5 Date: 4/16/2014
Time: From 9:55 AM To 10:05 AM

Site Location: KFC Patio. Located on the northwestern corner of Hunting (E/W) and Fremont (N/S).

Primary Noise Sources: Traffic on Fremont and Huntington.

Measurement Results	
	dBA
L_{eq}	69.4
L_{max}	78.9
L_{min}	58.7
L_{peak}	101.0
L_2	74.8
L_8	72.9
L_{25}	70.7
L_{50}	68.0
L_{90}	62.3
L_{99}	59.7
SEL	--

Atmospheric Conditions	
Average Wind Velocity (mph)	0.6
Maximum Wind Velocity (mph)	2.1
Temperature (F)	69.0
Relative Humidity (%)	52.8

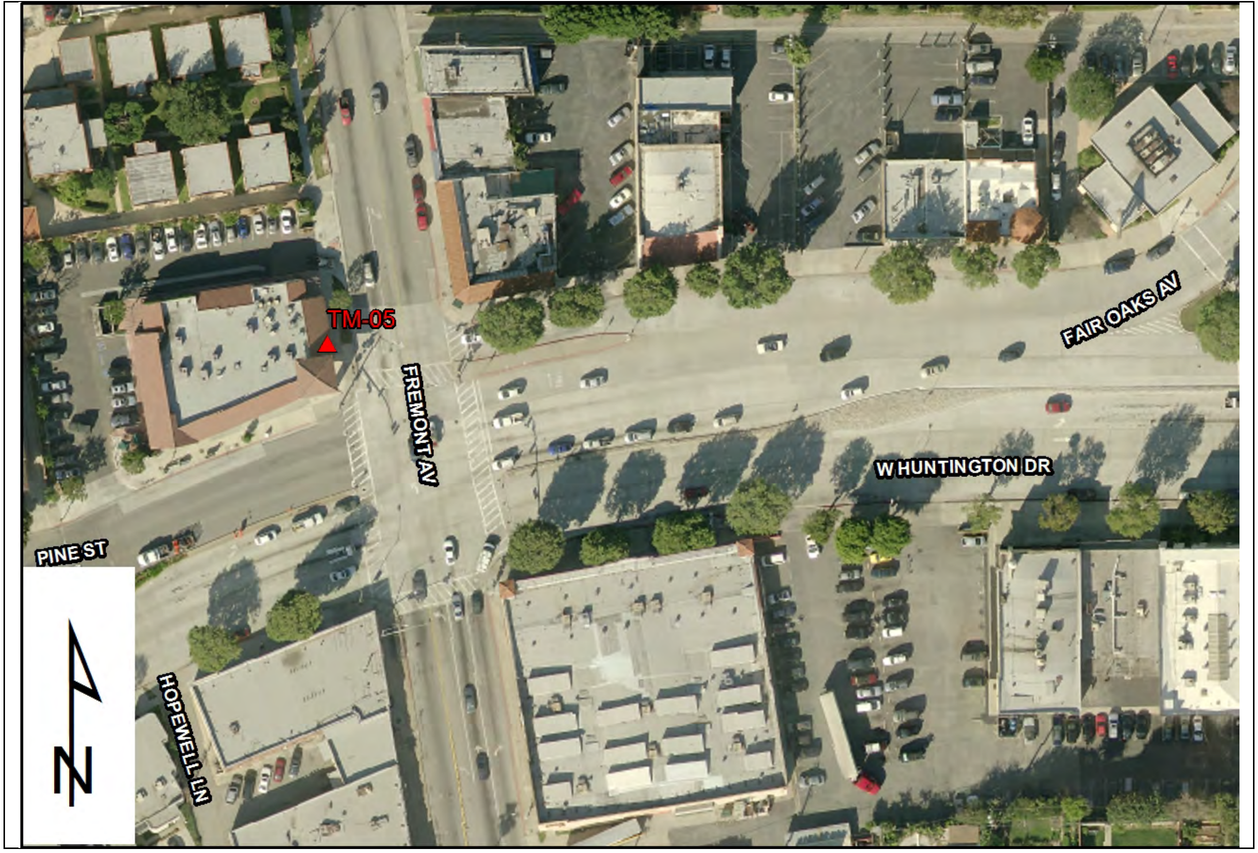
Comments: Two booth style tables on patio at KFC.

.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Fremont Avenue	1/1	30 mph	80	0	0	94	0	0

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: TM-6 Date: 4/16/2014

Time: From 9:55 AM To 10:05 AM

Site Location: 1400 Huntington Drive. In the Barkley Restaurant parking lot.

Primary Noise Sources: Traffic on Huntington Drive and Fremont Avenue.

Measurement Results	
	dBA
L_{eq}	63.4
L_{max}	74.9
L_{min}	52.6
L_{peak}	88.7
L_2	69.2
L_8	67.1
L_{25}	64.0
L_{50}	61.9
L_{90}	58.3
L_{99}	55.2
SEL	91.2

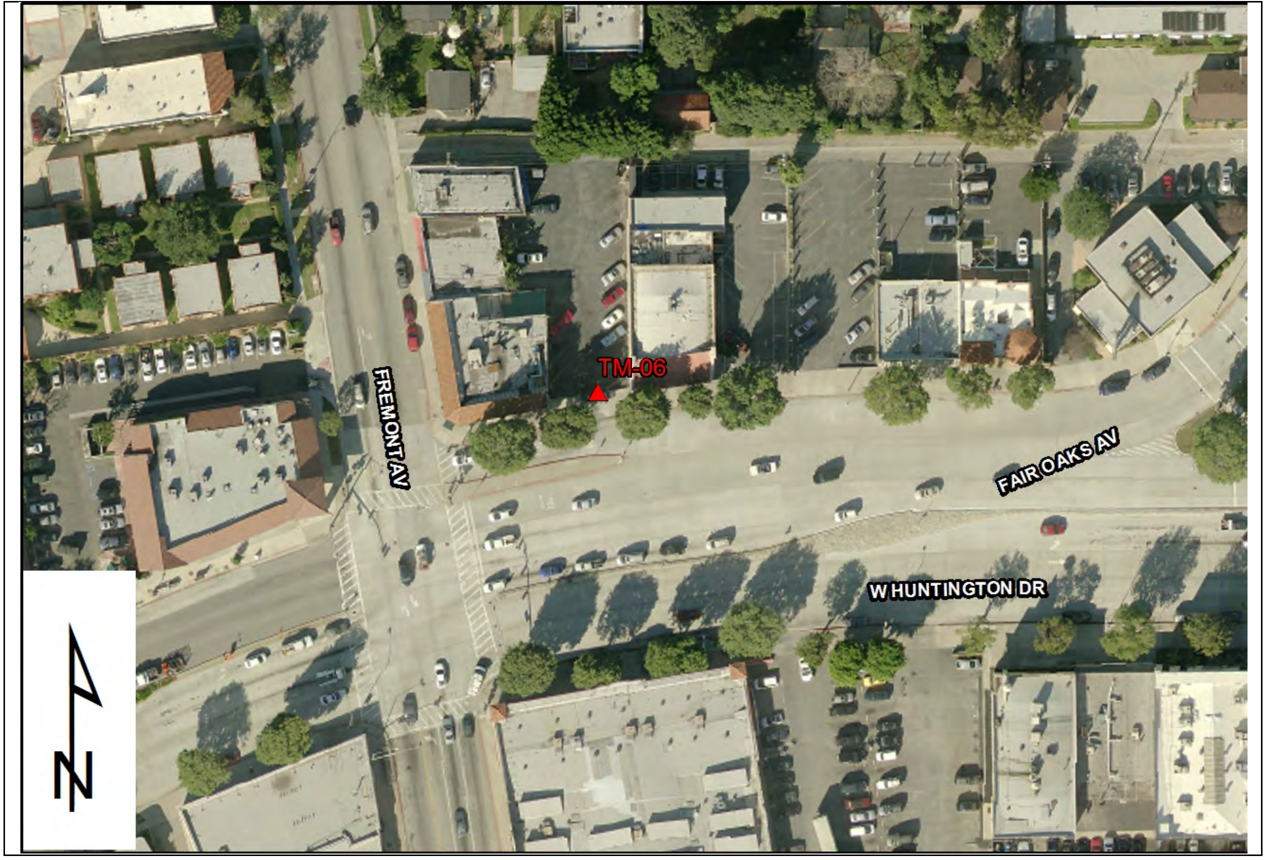
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 10 Foot Wall to the North. Near Parking Lot Entrance. Helicopter Flyover.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Huntington Drive			102	3	0	111	4	0

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 824

Site Number: TM-7 Date: 4/17/2014
Time: From 9:50 AM To 10:00 AM

Site Location: 1824 Second Street. In the alley next to backyards

Primary Noise Sources: Traffic on I-10 and I-10 ramps near SB Garfield

Measurement Results	
	dBA
L_{eq}	64.3
L_{max}	73.7
L_{min}	56.8
L_{peak}	95.9
L_2	69.3
L_8	67.6
L_{25}	65.4
L_{50}	62.8
L_{90}	59.7
L_{99}	58.0
SEL	--

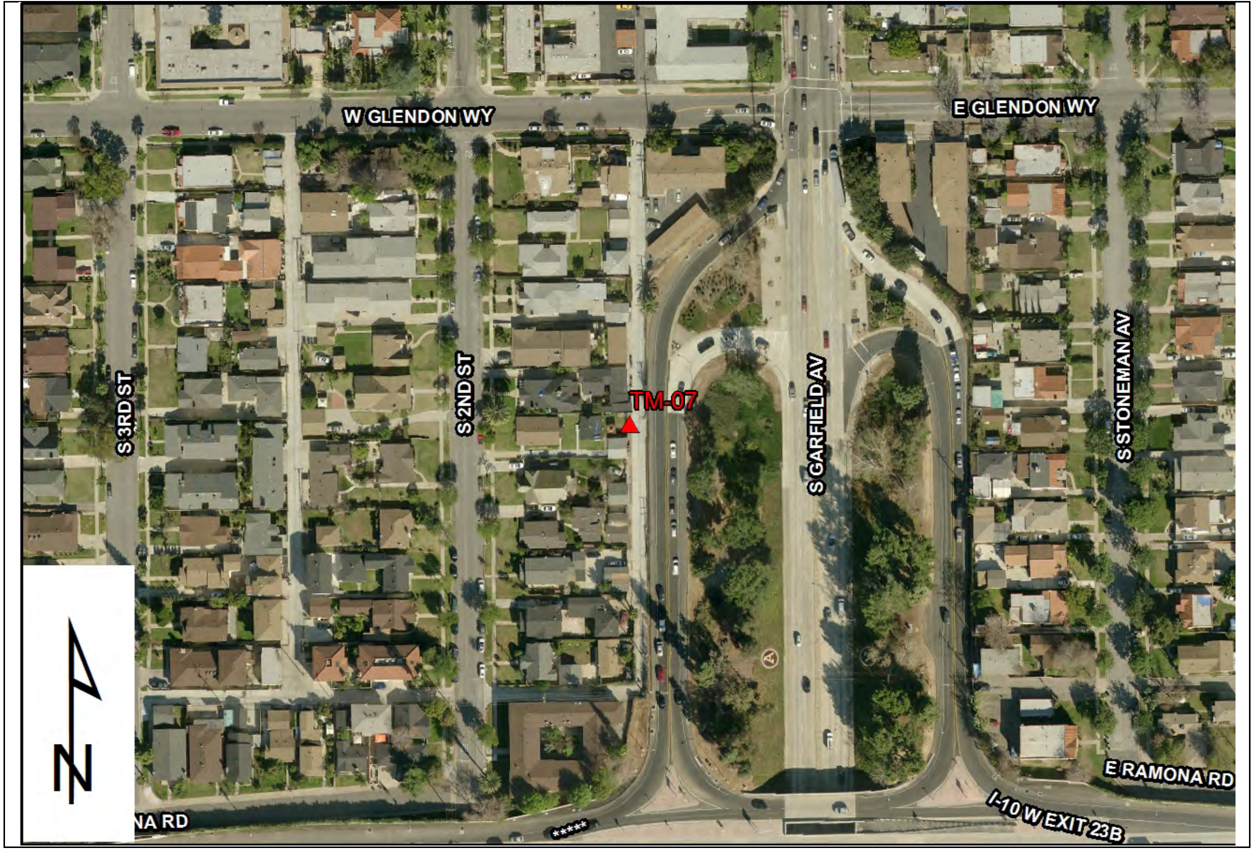
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Some Traffic on Northbound Side of Atlantic Slowed for Traffic Light at Atlantic and Front St.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Ramp 1 Ramp 2	1 1	35 mph 25 mph	80 62	2 0	0 0			
Ramp 3 Ramp 4	1 1	35 mph 25 mph	102 42	2 2	0 0			

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: TM-8 Date: 4/17/2014
Time: From 9:50 AM To 10:00 AM

Site Location: 1825 Stoneman Avenue. In the backyard.

Primary Noise Sources: Traffic on I-10, I-10 ramps, and Garfield Avenue.

Measurement Results	
	dBA
L_{eq}	56.9
L_{max}	67.9
L_{min}	51.9
L_{peak}	80.1
L_2	61.6
L_8	58.8
L_{25}	57.3
L_{50}	56.2
L_{90}	54.3
L_{99}	53.0
SEL	84.7

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 824

Site Number: TM-9 Date: 4/17/2014
Time: From 10:30 AM To 10:40 AM

Site Location: Adjacent to patio area at 1617 Garfield Avenue.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	67.6
L_{max}	81.2
L_{min}	51.3
L_{peak}	100.3
L_2	73.9
L_8	71.0
L_{25}	68.4
L_{50}	65.6
L_{90}	60.7
L_{99}	54.5
SEL	--

Atmospheric Conditions	
Average Wind Velocity (mph)	1.0
Maximum Wind Velocity (mph)	3.0
Temperature (F)	69.4
Relative Humidity (%)	60.6

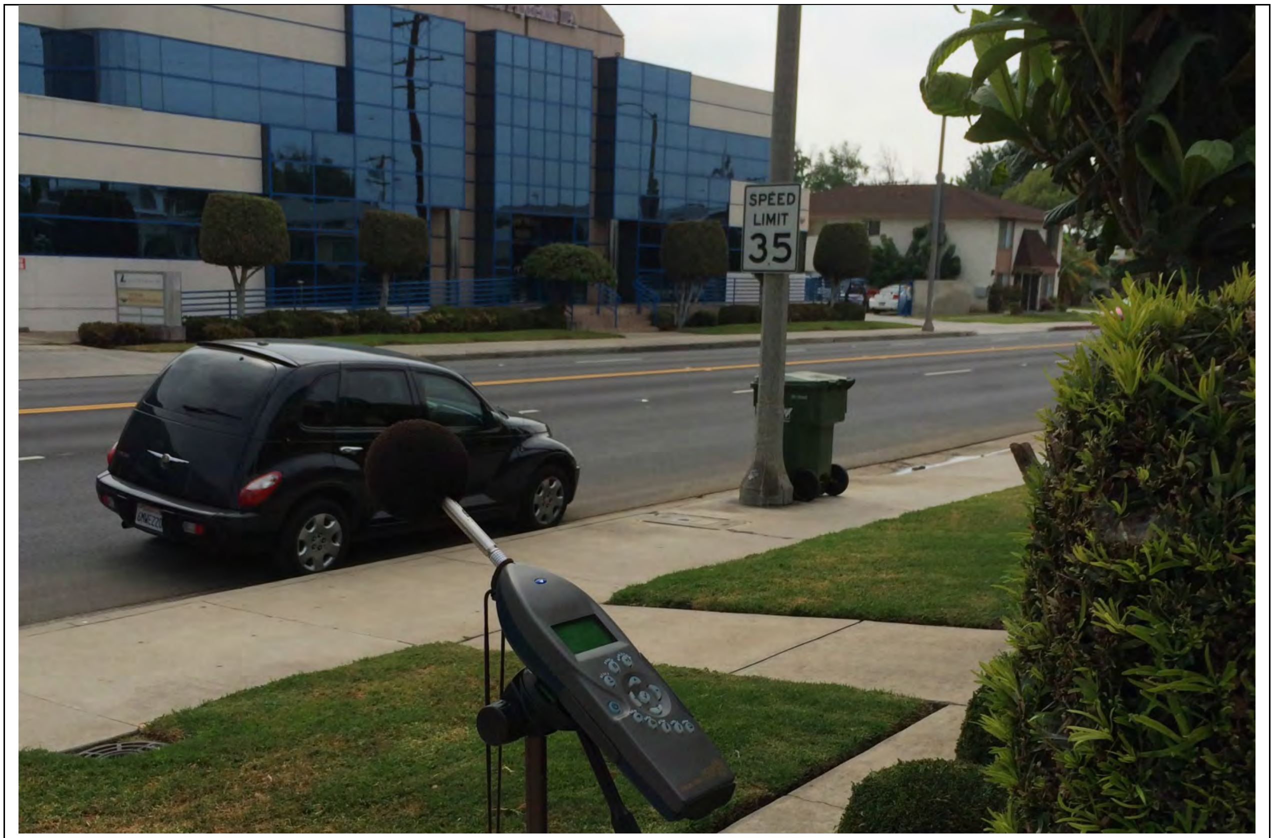
Comments: 5 ft high old wood fence.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Garfield Avenue	2/2	35 mph				206	4	2

Diagram:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: TM-10 Date: 4/17/2014 Time: From 10:28 AM To 10:38 AM

Site Location: 1714 Garfield Avenue. In front of the house (driveway).

Primary Noise Sources: Traffic on Garfield Avenue.

Measurement Results	
	dBA
L_{eq}	66.7
L_{max}	82.8
L_{min}	51.8
L_{peak}	98.9
L_2	73.8
L_8	69.9
L_{25}	67.2
L_{50}	64.7
L_{90}	55.7
L_{99}	53.0
SEL	93.9

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Garfield Avenue	2/2	35 mph	192	2	4			

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephen
Equipment: LD 824

Site Number: TM-11 Date: 4/17/2014 Time: From 10:55 AM To 11:05 AM

Site Location: 1517 Garfield Avenue. In line with facade in the driveway.

Primary Noise Sources: Traffic on Garfield Avenue.

Measurement Results	
	dBA
L_{eq}	63.6
L_{max}	75.1
L_{min}	45.3
L_{peak}	99.3
L_2	69.4
L_8	67.3
L_{25}	64.8
L_{50}	62.1
L_{90}	54.8
L_{99}	47.4
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	0.7
Maximum Wind Velocity (mph)	1.7
Temperature (F)	69.0
Relative Humidity (%)	62.1

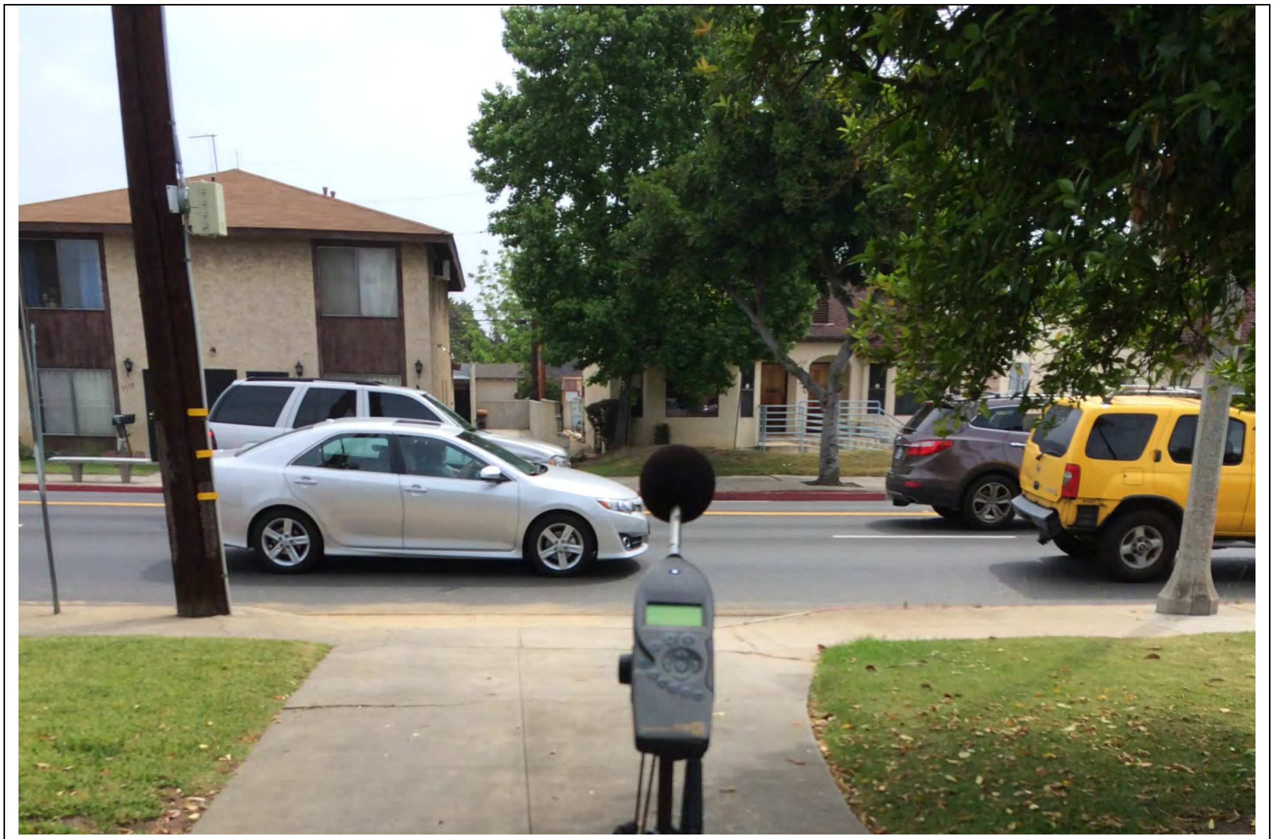
Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Garfield Avenue SB	2	35 mph				159	1	0

Diagram:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: TM-12 Date: 4/17/2014 Time: From 10:54 AM To 11:04 AM

Site Location: 1426 Garfield Avenue. Located approximately 25 ft from the edge of pavement.

Primary Noise Sources: Traffic on Garfield Avenue.

Measurement Results	
	dBA
L_{eq}	65.4
L_{max}	83.1
L_{min}	50.7
L_{peak}	94.8
L_2	71.6
L_8	68.7
L_{25}	66.5
L_{50}	63.7
L_{90}	56.9
L_{99}	52.1
SEL	93.2

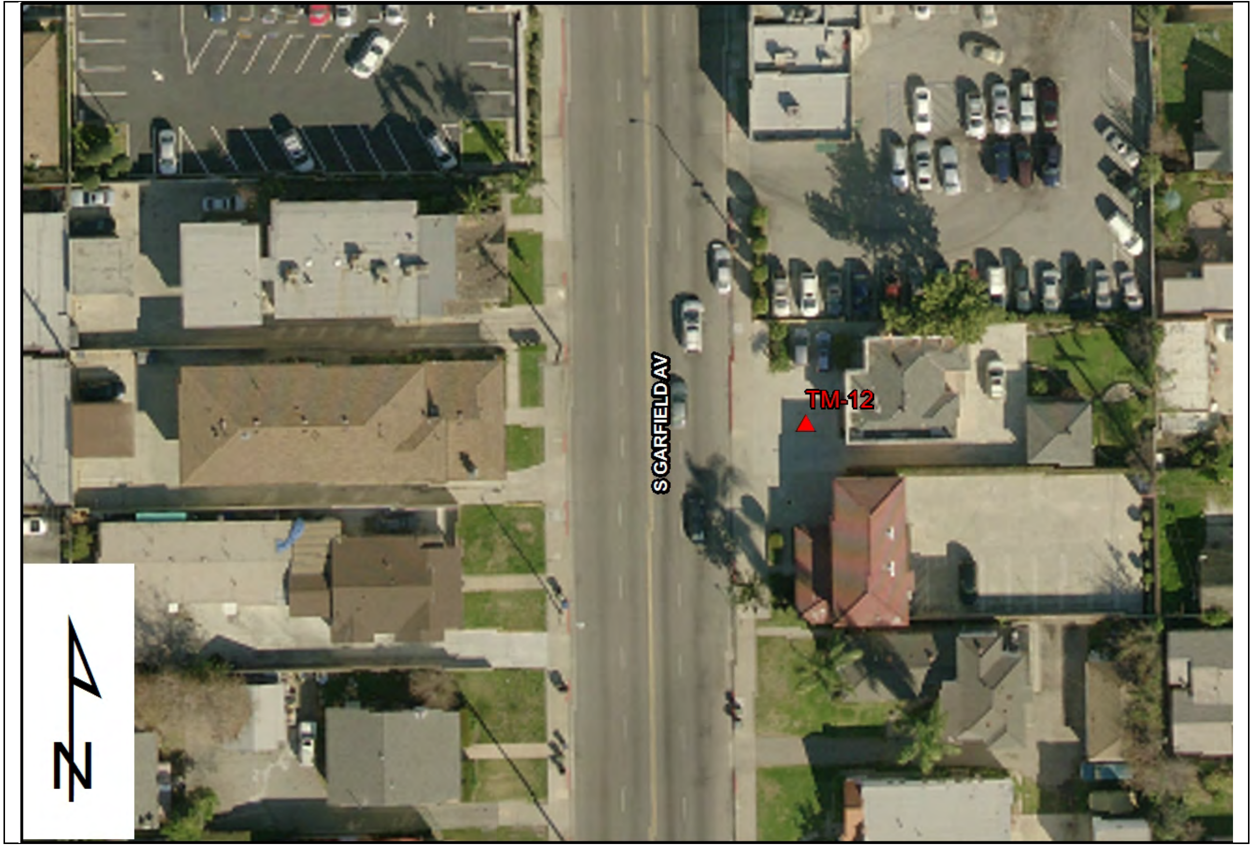
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Garfield Avenue	2/2		217	4	1			

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 824

Site Number: TM-13 Date: 4/17/2014 Time: From 8:21 AM To 8:31 AM

Site Location: 3728 Rosemead Boulevard. In front located on the southeast corner of De Adalena and Rosemead Boulevard.

Primary Noise Sources: Traffic on Rosemead Boulevard.

Measurement Results	
	dBA
L_{eq}	70.6
L_{max}	87.0
L_{min}	54.4
L_{peak}	103.6
L_2	76.9
L_8	73.5
L_{25}	71.8
L_{50}	68.3
L_{90}	59.5
L_{99}	55.6
SEL	--

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Rosemead Boulevard	2/2	40 mph	242	6	1			

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105 Test Personnel: Corey Knips
Project Name: SR-710 North Equipment: LD 824

Site Number: TM-14 Date: 4/17/2014 Time: From 8:22 AM To 8:32 AM

Site Location: 3845 Rosemead Boulevard. Rosemead Apartments. Approximately 23 ft from the edge of payment.

Primary Noise Sources: Traffic on Rosemead Boulevard.

Measurement Results	
	dBA
L_{eq}	7035
L_{max}	83.5
L_{min}	56.5
L_{peak}	95.6
L_2	75.0
L_8	73.3
L_{25}	71.5
L_{50}	69.6
L_{90}	64.2
L_{99}	58.4
SEL	98.3

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Two story apartment building with approximately 18 units (based on the number of mailboxes).

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Rosemead Boulevard						303	9	1

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Adam Remmel

Equipment: LD 820

Site Number: TM-15 Date: 4/16/2014 Time: From 8:23 AM To 8:33 AM

Site Location: 3930 Rosemead Boulevard. In front of Pine Crest Apartment complex approximately 25-30 ft from Rosemead Boulevard NB.

Primary Noise Sources: Traffic on Rosemead Boulevard and noise from a couple of residents entering to complex. .

Measurement Results	
	dBA
L_{eq}	67.9
L_{max}	81.8
L_{min}	57.8
L_{peak}	91.7
L_2	73.9
L_8	70.1
L_{25}	68.4
L_{50}	66.9
L_{90}	62.9
L_{99}	60.1
SEL	79.2

Atmospheric Conditions	
Average Wind Velocity (mph)	1.4
Maximum Wind Velocity (mph)	3.5
Temperature (F)	63.5
Relative Humidity (%)	71.7

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Rosemead Boulevard	2/2		222	6	2	279	7	1

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Adam Remmel
Project Name: SR-710 North
Equipment: LD 820

Site Number: TM-16 Date: 4/17/2014 Time: From 9:08 AM To 9:18 AM

Site Location: 4216 Rosemead Boulevard. In the patio areas of the Jack in the Box. Located approximately 25 to 30 ft from Rosemead Boulevard NB.

Primary Noise Sources: Traffic on Rosemead Boulevard, cars pulling in and out of Jack in the Box, couple of customers entering/exiting restaurant.

Measurement Results	
	dBA
L_{eq}	71.9
L_{max}	84.2
L_{min}	50.2
L_{peak}	95.0
L_2	77.9
L_8	75.9
L_{25}	73.7
L_{50}	69.6
L_{90}	57.9
L_{99}	52.1
SEL	87.3

Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	3.3
Temperature (F)	63.8
Relative Humidity (%)	69.7

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Rosemead Boulevard NB	2		181	4	2			

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Corey Knips
Project Name: SR-710 North
Equipment: LD 831

Site Number: TM-17 Date: 4/17/2014 Time: From 9:07 AM To 9:17 AM

Site Location: 4251 Rosemead Boulevard. U-Haul, even with building.

Primary Noise Sources: Traffic on Rosemead Boulevard.

Measurement Results	
	dBA
L_{eq}	62.9
L_{max}	77.6
L_{min}	48.7
L_{peak}	89.5
L_2	68.3
L_8	66.3
L_{25}	64.5
L_{50}	60.9
L_{90}	54.1
L_{99}	51.2
SEL	90.7

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

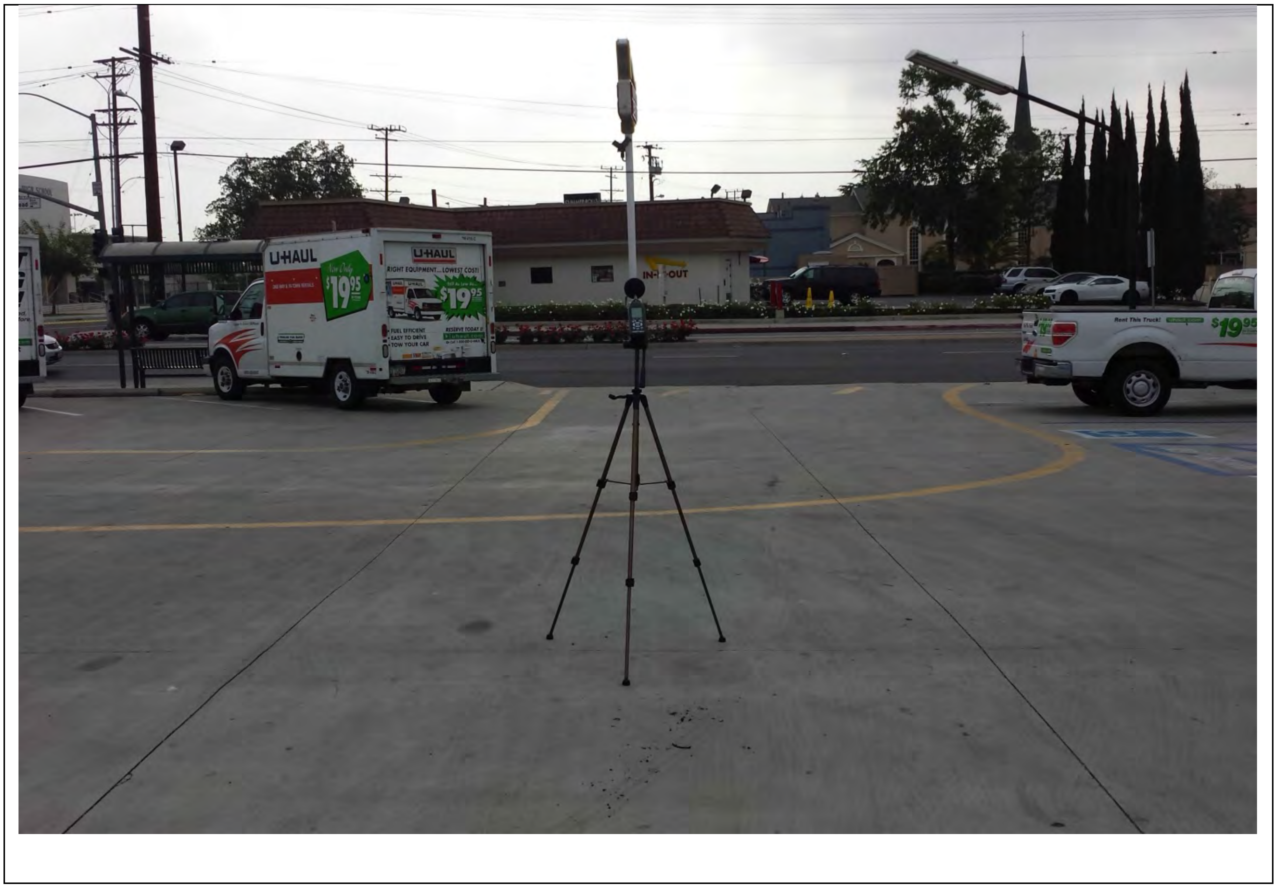
Comments: Had to Pause Momentarily for Helicopters Passing Close By.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Rosemead Boulevard						219	6	1

Diagram:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: LD 824

Site Number: TM-18 Date: 4/17/2014 Time: From 9:07 AM To 9:17 AM

Site Location: At softball field near parking lot to the south.

Primary Noise Sources: Traffic on Rosemead Boulevard.

Measurement Results	
	dBA
L_{eq}	61.2
L_{max}	70.3
L_{min}	48.6
L_{peak}	93.1
L_2	65.7
L_8	64.2
L_{25}	62.8
L_{50}	60.2
L_{90}	54.7
L_{99}	51.0
SEL	--

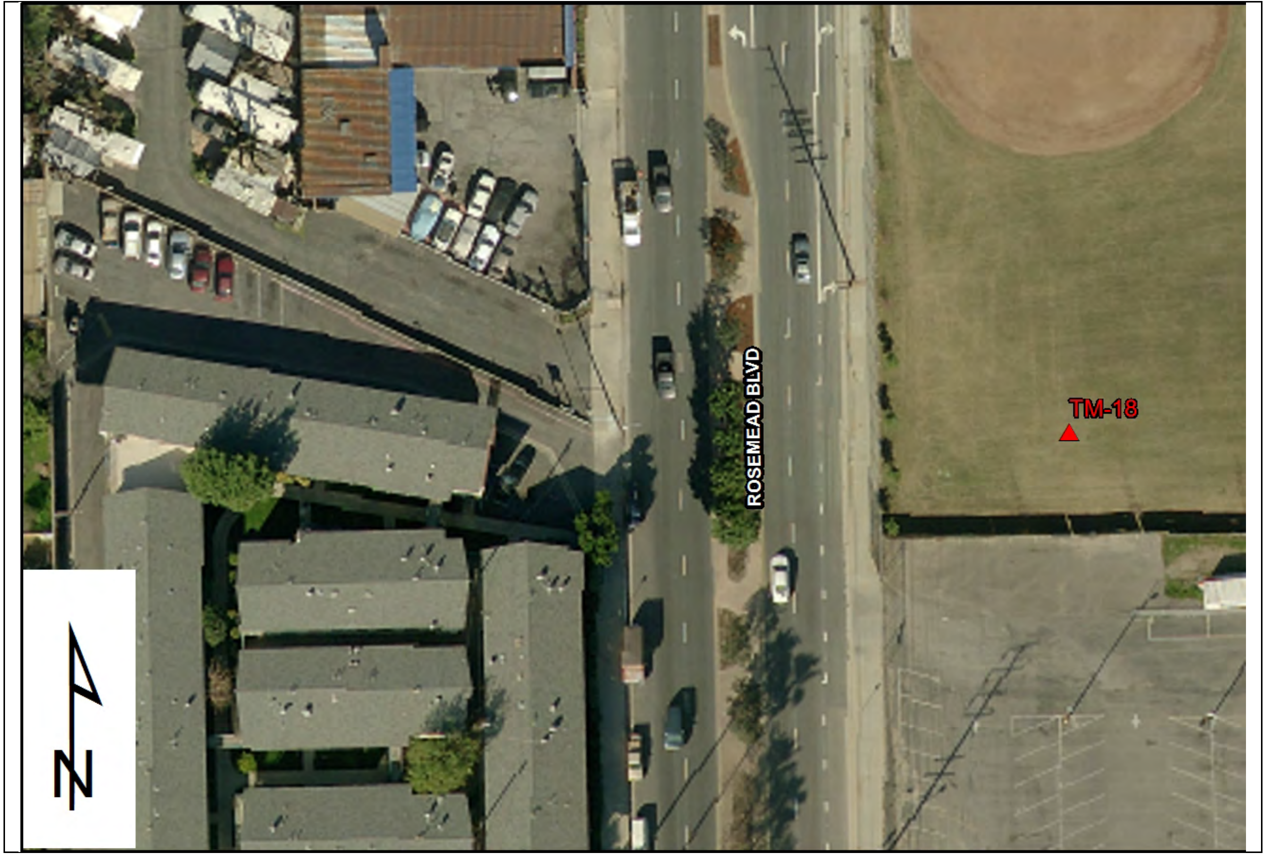
Atmospheric Conditions	
Average Wind Velocity (mph)	1.3
Maximum Wind Velocity (mph)	2.7
Temperature (F)	63.9
Relative Humidity (%)	69.6

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 824

Site Number: TM-19 Date: 4/17/2014 Time: From 1:00 PM To 1:10 PM

Site Location: 409 Garfield Boulevard. In the side yard.
.

Primary Noise Sources: Traffic on I-110 and a couple of vehicle pass-bys on Garfield Boulevard.
.

Measurement Results	
	dBA
L_{eq}	55.9
L_{max}	71.6
L_{min}	41.7
L_{peak}	95.8
L_2	62.8
L_8	59.5
L_{25}	56.7
L_{50}	53.5
L_{90}	48.0
L_{99}	43.8
SEL	--

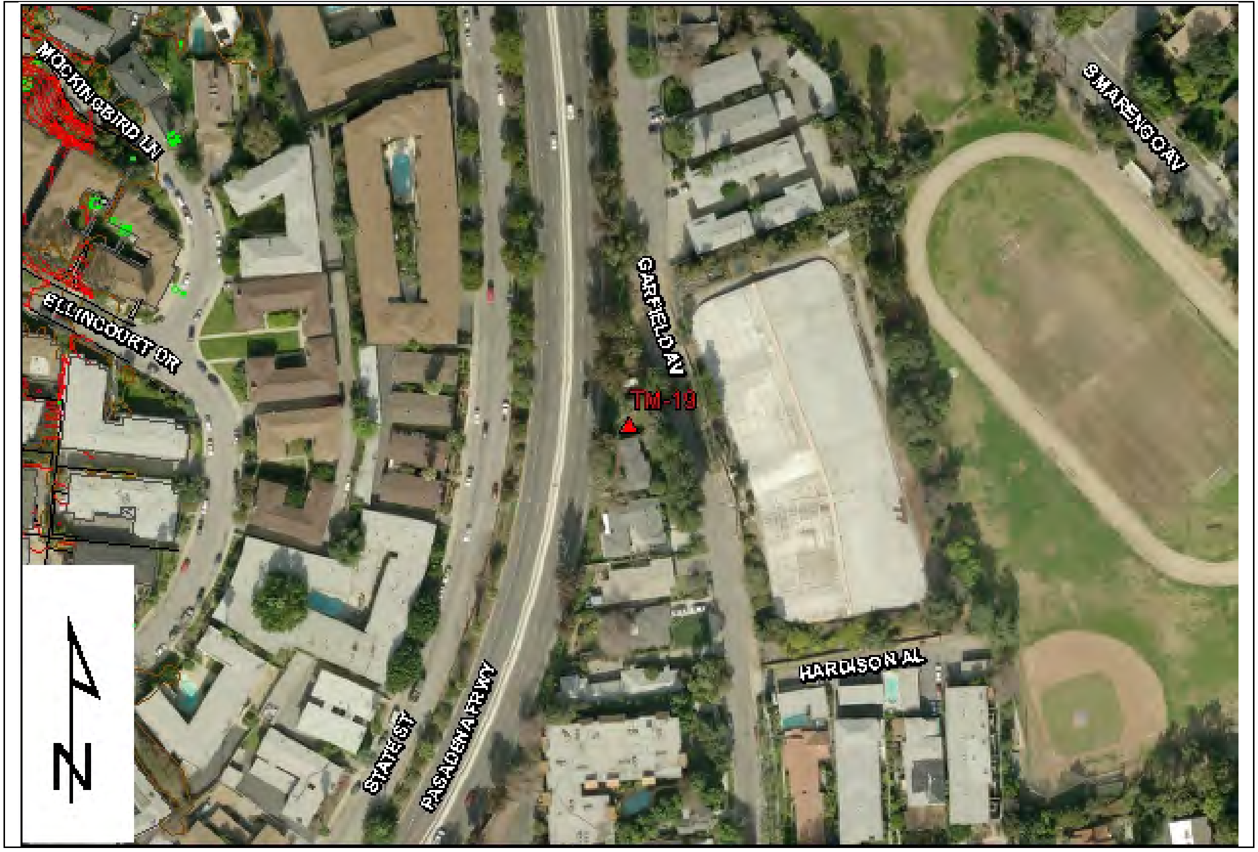
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Back yard is located below the berm and vehicles are not visible.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Corey Knips
Project Name: SR-710 North
Equipment: LD 831

Site Number: TM-20 Date: 4/17/2014 Time: From 12:59 PM To 1:09 PM

Site Location: 1960 State Street. Located at the base of the stairs (even with the edge of roof).

.

Primary Noise Sources: Traffic on SR-110 and faint traffic on State Street.

Measurement Results	
	dBA
L_{eq}	61.5
L_{max}	74.8
L_{min}	46.0
L_{peak}	84.2
L_2	68.1
L_8	65.8
L_{25}	62.1
L_{50}	59.1
L_{90}	53.5
L_{99}	48.0
SEL	89.2

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

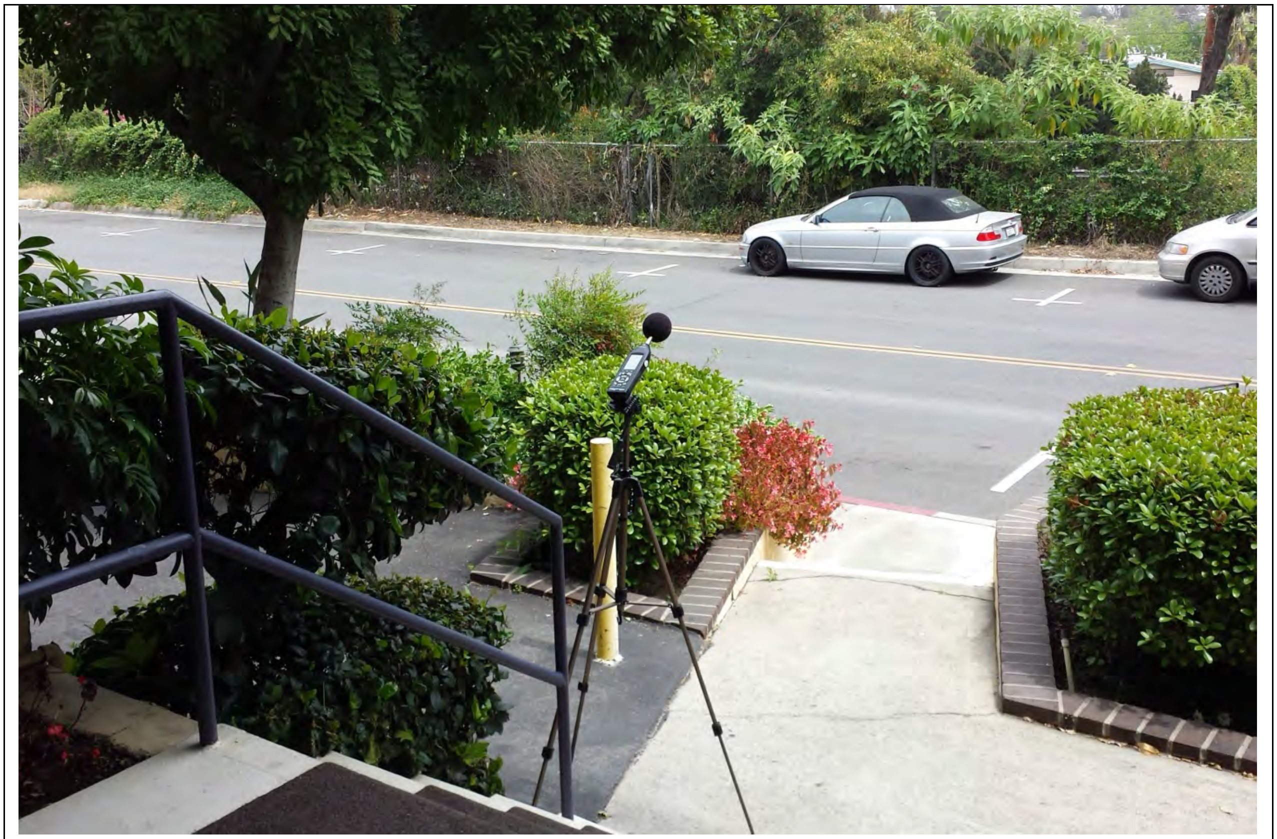
Comments: Two story apartment buildings with approximately 42 units.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
State Street	1/1		5	0	0	33	1	0

Diagram:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD 824

Site Number: TM-21 Date: 4/17//2014
Time: From 1:30 PM To 1:40 PM

Site Location: Located near bleachers at tennis courts and basketball court.

.

Primary Noise Sources: Traffic on I-110 and one loud bus on Marengo Avenue.

Measurement Results	
	dBA
L_{eq}	57.1
L_{max}	73.7
L_{min}	46.2
L_{peak}	92.8
L_2	62.5
L_8	58.9
L_{25}	56.8
L_{50}	54.9
L_{90}	51.6
L_{99}	48.5
SEL	--

Atmospheric Conditions	
Average Wind Velocity (mph)	24
Maximum Wind Velocity (mph)	7.1
Temperature (F)	72.5
Relative Humidity (%)	54

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Corey Knips
Project Name: SR-710 North
Equipment: LD 831

Site Number: TM-22 Date: 4/17//2014
Time: From 1:30 PM To 1:40 PM

Site Location: 1800 State Street. Palm Garden Apartments.

Primary Noise Sources: Traffic on SR-110, light traffic on State Street.

Measurement Results	
	dBA
L_{eq}	67.4
L_{max}	94.5
L_{min}	44.5
L_{peak}	107.4
L_2	68.2
L_8	64.5
L_{25}	62.2
L_{50}	59.6
L_{90}	53.5
L_{99}	46.2
SEL	95.3

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

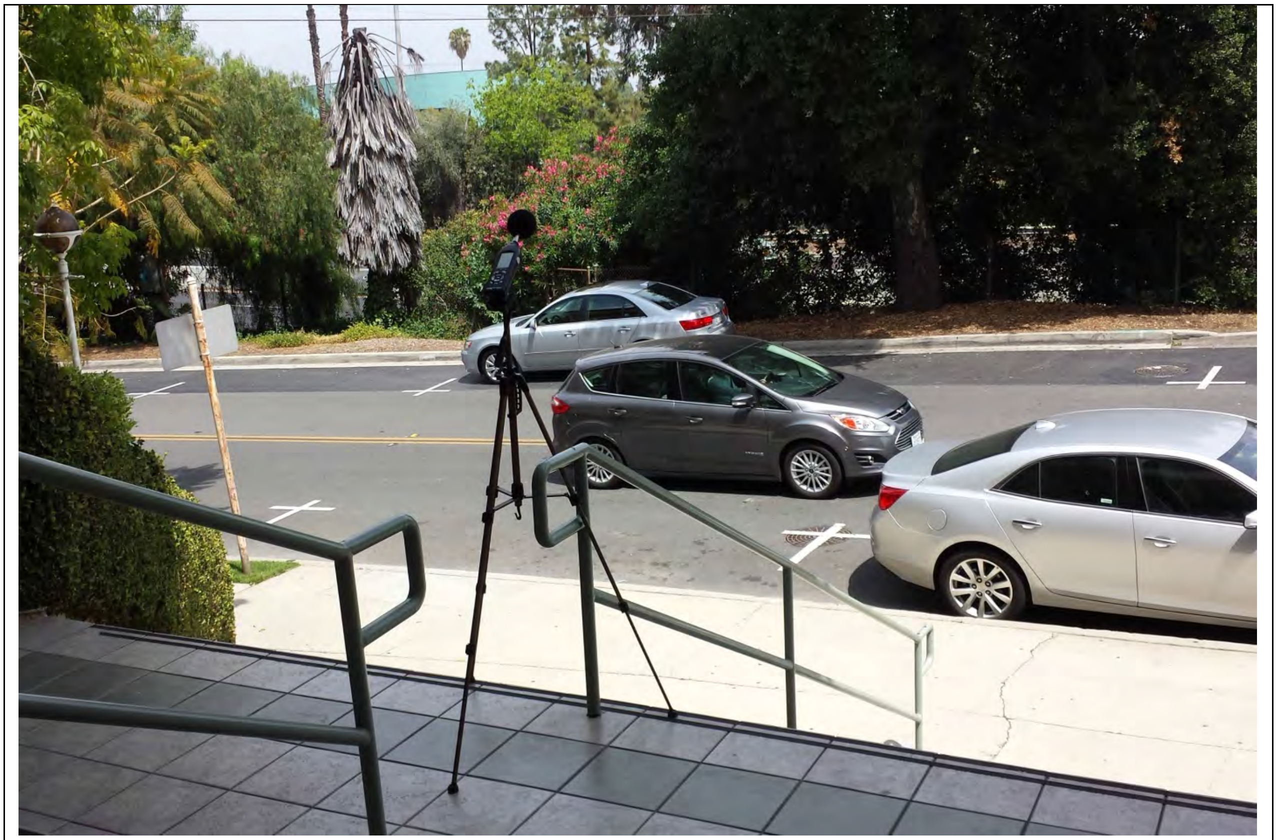
Comments: Base of tripod is 6 ft above the sidewalk (on stairs landing), elevation of ground floor of apartment building is approximately 5 ft higher than that. The 3 story apartment building with approximately 102 units.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
State Street	1/1		1	0	0	29	0	1

Diagram:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Corey Knips

Equipment: LD 824

Site Number: BM01 Date: 8/15/2013

Time: From 9:25 AM To 9:35 AM

Site Location: 1002 Atlantic Blvd. Wienerschnitzel Patio Area.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	66.1
L_{max}	81.1
L_{min}	50.7
L_{peak}	90.8
L_2	73.3
L_8	70.6
L_{25}	67.1
L_{50}	62.8
L_{90}	55.5
L_{99}	52.0
SEL	94.0

Atmospheric Conditions	
Average Wind Velocity (mph)	0.7
Maximum Wind Velocity (mph)	2.8
Temperature (F)	84.2
Relative Humidity (%)	54.0

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Adam Remmel
Equipment: LD 820

Site Number: BM02 Date: 8/15/2013
Time: From 9:25 AM To 9:35 AM

Site Location: 570 Atlantic Blvd. Atlantic Park, close to Southeast Corner of Atlantic Blvd. and Hasting St., Picnic Table Area

Primary Noise Sources: Traffic on Atlantic Blvd. (Main Source). Minimal Traffic on Hasting St. and Amalia Ave. Crow Cawing Briefly.

Measurement Results	
	dBA
L_{eq}	58.3
L_{max}	71.2
L_{min}	47.8
L_{peak}	86.0
L_2	65.2
L_8	62.0
L_{25}	59.0
L_{50}	56.3
L_{90}	51.2
L_{99}	49.0
SEL	

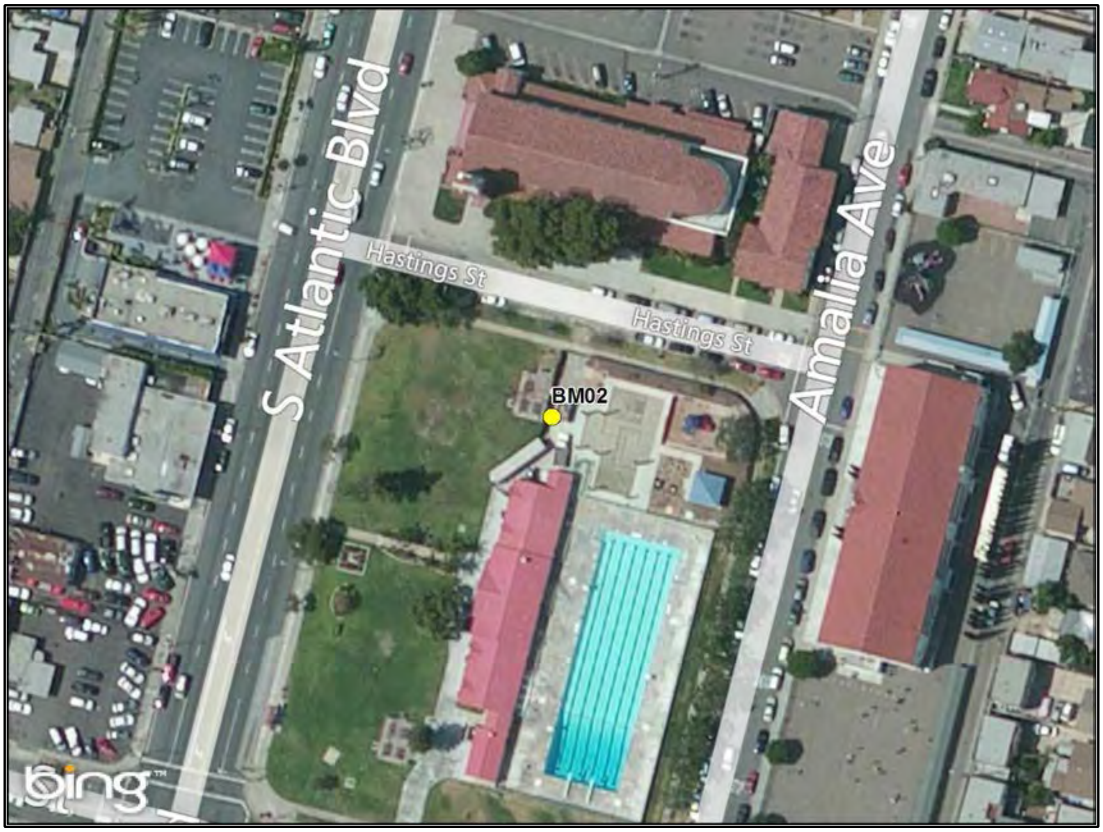
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

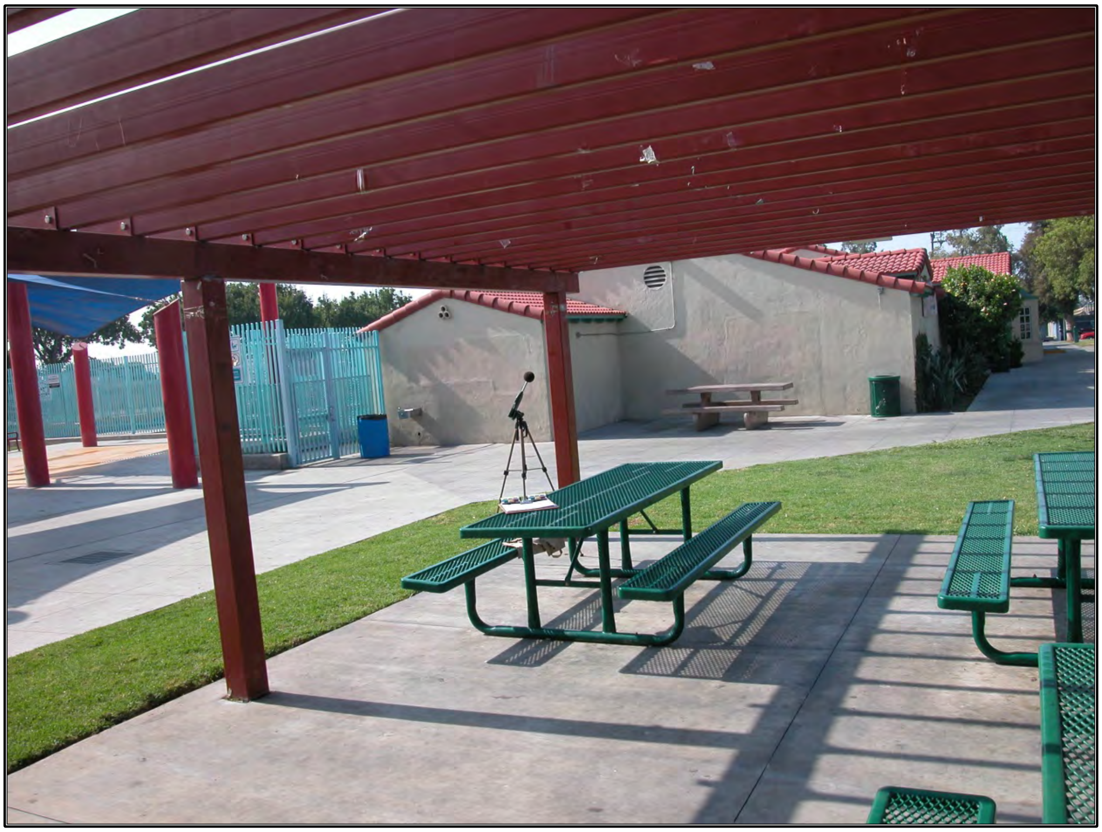
Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:



Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Logan Freeberg

Equipment: LD 831

Site Number: BM03 Date: 8/15/2013

Time: From 9:25 AM To 9:35 AM

Site Location: 532 Atlantic Blvd. St. Alphonsus Church

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	70.0
L_{max}	81.8
L_{min}	49.3
L_{peak}	95.2
L_2	76.1
L_8	73.9
L_{25}	71.2
L_{50}	68.4
L_{90}	59.2
L_{99}	51.7
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	0.9
Maximum Wind Velocity (mph)	1.1
Temperature (F)	86.8
Relative Humidity (%)	43.9

Comments: Sprinklers and Hose Running in Nearby Planter and Grass Area

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.	2/2	25-40 MPH	107	3	1	118	13	6

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: BM04 Date: 10/24/2013 Time: From 3:22 PM To 3:32 PM

Site Location: 420 Amalia Ave. 4Th Street Elementary School Exterior at Atlantic Blvd and Eagle St. On Grass Area of Playground Nearest Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	58.6
L_{max}	71.4
L_{min}	46.2
L_{peak}	83.8
L_2	64.7
L_8	62.0
L_{25}	59.6
L_{50}	57.6
L_{90}	50.6
L_{99}	48.3
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 266. Minor Noise From Kids Playing on Basketball Court Behind School. 2 Buses North Bound.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd	2/2	35 MPH	143	10	3	165	3	4

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: BM05 Date: 10/23/2013

Time: From 2:25 PM To 2:35 PM

Site Location: 269 Atlantic Blvd. McDonald's Outdoor Seating Area.

Primary Noise Sources: Metro Rail Engines Running (Fairly Quiet) Loud Bus Idling on Pomona (3-4 Minutes), Light Traffic on Pomona, Exhaust Fan from McDonald's. Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	61.7
L_{max}	78.6
L_{min}	56.2
L_{peak}	90.8
L_2	67.1
L_8	64.0
L_{25}	62.1
L_{50}	60.1
L_{90}	58.4
L_{99}	57.4
SEL	89.6

Atmospheric Conditions	
Average Wind Velocity (mph)	2.2
Maximum Wind Velocity (mph)	6.8
Temperature (F)	72.6
Relative Humidity (%)	57.0

Comments: Stored 259.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105 — Test Personnel: JT Stephens
Project Name: SR-710 North — Equipment: LD 820

Site Number: BM06 Date: 10/23/2013 — Time: From 2:25 PM To 2:35 PM

Site Location: Across Street from 5314 Fernfield Dr.

Primary Noise Sources: Traffic on I-210 Freeway. Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	62.3
L_{max}	71.4
L_{min}	57.1
L_{peak}	91.7
L_2	68.1
L_8	65.3
L_{25}	62.7
L_{50}	61.0
L_{90}	58.8
L_{99}	57.7
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Freeway Slowed. Some Walls on North Side of Fernfield.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.	3/3	40-45 MPH	237	4	2	143	2	2

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Corey Knips

Equipment: LD 824

Site Number: BM07 Date: 8/15/2013

Time: From 10:04 AM To 10:14 AM

Site Location: 2314 Atlantic Blvd. Animal Hospital.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	66.4
L_{max}	84.9
L_{min}	55.4
L_{peak}	95.5
L_2	74.2
L_8	69.4
L_{25}	65.8
L_{50}	63.3
L_{90}	58.5
L_{99}	56.1
SEL	94.2

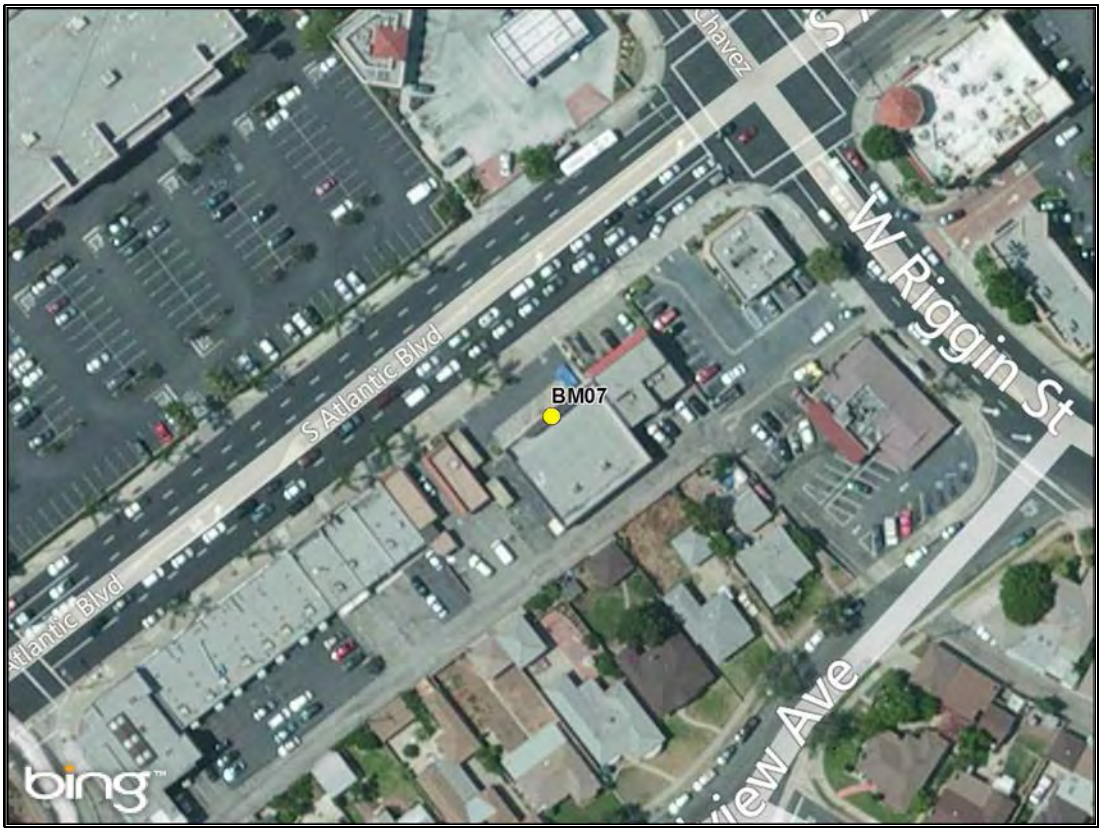
Atmospheric Conditions	
Average Wind Velocity (mph)	2.2
Maximum Wind Velocity (mph)	0.7
Temperature (F)	77.5
Relative Humidity (%)	58.6

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Adam Remmel
Equipment: LD 820

Site Number: BM08 Date: 8/15/2013
Time: From 10:04 AM To 10:14 AM

Site Location: 2020 Atlantic Blvd. Boston Market Restaurant. Approximately 40 Feet from Atlantic Blvd., Outside Bench Area.

Primary Noise Sources: Traffic on Atlantic Blvd. (Main Source). Cars Occasionally Passing or Parking in Commercial Area Parking Lot. Car Doors Closing and Activating Alarm (Minor), Nearby Fountain (Minor).

Measurement Results	
	dBA
L_{eq}	66.0
L_{max}	80.6
L_{min}	53.1
L_{peak}	93.8
L_2	72.1
L_8	69.5
L_{25}	66.7
L_{50}	63.8
L_{90}	58.3
L_{99}	54.8
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.	3/3		116	3	1	128	4	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: BM09 Date: 8/15/2013

Time: From 10:04 AM To 10:14 AM

Site Location: 850 Brightwood. In Apartment Complex Courtyard

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	61.3
L_{max}	69.7
L_{min}	52.9
L_{peak}	81.0
L_2	66.1
L_8	64.6
L_{25}	62.4
L_{50}	60.2
L_{90}	56.3
L_{99}	54.2
SEL	

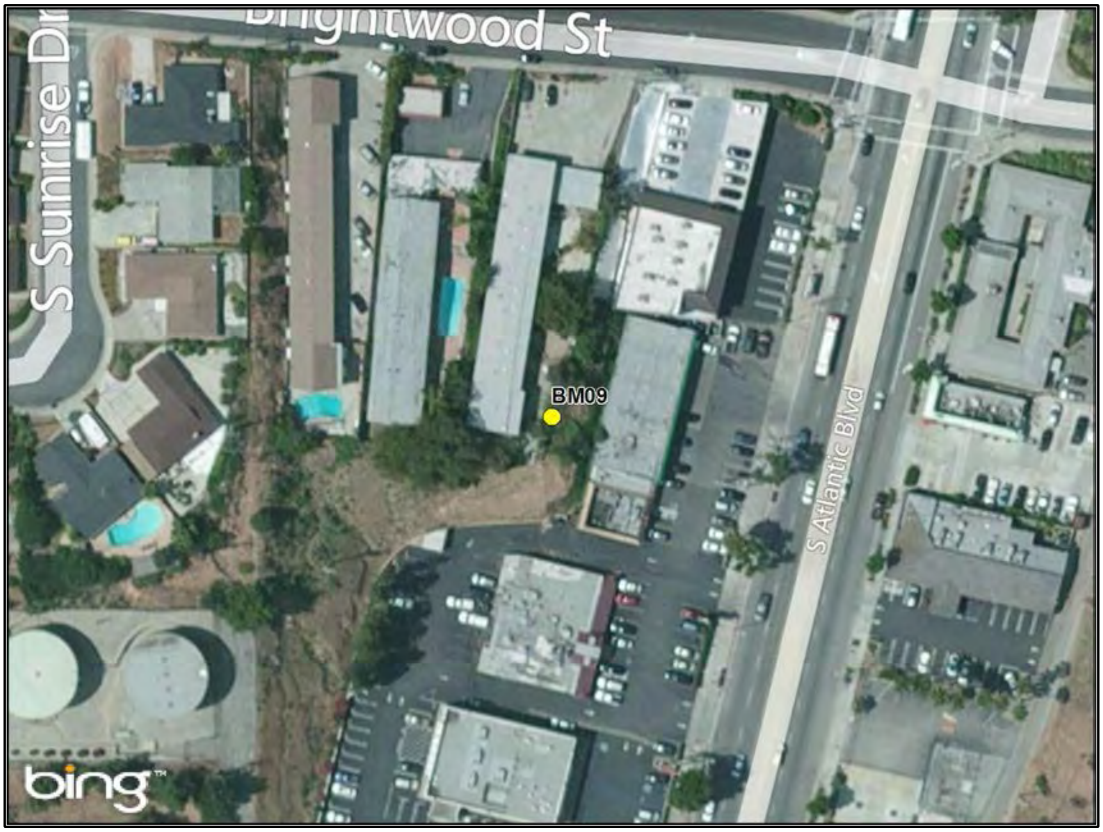
Atmospheric Conditions	
Average Wind Velocity (mph)	1.2
Maximum Wind Velocity (mph)	1.8
Temperature (F)	84.2
Relative Humidity (%)	52.6

Comments: Construction Equipment Back-up Beeper in Distance – Minor.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 824

Site Number: BM10 Date: 8/15/2013

Time: From 10:36 AM To 10:46 AM

Site Location: 1830 Atlantic Blvd. in Front of House.

Primary Noise Sources: Traffic on Atlantic Blvd., Buzzing Noise from Large Building Across the Street.

Measurement Results	
	dBA
L_{eq}	64.1
L_{max}	78.2
L_{min}	51.4
L_{peak}	88.8
L_2	73.7
L_8	66.9
L_{25}	63.3
L_{50}	60.4
L_{90}	54.8
L_{99}	52.2
SEL	91.9

Atmospheric Conditions	
Average Wind Velocity (mph)	1.3
Maximum Wind Velocity (mph)	2.6
Temperature (F)	82.0
Relative Humidity (%)	52.6

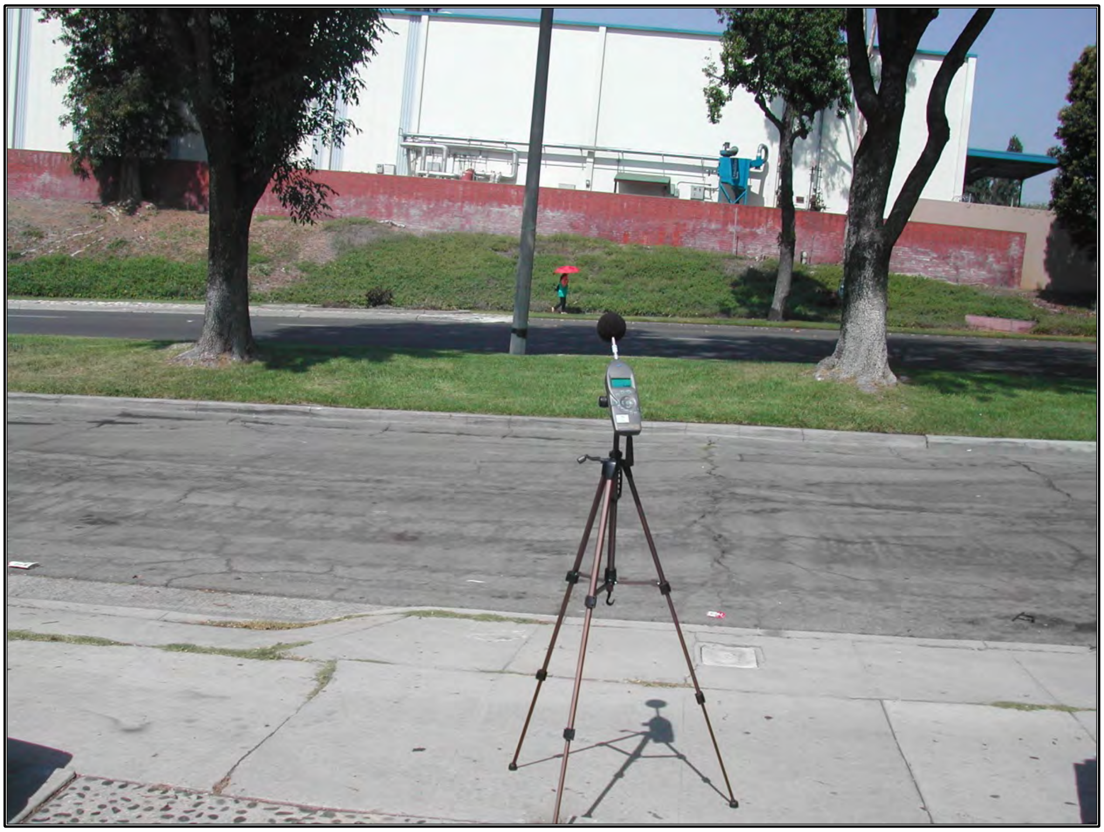
Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Adam Remmel
Equipment: LD 820

Site Number: BM11 Date: 8/15/2013

Time: From 10:36 AM To 10:47 AM

Site Location: 1600 Atlantic Blvd. (Side Street, Not Main) Approximately 30 Feet from Atlantic Blvd., Frontyard.

Primary Noise Sources: Traffic on Atlantic Blvd. (Main Source) A Couple Cars Passing on Side St. of Atlantic, Helicopters Passing Close By Momentarily (Paused).

Measurement Results	
	dBA
L_{eq}	62.0
L_{max}	74.5
L_{min}	49.2
L_{peak}	86.3
L_2	70.6
L_8	65.3
L_{25}	62.1
L_{50}	59.2
L_{90}	52.6
L_{99}	50.2
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Had to Pause Momentarily for Helicopters Passing Close By.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.	3/3		114	4	1	115	5	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: Logan Freeberg

Project Name: SR-710 North

Equipment: LD 831

Site Number: BM12 Date: 8/15/2013

Time: From 10:36 AM To 10:46 AM

Site Location: 1114 Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	65.0
L_{max}	79.8
L_{min}	48.1
L_{peak}	91.5
L_2	72.2
L_8	69.0
L_{25}	65.6
L_{50}	61.9
L_{90}	54.4
L_{99}	48.8
SEL	

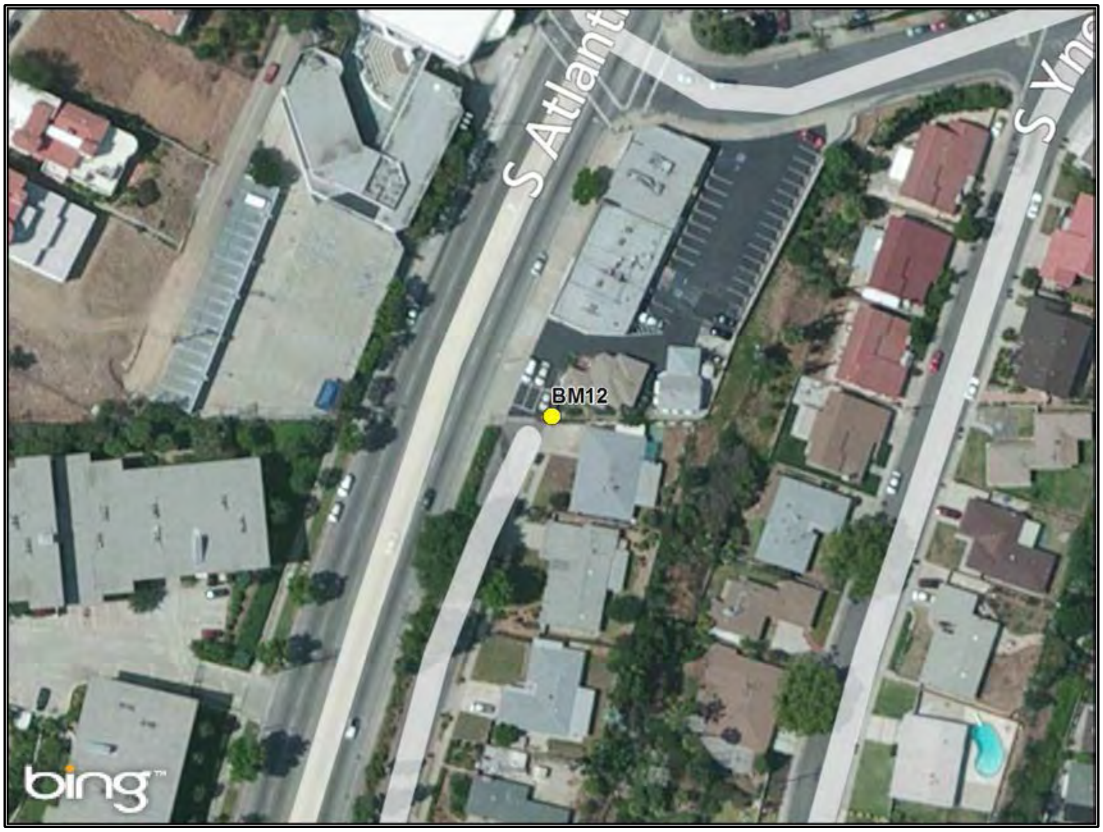
Atmospheric Conditions	
Average Wind Velocity (mph)	2.2
Maximum Wind Velocity (mph)	4.0
Temperature (F)	63.1
Relative Humidity (%)	48.7

Comments: Helicopter Flyover.

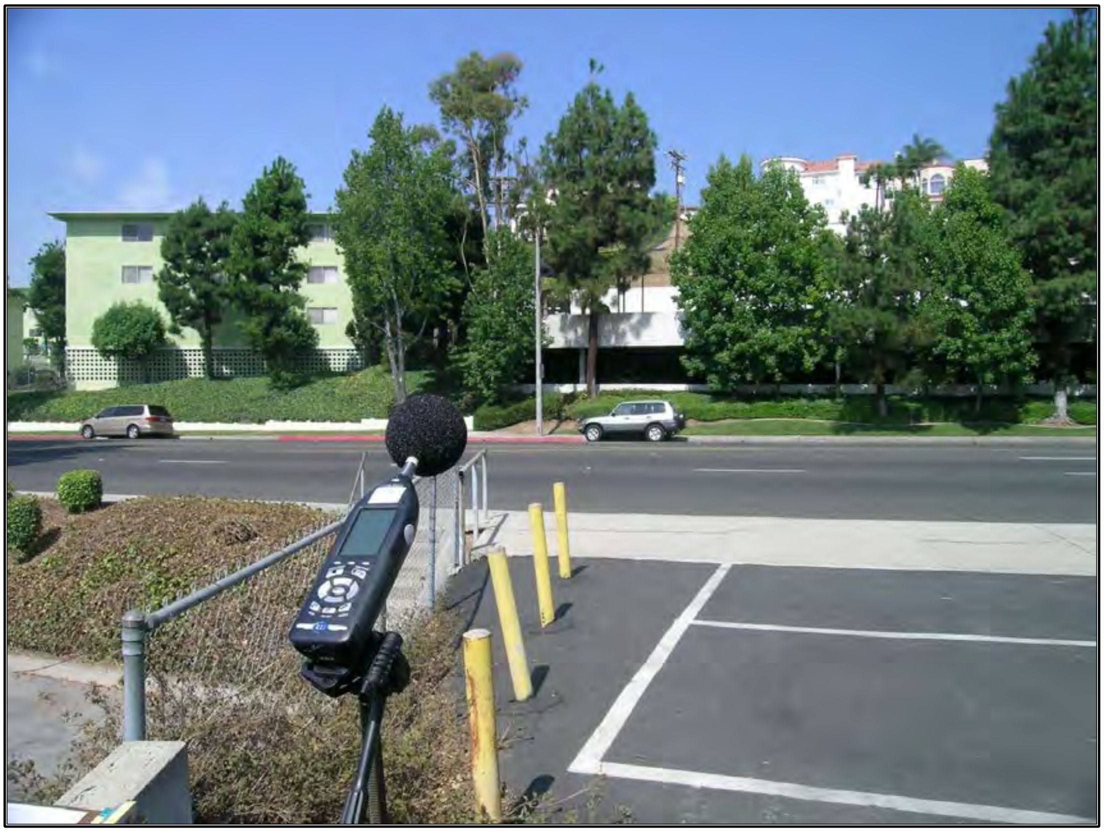
Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 824

Site Number: BM13 Date: 8/15/2013
Time: From 11:11 AM To 11:21 AM

Site Location: 900 Atlantic Blvd., in Parking Lot.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	55.7
L_{max}	72.8
L_{min}	46.4
L_{peak}	85.1
L_2	61.3
L_8	58.3
L_{25}	56.1
L_{50}	53.6
L_{90}	48.7
L_{99}	47.1
SEL	

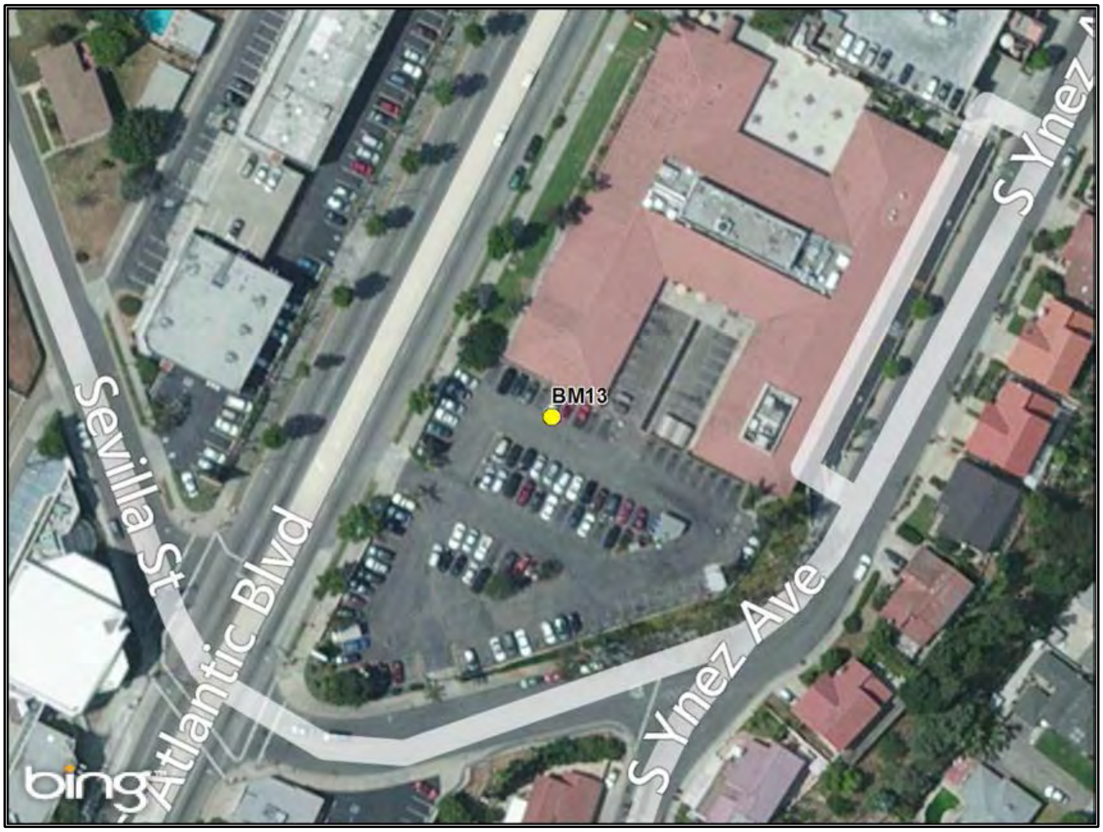
Atmospheric Conditions	
Average Wind Velocity (mph)	1.6
Maximum Wind Velocity (mph)	3.9
Temperature (F)	84.0
Relative Humidity (%)	49.6

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Adam Remmel
Equipment: LD 820

Site Number: BM14 Date: 8/15/2013
Time: From 11:11 AM To 11:21 AM

Site Location: 1111 Atlantic Blvd. Church Approximately 20 Feet from Atlantic Blvd. Southwest Corner of Atlantic Blvd. and Sevilla St.

Primary Noise Sources: Traffic on Atlantic Blvd. A Few Cars Passing on Sevilla St., Pedestrian Briefly Talking on Cell Phone Close By Meter.

Measurement Results	
	dBA
L_{eq}	68.2
L_{max}	80.3
L_{min}	49.4
L_{peak}	91.4
L_2	75.2
L_8	72.7
L_{25}	69.6
L_{50}	65.5
L_{90}	54.3
L_{99}	50.8
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Logan Freeberg

Equipment: LD 831

Site Number: BM15 Date: 8/15/2013

Time: From 11:11 AM To 11:21 AM

Site Location: 826 Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	66.3
L_{max}	84.9
L_{min}	48.1
L_{peak}	94.9
L_2	72.4
L_8	69.8
L_{25}	66.8
L_{50}	62.9
L_{90}	54.1
L_{99}	49.9
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	3.8
Maximum Wind Velocity (mph)	4.6
Temperature (F)	79.7
Relative Humidity (%)	53.2

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.	2/2	25-35 MPH	96	3	0	99	3	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 824

Site Number: BM16 Date: 8/15/2013
Time: From 11:53 AM To 12:03 PM

Site Location: 606 Atlantic Blvd., Good Shepherd Taiwanese Presbyterian Church.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	61.0
L_{max}	68.8
L_{min}	47.9
L_{peak}	81.7
L_2	67.0
L_8	65.3
L_{25}	62.2
L_{50}	58.9
L_{90}	53.2
L_{99}	49.3
SEL	88.8

Atmospheric Conditions	
Average Wind Velocity (mph)	0.6
Maximum Wind Velocity (mph)	1.8
Temperature (F)	91.4
Relative Humidity (%)	45.0

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: Adam Remmel

Project Name: SR-710 North

Equipment: LD 820

Site Number: BM17 Date: 8/15/2013

Time: From 11:53 AM To 12:03 PM

Site Location: 500 S. Atlantic Blvd. Optometry Office. Approximately 15 Feet from Atlantic Blvd. Southeast Corner of Atlantic and Harding Ave.

Primary Noise Sources: Traffic on Atlantic Blvd. Minimal Traffic on Harding Ave., Bus Momentarily Stopping Off at Bus Stop in Front of Meter.

Measurement Results	
	dBA
L_{eq}	68.6
L_{max}	86.1
L_{min}	51.5
L_{peak}	102.0
L_2	75.5
L_8	72.5
L_{25}	69.5
L_{50}	65.1
L_{90}	57.5
L_{99}	53.0
SEL	86.4

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.	3/3		124	2	0	144	4	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Logan Freeberg
Project Name: SR-710 North
Equipment: LD 831

Site Number: BM18 Date: 8/15/2013
Time: From 11:53 AM To 12:03 PM

Site Location: 400 Atlantic Blvd. Mr. Baguette Patio in the Monterey Park Mall

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	66.8
L_{max}	86.6
L_{min}	53.3
L_{peak}	97.2
L_2	72.7
L_8	70.1
L_{25}	66.9
L_{50}	64.1
L_{90}	59.0
L_{99}	55.9
SEL	

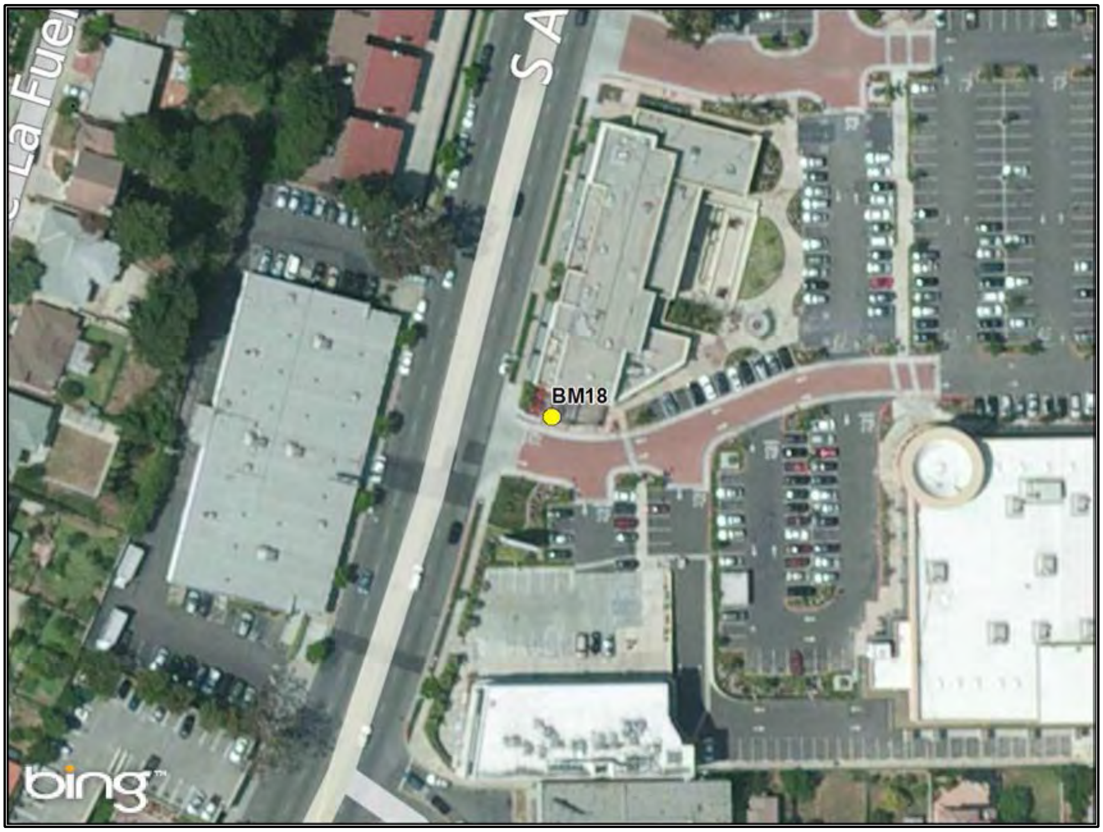
Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	1.4
Temperature (F)	87.1
Relative Humidity (%)	46.0

Comments: Patio Located Next to Parking Lot Entrance. Some Customers on Patio Talking (Minor). Car Door Slam on Road Next to Patio. Car Horn on Atlantic Blvd.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 824

Site Number: BM19 Date: 8/15/2013
Time: From 1:58 PM To 2:08 PM

Site Location: In Between Backyards of 261F and 297A Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	60.4
L_{max}	80.8
L_{min}	45.9
L_{peak}	91.3
L_2	67.6
L_8	61.1
L_{25}	58.5
L_{50}	55.9
L_{90}	49.9
L_{99}	47.3
SEL	88.2

Atmospheric Conditions	
Average Wind Velocity (mph)	1.6
Maximum Wind Velocity (mph)	5.0
Temperature (F)	89.2
Relative Humidity (%)	39.3

Comments: These Backyard Patios Have 4 Foot Wood Fences with Gaps and Are About 20-25 Feet Higher Elevation than Atlantic Blvd.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.	2/2		142	4	2	152	4	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: Adam Remmel

Project Name: SR-710 North

Equipment: LD 820

Site Number: BM20 Date: 8/15/2013

Time: From 1:58 PM To 2:08 PM

Site Location: 840 Mabel Ave. Apartment Complex (Closest Address). Northwest Corner of Complex – Backside Walkway Fence Area. Corner of Complex Closest to Southwest Corner of Atlantic Blvd. and Mabel Ave.

Primary Noise Sources: Traffic on Atlantic Blvd. Minimum Traffic on Mabel Ave., Helicopter Passing Overhead Momentarily (Paused)

Measurement Results	
	dBA
L_{eq}	59.4
L_{max}	75.6
L_{min}	52.3
L_{peak}	87.8
L_2	65.0
L_8	61.2
L_{25}	59.5
L_{50}	58.0
L_{90}	54.7
L_{99}	53.0
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

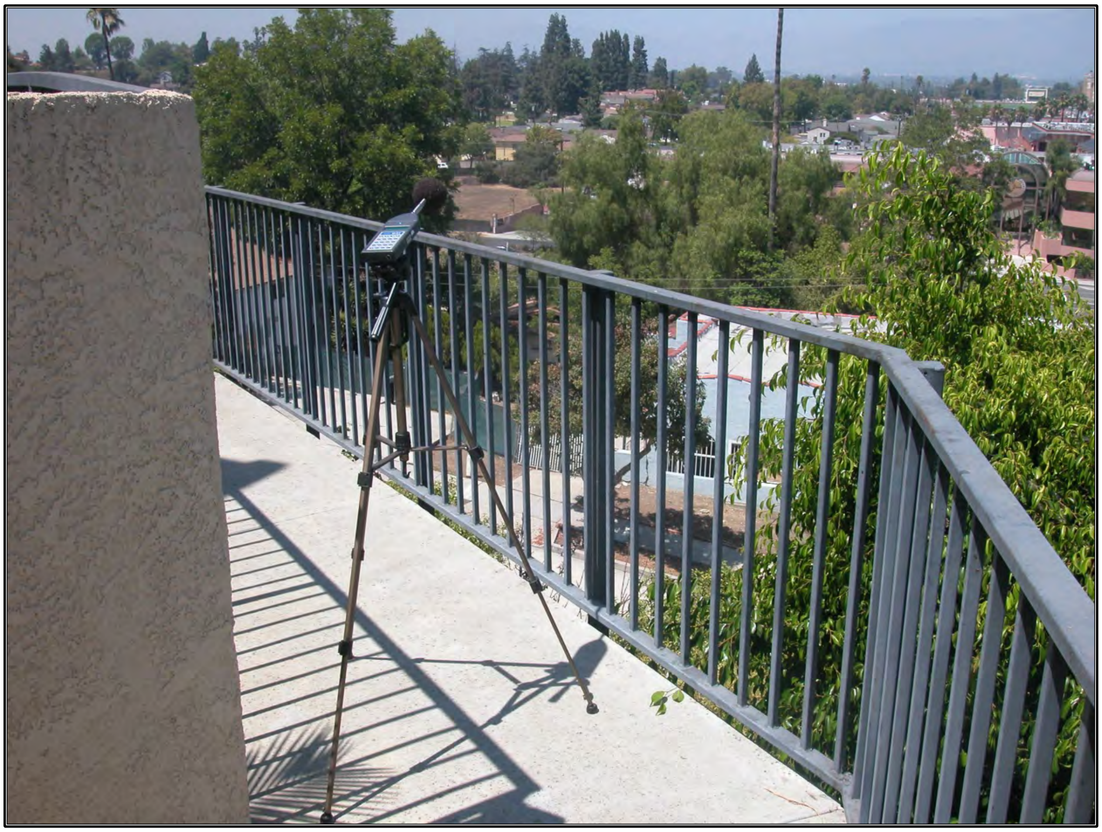
Comments: Had to Pause Momentarily for Helicopter Passing Overhead.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.	3/3		151	3	0	164	3	0

Sketch:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105

Test Personnel: Logan Freeberg

Project Name: SR-710 North

Equipment: LD 831

Site Number: BM21 Date: 8/15/2013

Time: From 1:58 PM To 2:08 PM

Site Location: 420 N. Atlantic Blvd. Monterey Park Best Western

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	62.0
L_{max}	72.4
L_{min}	51.6
L_{peak}	88.9
L_2	67.9
L_8	65.7
L_{25}	63.2
L_{50}	60.4
L_{90}	55.3
L_{99}	53.2
SEL	

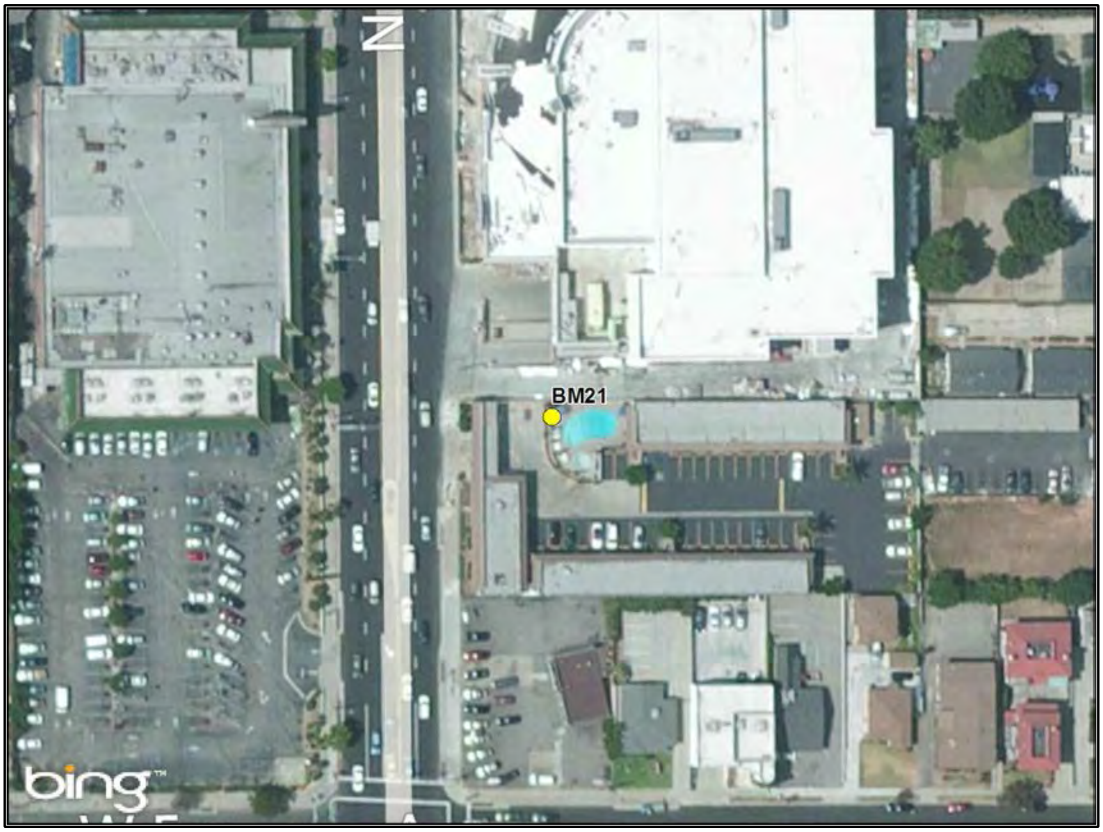
Atmospheric Conditions	
Average Wind Velocity (mph)	1.0
Maximum Wind Velocity (mph)	2.0
Temperature (F)	95.2
Relative Humidity (%)	35.9

Comments: 10 Foot Wall to the North. Near Parking Lot Entrance. Helicopter Flyover.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 820

Site Number: BM22 Date: 8/29/2013

Time: From 9:40 AM To 9:50 AM

Site Location: Rear Yard of 616 Hathaway Ave. Multi-family Property.

Primary Noise Sources: Traffic on Atlantic Blvd. Traffic on I-10 Freeway.

Measurement Results	
	dBA
L_{eq}	53.8
L_{max}	68.4
L_{min}	45.7
L_{peak}	79.9
L_2	59.7
L_8	56.2
L_{25}	54.2
L_{50}	52.6
L_{90}	49.2
L_{99}	47.1
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Jason Lui
Equipment: LD 824

Site Number: BM23 Date: 8/29/2013
Time: From 9:40 AM To 9:50 AM

Site Location: 908 W. Ramona Rd. in the Front Yard.

Primary Noise Sources: Traffic on I-10 Freeway.

Measurement Results	
	dBA
L_{eq}	72.4
L_{max}	84.3
L_{min}	64.5
L_{peak}	99.0
L_2	77.6
L_8	75.1
L_{25}	73.0
L_{50}	71.5
L_{90}	68.3
L_{99}	65.5
SEL	100.2

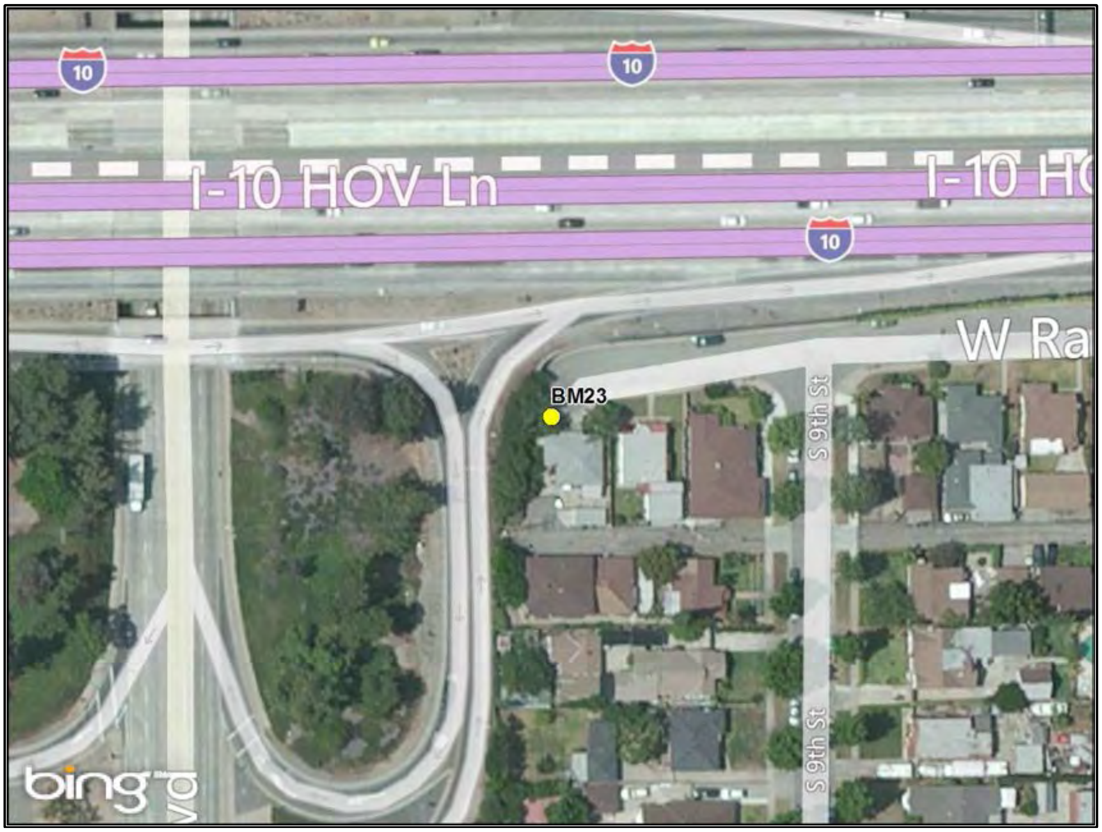
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Chain Link Fence w/ Thick Ivy Cover and Block Wall.
Block Wall = 11 Blocks and 12 Blocks @ 8 Inches + 32 Inch High Footer (Base).

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: BM24 Date: 8/29/2013
Time: From 9:40 AM To 9:50 AM

Site Location: 1120 Ramona Rd. Edge of Cul-de-sac.

Primary Noise Sources: Traffic on I-10 Freeway and Ramps.

Measurement Results	
	dBA
L_{eq}	70.3
L_{max}	79.0
L_{min}	64.0
L_{peak}	90.4
L_2	73.8
L_8	72.3
L_{25}	71.0
L_{50}	70.0
L_{90}	68.1
L_{99}	66.1
SEL	98.1

Atmospheric Conditions	
Average Wind Velocity (mph)	0.8
Maximum Wind Velocity (mph)	2.0
Temperature (F)	95.1
Relative Humidity (%)	28.3

Comments: Freeway Noise Barrier is About 12' Feet Tall. End of Cul-de-sac has 20' Feet of Chain Link Fence (No Noise Barrier). Residence has 6' Foot Wood Fence (With Gaps) Blocking Front and Backyard.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: LD 820

Site Number: BM25 Date: 8/29/2013

Time: From 10:12 AM To 10:22 AM

Site Location: Rear Yard of 1825 9TH St.

Primary Noise Sources: Traffic on I-10 Freeway and Ramps. Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	61.5
L_{max}	73.6
L_{min}	55.5
L_{peak}	87.0
L_2	67.5
L_8	63.8
L_{25}	61.7
L_{50}	60.5
L_{90}	58.1
L_{99}	56.5
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: No Property Line Wall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Jason Lui

Equipment: LD 824

Site Number: BM26 Date: 8/29/2013

Time: From 10:12 AM To 10:22 AM

Site Location: 1824 S. Olive Ave. Near the Backyard in the Alley.

Primary Noise Sources: Traffic on I-10 Freeway. Traffic on I-10 WB Freeway On-Ramp and Off-Ramps.

Measurement Results	
	dBA
L_{eq}	62.2
L_{max}	79.7
L_{min}	55.6
L_{peak}	96.6
L_2	66.6
L_8	65.0
L_{25}	62.7
L_{50}	60.2
L_{90}	57.6
L_{99}	56.4
SEL	90.3

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Chain Link Fence.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
I-10 WB On-Ramp	1	30 MPH	73	1	1			
I-10 WB Off-Ramp	1	30 MPH	75	1	0			

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: BM27 Date: 8/29/2013

Time: From 10:12 AM To 10:22 AM

Site Location: 1701M Atlantic Blvd. in Entryway (Driveway) to Apartments.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	67.0
L_{max}	78.5
L_{min}	50.2
L_{peak}	93.4
L_2	72.9
L_8	71.1
L_{25}	68.7
L_{50}	65.2
L_{90}	56.9
L_{99}	52.5
SEL	94.8

Atmospheric Conditions	
Average Wind Velocity (mph)	1.0
Maximum Wind Velocity (mph)	1.9
Temperature (F)	95.2
Relative Humidity (%)	29.5

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 824

Site Number: BM28 Date: 8/15/2013

Time: From 2:58 PM To 3:08 PM

Site Location: 1504(A/B) Atlantic Blvd. in Frontyard Near Fence on Northside.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	68.0
L_{max}	84.8
L_{min}	50.5
L_{peak}	95.9
L_2	76.2
L_8	70.2
L_{25}	67.0
L_{50}	64.8
L_{90}	56.0
L_{99}	51.9
SEL	95.8

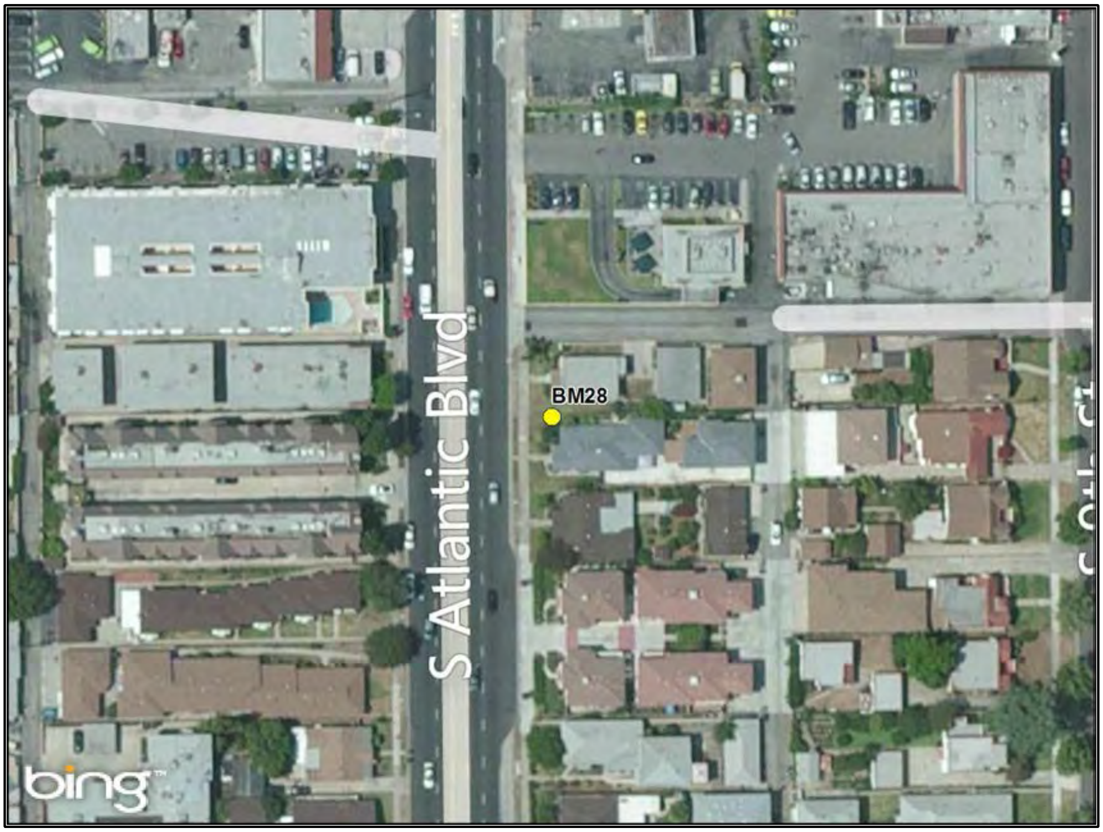
Atmospheric Conditions	
Average Wind Velocity (mph)	0.9
Maximum Wind Velocity (mph)	3.8
Temperature (F)	94.5
Relative Humidity (%)	43.8

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Adam Remmel
Equipment: LD 820

Site Number: BM29 Date: 8/15/2013

Time: From 2:58 PM To 3:08 PM

Site Location: 915 Atlantic Blvd. (Closest Residential Address). Frontyard , Closest to Intersection of Atlantic Blvd. and San Marino Ave., Approximately 10 Feet from Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd. Minimal Traffic on San Marino Ave.

Measurement Results	
	dBA
L_{eq}	70.8
L_{max}	90.4
L_{min}	46.4
L_{peak}	102.8
L_2	77.1
L_8	74.2
L_{25}	71.5
L_{50}	68.2
L_{90}	53.3
L_{99}	47.6
SEL	91.5

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: BM30 Date: 8/15/2013

Time: From 2:58 PM To 3:08 PM

Site Location: 806-1 Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	71.2
L_{max}	88.7
L_{min}	49.6
L_{peak}	102.2
L_2	80.7
L_8	74.2
L_{25}	69.8
L_{50}	66.2
L_{90}	58.3
L_{99}	50.5
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	2.2
Temperature (F)	95.5
Relative Humidity (%)	36.1

Comments: Some Traffic on Northbound Side of Atlantic Slowed for Traffic Light at Atlantic and Front St.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.	2/2	15-30 MPH	205	6	0	182	2	1

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: LD 824

Site Number: BM31 Date: 10/24/2013

Time: From 10:27 AM To 10:37 AM

Site Location: In Front of Northrop Elementary School (Alhambra) Near Outdoor Patio. 409 Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	65.5
L_{max}	79.5
L_{min}	46.5
L_{peak}	97.5
L_2	70.8
L_8	68.8
L_{25}	66.8
L_{50}	64.4
L_{90}	55.4
L_{99}	49.3
SEL	93.3

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd	2/2	35 MPH	127	1	0	149	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Logan Freeberg
Project Name: SR-710 North
Equipment: LD 831

Site Number: BM32 Date: 10/24/2013
Time: From 10:27 AM To 10:37 AM

Site Location: Grass Area at the End of Irving St. Along Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	57.8
L_{max}	74.8
L_{min}	44.0
L_{peak}	87.3
L_{2}	62.0
L_{8}	59.8
L_{25}	58.0
L_{50}	55.8
L_{90}	49.5
L_{99}	45.3
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 263. Minor But Continuous Bird Chirping Noise. 1 Bus North Bound. 2 Buses South Bound.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd	2/2	35 MPH	107	2	0	119	3	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Logan Freeberg
Project Name: SR-710 North
Equipment: LD 831

Site Number: BM33 Date: 10/24/2013
Time: From 11:03 AM To 11:13 AM

Site Location: 201A Atlantic Blvd. in Front Grass Area.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	67.9
L_{max}	84.2
L_{min}	46.7
L_{peak}	95.3
L_2	73.6
L_8	71.7
L_{25}	69.3
L_{50}	66.0
L_{90}	55.7
L_{99}	48.3
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 264. UPS Truck Stopped Around 3'45" Mark in Front of Measurement Site to Drop Package Off at Measurement Address. 1 Bus North Bound.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd	2/2	35 MPH	86	2	0	107	3	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 824

Site Number: BM34 Date: 8/27/2013

Time: From 9:10 AM To 9:20 AM

Site Location: 334 S. Atlantic Blvd. in Front of Apartment Building, 20' Feet from Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	67.8
L_{max}	78.3
L_{min}	50.8
L_{peak}	91.4
L_2	73.7
L_8	72.0
L_{25}	69.3
L_{50}	65.8
L_{90}	57.6
L_{99}	51.8
SEL	95.6

Atmospheric Conditions	
Average Wind Velocity (mph)	1.3
Maximum Wind Velocity (mph)	3.2
Temperature (F)	78.5
Relative Humidity (%)	52.0

Comments: Wall Shielding the Pool Area for this Apartment Building is 6' Feet Tall, with the Last 12' Feet (Toward Atlantic Bl) Only 3.5' Feet Tall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Adam Remmel
Equipment: LD 820

Site Number: BM35 Date: 8/27/2013
Time: From 9:10 AM To 9:20 AM

Site Location: 433 Atlantic Blvd. Front of Church Approximately 50’ Feet from Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd. Trash Truck Emptying Trash Can in Front of Meter at Beginning of Measurement.

Measurement Results	
	dBA
L_{eq}	62.3
L_{max}	80.8
L_{min}	43.3
L_{peak}	98.4
L_2	67.6
L_8	65.5
L_{25}	63.3
L_{50}	60.6
L_{90}	50.9
L_{99}	44.6
SEL	73.1

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd NB	2		99	1	0			
Atlantic Blvd SB	2		119	2	2			

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD831

Site Number: BM36 Date: 8/27/2013

Time: From 9:10 AM To 9:20 AM

Site Location: Next Door South of 812 Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	65.4
L_{max}	76.8
L_{min}	41.2
L_{peak}	93.4
L_2	71.1
L_8	69.7
L_{25}	67.3
L_{50}	63.7
L_{90}	50.3
L_{99}	43.8
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 6’ Foot High Hedge on Side of Driveway.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd	2/2	25-35 MPH	96	3	0	114	1	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Corey Knips

Equipment: LD 824

Site Number: BM37 Date: 8/27/2013

Time: From 9:42 AM To 9:52 AM

Site Location: 1010 First St. in the Front Yard.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	63.9
L_{max}	78.7
L_{min}	49.4
L_{peak}	90.0
L_2	70.3
L_8	68.1
L_{25}	64.8
L_{50}	61.3
L_{90}	54.1
L_{99}	51.3
SEL	91.7

Atmospheric Conditions	
Average Wind Velocity (mph)	0.3
Maximum Wind Velocity (mph)	1.0
Temperature (F)	79.0
Relative Humidity (%)	45.3

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd.			89	5	0	100	4	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Adam Remmel
Equipment: LD 820

Site Number: BM38 Date: 8/27/2013

Time: From 9:42 AM To 9:52 AM

Site Location: 1210 Atlantic Blvd. Front of In-n-Out Burger Seating and Drive-Thru Area (No Cars in Drive-Thru). Approximately 40’ Feet from Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd. Traffic on Huntington Dr. Traffic on Garfield Ave. Brief Helicopter Passover in Distance (Minor).

Measurement Results	
	dBA
L_{eq}	65.1
L_{max}	76.1
L_{min}	54.6
L_{peak}	87.3
L_2	70.5
L_8	68.5
L_{25}	66.3
L_{50}	63.8
L_{90}	59.1
L_{99}	56.4
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

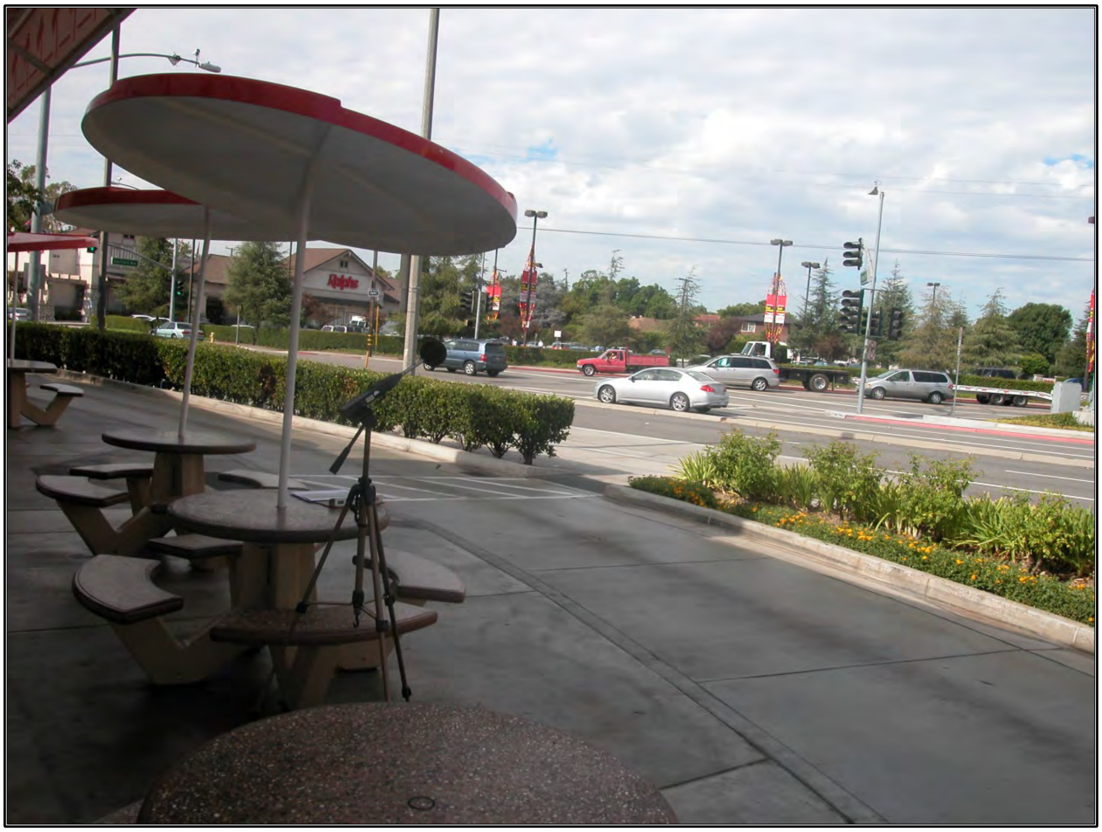
Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd NB	2		132	1	0			
Atlantic Blvd SB	2		132	2	1			

Sketch:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: BM39 Date: 8/27/2013

Time: From 9:42 AM To 9:52 AM

Site Location: 2051-2095 Huntington Dr. Front Yard Area.

Primary Noise Sources: Traffic on Huntington Dr.

Measurement Results	
	dBA
L_{eq}	65.3
L_{max}	78.1
L_{min}	44.9
L_{peak}	91.5
L_{2}	72.5
L_{8}	69.9
L_{25}	66.1
L_{50}	61.3
L_{90}	51.8
L_{99}	46.2
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Air Conditioner Unit Running in Nearby Apartment Window (Minor).

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Huntington Dr	3/3	20-30 MPH	98	8	1	117	3	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 824

Site Number: BM40 Date: 8/27/2013
Time: From 10:17 AM To 10:27 AM

Site Location: 1919 N. Huntington Dr. The Church of Jesus Christ of Latter-Day Saints, on Sidewalk to Entrance.

Primary Noise Sources: Traffic on Huntington Dr.

Measurement Results	
	dBA
L_{eq}	64.9
L_{max}	79.3
L_{min}	47.7
L_{peak}	92.9
L_2	72.1
L_8	69.8
L_{25}	65.9
L_{50}	61.1
L_{90}	53.1
L_{99}	49.3
SEL	92.7

Atmospheric Conditions	
Average Wind Velocity (mph)	1.4
Maximum Wind Velocity (mph)	3.3
Temperature (F)	84.7
Relative Humidity (%)	41.4

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Adam Remmel
Equipment: LD 820

Site Number: BM41 Date: 8/27/2013
Time: From 10:17 AM To 10:27 AM

Site Location: 1651 Huntington Dr. Closest Residential Front Yard, Next to Sidewalk. Approximately 15' Feet from Huntington Dr.

Primary Noise Sources: Traffic on Huntington Dr.

Measurement Results	
	dBA
L_{eq}	67.1
L_{max}	83.8
L_{min}	43.3
L_{peak}	95.3
L_2	74.0
L_8	71.0
L_{25}	68.1
L_{50}	62.4
L_{90}	52.9
L_{99}	48.6
SEL	85.8

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Had to Pause Measurement Momentarily for Pedestrian Asking Questions.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Huntington Dr. EB	3		107	3	2			
Huntington Dr. WB	3		114	4	0			

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: BM42 Date: 8/27/2013

Time: From 10:17 AM To 10:27 AM

Site Location: 1702 Fair Oaks Ave. in Pool Area of Apartment Complex.

Primary Noise Sources: Traffic on Fair Oaks Ave. Ambient Apartment Noise.

Measurement Results	
	dBA
L_{eq}	55.5
L_{max}	69.0
L_{min}	48.2
L_{peak}	78.9
L_2	61.7
L_8	58.5
L_{25}	55.8
L_{50}	54.1
L_{90}	50.4
L_{99}	49.0
SEL	

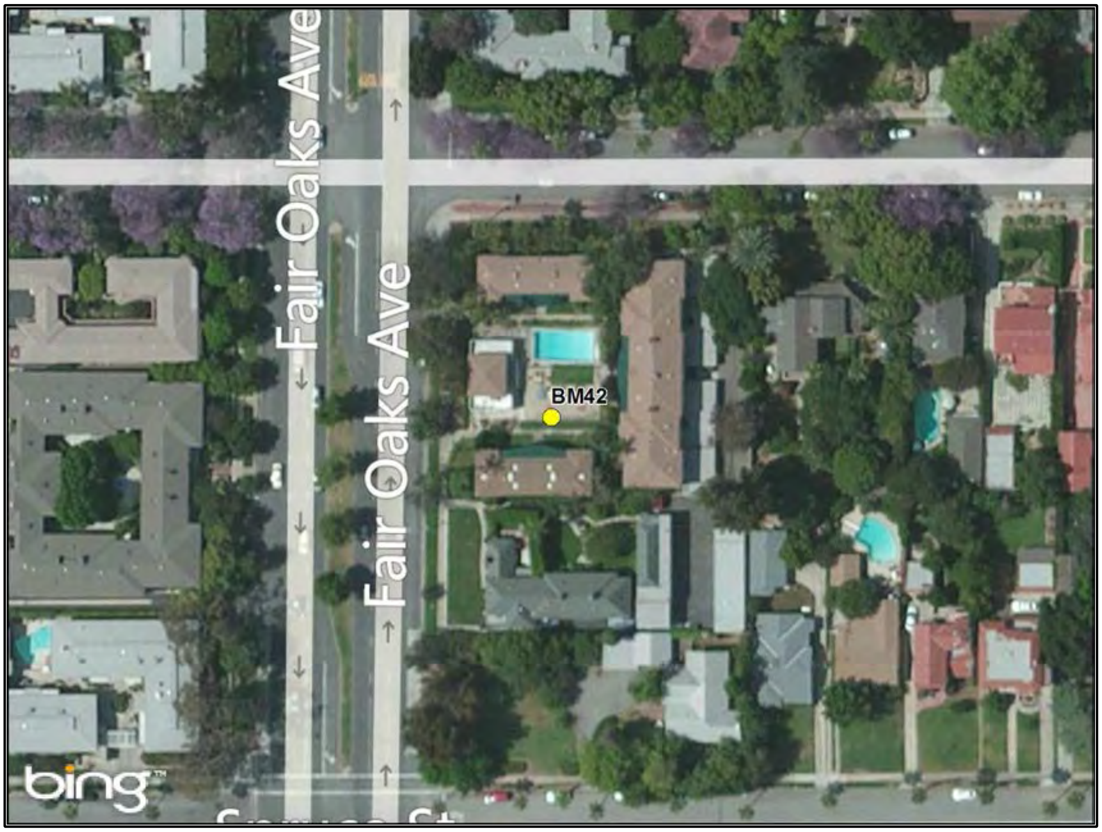
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Talking in Nearby Apartment (Minor).

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Fair Oaks Ave	3/3	25-35 MPH	101	8	0	93	6	4

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 824

Site Number: BM43 Date: 10/24/2013

Time: From 11:03 AM To 11:13 AM

Site Location: Parking Lot of South Pasadena Middle School In-line With Front Building Facade. 1500 Fair Oaks Ave.

Primary Noise Sources: Traffic on Fair Oaks Ave.

Measurement Results	
	dBA
L_{eq}	62.7
L_{max}	73.2
L_{min}	47.1
L_{peak}	92.2
L_2	69.7
L_8	67.3
L_{25}	63.5
L_{50}	59.7
L_{90}	52.5
L_{99}	48.1
SEL	90.5

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: No Outdoor Sensitive Areas Between Buildings and Roadway.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Fair Oaks Ave	3/3	40 MPH	101	5	0	106	4	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 824

Site Number: BM44 Date: 10/24/2013
Time: From 11:39 AM To 11:49 AM

Site Location: Jamba Juice Patio Near Oxley and Fair Oaks Ave. 1101Fair Oaks Ave.

Primary Noise Sources: Traffic on Fair Oaks Ave and Parking Lot.

Measurement Results	
	dBA
L_{eq}	66.9
L_{max}	91.3
L_{min}	53.3
L_{peak}	100.7
L_2	72.2
L_8	70.2
L_{25}	67.8
L_{50}	64.1
L_{90}	57.0
L_{99}	54.5
SEL	94.7

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Patio Seating for 20 Without Cement Barriers. Wheel Squeal. 1 Bus North Bound. 1 Bus South Bound.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Fair Oaks Ave	2/2	35 MPH	118	4	0	155	2	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: BM45 Date: 10/24/2013
Time: From 11:39 AM To 11:49 AM

Site Location: 716 Fair Oaks Ave. McDonald's Front Patio Area.

Primary Noise Sources: Traffic on Fair Oaks Ave. Traffic In and Out of McDonald's Parking Lot.

Measurement Results	
	dBA
L_{eq}	67.4
L_{max}	85.2
L_{min}	50.8
L_{peak}	98.0
L_2	75.1
L_8	71.1
L_{25}	67.4
L_{50}	64.5
L_{90}	58.3
L_{99}	54.5
SEL	

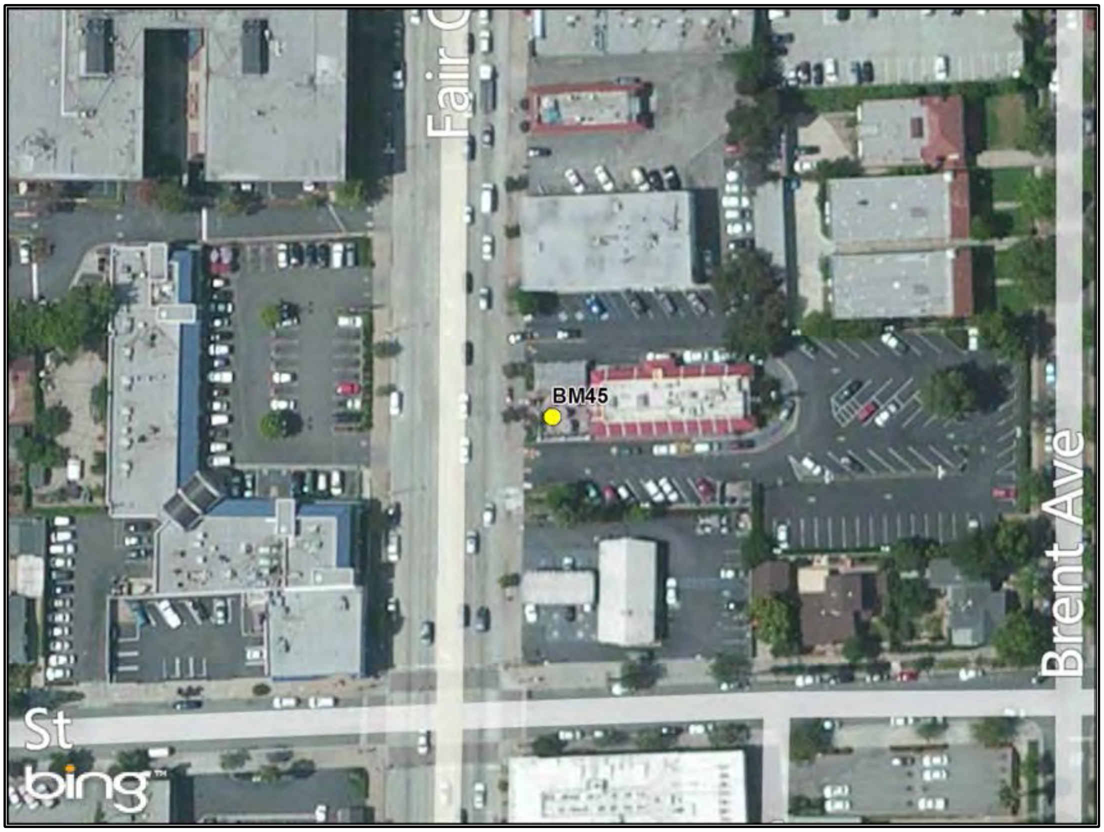
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 265. 1 Bus North Bound. 2 Buses South Bound.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Fair Oaks Ave	2/2		160	8	2	214	6	0

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 824

Site Number: BM46 Date: 8/27/2013

Time: From 11:19 AM To 11:29 AM

Site Location: 435 Fair Oaks Ave. South Pasadena, Near Sign in Front of Building.

Primary Noise Sources: Traffic on Fair Oaks Ave.

Measurement Results	
	dBA
L_{eq}	64.8
L_{max}	79.4
L_{min}	49.1
L_{peak}	90.8
L_2	72.0
L_8	68.2
L_{25}	64.8
L_{50}	61.9
L_{90}	56.3
L_{99}	50.4
SEL	92.6

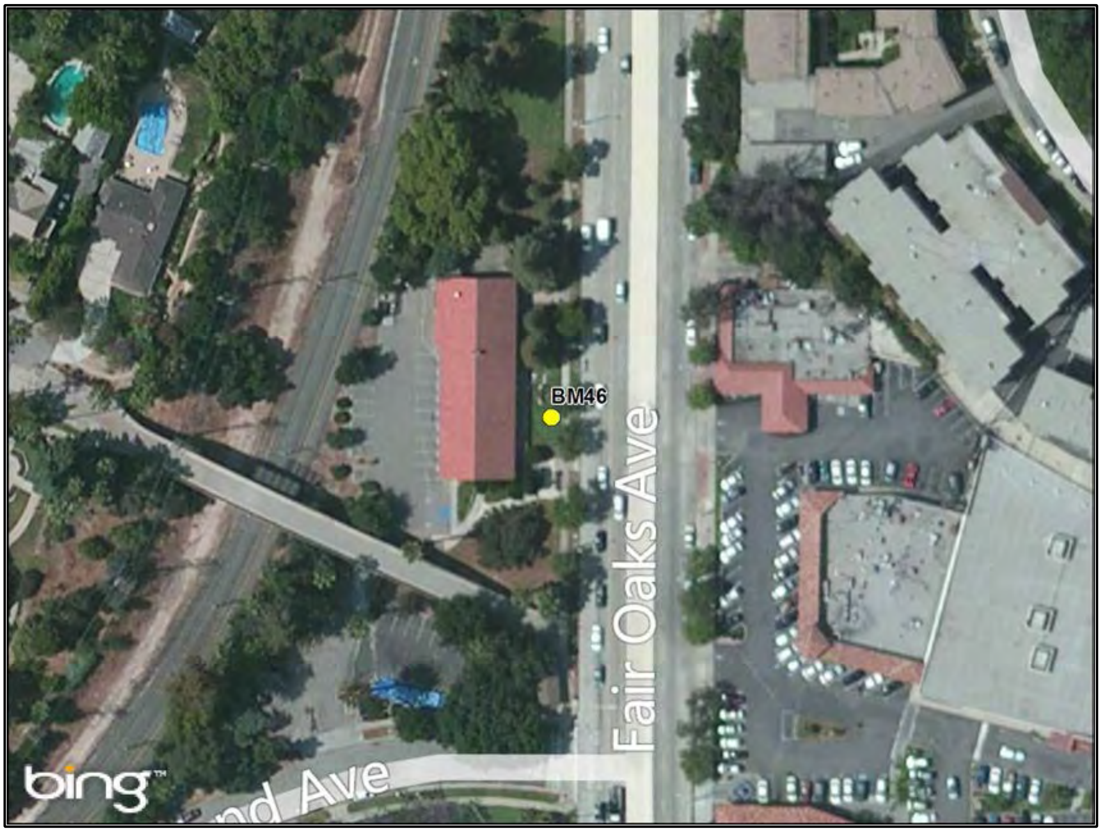
Atmospheric Conditions	
Average Wind Velocity (mph)	1.7
Maximum Wind Velocity (mph)	4.0
Temperature (F)	88.6
Relative Humidity (%)	36.2

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Adam Remmel
Equipment: LD 820

Site Number: BM47 Date: 8/27/2013

Time: From 11:19 AM To 11:29 AM

Site Location: 1602 Raymond Hill Rd. Closest Address of Apartment Complex. Front Area Closest to Stairway Access. Approximately 30' Feet from Fair Oaks Ave.

Primary Noise Sources: Traffic on Fair Oaks Ave. (Main Source). Light Traffic on Columbia St. Light Traffic on Raymond Hill Rd. (Minor).

Measurement Results	
	dBA
L_{eq}	68.4
L_{max}	83.8
L_{min}	52.4
L_{peak}	95.2
L_2	75.8
L_8	71.8
L_{25}	68.8
L_{50}	65.5
L_{90}	57.6
L_{99}	54.6
SEL	86.9

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: BM48 Date: 8/27/2013

Time: From 11:19 AM To 11:29 AM

Site Location: 958 Fair Oaks Ave.

Primary Noise Sources: Traffic on Fair Oaks Ave.

Measurement Results	
	dBA
L_{eq}	62.3
L_{max}	74.8
L_{min}	51.1
L_{peak}	87.6
L_2	68.7
L_8	65.9
L_{25}	63.2
L_{50}	60.5
L_{90}	54.4
L_{99}	52.0
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Siren Noise Edited Out. Car Alarm Horn Beeped for a Few Seconds.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Fair Oaks Ave	2/2	25-35 MPH	126	7	1	151	5	1

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 824

Site Number: BM49 Date: 8/27/2013
Time: From 11:53 AM To 12:03 PM

Site Location: 716 S. Fair Oaks Ave.

Primary Noise Sources: Traffic on Fair Oaks Ave.

Measurement Results	
	dBA
L_{eq}	71.5
L_{max}	90.5
L_{min}	56.9
L_{peak}	101.6
L_2	77.5
L_8	74.0
L_{25}	71.7
L_{50}	68.6
L_{90}	60.3
L_{99}	57.7
SEL	99.3

Atmospheric Conditions	
Average Wind Velocity (mph)	2.0
Maximum Wind Velocity (mph)	6.0
Temperature (F)	91.4
Relative Humidity (%)	39.1

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Adam Remmel
Project Name: SR-710 North
Equipment: LD 820

Site Number: BM50 Date: 8/27/2013
Time: From 11:53 AM To 12:03 PM

Site Location: 576 Fair Oaks Ave. Chase Bank Front Patio Area Next to Walkway. Approximately 20' Feet from Fair Oaks Ave.

Primary Noise Sources: Traffic on Fair Oaks Ave. Traffic on California Blvd. People Talking Nearby (Minor).

Measurement Results	
	dBA
L_{eq}	65.5
L_{max}	77.8
L_{min}	55.4
L_{peak}	91.9
L_2	72.6
L_8	69.0
L_{25}	66.4
L_{50}	62.9
L_{90}	58.6
L_{99}	56.3
SEL	

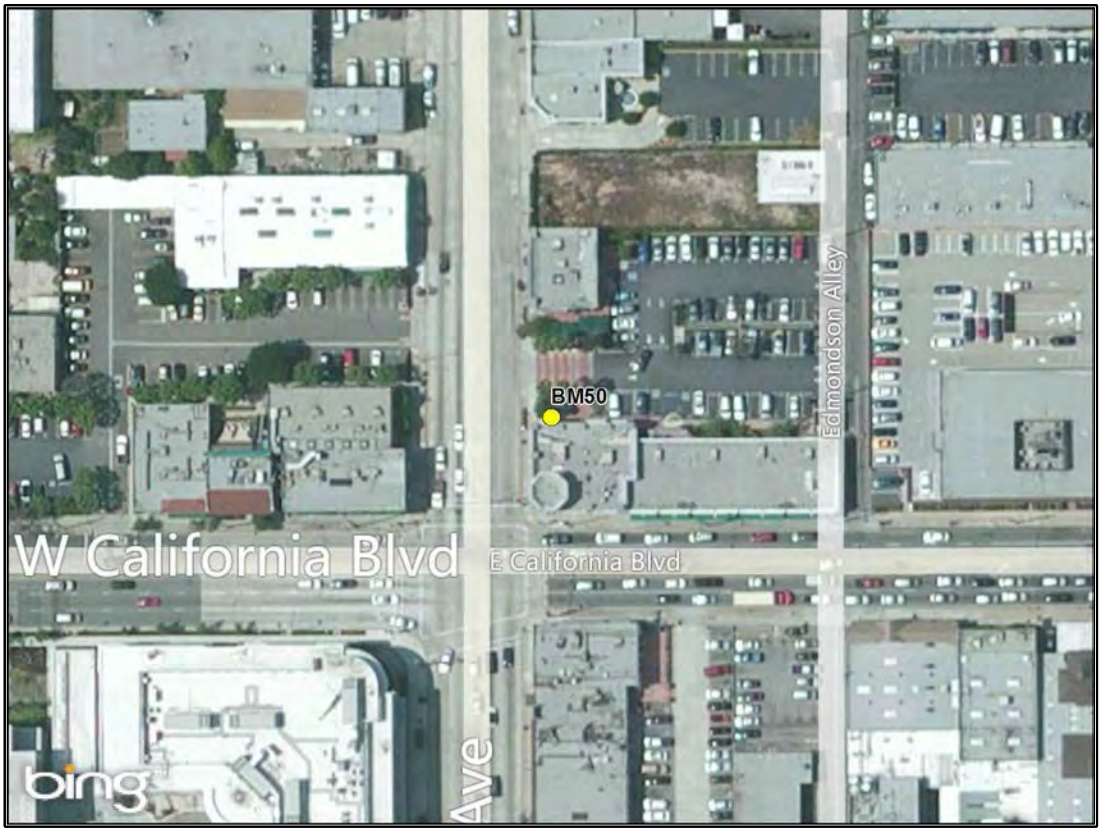
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
California Blvd. EB	2		115	1	0			
California Blvd. WB	2		120	1	0			

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: LD 820

Site Number: FM01 Date: 8/29/2013

Time: From 10:59 AM To 11:09 AM

Site Location: Rear Yard of 568 Casada Canyon Dr.

Primary Noise Sources: Traffic on SR-710 Freeway. Traffic on Corporate Center Dr.

Measurement Results	
	dBA
L_{eq}	58.2
L_{max}	70.6
L_{min}	52.2
L_{peak}	82.5
L_2	61.7
L_8	60.6
L_{25}	58.6
L_{50}	57.6
L_{90}	56.0
L_{99}	53.5
SEL	

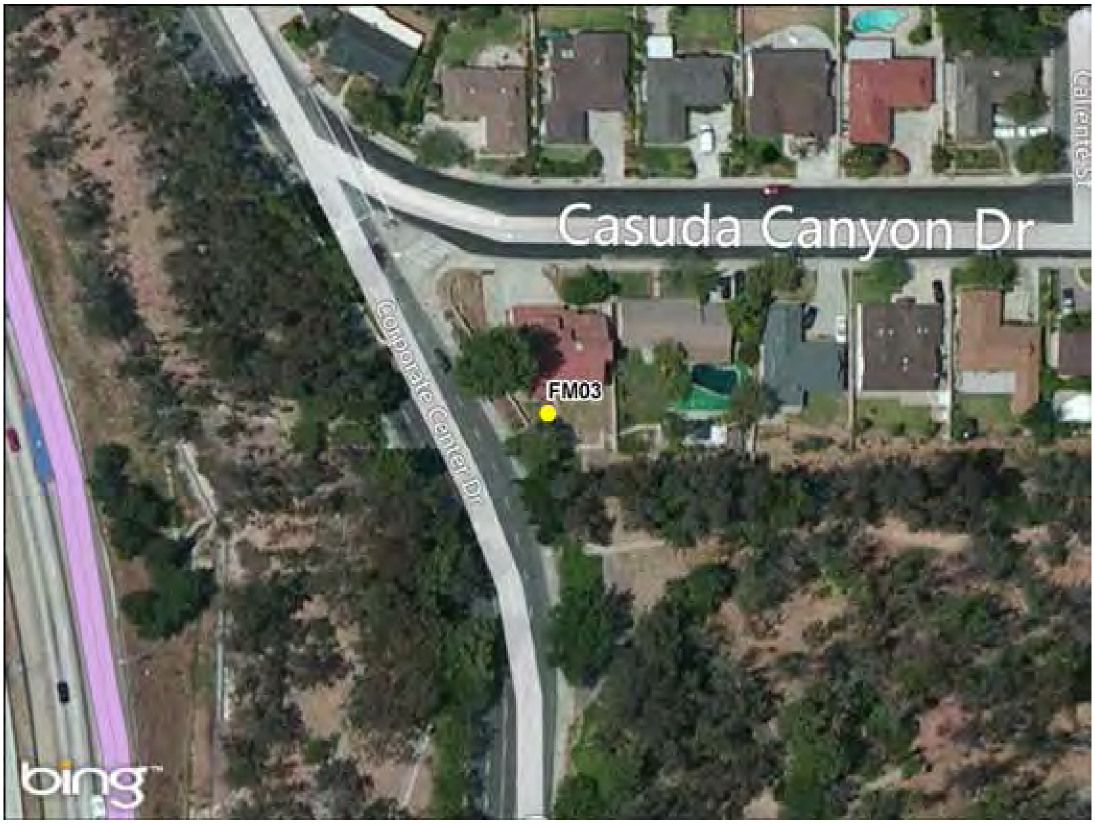
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 6' Foot High Property Line Wall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Corporate Center Dr.	2/2	40 MPH	20	2	0	17	0	0

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM02 Date: 8/29/2013

Time: From 10:59 AM To 11:09 AM

Site Location: 3912-4048 W. Ramona Blvd. in the Parking Lot of Golf Course and Driving Range. Monterey Park Golf Course.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	60.8
L_{max}	68.9
L_{min}	56.3
L_{peak}	83.4
L_2	63.9
L_8	62.7
L_{25}	61.5
L_{50}	60.5
L_{90}	58.6
L_{99}	57.2
SEL	88.9

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Chain Link Fence.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM03 Date: 8/29/2013

Time: From 10:59 AM To 11:09 AM

Site Location: 3700 W. Ramona Rd. Monterey Park. In Parking Lot NE of Monterey Hill Restaurant.

Primary Noise Sources: Traffic on SR-710 Freeway. Traffic on I-10 Freeway.

Measurement Results	
	dBA
L_{eq}	56.6
L_{max}	70.7
L_{min}	54.4
L_{peak}	89.9
L_2	58.4
L_8	57.5
L_{25}	56.7
L_{50}	56.2
L_{90}	55.5
L_{99}	55.0
SEL	84.5

Atmospheric Conditions	
Average Wind Velocity (mph)	0.8
Maximum Wind Velocity (mph)	2.2
Temperature (F)	94.4
Relative Humidity (%)	32.3

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM4 Date: 8/20/2013

Time: From 12:19 PM To 12:29 PM

Site Location: Rearyard of 3349 Balzac Rd.

Primary Noise Sources: Traffic on SR-710 Freeway and I-10 Freeway Interchange.

Measurement Results	
	dBA
L_{eq}	62.8
L_{max}	71.2
L_{min}	56.7
L_{peak}	96.2
L_2	66.5
L_8	65.1
L_{25}	63.6
L_{50}	62.5
L_{90}	59.7
L_{99}	57.9
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: No Rearyard Walls.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM5 Date: 8/20/2013

Time: From 11:29 AM To 11:39 AM

Site Location: Rearyard of 2405 Capetown Ave.

Primary Noise Sources: Traffic on SR-710 Freeway. Traffic on I-10 Freeway (Faint).

Measurement Results	
	dBA
L_{eq}	59.9
L_{max}	66.8
L_{min}	53.0
L_{peak}	85.2
L_2	62.9
L_8	62.0
L_{25}	61.0
L_{50}	59.6
L_{90}	57.1
L_{99}	54.1
SEL	

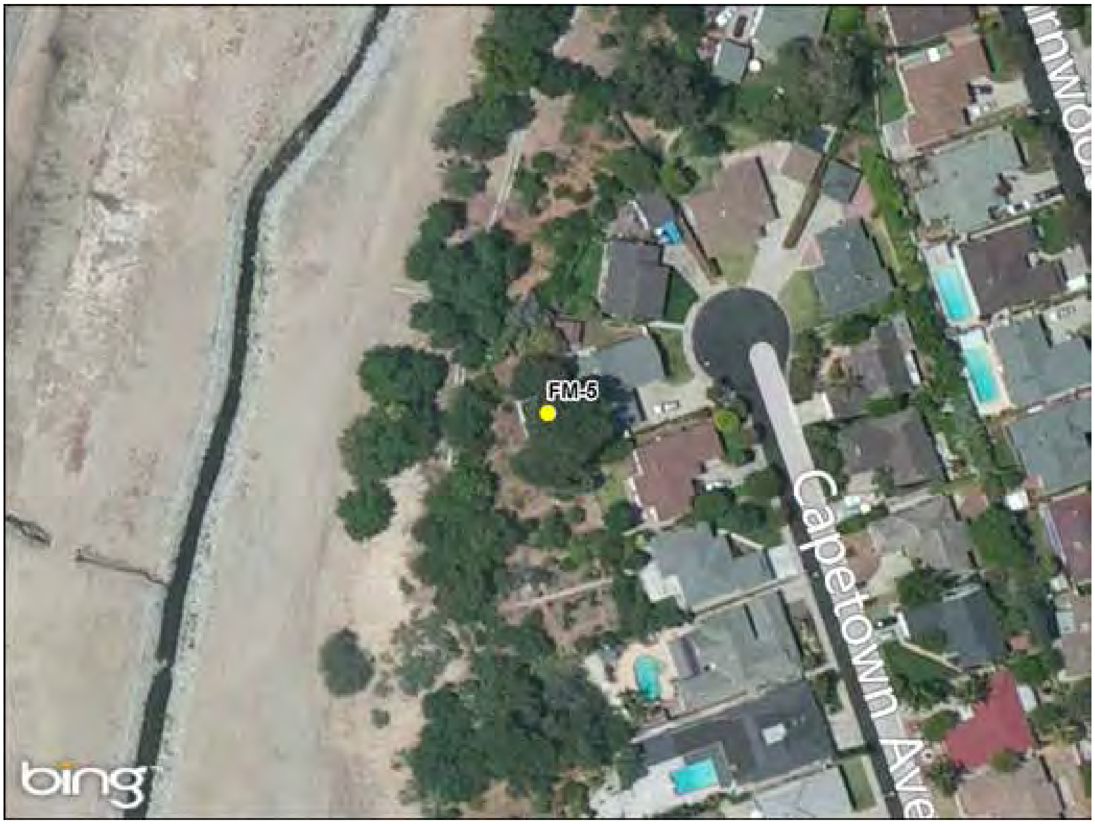
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Some Homes have Rear Walls and Some Do Not.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM6
Date: 8/20/2013
Time: From 11:29 AM To 11:39 AM

Site Location: 2321 Charnwood Ave. in the Backyard

Primary Noise Sources: Traffic on SR-710 Freeway and Some Faint Aircraft Noise.

Measurement Results	
	dBA
L_{eq}	57.4
L_{max}	64.5
L_{min}	47.5
L_{peak}	84.2
L_2	61.2
L_8	60.0
L_{25}	58.4
L_{50}	56.8
L_{90}	53.2
L_{99}	49.2
SEL	85.2

Atmospheric Conditions	
Average Wind Velocity (mph)	4.8
Maximum Wind Velocity (mph)	1.0
Temperature (F)	82.0
Relative Humidity (%)	56.0

Comments: Backyard Wall = 8 Blocks @8 Inches (Wall/Wood Fence). Wood Fence has Gaps in Between the Planks.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM7 Date: 8/20/2013

Time: From 11:29 AM To 11:39 AM

Site Location: 2225 Charnwood Ave., in the Backyard.

Primary Noise Sources: Traffic on SR-710, Dog Barking Inside.

Measurement Results	
	dBA
L_{eq}	61.4
L_{max}	72.1
L_{min}	47.7
L_{peak}	83.6
L_2	66.6
L_8	64.7
L_{25}	62.5
L_{50}	60.2
L_{90}	55.7
L_{99}	51.3
SEL	88.8

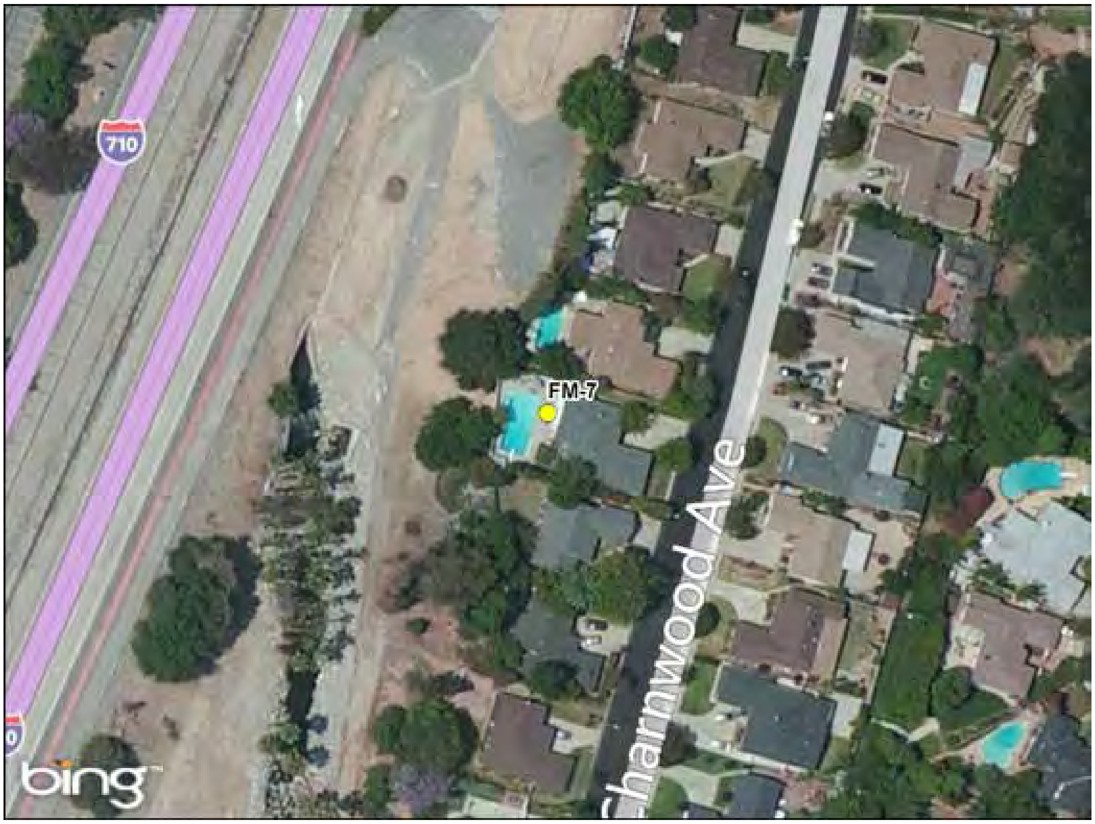
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 820

Site Number: FM8 Date: 8/20/2013
Time: From 10:56 AM To 11:06 AM

Site Location: Rearyard of 2201 Charnwood Ave. SE Corner of Pool.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	58.1
L_{max}	67.2
L_{min}	48.3
L_{peak}	84.9
L_2	62.4
L_8	60.7
L_{25}	59.2
L_{50}	57.7
L_{90}	53.5
L_{99}	49.2
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 6’ Foot High Property Line Wall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM9 Date: 8/20/2013
Time: From 10:56 AM To 11:06 AM

Site Location: 1937 Charnwood Ave, in the Backyard.

Primary Noise Sources: Traffic on SR-710 Freeway and Some Aircraft Noise.

Measurement Results	
	dBA
L_{eq}	66.0
L_{max}	76.3
L_{min}	47.6
L_{peak}	87.5
L_2	70.2
L_8	68.9
L_{25}	67.3
L_{50}	65.5
L_{90}	60.1
L_{99}	50.6
SEL	93.9

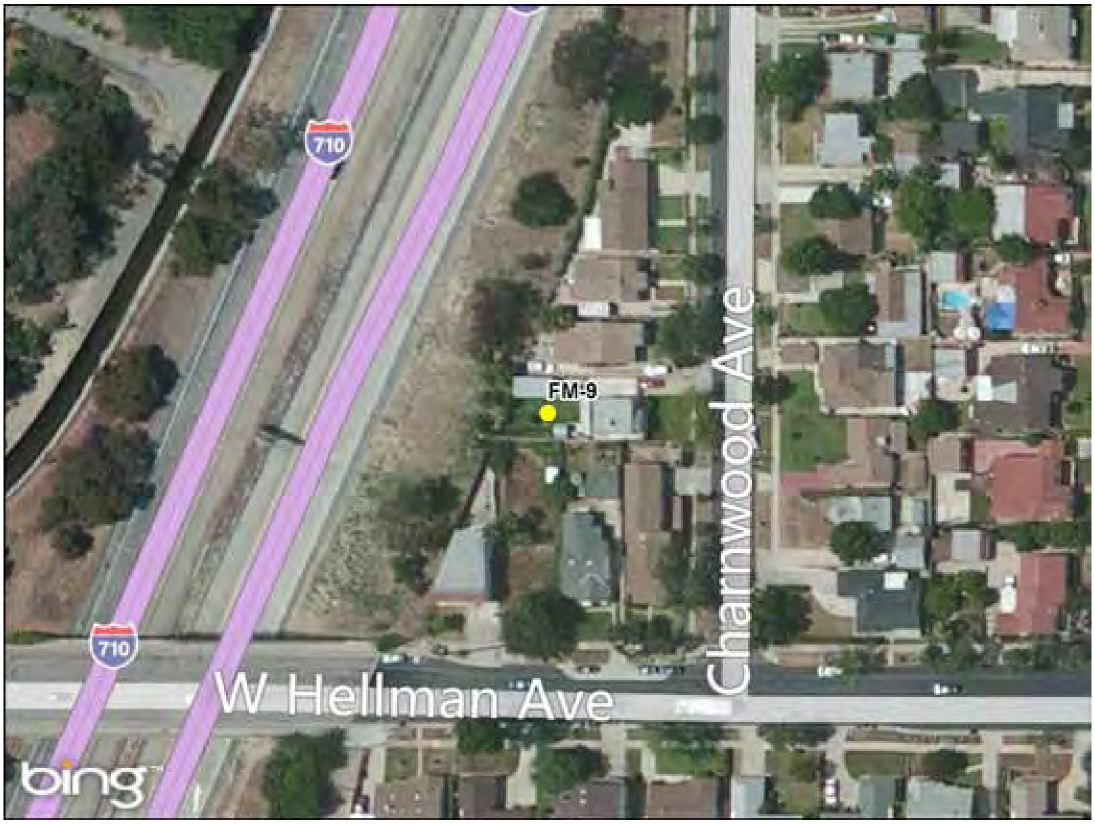
Atmospheric Conditions	
Average Wind Velocity (mph)	0.0
Maximum Wind Velocity (mph)	1.1
Temperature (F)	82.8
Relative Humidity (%)	56.2

Comments: Chain Link Fence. Southside Wall = 9 Block @ 8 Inches. Northside Wall = 6” Foot Wood Fence. Home is Higher in Elevation than SR-710 Freeway.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM10 Date: 8/20/2013

Time: From 10:56 AM To 11:06 AM

Site Location: 1896 Charnwood Ave., in Front of House.

Primary Noise Sources: Traffic on SR-710

Measurement Results	
	dBA
L_{eq}	73.3
L_{max}	80.3
L_{min}	53.7
L_{peak}	99.4
L_2	77.9
L_8	76.4
L_{25}	74.6
L_{50}	72.9
L_{90}	67.2
L_{99}	60.1
SEL	101.1

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: No Wall Between Meter and Freeway. Resident's Backyard has a 4' Foot Wood Panel Fence with Gaps.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM11 Date: 8/20/2013
Time: From 10:26 AM To 10:36 AM

Site Location: Rearyard of 1905 Westmont Ave.

Primary Noise Sources: Traffic on SR-710 Freeway NB.

Measurement Results	
	dBA
L_{eq}	53.2
L_{max}	60.5
L_{min}	46.8
L_{peak}	73.5
L_2	57.2
L_8	55.6
L_{25}	54.1
L_{50}	52.6
L_{90}	49.7
L_{99}	47.9
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: House at FM18 Between Meter and Source.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM12 Date: 8/20/2013

Time: From 10:26 AM To 10:36 AM

Site Location: 1609 Westmont Drive, on Side of House.

Primary Noise Sources: Traffic on SR-710 Freeway NB Off-Ramp.

Measurement Results	
	dBA
L_{eq}	59.5
L_{max}	77.7
L_{min}	48.4
L_{peak}	84.7
L_2	65.1
L_8	62.5
L_{25}	59.9
L_{50}	57.1
L_{90}	52.0
L_{99}	49.5
SEL	87.4

Atmospheric Conditions	
Average Wind Velocity (mph)	0.0
Maximum Wind Velocity (mph)	0.0
Temperature (F)	76.9
Relative Humidity (%)	60.6

Comments: Wrought Iron Fence. No Backyard Area. Covered in a Good Amount of Vegetation.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Corey Knips

Equipment: LD 831

Site Number: FM13

Date: 8/20/2013

Time: From 10:26 AM To 10:36 AM

Site Location: 1515 Westmont Drive, in the Backyard.

Primary Noise Sources: Traffic on Valley Blvd and SR-710 Ramps

Measurement Results	
	dBA
L_{eq}	50.7
L_{max}	62.1
L_{min}	44.1
L_{peak}	76.8
L_2	56.2
L_8	53.6
L_{25}	51.4
L_{50}	49.3
L_{90}	46.8
L_{99}	45.3
SEL	78.4

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 5.5’ Foot Wall Surrounding Backyard with Fiberglass Extensions (1.5’ Feet) on North and South Side, and Partially on West Side.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM14 Date: 8/20/2013

Time: From 9:48 AM To 9:58 AM

Site Location: In Front of 3215 Front St.

Primary Noise Sources: Traffic on Mission Ave. Ambient Noise.

Measurement Results	
	dBA
L_{eq}	51.2
L_{max}	67.0
L_{min}	47.0
L_{peak}	86.3
L_2	55.0
L_8	53.2
L_{25}	51.4
L_{50}	50.4
L_{90}	49.1
L_{99}	48.1
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: No Walls at Nearby Homes.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM15 Date: 8/20/2013

Time: From 9:48 AM To 9:58 AM

Site Location: 5557 Valley Blvd. #B330, Grifols, in Parking Lot by Northernmost Building (Near Rail Road)

Primary Noise Sources: Traffic on SR-710 Freeway. Fan in Building.

Measurement Results	
	dBA
L_{eq}	61.2
L_{max}	81.5
L_{min}	58.1
L_{peak}	94.3
L_2	66.2
L_8	62.6
L_{25}	60.8
L_{50}	60.2
L_{90}	59.1
L_{99}	58.6
SEL	90.1

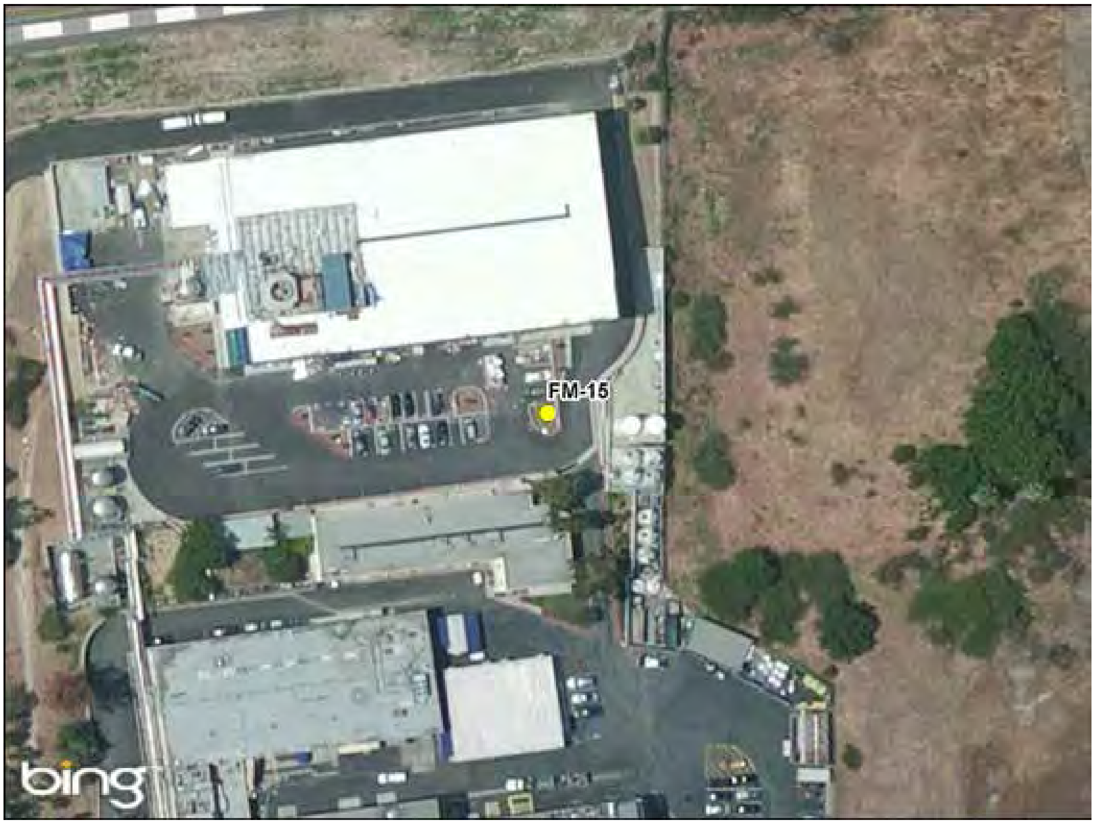
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM16 Date: 8/20/2013
Time: From 9:48AM To 9:58 AM

Site Location: 5555/5557 Valley Blvd at Grifols (An Industrial Plant) in Front of Building.

Primary Noise Sources: Traffic on Valley Blvd.

Measurement Results	
	dBA
L_{eq}	65.1
L_{max}	84.0
L_{min}	51.8
L_{peak}	95.9
L_2	72.1
L_8	67.9
L_{25}	64.1
L_{50}	61.3
L_{90}	56.7
L_{99}	54.1
SEL	93.4

Atmospheric Conditions	
Average Wind Velocity (mph)	3.0
Maximum Wind Velocity (mph)	6.7
Temperature (F)	76.9
Relative Humidity (%)	63.6

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Valley Blvd.	2/2	35-40 MPH	160	9	9			

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Corey Knips

Equipment: LD 831

Site Number: FM17 Date: 8/29/2013

Time: From 2:23 PM To 2:33 PM

Site Location: 2410 Lillyvale Ave. Grifols in Smoking Area and Motorcycle Parking Area.

Primary Noise Sources: Traffic on Valley Blvd.

Measurement Results	
	dBA
L_{eq}	54.0
L_{max}	75.2
L_{min}	46.7
L_{peak}	90.4
L_2	59.3
L_8	56.9
L_{25}	54.1
L_{50}	52.0
L_{90}	49.2
L_{99}	47.9
SEL	81.7

Atmospheric Conditions	
Average Wind Velocity (mph)	1.8
Maximum Wind Velocity (mph)	3.8
Temperature (F)	95.0
Relative Humidity (%)	27.6

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM18 Date: 8/29/2013
Time: From 2:23 PM To 2:33 PM

Site Location: Between 5506 and 5514 Valley Blvd. Apartment Complex in the Courtyard.

Primary Noise Sources: Traffic on Valley Blvd. Faint Air Conditioner Noise Nearby.

Measurement Results	
	dBA
L_{eq}	65.0
L_{max}	81.2
L_{min}	52.6
L_{peak}	91.2
L_2	71.4
L_8	68.3
L_{25}	65.6
L_{50}	63.2
L_{90}	57.9
L_{99}	53.7
SEL	92.8

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: No Outdoor Use Areas. 5 Unit Apartment Complex.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Valley Blvd.	2/2	40 MPH	109	3	0	86	3	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM19 Date: 8/29/2013
Time: From 2:23 PM To 2:33 PM

Site Location: Rear Yard of 2330 Highbury Ave.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	62.3
L_{max}	73.0
L_{min}	50.5
L_{peak}	83.3
L_2	67.3
L_8	65.2
L_{25}	63.5
L_{50}	61.6
L_{90}	57.1
L_{99}	52.1
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: No Property Line Wall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM20 Date: 8/29/2013
Time: From 1:53 PM To 2:03 PM

Site Location: 2276 Highbury Ave. in the Backyard.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	68.0
L_{max}	82.1
L_{min}	53.0
L_{peak}	98.3
L_2	73.2
L_8	71.0
L_{25}	68.8
L_{50}	66.6
L_{90}	61.1
L_{99}	55.8
SEL	95.7

Atmospheric Conditions	
Average Wind Velocity (mph)	0.8
Maximum Wind Velocity (mph)	1.9
Temperature (F)	98.9
Relative Humidity (%)	30.8

Comments: Only Wire Fences on West and South Sides of Yard.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Jason Lui

Equipment: LD 824

Site Number: FM21 Date: 8/29/2013

Time: From 1:53 PM To 2:03 PM

Site Location: Cul-de-sac of Vandala Ave.

Primary Noise Sources: Traffic on SR-710 Freeway (Faint).

Measurement Results	
	dBA
L_{eq}	52.5
L_{max}	61.4
L_{min}	47.5
L_{peak}	78.8
L_2	55.7
L_8	54.4
L_{25}	53.3
L_{50}	52.1
L_{90}	50.2
L_{99}	48.2
SEL	80.3

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Wrought Iron Fence.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM22 Date: 8/29/2013
Time: From 1:53 PM To 2:03 PM

Site Location: Near California State University Los Angeles Quad Area.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	55.5
L_{max}	61.9
L_{min}	50.5
L_{peak}	81.6
L_2	59.0
L_8	57.6
L_{25}	56.2
L_{50}	55.1
L_{90}	53.3
L_{99}	51.8
SEL	

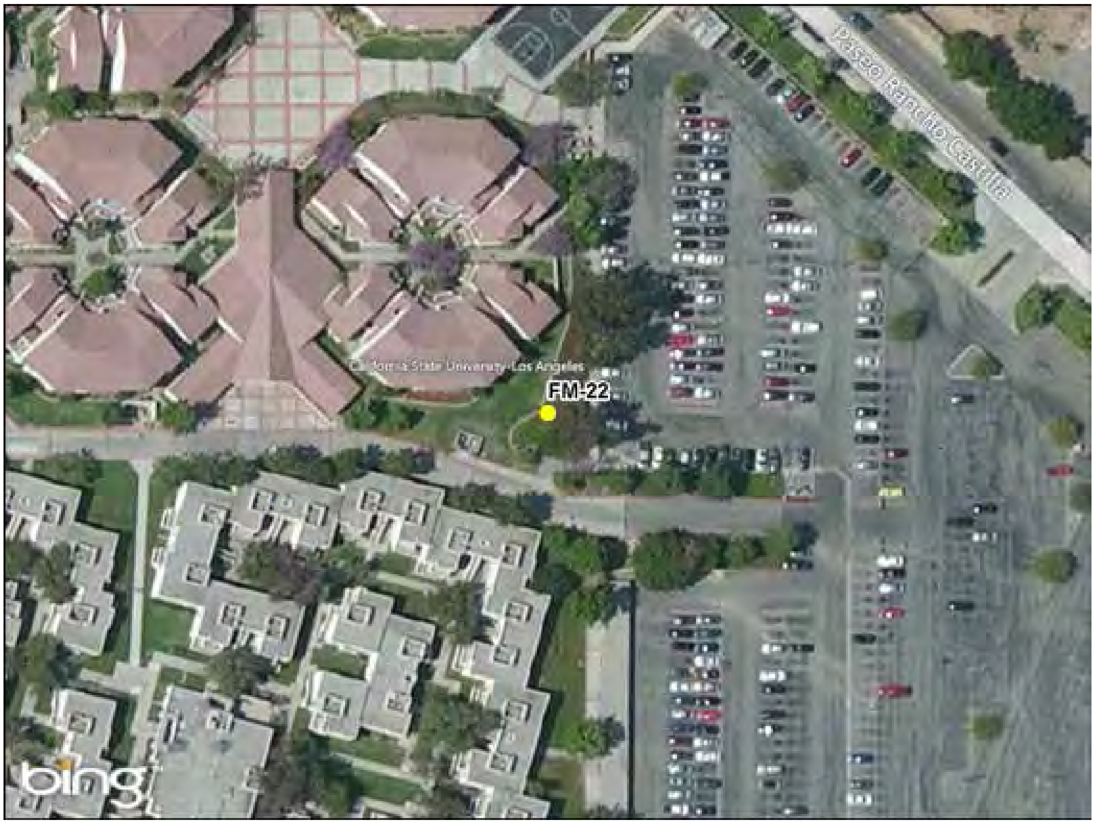
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Rather Quiet. Little to No Parking Lot Activity.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Corey Knips
Project Name: SR-710 North
Equipment: LD 831

Site Number: FM23 Date: 8/29/2013
Time: From 1:15 PM To 1:25 PM

Site Location: Martin Luther King Memorial Hall, California State University Los Angeles.

Primary Noise Sources: Traffic on SR-710 Freeway. A Few Cars on Circle Dr.

Measurement Results	
	dBA
L_{eq}	55.2
L_{max}	65.3
L_{min}	51.1
L_{peak}	79.7
L_2	58.3
L_8	56.9
L_{25}	55.9
L_{50}	54.8
L_{90}	53.2
L_{99}	52.2
SEL	83.0

Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	3.0
Temperature (F)	96.0
Relative Humidity (%)	36.2

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM24 Date: 8/29/2013

Time: From 1:15 PM To 1:25 PM

Site Location: 2004-2042 Circle Dr. Between Baseball Field and Tennis Courts at California State University Los Angeles.

Primary Noise Sources: Traffic on I-10 Freeway. Traffic on Circle Dr.

Measurement Results	
	dBA
L_{eq}	56.4
L_{max}	64.0
L_{min}	52.7
L_{peak}	78.6
L_2	59.4
L_8	58.0
L_{25}	57.0
L_{50}	56.1
L_{90}	54.3
L_{99}	53.5
SEL	84.2

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Traffic on SR-710 Freeway Not Audible.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Hill Ave	2/2	20-35 MPH	104	2	0	114	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD820

Site Number: FM25 Date: 8/29/2013
Time: From 11:41 AM To 11:51 AM

Site Location: Patio of Children's Law Center. 201 Centre Plaza Drive #3.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	65.4
L_{max}	76.4
L_{min}	61.3
L_{peak}	93.6
L_2	67.8
L_8	66.8
L_{25}	66.0
L_{50}	65.1
L_{90}	63.7
L_{99}	62.5
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North NSR

Test Personnel: Adam Remmel
Equipment: LD820

Site Number: FM26 Date: 7/30/2013

Time: From 10:05 AM To 10:15 AM

Site Location: Sheriff's Department, Back of Parking Lot in South East Corner – Closest to SR-710 Freeway

Primary Noise Sources: Traffic on SR-710 Freeway (Extremely Minor), Several Cars Passing By in Parking Lot (Minor), Airplane Passing Over (Minor, Brief)

Measurement Results	
	dBA
L_{eq}	53.6
L_{max}	61.3
L_{min}	51.4
L_{peak}	83.9
L_2	56.2
L_8	54.7
L_{25}	53.8
L_{50}	53.3
L_{90}	52.6
L_{99}	52.1
SEL	

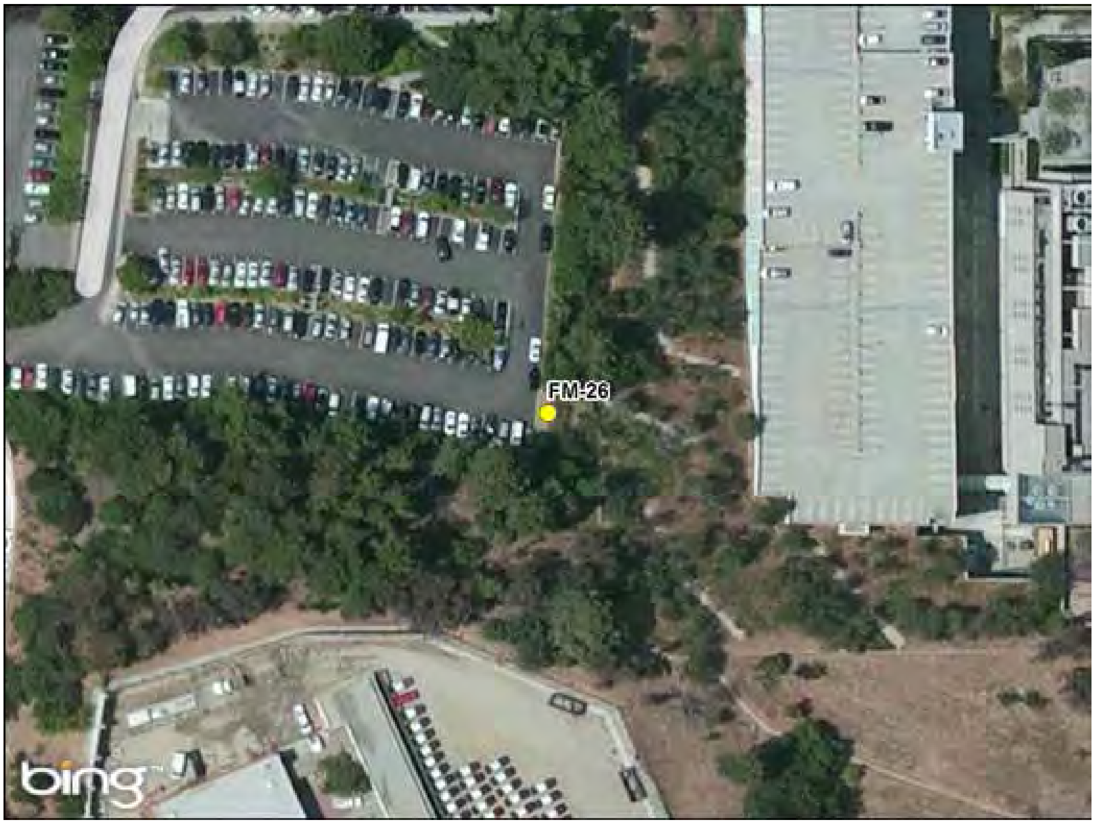
Atmospheric Conditions	
Average Wind Velocity (mph)	1.4
Maximum Wind Velocity (mph)	4.6
Temperature (F)	77.6
Relative Humidity (%)	53.0

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: LD 820

Site Number: FM27 Date: 8/21/2013

Time: From 9:35 AM To 9:45 AM

Site Location: Near Outdoor Patio/Benches of Huntington Hospital. 100 W California Blvd.

Primary Noise Sources: Traffic on Pasadena Ave. Noise from Fountain.

Measurement Results	
	dBA
L_{eq}	55.2
L_{max}	63.4
L_{min}	52.5
L_{peak}	75.9
L_2	58.9
L_8	57.3
L_{25}	55.6
L_{50}	54.6
L_{90}	53.4
L_{99}	52.9
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

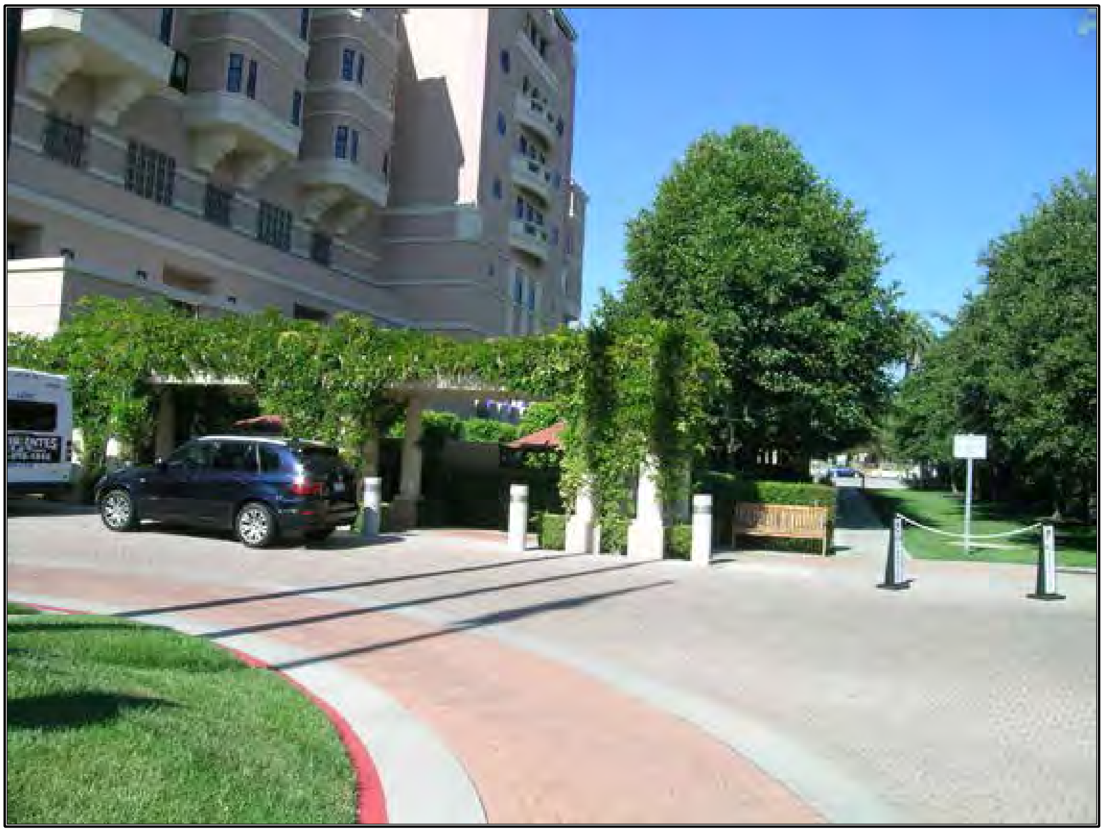
Comments: 6’ Foot Wall Surrounds Patio but Has Gaps and Holes.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM28 Date: 8/21/2013
Time: From 10:22 AM To 10:32 AM

Site Location: Vons Parking Lot. Corner of Pasadena Ave and California Blvd.

Primary Noise Sources: Traffic on Pasadena Ave. Traffic on California Blvd. Parking Lot Activities. Kids at Daycare Across Pasadena Ave.

Measurement Results	
	dBA
L_{eq}	58.1
L_{max}	70.4
L_{min}	50.7
L_{peak}	89.4
L_2	64.3
L_8	60.9
L_{25}	58.1
L_{50}	56.8
L_{90}	53.9
L_{99}	51.9
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Random Siren Goes Off Periodically at Daycare.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: Jason Lui

Project Name: SR-710 North

Equipment: LD 824

Site Number: FM29 Date: 8/21/2013

Time: From 10:22 AM To 10:32 AM

Site Location: 396 S. Pasadena Ave. on the Sidewalk.

Primary Noise Sources: Traffic on S. Pasadena Ave. Traffic on I-210 Freeway On-Ramp from S. Pasadena Ave.

Measurement Results	
	dBA
L_{eq}	71.8
L_{max}	82.2
L_{min}	53.1
L_{peak}	93.4
L_2	77.7
L_8	75.6
L_{25}	73.2
L_{50}	70.4
L_{90}	60.8
L_{99}	55.0
SEL	99.7

Atmospheric Conditions	
Average Wind Velocity (mph)	0.9
Maximum Wind Velocity (mph)	3.5
Temperature (F)	82.0
Relative Humidity (%)	42.5

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
S. Pasadena Ave	2	35-40 MPH	2	1	0			
SR-710 On-Ramp	1.5	40 MPH	121	2	0			

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM30 Date: 8/21/2013

Time: From 10:22 AM To 10:32 AM

Site Location: 368 Pasadena Ave. on Sidewalk.

Primary Noise Sources: Traffic on Pasadena Ave. Traffic on Ramp for I-210 Freeway

Measurement Results	
	dBA
L_{eq}	68.1
L_{max}	80.6
L_{min}	53.7
L_{peak}	93.5
L_2	75.7
L_8	72.8
L_{25}	69.0
L_{50}	63.9
L_{90}	57.3
L_{99}	54.5
SEL	95.9

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

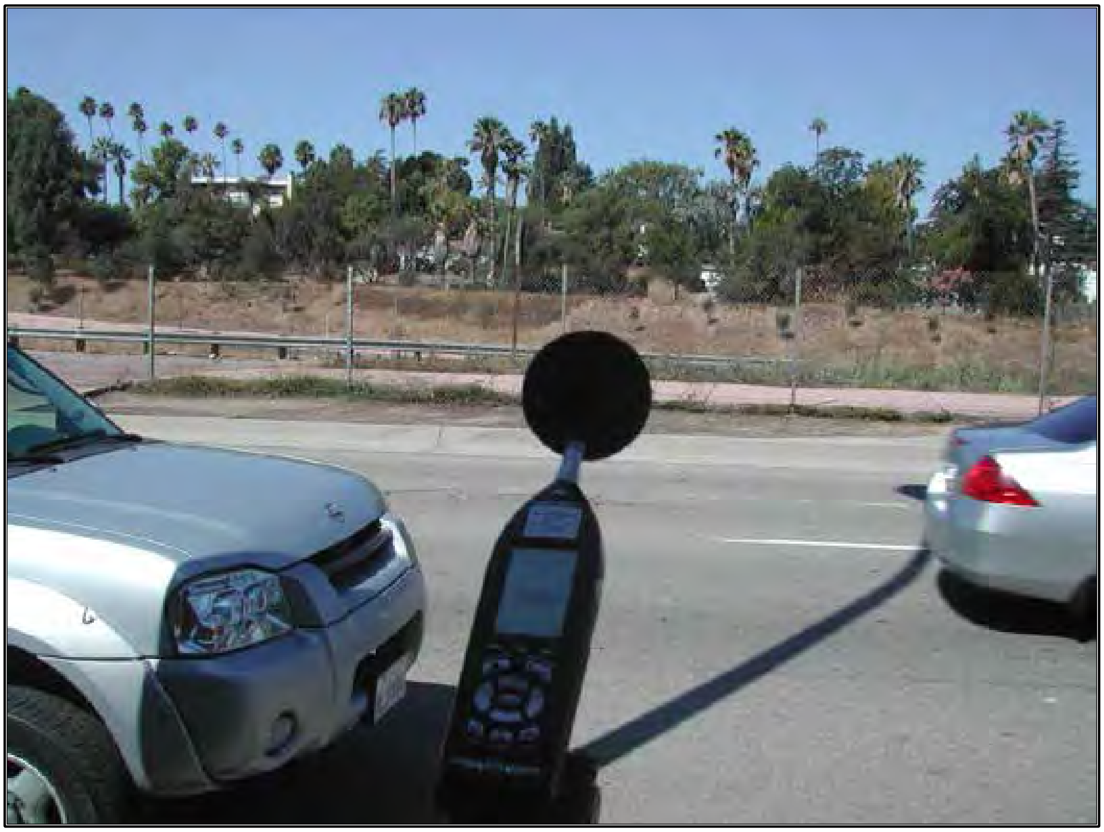
Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM31 Date: 8/21/2013

Time: From 10:50 AM To 11:01 AM

Site Location: Near 346 Waverly Drive and Pasadena Ave Intersection.

Primary Noise Sources: Traffic on SR-710 Freeway On-Ramp. Traffic on Pasadena Ave. Very Little Traffic on Waverly Dr.

Measurement Results	
	dBA
L_{eq}	63.8
L_{max}	75.8
L_{min}	49.3
L_{peak}	91.5
L_2	72.0
L_8	68.8
L_{25}	64.5
L_{50}	58.3
L_{90}	52.3
L_{99}	50.5
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Jason Lui
Project Name: SR-710 North
Equipment: LD 824

Site Number: FM32 Date: 8/21/2013
Time: From 10:50 AM To 11:00 AM

Site Location: 250 S. Pasadena Ave. on Orange Paseo In-Line with the Apartment Building.

Primary Noise Sources: Traffic on S. Pasadena Ave. Traffic on I-210 Freeway NB On-Ramp.

Measurement Results	
	dBA
L_{eq}	64.3
L_{max}	81.6
L_{min}	53.8
L_{peak}	93.6
L_2	73.2
L_8	66.8
L_{25}	62.4
L_{50}	59.7
L_{90}	56.8
L_{99}	55.1
SEL	92.2

Atmospheric Conditions	
Average Wind Velocity (mph)	0.8
Maximum Wind Velocity (mph)	2.3
Temperature (F)	81.7
Relative Humidity (%)	43.5

Comments: Outdoor Patios have 4' Foot High Plexi-glass Perimeters.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
I-210 NB On-Ramp			136	3	0			

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Corey Knips

Equipment: LD 831

Site Number: FM33 Date: 8/21/2013

Time: From 10:50 AM To 11:00 AM

Site Location: 250 Pasadena Ave. Between Gertrude Ct. and W. Valley St., in Between the Two Buildings.

Primary Noise Sources: Traffic on Pasadena Ave.

Measurement Results	
	dBA
L_{eq}	61.9
L_{max}	74.5
L_{min}	54.3
L_{peak}	92.2
L_2	68.1
L_8	65.5
L_{25}	61.8
L_{50}	59.9
L_{90}	57.1
L_{99}	55.3
SEL	89.7

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Jason Lui
Project Name: SR-710 North
Equipment: LD 824

Site Number: FM34 Date: 8/21/2013
Time: From 11:25 AM To 11:35 AM

Site Location: 54 S. Pasadena Ave. In Front of a Nail and Threading Salon at the Intersection of S. Pasadena Ave. and Martin Alley.

Primary Noise Sources: Traffic on S. Pasadena Ave. Traffic on Green St. Traffic on I-210 is Faint.

Measurement Results	
	dBA
L_{eq}	63.0
L_{max}	77.4
L_{min}	53.7
L_{peak}	93.2
L_2	71.0
L_8	66.6
L_{25}	62.0
L_{50}	60.5
L_{90}	57.7
L_{99}	54.8
SEL	90.8

Atmospheric Conditions	
Average Wind Velocity (mph)	2.4
Maximum Wind Velocity (mph)	4.5
Temperature (F)	85.0
Relative Humidity (%)	39.3

Comments: S. Pasadena Ave. is a One-Way Street, Two Lane Road with Traffic Speeds around 30 MPH.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM35 Date: 8/21/2013
Time: From 11:25 AM To 11:35 AM

Site Location: 168 W. Colorado Blvd. “Onesixeight’ Restaurant, on Sidewalk in Front of Restaurant.

Primary Noise Sources: Traffic on Colorado Blvd. Traffic on Pasadena Ave. Waterfall and Music from Restaurant.

Measurement Results	
	dBA
L_{eq}	67.5
L_{max}	83.6
L_{min}	58.3
L_{peak}	94.8
L_2	75.0
L_8	71.3
L_{25}	67.2
L_{50}	64.4
L_{90}	61.5
L_{99}	59.8
SEL	95.3

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Colorado Blvd			64	3	0	45	3	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM36 Date: 8/21/2013

Time: From 1:10 PM To 1:20 PM

Site Location: 74 N. Pasadena Ave. Office Building at the Corner of Union St. and N. Pasadena Ave.

Primary Noise Sources: Traffic on Union St. Traffic on Pasadena Ave. Faint Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	64.6
L_{max}	75.8
L_{min}	57.6
L_{peak}	94.6
L_2	69.8
L_8	67.9
L_{25}	65.3
L_{50}	63.0
L_{90}	60.6
L_{99}	59.0
SEL	92.6

Atmospheric Conditions	
Average Wind Velocity (mph)	2.1
Maximum Wind Velocity (mph)	7.2
Temperature (F)	91.0
Relative Humidity (%)	35.1

Comments: Union St. and S. Pasadena Ave. are One-Way Streets.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
S. Pasadena Ave. NB	2	40 MPH	37	1	0			
Union St. WB	3	30-35 MPH				50	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM37 Date: 8/21/2013

Time: From 1:10 PM To 1:20 PM

Site Location: 100 W. Walnut St., Pasadena – Parsons Corporation.

Primary Noise Sources: Traffic on SR-710 Freeway. Traffic on SR-134 Freeway and Interchange Ramps.

Measurement Results	
	dBA
L_{eq}	64.1
L_{max}	68.8
L_{min}	59.9
L_{peak}	85.2
L_2	66.3
L_8	65.6
L_{25}	64.8
L_{50}	63.9
L_{90}	62.2
L_{99}	60.9
SEL	92.0

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

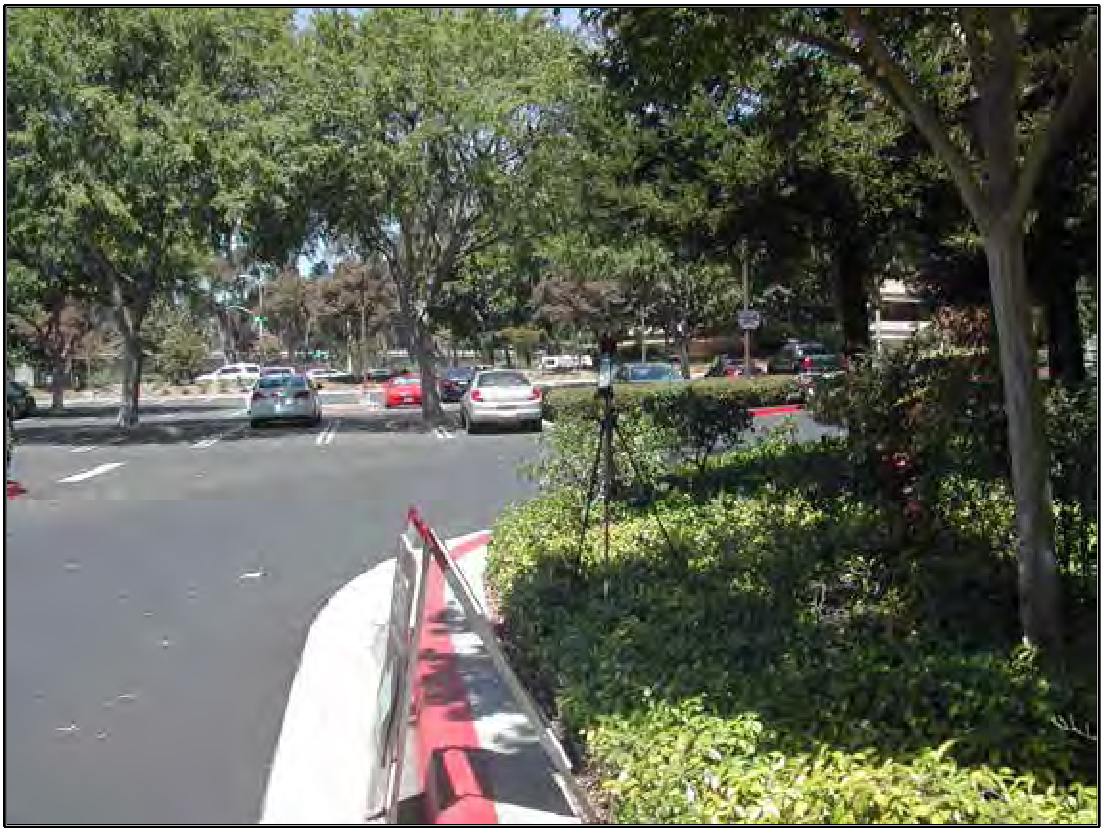
Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Walnut St.			31	0	0	47	0	0

Sketch:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 820

Site Number: FM38 Date: 8/21/2013
Time: From 2:46 PM To 2:56 PM

Site Location: Near Patio of 480 Cypress Ave.

Primary Noise Sources: Traffic on SR-134 WB to I-210 NB On-Ramp and Adjacent Ramps.

Measurement Results	
	dBA
L_{eq}	65.7
L_{max}	77.0
L_{min}	61.3
L_{peak}	87.3
L_2	69.1
L_8	67.8
L_{25}	66.5
L_{50}	65.3
L_{90}	63.1
L_{99}	62.0
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Exterior Wall is 7' Foot High. Some Units have Second Floor Balcony Facing Freeways. Very Few First Floor Private Patios.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM39 Date: 8/21/2013
Time: From 2:46 PM To 2:56 PM

Site Location: Between 502 and 540 Orange Grove Place Near Pool Area. Second Row.

Primary Noise Sources: Traffic on I-210 Freeway (SR-710).

Measurement Results	
	dBA
L_{eq}	62.1
L_{max}	74.7
L_{min}	57.7
L_{peak}	87.0
L_2	65.8
L_8	63.7
L_{25}	62.6
L_{50}	61.6
L_{90}	59.8
L_{99}	58.6
SEL	90.0

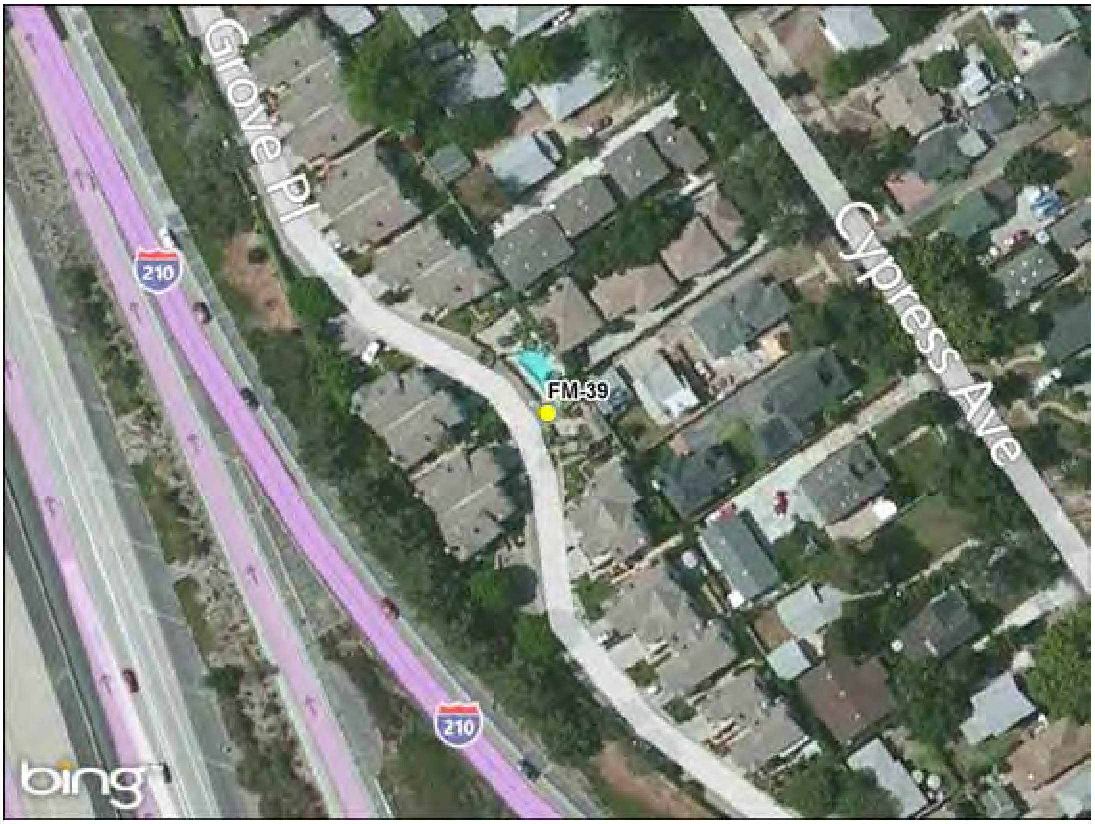
Atmospheric Conditions	
Average Wind Velocity (mph)	0.9
Maximum Wind Velocity (mph)	4.0
Temperature (F)	92.2
Relative Humidity (%)	29.2

Comments: Homes are Two-Storied. Two Homes are Shielding the Noise Meter.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: Corey Knips

Project Name: SR-710 North

Equipment: LD 831

Site Number: FM40 Date: 8/21/2013

Time: From 2:46 PM To 2:56 PM

Site Location: 572 Orange Grove Place in Front of Garage.

Primary Noise Sources: Traffic on I-210 Freeway and Ramps.

Measurement Results	
	dBA
L_{eq}	68.2
L_{max}	77.9
L_{min}	63.2
L_{peak}	88.9
L_2	71.1
L_8	70.0
L_{25}	68.9
L_{50}	67.8
L_{90}	66.2
L_{99}	64.9
SEL	96.0

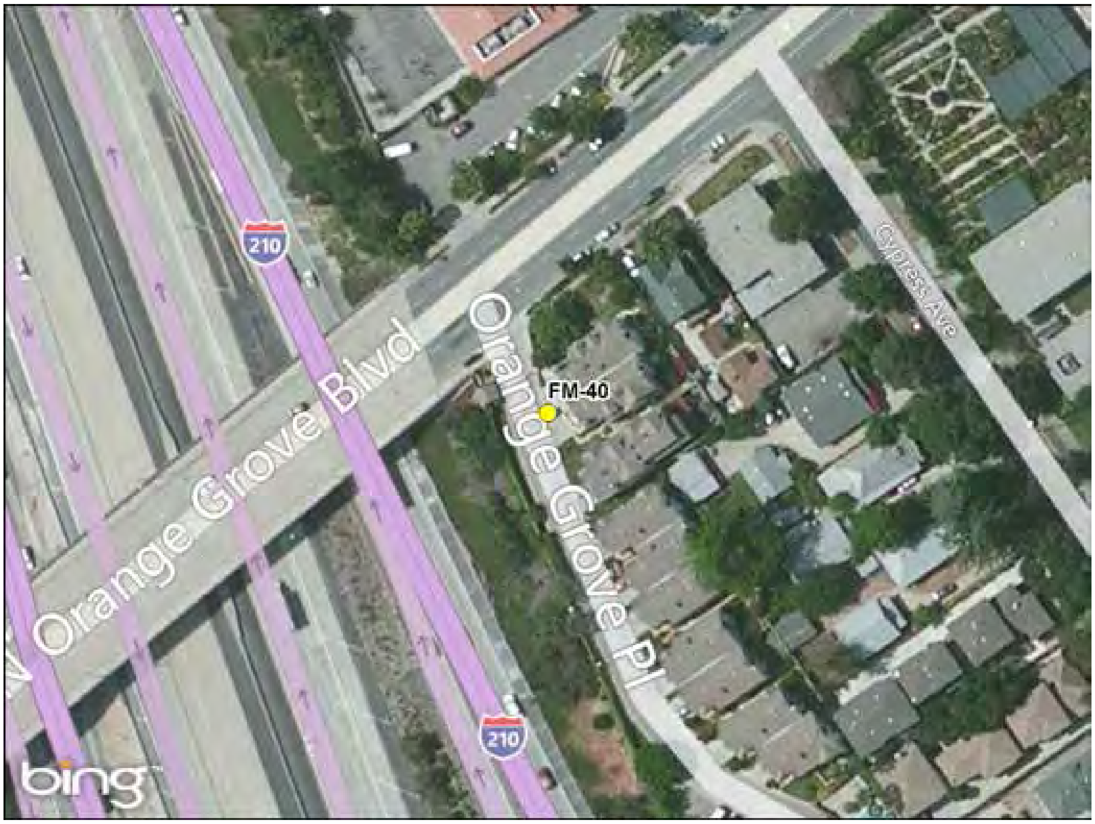
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 6’ Foot Wall on West Side of Orange Grove Ct.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Orange Grove	2/2		57	1	0	51	2	0

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM41 Date: 10/23/2013

Time: From 9:19 AM To 9:34 AM

Site Location: 651 N. Orange Grove Blvd. New Horizon School Near Soccer Field / Basketball Court.

Primary Noise Sources: Traffic on I-210 Freeway North Bound.

Measurement Results	
	dBA
L_{eq}	65.8
L_{max}	71.7
L_{min}	61.9
L_{peak}	90.0
L_2	68.0
L_8	67.3
L_{25}	66.5
L_{50}	65.7
L_{90}	64.2
L_{99}	63.0
SEL	

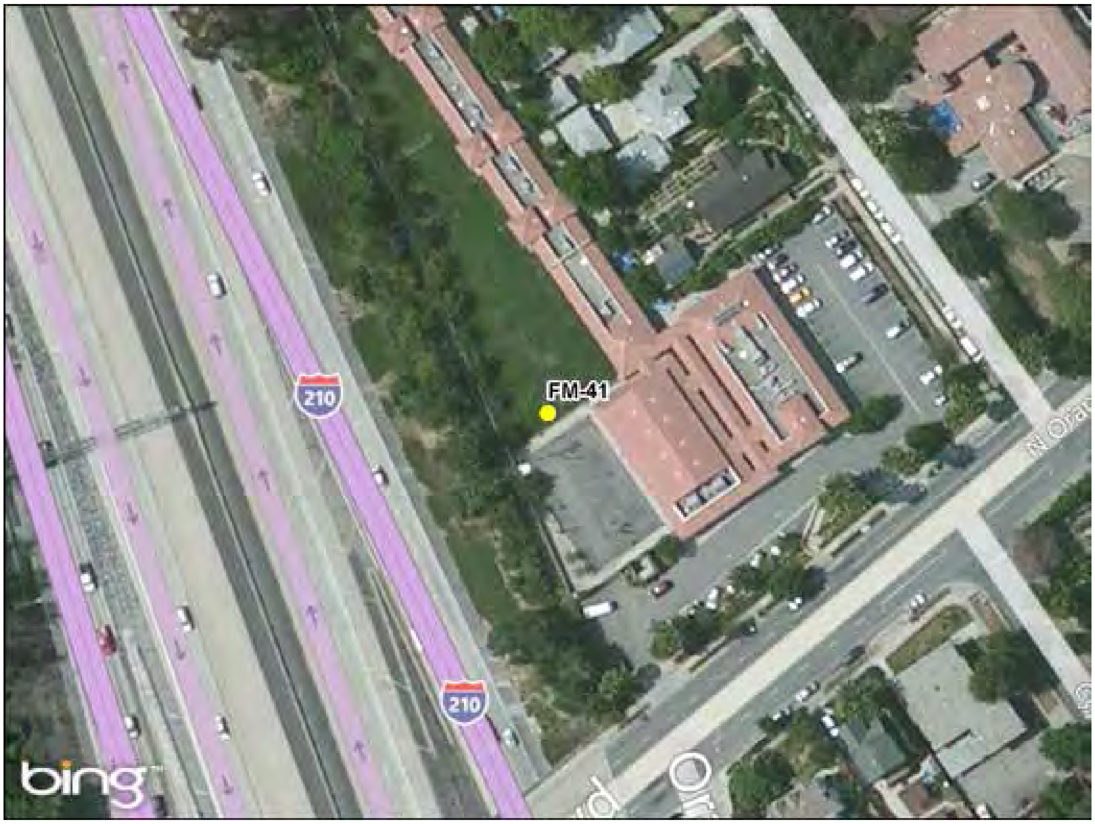
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 6' Foot High Stucco / Concrete Wall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: JT Stephens

Equipment: LD820

Site Number: FM42 Date: 8/22/2013

Time: From 11:44 AM To 11:54 AM

Site Location: Rear Yard of 717 Cypress Ave.

Primary Noise Sources: Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	62.6
L_{max}	67.1
L_{min}	57.9
L_{peak}	85.9
L_2	65.2
L_8	64.2
L_{25}	63.2
L_{50}	62.5
L_{90}	60.8
L_{99}	59.5
SEL	

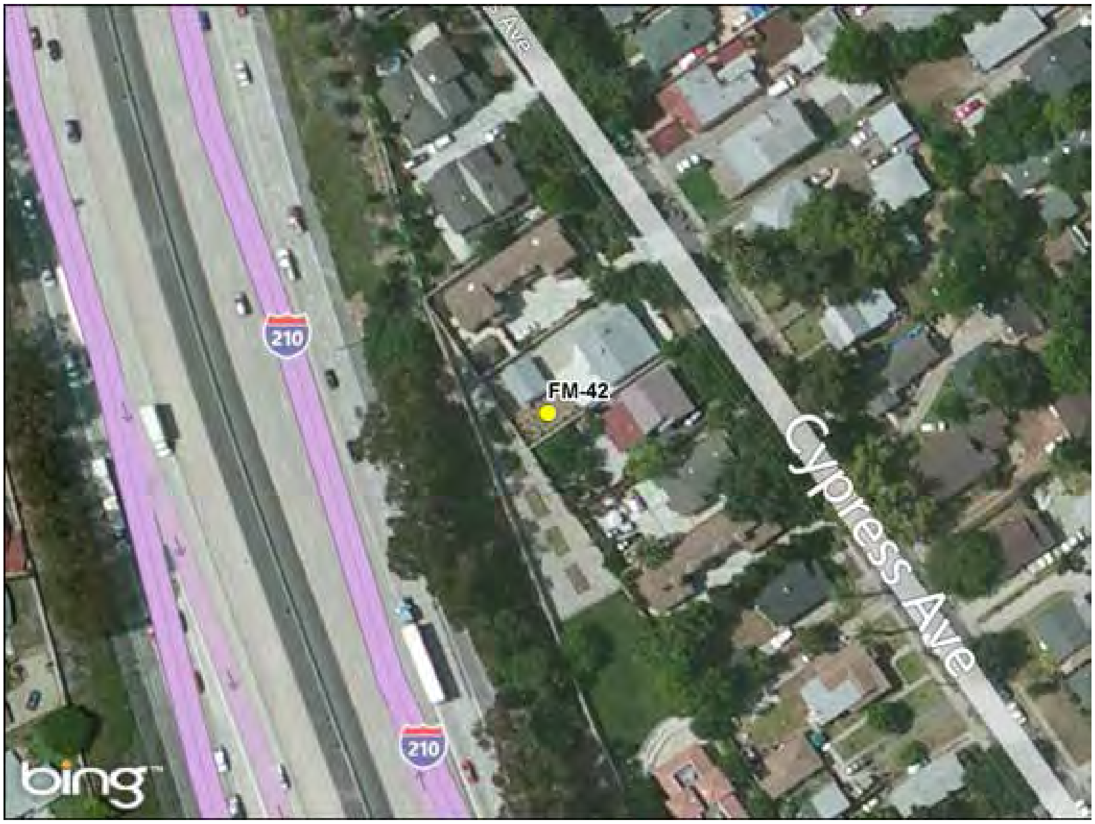
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 5’ Foot High Property Line Wall, Greenbelt, 6’ Foot High Property Line Wall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM43 Date: 8/22/2013

Time: From 11:44 AM To 11:54 AM

Site Location: 849 Lincoln Ave. on the Sidewalk at the Corner of Cypress Ave. and Barthe Drive.

Primary Noise Sources: Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	70.7
L_{max}	76.0
L_{min}	64.3
L_{peak}	89.1
L_2	73.8
L_8	73.0
L_{25}	71.6
L_{50}	70.3
L_{90}	68.0
L_{99}	66.3
SEL	98.5

Atmospheric Conditions	
Average Wind Velocity (mph)	1.0
Maximum Wind Velocity (mph)	2.6
Temperature (F)	93.3
Relative Humidity (%)	25.9

Comments: Wall at 9 Blocks@8 Inches. Partially Shielding Home. Home has 6-7' Foot High Property Barriers.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM44 Date: 8/22/2013

Time: From 12:18 AM To 12:28 AM

Site Location: Rear Yard of 877 Lincoln Ave.

Primary Noise Sources: Traffic on I-210 Freeway. Traffic on I-210 WB Off-Ramp

Measurement Results	
	dBA
L_{eq}	67.7
L_{max}	73.3
L_{min}	60.7
L_{peak}	86.5
L_2	70.8
L_8	69.7
L_{25}	68.6
L_{50}	67.3
L_{90}	64.8
L_{99}	61.7
SEL	

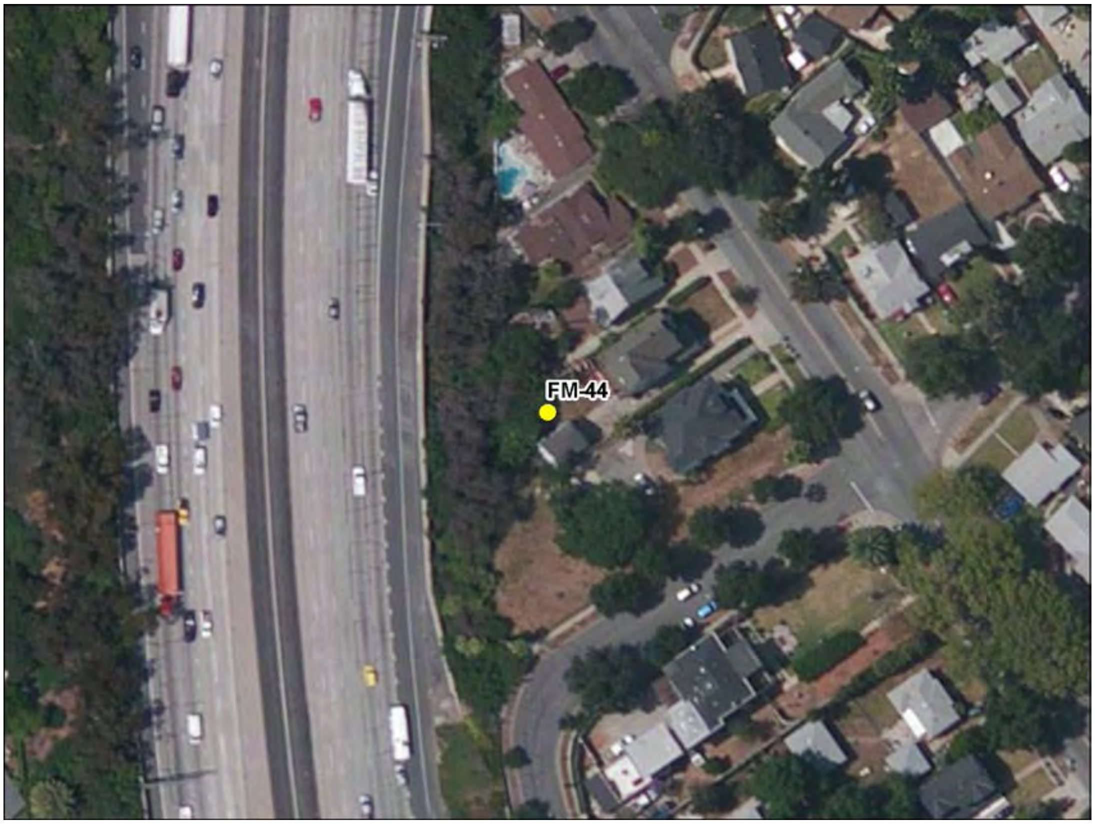
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: No Freeway Walls. Truck Stacks are Visible. Edge of Road Jersey Barrier is Present.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM45 Date: 8/22/2013

Time: From 12:18 PM To 12:28 PM

Site Location: 924 Cypress Ave. Side Yard with Bench and Vegetable Garden.

Primary Noise Sources: Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	60.3
L_{max}	64.8
L_{min}	56.3
L_{peak}	78.8
L_2	63.5
L_8	62.4
L_{25}	60.9
L_{50}	59.8
L_{90}	58.2
L_{99}	57.1
SEL	88.1

Atmospheric Conditions	
Average Wind Velocity (mph)	1.4
Maximum Wind Velocity (mph)	8.3
Temperature (F)	96.2
Relative Humidity (%)	20.5

Comments: Home is Lower in Elevation than Highway. No Barrier Along the Freeway is Visible.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM46 Date: 8/22/2013

Time: From 12:18 PM To 12:28 PM

Site Location: 860 Winona Ave. in the Backyard.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	61.4
L_{max}	77.7
L_{min}	56.0
L_{peak}	100.2
L_2	65.1
L_8	63.7
L_{25}	62.0
L_{50}	60.8
L_{90}	58.6
L_{99}	57.3
SEL	89.2

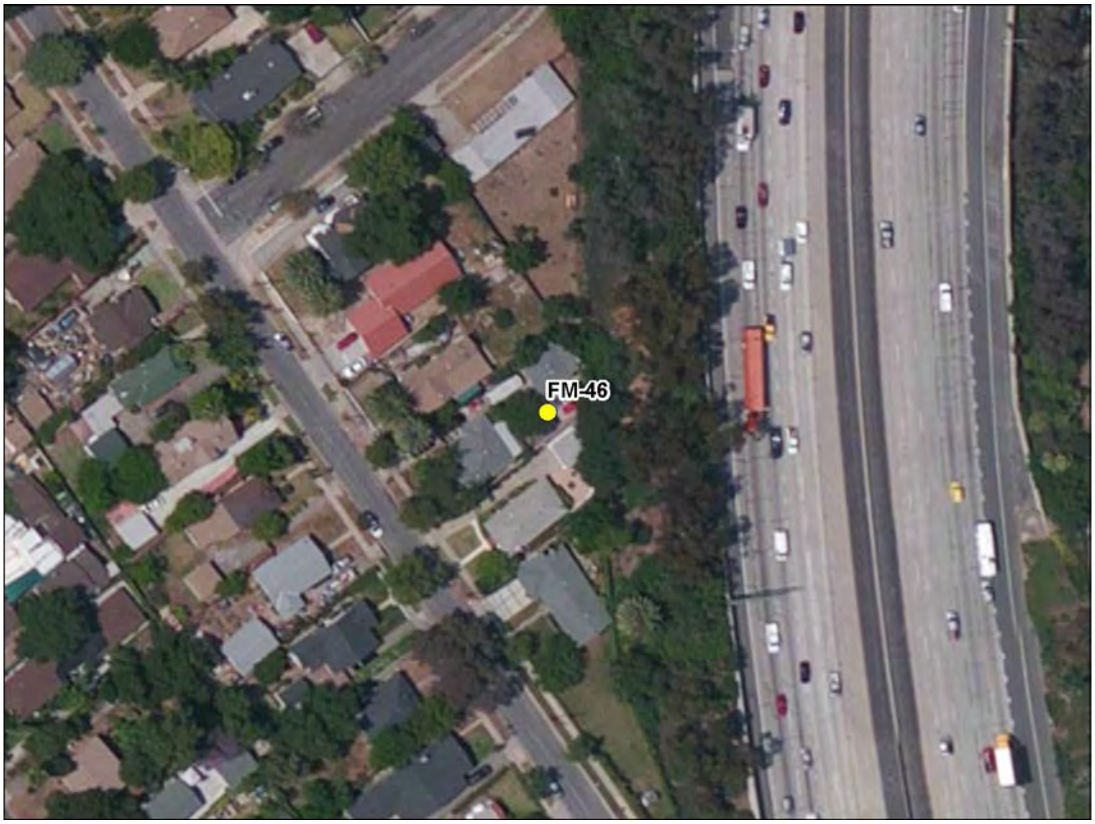
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: SE Side of Backyard has a 5.5' Foot Blockwall. NE Side of Backyard has a Wood Panel 6' Foot Fence with Gaps. NW Side of Backyard has a 6' Foot Wall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM47 Date: 8/22/2013

Time: From 11:44 AM To 11:54 AM

Site Location: 1 Mayview Lane, Driveway Approximately 20 Feet from Edge of Cul-de-sac.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	65.0
L_{max}	70.2
L_{min}	60.4
L_{peak}	82.2
L_2	67.8
L_8	66.7
L_{25}	65.7
L_{50}	64.8
L_{90}	63.0
L_{99}	61.5
SEL	92.8

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Wall Along Freeway is 10.5‘ Feet Tall. Ground Elevation is Going Up to the South While Top of Wall Elevation is Staying the Same, So it is Only 6’ Feet Tall Compared to the Ground About 80-100’ Feet to the South.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM48 Date: 10/23/2013

Time: From 9:19 AM To 9:34 AM

Site Location: 6 Mayview Ln, in Backyard, 25 Feet from Wall.

Primary Noise Sources: Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	67.6
L_{max}	73.0
L_{min}	63.3
L_{peak}	88.2
L_2	69.6
L_8	68.8
L_{25}	68.2
L_{50}	67.5
L_{90}	66.1
L_{99}	64.5
SEL	97.1

Atmospheric Conditions	
Average Wind Velocity (mph)	0.6
Maximum Wind Velocity (mph)	1.5
Temperature (F)	58.3
Relative Humidity (%)	81.2

Comments: Wall is 7 Feet 4 Inches Tall. Stored 255.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105 Test Personnel: Jason Lui
Project Name: SR-710 North Equipment: LD 824

Site Number: FM49 Date: 10/23/2013 Time: From 9:19 AM To 9:34 AM

Site Location: 550 Rosewood Lane. In the Front Yard.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	67.1
L_{max}	74.9
L_{min}	64.0
L_{peak}	90.4
L_2	69.1
L_8	68.3
L_{25}	67.6
L_{50}	66.9
L_{90}	65.7
L_{99}	64.8
SEL	96.7

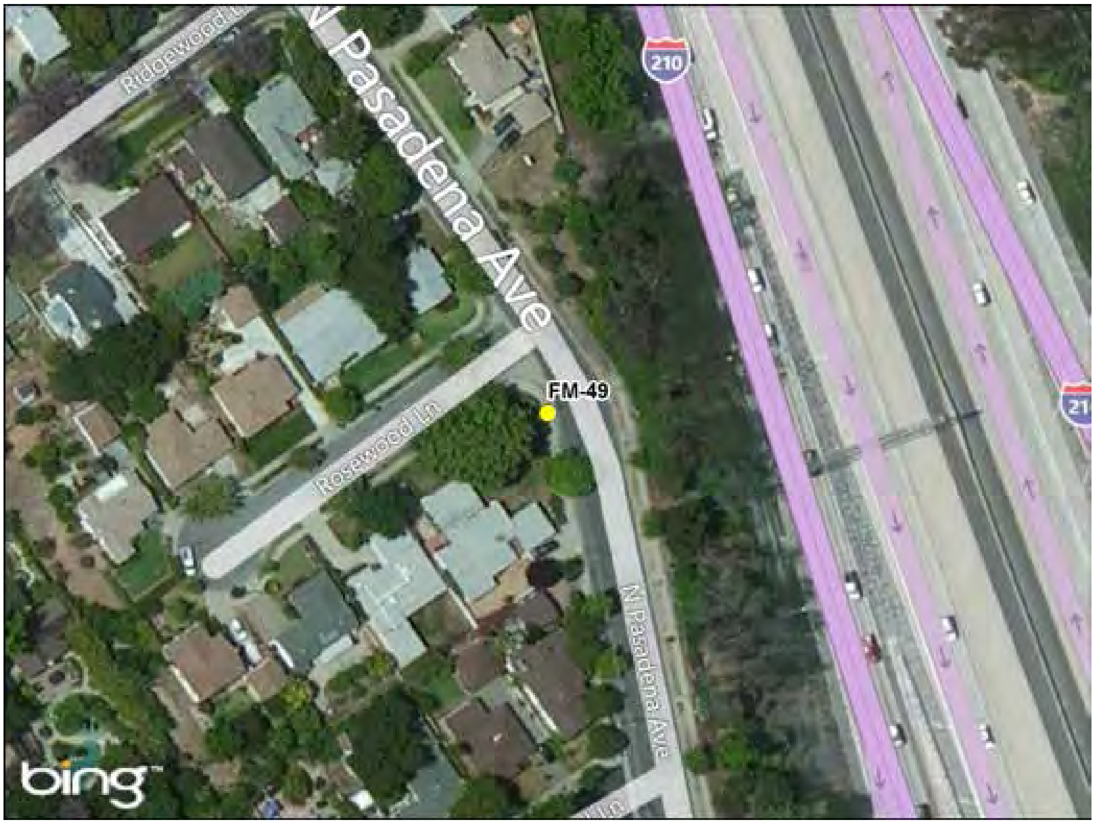
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 108.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
N. Pasadena Ave.	1/1	25 MPH	3	0	0	5	0	0

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM50 Date: 10/23/2013

Time: From 7:33 AM To 7:48 AM

Site Location: Longwood Ln, on South Curb, 42 Feet from Pasadena Ave.

Primary Noise Sources: Traffic on SR-134. Very Few Cars on Pasadena Ave (About 20 in 15 Minutes).

Measurement Results	
	dBA
L_{eq}	65.2
L_{max}	73.2
L_{min}	61.5
L_{peak}	86.4
L_2	67.8
L_8	66.5
L_{25}	65.5
L_{50}	65.0
L_{90}	63.9
L_{99}	62.7
SEL	94.8

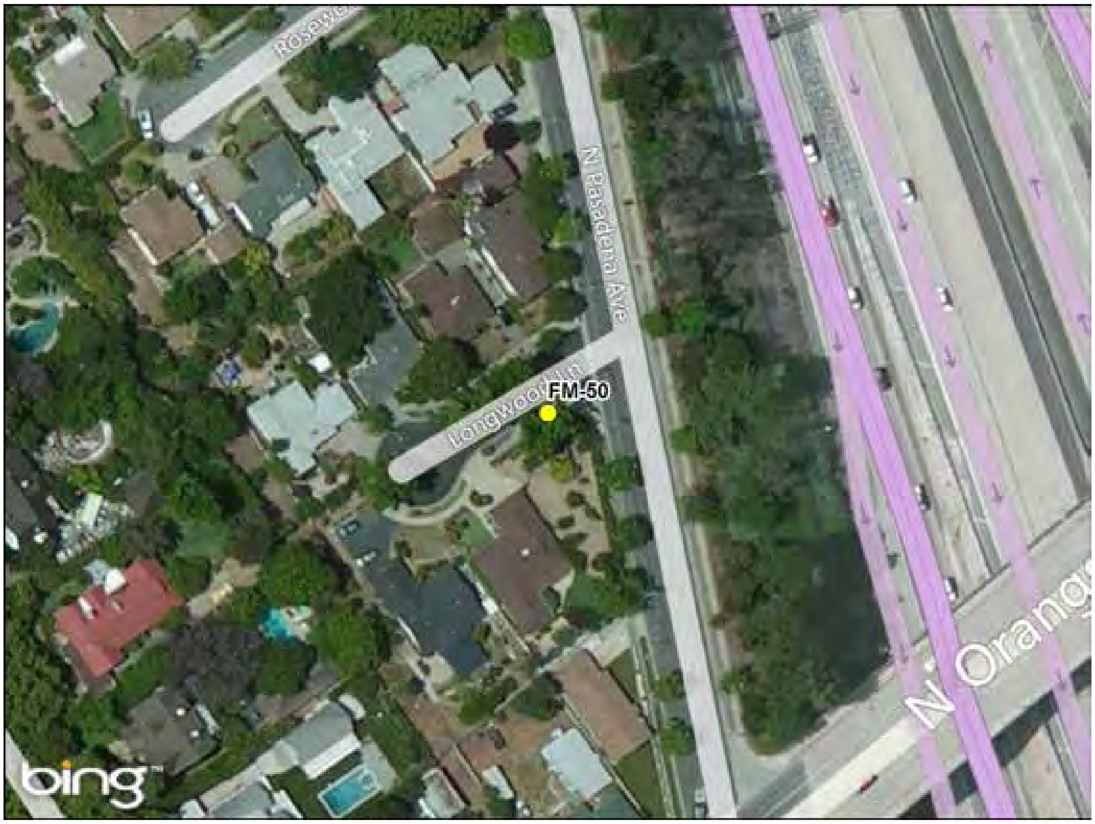
Atmospheric Conditions	
Average Wind Velocity (mph)	1.0
Maximum Wind Velocity (mph)	3.0
Temperature (F)	56.7
Relative Humidity (%)	86.7

Comments: Stored 253.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM51 Date: 10/23/2013
Time: From 7:33 AM To 7:48 AM

Site Location: 404-490 Rosemont Ave / 504-596 Orange Grove Blvd. Unit 528 Orange Grove Village II. Apartment Complex Near Outdoor Patio.

Primary Noise Sources: Traffic on SR-710 Freeway. Traffic on I-210. Bird Noise.

Measurement Results	
	dBA
L_{eq}	64.8
L_{max}	76.5
L_{min}	61.4
L_{peak}	87.4
L_2	68.5
L_8	65.8
L_{25}	64.9
L_{50}	64.3
L_{90}	63.1
L_{99}	62.3
SEL	94.3

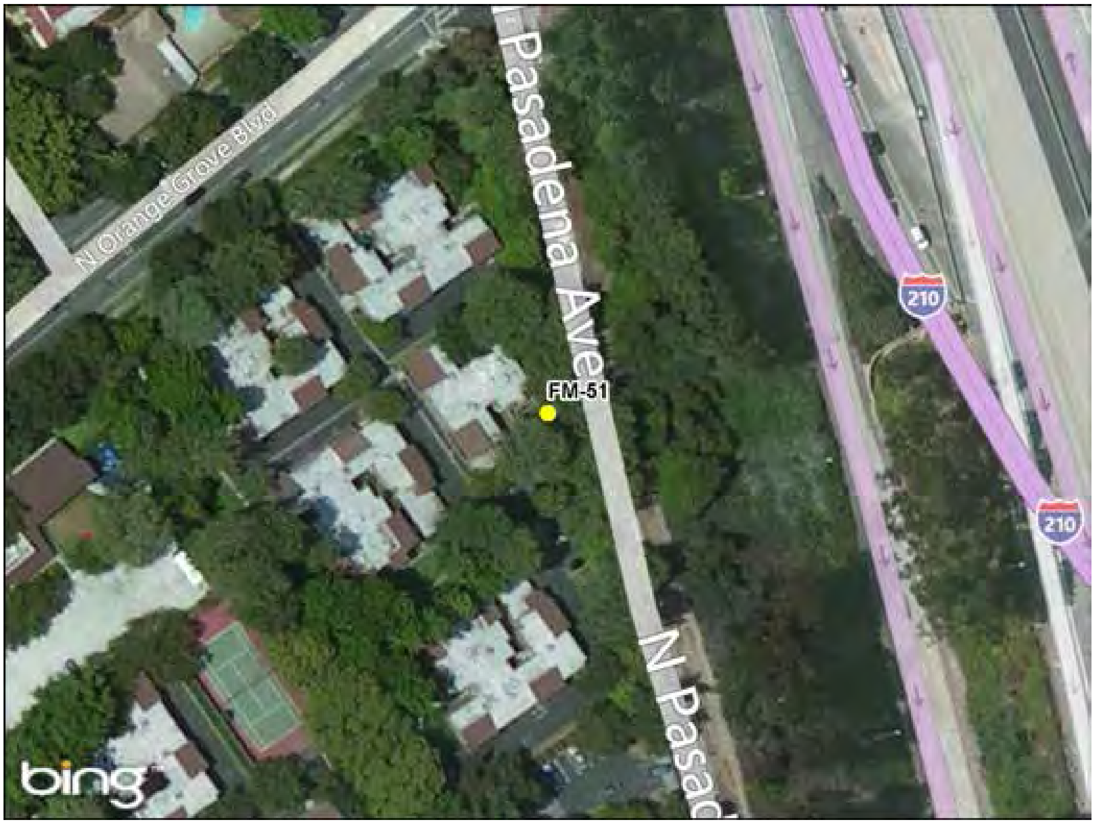
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Some Vehicles Passed By Along North Pasadena Ave. Outdoor Patio Has a 6' Foot High Perimeter Barrier (Concrete That Looks Like Wood). Stored 106.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
N. Pasadena Ave	1/1	25 MPH	2	0	0	2	0	0

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM52 Date: 10/23/2013
Time: From 7:33 AM To 7:48 AM

Site Location: 315 N. Pasadena Ave. Roosevelt Elementary School, Near Flag Pole.

Primary Noise Sources: Traffic on SR-710 Freeway. Traffic on I-210 Freeway, and Freeway Ramps.

Measurement Results	
	dBA
L_{eq}	62.5
L_{max}	71.8
L_{min}	59.5
L_{peak}	90.3
L_2	64.1
L_8	63.6
L_{25}	63.0
L_{50}	62.5
L_{90}	61.5
L_{99}	60.8
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 5 Foot Property Wall Around Parking Lot. Chain Link Fence in Front of Playground.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Corey Knips
Project Name: SR-710 North
Equipment: LD 831

Site Number: FM53 Date: 10/23/2013
Time: From 10:15 AM To 10:30 AM

Site Location: Orange Grove Village Apartment Complex Tennis Court.

Primary Noise Sources: Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	63.9
L_{max}	81.4
L_{min}	69.5
L_{peak}	97.1
L_2	66.8
L_8	65.5
L_{25}	64.5
L_{50}	63.7
L_{90}	62.0
L_{99}	60.7
SEL	93.5

Atmospheric Conditions	
Average Wind Velocity (mph)	0.7
Maximum Wind Velocity (mph)	2.0
Temperature (F)	59.9
Relative Humidity (%)	79.5

Comments: Stored 256.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM54 Date: 8/21/2013

Time: From 1:52 PM To 2:02 PM

Site Location: Rusnak Auto Dealership. Patio Sitting Area (Non Smoking Side)

Primary Noise Sources: Traffic on SR-710 Freeway. Traffic on SR-134 Freeway.

Measurement Results	
	dBA
L_{eq}	61.4
L_{max}	69.5
L_{min}	56.1
L_{peak}	86.9
L_2	65.6
L_8	64.0
L_{25}	62.2
L_{50}	60.6
L_{90}	58.4
L_{99}	56.8
SEL	89.2

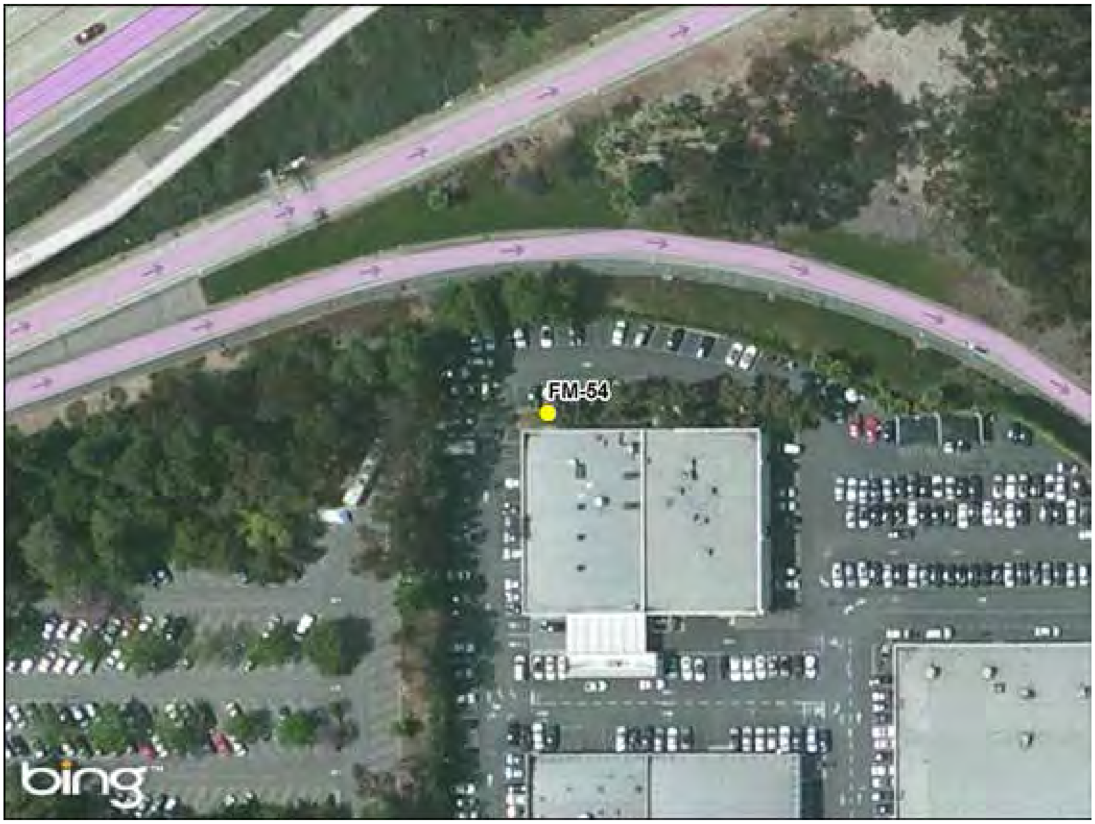
Atmospheric Conditions	
Average Wind Velocity (mph)	0.6
Maximum Wind Velocity (mph)	1.8
Temperature (F)	97.3
Relative Humidity (%)	29.4

Comments: No Walls or Barriers Between Building and Freeway.

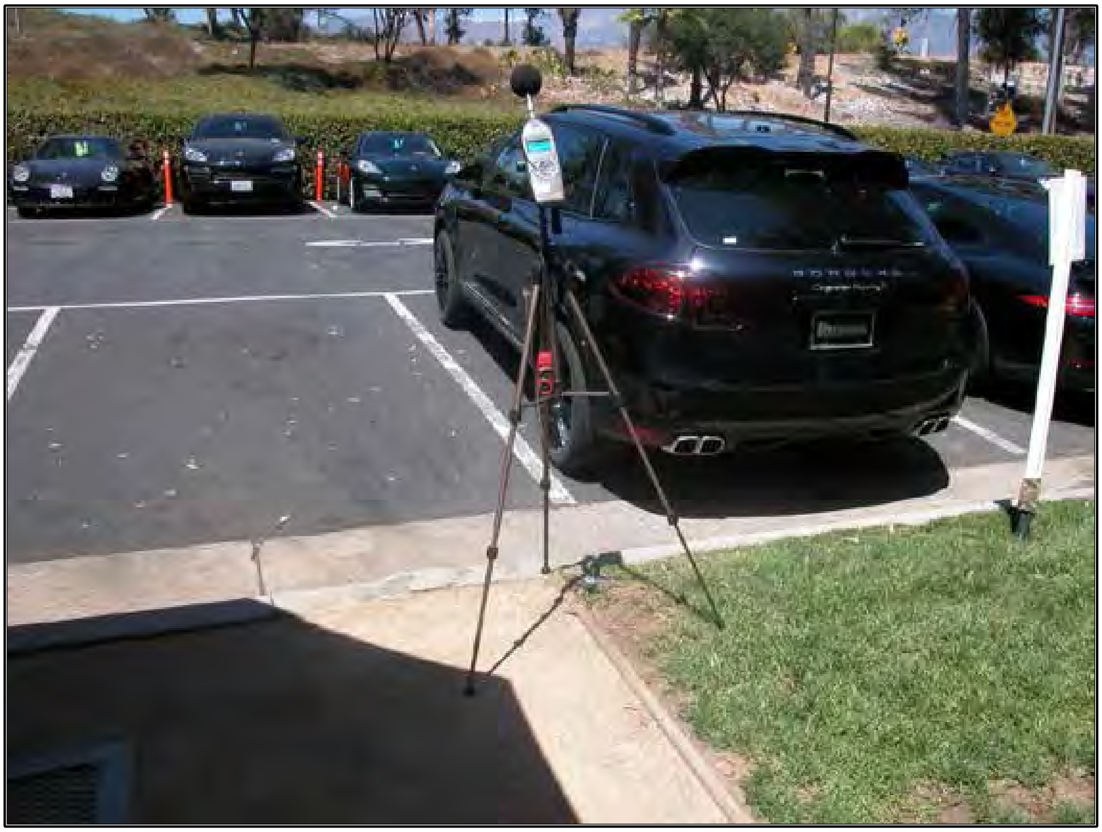
Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM55 Date: 8/21/2013

Time: From 1:52 PM To 2:02 PM

Site Location: Near Enterprise Rent-a-car Within Rusnak Dealership. In-line with Outdoor Patio Area.

Primary Noise Sources: Traffic on St. John Ave. Traffic on SR-710 Freeway. Car Wash in Dealership.

Measurement Results	
	dBA
L_{eq}	61.5
L_{max}	68.7
L_{min}	57.2
L_{peak}	91.6
L_2	65.5
L_8	64.1
L_{25}	62.4
L_{50}	60.8
L_{90}	58.8
L_{99}	57.8
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: No Freeways Visible

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM56 Date: 8/21/2013

Time: From 1:52 PM To 2:02 PM

Site Location: 277 Green St. on Sidewalk Along St. John Ave.

Primary Noise Sources: Traffic on SR-710 Freeway. Light Traffic on St. John Ave.

Measurement Results	
	dBA
L_{eq}	60.9
L_{max}	71.2
L_{min}	55.2
L_{peak}	92.7
L_2	66.5
L_8	63.7
L_{25}	61.2
L_{50}	59.6
L_{90}	57.5
L_{99}	56.0
SEL	55.2

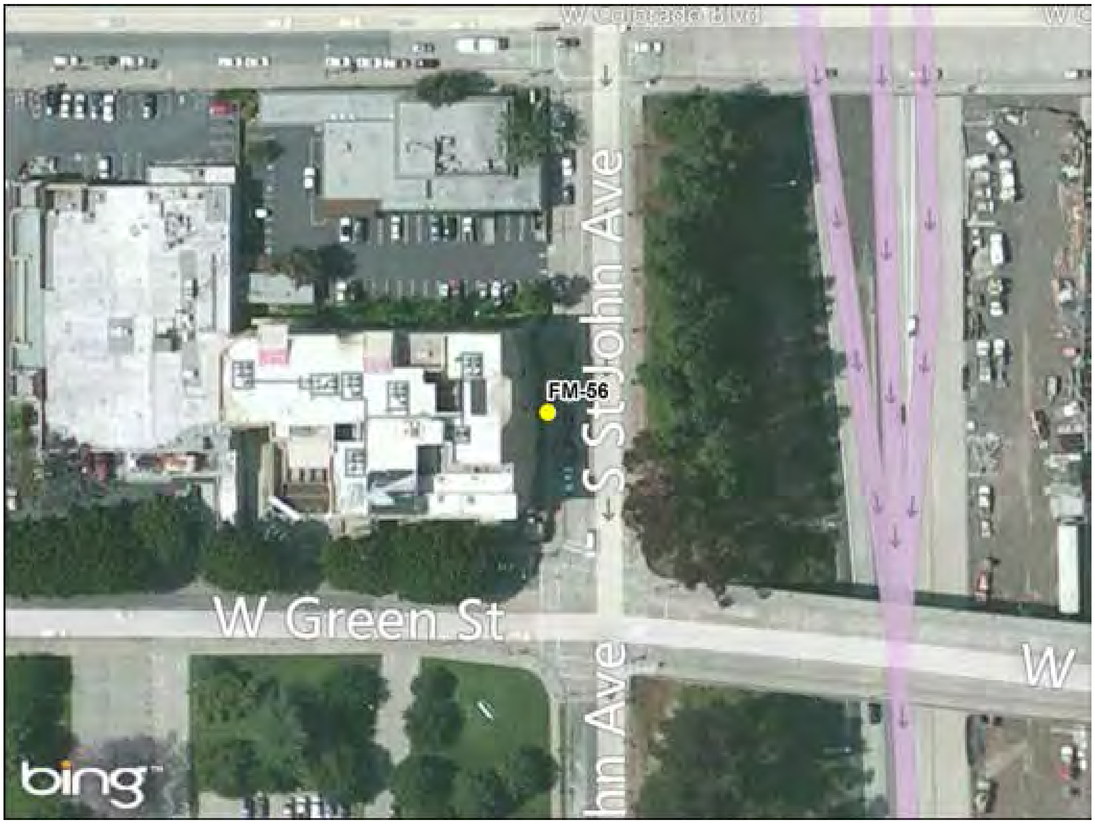
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
St. John Ave (One-Way)	3	35 MPH				40	1	0

Sketch:



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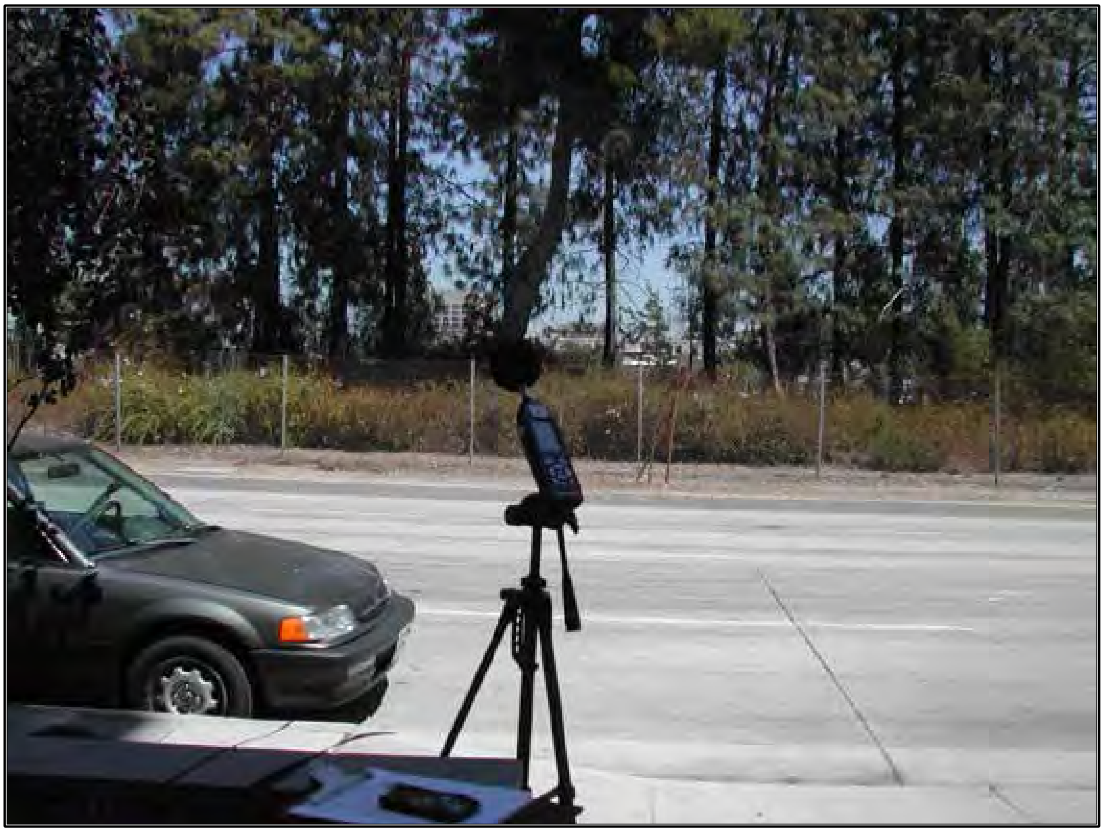


Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM57 Date: 10/23/2013
Time: From 8:18 AM To 8:33 AM

Site Location: 131 S. St. John Ave. HRock Church North of Church.

Primary Noise Sources: Traffic on St. John Ave.

Measurement Results	
	dBA
L_{eq}	59.1
L_{max}	70.3
L_{min}	55.7
L_{peak}	86.1
L_2	62.3
L_8	60.3
L_{25}	59.4
L_{50}	58.8
L_{90}	57.5
L_{99}	56.4
SEL	88.7

Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	2.7
Temperature (F)	57.6
Relative Humidity (%)	86.7

Comments: Stored 254.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
St. John Ave	2					22	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Jason Lui

Equipment: LD 824

Site Number: FM58 Date: 10/23/2013

Time: From 8:18 AM To 8:33 AM

Site Location: 169 S. St. John Ave. Maranatha High School Near Soccer Goal Post.

Primary Noise Sources: Traffic on SR-710 Freeway. Some Faint Construction Activity Across From SR-710.

Measurement Results	
	dBA
L_{eq}	57.3
L_{max}	69.2
L_{min}	53.3
L_{peak}	86.0
L_2	60.2
L_8	58.7
L_{25}	57.8
L_{50}	57.0
L_{90}	55.4
L_{99}	54.3
SEL	87.1

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 107.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
St. John Ave.	2	25 MPH	24	0	0			

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM59 Date: 10/23/2013
Time: From 8:18 AM To 8:33 AM

Site Location: Maranatha High School Near St. John Ave and Del Mar Blvd Intersection.

Primary Noise Sources: Traffic on St. John Ave. Traffic on Del Mar Blvd.

Measurement Results	
	dBA
L_{eq}	60.5
L_{max}	70.5
L_{min}	54.9
L_{peak}	83.6
L_2	65.3
L_8	63.3
L_{25}	61.2
L_{50}	59.6
L_{90}	57.2
L_{99}	56.1
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Del Mar Blvd	1/1	30 MPH	17	0	0	117	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM60 Date: 8/21/2013

Time: From 9:35 AM To 9:45 AM

Site Location: Edge of Waverly Drive, Near Gate for State Property on North Side of Waverly.

Primary Noise Sources: Traffic on SR-710 Freeway, Birds, Traffic on Del Mar Blvd.

Measurement Results	
	dBA
L_{eq}	53.3
L_{max}	63.8
L_{min}	49.1
L_{peak}	88.7
L_2	56.7
L_8	54.9
L_{25}	53.8
L_{50}	52.9
L_{90}	51.4
L_{99}	50.0
SEL	81.4

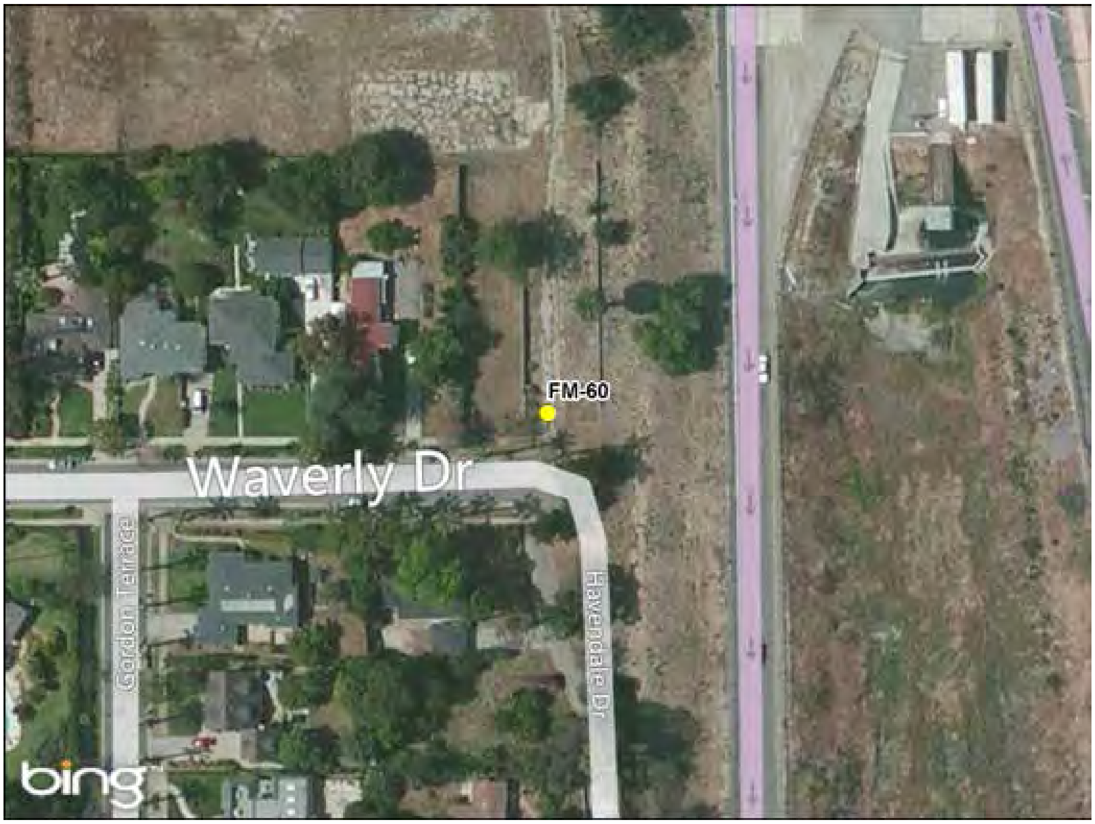
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Partial 4' Foot Wall Between Meter and SR-710 Freeway Starts About Even With Meter and Continues North.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Jason Lui
Project Name: SR-710 North
Equipment: LD 824

Site Number: FM61 Date: 8/21/2013
Time: From 9:35 AM To 9:45 AM

Site Location: 410-422 Gordon Terrace. Rose Garden Next to Apartment Building.

Primary Noise Sources: Traffic on SR-710 Freeway and Sirens in the Background.

Measurement Results	
	dBA
L_{eq}	51.9
L_{max}	60.0
L_{min}	47.0
L_{peak}	78.1
L_2	55.3
L_8	53.7
L_{25}	52.5
L_{50}	51.5
L_{90}	49.9
L_{99}	48.5
SEL	79.7

Atmospheric Conditions	
Average Wind Velocity (mph)	0.9
Maximum Wind Velocity (mph)	4.1
Temperature (F)	77.5
Relative Humidity (%)	51.6

Comments: Activities from the Apartment Building Filtered Out. No Wall Between the Apartment Building and the Freeway.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: FM62 Date: 8/20/2013
Time: From 2:44 PM To 2:54 PM

Site Location: Open Lot at End of Palmetto Drive, South side of Street.

Primary Noise Sources: Traffic on SR-710 Freeway.

Measurement Results	
	dBA
L_{eq}	55.0
L_{max}	75.4
L_{min}	46.7
L_{peak}	85.4
L_2	60.3
L_8	55.8
L_{25}	53.4
L_{50}	52.0
L_{90}	49.5
L_{99}	47.7
SEL	82.7

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 820

Site Number: FM63 Date: 8/20/2013

Time: From 2:44 PM To 2:54 PM

Site Location: 265 California Blvd. Cal Ritz Park Apartments.

Primary Noise Sources: Traffic on St John Ave. and California Blvd.

Measurement Results	
	dBA
L_{eq}	67.2
L_{max}	83.1
L_{min}	48.5
L_{peak}	103.8
L_2	75.7
L_8	70.1
L_{25}	66.7
L_{50}	63.7
L_{90}	58.7
L_{99}	52.5
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
California Blvd	1/1/1	30 MPH	84	0	2	58	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Jason Lui
Equipment: LD 824

Site Number: FM64 Date: 8/20/2013

Time: From 2:44 PM To 2:54 PM

Site Location: 202 California Blvd. In Front of the House.

Primary Noise Sources: Traffic on California Blvd. Traffic on Pasadena Ave.

Measurement Results	
	dBA
L_{eq}	62.7
L_{max}	70.2
L_{min}	52.5
L_{peak}	87.2
L_2	68.1
L_8	66.7
L_{25}	64.0
L_{50}	60.8
L_{90}	55.6
L_{99}	53.4
SEL	86.9

Atmospheric Conditions	
Average Wind Velocity (mph)	0.8
Maximum Wind Velocity (mph)	2.8
Temperature (F)	89.4
Relative Humidity (%)	37.7

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
California Blvd.	2/2	35-40 MPH	152	7	2	38	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: LM01 Date: 8/14/2013

Time: From 10:14 AM To 10:24 AM

Site Location: 252 Kern Ave. Back Yard

Primary Noise Sources: Traffic on SR-60 Freeway, Traffic on Kern Ave. Traffic on Mednik Ave

Measurement Results	
	dBA
L_{eq}	50.1
L_{max}	70.6
L_{min}	43.6
L_{peak}	83.9
L_2	56.6
L_8	52.6
L_{25}	49.3
L_{50}	47.8
L_{90}	46.1
L_{99}	44.7
SEL	

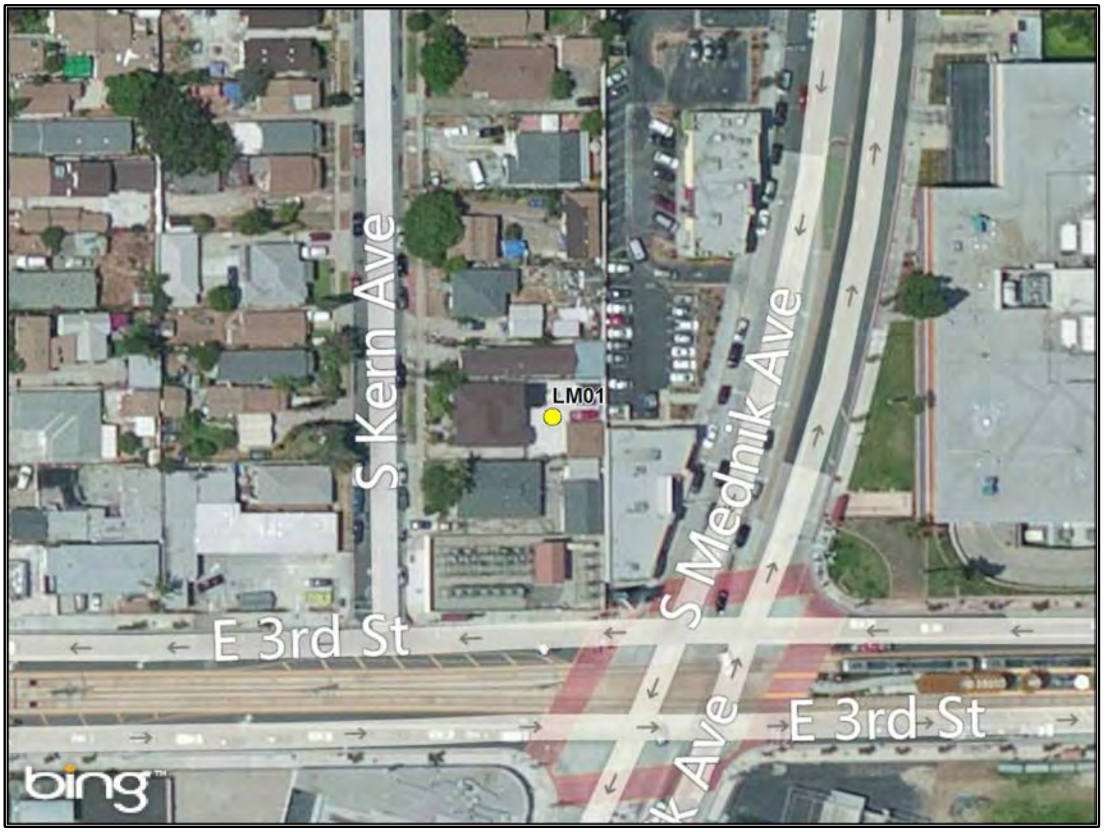
Atmospheric Conditions	
Average Wind Velocity (mph)	0.6
Maximum Wind Velocity (mph)	1.0
Temperature (F)	84.6
Relative Humidity (%)	51.1

Comments: 8 Foot Wall on Southside of Yard. 14 Foot High Garage to Eastside of Yard.
Dog Barking in Neighbor’s Yard.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Kern Ave.	1/1	215-20 MPH	2	0	0	2	0	0

Sketch:



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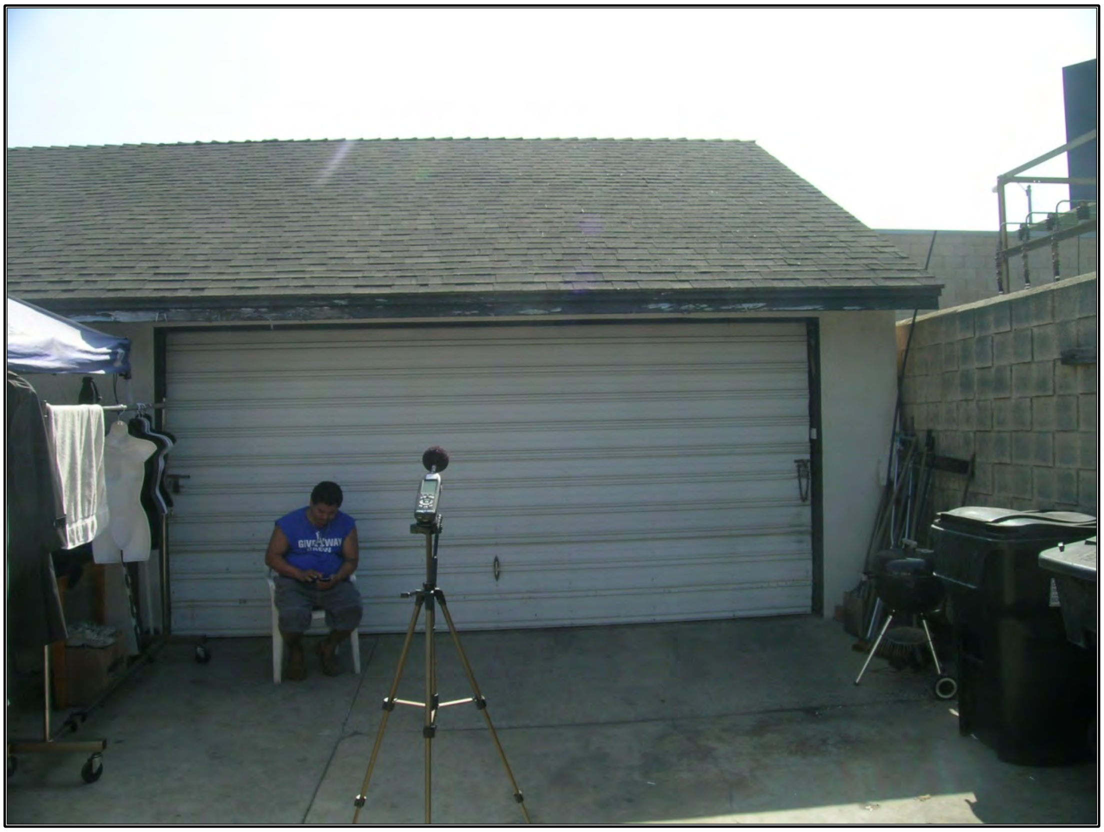


Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: LM02 Date: 8/14/2013

Time: From 9:05 AM To 9:15 AM

Site Location: 142 Kern Ave.

Primary Noise Sources: Traffic on SR-60 Freeway, Traffic on Kern Ave.

Measurement Results	
	dBA
L_{eq}	61.5
L_{max}	70.4
L_{min}	56.9
L_{peak}	81.2
L_2	64.2
L_8	62.9
L_{25}	62.0
L_{50}	61.1
L_{90}	59.6
L_{99}	58.6
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	1.3
Maximum Wind Velocity (mph)	1.5
Temperature (F)	73.4
Relative Humidity (%)	65.9

Comments: Airplane Flyovers X 3.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Kern Ave.	1/1	15-20 MPH	1	0	0	0	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: LM03 Date: 8/14/2013

Time: From 9:31 AM To 9:41 AM

Site Location: 4682 Gleason St. Corner of Gleason St. and Arizona Ave.

Primary Noise Sources: Traffic on SR-60 Freeway, Traffic on Gleason St. Traffic on Arizona Ave.

Measurement Results	
	dBA
L_{eq}	64.8
L_{max}	71.5
L_{min}	58.4
L_{peak}	84.0
L_2	68.0
L_8	66.8
L_{25}	65.7
L_{50}	64.5
L_{90}	61.9
L_{99}	60.1
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	0.7
Maximum Wind Velocity (mph)	1.6
Temperature (F)	80.5
Relative Humidity (%)	55.8

Comments: 15 Foot Wall Along SR-60 Freeway. Bird Chirping

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Arizona Ave	1/1	15-20 MPH	3	1	0	4	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: LM04 Date: 8/14/2013
Time: From 11:03 AM To 11:13 AM

Site Location: 4848 Civic Center Way. Mary Ridgway East Los Angeles Probation Office. Near Civic Center Way and Mednik Ave.

Primary Noise Sources: Traffic on SR-60 Freeway, Traffic on Mednik Ave. Traffic on Civic Center Wy. Traffic on Gleason St.

Measurement Results	
	dBA
L_{eq}	62.0
L_{max}	67.8
L_{min}	58.5
L_{peak}	85.8
L_2	64.6
L_8	63.7
L_{25}	62.6
L_{50}	61.8
L_{90}	60.2
L_{99}	59.1
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	0.7
Maximum Wind Velocity (mph)	1.8
Temperature (F)	83.7
Relative Humidity (%)	48.2

Comments: Measurement taken in Grass “Courtyard” in Front of Probation Office. Portable Building Between Mednik Ave and Yard About 16 Feet Tall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Gleason St.	1/1	0-15 MPH	4	0	0	6	0	0
Civic Center Wy.	1/1	0-15 MPH	10	0	0	13	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: LM05 Date: 8/14/2013

Time: From 11:50 AM To 12:05 PM

Site Location: Belvedere Skate Park at Corner of 1st St. and Mednik Ave.

Primary Noise Sources: Traffic on I-10 Freeway, Traffic on 1st St. Traffic on Mednik Ave.

Measurement Results	
	dBA
L_{eq}	59.3
L_{max}	67.8
L_{min}	55.3
L_{peak}	83.4
L_2	61.7
L_8	60.7
L_{25}	59.9
L_{50}	59.1
L_{90}	57.4
L_{99}	56.3
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	1.6
Maximum Wind Velocity (mph)	2.1
Temperature (F)	83.9
Relative Humidity (%)	46.5

Comments: A Few Skaters at Skatepark But Little to No Noise From Them.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Mednik Ave	2/2	25-35 MPH	56	3	0	62	2	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: Corey Knips

Project Name: SR-710 North

Equipment: LD 824

Site Number: LM06 Date: 8/14/2013

Time: From 1:20 PM To 1:30 PM

Site Location: 4775 E 1st St. Apartment 109. Park Vista Apartments

Primary Noise Sources: Traffic on Mednik Ave.

Measurement Results	
	dBA
L_{eq}	55.1
L_{max}	69.6
L_{min}	48.9
L_{peak}	82.4
L_2	60.8
L_8	58.5
L_{25}	55.5
L_{50}	52.9
L_{90}	50.7
L_{99}	49.6
SEL	82.9

Atmospheric Conditions	
Average Wind Velocity (mph)	1.1
Maximum Wind Velocity (mph)	2.6
Temperature (F)	88.7
Relative Humidity (%)	43.8

Comments: 2 Story Multi-family Homes. 6 Foot Block Wall on North Edge of Parking Lot.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Mednik Ave.		35 MPH Posted	67	2	0	78	1	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 824

Site Number: LM07 Date: 8/14/2013
Time: From 1:46 PM To 1:56 PM

Site Location: 229 Kern Ave. Just Outside of Fence.

Primary Noise Sources: Traffic on SR-60 Freeway. A Couple Vehicles on Kern Ave.

Measurement Results	
	dBA
L_{eq}	57.1
L_{max}	68.8
L_{min}	51.4
L_{peak}	91.2
L_2	65.1
L_8	60.4
L_{25}	56.1
L_{50}	54.8
L_{90}	53.3
L_{99}	52.0
SEL	84.9

Atmospheric Conditions	
Average Wind Velocity (mph)	1.9
Maximum Wind Velocity (mph)	3.5
Temperature (F)	89.5
Relative Humidity (%)	41.5

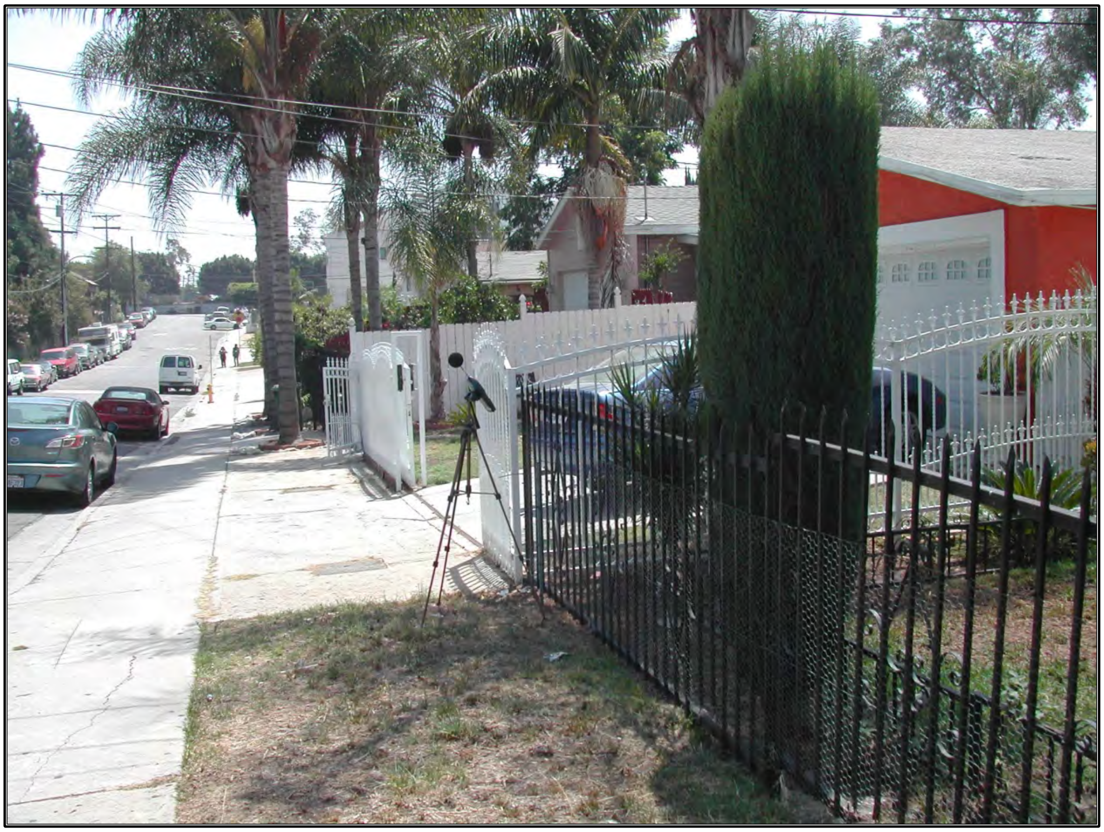
Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Kern Ave.	1/1	30 MPH	8	0	0	8	0	0

Sketch:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 824

Site Number: LM08 Date: 8/14/2013
Time: From 11:20 AM To 11:30 AM

Site Location: 337 Mednik Ave.

Primary Noise Sources: Traffic on Mednik Ave.

Measurement Results	
	dBA
L_{eq}	63.0
L_{max}	74.2
L_{min}	49.9
L_{peak}	84.7
L_2	70.1
L_8	68.0
L_{25}	64.3
L_{50}	59.5
L_{90}	52.3
L_{99}	50.8
SEL	90.9

Atmospheric Conditions	
Average Wind Velocity (mph)	0.0
Maximum Wind Velocity (mph)	0.0
Temperature (F)	86.1
Relative Humidity (%)	52.3

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Mednik Ave	2/2		54	1	1	62	0	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Logan Freeberg
Project Name: SR-710 North
Equipment: LD 831

Site Number: LM09 Date: 8/14/2013
Time: From 12:57 PM To 1:07 PM

Site Location: Corner of Mednik Ave. and Cesar E Chavez Ave. UC Cooperative Extension Center.

Primary Noise Sources: Traffic on Mednik Ave and Traffic on Cesar E Chavez Ave

Measurement Results	
	dBA
L_{eq}	64.9
L_{max}	81.9
L_{min}	52.3
L_{peak}	93.5
L_2	72.2
L_8	68.5
L_{25}	65.2
L_{50}	61.8
L_{90}	55.8
L_{99}	53.1
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	2.3
Maximum Wind Velocity (mph)	3.4
Temperature (F)	92.2
Relative Humidity (%)	36.9

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Cesar E Chavez Ave	2/2	25-35 MPH	41	3	0	63	3	0
Mednik Ave	2/2	25-35 MPH	66	1	0	65	2	0

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: LM10 Date: 8/14/2013
Time: From 1:28 PM To 1:38 PM

Site Location: 4821 Colonia De Los Pinos

Primary Noise Sources: Traffic on Mednik Ave.

Measurement Results	
	dBA
L_{eq}	49.3
L_{max}	61.2
L_{min}	44.9
L_{peak}	81.7
L_2	54.9
L_8	51.6
L_{25}	49.2
L_{50}	48.2
L_{90}	46.9
L_{99}	45.6
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	0.8
Maximum Wind Velocity (mph)	1.3
Temperature (F)	90.5
Relative Humidity (%)	33.7

Comments: Birds Chirping. Helicopter Flyover. Banging Noise in Nearby Apartment.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Mednik Ave.	2/2		58	2	0	51	4	1

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: Corey Knips

Project Name: SR-710 North

Equipment: LD 824

Site Number: LM11 Date: 8/14/2013

Time: From 10:45 AM To 10:55 AM

Site Location: End of Alley Between Hammel St. and Dozier St.

Primary Noise Sources: Traffic on Mednik Ave. Dogs Barking.

Measurement Results	
	dBA
L_{eq}	50.0
L_{max}	73.9
L_{min}	41.3
L_{peak}	86.2
L_2	57.3
L_8	53.9
L_{25}	48.9
L_{50}	45.9
L_{90}	43.2
L_{99}	42.2
SEL	77.8

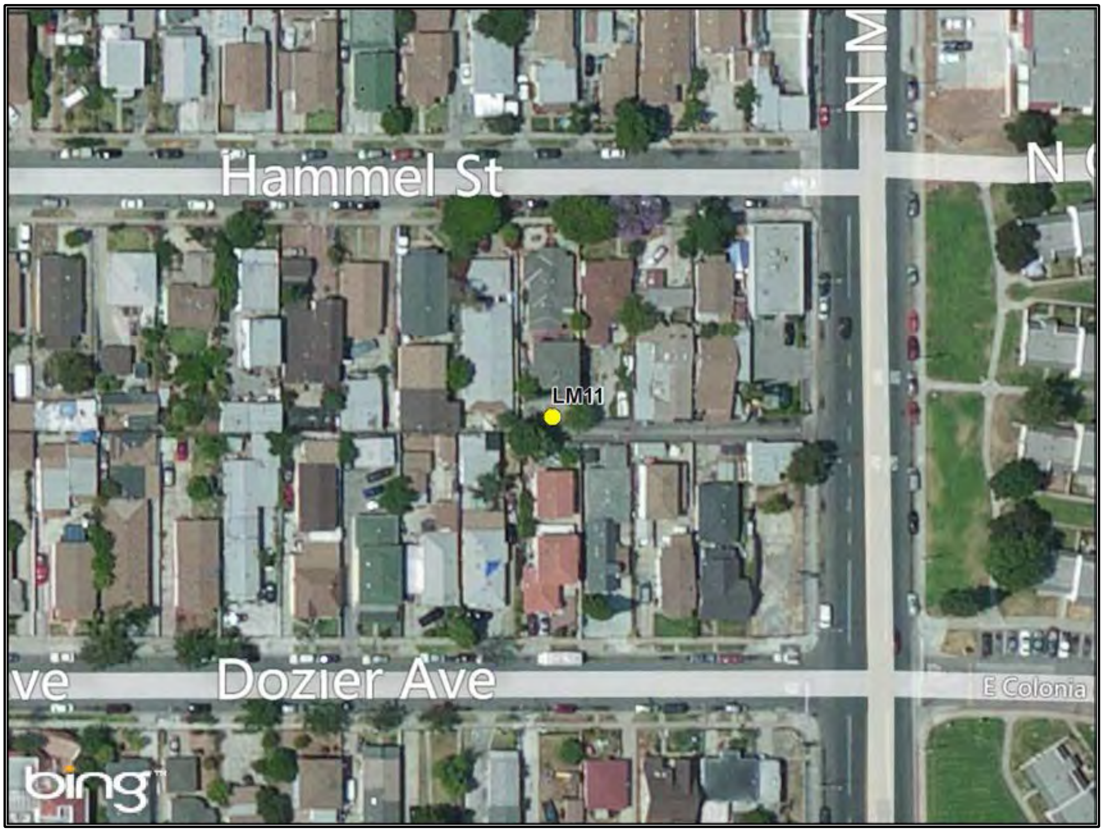
Atmospheric Conditions	
Average Wind Velocity (mph)	3.4
Maximum Wind Velocity (mph)	1.9
Temperature (F)	79.5
Relative Humidity (%)	53.3

Comments:

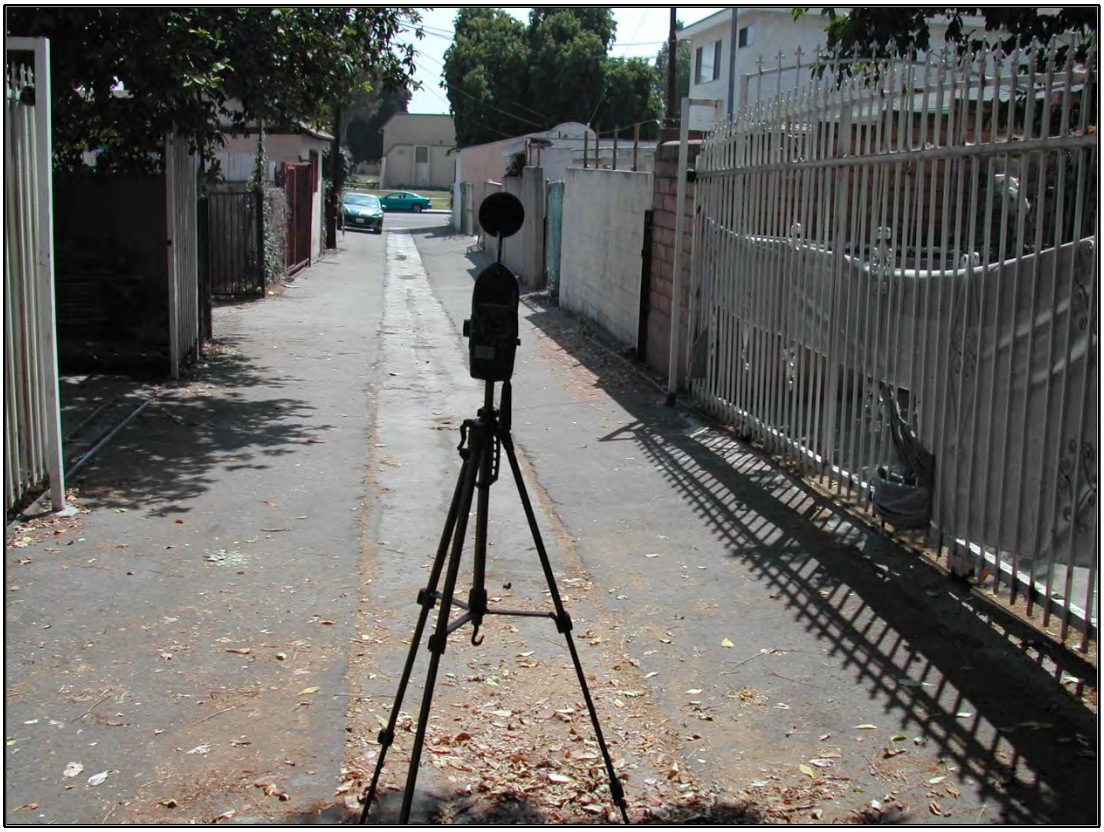
Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Mednik Ave			57	3	1	38	3	0

Sketch:



Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: LM12 Date: 8/14/2013

Time: From 2:06 PM To 2:16 PM

Site Location: 4800 Colonia De Las Rosas

Primary Noise Sources: Traffic on Mednik Ave.

Measurement Results	
	dBA
L_{eq}	63.6
L_{max}	78.1
L_{min}	50.0
L_{peak}	87.6
L_2	70.7
L_8	67.5
L_{25}	64.5
L_{50}	60.6
L_{90}	54.0
L_{99}	51.2
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	2.3
Maximum Wind Velocity (mph)	4.8
Temperature (F)	87.5
Relative Humidity (%)	38.3

Comments: Helicopter Flyover. A Few Skateboarders and Pedestrians Talking Passed By.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Mednik Ave.	2/2	25-35 MPH	77	3	1	54	0	1

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 824

Site Number: LM13 Date: 8/14/2013

Time: From 2:13 PM To 2:23 PM

Site Location: 4132 Floral Dr. East Edge of Property

Primary Noise Sources: Traffic on Floral Dr. Floral Dr. has Gaps in the Asphalt, so Vehicle Tires Make More Noise.

Measurement Results	
	dBA
L_{eq}	63.7
L_{max}	81.1
L_{min}	47.8
L_{peak}	95.3
L_2	69.7
L_8	66.8
L_{25}	64.2
L_{50}	61.2
L_{90}	54.1
L_{99}	49.5
SEL	91.5

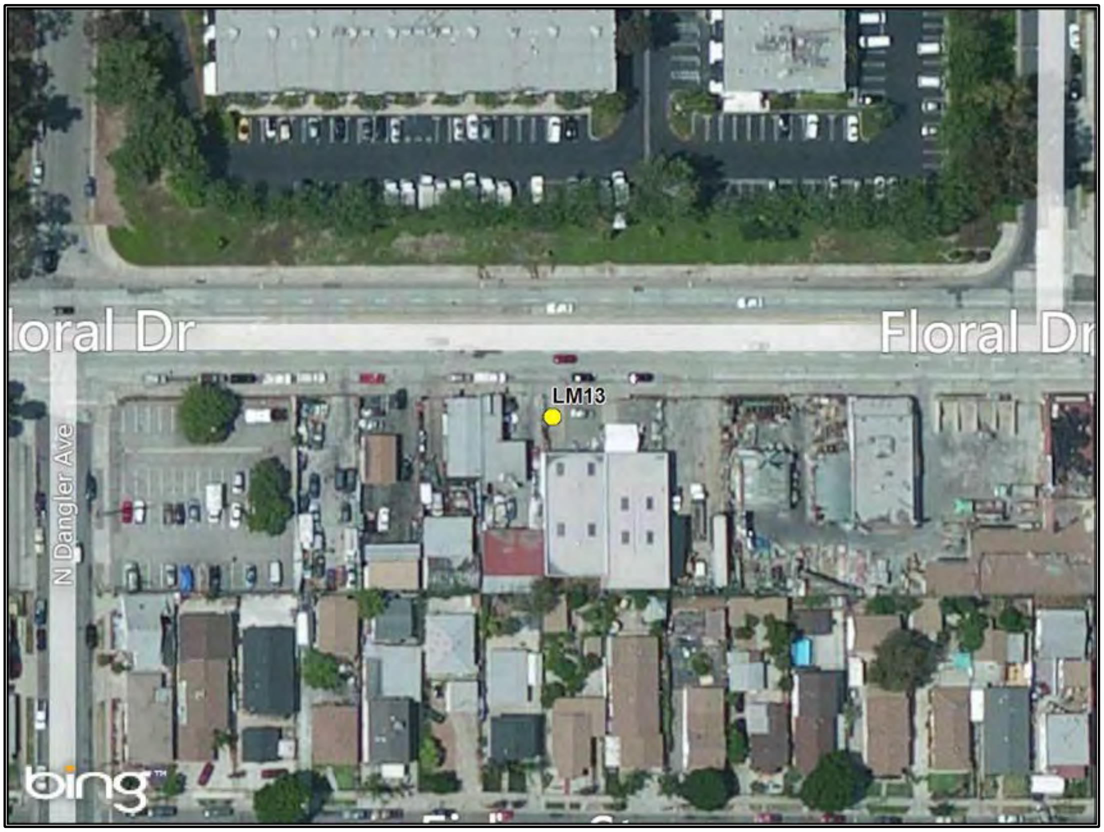
Atmospheric Conditions	
Average Wind Velocity (mph)	1.3
Maximum Wind Velocity (mph)	2.5
Temperature (F)	89.2
Relative Humidity (%)	39.9

Comments: Intermittent 6 Foot Wall Along Floral Dr. with Big Gaps for Gates.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Floral Dr.	2/2		78	7	0	70	3	0

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 824

Site Number: LM14 Date: 8/14/2013
Time: From 9:54 AM To 10:04 AM

Site Location: 1588 Corporate Center Dr. in Parking Lot South of Building

Primary Noise Sources: Traffic on I-710 Freeway.

Measurement Results	
	dBA
L_{eq}	55.3
L_{max}	65.6
L_{min}	51.8
L_{peak}	78.2
L_2	59.1
L_8	56.9
L_{25}	55.6
L_{50}	54.7
L_{90}	53.3
L_{99}	52.5
SEL	83.1

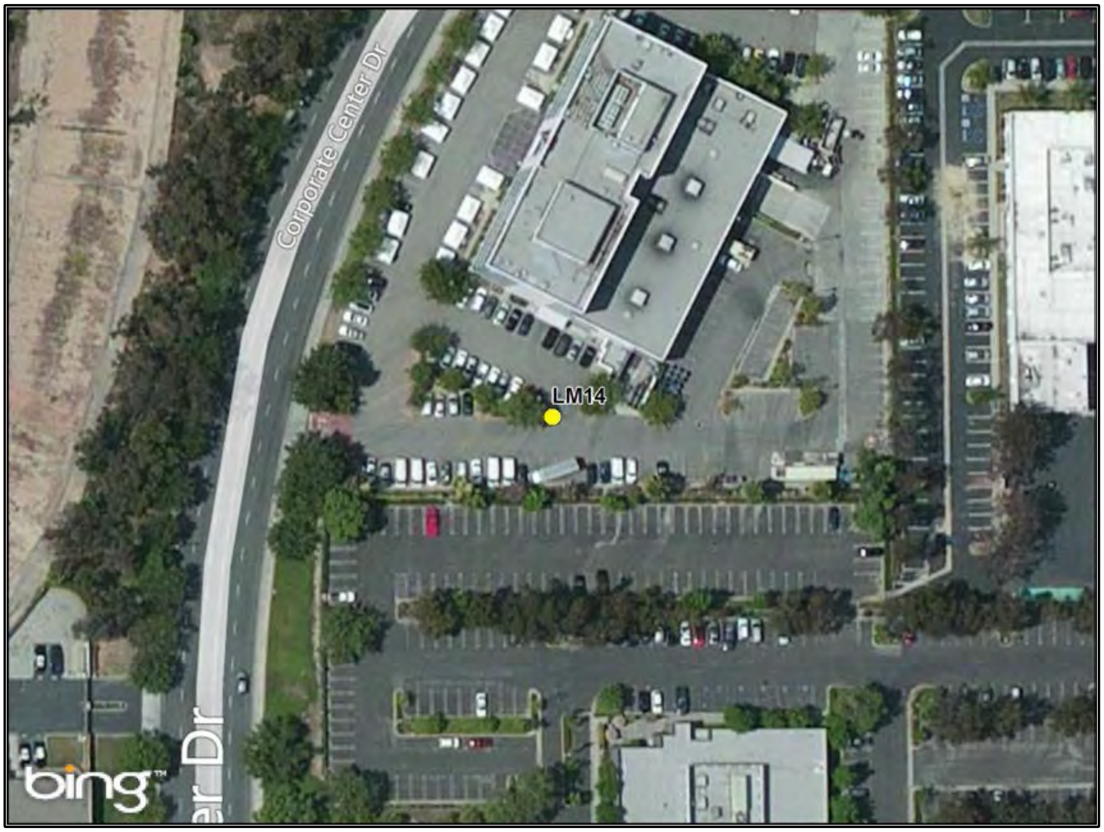
Atmospheric Conditions	
Average Wind Velocity (mph)	1.0
Maximum Wind Velocity (mph)	1.8
Temperature (F)	78.6
Relative Humidity (%)	56.9

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Corporate Center Dr.	2/2		20	2	0	18	3	1

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 824

Site Number: LM15 Date: 8/14/2013

Time: From 9:31 AM To 9:41 AM

Site Location: 1255 Corporate Center Dr. South of Building

Primary Noise Sources: Traffic on I-710 Freeway.

Measurement Results	
	dBA
L_{eq}	62.3
L_{max}	66.1
L_{min}	58.2
L_{peak}	80.3
L_2	64.4
L_8	63.6
L_{25}	62.8
L_{50}	62.1
L_{90}	60.6
L_{99}	59.2
SEL	90.1

Atmospheric Conditions	
Average Wind Velocity (mph)	0.8
Maximum Wind Velocity (mph)	1.5
Temperature (F)	73.9
Relative Humidity (%)	66.3

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 824

Site Number: LM16 Date: 8/14/2013

Time: From 9:05 AM To 9:15 AM

Site Location: 1155 Corporate Center Dr. North Edge of Parking Lot at Hedge Between Parking Lots.

Primary Noise Sources: Traffic on I-710 Freeway.

Measurement Results	
	dBA
L_{eq}	59.2
L_{max}	69.6
L_{min}	55.9
L_{peak}	83.4
L_2	62.9
L_8	60.6
L_{25}	59.4
L_{50}	58.7
L_{90}	57.4
L_{99}	56.5
SEL	87.3

Atmospheric Conditions	
Average Wind Velocity (mph)	1.0
Maximum Wind Velocity (mph)	3.7
Temperature (F)	77.3
Relative Humidity (%)	54.3

Comments: Freeway Noise Barrier Stops at Edge of Ramona Rd., Exposing These Homes to I-10 Freeway Traffic Noise.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

LONG-TERM (24-HOUR) NOISE LEVEL MEASUREMENTS

Noise Measurement Survey – 24 HR

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: Quest DLX NLJ080013

Site Number: TML1 Start Date: 4/16/2014

Time: From 1:00 PM To 1:00 PM

Site Location: 1201 South Marengo Avenue. Blair High School near Garfield Avenue terminus.

Primary Noise Sources: Traffic on SR-110 Freeway, Garfield Avenue, and possible impacts from school activities.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: Quest DLX NLJ080013

Site Number: TML1 Start Date: 4/16/2014

Time: From 1:00 PM To 1:00 PM

Site Location: 1201 South Marengo Avenue. Blair High School near Garfield Avenue terminus.

Primary Noise Sources: Traffic on SR-110 Freeway, Garfield Avenue, and possible impacts from school activities.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: Quest DLX 070056

Site Number: BML1 Start Date: 7/23/2013
Time: From 9:00AM To

Site Location: Rear Property Line of Burger King at 535 Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd. Distant Construction. Ambient Neighborhood Noise.

Comments: Hiding in Ivy, Backside of Wall.

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: Quest DLX 030086

Site Number: BML2 Start Date: 7/23/2013

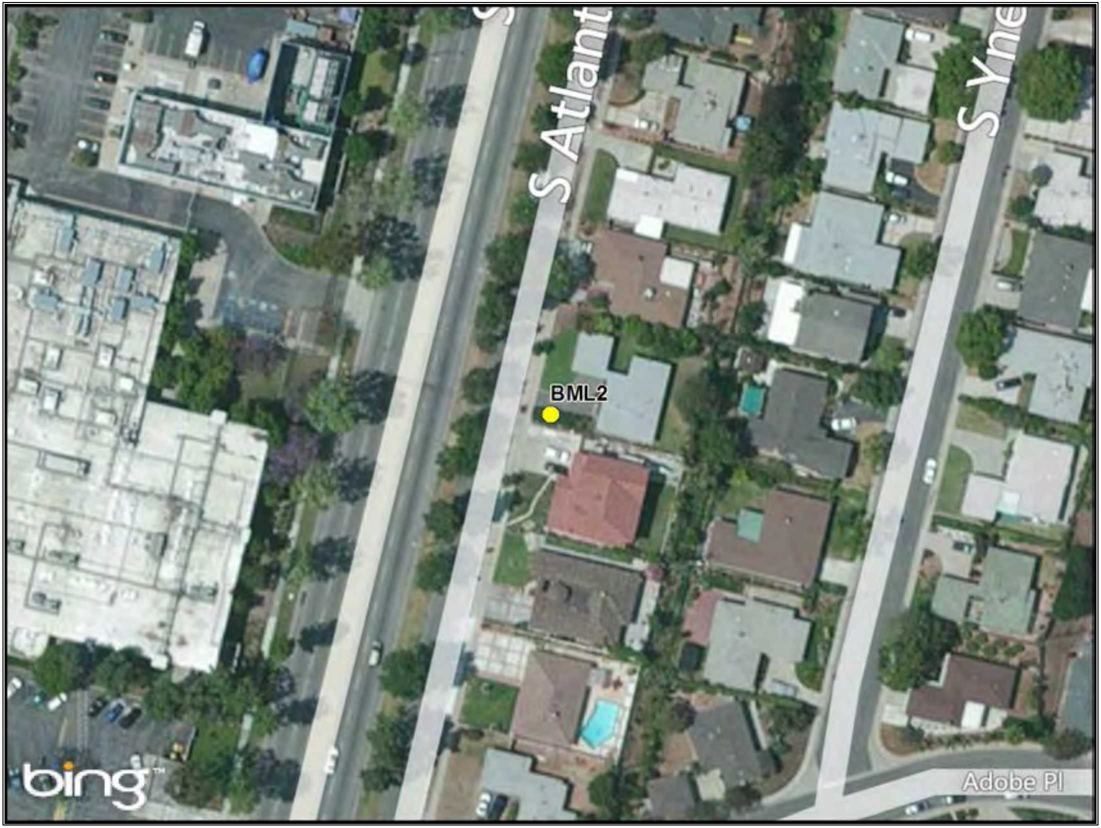
Time: From 9:45 AM To

Site Location: 1680 Atlantic Blvd. Front Yard of SF Home.

Primary Noise Sources: Ambient Neighborhood Noise. Traffic on Atlantic Blvd.

Comments: In Shrubs in Front, Left of Driveway.

Sketch:



Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Logan Freeberg
Equipment: Quest DLX 050036

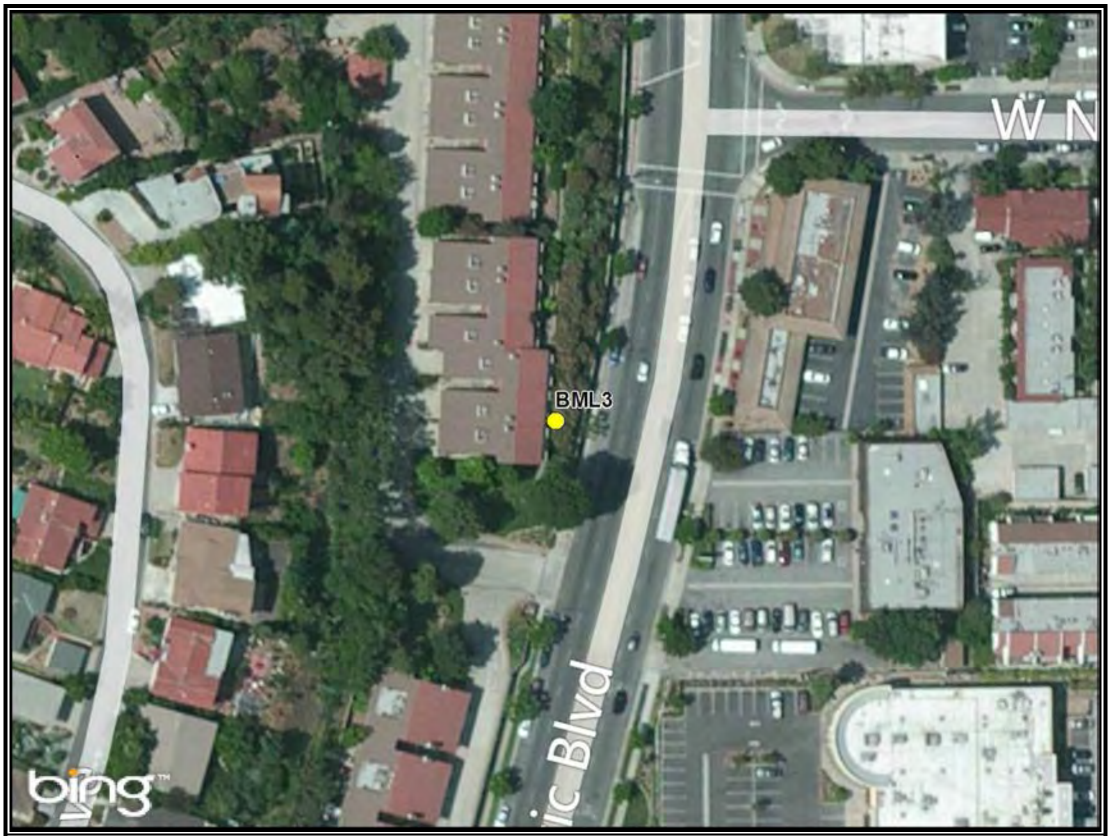
Site Number: BML3 Start Date: 11/5/2013
Time: From 12:00 PM To

Site Location: Park View Estates 315 Atlantic Blvd. On Top of Slope In Bushes.

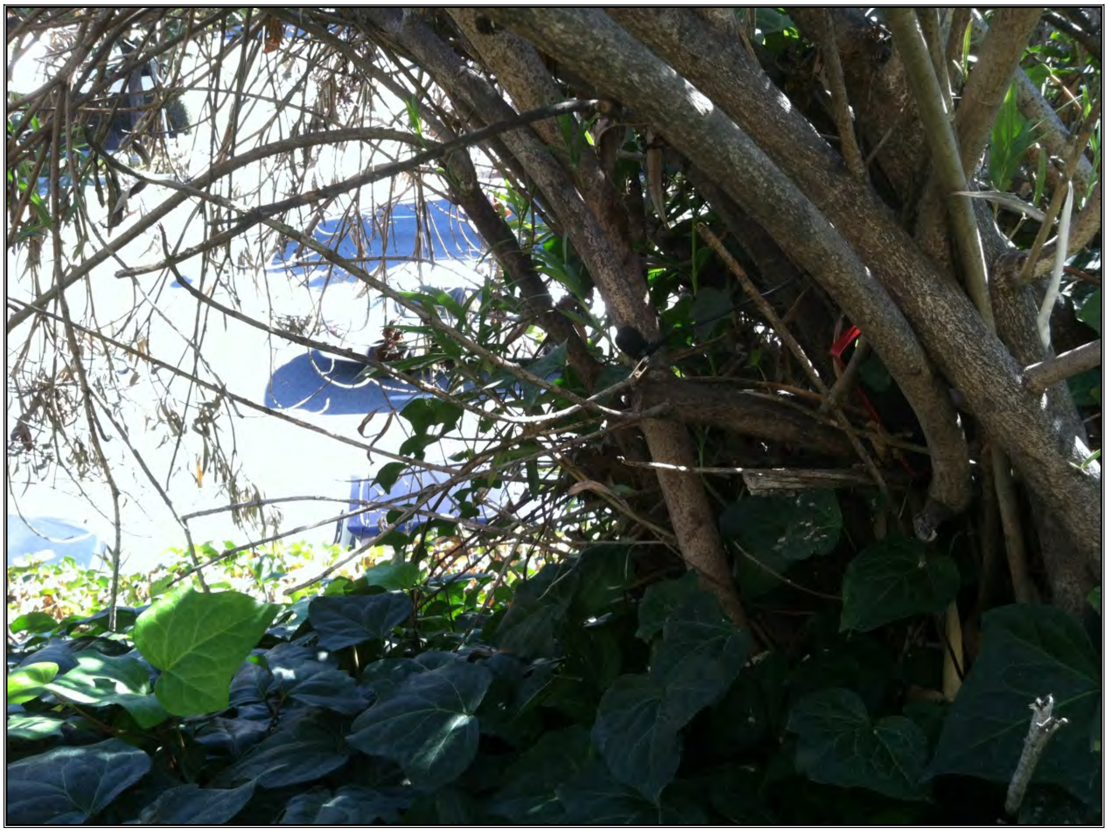
Primary Noise Sources: Ambient Neighborhood Noise.

Comments: In Trees on Top of Hill.

Sketch:



Location Photo:



Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Logan Freeberg
Equipment: Quest DLX 100115

Site Number: BML4 Start Date: 7/23/2013
Time: From 10:30 AM To

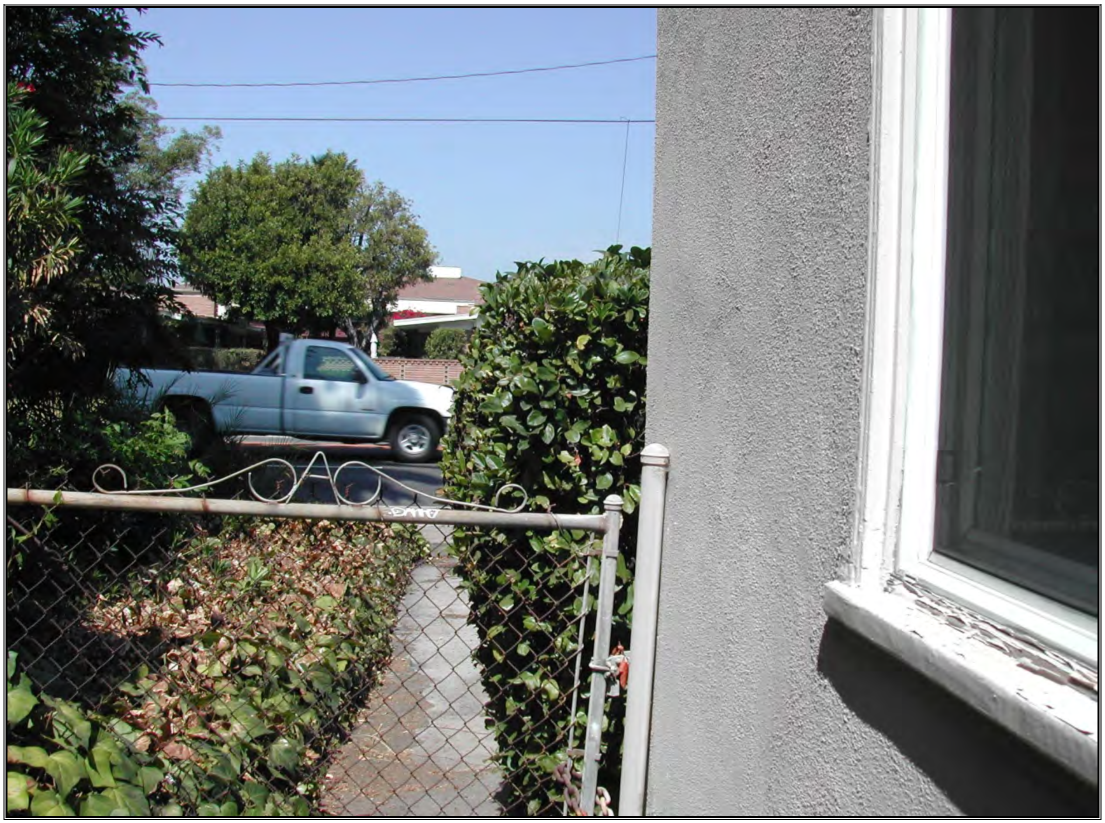
Site Location: 1108 Atlantic Blvd. Near Shorb St and Atlantic Blvd. Apartment Complex.

Primary Noise Sources: Traffic on Atlantic Blvd. Ambient Neighborhood Noise.

Comments: In Ivy on Fence

Sketch:

Location Photo:



Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: Quest DLX 070056

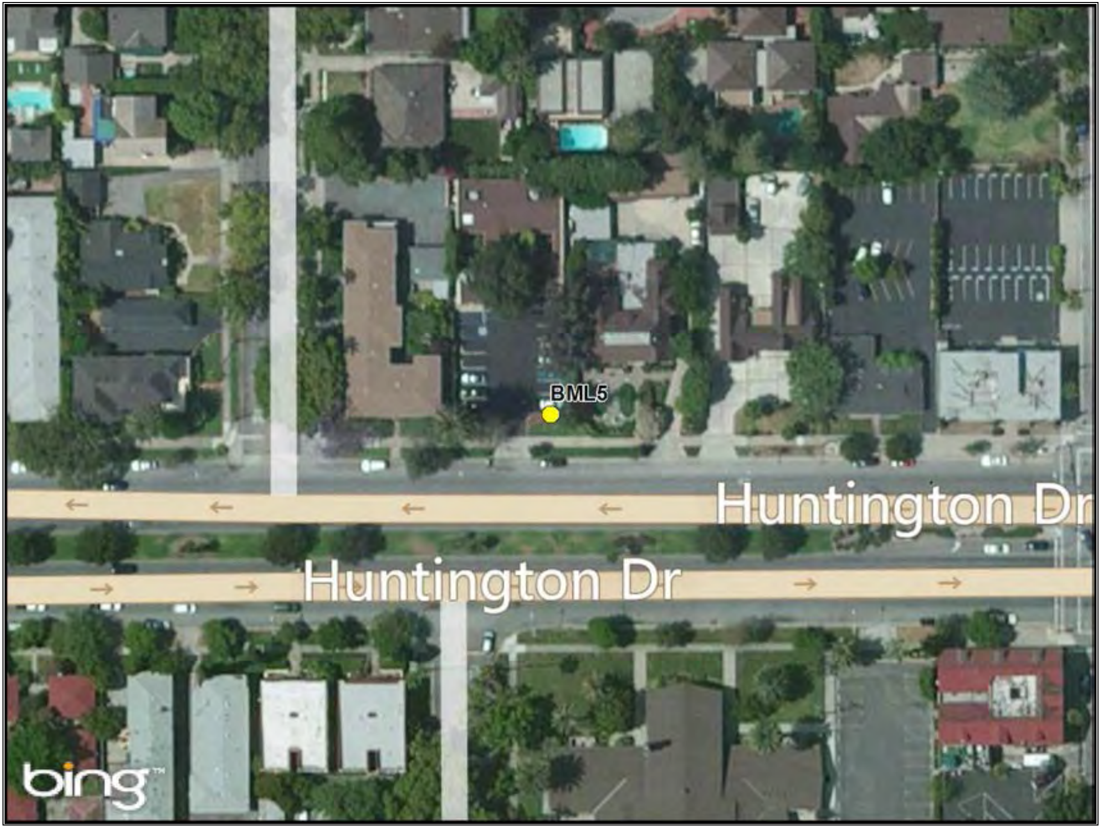
Site Number: BML5 Start Date: 7/24/2013
Time: From 1:00 PM To

Site Location: 1910 Huntington Dr. Near Trash Dumpster Area.

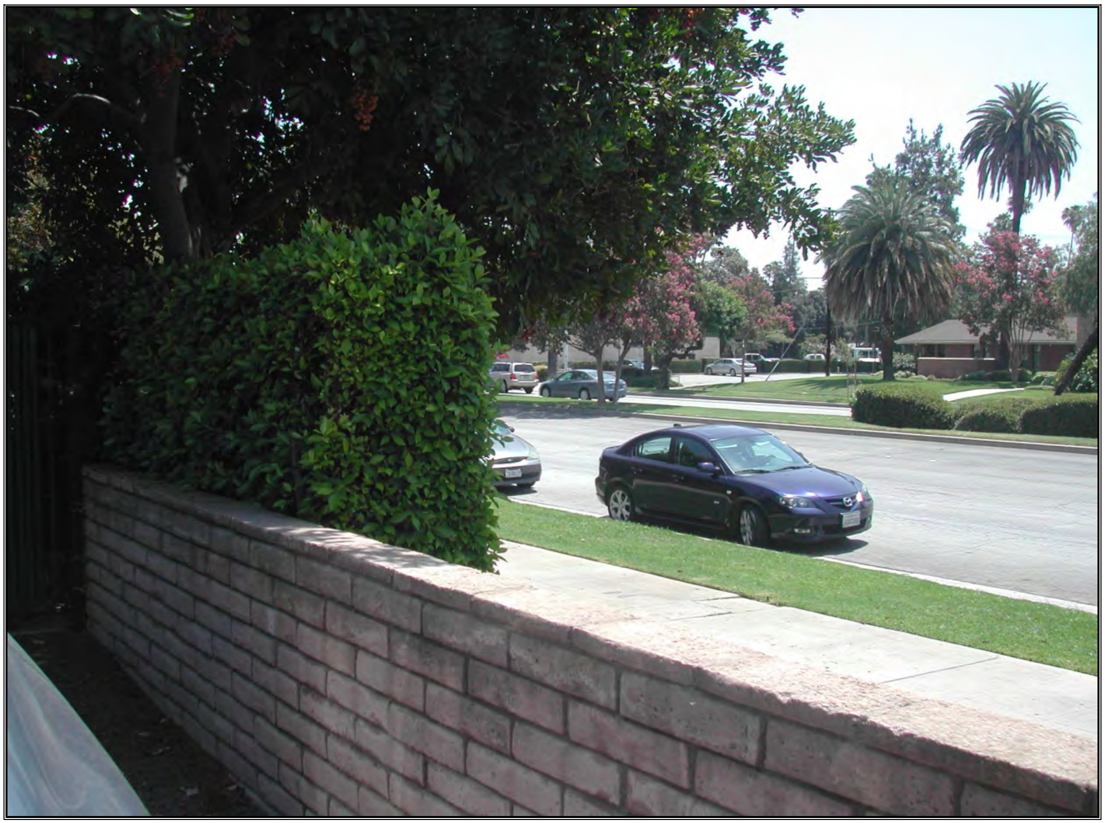
Primary Noise Sources: Traffic on Huntington Dr. Ambient Neighborhood Noise.

Comments:

Sketch:



Location Photo:



Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: Quest DLX 040031

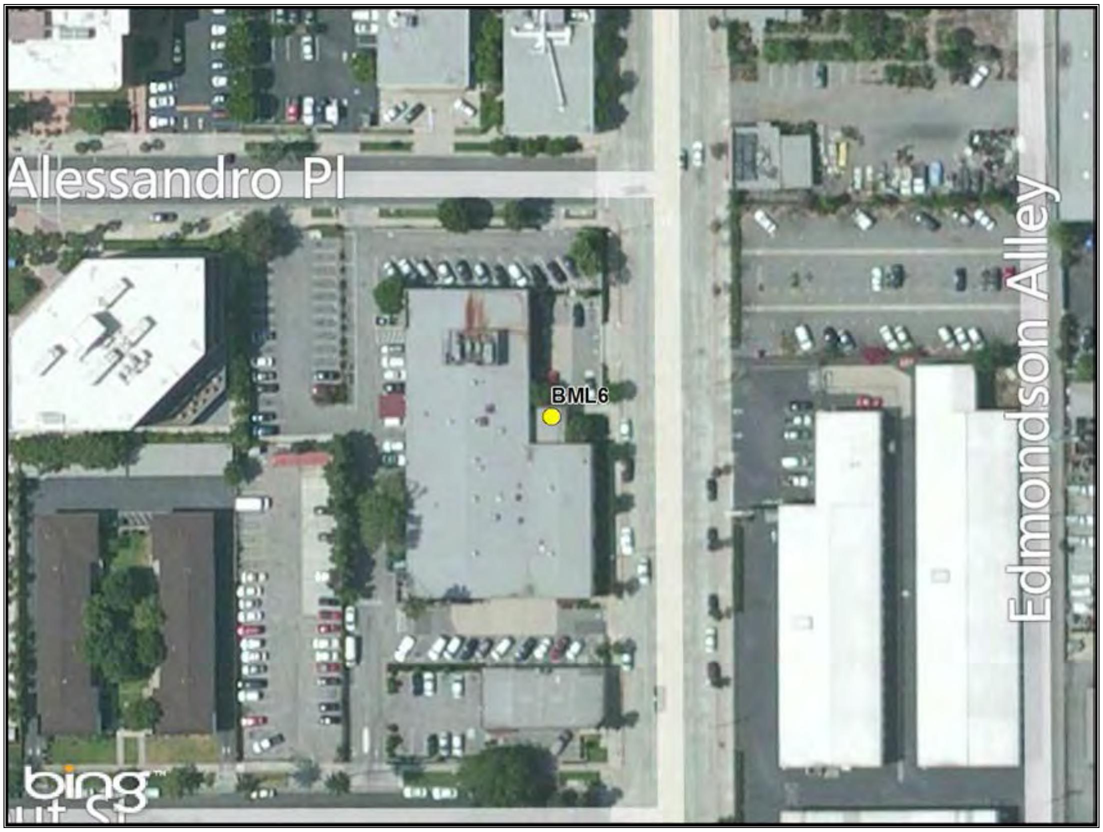
Site Number: BML6 Start Date: 7/24/2013
Time: From 1:15 PM To

Site Location: 909 Fair Oaks Ave. in Tree.

Primary Noise Sources: Traffic on Fair Oaks Ave. Ambient Neighborhood Noise.

Comments:

Sketch:



Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: Quest DLX 120115

Site Number: BML7 Start Date: 7/24/2013

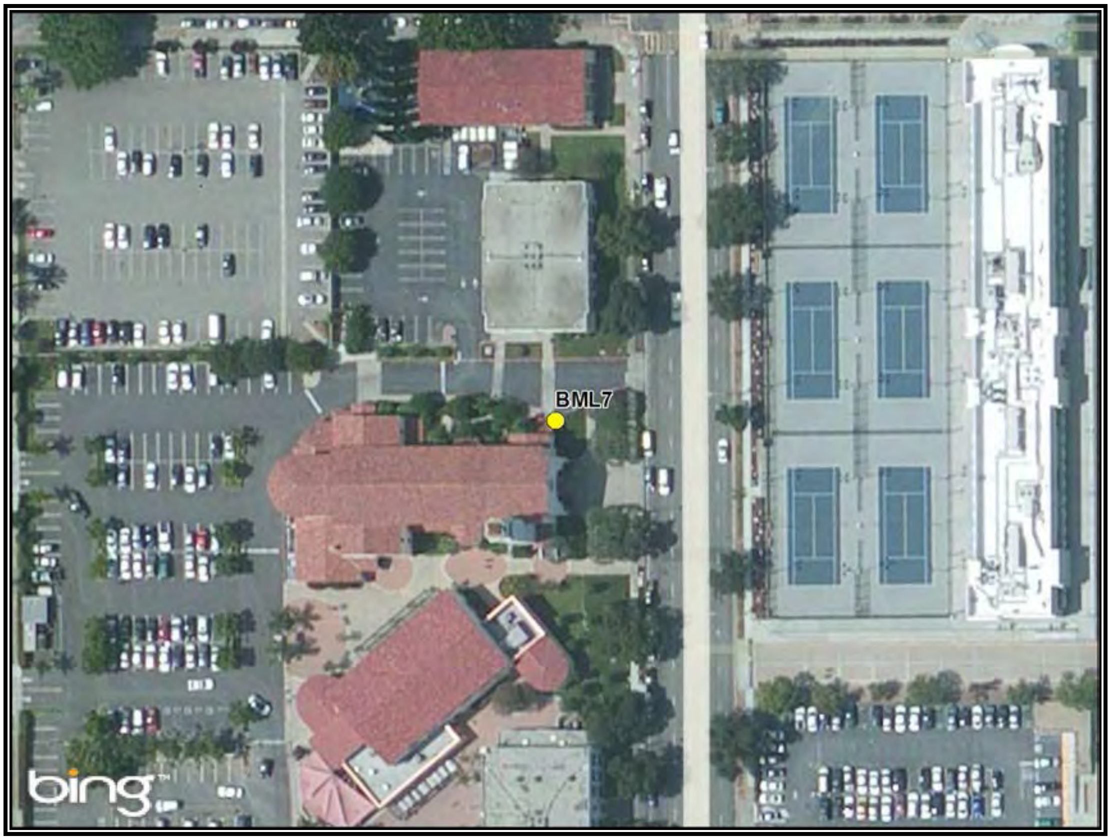
Time: From 1:45 PM To

Site Location: 151 S. Hill Ave. Saint Philip the Apostle Church.

Primary Noise Sources: Traffic on Hill St. Ambient Neighborhood Noise.

Comments:

Sketch:



Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: Quest DLX 120115

Site Number: FML1 Start Date: 7/23/2013
Time: From 11:00AM To

Site Location: 3351 Balzac St. In Backyard.

Primary Noise Sources: Traffic on SR-710 Freeway. Traffic on I-10 Freeway. Ambient Noise.

Comments: On Fence.

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: Quest DLX 040031

Site Number: FML2 Start Date: 7/23/2013

Time: From 11:15 AM To

Site Location: Across From 1912 Charnwood Ave. Near SR-710 Freeway.

Primary Noise Sources: Ambient Noise. Traffic on SR-710 Freeway.

Comments: In Ivy on Fence.

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: Quest DLX 030086

Site Number: FML3 Start Date: 7/24/2013
Time: From 2:30 PM To

Site Location: End of Palmetto Dr. In Yard Along Fence Behind Black silt Fence.

Primary Noise Sources: Ambient Noise. Traffic on SR-710 Freeway.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: Quest DLX 100115

Site Number: FML4 Start Date: 7/24/2013

Time: From 2:15 PM To

Site Location: Corner of St. John Ave and Green St. In Ivy on Wall.

Primary Noise Sources: Traffic on SR-710 Freeway. Traffic on St. John Ave. Traffic on Green St. Ambient Noise.

Comments: In Ivy on Fence.

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105 Test Personnel: JT Stephens
Project Name: SR-710 North Equipment: Quest DLX 070056

Site Number: FML5 Start Date: 7/25/2013 Time: From 4:00 PM To

Site Location: 1709 Ramona Blvd.

Primary Noise Sources: Traffic on Oak St. Traffic on Ramona Blvd. Ambient Noise.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: Quest DLX 100115

Site Number: LML1 Start Date: 7/25/2013

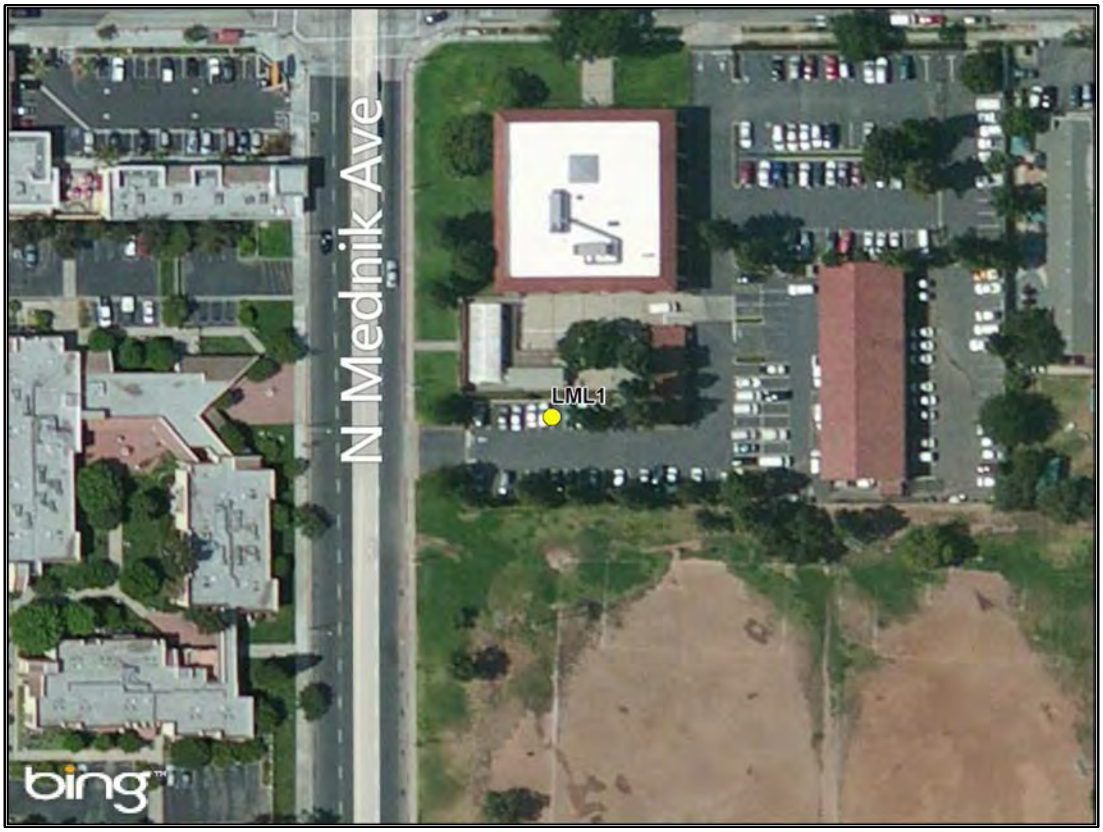
Time: From 4:45 PM To

Site Location: Parking Lot of UC Extension Center Branch Location. Corner of Mednik Ave and Cesar Chavez Ave.

Primary Noise Sources: Traffic on Mednik Ave. Ambient Noise.

Comments:

Sketch:



Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: Quest DLX 120115

Site Number: LML2 Start Date: 7/25/2013

Time: From 5:00 PM To ______

Site Location: On Side of Hill Near Grand Pacific / AIS Building. Corner of Corporate Center Dr and Corporate Pl.

Primary Noise Sources: Ambient Noise. Traffic on SR-710 Freeway.

Comments: Business Park.

Sketch:

Location Photo:

NEIGHBORHOOD (24-HOUR) NOISE LEVEL MEASUREMENTS

Noise Measurement Survey – 24 HR

Project Number: CHM1105

Project Name: SR-710 North

Test Personnel: Logan Freeberg

Equipment: Quest DLX 040031

Site Number: NL1 Start Date: 7/25/2013

Time: From 5:00PM To

Site Location: Behind 600 N. 18^{TH} St. on the Park Side In the First Tree Nearest Victoria Ave.

Primary Noise Sources: Traffic on Victoria Ave. Ambient Neighborhood Noise.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105

Test Personnel: Logan Freeberg

Project Name: SR-710 North

Equipment: Quest DLX 120115

Site Number: NL2 Start Date: 7/29/2013

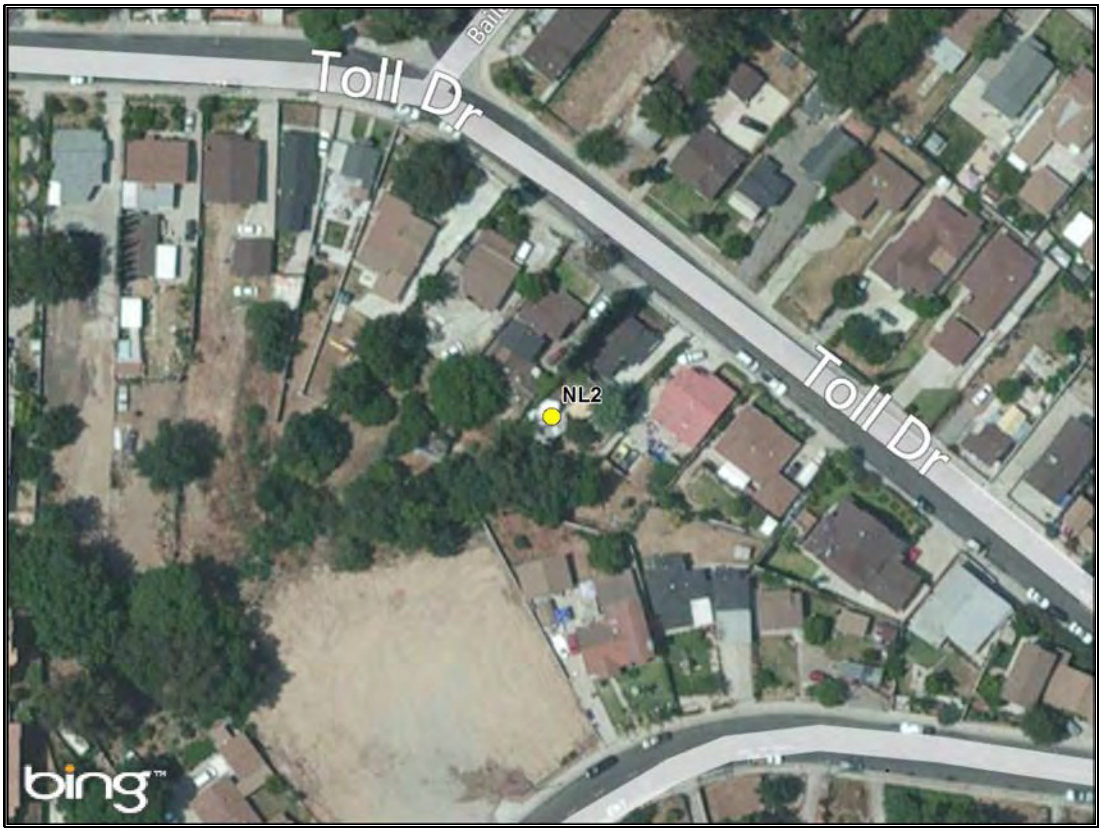
Time: From 10:45 AM To

Site Location: 7422 Toll Dr. In Backyard on White Lattice Fence on West Side of Yard.

Primary Noise Sources: Ambient Neighborhood Noise.

Comments:

Sketch:



Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: Quest DLX 100115

Site Number: NL3 Start Date: 7/29/2013

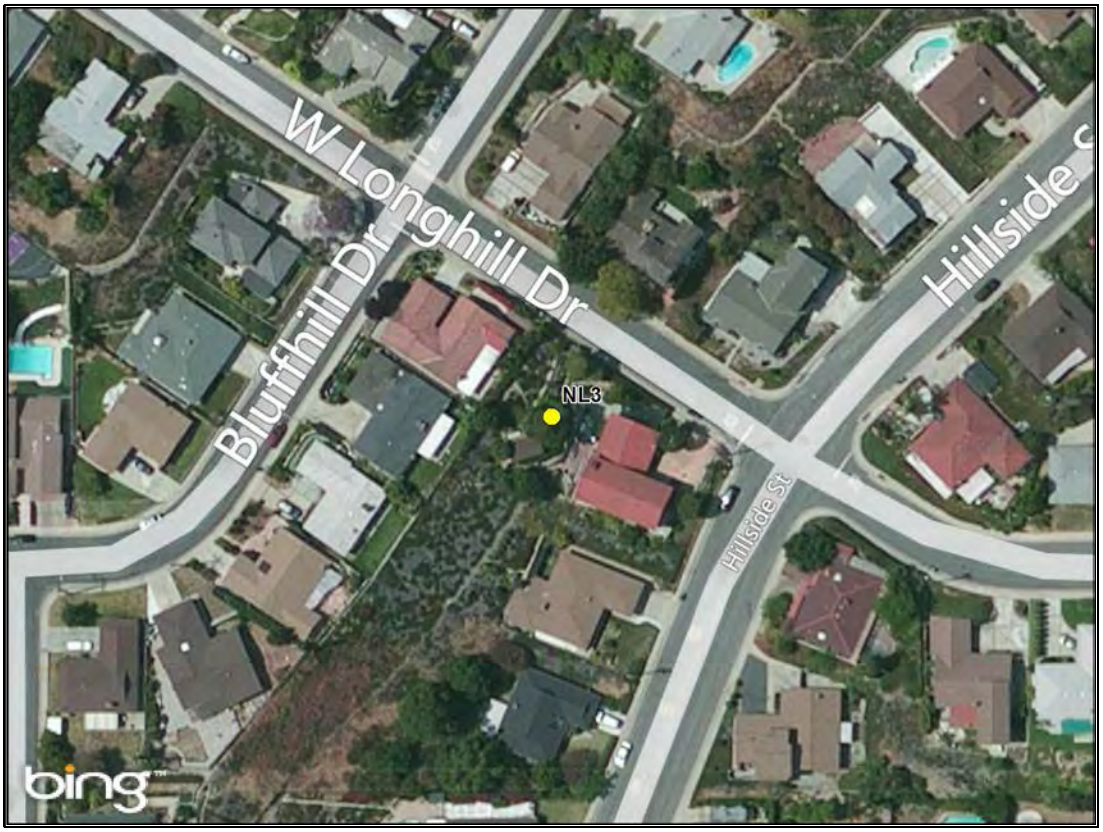
Time: From 11:30 AM To

Site Location: 1265 Hillside St. Backyard on 5' Foot Wall in Short Ivy.

Primary Noise Sources: Ambient Neighborhood Noise.

Comments:

Sketch:



Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: Quest DLX 040031

Site Number: NL4 Start Date: 7/29/2013

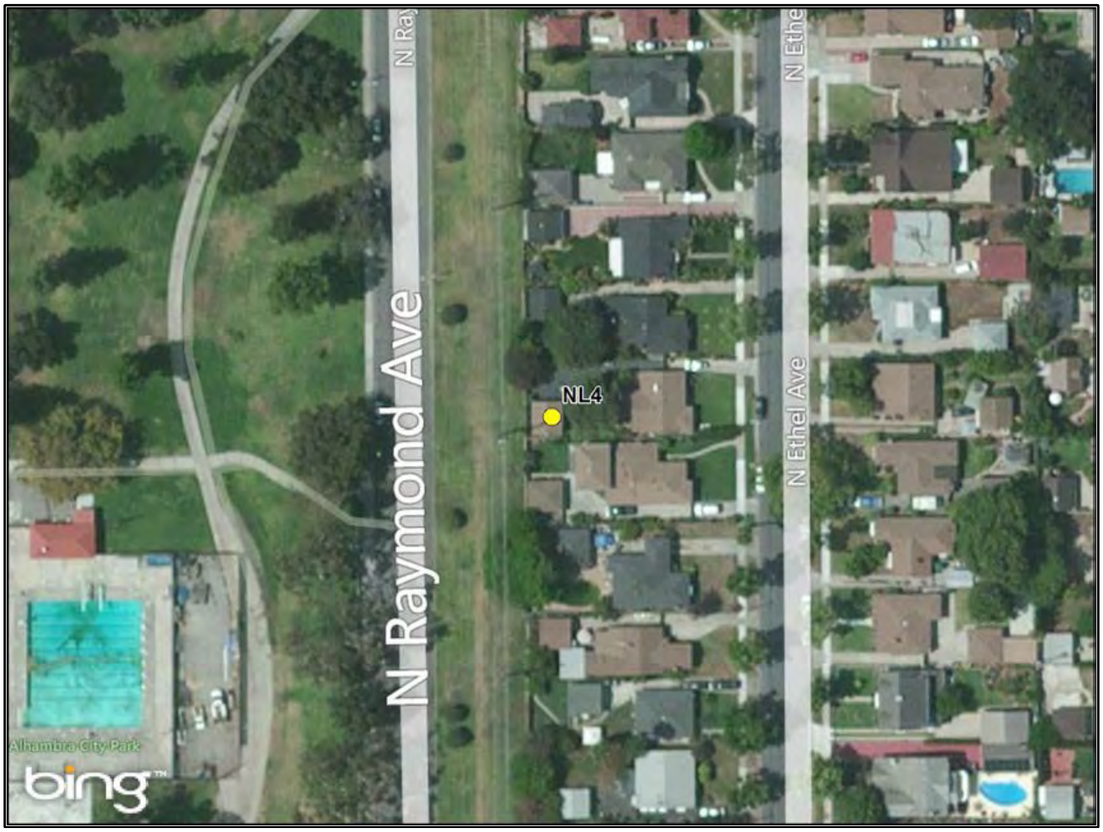
Time: From 12:15 PM To

Site Location: 501 Ethel Ave. Far Back Wall of Backyard in Tree at Top of Wall Level.

Primary Noise Sources: Traffic on N Raymond Ave. Ambient Neighborhood Noise.

Comments:

Sketch:



Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: Quset DLX 070056

Site Number: NL5 Start Date: 7/29/2013

Time: From 1:00 PM To

Site Location: 1500 Marengo Ave. Backyard on Tree in Middle of Yard.

Primary Noise Sources: Traffic on Marengo Ave. Ambient Neighborhood Noise.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: Quest DLX 040031

Site Number: NL6 Start Date: 7/30/2013

Time: From 4:30 PM To

Site Location: 700 S. El Molino Ave.

Primary Noise Sources: Traffic on S. El Molino Ave. Ambient Neighborhood Noise.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: Quest DLX 120115

Site Number: NL7 Start Date: 7/30/2013

Time: From 5:00 PM To

Site Location: 1116 Birch Lane. Front Yard.

Primary Noise Sources: Traffic on Birch Ln. Traffic on Hammond St. Ambient Neighborhood Noise.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105

Test Personnel: Logan Freeberg

Project Name: SR-710 North

Equipment: Quest DLX 080063

Site Number: NL8 Start Date: 11/5/2013

Time: From 11:00 AM To

Site Location: Backyard of 1848 Keystone St.

Primary Noise Sources: Ambient Neighborhood Noise.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Logan Freeberg
Equipment: Quest DLX 100115

Site Number: NL9
Start Date: 7/30/2013
Time: From 5:00 PM To

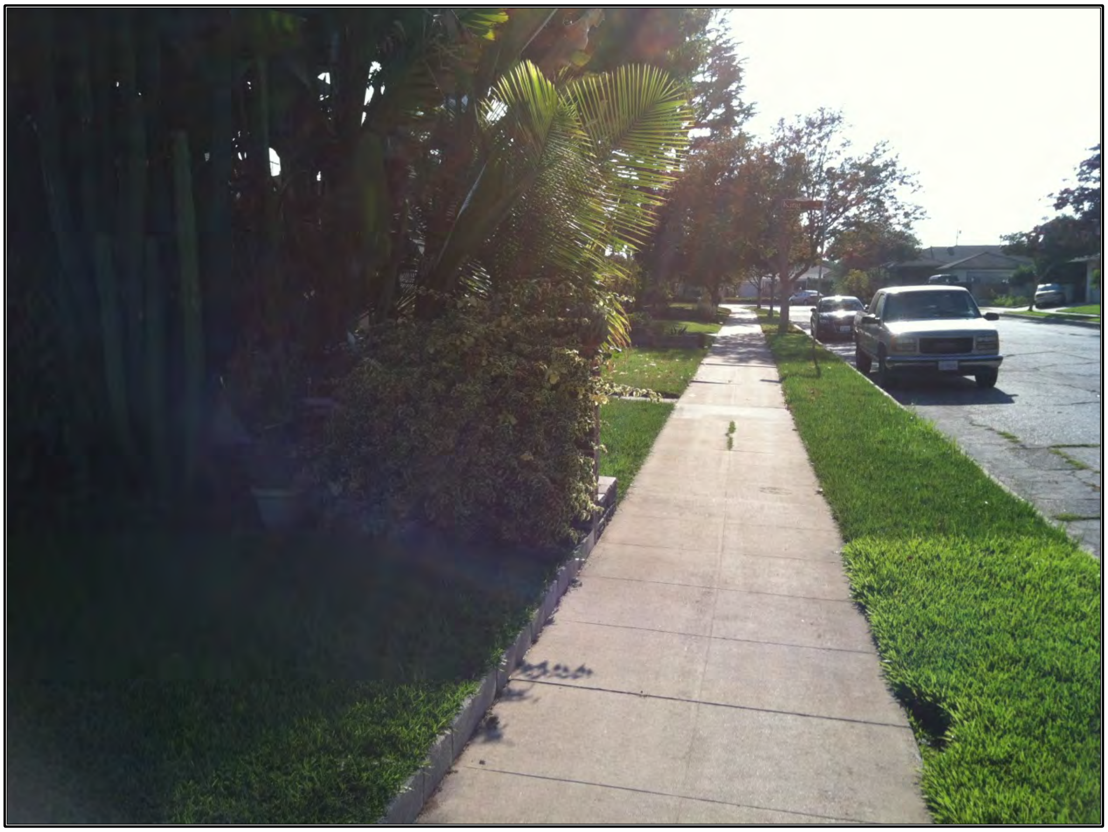
Site Location: Between 206 and 204 Circle Dr.

Primary Noise Sources: Traffic on Circle Dr. Ambient Neighborhood Noise.

Comments:

Sketch:

Location Photo:



Noise Measurement Survey – 24 HR

Project Number: CHM1105
Test Personnel: Logan Freeberg
Project Name: SR-710 North
Equipment: Quest DLX 100115

Site Number: NL10
Start Date: 11/5/2013
Time: From 10:00 AM To

Site Location: End of Indianola Way Behind Bushes on Fence Line..

Primary Noise Sources: Traffic on I-210 Freeway. Traffic on Indianola Way. Ambient Neighborhood Noise.

Comments:

Sketch:

Location Photo:

Noise Measurement Survey – 24 HR

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Logan Freeberg
Equipment: Quest DLX 100115

Site Number: NL11 Start Date: 11/5/2013

Time: From 9:00 AM To

Site Location: La Canada High School on Top of Storage Container Between Tennis Courts and Volleyball Court.

Primary Noise Sources: Traffic on I-210 Freeway. Ambient School Noise.

Comments:

Sketch:

Location Photo:

INTERIOR AND EXTERIOR (SCHOOL) NOISE LEVEL MEASUREMENTS

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD824

Site Number: SM-1 I Date: 10/17/2013

Time: From 2:30 PM To 2:40 PM

Site Location: 668 S. Atlantic Blvd. Kipp Raices Academy Classroom 115 Interior.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	38.5
L_{max}	57.5
L_{min}	32.3
L_{peak}	
L_2	
L_8	
L_{25}	
L_{50}	
L_{90}	
L_{99}	
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 105. One Fixed Window 4’ Ft 3” In X 10’ Ft 6” In.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: Corey Knips

Project Name: SR-710 North

Equipment: LD 831

Site Number: SM-1 E Date: 10/17/2013

Time: From 2:30 PM To 2:40 PM

Site Location: 668 S. Atlantic Blvd. Kipp Raices Academy Exterior Sidewalk Along Atlantic Blvd 6 Feet From Building.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	73.1
L_{max}	86.8
L_{min}	55.0
L_{peak}	97.2
L_2	79.5
L_8	76.7
L_{25}	74.3
L_{50}	71.1
L_{90}	62.9
L_{99}	57.0
SEL	100.9

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

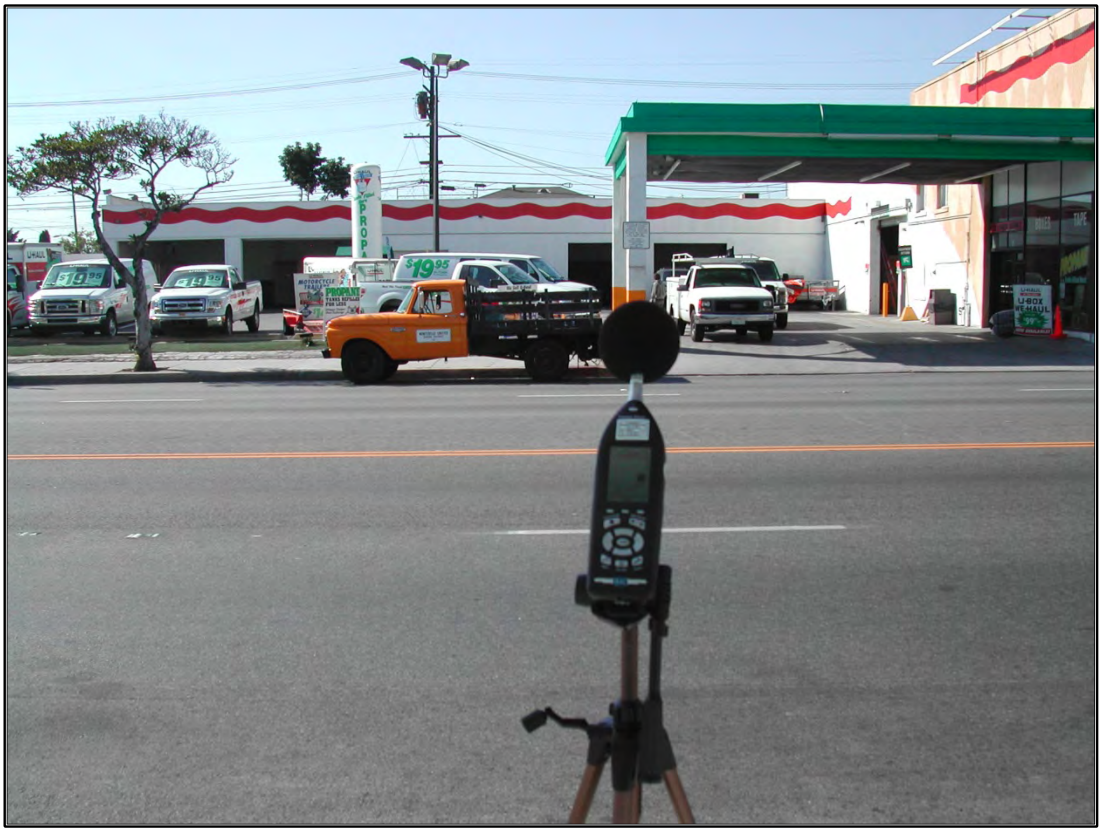
Comments: Stored 252.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:

Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 824

Site Number: SM-2 I Date: 10/24/2013
Time: From 3:22 PM To 3:32 PM

Site Location: 420 Amalia Ave. 4TH St. Primary Center 1ST Floor Kindergarten Interior.

Primary Noise Sources: Traffic on Atlantic Blvd (Very Faint).

Measurement Results	
	dBA
L_{eq}	38.4
L_{max}	59.7
L_{min}	30.7
L_{peak}	82.1
L_2	43.5
L_8	35.9
L_{25}	33.8
L_{50}	33.0
L_{90}	32.1
L_{99}	31.5
SEL	66.2

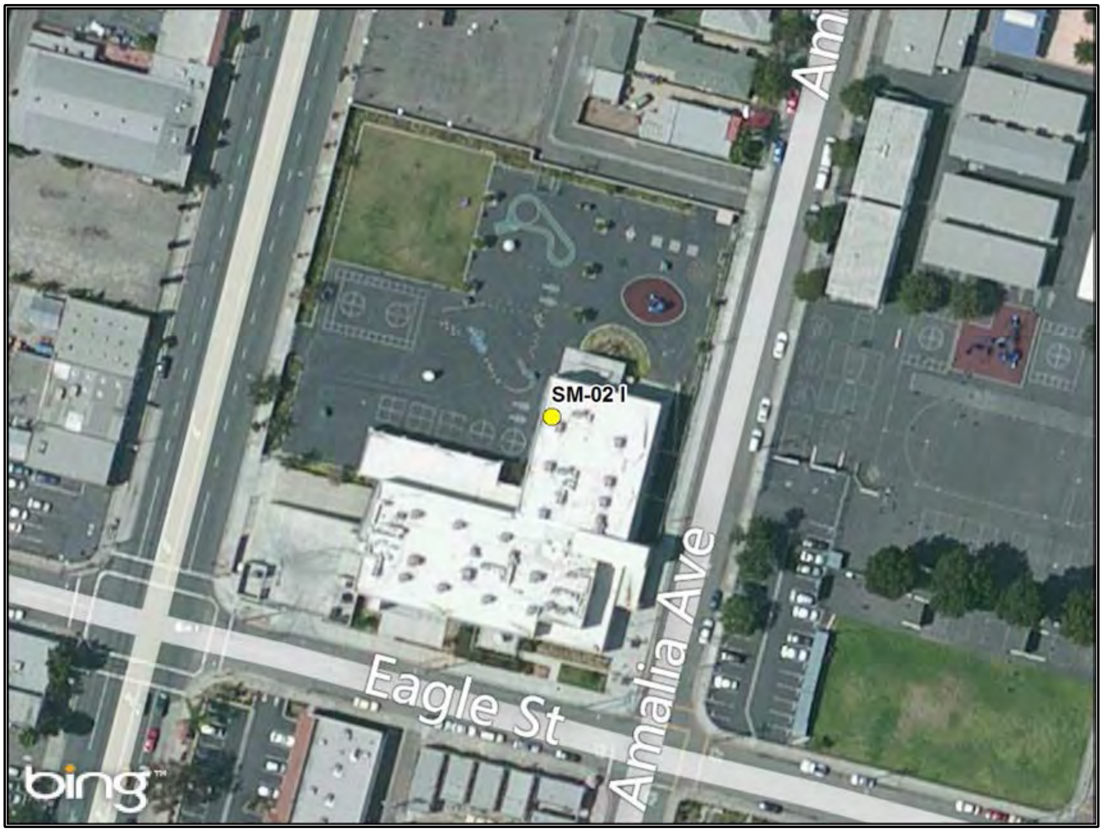
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 118. Three Windows Facing Atlantic 5' Ft 6' In X 3' Ft 3' In Each.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Logan Freeberg
Equipment: LD 831

Site Number: SM-2 E Date: 10/24/2013
Time: From 3:22 PM To 3:32 PM

Site Location: 420 Amalia Ave. 4Th Street Elementary School Exterior at Atlantic Blvd and Eagle St. On Grass Area of Playground Nearest Atlantic Blvd.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	58.6
L_{max}	71.4
L_{min}	46.2
L_{peak}	83.8
L_2	64.7
L_8	62.0
L_{25}	59.6
L_{50}	57.6
L_{90}	50.6
L_{99}	48.3
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 266. Minor Noise From Kids Playing on Basketball Court Behind School. 2 Buses North Bound.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT
Atlantic Blvd	2/2	35 MPH	143	10	3	165	3	4

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 824

Site Number: SM-3 I Date: 10/3/2013
Time: From 10:09 AM To 10:19 AM

Site Location: 409 S. Atlantic Blvd. Classroom K-1, Northrop Elementary School Interior.

Primary Noise Sources: Traffic on Atlantic Blvd. Few Kids on Playground.

Measurement Results	
	dBA
L_{eq}	37.2
L_{max}	56.2
L_{min}	27.1
L_{peak}	
L_2	
L_8	
L_{25}	
L_{50}	
L_{90}	
L_{99}	
SEL	

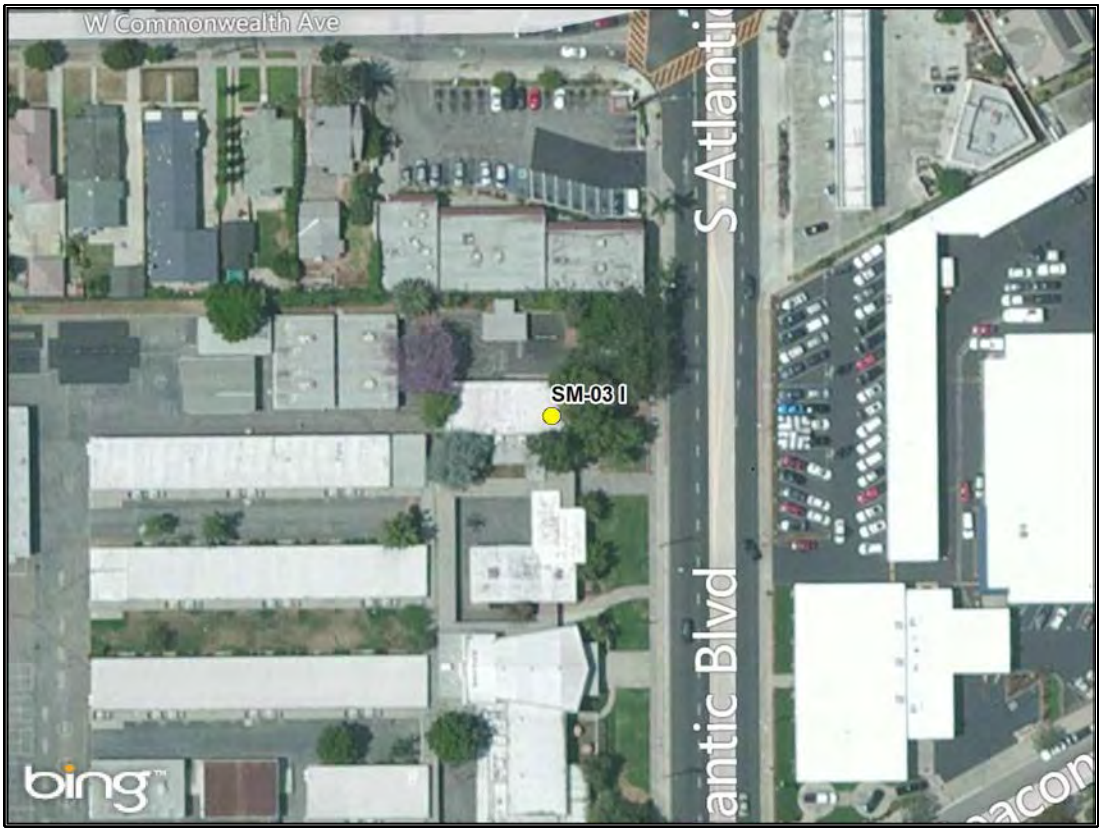
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Seven 3’ Ft X 4.5’ Ft Fixed Mostly Glass Windows. Seven 3’ Ft X 8’ Ft Dual Pane Windows.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: SM-3 E Date: 10/3/2013
Time: From 10:09 AM To 10:19 AM

Site Location: 409 S Atlantic Blvd. William Northrop Elementary School, Classroom K-1 Exterior.

Primary Noise Sources: Traffic on Atlantic Blvd.

Measurement Results	
	dBA
L_{eq}	62.4
L_{max}	77.4
L_{min}	44.6
L_{peak}	89.7
L_2	69.1
L_8	65.8
L_{25}	63.3
L_{50}	60.7
L_{90}	52.4
L_{99}	46.5
SEL	90.3

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 241.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 824

Site Number: SM-4 I Date: 10/3/2013

Time: From 8:34 AM To 8:44 AM

Site Location: 110 W. McLean St. Library of Garfield Elementary School Interior.

Primary Noise Sources: Extremely Quiet. Traffic on Nearby Streets.

Measurement Results	
	dBA
L_{eq}	26.7
L_{max}	
L_{min}	23.8
L_{peak}	43.2
L_2	
L_8	
L_{25}	
L_{50}	
L_{90}	
L_{99}	
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 89. Nine 2.5’ Ft X 1’ Ft Operable Windows. Nine 2.5’ Ft X 2.3’ Ft Fixed Windows.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: SM-4 E Date: 10/3/2013

Time: From 8:34 AM To 8:44 AM

Site Location: 110 W. McLean St. Garfield Elementary School, Classroom H21 (Library) Exterior.

Primary Noise Sources: Light Traffic on Alhambra Road, 2 Aircraft.

Measurement Results	
	dBA
L_{eq}	50.9
L_{max}	61.3
L_{min}	41.3
L_{peak}	73.3
L_2	56.7
L_8	54.7
L_{25}	52.1
L_{50}	49.2
L_{90}	44.2
L_{99}	42.3
SEL	78.7

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 239.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 831

Site Number: SM-5 I Date: 10/3/2013
Time: From 7:44 AM To 7:54 AM

Site Location: 1500 Fair Oaks Ave. Classroom 201 1^ST South Pasadena Middle School Interior.

Primary Noise Sources: Kids on Outside Walkway.

Measurement Results	
	dBA
L_{eq}	52.4
L_{max}	75.7
L_{min}	33.7
L_{peak}	82.9
L_2	46.9
L_8	44.6
L_{25}	42.6
L_{50}	40.7
L_{90}	36.5
L_{99}	35.0
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 5.5' Ft X 3' Ft Fixed Window Facing Oak Street.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 824

Site Number: SM-5 E Date: 10/3/2013

Time: From 7:44 AM To 7:54 AM

Site Location: 1500 Fair Oaks Ave. South Pasadena Middle School, Room 201, Upstairs Exterior.

Primary Noise Sources: Traffic on Fair Oaks Ave. and Oak St. Kids Talking and Opening and Closing of Lockers. Talking Was Very Loud For Second Half of Measurement.

Measurement Results	
	dBA
L_{eq}	72.8
L_{max}	85.9
L_{min}	60.7
L_{peak}	96.5
L_2	79.2
L_8	76.6
L_{25}	73.6
L_{50}	70.9
L_{90}	65.3
L_{99}	62.3
SEL	100.6

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 88.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 824

Site Number: SM-6 I Date: 9/24/2013
Time: From 1:49 PM To 1:59 PM

Site Location: 535 S. Pasadena Ave. Classroom 114 1ST Floor Sequoyah School Interior.

Primary Noise Sources: Traffic on I-210 Freeway South Bound Off-Ramp to California Blvd.

Measurement Results	
	dBA
L_{eq}	33.5
L_{max}	52.8
L_{min}	26.1
L_{peak}	
L_2	
L_8	
L_{25}	
L_{50}	
L_{90}	
L_{99}	
SEL	

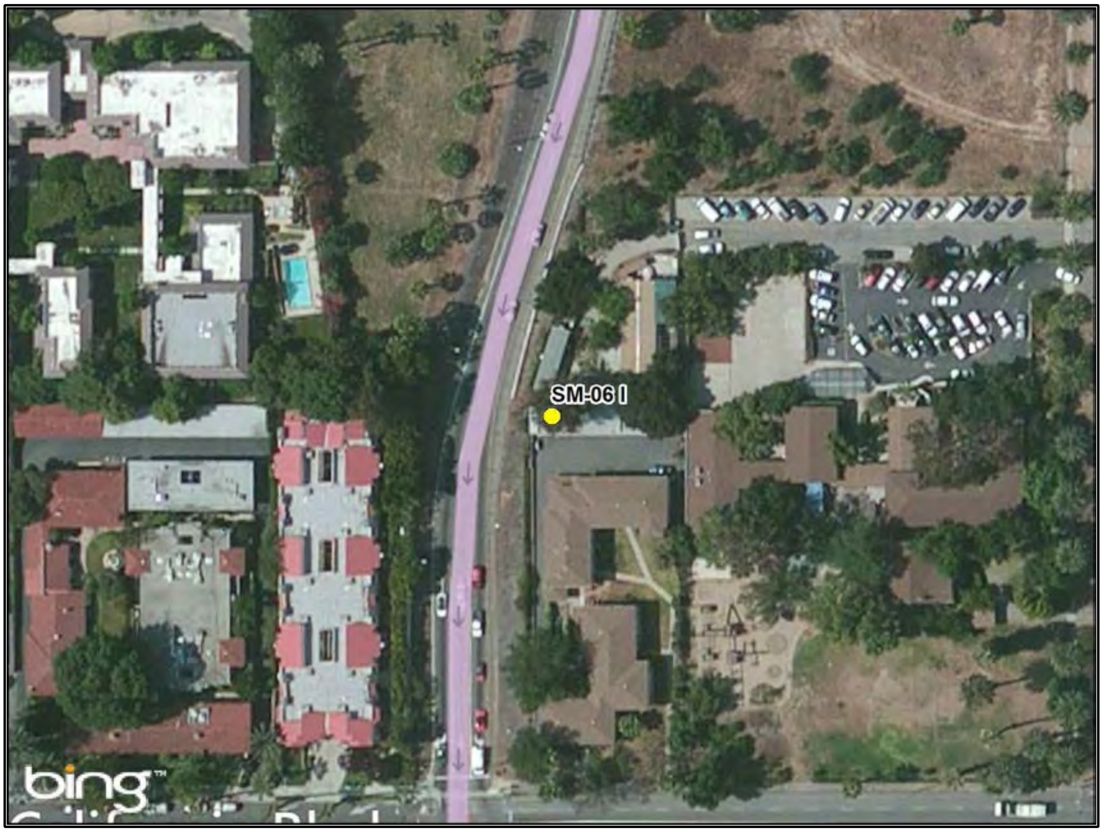
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 81. Three 6'Ft X 5.5' Ft Windows. 4' Ft X 2' Ft Openable, Rest are Fixed. Art Room – 2 Story Building 1St Floor. Approximately 20' Ft X 12' Ft Exterior Wall.

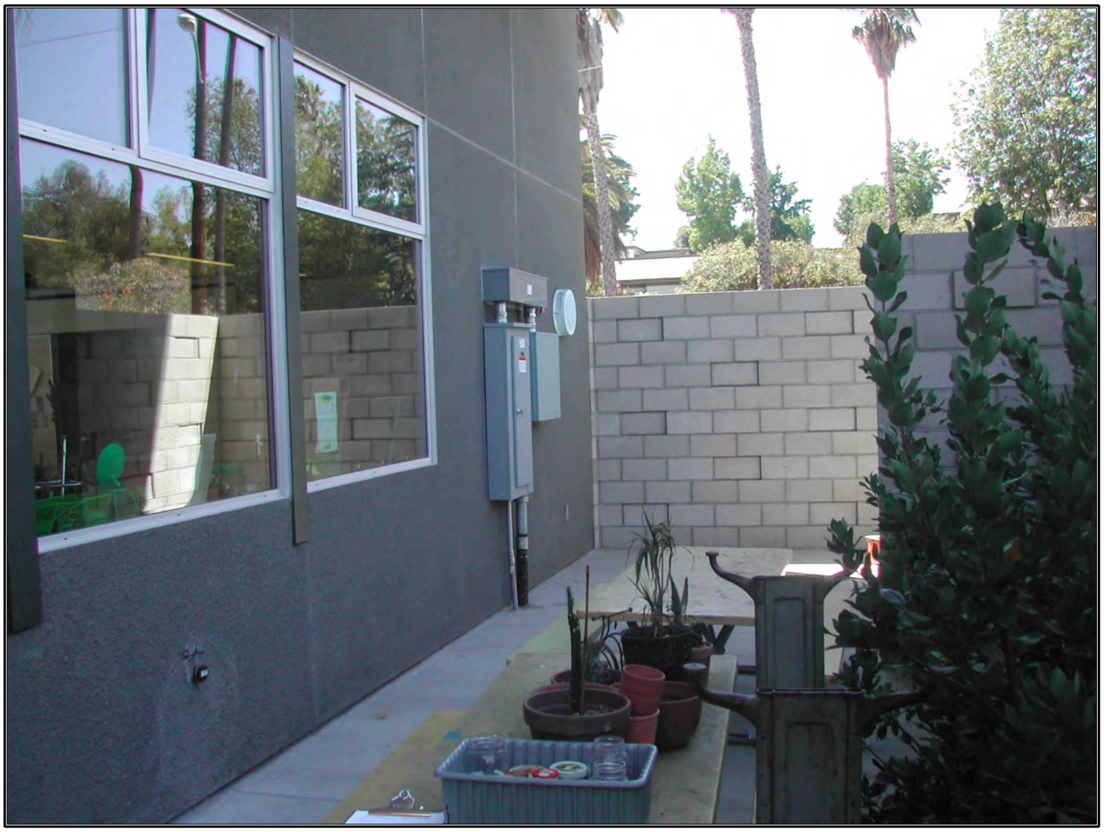
Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Test Personnel: Corey Knips
Project Name: SR-710 North
Equipment: LD 831

Site Number: SM-6 E Date: 9/24/2013
Time: From 1:49 PM To 1:59 PM

Site Location: 535 S. Pasadena Ave. Classroom 114 Sequoyah School Exterior. 12’ Feet North of Building Exterior.

Primary Noise Sources: Traffic on I-210 South Bound Off-Ramp.

Measurement Results	
	dBA
L_{eq}	59.3
L_{max}	67.4
L_{min}	48.7
L_{peak}	80.4
L_2	64.4
L_8	62.7
L_{25}	60.6
L_{50}	58.3
L_{90}	53.4
L_{99}	50.2
SEL	87.1

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 230. 7’ Ft 4” In Wall Only Partially Blocks I-210 South Off-Ramp. There is a Patio on North Side of Classroom That is Considered an Extension of the Art Room.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Test Personnel: JT Stephens
Project Name: SR-710 North
Equipment: LD 824

Site Number: SM-7 I Date: 10/17/2013
Time: From 11:02 AM To 11:12 AM

Site Location: 169 S. St. John Ave. Maranatha High School Physical Education Classroom Interior.

Primary Noise Sources: Traffic on SR-710 Freeway South Bound Off-Ramp. Traffic on St. John Ave.

Measurement Results	
	dBA
L_{eq}	48.0
L_{max}	66.3
L_{min}	44.9
L_{peak}	
L_2	
L_8	
L_{25}	
L_{50}	
L_{90}	
L_{99}	
SEL	

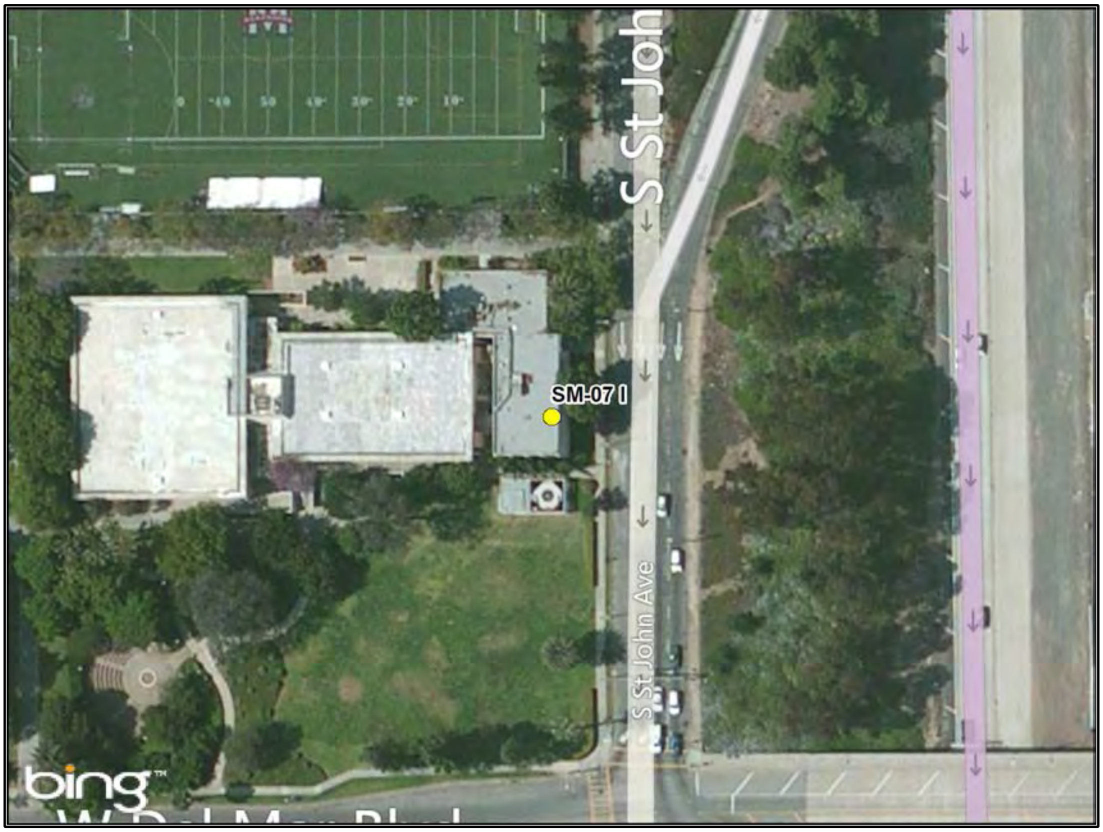
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Four 3’ Ft X 5’ Ft Fixed Windows. Soon to Be Covered By Lockers.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: SM-7 E Date: 10/17/2013
Time: From 11:02 AM To 11:12 AM

Site Location: Maranatha High School Exterior 10 Feet From Building By Steps.

Primary Noise Sources: Light Traffic on St. John Ave.

Measurement Results	
	dBA
L_{eq}	62.7
L_{max}	79.1
L_{min}	53.8
L_{peak}	93.5
L_2	71.3
L_8	66.3
L_{25}	62.4
L_{50}	58.7
L_{90}	56.0
L_{99}	54.7
SEL	90.5

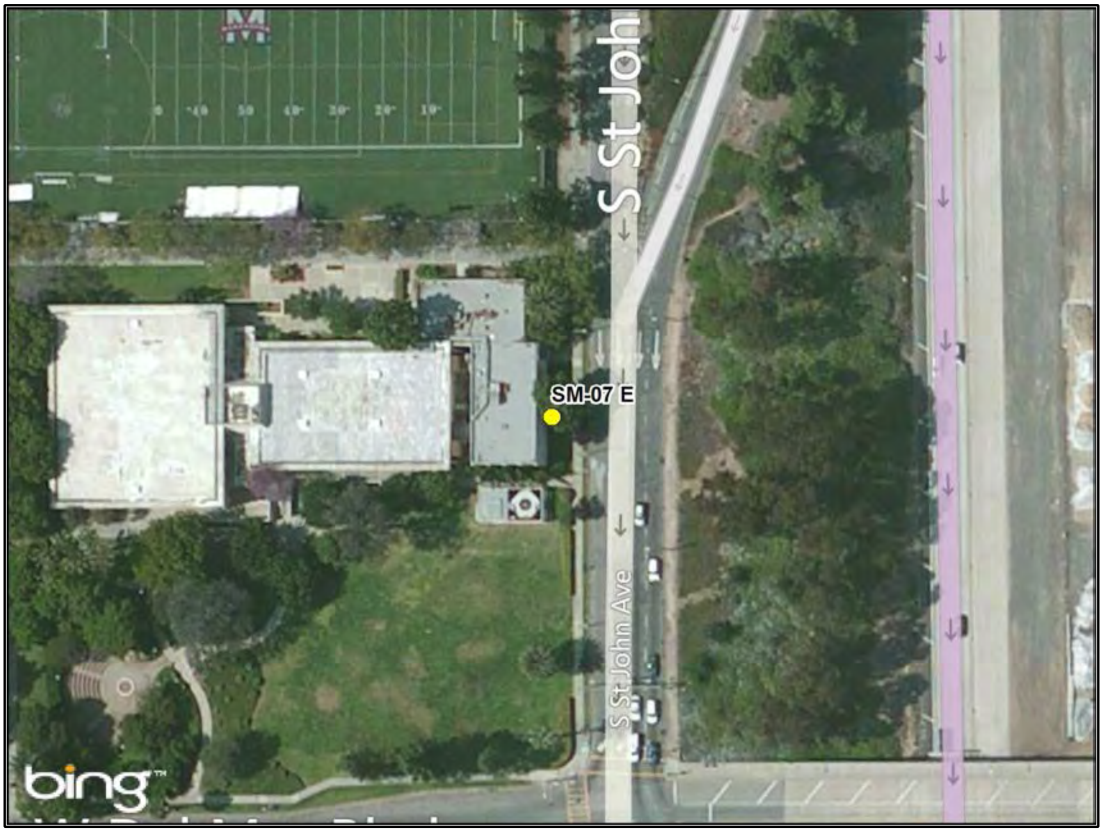
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 251.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 824

Site Number: SM-08 I Date: 10/17/2013

Time: From 7:34 AM To 7:44 AM

Site Location: 315 N. Pasadena Ave. Physical Therapy Room, Roosevelt Elementary School Interior.

Primary Noise Sources: Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	44.6
L_{max}	55.0
L_{min}	43.0
L_{peak}	
L_2	
L_8	
L_{25}	
L_{50}	
L_{90}	
L_{99}	
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Air on in Room, Not Able to Turn Off Manually. Seven 6’ Ft X 3.5’ Ft Windows (Majority of Wall Facing Freeway).

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: SM-08 E Date: 10/17/2013
Time: From 7:34 AM To 7:44 AM

Site Location: 315 N. Pasadena Ave. Roosevelt Elementary School Exterior.

Primary Noise Sources: Traffic on I-210 Freeway. Traffic on SR-134 Freeway and Ramps.

Measurement Results	
	dBA
L_{eq}	64.9
L_{max}	69.0
L_{min}	63.0
L_{peak}	84.2
L_2	66.1
L_8	65.6
L_{25}	65.2
L_{50}	64.7
L_{90}	64.3
L_{99}	63.9
SEL	92.7

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 247. Wall is 7' Ft Tall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 824

Site Number: SM-9 I Date: 10/17/2013

Time: From 9:59 AM To 10:09 AM

Site Location: 55 W. Eureka St. Office at Pacific Oaks College Interior.

Primary Noise Sources: Traffic on I-210 Freeway and Adjacent Streets.

Measurement Results	
	dBA
L_{eq}	37.5
L_{max}	61.8
L_{min}	31.3
L_{peak}	
L_2	
L_8	
L_{25}	
L_{50}	
L_{90}	
L_{99}	
SEL	

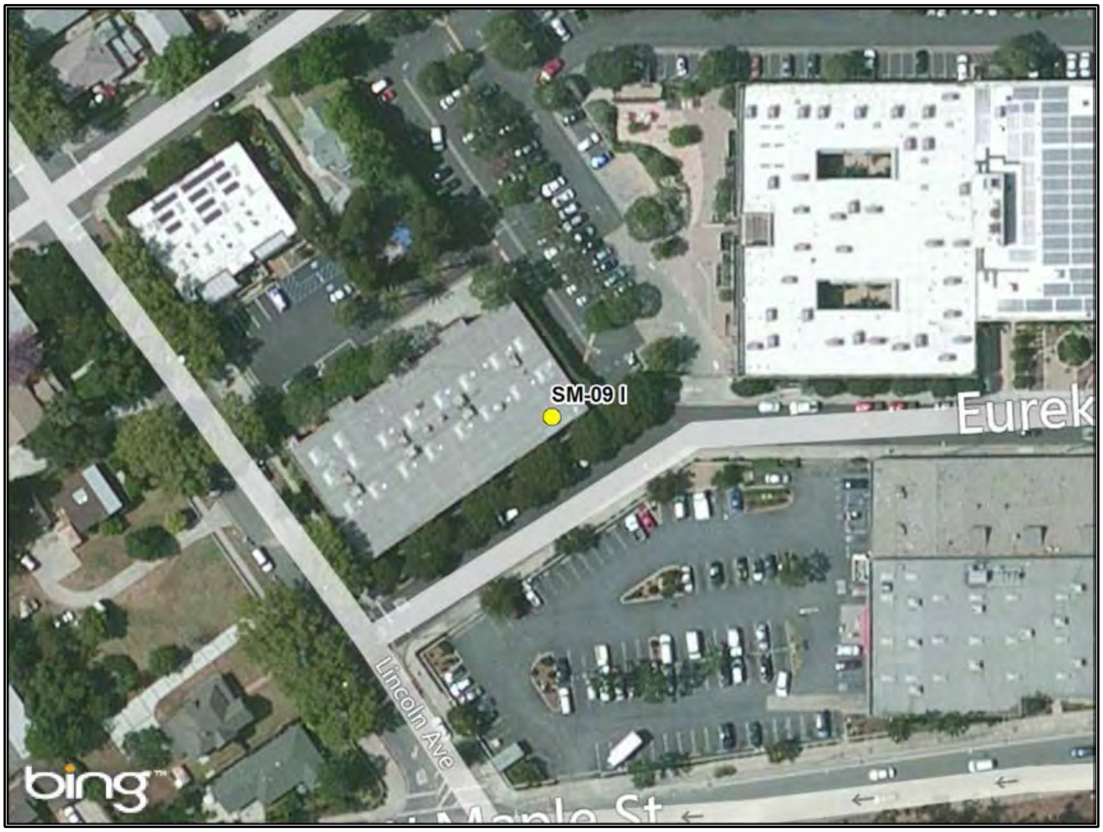
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: One 7’ Ft X 8’ Ft Fixed Window With Thick Glass. Stored 103.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: Corey Knips
Equipment: LD 831

Site Number: SM-9 E Date: 10/17/2013
Time: From 9:59 AM To 10:09 AM

Site Location: 55 W. Eureka St. Pacific Oaks College Exterior.

Primary Noise Sources: Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	62.3
L_{max}	69.0
L_{min}	58.6
L_{peak}	82.8
L_2	65.5
L_8	64.2
L_{25}	62.8
L_{50}	61.9
L_{90}	60.7
L_{99}	59.6
SEL	90.2

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 250.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North
Test Personnel: JT Stephens
Equipment: LD 824

Site Number: SM-10 I Date: 9/24/2013
Time: From 5:13 PM To 5:23 PM

Site Location: 651 N Orange Grove Blvd. New Horizon School, Farthest North Classroom Interior.

Primary Noise Sources: Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	36.6
L_{max}	55.7
L_{min}	33.7
L_{peak}	
L_2	
L_8	
L_{25}	
L_{50}	
L_{90}	
L_{99}	
SEL	

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Two 3’ Ft X 3.5’ Ft Windows w/ Sliders. One Entry Door Well Sealed. Stucco Exterior 20’ Ft X 10’ Ft Room.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 824

Site Number: SM-10 E Date: 9/24/2013

Time: From 5:13 PM To 5:23 PM

Site Location: Farthest North Classroom, New Horizon School, Exterior.

Primary Noise Sources: Traffic on I-210 Freeway.

Measurement Results	
	dBA
L_{eq}	67.0
L_{max}	69.8
L_{min}	64.3
L_{peak}	84.7
L_2	68.9
L_8	68.2
L_{25}	67.4
L_{50}	66.9
L_{90}	66.0
L_{99}	65.2
SEL	94.8

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Wall is 6’ Ft to 7.5’ Ft. Stored 237.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 824

Site Number: SM-11I Date: 4/16/2014

Time: From 2:43 PM To 2:53 PM

Site Location: 1955 Fremont Avenue. Almansor Academy - Physical Therapy room, Interior.

Primary Noise Sources: Traffic on Fremont Avenue.

Measurement Results	
	dBA
L_{eq}	36.8
L_{max}	50.5
L_{min}	25.2
L_{peak}	74.9
L_2	41.6
L_8	39.7
L_{25}	38
L_{50}	36.1
L_{90}	29
L_{99}	26.2
SEL	-

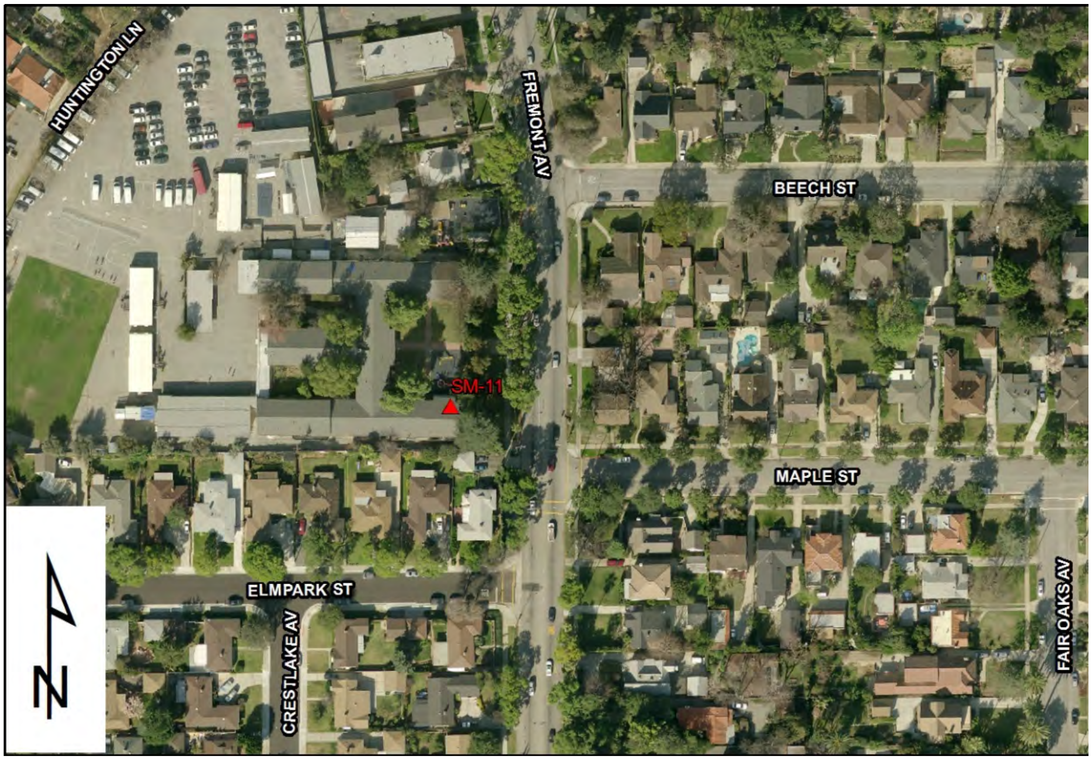
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: There are three 2.5 foot by 8 foot windows facing north.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105 — Test Personnel: Corey Knips

Project Name: SR-710 North — Equipment: LD 831

Site Number: SM-11 E Date: 4/16/2014 — Time: From 2:43 PM To 2:53 PM

Site Location: 1955 Fremont Avenue. Almansor Academy - Physical Therapy room, Exterior.

Primary Noise Sources: Traffic on Fremont Avenue.

Measurement Results	
	dBA
L_{eq}	63.8
L_{max}	75.2
L_{min}	47.2
L_{peak}	90.4
L_2	68.0
L_8	66.9
L_{25}	65.4
L_{50}	63.4
L_{90}	51.2
L_{99}	48.1
SEL	91.5

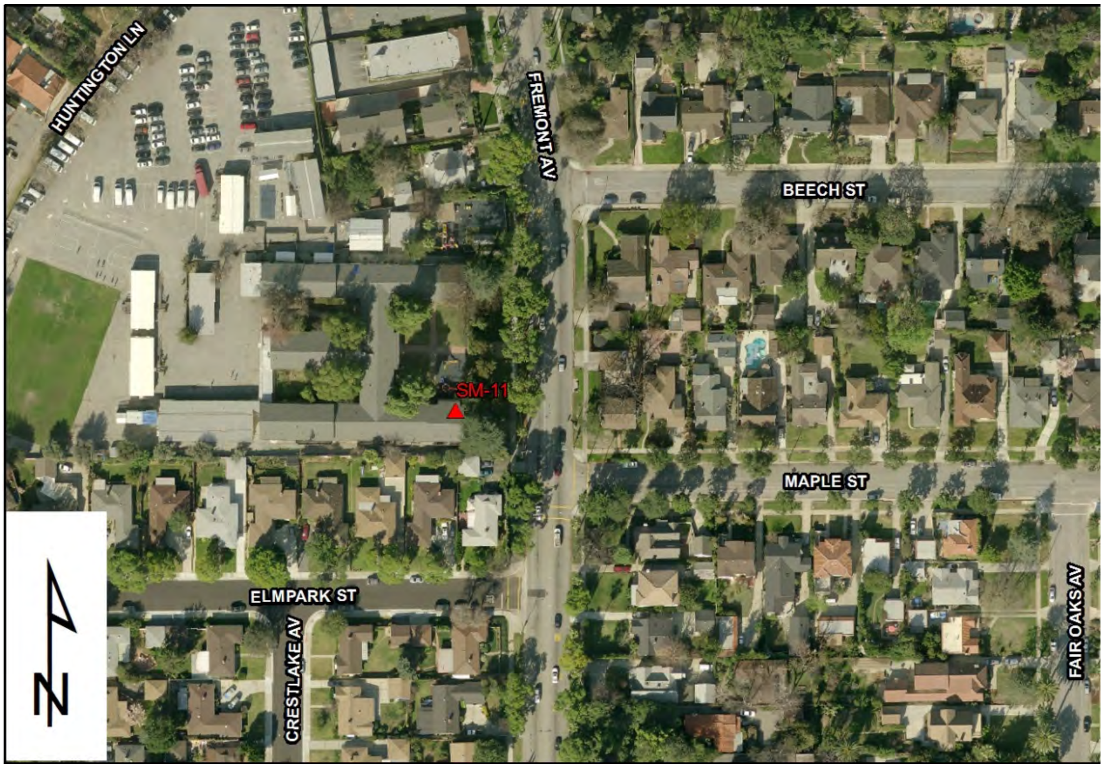
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored .035.

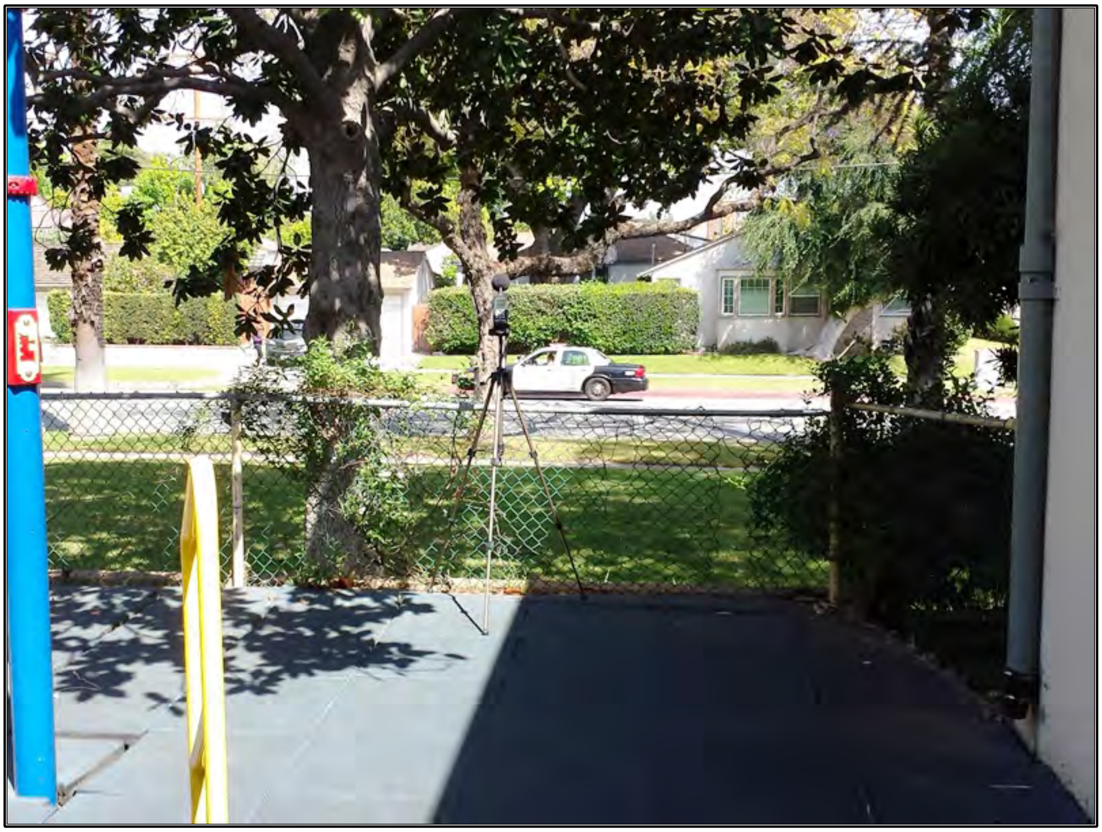
Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:



Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: JT Stephens
Equipment: LD 824

Site Number: SM-12 I Date: 4/16/2014

Time: From 3:53 PM To 4: 03 PM

Site Location: 9063 East Mission Drive. Rosemead High School - Science Lab 105, Interior.

Primary Noise Sources: Traffic on Rosemead Boulevard.

Measurement Results	
	dBA
L_{eq}	32.6
L_{max}	49.0
L_{min}	25.7
L_{peak}	80.2
L_2	39.0
L_8	34.9
L_{25}	32.9
L_{50}	31.1
L_{90}	27.3
L_{99}	26.4
SEL	-

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 6. Approximately 15 foot by 3 foot fixed glass at top of wall.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105
Project Name: SR-710 North

Test Personnel: Corey Knips
Equipment: LD 831

Site Number: SM-12 E Date: 4/16/2014

Time: From 3:53 PM To 4:03 PM

Site Location: 9063 East Mission Drive. Rosemead High School - Science Lab 105, Exterior.

Primary Noise Sources: Traffic on Rosemead Boulevard.

Measurement Results	
	dBA
L_{eq}	70.4
L_{max}	87.3
L_{min}	54.0
L_{peak}	102.2
L_2	76.6
L_8	73.4
L_{25}	71.4
L_{50}	68.3
L_{90}	58.6
L_{99}	55.3
SEL	98.6

Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: 15 feet from building.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:

Location Photo:

Noise Measurement Survey

Project Number: CHM1105

Test Personnel: JT Stephens

Project Name: SR-710 North

Equipment: LD 824

Site Number: SM-13 I Date: 4/16/2013

Time: From 12:24 PM To 12:34 PM

Site Location: 1201 South Marengo Avenue. Blair High School - Room 133 Health Careers Academy, Interior.

Primary Noise Sources: Traffic on SR-110 Freeway.

Measurement Results	
	dBA
L_{eq}	44.5
L_{max}	60.4
L_{min}	41.2
L_{peak}	-
L_2	48.6
L_8	45.7
L_{25}	44.2
L_{50}	43.3
L_{90}	42.4
L_{99}	41.8
SEL	-

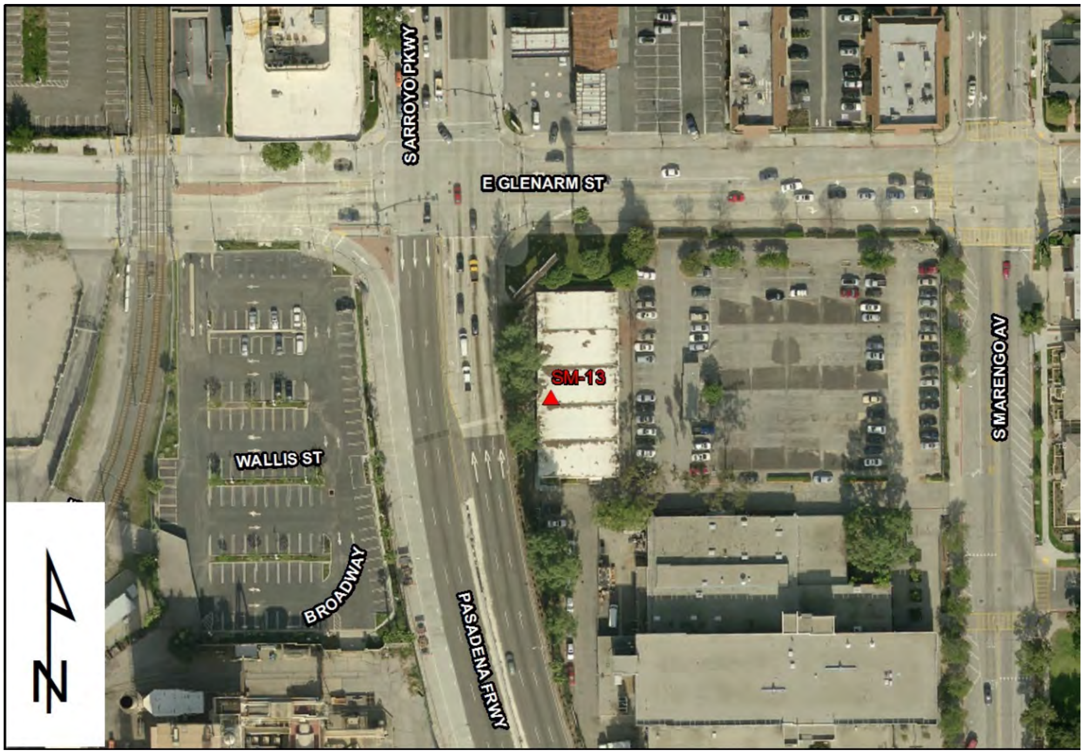
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Three small sliders.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

Noise Measurement Survey

Project Number: CHM1105 Test Personnel: Corey Knips
Project Name: SR-710 North Equipment: LD 831

Site Number: SM-13 E Date: 4/16/2014 Time: From 12:24 PM To 12:34 PM

Site Location: 1201 South Marengo Avenue. Blair High School - Room 133 Health Careers Academy, Interior.

Primary Noise Sources: Traffic on SR-110 Freeway.

Measurement Results	
	dBA
L_{eq}	64.3
L_{max}	84.4
L_{min}	54.9
L_{peak}	104.6
L_2	71.1
L_8	67.4
L_{25}	64.2
L_{50}	60.2
L_{90}	57.1
L_{99}	55.8
SEL	92.1

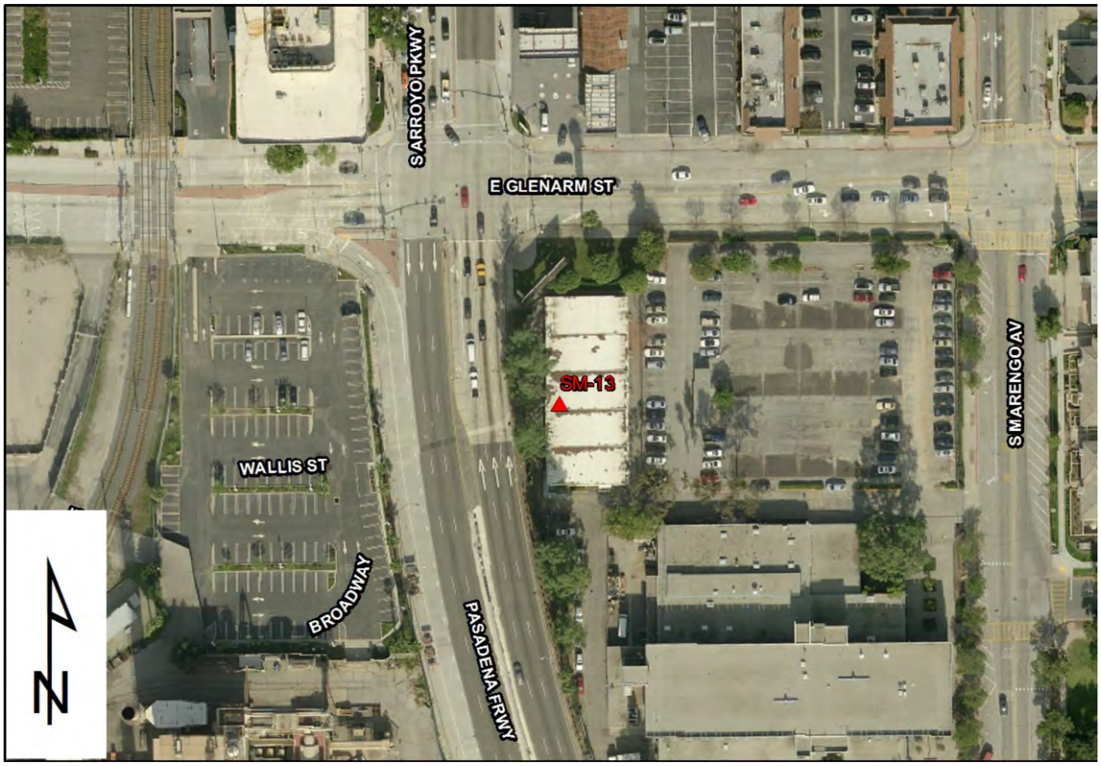
Atmospheric Conditions	
Average Wind Velocity (mph)	
Maximum Wind Velocity (mph)	
Temperature (F)	
Relative Humidity (%)	

Comments: Stored 034. Meter is 11 feet from the building.

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Sketch:



Location Photo:

TRAFFIC COUNTS

SR-710 North Project

Traffic Counts During Noise Monitoring - TSM/TDM Alternative

	Traffic Counts (10 min)				Distribution			Traffic Volume (Hourly)			Measured Average Speed		
Traffic Counts	**Auto**	**Medium**	**Heavy**	**Total**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**
4-17-14 M-7/8 (Cal 4)													
I-10 WB	1,105	29	48	1,182	0.93	0.02	0.04	6,630	174	288	65	65	60
I-10 EB	825	24	32	881	0.94	0.03	0.04	4,950	144	192	65	65	60
I-10 HOV WB	178	2	0	180	0.99	0.01	0.00	1,068	12	0	65	65	60
I-10 HOV EB	30	3	1	34	0.88	0.09	0.03	180	18	6	65	65	60
4-17-14 M-9/10 (Cal 5)													
I-10 WB	983	27	40	1,050	0.94	0.03	0.04	5,898	162	240	65	65	60
I-10 EB	895	31	35	961	0.93	0.03	0.04	5,370	186	210	65	65	60
I-10 HOV WB	131	2	1	134	0.98	0.01	0.01	786	12	6	65	65	60
I-10 HOV EB	37	3	4	44	0.84	0.07	0.09	222	18	24	65	65	60
4-17-14 M-11/12 (Cal 6)													
I-10 WB	1,037	31	37	1,105	0.94	0.03	0.03	6,222	186	222	65	65	60
I-10 EB	897	29	44	970	0.92	0.03	0.05	5,382	174	264	65	65	60
I-10 HOV WB	111	3	0	114	0.97	0.03	0.00	666	18	0	65	65	60
I-10 HOV EB	50	3	1	54	0.93	0.06	0.02	300	18	6	65	65	60
4-17-14 M-19/20 (Cal 9)													
I-110 NB	183	0	0	183	1.00	0.00	0.00	1,098	0	0	65	65	60
I-110 SB	210	0	0	210	1.00	0.00	0.00	1,260	0	0	65	65	60
4-17-14 M-21/22 (Cal 10)													
I-110 NB	224	0	0	224	1.00	0.00	0.00	1,344	0	0	65	65	60
I-110 SB	184	0	0	184	1.00	0.00	0.00	1,104	0	0	65	65	60

SR-710 North Project

Traffic Counts During Noise Monitoring - BRT Alternative

	Traffic Counts (10 min)				Distribution			Traffic Volume (Hourly)			Posted Speed		
Traffic Counts	**Auto**	**Medium**	**Heavy**	**Total**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**
BM-1 through BM-3													
Atlantic NB (1)	85	4	1	90	0.94	0.04	0.01	510	24	6	35	35	30
Atlantic NB (3)	107	3	1	111	0.96	0.03	0.01	642	18	6	35	35	30
Atlantic SB (1)	107	5	6	118	0.91	0.04	0.05	642	30	36	35	35	30
Atlantic SB (3)	118	13	6	137	0.86	0.09	0.04	708	78	36	35	35	30
BM-4													
Atlantic NB (8)	143	10	3	156	0.92	0.06	0.02	858	60	18	35	35	30
Atlantic SB (8)	165	3	4	172	0.96	0.02	0.02	990	18	24	35	35	30
BM-5 and BM-6													
Atlantic NB (8)	159	3	1	163	0.98	0.02	0.01	951	16	8	35	35	30
Atlantic SB (8)	127	2	2	131	0.97	0.01	0.01	762	11	11	35	35	30
SR-60 EB	776	34	55	865	0.90	0.04	0.06	4,655	205	332	65	65	60
SR-60 WB	670	28	64	762	0.88	0.04	0.08	4,020	165	385	65	65	60
BM-7 through BM-9													
Atlantic NB (8)	116	3	1	120	0.97	0.03	0.01	696	18	6	35	35	30
Atlantic SB (8)	128	4	0	132	0.97	0.03	0.00	768	24	0	35	35	30
BM-10 through BM-12													
Atlantic NB (11)	114	4	1	119	0.96	0.03	0.01	684	24	6	35	35	30
Atlantic SB (11)	115	5	0	120	0.96	0.04	0.00	690	30	0	35	35	30
BM-13 through BM-15													
Atlantic NB (15)	96	3	0	99	0.97	0.03	0.00	576	18	0	35	35	30
Atlantic SB (15)	99	3	0	102	0.97	0.03	0.00	594	18	0	35	35	30
BM-16 through BM-18													
Atlantic NB (17)	124	2	0	126	0.98	0.02	0.00	744	12	0	35	35	30
Atlantic SB (17)	144	4	0	148	0.97	0.03	0.00	864	24	0	35	35	30
BM-19 through BM-21													
Atlantic NB (19)	142	4	2	148	0.96	0.03	0.01	852	24	12	35	35	30
Atlantic NB (20)	151	3	0	154	0.98	0.02	0.00	906	18	0	35	35	30
Atlantic SB (19)	152	4	0	156	0.97	0.03	0.00	912	24	0	35	35	30
Atlantic SB (20)	164	3	0	167	0.98	0.02	0.00	984	18	0	35	35	30
BM-22 through BM-24													
Atlantic NB (20)	147	4	1	152	0.97	0.03	0.01	882	24	6	35	35	30
Atlantic SB (20)	158	4	0	162	0.98	0.02	0.00	948	24	0	35	35	30
I-10 EB Mainline	697	34	26	757	0.92	0.04	0.03	4182	204	156	65	65	60
I-10 WB Mainline	887	27	47	961	0.92	0.03	0.05	5322	162	282	65	65	60
I-10 EB HOV	20	6	1	27	0.74	0.22	0.04	120	36	6	65	65	60
I-10 WB HOV	251	6	1	258	0.97	0.02	0.00	1506	36	6	65	65	60
I-10 EB Off-Ramp	86	8	0	94	0.91	0.09	0.00	516	48	0	35	35	30
I-10 EB On-Ramp	64	1	0	65	0.98	0.02	0.00	384	6	0	35	35	30
BM-25 through BM-27													
Atlantic NB (20)	147	4	1	152	0.97	0.03	0.01	882	24	6	35	35	30
Atlantic SB (20)	158	4	0	162	0.98	0.02	0.00	948	24	0	35	35	30
I-10 EB Mainline	695	30	46	771	0.90	0.04	0.06	4170	180	276	65	65	60
I-10 WB Mainline	814	38	30	882	0.92	0.04	0.03	4885	228	180	65	65	60
I-10 EB HOV	19	5	1	25	0.76	0.20	0.04	114	30	6	65	65	60
I-10 WB HOV	159	1	1	161	0.99	0.01	0.01	954	6	6	65	65	60
I-10 EB Off-Ramp	74	1	0	75	0.99	0.01	0.00	444	6	0	35	35	30
I-10 EB On-Ramp	73	1	1	75	0.97	0.01	0.01	438	6	6	35	35	30
BM-28 through BM-30													
Atlantic NB (30)	205	6	0	211	0.97	0.03	0.00	1,230	36	0	35	35	30
Atlantic SB (30)	182	2	1	185	0.98	0.01	0.01	1,092	12	6	35	35	30
BM-31 and BM-32													
Atlantic NB (31)	127	1	0	128	0.99	0.01	0.00	762	6	0	35	35	30
Atlantic SB (31)	149	0	0	149	1.00	0.00	0.00	894	0	0	35	35	30
Atlantic NB (32)	107	2	0	109	0.98	0.02	0.00	642	12	0	35	35	30
Atlantic SB (32)	119	3	0	122	0.98	0.02	0.00	714	18	0	35	35	30

Traffic Counts During Noise Monitoring - BRT Alternative

	Traffic Counts (10 min)				Distribution			Traffic Volume (Hourly)			Posted Speed		
Traffic Counts	**Auto**	**Medium**	**Heavy**	**Total**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**
BM-33													
Atlantic NB (33)	107	3	0	110	0.97	0.03	0.00	642	18	0	35	35	30
Atlantic SB (33)	86	1	0	87	0.98	0.02	0.00	516	8	0	35	35	30
BM-34 through BM-36													
Atlantic NB (35)	99	1	0	100	0.99	0.01	0.00	594	6	0	35	35	30
Atlantic NB (36)	96	3	0	99	0.97	0.03	0.00	576	18	0	35	35	30
Atlantic SB (35)	119	2	2	123	0.97	0.02	0.02	714	12	12	35	35	30
Atlantic SB (36)	114	1	0	115	0.99	0.01	0.00	684	6	0	35	35	30
											35	35	30
BM-37 through BM-39											35	35	30
Atlantic NB (37)	89	5	0	94	0.95	0.05	0.00	534	30	0	35	35	30
Atlantic NB (38)	132	1	0	133	0.99	0.01	0.00	792	6	0	35	35	30
Atlantic NB (39)	98	8	1	107	0.92	0.07	0.01	588	48	6	35	35	30
Atlantic SB (37)	100	4	0	104	0.96	0.04	0.00	600	24	0	35	35	30
Atlantic SB (38)	132	2	0	134	0.99	0.01	0.00	792	12	0	35	35	30
Atlantic SB (39)	117	3	0	120	0.98	0.03	0.00	702	18	0	35	35	30
BM-40 through BM-42													
Huntington NB (41)	107	3	2	112	0.96	0.03	0.02	642	18	12	35	35	30
Huntington SB (41)	114	4	0	118	0.97	0.03	0.00	684	24	0	35	35	30
Fair Oaks NB (42)	101	8	0	109	0.93	0.07	0.00	606	48	0	35	35	30
Fair Oaks SB (42)	93	6	4	103	0.90	0.06	0.04	558	36	24	35	35	30
BM-43													
Atlantic NB (43)	101	5	0	106	0.95	0.05	0.00	606	30	0	35	35	30
Atlantic SB (43)	106	4	0	110	0.96	0.04	0.00	638	24	0	35	35	30
BM-44 and BM-45													
Atlantic NB (44)	118	4	0	122	0.97	0.03	0.00	708	24	0	35	35	30
Atlantic SB (44)	155	2	0	157	0.99	0.01	0.00	930	12	0	35	35	30
Atlantic NB (45)	160	8	2	170	0.94	0.05	0.01	960	48	12	65	65	60
Atlantic SB (45)	214	6	0	220	0.97	0.03	0.00	1,284	36	0	65	65	60
BM-46 and BM-48													
Fair Oaks NB (48)	126	7	1	134	0.94	0.05	0.01	756	42	6	35	35	30
Fair Oaks SB (48)	151	5	1	157	0.96	0.03	0.01	906	30	6	35	35	30
BM-49 and BM-50													
California NB (50)	115	1	0	116	0.99	0.01	0.00	690	6	0	35	35	30
California SB (50)	120	1	0	121	0.99	0.01	0.00	720	6	0	35	35	30

SR-710 North Project

Traffic Counts During Noise Monitoring - Freeway Tunnel Alternative

	Traffic Counts (10/15 min)				Distribution			Traffic Volume (Hourly)			Posted Speed		
Traffic Counts	**Auto**	**Medium**	**Heavy**	**Total**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**
FM-1, FM-2, FM-3													
SR-710 NB	504	16	37	557	0.90	0.03	0.07	3,024	96	222	65	65	60
SR-710 SB	447	24	50	521	0.86	0.05	0.10	2,682	144	300	65	65	60
Cesar Chavez Ave. Exit SB Off-Ramp	34	2	0	36	0.94	0.06	0.00	204	12	0	65	65	60
Corporate Center Dr EB (FM04)	20	2	0	22	0.91	0.09	0.00	120	12	0	40	40	35
Corporate Center Dr WB (FM04)	17	0	0	17	1.00	0.00	0.00	102	0	0	40	40	35
El Monte Bus Route EB	5	3	2	10	0.50	0.30	0.20	30	18	12	65	65	60
El Monte Bus Route WB	35	2	1	38	0.92	0.05	0.03	210	12	6	65	65	60
I-10 Collector/Distributor	9	0	0	9	1.00	0.00	0.00	54	0	0	65	65	60
SR-710 N/S to I-10 WB Connector	201	16	27	244	0.82	0.07	0.11	1,206	96	162	65	65	60
I-10 WB	717	30	29	776	0.92	0.04	0.04	4,302	180	174	65	65	60
I-10 EB	615	40	25	680	0.90	0.06	0.04	3,690	240	150	65	65	60
Eastern Ave On-Ramp EB	36	2	0	38	0.95	0.05	0.00	216	12	0	65	65	60
Ramona Blvd Exit/SR-710 N Connector EB	39	1	1	41	0.95	0.02	0.02	234	6	6	65	65	60
I-10 E to SR-710 S Connector	152	17	26	195	0.78	0.09	0.13	912	102	156	65	65	60
Ramona Blvd Loop On-Ramp to SR-710 S	30	0	0	30	1.00	0.00	0.00	180	0	0	45	45	40
FM-4													
SR-710 NB	169	4	2	175	0.97	0.02	0.01	1,014	24	12	65	65	60
SR-710 SB	152	7	5	164	0.93	0.04	0.03	912	42	30	65	65	60
SR-710 SB to I-10 EB	1	1	0	2	0.50	0.50	0.00	6	6	0	65	65	60
SR-710 SB to I-10 WB	12	0	1	13	0.92	0.00	0.08	72	0	6	65	65	60
SR-710 to I-10 WB Connector	182	12	16	210	0.87	0.06	0.08	1,092	72	96	65	65	60
El Monte Bus Route WB	25	7	0	32	0.78	0.22	0.00	150	42	0	65	65	60
El Monte Bus Route EB	4	1	2	7	0.57	0.14	0.29	24	6	12	65	65	60
I-10 WB Collector/Distributor	9	0	0	9	1.00	0.00	0.00	54	0	0	65	65	60
I-10 WB	630	29	15	674	0.93	0.04	0.02	3,780	174	90	65	65	60
I-10 EB	719	28	16	763	0.94	0.04	0.02	4,314	168	96	65	65	60
Eastern Ave. On-Ramp	49	2	1	52	0.94	0.04	0.02	294	12	6	65	65	60
Ramona Blvd Exit/ SR-710 N Connector	39	2	0	41	0.95	0.05	0.00	234	12	0	65	65	60
I-10 E to SR-710 S Connector	154	6	11	171	0.90	0.04	0.06	924	36	66	65	65	60
Ramona Blvd. Loop On-Ramp to SR-710 S	44	1	1	46	0.96	0.02	0.02	264	6	6	45	45	40
FM-5, FM-6, FM-7													
SR-710 NB	176	13	7	196	0.90	0.07	0.04	1,056	78	42	65	65	60
SR-710 SB	167	10	5	182	0.92	0.05	0.03	1,002	60	30	65	65	60
SR-710 SB to I-10 EB	0	1	2	3	0.00	0.33	0.67	0	6	12	65	65	60
SR-710 SB to I-10 WB	16	0	0	16	1.00	0.00	0.00	96	0	0	65	65	60
El Monte Bus Route WB	40	3	1	44	0.91	0.07	0.02	240	18	6	65	65	60
El Monte Bus Route EB	9	0	2	11	0.82	0.00	0.18	54	0	12	65	65	60
SR-710 N/S to I-10 Connector WB	211	12	17	240	0.88	0.05	0.07	1,266	72	102	65	65	60
I-10 WB Collector/Distributor	8	0	0	8	1.00	0.00	0.00	48	0	0	65	65	60
I-10 WB	692	21	17	730	0.95	0.03	0.02	4,152	126	102	65	65	60
I-10 EB	675	23	19	717	0.94	0.03	0.03	4,050	138	114	65	65	60
Eastern Ave. On-Ramp EB	57	3	0	60	0.95	0.05	0.00	342	18	0	65	65	60
I-10 E to SR-710 S Connector EB	175	14	13	202	0.87	0.07	0.06	1,050	84	78	65	65	60
Ramona Blvd. Loop On-Ramp to SR-710 S	54	0	0	54	1.00	0.00	0.00	324	0	0	45	45	40
Ramona Blvd. Exit/SR-710 N Connector EB	33	2	1	36	0.92	0.06	0.03	198	12	6	65	65	60
FM-8, FM-9, FM-10													
SR-710 NB	145	14	5	164	0.88	0.09	0.03	870	84	30	65	65	60
SR-710 SB	156	9	4	169	0.92	0.05	0.02	936	54	24	65	65	60
SR-710 SB to I-10 EB	0	0	0	0				0	0	0	65	65	60
SR-710 SB to I-10 WB	14	0	0	14	1.00	0.00	0.00	84	0	0	65	65	60
I-10 WB	699	22	20	741	0.94	0.03	0.03	4,194	132	120	65	65	60
I-10 EB	553	21	16	590	0.94	0.04	0.03	3,318	126	96	65	65	60
Eastern Ave. I-10 On-Ramp EB	38	4	0	42	0.90	0.10	0.00	228	24	0	65	65	60
Campus Dr. I-10 On-Ramp WB	55	0	0	55	1.00	0.00	0.00	330	0	0	65	65	60
Ramona Blvd. Exit/SR-710 N Connector EB	45	1	0	46	0.98	0.02	0.00	270	6	0	65	65	60
I-10 to SR-710 S Connector EB	161	6	18	185	0.87	0.03	0.10	966	36	108	65	65	60
Ramona Blvd Loop On-Ramp to SR-710 S	35	1	0	36	0.97	0.03	0.00	210	6	0	45	45	40
FM-11, FM-12, FM-13													
SR-710 NB	156	11	3	170	0.92	0.06	0.02	936	66	18	65	65	60
SR-710 SB	150	9	6	165	0.91	0.05	0.04	900	54	36	65	65	60
SR-710 SB to I-10 EB	0	0	0	0				0	0	0	65	65	60
SR-710 SB to I-10 WB	9	1	1	11	0.82	0.09	0.09	54	6	6	65	65	60
El Monte Bus Route WB	67	1	1	69	0.97	0.01	0.01	402	6	6	65	65	60

Traffic Counts During Noise Monitoring - Freeway Tunnel Alternative

	Traffic Counts (10/15 min)				Distribution			Traffic Volume (Hourly)			Posted Speed		
Traffic Counts	**Auto**	**Medium**	**Heavy**	**Total**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**
SR-710 N/S to I-10 Connector WB	212	16	11	239	0.89	0.07	0.05	1,272	96	66	65	65	60
El Monte Bus Route EB	0	2	0	2	0.00	1.00	0.00	0	12	0	65	65	60
I-10 WB Collector/Distributor	18	0	0	18	1.00	0.00	0.00	108	0	0	65	65	60
I-10 WB	832	27	17	876	0.95	0.03	0.02	4,992	162	102	65	65	60
I-10 EB	499	22	15	536	0.93	0.04	0.03	2,994	132	90	65	65	60
Eastern Ave On-Ramp EB	43	3	3	49	0.88	0.06	0.06	258	18	18	65	65	60
I-10 E to SR-710 S Connector EB	134	7	15	156	0.86	0.04	0.10	804	42	90	65	65	60
Ramona Blvd Loop On-Ramp to SR-710 S	30	1	0	31	0.97	0.03	0.00	180	6	0	45	45	40
Ramona Blvd Exit/SR-710 N Connector	24	2	0	26	0.92	0.08	0.00	144	12	0	65	65	60
FM-14, FM-15, FM-16													
SR-710 NB	150	8	3	161	0.93	0.05	0.02	900	48	18	65	65	60
SR-710 SB	193	12	2	207	0.93	0.06	0.01	1,158	72	12	65	65	60
SR-710 SB to I-10 EB	1	0	0	1	1.00	0.00	0.00	6	0	0	65	65	60
SR-710 SB to I-10 WB	7	0	1	8	0.88	0.00	0.13	42	0	6	65	65	60
Valley Blvd EB (FM31)	80	4	5	89	0.90	0.04	0.06	480	24	30	35	35	30
Valley Blvd WB (FM31)	80	5	4	89	0.90	0.06	0.04	480	30	24	35	35	30
El Monte Bus Route WB	120	4	1	125	0.96	0.03	0.01	720	24	6	65	65	60
SR-710 N/S to I-10 Connector WB	221	12	19	252	0.88	0.05	0.08	1,326	72	114	65	65	60
El Monte Bus Route EB	0	4	0	4	0.00	1.00	0.00	0	24	0	65	65	60
I-10 WB	732	17	10	759	0.96	0.02	0.01	4,392	102	60	65	65	60
I-10 EB	540	25	10	575	0.94	0.04	0.02	3,240	150	60	65	65	60
Eastern Ave On-Ramp EB	32	1	0	33	0.97	0.03	0.00	192	6	0	45	45	40
I-10 E to SR-710 S Connector EB	162	4	14	180	0.90	0.02	0.08	972	24	84	65	65	60
Ramona Blvd Loop On-Ramp to SR-710 S	34	1	0	35	0.97	0.03	0.00	204	6	0	45	45	40
Ramona Blvd Exit/SR-710 NB Connector EB	32	0	0	32	1.00	0.00	0.00	192	0	0	65	65	60
FM-17, FM-18, FM-19													
SR-710 NB	209	7	1	217	0.96	0.03	0.00	1,254	42	6	65	65	60
SR-710 SB	209	4	4	217	0.96	0.02	0.02	1,254	24	24	65	65	60
Valley Blvd EB	121	3	0	124	0.98	0.02	0.00	726	18	0	35	35	30
Valley Blvd WB	110	5	0	115	0.96	0.04	0.00	660	30	0	35	35	30
Valley Blvd EB (FM29)	109	3	0	112	0.97	0.03	0.00	654	18	0	35	35	30
Valley Blvd WB (FM29)	86	3	0	89	0.97	0.03	0.00	516	18	0	35	35	30
FM-20, FM-21, FM-22													
SR-710 NB	221	5	3	229	0.97	0.02	0.01	1,326	30	18	65	65	60
SR-710 SB	221	6	5	232	0.95	0.03	0.02	1,326	36	30	65	65	60
Valley Blvd EB	107	6	0	113	0.95	0.05	0.00	642	36	0	35	35	30
Valley Blvd WB	137	7	4	148	0.93	0.05	0.03	822	42	24	35	35	30
FM-23, FM-24													
SR-710 NB	223	10	5	238	0.94	0.04	0.02	1,338	60	30	65	65	60
SR-710 SB	192	8	5	205	0.94	0.04	0.02	1,152	48	30	65	65	60
SR-710 SB Off-Ramp to I-10 EB Connector	19	1	1	21	0.90	0.05	0.05	114	6	6	65	65	60
Circle Dr EB (FM43)	30	2	0	32	0.94	0.06	0.00	180	12	0	25	25	20
Circle Dr WB (FM43)	60	2	0	62	0.97	0.03	0.00	360	12	0	25	25	20
El Monte Bus Route EB	16	2	1	19	0.84	0.11	0.05	96	12	6	65	65	60
El Monte Bus Route WB	31	3	2	36	0.86	0.08	0.06	186	18	12	65	65	60
I-10 Collector/Distributor WB	20	0	0	20	1.00	0.00	0.00	120	0	0	65	65	60
SR-710 N/S to I-10 W Connector WB	232	16	26	274	0.85	0.06	0.09	1,392	96	156	65	65	60
I-10 WB	627	19	21	667	0.94	0.03	0.03	3,762	114	126	65	65	60
I-10 EB	758	33	18	809	0.94	0.04	0.02	4,548	198	108	65	65	60
Eastern Ave On-Ramp EB	68	1	1	70	0.97	0.01	0.01	408	6	6	65	65	60
Ramona Blvd Exit/SR-710 N Connector EB	57	4	0	61	0.93	0.07	0.00	342	24	0	65	65	60
I-10 E to SR-710 S Connector EB	205	15	26	246	0.83	0.06	0.11	1,230	90	156	65	65	60
Ramona Blvd Loop On-Ramp to SR-710 S	44	0	0	44	1.00	0.00	0.00	264	0	0	45	45	40
FM-25													
SR-710 NB	580	21	29	630	0.92	0.03	0.05	3,480	126	174	65	65	60
SR-710 SB	480	18	40	538	0.89	0.03	0.07	2,880	108	240	65	65	60
Cesar Chavez Ave Exit SB Off-Ramp	41	3	0	44	0.93	0.07	0.00	246	18	0	65	65	60
El Monte Bus Route EB	5	1	1	7	0.71	0.14	0.14	30	6	6	65	65	60
El Monte Bus Route WB	28	3	0	31	0.90	0.10	0.00	168	18	0	65	65	60
I-10 Collector/Distributor	7	0	0	7	1.00	0.00	0.00	42	0	0	65	65	60
SR-710 N/S to I-10 Connector WB	229	9	17	255	0.90	0.04	0.07	1,374	54	102	65	65	60
I-10 WB	618	30	19	667	0.93	0.04	0.03	3,708	180	114	65	65	60
I-10 EB	662	30	21	713	0.93	0.04	0.03	3,972	180	126	65	65	60
Eastern Ave. On-Ramp EB	67	5	0	72	0.93	0.07	0.00	402	30	0	65	65	60
Ramona Blvd Exit/SR-710 N Connector EB	55	1	0	56	0.98	0.02	0.00	330	6	0	65	65	60

Traffic Counts During Noise Monitoring - Freeway Tunnel Alternative

	Traffic Counts (10/15 min)				Distribution			Traffic Volume (Hourly)			Posted Speed		
Traffic Counts	**Auto**	**Medium**	**Heavy**	**Total**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**
I-10 E to SR-710 S Connector EB	178	5	18	201	0.89	0.02	0.09	1,068	30	108	65	65	60
Ramona Blvd Loop On-Ramp to SR-710 S	47	2	0	49	0.96	0.04	0.00	282	12	0	45	45	40
FM-26													
710 Fwy NB	545	39	44	628	0.87	0.06	0.07	3,270	234	264	65	65	60
710 Fwy SB	617	25	48	690	0.89	0.04	0.07	3,702	150	288	65	65	60
FM-27, FM-60, FM-61													
SR-210 SB	367	3	0	370	0.99	0.01	0.00	2,202	18	0	65	65	60
Pasadena Ave NB	101	1	0	102	0.99	0.01	0.00	606	6	0	25	25	20
SR-210 NB On-Ramp from Pasadena Ave NB	170	3	0	173	0.98	0.02	0.00	1,020	18	0	65	65	60
California Blvd EB	175	4	0	179	0.98	0.02	0.00	1,050	24	0	35	35	30
California Blvd. WB	120	4	1	125	0.96	0.03	0.01	720	24	6	35	35	30
FM-28, FM-29, FM-30													
SR-210 SB	263	1	0	264	1.00	0.00	0.00	1,578	6	0	65	65	60
Pasadena Ave NB	99	4	0	103	0.96	0.04	0.00	594	24	0	25	25	20
SR-210 NB On-Ramp from Pasadena Ave NB	153	5	0	158	0.97	0.03	0.00	918	30	0	65	65	60
California Blvd. EB	145	2	0	147	0.99	0.01	0.00	870	12	0	35	35	30
California Blvd. WB	115	3	0	118	0.97	0.03	0.00	690	18	0	35	35	30
FM-31, FM-32, FM-33													
SR-210 NB	163	1	0	164	0.99	0.01	0.00	978	6	0	65	65	60
SR-210 SB	241	1	0	242	1.00	0.00	0.00	1,446	6	0	65	65	60
SR-210 NB On-Ramp from Del Mar Blvd	133	1	0	134	0.99	0.01	0.00	798	6	0	65	65	60
SR-210 SB Off-Ramp to Del Mar Blvd	78	0	1	79	0.99	0.00	0.01	468	0	6	65	65	60
Pasadena Ave NB	42	1	1	44	0.95	0.02	0.02	252	6	6	25	25	20
Valley St. WB	1	0	0	1	1.00	0.00	0.00	6	0	0	25	25	20
Valley St. EB	0	0	0	0	0.00	0.00	0.00	0	0	0	25	25	20
FM-34, FM-35													
SR-210 NB	167	5	0	172	0.97	0.03	0.00	1,002	30	0	65	65	60
SR-210 SB	253	3	0	256	0.99	0.01	0.00	1,518	18	0	65	65	60
SR-210 NB On-Ramp from Del Mar Blvd.	105	3	0	108	0.97	0.03	0.00	630	18	0	65	65	60
SR-210 SB Off-Ramp to Del Mar Blvd.	64	1	0	65	0.98	0.02	0.00	384	6	0	65	65	60
Colorado Blvd EB (FM70)	64	3	0	67	0.96	0.04	0.00	384	18	0	35	35	30
Colorado Blvd WB (FM70)	45	3	0	48	0.94	0.06	0.00	270	18	0	35	35	30
Green St EB (FM68)	35	0	0	35	1.00	0.00	0.00	210	0	0	35	35	30
Green St WB (FM68)	4	0	0	4	1.00	0.00	0.00	24	0	0	35	35	30
Pasadena Ave NB	38	0	0	38	1.00	0.00	0.00	228	0	0	25	25	20
FM-36, FM-37													
SR-210 NB	120	2	1	123	0.98	0.02	0.01	720	12	6	65	65	60
SR-210 SB	104	2	1	107	0.97	0.02	0.01	624	12	6	65	65	60
SR-210 NB Off-Ramp	122	1	0	123	0.99	0.01	0.00	732	6	0	65	65	60
SR-210 NB Loop Ramp (over SR-210)	93	2	0	95	0.98	0.02	0.00	558	12	0	45	45	40
CA-134 to SR-210 SB Connector	163	2	1	166	0.98	0.01	0.01	978	12	6	65	65	60
Walnut St EB (FM72)	31	0	0	31	1.00	0.00	0.00	186	0	0	30	30	25
Walnut St WB (FM72)	47	0	0	47	1.00	0.00	0.00	282	0	0	30	30	25
Fair Oaks Ave NB (FM121)	148	2	2	152	0.97	0.01	0.01	888	12	12	45	45	40
Fair Oaks Ave SB (FM121)	162	4	1	167	0.97	0.02	0.01	972	24	6	45	45	40
S Pasadena Ave NB (FM71)	38	1	0	39	0.97	0.03	0.00	228	6	0	40	40	35
Union St WB (FM71)	50	0	0	50	1.00	0.00	0.00	300	0	0	35	35	30
SR-210 N to CA-134 EB Connector	133	2	1	136	0.98	0.01	0.01	798	12	6	65	65	60
Fair Oaks Off-Ramp EB	99	1	1	101	0.98	0.01	0.01	594	6	6	65	65	60
CA-134 EB	781	31	19	831	0.94	0.04	0.02	4,686	186	114	65	65	60
CA-134 WB	611	24	18	653	0.94	0.04	0.03	3,666	144	108	65	65	60
Maple St On-Ramp to CA-134 WB	102	1	0	103	0.99	0.01	0.00	612	6	0	65	65	60
CA-134 HOV/Carpool Lane WB	55	1	0	56	0.98	0.02	0.00	330	6	0	65	65	60
FM-38, FM-39, FM-40													
SR-210 NB	260	4	4	268	0.97	0.01	0.01	1,560	24	24	65	65	60
SR-210 SB	137	4	0	141	0.97	0.03	0.00	822	24	0	65	65	60
SR-210 NB On-Ramp	415	11	53	479	0.87	0.02	0.11	2,490	66	318	65	65	60
SR-210 Loop Ramp (Over CA-134)	114	4	3	121	0.94	0.03	0.02	684	24	18	45	45	40
SR-210 SB Off-Ramp to St. John Ave.	58	1	0	59	0.98	0.02	0.00	348	6	0	65	65	60
Orange Grove Blvd NB (FM87)	57	1	0	58	0.98	0.02	0.00	342	6	0	35	35	30
Orange Grove Blvd SB (FM87)	51	2	0	53	0.96	0.04	0.00	306	12	0	35	35	30
CA-134 WB to SR-210 NB	397	18	55	470	0.84	0.04	0.12	2,382	108	330	65	65	60
CA-134 WB to SR-210 SB	133	3	0	136	0.98	0.02	0.00	798	18	0	65	65	60

Traffic Counts During Noise Monitoring - Freeway Tunnel Alternative

	Traffic Counts (10/15 min)				Distribution			Traffic Volume (Hourly)			Posted Speed		
Traffic Counts	**Auto**	**Medium**	**Heavy**	**Total**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**
Maple St On-Ramp to CA-134 WB	120	2	0	122	0.98	0.02	0.00	720	12	0	65	65	60
CA-134 WB	625	21	13	659	0.95	0.03	0.02	3,750	126	78	65	65	60
CA-134 WB HOV/Carpool	91	0	0	91	1.00	0.00	0.00	546	0	0	65	65	60
CA-134 EB	920	29	22	971	0.95	0.03	0.02	5,520	174	132	65	65	60
SR-210 N to CA-134 EB Connector	137	2	0	139	0.99	0.01	0.00	822	12	0	65	65	60
Fair Oaks Ave. Off-Ramp EB	108	1	0	109	0.99	0.01	0.00	648	6	0	65	65	60
FM-41, FM-48, FM-49													
SR-210 NB On-Ramp	595	28	80	703	0.85	0.04	0.11	2,380	112	320	45	45	40
SR-210 NB	221	6	0	227	0.97	0.03	0.00	884	24	0	65	65	60
SR-210 SB	460	8	2	470	0.98	0.02	0.00	1,840	32	8	65	65	60
SR-210 SB Off-Ramp	701	31	71	803	0.87	0.04	0.09	2,804	124	284	45	45	40
N Pasadena Ave NB (FM99)	3	0	0	3	1.00	0.00	0.00	12	0	0	30	30	25
N Pasadena Ave SB (FM99)	5	0	0	5	1.00	0.00	0.00	20	0	0	30	30	25
FM-42, FM-43, FM-47													
SR-210 NB On-Ramp	193	3	2	198	0.97	0.02	0.01	1,158	18	12	65	65	60
SR-210 SB Off-Ramp	164	3	0	167	0.98	0.02	0.00	984	18	0	65	65	60
SR-210 NB	347	11	67	425	0.82	0.03	0.16	2,082	66	402	65	65	60
SR-210 SB	372	15	38	425	0.88	0.04	0.09	2,232	90	228	65	65	60
Mountain St. Exit Off-Ramp NB	56	3	1	60	0.93	0.05	0.02	336	18	6	65	65	60
Mountain St. On-Ramp to SR-210 SB	53	3	0	56	0.95	0.05	0.00	318	18	0	65	65	60
FM-50, FM-51, FM-52													
Del Mar Blvd / California Blvd to 110 Ramp EB	111	2	0	113	0.98	0.02	0.00	666	12	0	65	65	60
SR-210 West On-Ramp EB	110	2	1	113	0.97	0.02	0.01	660	12	6	65	65	60
CA-134 EB	958	23	13	994	0.96	0.02	0.01	5,748	138	78	65	65	65
CA-134 EB HOV	69	2	0	71	0.97	0.03	0.00	414	12	0	65	65	60
CA-134 WB	909	19	9	937	0.97	0.02	0.01	5,454	114	54	65	65	60
CA-134 WB HOV	123	2	0	125	0.98	0.02	0.00	738	12	0	65	65	60
Orange Grove On-Ramp to CA-134 EB	97	0	0	97	1.00	0.00	0.00	582	0	0	45	45	40
Orange Grove Off-Ramp from CA-134 WB	104	3	0	107	0.97	0.03	0.00	624	18	0	45	45	40
SR-210 NB to CA-134 WB On-Ramp	177	0	0	177	1.00	0.00	0.00	1,062	0	0	65	65	60
SR-210 SB to CA-134 WB On-Ramp	123	5	0	128	0.96	0.04	0.00	738	30	0	65	65	60
SR-210 NB	307	3	1	311	0.99	0.01	0.00	1,228	12	4	65	65	60
SR-210 SB	401	5	0	406	0.99	0.01	0.00	1,604	20	0	65	65	60
SR-210 SB Off-Ramp	217	1	0	218	1.00	0.00	0.00	868	4	0	45	45	40
SR-210 NB On-Ramp	65	2	0	67	0.97	0.03	0.00	260	8	0	45	45	40
N Pasadena Ave SB (FM97)	2	0	0	2	1.00	0.00	0.00	8	0	0	25	25	20
N Pasadena Ave NB (FM97)	2	0	0	2	1.00	0.00	0.00	8	0	0	25	25	20
FM-53													
CA-134 WB	999	40	43	1,082	0.92	0.04	0.04	3,996	160	172	65	65	60
CA-134 WB HOV	120	6	0	126	0.95	0.05	0.00	480	24	0	65	65	60
CA-134 EB	910	23	39	972	0.94	0.02	0.04	3,640	92	156	65	65	60
CA-134 EB HOV	53	0	0	53	1.00	0.00	0.00	212	0	0	65	65	60
SR-210 West On Ramp EB	71	3	1	75	0.95	0.04	0.01	284	12	4	65	65	60
Del Mar Blvd / California Blvd to 110 Ramp EB	102	4	1	107	0.95	0.04	0.01	408	16	4	65	65	60
Orange Grove Off-Ramp from CA-134 WB (FM118)	59	1	1	61	0.97	0.02	0.02	236	4	4	45	45	40
Orange Grove On-Ramp to CA-134 EB (FM118)	67	2	1	70	0.96	0.03	0.01	268	8	4	45	45	40
FM-54, FM-55, FM-56													
SR-210 NB	121	2	0	123	0.98	0.02	0.00	726	12	0	65	65	60
SR-210 SB	125	5	0	130	0.96	0.04	0.00	750	30	0	65	65	60
SR-210 SB On-Ramp	121	0	0	121	1.00	0.00	0.00	726	0	0	65	65	60
SR-210 NB Loop Ramp (over SR-210)	67	0	0	67	1.00	0.00	0.00	402	0	0	45	45	40
SR-210 NB Off-Ramp	121	2	0	123	0.98	0.02	0.00	726	12	0	65	65	60
St John Ave SB (FM82)	40	1	0	41	0.98	0.02	0.00	240	6	0	35	35	30
SR134 EB to SR-210 WB/NB On-Ramp	67	5	0	72	0.93	0.07	0.00	402	30	0	65	65	60
Del Mar Blvd/California Blvd Exit to SR-110	92	1	0	93	0.99	0.01	0.00	552	6	0	65	65	60
CA-134 EB	756	32	15	803	0.94	0.04	0.02	4,536	192	90	65	65	60
CA-134 HOV/Carpool EB	74	5	0	79	0.94	0.06	0.00	444	30	0	65	65	60
CA-134 WB	665	21	20	706	0.94	0.03	0.03	3,990	126	120	65	65	60
CA-134 HOV/Carpool WB	79	0	0	79	1.00	0.00	0.00	474	0	0	65	65	60
Orange Grove Off-Ramp from CA-134 WB	29	0	0	29	1.00	0.00	0.00	174	0	0	65	65	60
Orange Grove On-Ramp to CA-134 EB	57	2	0	59	0.97	0.03	0.00	342	12	0	65	65	60
FM-57, FM-58, FM-59													
SR-210 EB/WB On-Ramp	84	2	1	87	0.97	0.02	0.01	336	8	4	45	45	40
CA-134 WB On-Ramp	262	5	0	267	0.98	0.02	0.00	1,048	20	0	45	45	40

Traffic Counts During Noise Monitoring - Freeway Tunnel Alternative

	Traffic Counts (10/15 min)				**Distribution**			**Traffic Volume (Hourly)**			**Posted Speed**		
Traffic Counts	**Auto**	**Medium**	**Heavy**	**Total**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**	**Auto**	**Medium**	**Heavy**
SR-210 NB	357	9	2	368	0.97	0.02	0.01	1,428	36	8	65	65	60
SR-210 SB	581	1	0	582	1.00	0.00	0.00	2,324	4	0	65	65	60
Del Mar Blvd Off-Ramp SB	361	2	0	363	0.99	0.01	0.00	1,444	8	0	45	45	40
Del Mar Blvd EB (FM79)	17	0	0	17	1.00	0.00	0.00	68	0	0	35	35	30
Del Mar Blvd WB (FM79)	117	0	0	117	1.00	0.00	0.00	468	0	0	35	35	30
St John Ave SB (FM81)	22	0	0	22	1.00	0.00	0.00	88	0	0	35	35	30
St John Ave SB (FM80)	24	0	0	24	1.00	0.00	0.00	96	0	0	35	35	30
FM-62, FM-63, FM-64													
S Pasadena Ave NB	343	6	2	351	0.98	0.02	0.01	2,058	36	12	25	25	20
SR-710 NB On-Ramp from S Pasadena Ave	252	2	2	256	0.98	0.01	0.01	1,512	12	12	65	65	60
California Blvd EB (FM73)	84	0	2	86	0.98	0.00	0.02	504	0	12	35	35	30
California Blvd WB (FM73)	58	0	0	58	1.00	0.00	0.00	348	0	0	35	35	30
California Blvd EB (FM74)	151	7	2	160	0.94	0.04	0.01	906	42	12	35	35	30
California Blvd WB (FM74)	38	0	0	38	1.00	0.00	0.00	228	0	0	35	35	30
SR-710 SB	313	8	0	321	0.98	0.02	0.00	1,878	48	0	65	65	60
FM-44, FM-45, FM-46													
SR-210 NB On-Ramp	177	1	0	178	0.99	0.01	0.00	1,062	6	0	65	65	60
SR-210 SB Off-Ramp	147	7	2	156	0.94	0.04	0.01	882	42	12	65	65	60
SR-210 NB	379	14	47	440	0.86	0.03	0.11	2,274	84	282	65	65	60
SR-210 SB	344	26	38	408	0.84	0.06	0.09	2,064	156	228	65	65	60
Mountain St. Exit Off-Ramp NB	53	1	0	54	0.98	0.02	0.00	318	6	0	65	65	60
Mountain St. On-Ramp to SR-210 SB	55	1	1	57	0.96	0.02	0.02	330	6	6	65	65	60

LARSON DAVIS MODEL 820 NOISE METER CERTIFICATION

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-172024

Instrument Model 820, Serial Number 1584, was calibrated on 02APR2013. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 02APR2013
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0277 / 0109	12 Months	08MAR2014	2013-171090

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 37 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

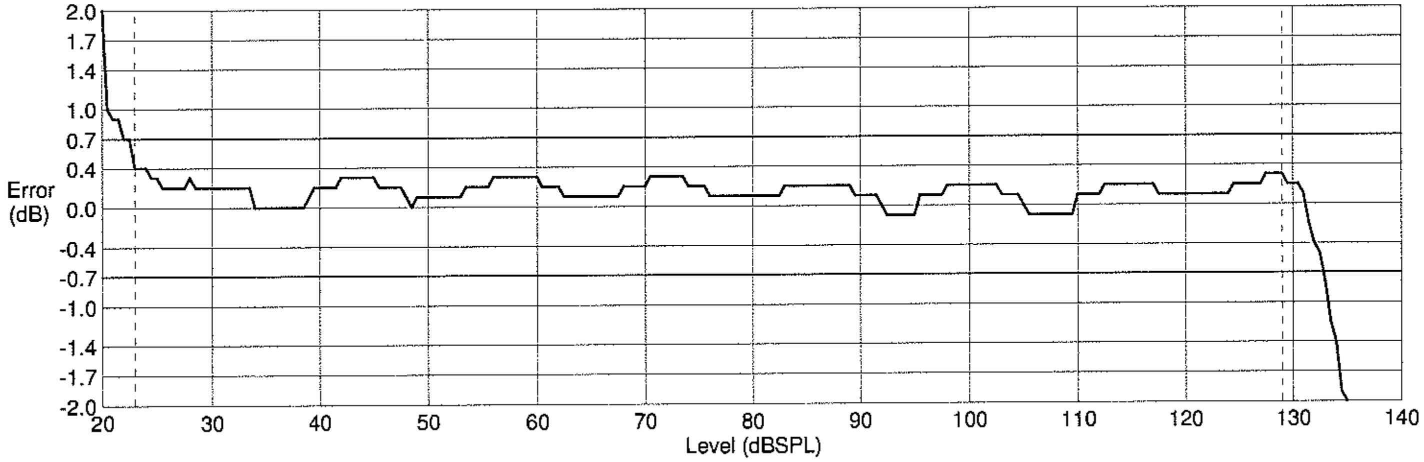
The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.
Tested with PRM828-2484

Signed: Ron Harris
Technician: Ron Harris

Sound Level Meter Model: 820A Serial Number: A1584
Log Linearity, Differential Linearity and Range Data

This Type 1 Sound Level Meter (including attached PRM828 preamplifier and ADP005 18 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 114.0 dBSPL. The instrument's Log Linearity A-weighted slow response was then electrically tested using a 1kHz sine wave from 18.0 dBSPL to 138.0 dBSPL in 0.5 dB increments.



Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB
18.0	**20.2**	**2.2**	38.5	38.5	0.0	59.0	59.3	0.3	79.5	79.6	0.1	100.0	100.2	0.2	120.5	120.6	0.1
18.5	**20.3**	**1.8**	39.0	39.1	0.1	59.5	59.8	0.3	80.0	80.1	0.1	100.5	100.7	0.2	121.0	121.1	0.1
19.0	**20.7**	**1.7**	39.5	39.7	0.2	60.0	60.3	0.3	80.5	80.6	0.1	101.0	101.2	0.2	121.5	121.6	0.1
19.5	**21.0**	**1.5**	40.0	40.2	0.2	60.5	60.7	0.2	81.0	81.1	0.1	101.5	101.7	0.2	122.0	122.1	0.1
20.0	**21.2**	**1.2**	40.5	40.7	0.2	61.0	61.2	0.2	81.5	81.6	0.1	102.0	102.2	0.2	122.5	122.6	0.1
20.5	**21.5**	**1.0**	41.0	41.2	0.2	61.5	61.7	0.2	82.0	82.1	0.1	102.5	102.7	0.2	123.0	123.1	0.1
21.0	**21.9**	**0.9**	41.5	41.7	0.2	62.0	62.2	0.2	82.5	82.6	0.1	103.0	103.1	0.1	123.5	123.6	0.1
21.5	**22.4**	**0.9**	42.0	42.3	0.3	62.5	62.6	0.1	83.0	83.2	0.2	103.5	103.6	0.1	124.0	124.1	0.1
22.0	**22.7**	**0.7**	42.5	42.8	0.3	63.0	63.1	0.1	83.5	83.7	0.2	104.0	104.1	0.1	124.5	124.7	0.2
22.5	**23.2**	**0.7**	43.0	43.3	0.3	63.5	63.6	0.1	84.0	84.2	0.2	104.5	104.6	0.1	125.0	125.2	0.2
23.0	23.4	0.4	43.5	43.8	0.3	64.0	64.1	0.1	84.5	84.7	0.2	105.0	105.0	0.0	125.5	125.7	0.2
23.5	23.9	0.4	44.0	44.3	0.3	64.5	64.6	0.1	85.0	85.2	0.2	105.5	105.4	-0.1	126.0	126.2	0.2
24.0	24.4	0.4	44.5	44.8	0.3	65.0	65.1	0.1	85.5	85.7	0.2	106.0	105.9	-0.1	126.5	126.7	0.2
24.5	24.8	0.3	45.0	45.3	0.3	65.5	65.6	0.1	86.0	86.2	0.2	106.5	106.4	-0.1	127.0	127.2	0.2
25.0	25.3	0.3	45.5	45.7	0.2	66.0	66.1	0.1	86.5	86.7	0.2	107.0	106.9	-0.1	127.5	127.8	0.3
25.5	25.7	0.2	46.0	46.2	0.2	66.5	66.6	0.1	87.0	87.2	0.2	107.5	107.4	-0.1	128.0	128.3	0.3
26.0	26.2	0.2	46.5	46.7	0.2	67.0	67.1	0.1	87.5	87.7	0.2	108.0	107.9	-0.1	128.5	128.8	0.3
26.5	26.7	0.2	47.0	47.2	0.2	67.5	67.6	0.1	88.0	88.2	0.2	108.5	108.4	-0.1	129.0	129.3	0.3
27.0	27.2	0.2	47.5	47.7	0.2	68.0	68.2	0.2	88.5	88.7	0.2	109.0	108.9	-0.1	**129.5**	**129.7**	**0.2**
27.5	27.7	0.2	48.0	48.1	0.1	68.5	68.7	0.2	89.0	89.2	0.2	109.5	109.4	-0.1	**130.0**	**130.2**	**0.2**
28.0	28.3	0.3	48.5	48.5	0.0	69.0	69.2	0.2	89.5	89.6	0.1	110.0	110.1	0.1	**130.5**	**130.7**	**0.2**
28.5	28.7	0.2	49.0	49.1	0.1	69.5	69.7	0.2	90.0	90.1	0.1	110.5	110.6	0.1	**131.0**	**131.1**	**0.1**
29.0	29.2	0.2	49.5	49.6	0.1	70.0	70.2	0.2	90.5	90.6	0.1	111.0	111.1	0.1	**131.5**	**131.3**	**-0.2**
29.5	29.7	0.2	50.0	50.1	0.1	70.5	70.8	0.3	91.0	91.1	0.1	111.5	111.6	0.1	**132.0**	**131.6**	**-0.4**
30.0	30.2	0.2	50.5	50.6	0.1	71.0	71.3	0.3	91.5	91.6	0.1	112.0	112.1	0.1	**132.5**	**132.0**	**-0.5**
30.5	30.7	0.2	51.0	51.1	0.1	71.5	71.8	0.3	92.0	92.0	0.0	112.5	112.7	0.2	**133.0**	**132.2**	**-0.8**
31.0	31.2	0.2	51.5	51.6	0.1	72.0	72.3	0.3	92.5	92.4	-0.1	113.0	113.2	0.2	**133.5**	**132.3**	**-1.2**
31.5	31.7	0.2	52.0	52.1	0.1	72.5	72.8	0.3	93.0	92.9	-0.1	113.5	113.7	0.2	**134.0**	**132.6**	**-1.4**
32.0	32.2	0.2	52.5	52.6	0.1	73.0	73.3	0.3	93.5	93.4	-0.1	114.0	114.2	0.2	**134.5**	**132.6**	**-1.9**
32.5	32.7	0.2	53.0	53.1	0.1	73.5	73.8	0.3	94.0	93.9	-0.1	114.5	114.7	0.2	**135.0**	**132.6**	**-2.4**
33.0	33.2	0.2	53.5	53.7	0.2	74.0	74.2	0.2	94.5	94.4	-0.1	115.0	115.2	0.2	**135.5**	**132.6**	**-2.9**
33.5	33.7	0.2	54.0	54.2	0.2	74.5	74.7	0.2	95.0	94.9	-0.1	115.5	115.7	0.2	**136.0**	**132.6**	**-3.4**
34.0	34.0	0.0	54.5	54.7	0.2	75.0	75.2	0.2	95.5	95.6	0.1	116.0	116.2	0.2	**136.5**	**132.5**	**-4.0**
34.5	34.5	0.0	55.0	55.2	0.2	75.5	75.7	0.2	96.0	96.1	0.1	116.5	116.7	0.2	**137.0**	**132.5**	**-4.5**
35.0	35.0	0.0	55.5	55.7	0.2	76.0	76.1	0.1	96.5	96.6	0.1	117.0	117.2	0.2	**137.5**	**132.6**	**-4.9**
35.5	35.5	0.0	56.0	56.3	0.3	76.5	76.6	0.1	97.0	97.1	0.1	117.5	117.6	0.1	**138.0**	**132.6**	**-5.4**
36.0	36.0	0.0	56.5	56.8	0.3	77.0	77.1	0.1	97.5	97.6	0.1	118.0	118.1	0.1			
36.5	36.5	0.0	57.0	57.3	0.3	77.5	77.6	0.1	98.0	98.2	0.2	118.5	118.6	0.1			
37.0	37.0	0.0	57.5	57.8	0.3	78.0	78.1	0.1	98.5	98.7	0.2	119.0	119.1	0.1			
37.5	37.5	0.0	58.0	58.3	0.3	78.5	78.6	0.1	99.0	99.2	0.2	119.5	119.6	0.1			
38.0	38.0	0.0	58.5	58.8	0.3	79.0	79.1	0.1	99.5	99.7	0.2	120.0	120.1	0.1			

Plotted per typical sensitivity of a 2541 microphone; 44.5 mV/Pa & 17.1 pF.

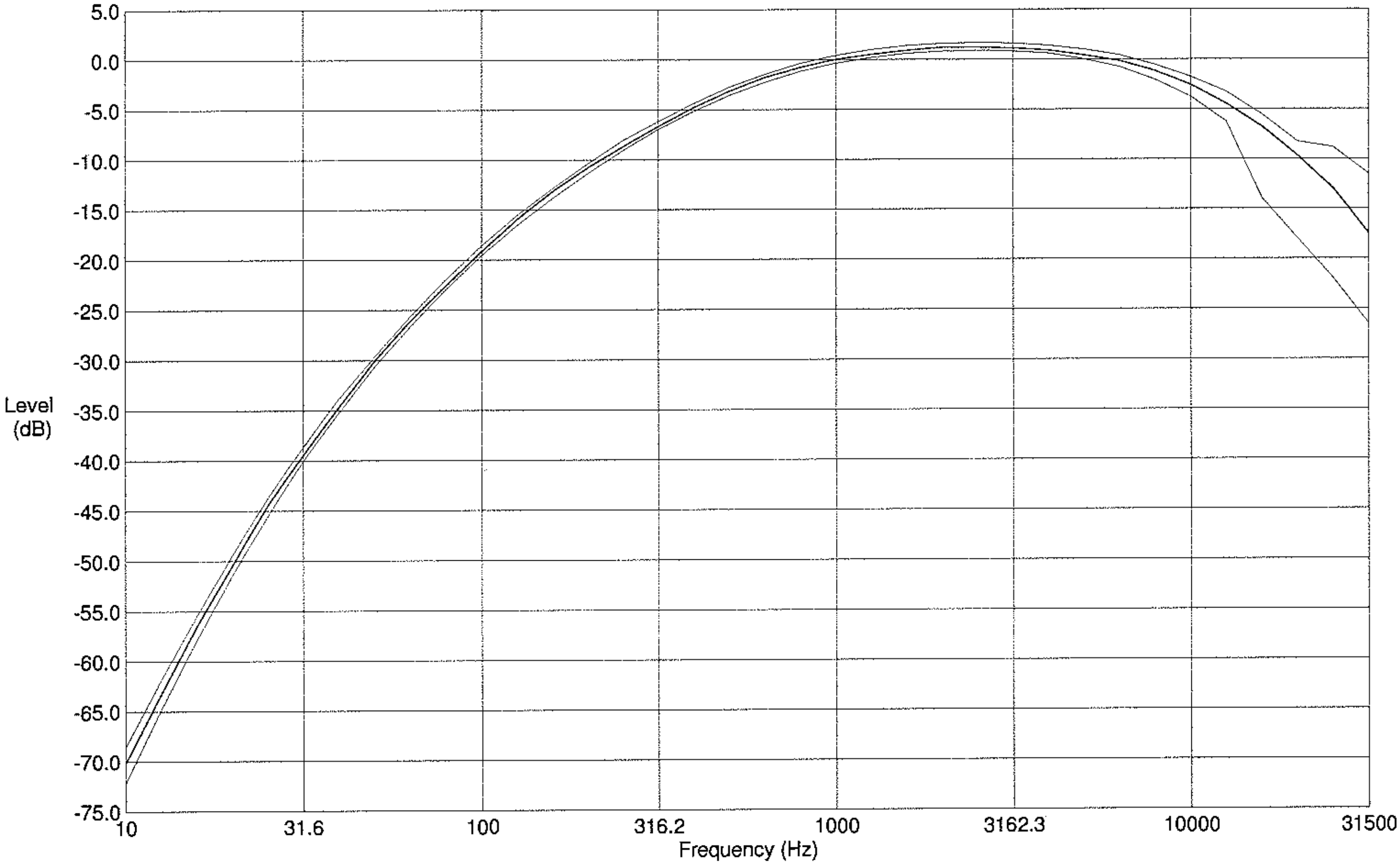
Overload occurs at 129.1 dBSPL.
Primary indicator range: 106.0 dB (lower limit: 23.0 dBSPL to upper limit: 129.0 dBSPL).
Dynamic range: 112.1 dB (noise floor: 16.9 dBSPL to upper limit: 129.0 dBSPL).

This instrument is in compliance with IEC 60651 (2001-10) 7.9 and 7.10, ANSI S1.4-1983 3.2 and IEC 60804 (2001-10) 9.2.1 for Type 1 sound level meters when used with a Larson Davis Type 1 microphone.

Technician: Ron Harris Test Date: 02APR2013

Sound Level Meter Model: 820A Serial Number: A1584
Certificate of A-Weight Electrical Conformance

This Type 1 Sound Level Meter (including attached PRM828 preamplifier and ADP005 18 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 114.0 dBSPL. The instrument's A-weighted response was then electrically tested using a 1.8 Vrms sinewave at exact frequencies as specified in IEC 60651 (2001-10) and ANSI S1.4-1983.



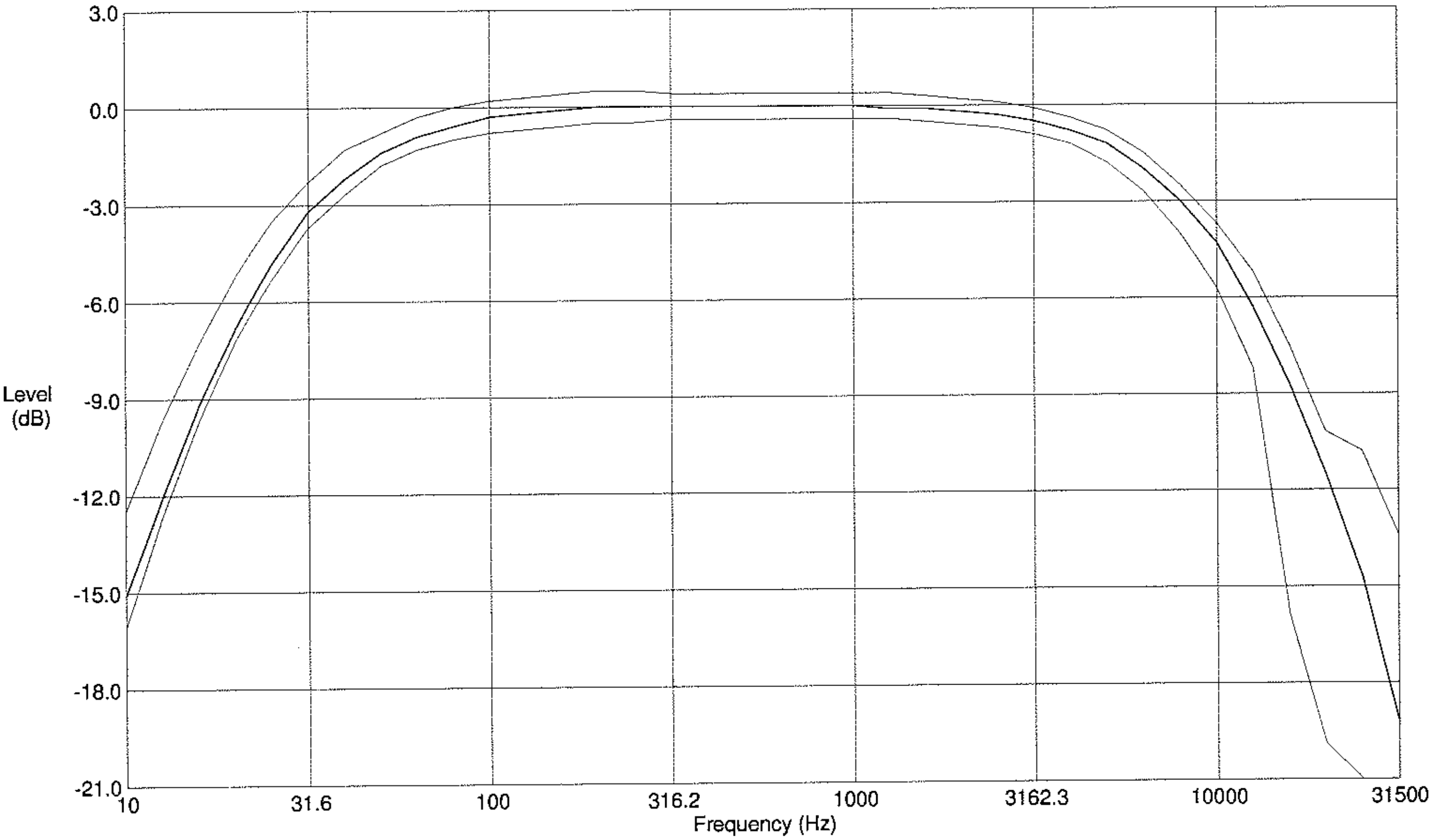
Freq (Hz)	Theor	Measured	Error	Tolerance
10.00	-70.4	-70.20	0.20	+1.8, -1.8
12.59	-63.4	-63.30	0.10	+1.5, -1.5
15.85	-56.7	-56.50	0.20	+1.2, -1.2
19.95	-50.5	-50.50	0.00	+1.0, -1.0
25.12	-44.7	-44.50	0.20	+0.9, -0.9
31.62	-39.4	-39.50	-0.10	+0.7, -0.7
39.81	-34.6	-34.70	-0.10	+0.7, -0.7
50.12	-30.2	-30.10	0.10	+0.5, -0.5
63.10	-26.2	-26.10	0.10	+0.5, -0.5
79.43	-22.5	-22.60	-0.10	+0.5, -0.5
100.00	-19.1	-19.20	-0.10	+0.5, -0.5
125.89	-16.1	-16.00	0.10	+0.5, -0.5
158.49	-13.4	-13.20	0.20	+0.5, -0.5
199.53	-10.9	-10.80	0.10	+0.5, -0.5
251.19	-8.6	-8.70	-0.10	+0.5, -0.5
316.23	-6.6	-6.70	-0.10	+0.4, -0.4
398.11	-4.8	-4.80	0.00	+0.4, -0.4
501.19	-3.2	-3.20	0.00	+0.4, -0.4
630.96	-1.9	-1.80	0.10	+0.4, -0.4
794.33	-0.8	-0.80	0.00	+0.4, -0.4
1000.00	0.0	0.00	0.00	+0.4, -0.4
1258.90	0.6	0.50	-0.10	+0.4, -0.4
1584.90	1.0	0.90	-0.10	+0.4, -0.4
1995.30	1.2	1.20	0.00	+0.4, -0.4
2511.90	1.3	1.20	-0.10	+0.4, -0.4
3162.30	1.2	1.10	-0.10	+0.4, -0.4
3981.10	1.0	0.90	-0.10	+0.4, -0.4
5011.90	0.5	0.40	-0.10	+0.5, -0.5
6309.60	-0.1	-0.20	-0.10	+0.5, -0.7
7943.30	-1.1	-1.20	-0.10	+0.5, -1.0
10000.00	-2.5	-2.60	-0.10	+0.7, -1.3
12589.00	-4.3	-4.50	-0.20	+1.0, -2.0
15849.00	-6.6	-6.80	-0.20	+1.0, -7.4
19953.00	-9.3	-9.70	-0.40	+1.0, -8.7
25119.00	-12.4	-13.00	-0.60	+3.5, -9.6
31623.00	-15.8	-17.50	-1.70	+4.3, -10.7

This instrument is in compliance with IEC 60651 (2001-10) 6.1 and 9.2.2, ANSI S1.4-1983 5.1 and 8.2.1, and IEC 60804 (2001-10) 5.1 for Type 1 sound level meters when used with a Larson Davis Type 1 microphone.

Technician: Ron Harris Test Date: 02APR2013

Sound Level Meter Model: 820A Serial Number: A1584
Certificate of C-Weight Electrical Conformance

This Type 1 Sound Level Meter (including attached PRM828 preamplifier and ADP005 18 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 114.0 dBSPL. The instrument's C-weighted response was then electrically tested using a 1.8 Vrms sinewave at exact frequencies as specified in IEC 60651 (2001-10) and ANSI S1.4-1983.



Freq (Hz)	Theor	Measured	Error	Tolerance
10.00	-14.3	-15.10	-0.80	+1.8, -1.8
12.59	-11.2	-12.10	-0.90	+1.5, -1.5
15.85	-8.5	-9.20	-0.70	+1.2, -1.2
19.95	-6.2	-6.80	-0.60	+1.0, -1.0
25.12	-4.4	-4.80	-0.40	+0.9, -0.9
31.62	-3.0	-3.20	-0.20	+0.7, -0.7
39.81	-2.0	-2.20	-0.20	+0.7, -0.7
50.12	-1.3	-1.40	-0.10	+0.5, -0.5
63.10	-0.8	-0.90	-0.10	+0.5, -0.5
79.43	-0.5	-0.60	-0.10	+0.5, -0.5
100.00	-0.3	-0.30	0.00	+0.5, -0.5
125.89	-0.2	-0.20	0.00	+0.5, -0.5
158.49	-0.1	-0.10	0.00	+0.5, -0.5
199.53	0.0	0.00	0.00	+0.5, -0.5
251.19	0.0	0.00	0.00	+0.5, -0.5
316.23	0.0	0.00	0.00	+0.4, -0.4
398.11	0.0	0.00	0.00	+0.4, -0.4
501.19	0.0	0.00	0.00	+0.4, -0.4

Freq (Hz)	Theor	Measured	Error	Tolerance
630.96	0.0	0.00	0.00	+0.4, -0.4
794.33	0.0	0.00	0.00	+0.4, -0.4
1000.00	0.0	0.00	0.00	+0.4, -0.4
1258.90	0.0	-0.10	-0.10	+0.4, -0.4
1584.90	-0.1	-0.10	0.00	+0.4, -0.4
1995.30	-0.2	-0.20	0.00	+0.4, -0.4
2511.90	-0.3	-0.30	0.00	+0.4, -0.4
3162.30	-0.5	-0.50	0.00	+0.4, -0.4
3981.10	-0.8	-0.80	0.00	+0.4, -0.4
5011.90	-1.3	-1.20	0.10	+0.5, -0.5
6309.60	-2.0	-2.00	0.00	+0.5, -0.7
7943.30	-3.0	-3.00	0.00	+0.5, -1.0
10000.00	-4.4	-4.30	0.10	+0.7, -1.3
12589.00	-6.2	-6.30	-0.10	+1.0, -2.0
15849.00	-8.5	-8.70	-0.20	+1.0, -7.4
19953.00	-11.2	-11.50	-0.30	+1.0, -8.7
25119.00	-14.3	-14.70	-0.40	+3.5, -9.6
31623.00	-17.7	-19.20	-1.50	+4.3, -10.7

This instrument is in compliance with IEC 60651 (2001-10) 6.1 and 9.2.2, ANSI S1.4-1983 5.1 and 8.2.1, and IEC 60804 (2001-10) 5.1 for Type 1 sound level meters when used with a Larson Davis Type 1 microphone.

Technician: Ron Harris Test Date: 02APR2013

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-172979

Microphone Model PCB 377A60, Serial Number 101355, was calibrated on 19APR2013. The microphone meets factory specifications per Test Procedure D0001.8167.

Instrument found to be in calibration as received: NO
Date Calibrated: 19APR2013
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2559	2506	12 Months	11JUN2013	19157-1
Larson Davis	2900	0575	12 Months	26JUL2013	2012-162047
Larson Davis	PRM902	0206	12 Months	14AUG2013	2012-162575
Larson Davis	2559	3034LF	12 Months	14AUG2013	2012-162596
Larson Davis	MTS1000 / 2201	1000 / 0100	12 Months	07SEP2013	SM070912-2
Larson Davis	PRM902	0529	12 Months	07SEP2013	2012-163529
Larson Davis	PRM902	0528	12 Months	10SEP2013	2012-163530
Hewlett Packard	34401A	3146A62099	12 Months	26NOV2013	5884920
Larson Davis	PRM915	0102	12 Months	04DEC2013	2012-167168
Larson Davis	PRM916	0102	12 Months	13DEC2013	2012-167454
Larson Davis	CAL250	42630	12 Months	04JAN2014	2013-168402

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data is unavailable due to unit failure.

Signed: Abraham Ortega
Technician: Abraham Ortega

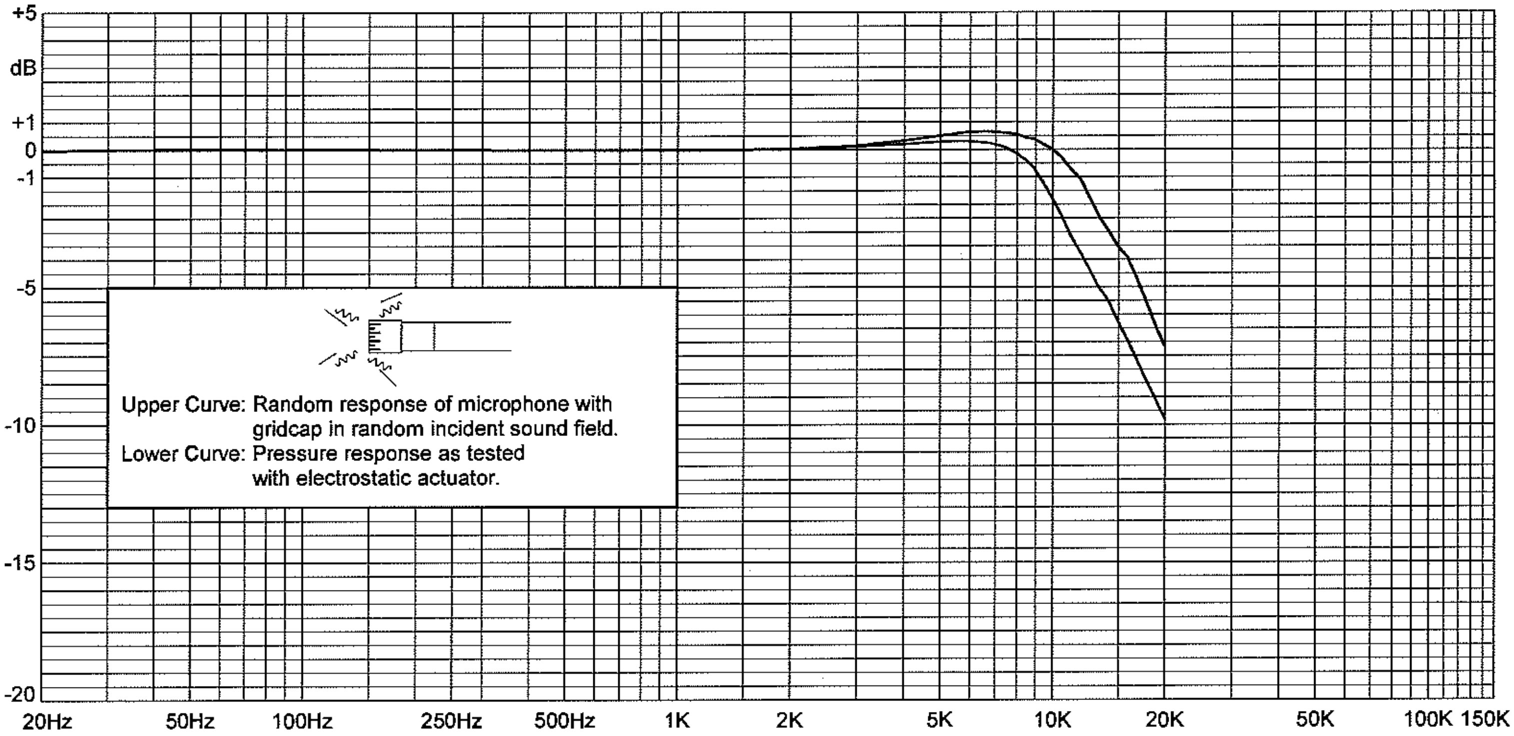
Larson Davis

PCB 1/2" Microphone Calibration Chart
Model: 377A60 Serial Number: 101355

Open Circuit Sensitivity @ 1014.6 mbar & 251.19 Hz
-26.87 dB re 1V/Pascal
45.36 mV/Pascal
+0.85 K_0(-dB re 50 mV/Pascal)
Expanded Uncertainty @ ~95% confidence level
0.18 dB

Capacitance @ 251.2 Hz
18.4 pF
Lower Limiting Frequency
-3 dB @ **1.19** Hz
Test Conditions:

Polarization Voltage	**200** V
Ambient Pressure	**1014.6** mbar
Temperature	**23.9** °C
Relative Humidity	**29.3** %



Frequency Response (0 dB @ 251.19 Hz)
Random and actuator response with reference to level at 251.19 Hz

Freq (Hz)	Upper (dB)	Lower (dB)
19.95	-0.03	-0.03
25.12	0.00	-0.00
31.62	0.01	0.01
39.81	0.02	0.02
50.12	0.02	0.02
63.10	0.02	0.02
79.43	0.02	0.02
100.00	0.02	0.02
125.89	0.01	0.01
158.49	0.01	0.01
199.53	0.00	0.00
251.19	0.00	0.00
316.23	0.00	-0.00
398.11	-0.01	-0.01
501.19	-0.01	-0.01
630.96	-0.01	-0.01
794.33	-0.01	-0.01
1000.00	-0.01	-0.01
1059.25	-0.01	-0.01
1122.02	-0.01	-0.01
1188.50	-0.01	-0.01
1258.93	0.00	-0.00
1333.52	0.00	-0.00
1412.54	0.00	0.00
1496.24	0.01	0.01
1584.89	0.01	0.01
1678.80	0.01	0.01
1778.28	0.02	0.02
1883.65	0.03	0.03
1995.26	0.03	0.03
2113.49	0.04	0.04
2238.72	0.06	0.06
2371.37	0.08	0.07
2511.89	0.09	0.08
2660.73	0.10	0.09
2818.38	0.13	0.11
2985.38	0.15	0.12
3162.28	0.18	0.14
3349.65	0.22	0.16
3548.13	0.25	0.17
3758.37	0.29	0.19
3981.07	0.32	0.20
4216.97	0.37	0.23
4466.84	0.42	0.25
4731.51	0.47	0.27
5011.87	0.52	0.29
5308.84	0.55	0.30
5623.41	0.60	0.31
5956.62	0.63	0.30
6309.57	0.65	0.28
6683.44	0.66	0.24
7079.46	0.64	0.18
7498.94	0.60	0.06
7943.28	0.56	-0.12
8413.95	0.44	-0.36
8912.51	0.38	-0.68
9440.61	0.20	-1.20
10000.00	0.00	-1.80
10592.54	-0.30	-2.42
11220.19	-0.71	-3.16
11885.02	-1.08	-3.77
12589.25	-1.77	-4.39
13335.21	-2.46	-5.04
14125.38	-2.96	-5.50
14962.36	-3.53	-6.25
15848.93	-3.90	-6.90
16788.04	-4.67	-7.62
17782.80	-5.49	-8.38
16836.49	-6.39	-9.07
19952.62	-7.15	-9.77

Abraham Ortega 19APR2013
Larson-Davis Model 9700 ES Microphone Calibration System

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-172016

Instrument Model PRM828, Serial Number 2484, was calibrated on 02APR2013. The instrument meets factory specifications per Procedure D0001.8135.

Instrument found to be in calibration as received: YES
Date Calibrated: 02APR2013
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Agilent Technologies	34401A	MY41044529	12 Months	25JAN2014	5954339
Larson Davis	LDSigGn/2209	0277 / 0109	12 Months	08MAR2014	2013-171090

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 37 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

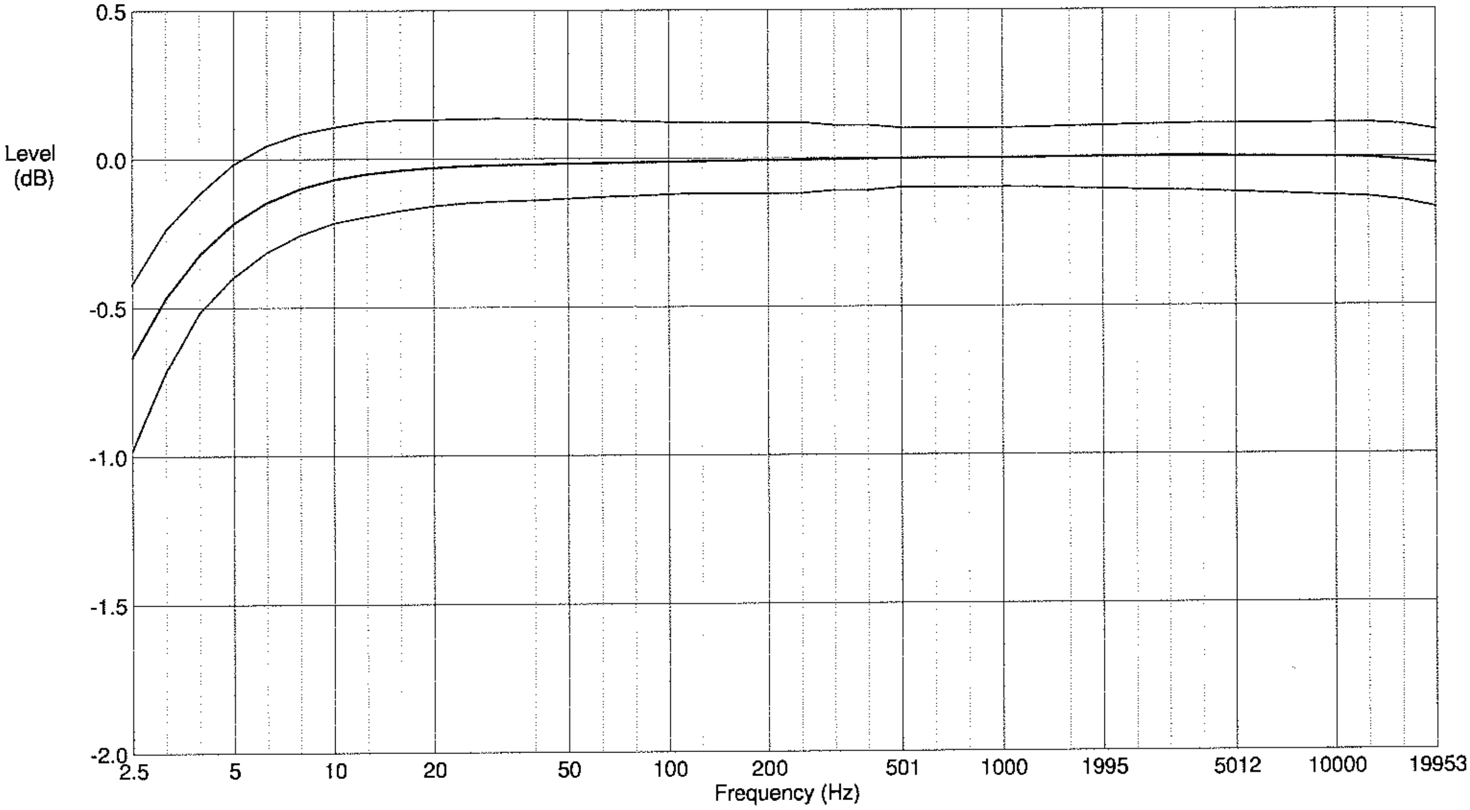
The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.

Signed: Ron Harris
Technician: Ron Harris

Preamplifier Model: 828 Serial Number: 2484
Certificate of Electrical Conformance

Frequency response of this model 828 preamplifier was tested at a level of 1 Vrms with 18pF microphone capacitance and driving a short cable. Output level at 1kHz is 0.8899 Vrms (-1.013 dBV), uncertainty 0.033 dB. Results are displayed relative to the level at 1kHz.



Freq (Hz)	Measured (dB)	Uncert (dB)	Tolerance (dB)
2.51	-0.67	0.075	-0.42, -0.98
3.16	-0.47	0.058	-0.24, -0.72
3.98	-0.32	0.058	-0.12, -0.52
5.01	-0.22	0.036	-0.02, -0.40
6.31	-0.15	0.036	+0.05, -0.31
7.94	-0.10	0.036	+0.08, -0.26
10.00	-0.07	0.016	+0.11, -0.22
12.59	-0.05	0.016	+0.13, -0.19
15.85	-0.04	0.016	+0.13, -0.18
19.95	-0.03	0.016	+0.13, -0.16
25.12	-0.03	0.016	+0.13, -0.15
31.62	-0.02	0.016	+0.14, -0.14
39.81	-0.02	0.016	+0.14, -0.14
50.12	-0.02	0.016	+0.13, -0.14
63.10	-0.02	0.016	+0.13, -0.13
79.43	-0.01	0.016	+0.13, -0.13
100.00	-0.01	0.016	+0.12, -0.12
125.89	-0.01	0.016	+0.12, -0.12
158.49	-0.01	0.016	+0.12, -0.12
199.53	-0.01	0.016	+0.12, -0.12
251.19	-0.01	0.016	+0.12, -0.12
316.23	-0.01	0.016	+0.11, -0.11
398.11	-0.00	0.016	+0.11, -0.11
501.19	-0.00	0.016	+0.10, -0.10
630.96	-0.00	0.016	+0.10, -0.10
794.33	-0.00	0.016	+0.10, -0.10
1000.00	0.00	0.016	+0.10, -0.10
1258.90	0.00	0.016	+0.10, -0.10
1584.90	0.00	0.016	+0.10, -0.10
1995.30	0.00	0.016	+0.11, -0.11
2511.90	0.00	0.016	+0.11, -0.11
3162.30	0.00	0.016	+0.11, -0.11
3981.10	0.01	0.016	+0.11, -0.11
5011.90	0.00	0.016	+0.12, -0.12
6309.60	0.00	0.016	+0.12, -0.12
7943.30	0.00	0.016	+0.12, -0.13
10000.00	-0.00	0.016	+0.12, -0.13
12589.00	-0.00	0.016	+0.12, -0.14
15849.00	-0.01	0.016	+0.11, -0.15
19953.00	-0.02	0.016	+0.09, -0.17
25250.00	-0.04	0.022	n/a n/a
31500.00	-0.07	0.022	n/a n/a
39750.00	-0.12	0.022	n/a n/a
50000.00	-0.20	0.022	n/a n/a
63000.00	-0.34	0.047	n/a n/a
79500.00	-0.61	0.047	n/a n/a
100000.00	-1.15	0.047	n/a n/a
126000.00	-2.11	0.063	n/a n/a

Noise floor data: 1kHz (1/3 Octave) = 0.33 uV, -9.5 dBuV, uncertainty = 0.47 dB
Flat (20Hz-20kHz) = 3.2 uV, 10.1 dBuV, uncertainty = 0.47 dB
Awt = 1.7 uV, 4.6 dBuV, uncertainty = 0.46 dB

Uncertainties are given as expanded uncertainty at ~95% confidence interval (k = 2).

Technician: Ron Harris   Test Date: 02APR2013

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-172033

Instrument Model CAL200, Serial Number 4973, was calibrated on 02APR2013. The instrument meets factory specifications per Procedure D0001.8190, IEC 60942:2003.

Instrument found to be in calibration as received: YES
Date Calibrated: 02APR2013
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2900	0661	12 Months	06APR2013	2012-157399
PCB	1502B02FJ15PSIA	1428	12 Months	10APR2013	3416909125.00
Larson Davis	2559	2506	12 Months	11JUN2013	19157-1
Hewlett Packard	34401A	3146A10352	12 Months	28AUG2013	5778699
Larson Davis	PRM902	0480	12 Months	07SEP2013	2012-163567
Larson Davis	MTS1000/2201	0111	12 Months	07SEP2013	SM070912-3
Larson Davis	PRM915	0112	12 Months	08OCT2013	2012-164811

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as shown on calibration report.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

Before: 114.09 dB, 94.09 dB, 1000.4 Hz @ sea level.
After: Refer to Certificate of Measured Output.

Signed: Scott Montgomery
Technician: Scott Montgomery

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Larson Davis CAL200 Acoustic Calibrator, SN: 4973
Certificate of Measured Output

Performance at Reference Conditions

Nominal Level (dB SPL):	94	114
Measured Level (dB SPL):	**94.02**	**114.02**
Expanded Uncertainty (dB):	0.153	0.152
Level Error Limit (dB):	±0.35	±0.35
Nominal Frequency (Hz):	1000	1000
Measured Frequency (Hz):	**1000.4**	**1000.4**
Expanded Uncertainty (Hz):	0.2	0.2
Frequency Error Limit (Hz):	±10.0	±10.0
Measured Distortion (%):	0.40	0.31
Expanded Uncertainty (%):	0.25	0.25
Distortion Limit (%):	2.0	2.0

The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity.

Environmental Conditions

Temperature (°C):	25	25
Relative Humidity (%):	36	36
Static Pressure (kPa):	101.2	101.2

Reference Microphone

Model: Larson Davis 2559
Serial Number: 2506
Open Circuit Sensitivity: 12.336 mV/Pascal
Uncertainty: 0.130 dB

Influence of Static Pressure

Nominal Level (dB SPL): 114

Nominal Pressure (kPa)	Pressure (kPa)	Level Change (dB)	Frequency Change (Hz)	Distortion (%)
108.0	108.0	-0.05	0.00	0.31
101.3	101.3	0.00	0.00	0.32
92.0	92.0	0.06	0.00	0.32
83.0	83.0	0.10	0.00	0.34
74.0	74.0	0.10	0.00	0.36
65.0	65.0	0.05	-0.00	0.38
Expanded Uncertainty:	1.0	0.04	0.20	0.25
Limit:		±0.30	±10.0	2.0

Reference microphone corrections applied.

Environmental Conditions

Temperature (°C):	25
Relative Humidity (%):	37

Reference Microphone

Model: Larson Davis 2559
Serial Number: 2506

Static pressure was measured with a calibrated Motorola pressure sensor MPX2100AP.
Temperature and humidity was measured with a calibrated Fluke 1620A sensor.
Expanded uncertainty of environmental measurements: 0.3 °C, 3 %RH, 1.0 kPa
Uncertainty values are given at 95% confidence level (k = 2).

A Sound Level Meter can be calibrated to a level (L) defined as: L = measured level + pressure sensitivity
or if a Sound Level Meter is calibrated using the nominal level, the adjustments to data (X) are defined as:
X = measured level - nominal level - pressure sensitivity

Scott Montgomery — Larson Davis Calibrator Calibration System — 04 / 02 / 2013

LARSON DAVIS MODEL 824 NOISE METER CERTIFICATION

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-181914

Instrument Model 824, Serial Number A1612, was calibrated on 07NOV2013. The instrument meets factory specifications per Procedure D0001.8046, IEC 61672-1:2002 Class 1; IEC 60651-2001, 60804-2000 and ANSI S1.4-1983 Type 1 1/3, 1/1 Oct. Filters; S1.11-1986 Type 1C; IEC61260-am1-2001 Class 1 .

Instrument found to be in calibration as received: YES
Date Calibrated: 07NOV2013
Calibration due: 07NOV2014

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0617 / 0104	12 Months	16JAN2014	2013-168816

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

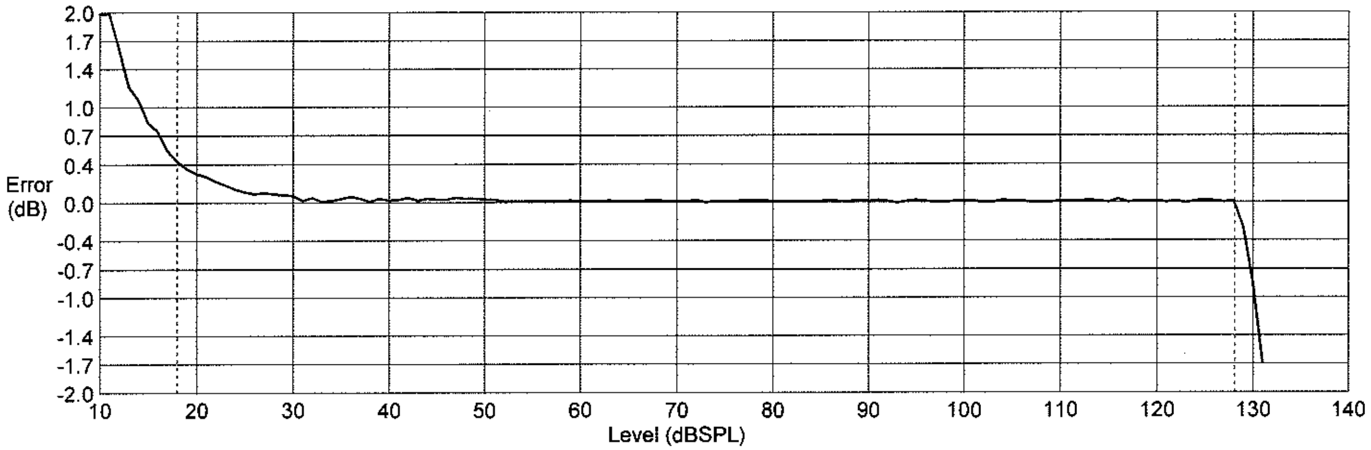
The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As received" data is the same as shipped data.
Tested with PRM902 S/N 2104

Signed:
Technician: Sean Childs

Sound Level Meter Model: 824 Serial Number: A1612
Log Linearity, Differential Linearity and Range Data

This Type 1 Sound Level Meter (including attached PRM902 preamplifier and ADP005 18 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 114.0 dBSPL. The instrument's Log Linearity A-weighted fast response was then electrically tested using a 1kHz sine wave from 11.0 dBSPL to 131.0 dBSPL in 1.0 dB increments.



Levl dBSPL	Meas dBSPL	Uncert +/- dB	Err dB
11.0	13.0	0.27	2.0
12.0	13.6	0.27	1.6
13.0	14.2	0.27	1.2
14.0	15.1	0.27	1.1
15.0	15.8	0.27	0.8
16.0	16.7	0.27	0.7
17.0	17.5	0.27	0.5
18.0	18.4	0.26	0.4
19.0	19.3	0.26	0.3
20.0	20.3	0.26	0.3
21.0	21.3	0.26	0.3
22.0	22.2	0.26	0.2
23.0	23.2	0.26	0.2
24.0	24.1	0.16	0.1
25.0	25.1	0.16	0.1
26.0	26.1	0.16	0.0
27.0	27.1	0.16	0.1
28.0	28.1	0.16	0.0
29.0	29.1	0.16	0.0
30.0	30.1	0.16	0.0
31.0	31.0	0.16	0.0
32.0	32.1	0.16	0.0
33.0	33.0	0.16	0.0
34.0	34.0	0.15	0.0
35.0	35.0	0.15	0.0
36.0	36.1	0.15	0.0
37.0	37.0	0.15	0.0
38.0	38.0	0.15	0.0
39.0	39.0	0.15	0.0
40.0	40.0	0.11	0.0
41.0	41.0	0.11	0.0
42.0	42.1	0.11	0.0
43.0	43.0	0.11	0.0
44.0	44.0	0.11	0.0
45.0	45.0	0.11	0.0
46.0	46.0	0.11	0.0
47.0	47.1	0.11	0.0
48.0	48.0	0.11	0.0
49.0	49.0	0.11	0.0
50.0	50.0	0.11	0.0
51.0	51.0	0.11	0.0
52.0	52.0	0.11	0.0
53.0	53.0	0.11	0.0
54.0	54.0	0.11	0.0
55.0	55.0	0.11	0.0
56.0	56.0	0.11	0.0
57.0	57.0	0.11	0.0
58.0	58.0	0.11	0.0
59.0	59.0	0.11	0.0
60.0	60.0	0.11	0.0
61.0	61.0	0.11	0.0
62.0	62.0	0.11	0.0
63.0	63.0	0.11	0.0
64.0	64.0	0.11	0.0
65.0	65.0	0.11	0.0
66.0	66.0	0.11	0.0
67.0	67.0	0.11	0.0
68.0	68.0	0.11	0.0
69.0	69.0	0.11	0.0
70.0	70.0	0.11	0.0
71.0	71.0	0.11	0.0
72.0	72.0	0.11	0.0
73.0	73.0	0.11	0.0
74.0	74.0	0.11	0.0
75.0	75.0	0.11	0.0
76.0	76.0	0.11	0.0
77.0	77.0	0.13	0.0
78.0	78.0	0.13	0.0
79.0	79.0	0.12	0.0
80.0	80.0	0.12	0.0
81.0	81.0	0.12	0.0
82.0	82.0	0.12	0.0
83.0	83.0	0.12	0.0
84.0	84.0	0.12	0.0
85.0	85.0	0.11	0.0
86.0	86.0	0.11	0.0
87.0	87.0	0.11	0.0
88.0	88.0	0.11	0.0
89.0	89.0	0.11	0.0
90.0	90.0	0.11	0.0
91.0	91.0	0.11	0.0
92.0	92.0	0.11	0.0
93.0	93.0	0.11	0.0
94.0	94.0	0.11	0.0
95.0	95.0	0.11	0.0
96.0	96.0	0.11	0.0
97.0	97.0	0.11	0.0
98.0	98.0	0.11	0.0
99.0	99.0	0.11	0.0
100.0	100.0	0.11	0.0
101.0	101.0	0.11	0.0
102.0	102.0	0.11	0.0
103.0	103.0	0.11	0.0
104.0	104.0	0.11	0.0
105.0	105.0	0.11	0.0
106.0	106.0	0.11	0.0
107.0	107.0	0.11	0.0
108.0	108.0	0.11	0.0
109.0	109.0	0.11	0.0
110.0	110.0	0.11	0.0
111.0	111.0	0.11	0.0
112.0	112.0	0.11	0.0
113.0	113.0	0.11	0.0
114.0	114.0	0.11	0.0
115.0	115.0	0.11	0.0
116.0	116.0	0.11	0.0
117.0	117.0	0.11	0.0
118.0	118.0	0.11	0.0
119.0	119.0	0.11	0.0
120.0	120.0	0.11	0.0
121.0	121.0	0.11	0.0
122.0	122.0	0.11	0.0
123.0	123.0	0.11	0.0
124.0	124.0	0.11	0.0
125.0	125.0	0.11	0.0
126.0	126.0	0.11	0.0
127.0	127.0	0.11	0.0
128.0	128.0	0.11	0.0
129.0	**128.7**	**0.11**	**-0.3**
130.0	**129.2**	**0.11**	**-0.9**
131.0	**129.3**	**0.11**	**-1.7**

Uncertainties are given as expanded uncertainty at ~95% confidence interval (k = 2).

Plotted per typical sensitivity of a 2541 microphone; 44.5 mV/Pa & 17.1 pF.

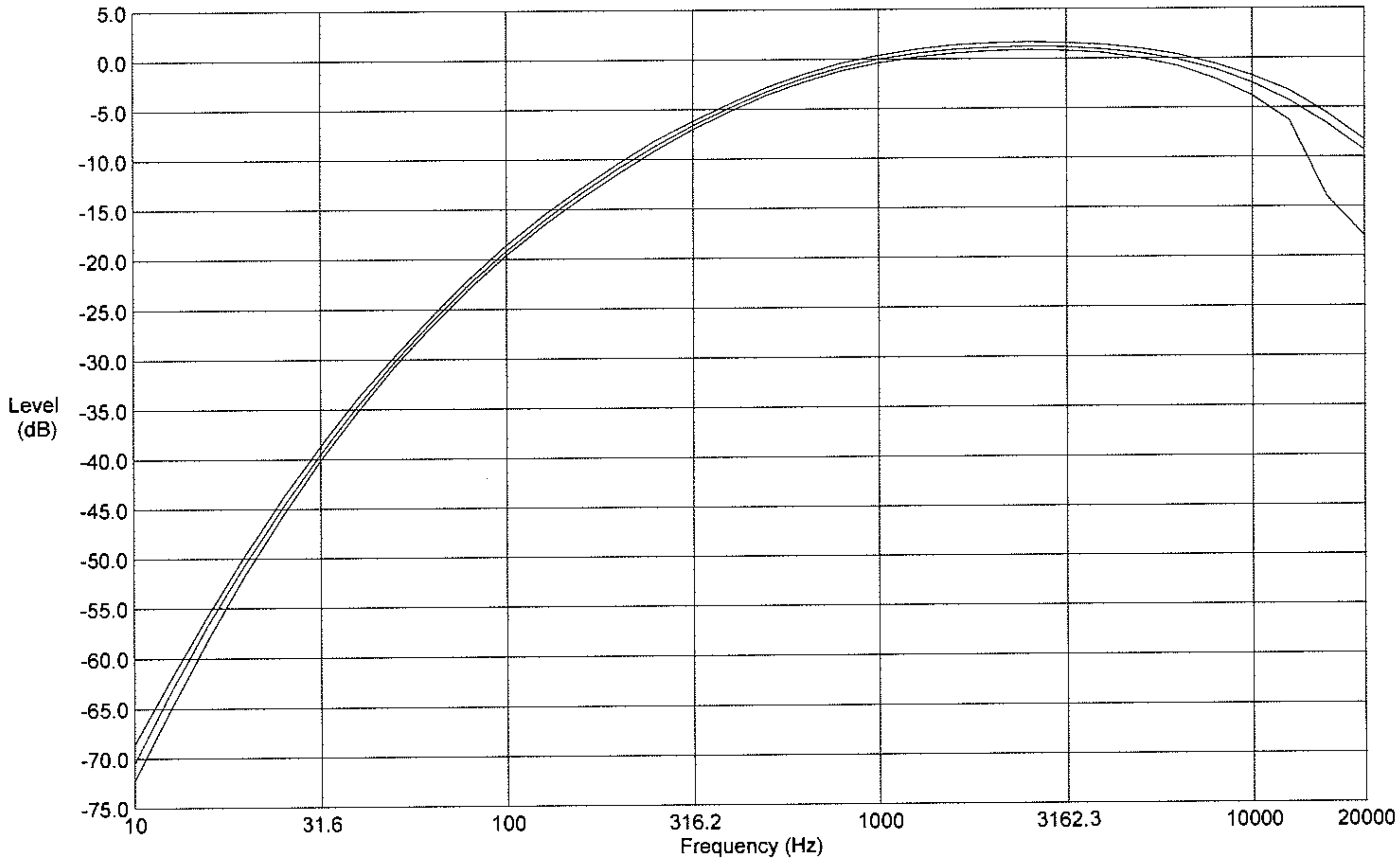
Overload occurs at 128.2 dBSPL.
Primary indicator range: 110.1 dB (lower limit: 18.0 dBSPL to upper limit: 128.1 dBSPL).
Dynamic range: 119.2 dB (noise floor: 8.9 dBSPL to upper limit: 128.1 dBSPL).

This instrument is in compliance with IEC 60651 (2001-10) 7.9 and 7.10, ANSI S1.4-1983 3.2, IEC 61672-1 (2002-05) 5.5 class 1 and IEC 60804 (2001-10) 9.2.1 for Type 1 sound level meters when used with a Larson Davis Type 1 microphone.

Technician: Sean Childs Test Date: 07NOV2013

Sound Level Meter Model: 824 Serial Number: A1612
Certificate of A-Weight Electrical Conformance

This Type 1 Sound Level Meter (including attached PRM902 preamplifier and ADP005 18 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 114.0 dBSPL. The instrument's A-weighted response was then electrically tested using a 1.6 Vrms sinewave at exact frequencies as specified in IEC 60651 (2001-10) and ANSI S1.4-1983.



Freq (Hz)	Theor	Measured	Uncertainty	Error	Tolerance
10.00	-70.4	-70.49	0.10	-0.09	+1.8, -1.8
12.59	-63.4	-63.21	0.10	0.19	+1.5, -1.5
15.85	-56.7	-56.46	0.10	0.24	+1.2, -1.2
19.95	-50.5	-50.47	0.10	0.03	+1.0, -1.0
25.12	-44.7	-44.77	0.10	-0.07	+0.9, -0.9
31.62	-39.4	-39.51	0.10	-0.11	+0.7, -0.7
39.81	-34.6	-34.70	0.10	-0.10	+0.7, -0.7
50.12	-30.2	-30.28	0.10	-0.08	+0.5, -0.5
63.10	-26.2	-26.26	0.10	-0.06	+0.5, -0.5
79.43	-22.5	-22.56	0.10	-0.06	+0.5, -0.5
100.00	-19.1	-19.19	0.10	-0.09	+0.5, -0.5
125.89	-16.1	-16.14	0.10	-0.04	+0.5, -0.5
158.49	-13.4	-13.40	0.10	0.00	+0.5, -0.5
199.53	-10.9	-10.90	0.10	0.00	+0.5, -0.5
251.19	-8.6	-8.67	0.10	-0.07	+0.5, -0.5
316.23	-6.6	-6.64	0.10	-0.04	+0.4, -0.4
398.11	-4.8	-4.83	0.10	-0.03	+0.4, -0.4
501.19	-3.2	-3.25	0.10	-0.05	+0.4, -0.4
630.96	-1.9	-1.92	0.10	-0.02	+0.4, -0.4
794.33	-0.8	-0.85	0.10	-0.05	+0.4, -0.4
1000.00	0.0	0.00	0.10	0.00	+0.4, -0.4
1258.90	0.6	0.57	0.10	-0.03	+0.4, -0.4
1584.90	1.0	0.97	0.10	-0.03	+0.4, -0.4
1995.30	1.2	1.16	0.10	-0.04	+0.4, -0.4
2511.90	1.3	1.24	0.10	-0.06	+0.4, -0.4
3162.30	1.2	1.19	0.10	0.00	+0.4, -0.4
3981.10	1.0	0.94	0.10	-0.06	+0.4, -0.4
5011.90	0.5	0.54	0.10	0.04	+0.5, -0.5
6309.60	-0.1	-0.13	0.10	-0.03	+0.5, -0.7
7943.30	-1.1	-1.13	0.10	-0.03	+0.5, -1.0
10000.00	-2.5	-2.50	0.12	0.00	+0.7, -1.3
12589.00	-4.3	-4.33	0.12	-0.03	+1.0, -2.0
15849.00	-6.6	-6.62	0.12	-0.02	+1.0, -7.4
19953.00	-9.3	-9.35	0.12	-0.05	+1.0, -8.7

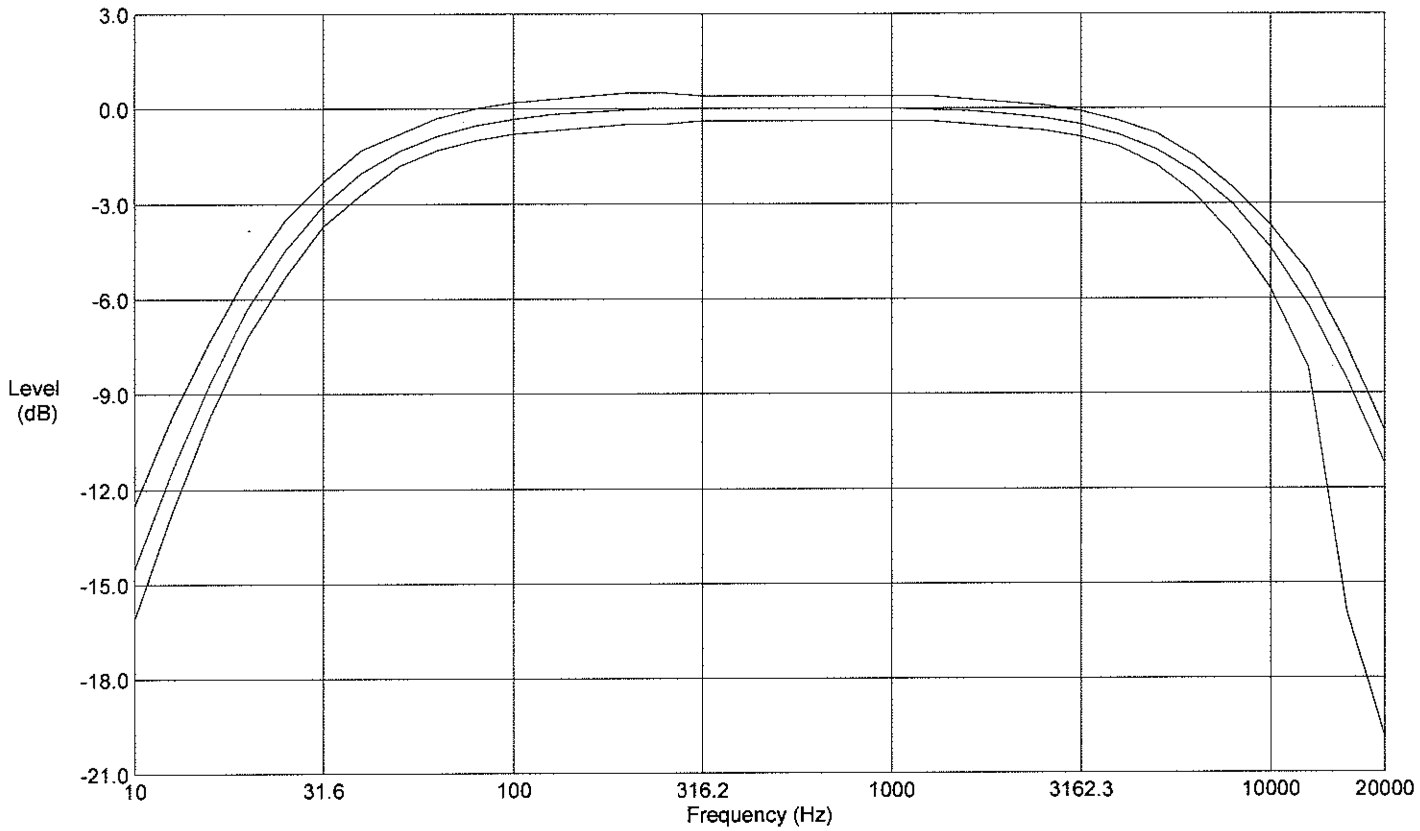
Uncertainties are given as expanded uncertainty at ~95% confidence interval (k = 2).

This instrument is in compliance with IEC 60651 (2001-10) 6.1 and 9.2.2, ANSI S1.4-1983 5.1 and 8.2.1, and IEC 60804 (2001-10) 5.1 for Type 1 sound level meters when used with a Larson Davis Type 1 microphone.

Technician: Sean Childs Test Date: 07NOV2013

Sound Level Meter Model: 824 Serial Number: A1612
Certificate of C-Weight Electrical Conformance

This Type 1 Sound Level Meter (including attached PRM902 preamplifier and ADP005 18 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 114.0 dBSPL. The instrument's C-weighted response was then electrically tested using a 1.6 Vrms sinewave at exact frequencies as specified in IEC 60651 (2001-10) and ANSI S1.4-1983.



Freq (Hz)	Theor	Measured	Uncertainty	Error	Tolerance
10.00	-14.3	-14.50	0.10	-0.20	+1.8, -1.8
12.59	-11.2	-11.39	0.10	-0.19	+1.5, -1.5
15.85	-8.5	-8.66	0.10	-0.16	+1.2, -1.2
19.95	-6.2	-6.31	0.10	-0.11	+1.0, -1.0
25.12	-4.4	-4.46	0.10	-0.06	+0.9, -0.9
31.62	-3.0	-3.06	0.10	-0.06	+0.7, -0.7
39.81	-2.0	-2.03	0.10	-0.03	+0.7, -0.7
50.12	-1.3	-1.33	0.10	-0.03	+0.5, -0.5
63.10	-0.8	-0.86	0.10	-0.06	+0.5, -0.5
79.43	-0.5	-0.54	0.10	-0.04	+0.5, -0.5
100.00	-0.3	-0.34	0.10	-0.04	+0.5, -0.5
125.89	-0.2	-0.19	0.10	0.00	+0.5, -0.5
158.49	-0.1	-0.12	0.10	-0.02	+0.5, -0.5
199.53	0.0	-0.05	0.10	-0.05	+0.5, -0.5
251.19	0.0	-0.02	0.10	-0.02	+0.5, -0.5
316.23	0.0	0.00	0.10	0.00	+0.4, -0.4
398.11	0.0	0.02	0.10	0.02	+0.4, -0.4
501.19	0.0	0.02	0.10	0.02	+0.4, -0.4
630.96	0.0	0.02	0.10	0.02	+0.4, -0.4
794.33	0.0	0.02	0.10	0.02	+0.4, -0.4
1000.00	0.0	0.00	0.10	0.00	+0.4, -0.4
1258.90	0.0	-0.05	0.10	-0.05	+0.4, -0.4
1584.90	-0.1	-0.09	0.10	0.01	+0.4, -0.4
1995.30	-0.2	-0.19	0.10	0.00	+0.4, -0.4
2511.90	-0.3	-0.31	0.10	0.00	+0.4, -0.4
3162.30	-0.5	-0.51	0.10	-0.01	+0.4, -0.4
3981.10	-0.8	-0.83	0.10	-0.03	+0.4, -0.4
5011.90	-1.3	-1.30	0.10	0.00	+0.5, -0.5
6309.60	-2.0	-2.02	0.10	-0.02	+0.5, -0.7
7943.30	-3.0	-3.02	0.10	-0.02	+0.5, -1.0
10000.00	-4.4	-4.40	0.12	0.00	+0.7, -1.3
12589.00	-6.2	-6.23	0.12	-0.03	+1.0, -2.0
15849.00	-8.5	-8.54	0.12	-0.04	+1.0, -7.4
19953.00	-11.2	-11.25	0.12	-0.05	+1.0, -8.7

Uncertainties are given as expanded uncertainty at ~95% confidence interval (k = 2).

This instrument is in compliance with IEC 60651 (2001-10) 6.1 and 9.2.2, ANSI S1.4-1983 5.1 and 8.2.1, and IEC 60804 (2001-10) 5.1 for Type 1 sound level meters when used with a Larson Davis Type 1 microphone.

Technician: Sean Childs Test Date: 07NOV2013

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-181913

Instrument Model PRM902, Serial Number 2104, was calibrated on 07NOV2013. The instrument meets factory specifications per Procedure D0001.8126.

Instrument found to be in calibration as received: YES
Date Calibrated: 07NOV2013
Calibration due: 07NOV2014

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0617 / 0104	12 Months	16JAN2014	2013-168816
Hewlett Packard	34401A	US36033460	12 Months	01JUL2014	6141807

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

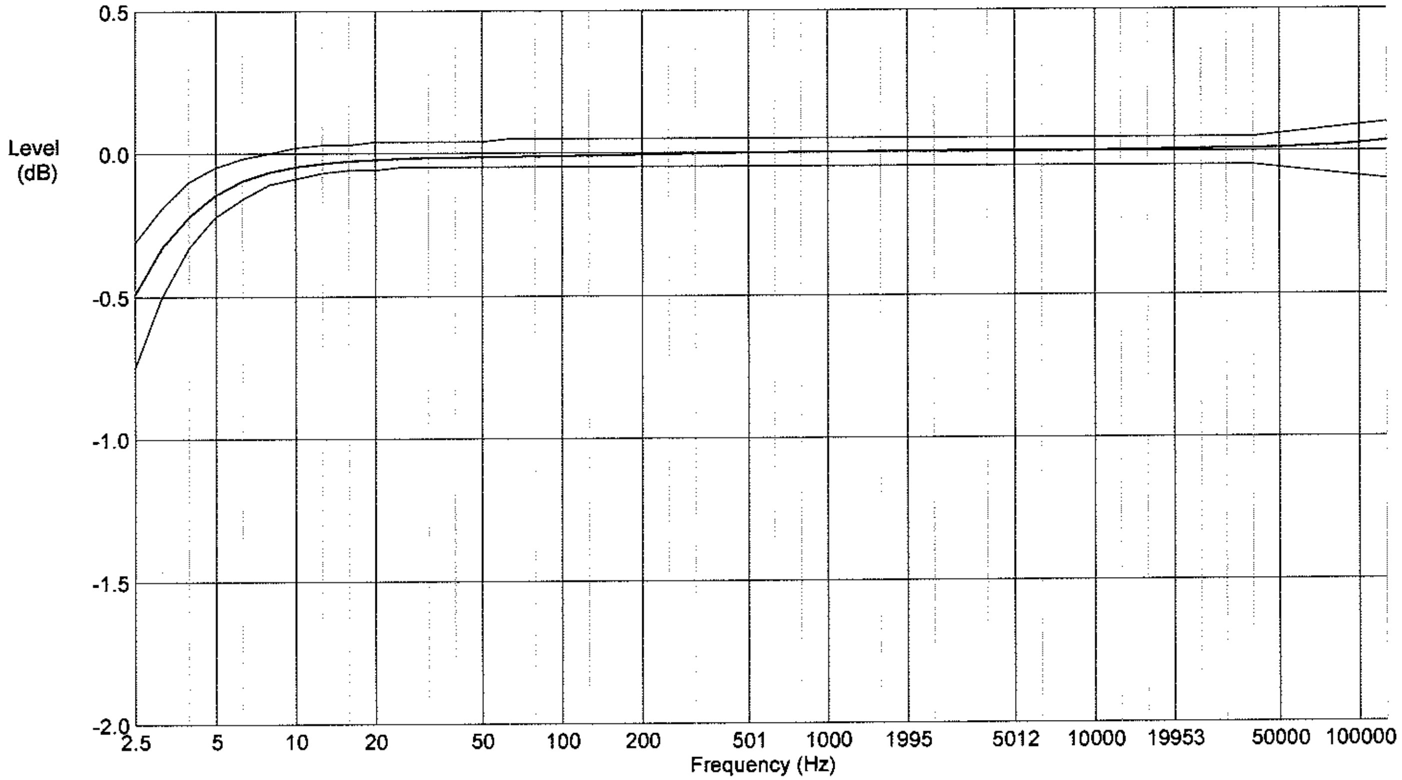
"As received" data is the same as shipped data.

Signed:

Technician: Sean Childs

Preamplifier Model: 902 Serial Number: 2104
Certificate of Electrical Conformance

Frequency response of this model 902 preamplifier was tested at a level of 1 Vrms with 18pF microphone capacitance and driving a short cable. Output level at 1kHz is 0.9696 Vrms (-0.268 dBV), uncertainty 0.033 dB. Results are displayed relative to the level at 1kHz.



Freq (Hz)	Measured (dB)	Uncert (dB)	Tolerance (dB)
2.51	-0.49	0.075	-0.31, -0.75
3.16	-0.33	0.058	-0.19, -0.50
3.98	-0.22	0.058	-0.10, -0.33
5.01	-0.14	0.036	-0.05, -0.22
6.31	-0.10	0.036	-0.02, -0.16
7.94	-0.07	0.036	+0.00, -0.11
10.00	-0.05	0.016	+0.02, -0.09
12.59	-0.04	0.016	+0.03, -0.07
15.85	-0.03	0.016	+0.03, -0.06
19.95	-0.02	0.016	+0.04, -0.06
25.12	-0.02	0.016	+0.04, -0.05
31.62	-0.02	0.016	+0.04, -0.05
39.81	-0.02	0.016	+0.04, -0.05
50.12	-0.01	0.016	+0.04, -0.05
63.10	-0.01	0.016	+0.05, -0.05
79.43	-0.01	0.016	+0.05, -0.05
100.00	-0.01	0.016	+0.05, -0.05
125.89	-0.01	0.016	+0.05, -0.05
158.49	-0.01	0.016	+0.05, -0.05
199.53	-0.01	0.016	+0.05, -0.05
251.19	-0.01	0.016	+0.05, -0.05
316.23	-0.01	0.016	+0.05, -0.05
398.11	-0.00	0.016	+0.05, -0.05
501.19	-0.00	0.016	+0.05, -0.05
630.96	-0.00	0.016	+0.05, -0.05
794.33	0.00	0.016	+0.05, -0.05
1000.00	0.00	0.016	+0.05, -0.05
1258.90	0.00	0.016	+0.05, -0.05
1584.90	0.00	0.016	+0.05, -0.05
1995.30	0.00	0.016	+0.05, -0.05
2511.90	0.00	0.016	+0.05, -0.05
3162.30	0.00	0.016	+0.05, -0.05
3981.10	0.00	0.016	+0.05, -0.05
5011.90	0.00	0.016	+0.05, -0.05
6309.60	0.00	0.016	+0.05, -0.05
7943.30	0.00	0.016	+0.05, -0.05
10000.00	0.00	0.016	+0.05, -0.05
12589.00	0.01	0.016	+0.05, -0.05
15849.00	0.01	0.016	+0.05, -0.05
19953.00	0.01	0.016	+0.05, -0.05
25250.00	0.01	0.022	+0.05, -0.05
31500.00	0.01	0.022	+0.05, -0.05
39750.00	0.01	0.022	+0.05, -0.05
50000.00	0.01	0.022	+0.06, -0.06
63000.00	0.02	0.047	+0.07, -0.07
79500.00	0.02	0.047	+0.08, -0.08
100000.00	0.03	0.047	+0.09, -0.09
126000.00	0.03	0.063	+0.10, -0.10

Noise floor data: 1kHz (1/3 Octave) = 0.52 uV, -5.6 dBuV, uncertainty = 0.47 dB
Flat (20Hz-20kHz) = 3.9 uV, 11.9 dBuV, uncertainty = 0.47 dB
Awt = 2.7 uV, 8.5 dBuV, uncertainty = 0.46 dB

Uncertainties are given as expanded uncertainty at ~95% confidence interval (k = 2).

Technician: Sean Childs Test Date: 07NOV2013

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-181917

Microphone Model 2541, Serial Number 7977, was calibrated on 08NOV2013. The microphone meets factory specifications per Test Procedure D0001.8167.

Instrument found to be in calibration as received: YES
Date Calibrated: 08NOV2013
Calibration due: 08NOV2014

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Hewlett Packard	34401A	3146A62099	12 Months	26NOV2013	5884920
Larson Davis	PRM915	0102	12 Months	04DEC2013	2012-167168
Larson Davis	PRM916	0102	12 Months	13DEC2013	2012-167454
Larson Davis	2559	2504	12 Months	03JAN2014	19648-1
Larson Davis	CAL250	42630	12 Months	04JAN2014	2013-168402
Larson Davis	2900	0575	12 Months	24JUL2014	2013-177110
Larson Davis	2559	3034LF	12 Months	13AUG2014	2013-178081
Larson Davis	PRM902	0206	12 Months	15AUG2014	2013-178254
Larson Davis	MTS1000 / 2201	1000 / 0100	12 Months	03SEP2014	SM090313
Larson Davis	PRM902	0529	12 Months	10SEP2014	2013-179249
Larson Davis	PRM902	0528	12 Months	10SEP2014	2013-179248

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data is the same as shipped data.

Signed:
Technician: Abraham Ortega

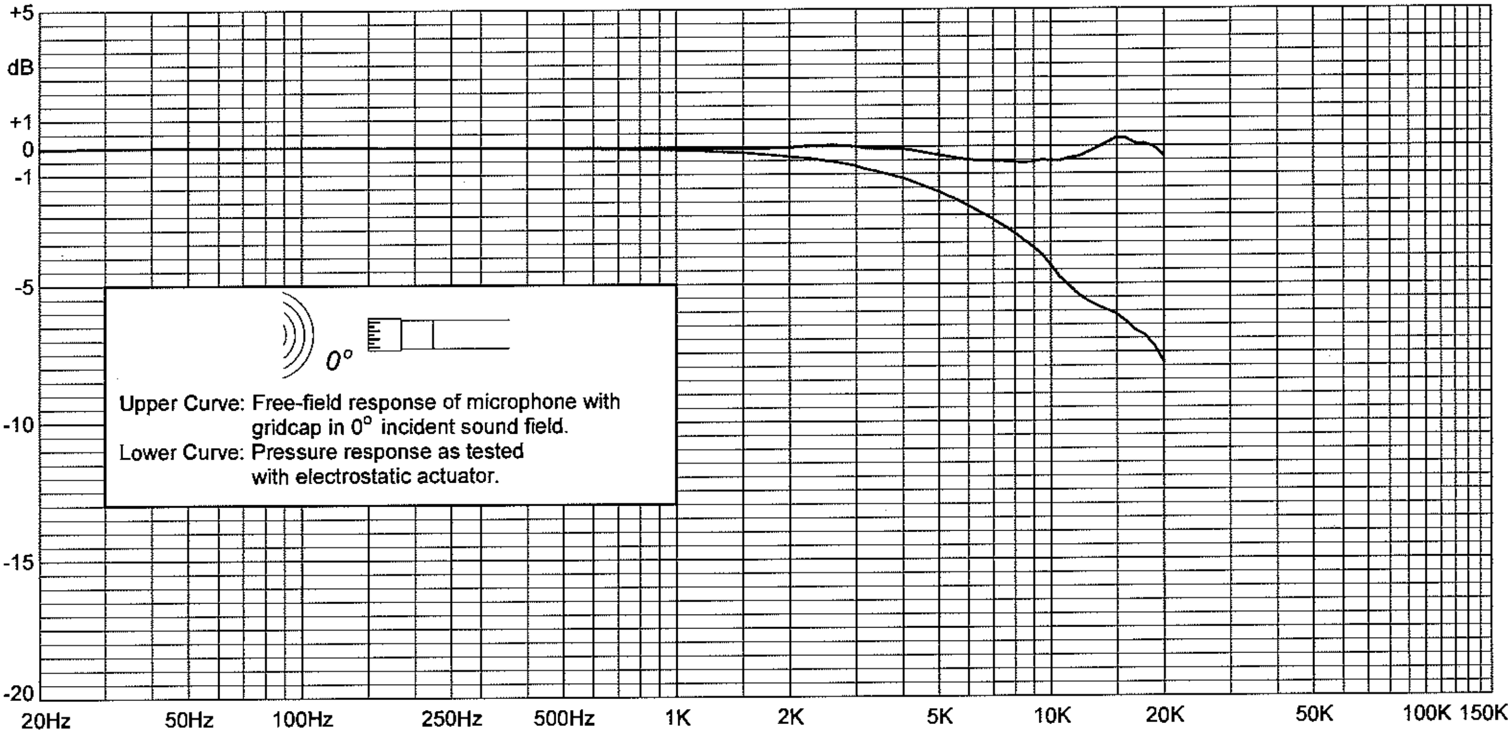
Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2008 Certified

Larson Davis

Larson-Davis 1/2" Microphone Calibration Chart
Model: 2541 Serial Number: 7977

Open Circuit Sensitivity @ 1015.8 mbar & 251.19 Hz
-26.99 dB re 1V/Pascal
44.73 mV/Pascal
+0.97 K_0(-dB re 50 mV/Pascal)
Expanded Uncertainty @ ~95% confidence level
0.18 dB

Capacitance @ 251.2 Hz
18.9 pF
Lower Limiting Frequency
-3 dB @ **1.38** Hz
Test Conditions:
Polarization Voltage **200** V
Ambient Pressure **1015.8** mbar
Temperature **24.0** °C
Relative Humidity **29.4** %



Frequency Response (0 dB @ 251.19 Hz)
Free-field and actuator response with reference to level at 251.19 Hz

Freq (Hz)	Upper (dB)	Lower (dB)	Freq (Hz)	Upper (dB)	Lower (dB)	Freq (Hz)	Upper (dB)	Lower (dB)	Freq (Hz)	Upper (dB)	Lower (dB)	Freq (Hz)	Upper (dB)	Lower (dB)
19.95	-0.04	-0.04	501.19	-0.01	-0.03	1883.65	-0.04	-0.32	4216.97	-0.14	-1.27	9440.61	-0.51	-3.93
25.12	-0.01	-0.01	630.96	-0.02	-0.05	1995.26	-0.03	-0.36	4466.84	-0.20	-1.39	10000.00	-0.53	-4.35
31.62	0.01	0.01	794.33	-0.02	-0.07	2113.49	0.00	-0.39	4731.51	-0.26	-1.52	10592.54	-0.53	-4.77
39.81	0.01	0.01	1000.00	-0.03	-0.10	2238.72	0.03	-0.42	5011.87	-0.32	-1.66	11220.19	-0.44	-5.09
50.12	0.02	0.02	1059.25	-0.04	-0.12	2371.37	0.04	-0.47	5308.84	-0.39	-1.81	11885.02	-0.38	-5.43
63.10	0.02	0.02	1122.02	-0.04	-0.13	2511.89	0.04	-0.52	5623.41	-0.44	-1.97	12589.25	-0.23	-5.65
79.43	0.02	0.02	1188.50	-0.05	-0.14	2660.73	0.04	-0.57	5956.62	-0.49	-2.14	13335.21	-0.06	-5.83
100.00	0.01	0.01	1258.93	-0.06	-0.16	2818.38	0.02	-0.63	6309.57	-0.52	-2.32	14125.38	0.12	-5.98
125.89	0.01	0.01	1333.52	-0.06	-0.17	2985.38	0.00	-0.69	6683.44	-0.54	-2.51	14962.36	0.29	-6.11
158.49	0.01	0.01	1412.54	-0.06	-0.19	3162.28	-0.06	-0.81	7079.46	-0.54	-2.71	15848.93	0.26	-6.38
199.53	0.01	0.01	1496.24	-0.05	-0.21	3349.65	-0.07	-0.88	7498.94	-0.56	-2.92	16788.04	0.08	-6.71
251.19	0.00	0.00	1584.89	-0.05	-0.24	3548.13	-0.08	-0.96	7943.28	-0.58	-3.14	17782.80	0.07	-6.90
316.23	-0.01	-0.01	1678.80	-0.06	-0.26	3758.37	-0.08	-1.05	8413.95	-0.61	-3.39	18836.49	-0.06	-7.26
398.11	-0.01	-0.02	1778.28	-0.05	-0.29	3981.07	-0.10	-1.16	8912.51	-0.58	-3.65	19952.62	-0.36	-7.86

Abraham Ortega 08NOV2013
Larson-Davis Model 9700 ES Microphone Calibration System

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-181710

Instrument Model CAL200, Serial Number 3228, was calibrated on 05NOV2013. The instrument meets factory specifications per Procedure D0001.8190, IEC 60942:2003.

Instrument found to be in calibration as received: YES
Date Calibrated: 05NOV2013
Calibration due: 05NOV2014

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2559	2504	12 Months	03JAN2014	19648-1
PCB	1502B02FJ15PSIA	1342	12 Months	14JAN2014	3441014716
Larson Davis	2900	0661	12 Months	08APR2014	2013-172252
Larson Davis	MTS1000/2201	0111	12 Months	22AUG2014	SM082213
Larson Davis	PRM902	0480	12 Months	23AUG2014	2013-178669
Hewlett Packard	34401A	3146A10352	12 Months	03SEP2014	6214490
Larson Davis	PRM915	0112	12 Months	09OCT2014	2013-180644

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as shown on calibration report.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

Before: 113.94 dB, 93.96 dB, 1000.2 Hz @ sea level.
After: Refer to Certificate of Measured Output.

Signed: Scott Montgomery
Technician: Scott Montgomery

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Larson Davis CAL200 Acoustic Calibrator, SN: 3228
Certificate of Measured Output

Performance at Reference Conditions

Nominal Level (dB SPL):	94	114
Measured Level (dB SPL):	**94.01**	**113.99**
Expanded Uncertainty (dB):	0.137	0.132
Level Error Limit (dB):	±0.34	±0.33
Nominal Frequency (Hz):	1000	1000
Measured Frequency (Hz):	**1000.1**	**1000.1**
Expanded Uncertainty (Hz):	0.2	0.2
Frequency Error Limit (Hz):	±10.0	±10.0
Measured Distortion (%):	0.37	0.32
Expanded Uncertainty (%):	0.25	0.25
Distortion Limit (%):	2.0	2.0

The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity.

Environmental Conditions

Temperature (°C):	24	24
Relative Humidity (%):	25	25
Static Pressure (kPa):	101.3	101.3

Reference Microphone

Model: Larson Davis 2559
Serial Number: 2504
Open Circuit Sensitivity: 11.440 mV/Pascal
Uncertainty: 0.110 dB

Influence of Static Pressure

Nominal Level (dB SPL): 114

Nominal Pressure (kPa)	Pressure (kPa)	Level Change (dB)	Frequency Change (Hz)	Distortion (%)
108.0	107.9	-0.02	0.00	0.32
101.3	101.0	0.00	0.00	0.33
92.0	92.0	0.01	-0.00	0.34
83.0	83.1	-0.01	-0.00	0.36
74.0	74.0	-0.07	-0.00	0.39
65.0	65.2	-0.18	-0.01	0.43
Expanded Uncertainty:	1.0	0.04	0.20	0.25
Limit:		±0.30	±10.0	2.0

Reference microphone corrections applied.

Environmental Conditions

Temperature (°C):	25
Relative Humidity (%):	25

Reference Microphone

Model: Larson Davis 2559
Serial Number: 2504

Static pressure was measured with a calibrated Motorola pressure sensor MPX2100AP.
Temperature and humidity was measured with a calibrated Fluke 1620A sensor.
Expanded uncertainty of environmental measurements: 0.3 °C, 3 %RH, 1.0 kPa
Uncertainty values are given at 95% confidence level (k = 2).

A Sound Level Meter can be calibrated to a level (L) defined as: L = measured level + pressure sensitivity
or if a Sound Level Meter is calibrated using the nominal level, the adjustments to data (X) are defined as:
X = measured level - nominal level - pressure sensitivity

Scott Montgomery   Larson Davis Calibrator Calibration System   11 / 05 / 2013

LARSON DAVIS MODEL 831 NOISE METER CERTIFICATION

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-182761

Instrument Model 831, Serial Number 0002441, was calibrated on 26NOV2013. The instrument meets factory specifications per Procedure D0001.8310, ANSI S1.4-1983 (R 2006) Type 1; S1.4A-1985 ; S1.43-1997 Type 1; S1.11-2004 Octave Band Class 1; S1.25-1991; IEC 61672-2002 Class 1; 60651-2001 Type 1; 60804-2000 Type 1; 61260-2001 Class 1; 61252-2002.

Instrument found to be in calibration as received: YES
Date Calibrated: 26NOV2013
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Stanford Research Systems	DS360	61746	12 Months	10JAN2014	61746-071013

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 22 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

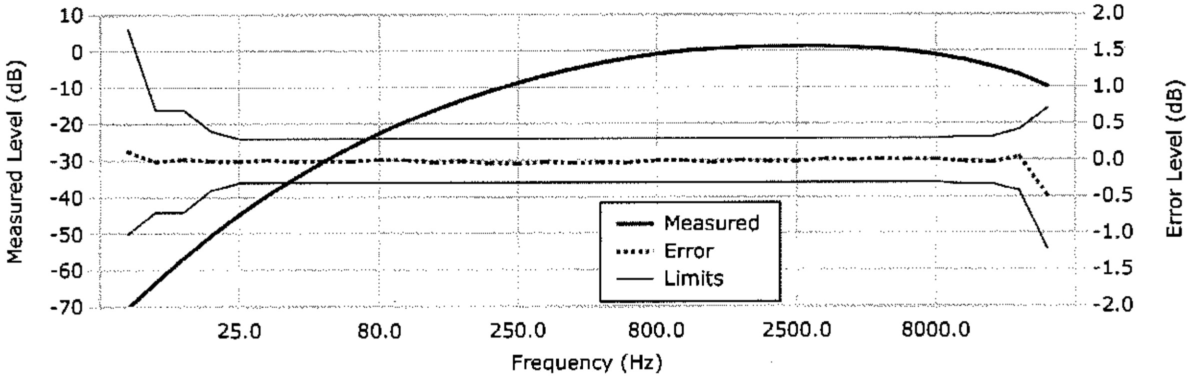
The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.
Tested with PRM831-017139

Signed: Ron Harris
Technician: Ron Harris

Sound Level Meter Model: 831 Serial Number: 0002441 Firmware: 2.205
A-Weight Electrical Test Report

This Sound Level Meter (including attached PRM831 preamplifier and ADP090 12 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 137.0dBμV. The instrument's A-weighted response was then electrically tested using a sinewave at exact frequencies as specified in IEC 61672-1:2002 Table 2 note b. Instrument has 0dB gain.



Freq. (Hz)	Meas. (dB)	Theor. (dB)	Error (dB)	Uncert. (dB)	Limits (dB)
10.00	-70.30	-70.43	0.13	0.13	1.80,-1.00
12.59	-63.38	-63.37	-0.01	0.13	0.70,-0.70
15.85	-56.66	-56.69	0.02	0.13	0.70,-0.70
19.95	-50.45	-50.45	-0.00	0.13	0.40,-0.40
25.12	-44.71	-44.70	-0.01	0.13	0.30,-0.30
31.62	-39.43	-39.44	0.01	0.13	0.30,-0.30
39.81	-34.65	-34.63	-0.02	0.13	0.30,-0.30
50.12	-30.24	-30.23	-0.01	0.13	0.30,-0.30
63.10	-26.20	-26.19	-0.01	0.13	0.30,-0.30
79.43	-22.49	-22.50	0.02	0.13	0.30,-0.30
100.00	-19.13	-19.14	0.01	0.13	0.30,-0.30
125.89	-16.12	-16.10	-0.03	0.13	0.30,-0.30
158.49	-13.36	-13.35	-0.01	0.13	0.30,-0.30
199.53	-10.91	-10.87	-0.03	0.13	0.30,-0.30
251.19	-8.67	-8.63	-0.04	0.13	0.30,-0.30
316.23	-6.63	-6.61	-0.02	0.13	0.30,-0.30
398.11	-4.84	-4.81	-0.03	0.13	0.30,-0.30
501.19	-3.26	-3.23	-0.02	0.13	0.30,-0.30
630.96	-1.93	-1.90	-0.03	0.13	0.30,-0.30
794.33	-0.82	-0.82	0.00	0.13	0.30,-0.30
1000.00	0.00	0.00	0.00	0.13	0.30,-0.30
1258.93	0.57	0.59	-0.02	0.13	0.30,-0.30
1584.89	0.99	0.98	0.01	0.13	0.30,-0.30
1995.26	1.19	1.20	-0.01	0.13	0.30,-0.30
2511.89	1.26	1.27	-0.01	0.13	0.30,-0.30
3162.28	1.22	1.20	0.02	0.13	0.30,-0.30
3981.07	0.98	0.97	0.01	0.13	0.30,-0.30
5011.87	0.57	0.55	0.02	0.13	0.30,-0.30
6309.57	-0.11	-0.12	0.01	0.13	0.30,-0.30
7943.28	-1.10	-1.11	0.01	0.13	0.30,-0.30
10000.00	-2.51	-2.49	-0.02	0.13	0.32,-0.32
12589.25	-4.34	-4.32	-0.03	0.13	0.32,-0.32
15848.93	-6.56	-6.60	0.05	0.13	0.42,-0.42
19952.62	-9.81	-9.32	-0.49	0.13	0.71,-1.21

Environmental conditions: 22.8 °C, 29.4 %RH (0.3 °C, 3 %RH uncertainty)
Uncertainty is given as expanded uncertainty at ~95 percent confidence level (k = 2).
Test Procedure: 831 Cert OBA (ADP090).xml

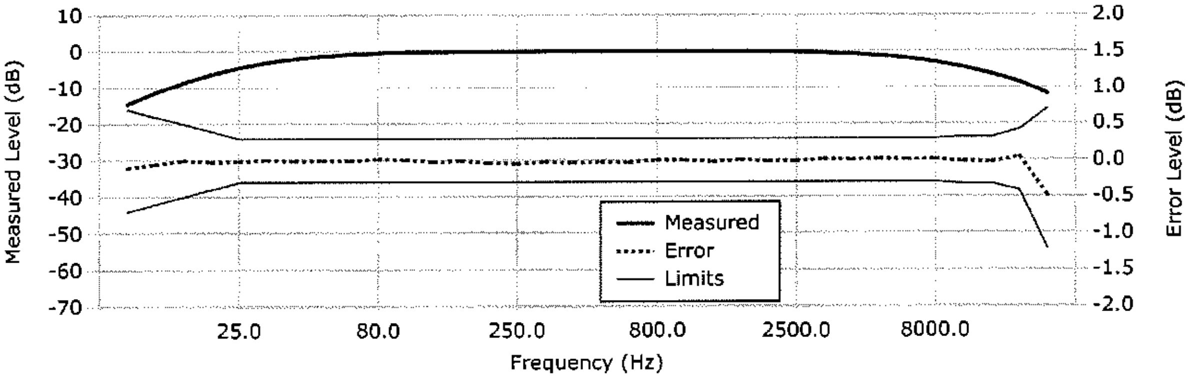
This A-Weight frequency response is in compliance with IEC 61672-1:2002 5.4 Class 1, IEC 60651-2001 6.1 and 9.2.2, ANSI S1.4-1983 (R2006) 5.1 and 8.2.1, and IEC 60804-2000 5.1 for Type 1 sound level meters when used with a PCB precision microphone.

Technician: Ron Harris   Test Date: 26 Nov 2013 13:04:22

Test Location: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001   www.LarsonDavis.com

Sound Level Meter Model: 831 Serial Number: 0002441 Firmware: 2.205
C-Weight Electrical Test Report

This Sound Level Meter (including attached PRM831 preamplifier and ADP090 12 pF input adapter) was calibrated with a reference 1kHz sine wave at a level of 137.0dBµV. The instrument's C-weighted response was then electrically tested using a sinewave at exact frequencies as specified in IEC 61672-1:2002 Table 2 note b. Instrument has 0dB gain.



Freq. (Hz)	Meas. (dB)	Theor. (dB)	Error (dB)	Uncert. (dB)	Limits (dB)
10.00	-14.43	-14.33	-0.10	0.12	0.70,-0.70
12.59	-11.30	-11.25	-0.05	0.12	0.60,-0.60
15.85	-8.53	-8.53	-0.00	0.12	0.50,-0.50
19.95	-6.26	-6.24	-0.02	0.12	0.40,-0.40
25.12	-4.42	-4.41	-0.02	0.12	0.30,-0.30
31.62	-3.00	-3.01	0.01	0.12	0.30,-0.30
39.81	-2.01	-2.00	-0.01	0.12	0.30,-0.30
50.12	-1.30	-1.29	-0.01	0.12	0.30,-0.30
63.10	-0.83	-0.82	-0.01	0.12	0.30,-0.30
79.43	-0.49	-0.50	0.02	0.12	0.30,-0.30
100.00	-0.29	-0.30	0.01	0.12	0.30,-0.30
125.89	-0.19	-0.17	-0.03	0.12	0.30,-0.30
158.49	-0.09	-0.09	-0.01	0.12	0.30,-0.30
199.53	-0.07	-0.03	-0.04	0.12	0.30,-0.30
251.19	-0.05	-0.00	-0.05	0.12	0.30,-0.30
316.23	-0.00	0.02	-0.02	0.12	0.30,-0.30
398.11	-0.01	0.03	-0.04	0.12	0.30,-0.30
501.19	0.01	0.03	-0.02	0.12	0.30,-0.30
630.96	0.00	0.03	-0.03	0.12	0.30,-0.30
794.33	0.02	0.02	0.00	0.12	0.30,-0.30
1000.00	0.00	0.00	0.00	0.12	0.30,-0.30
1258.93	-0.06	-0.03	-0.02	0.12	0.30,-0.30
1584.89	-0.08	-0.09	0.01	0.12	0.30,-0.30
1995.26	-0.18	-0.17	-0.01	0.12	0.30,-0.30
2511.89	-0.31	-0.30	-0.01	0.12	0.30,-0.30
3162.28	-0.49	-0.50	0.02	0.12	0.30,-0.30
3981.07	-0.81	-0.82	0.01	0.12	0.30,-0.30
5011.87	-1.27	-1.29	0.02	0.12	0.30,-0.30
6309.57	-1.99	-2.00	0.01	0.12	0.30,-0.30
7943.28	-3.00	-3.01	0.02	0.12	0.30,-0.30
10000.00	-4.42	-4.41	-0.02	0.12	0.32,-0.32
12589.25	-6.27	-6.24	-0.03	0.12	0.32,-0.32
15848.93	-8.48	-8.53	0.05	0.12	0.42,-0.42
19952.62	-11.74	-11.25	-0.49	0.12	0.71,-1.21

Environmental conditions: 22.8 °C, 29.6 %RH (0.3 °C, 3 %RH uncertainty)
Uncertainty is given as expanded uncertainty at ~95 percent confidence level (k = 2).
Test Procedure: 831 Cert OBA (ADP090).xml

This C-Weight frequency response is in compliance with IEC 61672-1:2002 5.4 Class 1, IEC 60651-2001 6.1 and 9.2.2, ANSI S1.4-1983 (R2006) 5.1 and 8.2.1, and IEC 60804-2000 5.1 for Type 1 sound level meters when used with a PCB precision microphone.

Technician: Ron Harris   Test Date: 26 Nov 2013 13:04:22

Test Location: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-182741

Instrument Model PRM831, Serial Number 017139, was calibrated on 26NOV2013. The instrument meets factory specifications per Procedure D0001.8167.

Instrument found to be in calibration as received: YES
Date Calibrated: 26NOV2013
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2239	0099 / 0104	12 Months	25JAN2014	2013-169210
Agilent Technologies	34401A	MY41044529	12 Months	25JAN2014	5954339

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 22 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

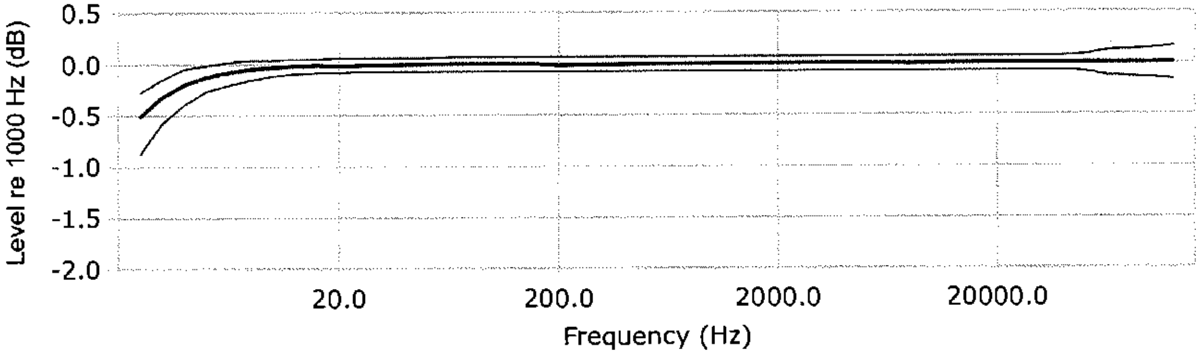
The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.

Signed: Ron Harris
Technician: Ron Harris

Preamplifier Model: PRM831 Serial Number: 017139
Frequency Response Test Report

Frequency response electrically tested at 120.0 dBµV using a 18 pF capacitor to simulate microphone capacitance.



Frequency (Hz)	Relative Level (dB)	Uncertainty (dB)	Limits (dB)	Frequency (Hz)	Relative Level (dB)	Uncertainty (dB)	Limits (dB)
2.5	-0.50	0.08	-0.27,-0.87	631.0	-0.00	0.02	0.07,-0.07
3.2	-0.31	0.06	-0.14,-0.57	794.3	-0.00	0.02	0.07,-0.07
4.0	-0.19	0.06	-0.04,-0.39	1000.0	0.00	0.02	0.07,-0.07
5.0	-0.12	0.04	-0.01,-0.26	1258.9	0.00	0.02	0.07,-0.07
6.3	-0.07	0.04	0.02,-0.20	1584.9	0.00	0.02	0.07,-0.07
7.9	-0.05	0.04	0.04,-0.15	1995.3	0.00	0.02	0.07,-0.07
10.0	-0.03	0.02	0.04,-0.11	2511.9	0.00	0.02	0.07,-0.07
12.6	-0.02	0.02	0.05,-0.09	3162.3	0.00	0.02	0.07,-0.07
15.8	-0.01	0.02	0.05,-0.08	3981.1	0.00	0.02	0.07,-0.07
20.0	-0.02	0.02	0.06,-0.08	5011.9	0.00	0.02	0.07,-0.07
25.1	-0.01	0.02	0.06,-0.07	6309.6	0.00	0.02	0.07,-0.07
31.6	-0.00	0.02	0.06,-0.07	7943.3	-0.00	0.02	0.07,-0.07
39.8	-0.00	0.02	0.06,-0.07	10000.0	0.00	0.02	0.07,-0.07
50.1	0.00	0.02	0.06,-0.07	12589.3	0.00	0.02	0.07,-0.07
63.1	0.00	0.02	0.07,-0.07	15848.9	0.00	0.02	0.07,-0.07
79.4	0.00	0.02	0.07,-0.07	19952.6	0.00	0.02	0.07,-0.07
100.0	0.00	0.02	0.07,-0.07	25118.9	0.00	0.02	0.07,-0.07
125.9	0.00	0.02	0.07,-0.07	31622.8	0.00	0.02	0.07,-0.07
158.5	0.00	0.02	0.07,-0.07	39810.7	0.00	0.02	0.07,-0.07
199.5	-0.01	0.02	0.07,-0.07	50118.7	0.00	0.02	0.08,-0.08
251.2	-0.01	0.02	0.07,-0.07	63095.7	0.00	0.05	0.12,-0.12
316.2	-0.00	0.02	0.07,-0.07	79432.8	0.00	0.05	0.13,-0.13
398.1	-0.00	0.02	0.07,-0.07	100000.0	0.00	0.05	0.14,-0.14
501.2	-0.00	0.02	0.07,-0.07	125892.5	0.00	0.06	0.16,-0.16

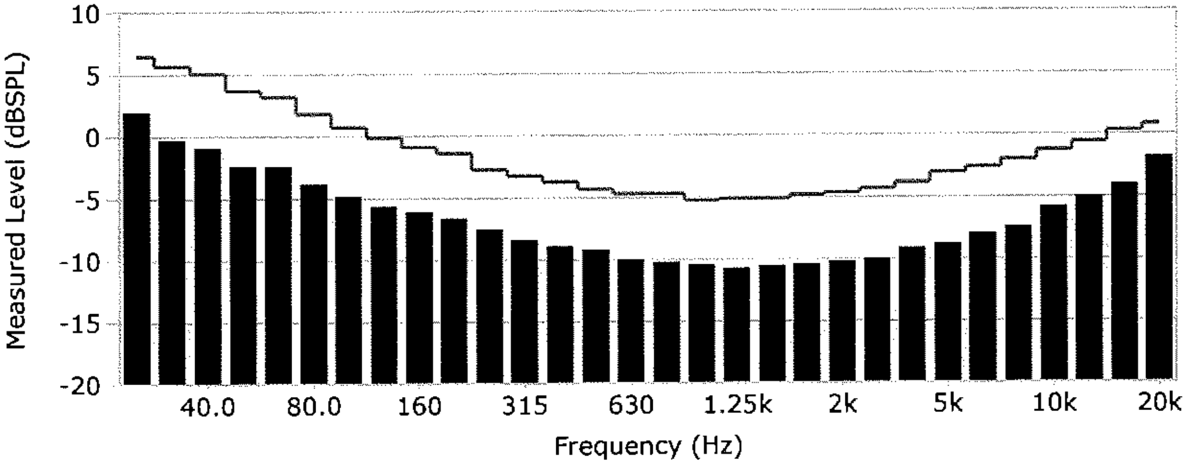
1000 Hz measured level: 119.909 dBµV, -0.091 dB re input (0.035 dB uncertainty; -0.490 dB to 0.010 dB limit)
Environmental conditions: 22.8 °C, 28.7 %RH (0.3 °C, 3 %RH uncertainty)
Uncertainties are given as expanded uncertainty at ~95 percent confidence level (k = 2).
Test Procedure: PRM831.xml
This frequency response is in compliance with manufacturers specification for the item tested.
This report may not be reproduced, except in full, without the written approval of the issuer.

Technician: Ron Harris   Test Date: 26 Nov 2013 12:50:35

Test Location: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

Preamplifier Model: PRM831 Serial Number: 017139
1/3 Octave Noise Floor Test Report

Tested electrically using a 18 pF capacitor to simulate microphone capacitance.



Frequency (Hz)	Measured (dBµV)	Uncertainty (dB)	Limits (dBµV)
25.0	2.0	2.0	6.5
31.5	-0.3	1.9	5.7
40.0	-0.9	1.8	5.1
50.0	-2.4	1.7	3.7
63.0	-2.4	1.6	3.2
80.0	-3.8	1.5	1.8
100.0	-4.8	1.4	0.7
125.0	-5.6	1.3	-0.1
160.0	-6.1	1.2	-0.9
200.0	-6.6	1.1	-1.4
250.0	-7.5	1.0	-2.7
315.0	-8.4	0.9	-3.2
400.0	-8.9	0.8	-3.7
500.0	-9.2	0.7	-4.3
630.0	-10.0	0.6	-4.7
800.0	-10.2	0.6	-4.7
1000.0	-10.4	0.5	-5.2
1250.0	-10.7	0.5	-5.1
1600.0	-10.5	0.5	-5.1
2000.0	-10.4	0.5	-4.8
2500.0	-10.2	0.5	-4.6
3150.0	-10.0	0.5	-4.3
4000.0	-9.1	0.5	-3.8
5000.0	-8.7	0.5	-3.0
6300.0	-7.9	0.5	-2.6
8000.0	-7.4	0.5	-2.0
10000.0	-5.8	0.5	-1.3
12500.0	-5.0	0.5	-0.6
16000.0	-4.0	0.5	0.3
20000.0	-1.8	0.5	0.8

A-weighted Sum: 1.4 µV, 3.1 dBµV (0.5 dB uncertainty; 7.0 dBµV limit)
Environmental conditions: 22.8 °C, 28.8 %RH (0.3 °C, 3 %RH uncertainty)
Uncertainties are given as expanded uncertainty at ~95 percent confidence level (k = 2).
Test Procedure: PRM831.xml
This noise floor is in compliance with manufacturers specification for the item tested.
This report may not be reproduced, except in full, without the written approval of the issuer.

Technician: Ron Harris Test Date: 26 Nov 2013 12:50:35

Test Location: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2013-183008

Microphone Model 377B02, Serial Number 120629, was calibrated on 03DEC2013. The microphone meets factory specifications per Test Procedure D0001.8167.

Instrument found to be in calibration as received: YES
Date Calibrated: 03DEC2013
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2559	2504	12 Months	03JAN2014	19648-1
Larson Davis	CAL250	4239	12 Months	25JUN2014	2013-175826
Larson Davis	2559	3034LF	12 Months	13AUG2014	2013-178081
Larson Davis	PRM915	103	12 Months	23AUG2014	2013-178688
Larson Davis	PRM902	0213	12 Months	23AUG2014	2013-178687
Larson Davis	MTS1000 / 2201	1001 / 0101	12 Months	23AUG2014	SM082313
Larson Davis	PRM916	103	12 Months	23AUG2014	2013-178668
Hewlett Packard	34401A	US36015263	12 Months	29AUG2014	6206963
Larson Davis	PRM902	0529	12 Months	10SEP2014	2013-179249
Larson Davis	PRM902	0528	12 Months	10SEP2014	2013-179248
Larson Davis	2900	0623	12 Months	12NOV2014	2013-182064

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data is the same as shipped data.

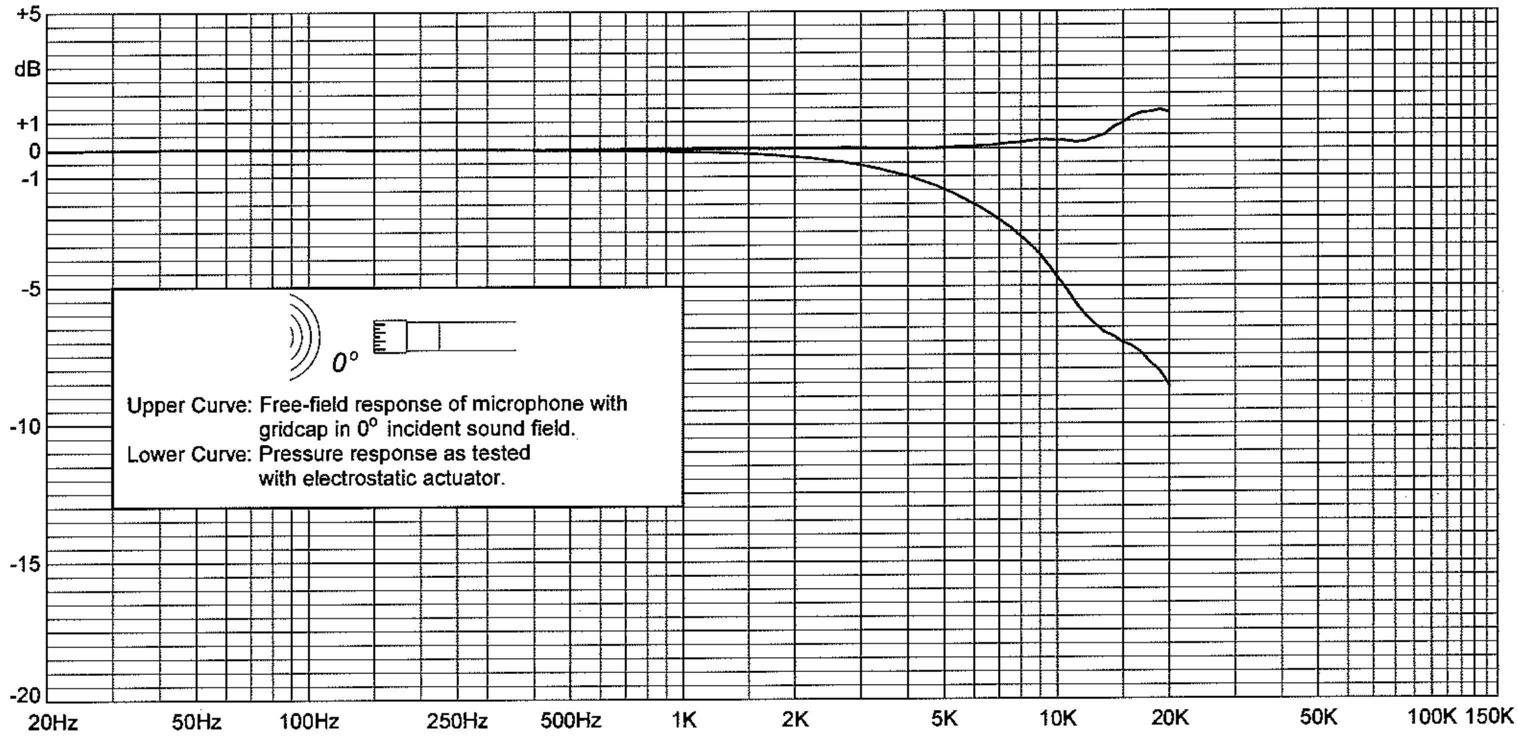
Signed:
Technician: Abraham Ortega

Larson Davis

PCB 1/2" Microphone Calibration Chart
Model: 377B02 Serial Number: 120629

Open Circuit Sensitivity @ 1014.4 mbar & 251.19 Hz
-26.70 dB re 1V/Pascal
46.23 mV/Pascal
+0.68 K_0(-dB re 50 mV/Pascal)
Expanded Uncertainty @ ~95% confidence level
0.2 dB

Capacitance @ 251.2 Hz
12.4 pF
Lower Limiting Frequency
-3 dB @ **1.68** Hz
Test Conditions:
Polarization Voltage **0** V
Ambient Pressure **1014.4** mbar
Temperature **24.4** °C
Relative Humidity **32.6** %



Frequency Response (0 dB @ 251.19 Hz)
Free-field and actuator response with reference to level at 251.19 Hz

Freq (Hz)	Upper (dB)	Lower (dB)	Freq (Hz)	Upper (dB)	Lower (dB)	Freq (Hz)	Upper (dB)	Lower (dB)	Freq (Hz)	Upper (dB)	Lower (dB)	Freq (Hz)	Upper (dB)	Lower (dB)
19.95	-0.03	-0.03	501.19	0.02	-0.02	1883.65	0.03	-0.25	4216.97	0.02	-1.09	9440.61	0.31	-4.21
25.12	-0.01	-0.01	630.96	0.01	-0.03	1995.26	0.03	-0.28	4466.84	0.01	-1.22	10000.00	0.28	-4.67
31.62	0.00	0.00	794.33	0.04	-0.05	2113.49	0.03	-0.31	4731.51	0.03	-1.34	10592.54	0.28	-5.12
39.81	0.02	0.02	1000.00	0.04	-0.08	2238.72	0.03	-0.34	5011.87	0.04	-1.49	11220.19	0.24	-5.62
50.12	0.02	0.02	1059.25	0.05	-0.08	2371.37	0.03	-0.38	5308.84	0.06	-1.64	11885.02	0.27	-6.05
63.10	0.02	0.02	1122.02	0.05	-0.09	2511.89	0.04	-0.42	5623.41	0.07	-1.81	12589.25	0.39	-6.38
79.43	0.02	0.02	1188.50	0.05	-0.10	2660.73	0.04	-0.47	5956.62	0.08	-1.99	13335.21	0.51	-6.68
100.00	0.02	0.02	1258.93	0.04	-0.12	2818.38	0.04	-0.52	6309.57	0.10	-2.19	14125.38	0.77	-6.82
125.89	0.01	0.01	1333.52	0.06	-0.12	2985.38	0.04	-0.58	6683.44	0.12	-2.40	14962.36	0.93	-7.04
158.49	0.00	0.00	1412.54	0.05	-0.14	3162.28	0.03	-0.65	7079.46	0.16	-2.62	15848.93	1.16	-7.19
199.53	0.01	0.01	1496.24	0.04	-0.16	3349.65	0.02	-0.72	7498.94	0.20	-2.87	16788.04	1.29	-7.43
251.19	0.00	0.00	1584.89	0.03	-0.18	3548.13	0.01	-0.81	7943.28	0.22	-3.17	17782.80	1.32	-7.79
316.23	0.01	-0.00	1678.80	0.03	-0.20	3758.37	0.01	-0.89	8413.95	0.27	-3.46	18836.49	1.41	-8.10
398.11	-0.01	-0.01	1778.28	0.03	-0.22	3981.07	0.02	-0.98	8912.51	0.33	-3.78	19952.62	1.31	-8.62

Abraham Ortega 03DEC2013
Larson-Davis Model 9700 ES Microphone Calibration System

QUEST NOISE PRO DLX DOSIMETERS CERTIFICATIONS

Ashtead TECHNOLOGY
INSTRUMENT DIVISION

Certificate Number:
00319
Calibration Date: 9/6/12

Calibration Certificate

Asset No:	R7123
Description:	Quest Noise Pro DLX
Manufacturer:	QUEST
Serial No:	NXE030086
Calibration Date:	9/6/12
Next Calibration:	9/5/13
Accuracy of Unit Under Test:	+/-0.1%
Adjustments made:	114dB
Calibration Technician:	Edgar Hernandez

Details of any limitations to the use of the equipment:

The following measurement equipment used during the calibration procedure is traceable to National Standards.

Equipment / Standard	**Serial Number**	**Reference**
Quest QC 20	QF4060002 EXP.8-29-2013	M7061
QUEST 1100 SLM	DBH110007 EXP.4-11-2013	R10796

List additional equipment / standards on following page.

Record results and attach.

Calibrated by ____________________

Confirm Intranet Updated. Initial:______ Date:_______

Calibration Certificate

Asset No: R7354

Description: NoisePro

Manufacturer: Quest Technologies

Serial No: NXE120109

Calibration Date: June 7, 2013

Next Calibration: Refer to Manufacturers Instructions

Accuracy of Unit Under Test: +/-0.1%

Adjustments made: 114dB

Calibration Technician: Herbert Galvan

Details of any limitations to the use of the equipment:

None

The following measurement equipment used during the calibration procedure is traceable to National Standards.

Equipment / Standard	**Serial Number**	**Reference**
Quest QC-20 calibrator	S/N QF4060002	Exp:8-29-2013

List additional equipment / standards on following page.

Record results and attach.

Calibrated by ______________________________

Confirm Intranet Updated. Initial:______ Date:_______

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 11368
Description Quest NoisePro DLX Dosimeter
Calibrated 5/10/2013

Manufacturer	Quest	**Classification**	
Model Number	NoisePro DLX Dosimeter	**Status**	pass
Serial Number	NXG070056	**Frequency**	Yearly EOM
Location	New Jersey	**Department**	Lab
Temp	76	**Humidity**	36

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	1/10/2013	1/10/2014
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	1/10/2013	1/10/2014
FLUKE 114	Fluke 114 NIST Traceable Multimeter	Fluke	15310288	2/13/2013	2/13/2014

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Alberto Albuquerque

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 8723
Description Quest NoisePro DLX Dosimeter
Calibrated 9/12/2012

Manufacturer Quest
Model Number NoisePro DLX Dosimeter
Serial Number NXF100115
Location New Jersey
Temp 77

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 35

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	12/19/2011	12/19/2012
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	12/20/2011	12/20/2012
FLUKE 114	Fluke 114 NIST Traceable Multimeter	Fluke	15310288	2/3/2012	2/3/2013

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Jeff Frady

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

Page 1 of 1
Certificate Number:
Calibration Date: 7/15/13

PINE ENVIRONMENTAL SERVICES, LLC
Formerly Ashtead Technology

Calibration Certificate

Asset No:	015894
Description:	NoisePro DLX
Manufacturer:	Quest
Serial No:	#NXJ040031
Calibration Date:	7/15/13
Next Calibration:	N/R
Accuracy of Unit Under Test:	PASS
Adjustments made:	none
Calibration Technician:	KL

Details of any limitations to the use of the equipment:

N/A

The following measurement equipment used during the calibration procedure is traceable to National Standards.

Equipment / Standard	Serial Number	Reference
AC-300	AC-300001164	R129884

List additional equipment / standards on following page.

Record results and attach.
114dB - PASS

Calibrated by ______Khalfani Lee___________

Confirm Intranet Updated. Initial:______ Date:_______

Page 1 of 1
Certificate Number: 00745
Calibration Date: 3/13/13

Calibration Certificate

Asset No:	R9800
Description:	Quest Noise Pro DLX
Manufacturer:	QUEST
Serial No:	NXF120114
Calibration Date:	3/13/13
Next Calibration:	3/12/14
Accuracy of Unit Under Test:	+/-0.1%
Adjustments made:	114dB
Calibration Technician:	Edgar Hernandez

Details of any limitations to the use of the equipment:

The following measurement equipment used during the calibration procedure is traceable to National Standards.

Equipment / Standard	**Serial Number**	**Reference**
Quest QC 20	QF4060002 EXP.8-29-2013	M7061
QUEST 1100 SLM	DBH110007 EXP.4-11-2013	R10796

List additional equipment / standards on following page.

Record results and attach.

Calibrated by ______________________________

Confirm Intranet Updated. Initial:______ Date:_______

Ashtead
TECHNOLOGY
INSTRUMENT DIVISION

Certificate Number:
00319
Calibration Date: 9/6/12

Calibration Certificate

Asset No: R7123

Description: Quest Noise Pro DLX

Manufacturer: QUEST

Serial No: NXE030086

Calibration Date: 9/6/12

Next Calibration: 9/5/13

Accuracy of Unit Under Test: +/-0.1%

Adjustments made: 114dB

Calibration Technician: Edgar Hernandez

Details of any limitations to the use of the equipment:

The following measurement equipment used during the calibration procedure is traceable to National Standards.

Equipment / Standard	**Serial Number**	**Reference**
Quest QC 20	QF4060002 EXP.8-29-2013	M7061
QUEST 1100 SLM	DBH110007 EXP.4-11-2013	R10796

List additional equipment / standards on following page.

Record results and attach.

Calibrated by ______________________________

Confirm Intranet Updated. Initial:______ Date:_______

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 8723
Description Quest NoisePro DLX Dosimeter
Calibrated 9/12/2012

Manufacturer	Quest	**Classification**	
Model Number	NoisePro DLX Dosimeter	**Status**	pass
Serial Number	NXF100115	**Frequency**	Yearly EOM
Location	New Jersey	**Department**	Lab
Temp	77	**Humidity**	35

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	12/19/2011	12/19/2012
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	12/20/2011	12/20/2012
FLUKE 114	Fluke 114 NIST Traceable Multimeter	Fluke	15310288	2/3/2012	2/3/2013

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Jeff Frady

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

Calibration Certificate

Asett:	R9800
Description:	NOISEPRO DLX
Manufacturer:	QUEST TECHNOLOGIES
Serial No:	NXF120115
Calibration Date:	3/12/2013
Next Calibration:	3/12/2014
Accuracy of Unit Under Test:	+/- .5 dB
Adjustments made:	NONE
Calibration Technician:	VICTOR VEGA

Details of any limitations to the use of the equipment:

The following measurement equipment used during the calibration procedure is traceable to National Standards.

Equipment / Standard	**Serial Number**	**RESPONSE**
Quest-Cal Calibrator	KZ700007	114.0 Db
Quest QC-20 Calibrator	QF4080001	114.0 dB
Edgetech 2002	M1001	24.5 C
Edgetech 2002	M1001	47.6 % RH

List additional equipment / standards on following page.

Record results and attach.

Calibrated by ______________________________

Confirm Intranet Updated. Initial:______ Date:_______

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 11368
Description Quest NoisePro DLX Dosimeter
Calibrated 5/10/2013

Manufacturer	Quest	**Classification**	
Model Number	NoisePro DLX Dosimeter	**Status**	pass
Serial Number	NXG070056	**Frequency**	Yearly EOM
Location	New Jersey	**Department**	Lab
Temp	76	**Humidity**	36

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	1/10/2013	1/10/2014
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	1/10/2013	1/10/2014
FLUKE 114	Fluke 114 NIST Traceable Multimeter	Fluke	15310288	2/13/2013	2/13/2014

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Alberto Albuquerque

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

Certificate Number:
Calibration Date: 7/15/13

PINE ENVIRONMENTAL SERVICES, LLC
Formerly Ashtead Technology

Calibration Certificate

Asset No:	015894
Description:	NoisePro DLX
Manufacturer:	Quest
Serial No:	#NXJ040031
Calibration Date:	7/15/13
Next Calibration:	N/R
Accuracy of Unit Under Test:	PASS
Adjustments made:	none
Calibration Technician:	KL

Details of any limitations to the use of the equipment:

N/A

The following measurement equipment used during the calibration procedure is traceable to National Standards.

Equipment / Standard	Serial Number	Reference
AC-300	AC-300001164	R129884

List additional equipment / standards on following page.

Record results and attach.
114dB - PASS

Calibrated by ______Khalfani Lee___________

Confirm Intranet Updated. Initial:______ Date:_______

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 16019
Description Quest NoisePro DLX Dosimeter
Calibrated 9/18/2013

Manufacturer	Quest	**Classification**	
Model Number	NoisePro DLX Dosimeter	**Status**	pass
Serial Number	NXJ050036	**Frequency**	Yearly EOM
Location	New Jersey	**Department**	Lab
Temp	75	**Humidity**	30

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	1/10/2013	1/10/2014
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	1/10/2013	1/10/2014
FLUKE 114	Fluke 114 NIST Traceable Multimeter	Fluke	15310288	2/13/2013	2/13/2014

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Jeff Frady

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID R7075
Description Quest NoisePro DLX Dosimeter
Calibrated 8/27/2013

Manufacturer Quest
Model Number NoisePro DLX Dosimeter
Serial Number NXD080063
Location New Jersey
Temp 75

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 33

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	1/10/2013	1/10/2014
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	1/10/2013	1/10/2014
FLUKE 114	Fluke 114 NIST Traceable Multimeter	Fluke	15310288	2/13/2013	2/13/2014

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Jeff Frady

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 16018
Description Quest NoisePro DLX Dosimeter
Calibrated 8/14/2013

Manufacturer	Quest	**Classification**	
Model Number	NoisePro DLX Dosimeter	**Status**	pass
Serial Number	NXJ050035	**Frequency**	Yearly EOM
Location	New Jersey	**Department**	Lab
Temp	76	**Humidity**	32

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	Last Cal Date (As Of Cal Entry Date)	Next Cal Date (As Of Cal Entry Date)
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	1/10/2013	1/10/2014
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	1/10/2013	1/10/2014
FLUKE 114	Fluke 114 NIST Traceable Multimeter	Fluke	15310288	2/13/2013	2/13/2014

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Jeff Frady

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID R6477
Description Quest QC-10 Acoustic Calibrator
Calibrated 9/12/2013

Manufacturer Quest
Model Number QC-10
Serial Number QIF060278
Location New Jersey
Temp 75

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 36

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	1/10/2013	1/10/2014
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	1/10/2013	1/10/2014
FLUKE 114	Fluke 114 NIST Traceable Multimeter	Fluke	15310288	2/13/2013	2/13/2014
SOUNDPRO SP DL-2-1/1	Quest Technologies SoundPro SP DL-2-1/1	Quest Technologies	BHJ050013	8/23/2013	8/23/2014

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Jeff Frady

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 11571
Description Quest NoisePro DLX Dosimeter
Calibrated 2/15/2013

Manufacturer Quest
Model Number NoisePro DLX Dosimeter
Serial Number NXG070063
Location New Jersey
Temp 74

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 26

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	Last Cal Date (As Of Cal Entry Date)	Next Cal Date (As Of Cal Entry Date)
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	1/10/2013	1/10/2014
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	1/10/2013	1/10/2014

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Jeff Frady

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.